Overview

Operation of an electric cylinder is simple. An electric motor – through either a timing belt or gear drive – rotates a ballscrew or acme screw, which translates the thrust tube.

As you can see by the cutaway actuator below, while the concept is simple, much expertise has been invested in the specification, design and selection of each component.

An Electric Cylinder Is Preferred When:

- Positioning an externally guided and supported load, or a very light unsupported load, or
- Moving a load that pivots, or
- There is a high concentration of airborne contaminants (rodless actuators are inherently less protected), or
- Replacing a hydraulic cylinder with a similar size electrically powered replacement.

Other Choices

If you need an integrated linear bearing system packaged with the cylinder, go to the Rodless Actuator section page B-1.

If you need more than 1330 mm/sec [52.5 in/sec] speeds, go to the Linear Motor section page C1.

If you need rotary motion, go to the Step Motors page G1, Servo Motors section page H1, or Gearhead section page I1.

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Overview

EC Series

- Designed for performance
- Highest quality precision rolled ballscrews or acme screw – for quiet, long-life operation
- Thrust up to 25000 N [5620 lb]
- Speed up to 1.3 m/s [52.5 in/sec]
- Metric design (ISO 6431)
- Step Motor, Brushless Servo, 24 or 160 Volt DC Motor

NV Series

- Smallest package
- Time-proven design
- Thrust up to 1800 N [400 lb]
- Speed up to 0.3 m/s [12 in/sec]
- English dimensions
- 24 Volt DC, 160 Volt DC, or Step Motor

Overview

Principle of Operation

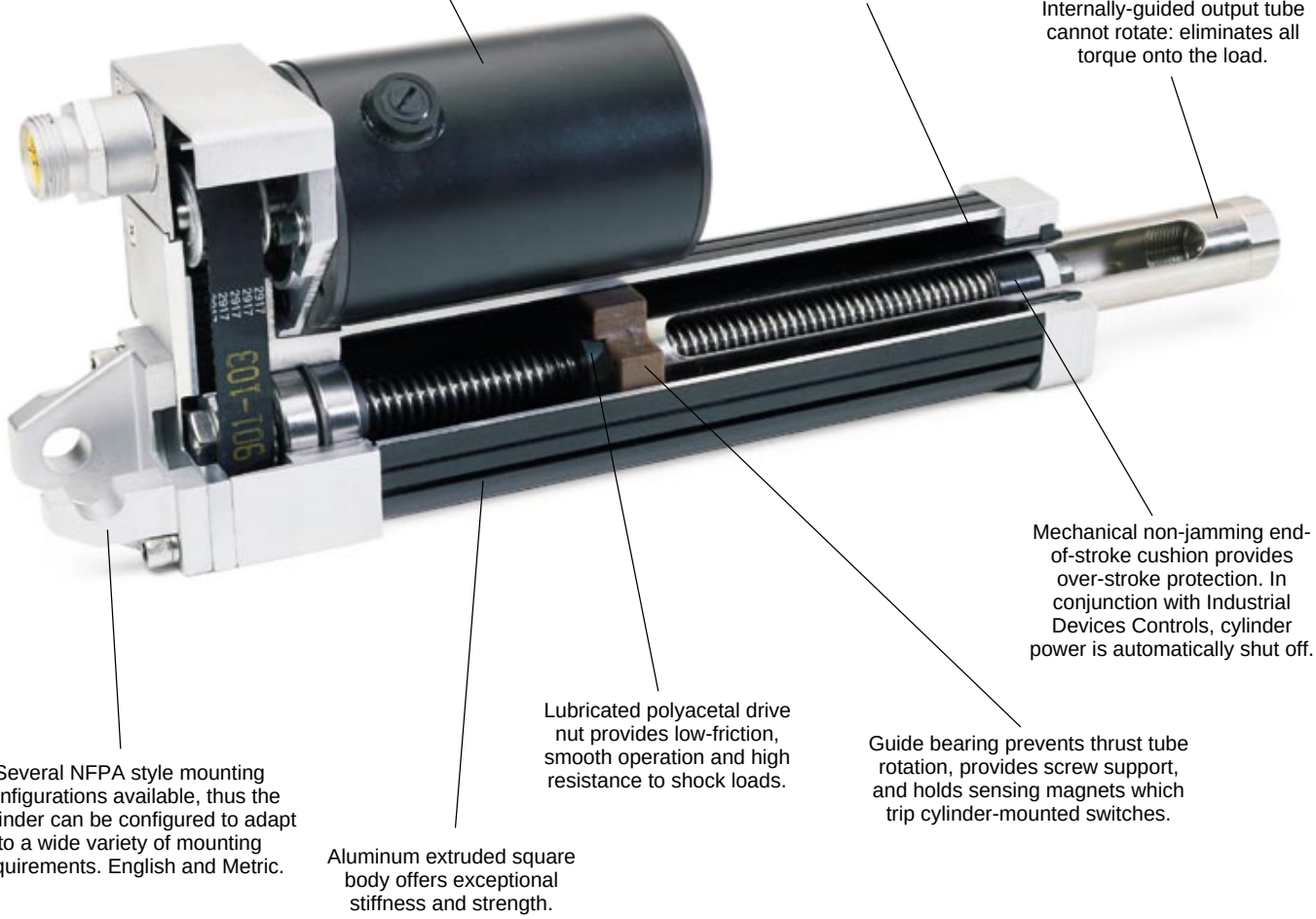
Operation of Industrial Devices electric cylinders is simple. When power is supplied, the motor – through either a timing belt, gear drive or direct coupling – rotates the lead screw, causing the drive nut to translate, extending the thrust tube. Reversing the motor rotation retracts the thrust tube.

While the concept is simple, much expertise has been invested in the specification, design and selection of each component to provide performance, reliability and value.

IDC offers electric cylinder drive mechanisms based on either acme or ballscrews. Ballscrews, which utilize ball nuts riding on recirculating ball bearings, are the most efficient, allowing for higher speeds, loads and cycle rates. They can, however, be back-driven when power is removed. Acme screws are capable of holding the load in position when power is removed, but are less efficient in operation.

Industrial Devices' patented guide system prevents rotation of the drive nut, thus eliminating any torque loading to machine linkage.

NV Series



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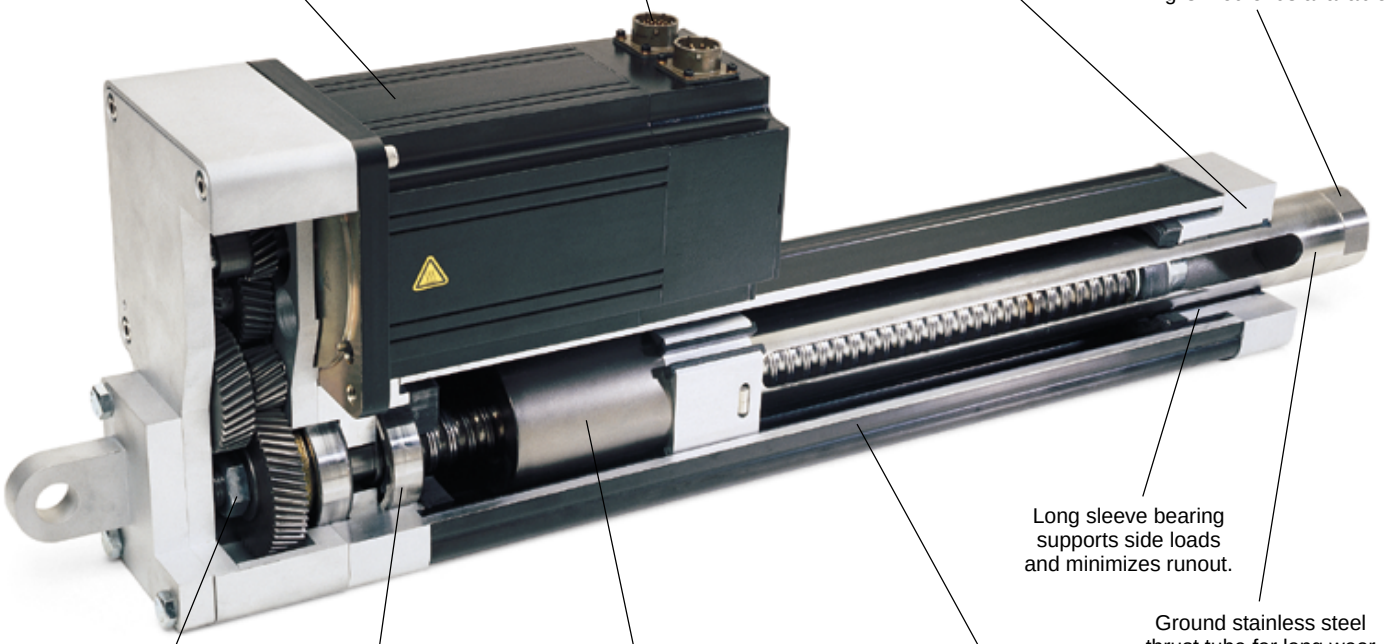
EC Series


Available with permanent magnet DC motor (24V or 160V servo), 1.8° step motor, or brushless servo motor.
Quick connect cabling simplifies installation.
Wiper seal on polished stainless steel output tube keeps contaminants out and lubricants in.
Metric (ISO 6431) and English rod ends available
Long sleeve bearing supports side loads and minimizes runout.
Ground stainless steel thrust tube for long wear and corrosion resistance.
Timing belt and geared drives provide long life with a wide variety of drive ratios.
Angular contact bearings ensure long life with minimal backlash.
Acme or recirculating ball bearing lead screws provide smooth, high thrust drive, acme screws hold load without power.
Housing is hard-coat anodized and teflon impregnated for long life, permanent lubrication, resistance to corrosion, and protection of all internal components.

Cross Section Comparison

Operation of an electric cylinder is pretty basic. An electric motor – through either a timing belt, a gear drive or via in-line direct coupling – rotates a ballscrew or acme screw, which translates the torque into force through the thrust tube.

While the concept is straight forward, as illustrated by the cylinder cutaways on these pages, significant expertise and development has been invested in the specification and design of each component.

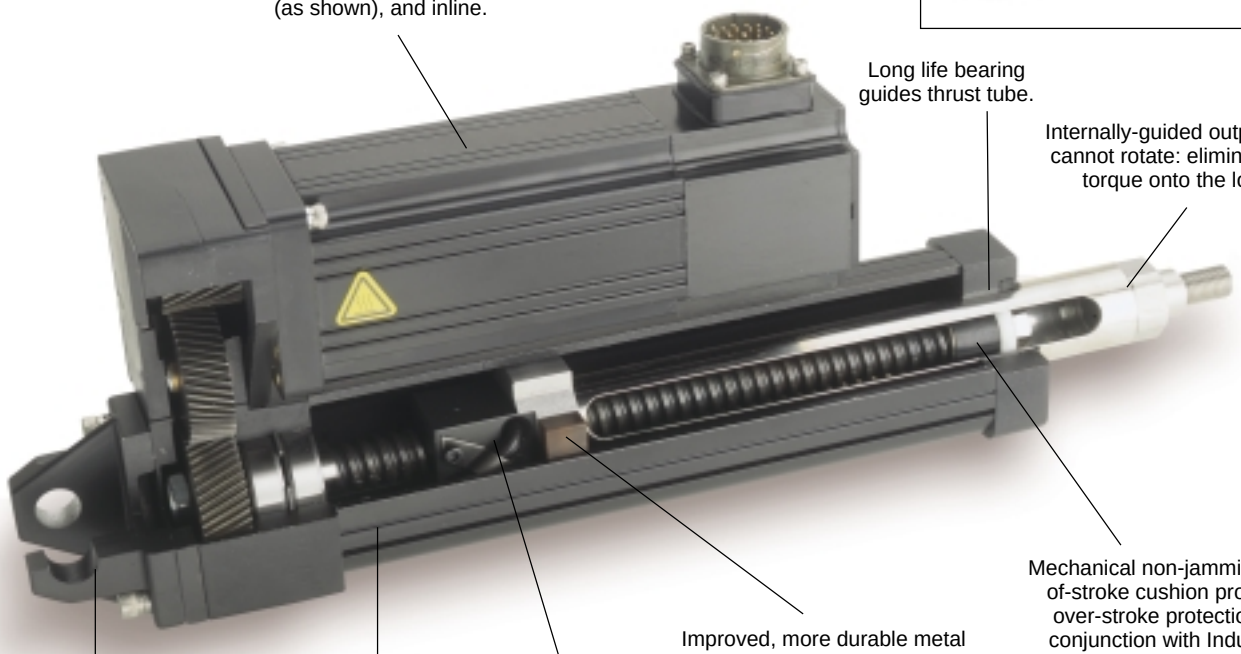
N Series (N2 & NV)

- Smallest Package Size
- Time-Proven Design
- Improved Durability (metal guide flange)
- NV Series Quick Delivery – Lowest Price
- Thrust up to 2670 N [600 lb]
  NV max = 1780 N [400 lb]
- Speed up to .76 m/s [30 in/sec]
  NV max = .3 m/s [12 in/sec]
- English dimensions (to NFPA standards)
- 24 Volt DC, 160 Volt DC, Step Motor, or Servo Motor

NV

See page A-199 for expanded view

N2



Standard motor mounting configurations include parallel (as shown), and inline.

Long life bearing guides thrust tube.

Internally-guided output tube cannot rotate: eliminates all torque onto the load.

Mechanical non-jamming end-of-stroke cushion provides over-stroke protection. In conjunction with Industrial Devices Controls, cylinder power is automatically shut off.

Improved, more durable metal guide bearing prevents thrust tube rotation, provides screw support and holds sensing magnets which trip cylinder mounted switches.

Aluminum extruded square body offers exceptional stiffness and strength.

Lubricated polyacetal drive nut provides low-friction, smooth operation and high resistance to shock loads.

Several NFPA style mounting configurations available, thus the cylinder can be configured to adapt to a wide variety of mounting requirements. English and Metric.

New improved, quick-disconnect limit switches available on EC, N2, and NV Series.

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Cross Section Comparison

IDC offers electric cylinder drive mechanisms designed around either acme or ballscrews. Ballscrews, being the more efficient of the two, utilize ball nuts riding on recirculating ball bearings resulting in higher speeds, loads and cycle rates. However, the more efficient design of ballscrew technology lends it to being back-driven when power is removed if precautions are not taken (e.g., electric brakes or counter loading).

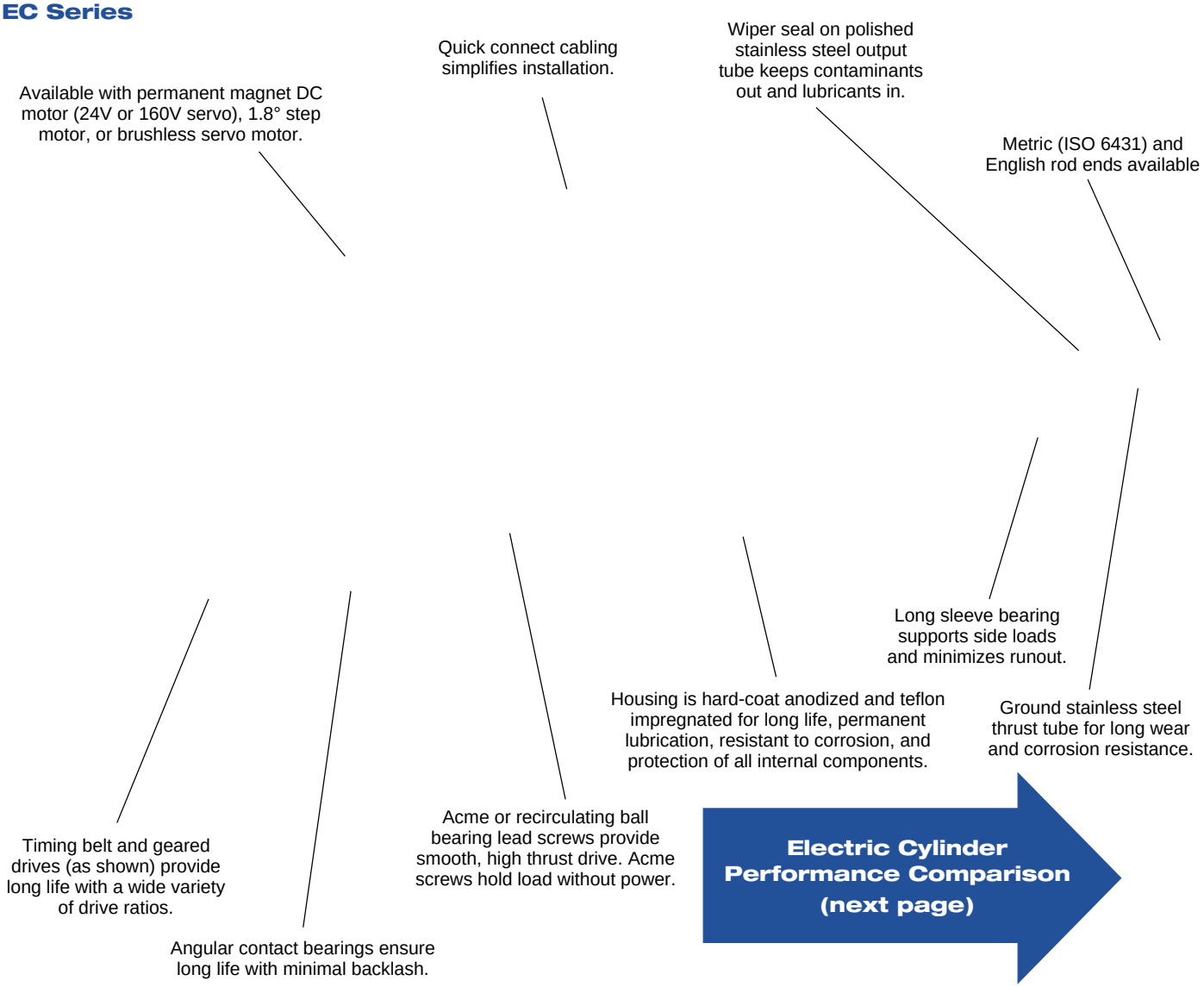
Acme screws are capable of holding the load in position when power is removed, but are less efficient in operation.

Industrial Devices' patented guide system prevents rotation of the drive nut, thus eliminating any torque loading to machine linkage.

EC Series

- Designed for performance
- Highest quality precision rolled ballscrews and acme screws – for quiet, long-life operation
- 24 or 160 VDC motor, Step Motor, or Brushless Servo.
- Sealed for IP54 protection. IP65 option available.
- Thrust up to 25000 N [5620 lb]
- Speed up to 1.3 m/s [52.5 in/sec]
- Metric design (ISO 6431)
- Now available in 4 power ranges – EC2, 3, 4 & 5

EC Series



Electric Cylinder Performance Comparison (next page)

Performance Comparison

Simple Selection

IDC offers five sizes of electric cylinders, each with three types of motor options (DC, step motor & servo motor). To help you select the right electric cylinder system, each individual NV, N2, EC2, EC3, EC4, and EC5 model's complete specifications are given. The motion performance of each motor-cylinder combination is characterized on force-speed curves for our full range of motors and control options. See the pages listed below.

Rapid Delivery

Electric Cylinders generally ship within 7-10 working days when ordered with a standard travel length, motor, mounting or other catalog option . IDC can also provide fast turnaround on custom configurations to satisfy our customers' need to meet tight time-to-market schedules.

Cylinder Cross Section Comparison

The tables and graphs below are designed to help you contrast and compare the performance range of the NV, N2 and EC Series electric cylinders.

When getting high force out of a small package is important, you will find that the EC Series offers Industry leading performance.

Organized by thrust.

		NV	N2	EC2
Thrust	N [lb]	1780 [400]	2670 [600]	3600 [810]
Max. Speed	mm/s [in/s]	305 [12]	760 [30]	1280 [50.4]
Max. Stroke	mm [in]	305 [12]	420 [16.5]	750 [23.6]
Size (cross-section)	mm [in]	50.8 [2]	50.8 [2]	55 [2.17]
Motor Types Available		24 VDC 160 VDC Stepper NEW Brushless Servo	24 VDC 160 VDC Stepper Brushless Servo	24 VDC 160 VDC Stepper Brushless Servo
For details see page		A-201	A-155	A-23

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Performance Comparison

Stroke Length Comparison

Organized by thrust.

		EC3	EC4	EC5
Thrust	N [lb]	7200 [1620]	12000 [2700]	25000 [5620]
Max. Speed	mm/s [in/s]	1280 [50.4]	1330 [52.4]	1330 [52.4]
Max. Stroke	mm [in]	1000 [29.5]	1500 [59.1]	1500 [59.1]
Size (cross-section)	mm [in]	68 [2.68]	92.2 [3.63]	92.2 [3.63]
Motor Types Available		160 VDC Stepper Brushless Servo	160 VDC Stepper Brushless Servo	Stepper Brushless Servo
For details see page		A-63	A-101	A-129

Electric Cylinder vs. Hydraulics, Pneumatics (next page)

Hydraulics and Pneumatics

For many applications, hydraulic or pneumatic linear cylinders are a better choice than their electromechanical alternatives. For example, when extremely heavy loads (>25,000 N [5,620 lb]) must be moved, hydraulic cylinders are usually the best solution. Or, when very light loads must be moved rapidly and repeatedly from one fixed location to another fixed location, pneumatic cylinders may be the most economical solution.

	Industrial Devices Electric Cylinders	Hydraulic Cylinders	Pneumatic Cylinders
Installation	All electric operation requires simple wiring; directly compatible with other electronic controls.	Requires expensive plumbing, filtering, pumps, etc. Must pay close attention to compatibility of components.	Requires expensive plumbing, filtering, pumps, etc.
Precise Positioning	Cost-effective, repeatable (to ±0.013mm [±0.0005in]), rigid multi-stop capabilities.	Requires expensive position sensing and precise electro-hydraulic valving to implement; has tendency to creep.	Most difficult to achieve. Requires expensive position sensing and precise valving to implement; has tendency to creep.
Control	Solid-state microprocessor-based controls allow automatic operation of complex motion sequences.	Requires electronic/fluid interfaces and sometimes exotic valve designs. Hysteresis, dead zone, supply pressure and temperature changes complicate control.	Inherently non-linear, compressible power source severely complicates servo control. Compressibility can be an advantage in open loop operation.
Speed	Smooth, variable speed capabilities from 0.5 to 1330 mm/sec [0.02 to 52.5 in/sec].	Difficult to control accurately. Varies with temperature and wear. Stick slip can be a problem.	More susceptible to stick slip and varying load. Well-suited for high speed applications to 5 m/sec [200 in/sec].
Reliability	Repeatable, reproducible performance throughout useful life of product; little maintenance required.	Very contamination sensitive. Fluid sources require maintenance. Seals are prone to leak. Good reliability with diligent maintenance.	Very contamination sensitive. Air sources require proper filtration. Good reliability, but usually many system components are involved.
Power	Up to 25,000 N [5620 lb], 3kW [4 HP].	Virtually unlimited force. Most powerful.	Up to 5,000 lbs. Typically used below 1 HP.
Cycle Life	Up to millions of cycles at rated load. Easy to predict.	Dependent on design and seal wear; usually good.	Dependent on seal wear, usually good.
Environment	Standard models rated for -20° to 160° F. Inherently clean and energy efficient.	Temperature extremes can be a major problem. Seals are prone to leak. Waste disposal is increasingly problematic.	Temperature extremes can be a major problem. Seals prone to leak. Air-borne oil can be a problem.
Safe Load Holding	Acme screw units are self-locking if power fails. Fail-safe brakes available for ball screw models.	Complex back-up safety devices must be used.	Complex back-up safety devices must be used.
Cost	Moderate initial cost; very low operating cost.	Components often cost less, but installation and maintenance are increased. Hydraulic power unit cost is high if not pre-existing. Most economical above 10 HP.	Components often cost less, but installation and maintenance are increased. Most cost-effective for low power, simple point-to-point applications.

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Hydraulics and Pneumatics

But when simplicity, flexibility, programmability, accuracy and reliability are important and loads are within the capacity of the technology, electromechanical solutions often are the most desirable.

Further, electromechanical systems are inherently more compatible with today's automation controls.

Selecting Electric Cylinder Controls

Stepper, Servo or DC Motor Controls?

IDC offers control solutions from all three technologies, but how do you determine what technology is best for your application? Many times, the technology selection is based on performance requirements, technology preference, or control and interface requirements.

- **Performance Requirements** – In those rare situations where an electric cylinder system (viewing the motor, drive and cylinder as a system) is being pushed to its performance limits, selecting the right motor technology can make a significant difference; DC motors will economically deliver torque and high speeds, however you can't beat a step motor for continuous power vs. package size, and a properly sized servo system can deliver optimum performance for a premium. To learn everything you need to know about the strengths and weaknesses of each technology, refer to "Introduction to Motion Control Technology" in the Engineering section of this catalog (Section K). We also strongly recommend that rigorous attention be given to the guidelines provided in our Product Selection Checklist (A-20) as well as our Product Selection Worksheets (A-17). These two documents will help to ensure application success. Checklists and Worksheets are found in each product section.
- **Technology Preference** – Many system designers have a technology preference that they like to stay with whenever possible. There are many good reasons for this approach. Often a controller has already been selected dictating a type of control signal that will be used (e.g., step & direction pulse train, analog command signal, etc.). Another common reason for selecting one technology over another is that the designer, machine operator or technician might be more familiar and comfortable with a particular technology. Why change something that has been successful in the past? These are just a few of the reasons why IDC maintains a broad range of motor technologies and control options for our customers to choose from.
- **Control and Interface Requirements** – Most of the time, electric cylinders are selected for their unique mechanical design attributes and are often sized with plenty of headroom to extend life and to limit the need for maintenance. As a result, the capability of the controller becomes a more significant influence to technology selection than does performance. Finding a controller that offers the programmability, I/O options, and/or interface features desired can end up dictating the technology selected. When considering IDC controls, there are very few tradeoffs that have to be made when selecting between a servo control system and a step motor control system (See Chart A). IDC delivers many of the same features and options in both technology platforms. We refer to these closely related families of stepper and servo control products as SmartDrive and SmartControl products.

  Aside from all the similarities there is one big difference regarding step motors that makes IDC the industry's front runner in step motor control technology - the NextStep Drive, and SmartStep Indexer/Drive products (Section G). These are the highest performing microstepping drive packages available, narrowing the performance gap between step motor and servo motor systems.

  When considering DC Controls from IDC, you will find some of the most unique, simple, application specific, PLC friendly, and cost effective solutions available today. Designed specifically with electric cylinders and rodless actuators in mind, IDC's D & H Series controls (Section F) utilize limit switches or analog command signals to solve the most common application challenges (See Figure 1). The simplistic way in which these control products solve a variety of commonplace applications has contributed significantly to the growth of the actuator market.

Use the chart below to guide you to the optimum control solution for your application.

When Using IDC Controls with Electric Cylinders or Rodless Actuators...

DC Motor Controls are IDeal solutions when you need:	Servo & Stepper Smart Drive packages are IDeal solutions when you need:
• The same stopping point each cycle	• To change stopping points under program control
• Analog Position Control (0 - 10V, or 0/4 - 20 mA)	• A user interface (i.e., keypad, display)
• Simple push button operation & control	• The flexibility and integrity of Optically Isolated I/O
• One or two speed requirements per direction	• Mathematical functions
• To replace pneumatic cylinders	• Force Control (e.g., clamping, nut running, etc)
• To replace low thrust hydraulic cylinders	• Computer interfacing or control
• Automatic cycling between two locations	• Complex and customized motion profiles
• An end-of-move dwell timer	• High repeatability, resolution and/or accuracy
• To change speed when a sensor is triggered	• Multi-axis Control
• Web or Edge Guide Control	• Multiple program selection or "if - then" conditional logic
• The lowest system cost	• Stepper or brushless servo performance

Selecting Electric Cylinder Controls

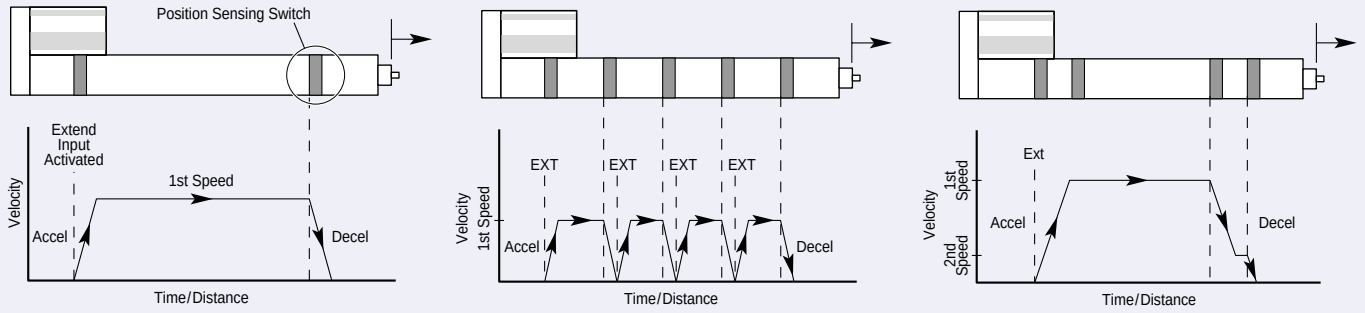
Chart A

	Servo Products (Drive Only)			Step Motor Products (Drive Only)				Stand-Alone Controllers	
Model Number:	B8001	B8961	B8962	*NextStep*	S6961	S6962	*SmartStep*	961	962
Drive & Control Package (SmartDrive)		•	•		•	•	•		
Controller Only (SmartControl)								•	•
Control Input Signal (IDeal = IDeal Prog. Language)	Analog & Step/Dir.	IDeal (Serial)	IDeal (Serial)	Step/Dir.	IDeal (Serial)	IDeal (Serial)	IDeal (Serial)	IDeal (Serial)	IDeal (Serial)
Number of Drive Axes	1	1	2	1	1	2	1	1*	2*
Front Panel Option		•	•		•	•	•	•	•
See Page	H-20	H-36	H-36	G-12	G-32	G-32	G-26	H-44	H-44

* Refers to Step & Direction digital outputs. Unlike SmartDrives, SmartControls do not have internal drives.

Figure 1 Typical Examples of DC Motor Controls

Limit Switch Control

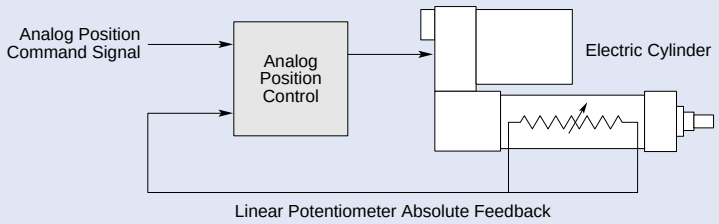


Simple Extend Motion

Multiple Stop Positions

Reducing Speed Before Stopping

Analog Position Control



Advantages to Analog Positioning Controls:

- Follows 0-10 V or 0/4-20 mA signal for position control
- No need for homing on power-up
- Absolute position feedback
- Low-cost analog positioning system solution

Smart Drives & Controls – or – Limit Switch & Analog Controls?

As described previously, it often comes down to a question of your flexibility, complexity or operator interface requirements. The programmability of IDC's Smart products allows machine designers to refine their applications beyond their initial intentions or expectations. Learning to program a Smart product is quick and easy with IDC's Windows® based Application Developer software. The optional Front Panel for Smart products can be used to create or edit programs and, through the use of lockout features, it can also become a remote operator interface. By virtue of your program design, an operator can input data and/or answer questions that influence program flow, or the value of motion parameter through the use of program variables.

On the other hand, many positioning applications are simple in nature, requiring only a few fixed stopping positions, or the flexibility of following a simple analog control signal. In these situations, there is less of a need for programmability and operator influence. Why introduce the added complexity of a programmable motion controller when a simple application specific DC Control product from IDC can adequately solve your needs?

The following two pages provide more detail regarding your control options for IDC Electric Cylinders. When in doubt, don't hesitate to consult an IDC Applications Engineer at (800)747-0064.

IDC's Electric Cylinder Control Options (next page)

IDC's Electric Cylinder Control Options

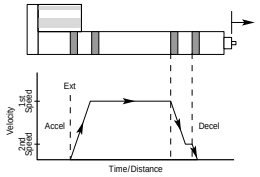
Limit Switch Controls

- Attractive pricing – exceptional value.
- Point-to-point moves.
- No program to write.
- Cylinder mounted sensors set stop and reverse positions.
- Interface to PLCs, operator switch panels, or I/O from industrial PC.
- Common Applications:
  – conveyor diverter gate
  – indexing
  – part rejection
  – manual jog operations

Reference: Section F

Simple Extend/Retract or Multiple Stop

Reducing Speed Before Stopping

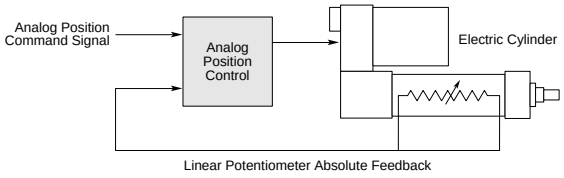


Motor Type	Compatible Cylinders	Control Models	Interface Type
24V Brushed DC	NV-D, N2-D, EC2-D	D220x, D230x, D240x	Discrete TTL or contact inputs. Ideal for PLC interfacing.
160V Brushed DC	NV-H, N2-H, EC2-H, EC3-H	H3301B	
	EC4-H	H4301B	

Analog Position

- Simplest Closed-loop Positioning System.
- No homing required.
- Received an analog voltage or current position signal from:
  - PLC
  - Analog Sensor
  - Industrial PC I/O
  - Potentiometer or Joystick
- Common Applications:
  - Remote positioning (manual or PC/PLC controlled)
  - Valve control (flow/mixing)
- Absolute Positioning

Reference: Section F



Motor Type	Compatible Cylinders	Control Models	Interface Type
24V Brushed DC	NV-D-L, N2-D-L, EC2-D-L	D250x	Analog voltage or current position control.
160V Brushed DC	NV-H-L, N2-H-L, EC2-H-L, EC3-H-L	H3501	
	EC4-H-L	H4501	
Brushless Servo	NV-BN-L, N2-B-L, EC2-B-L, EC3-B-L, EC4-B-L, EC5-B-L	B8501	

Edge Guide Control

- Reads 2 or 4 web edge positioning sensors. Moves as required to maintain constant web position.
- No need for PLC decoding of inputs.
- Auto/Manual (jog) mode
- Common Applications:
  - Reel stand (let-off/re-reel)
  - Steering roller
  - Pivoting roller

Reference: Section F

Motor Type	Compatible Cylinders	Control Models	Interface Type
160V Brushed DC	NV-H, N2-H, EC2-H, EC3-H	H3321B	Web edge position control of using an array of 2 or 4 discrete (on/off) sensors.
	EC4-H	H4321	

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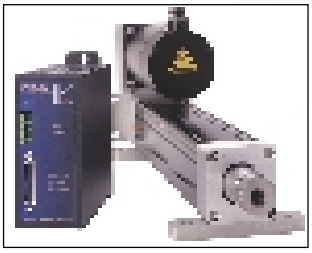
IDC's Electric Cylinder Control Options

SmartDrives and SmartControls

Fully Integrated Stepper and Servo Motion Control Products

- Easy to use IDeal Programming Language
- Fully supported by IDC's Windows®-based Application Developer Software
- Short implementation time
- Control only versions available (961 & 962)
- Optional Dual Purpose Interface
  - Remote Programmer/Editor
  - Operator Interface with Lockout protect
- Built in power supplies
- Dedicated EOT and Home inputs
- Programmable I/O
- Compatible with OPTO-22 and Grayhill Signal Conditioner Modules

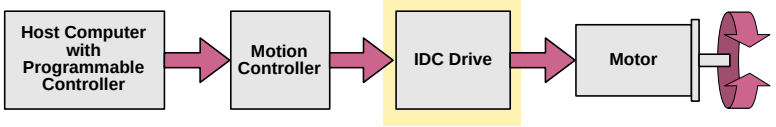


Reference: Section G (Step Motor Systems) and Section H (Servo Motor Systems)

Motor Type	Compatible Cylinders	Control Models	Interface Type
Step Motor	NV-P, N2-P, EC2-S/P	SmartStep23 S6961 S6962 (2-axis)	SmartDrives and Controls are programmed over a standard PC serial port (RS-232C), or by using the optional, detachable front panel interface. Up to 99 SmartDrives can be daisy chained together for communication convenience.
	EC3-S, EC4-P, EC5-S	SmartStep23 SmartStep S6961 S6962 (2-axis)	
Brushless Servo	NV-BN, N2-B, EC2-B, EC3-B, EC4-B, EC5-B	B8961 B8962 (2-axis)	

Drive

- Fully compatible with industry standard motion controllers.
- 120 or 240 VAC operation.
- Provides more usable torque than other drives.
- Largest selection of motors available.



Custom and Modified Products (next page)

Motor Type	Compatible Cylinders	Control Models	Interface Type
Step Motor	NV-P, N2-P, EC2-S/P EC3-S/P, EC4-P, EC5-S	NextStep S6002 (2-axis)	Step/Direction or CW/CCW index pulse.
Brushless Servo	NV-BN, N2-B, EC2-B EC3-B, EC4-B, EC5-B	B8001	Step/Direction or ±10 VDC velocity or torque signal.

Custom Products

If you don't see exactly what you need in this catalog, call us

Industrial Devices will modify standard catalog products to fit your unique needs. In fact, many of our now popular features and options began as special customer requests. Our willingness and ability to "Customer-ize" our products is one of many factors that differentiates IDC from our competition.

Knowledge is power! Industrial Devices is capable of developing fully custom mechanical and electronic designs, when the application demands it and the business opportunity supports it.

Detail your application design, performance and cost requirements in the Application Data Form provided and fax it to the factory or your local IDC Distributor. We will review your specifications and contact you with a recommendation.

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Product Selection Worksheet (page 1 of 3)

For selection assistance, fax to your local IDC Distributor or directly to IDC

Prepared By	**Prepared For**
Name _____	Name _____
Company _____	Company _____
Phone _____	Phone _____
Fax _____	Fax _____
Email _____	E-mail _____
Address _____	Address _____

User's primary business _____

_____

Type of machine IDC product to be used on _____

_____

Current IDC user? Yes ☐ No ☐

Project Time Frame	**Volume Requirements**
Proposal ___/___/___	Next 12 months: _____
Build prototype ___/___/___	Year 2: _____
In production ___/___/___	Year 3: _____

Action Required

☐ Demo ☐ Price quotation

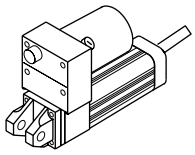
☐ Recommend product ☐ Call me to discuss

Please include drawings, comments or additional information on separate pages.

Electric Cylinder Selection Data (page 2 of 3)

Worksheet

Electric Cylinder



Loads

Payload

Weight _____ lbs

☐ Payload Externally Supported, by _____ (rails, etc.)

Hold Position: ☐ After Move ☐ Power Off

Orientation

☐ Vertical

☐ Horizontal

☐ Inclined _____° (angle from horizontal plane)

Motion

Travel

Stroke Length Required _____ in
(= usable travel distance + min. 2 inches for limit switches)

Shortest Move _____ in

Max. Avaliable Stroke Length
Electric Cylinders:
NV – 12 in EC3 – 750 mm
EC2 – 600 mm EC5 – 1500 mm

Speed (WCM=Worst-Case Move)

WCM Distance _____ in

Time for WCM _____ sec

or

Max. Speed _____ in/sec

Min. Speed _____ in/sec

Complete Move Profile Chart (see p. A24)

Precision

Repeatability _____ in

Accuracy _____ in

Max. Backlash _____ in

Resolution _____ in

Straightness/Flatness _____ in

Thrust Calculation (See Engineering Section in IDC catalog for assistance)

Thrust

Thrust = $Force_{ACCELERATED\ MASS}$ + $Force_{FRICTION}$ + $Force_{GRAVITY}$ + $Force_{EXTERNAL}$

_____ lbs = _____ lbs + _____ lbs + _____ lbs + _____ lbs

Duty Cycle/Life

Duty Cycle

Total Cycle Time _____ sec. Extend/Retract Cycles per day ____

Sum of Move Times _____ sec. Move Distance per cycle _____

Complete Move Profile Chart (see page A-19)

Required Life

Units: ☐ Inches ☐ Meters ☐ Cycles ☐ Months ☐ Years

Minimum Life _____

Maintenance/Lube Interval ____

Environment

Operating Temperature

☐ Normal 32-140°F [0-60°C]

☐ High Temp._____ °F / °C

☐ Low Temp._____ °F / °C

Contaminants (Check all that apply)

Solid: _____

☐ non-abrasive ☐ coarse chips

☐ abrasive ☐ fine dust

Liquid: _____

☐ Dripping ☐ Non-corrosive

☐ Mist / Spray ☐ Corrosive

☐ Splashing

☐ High Pressure

Conditions

☐ Washdown ☐ Outdoor ☐ Vacuum ☐ Cleanroom

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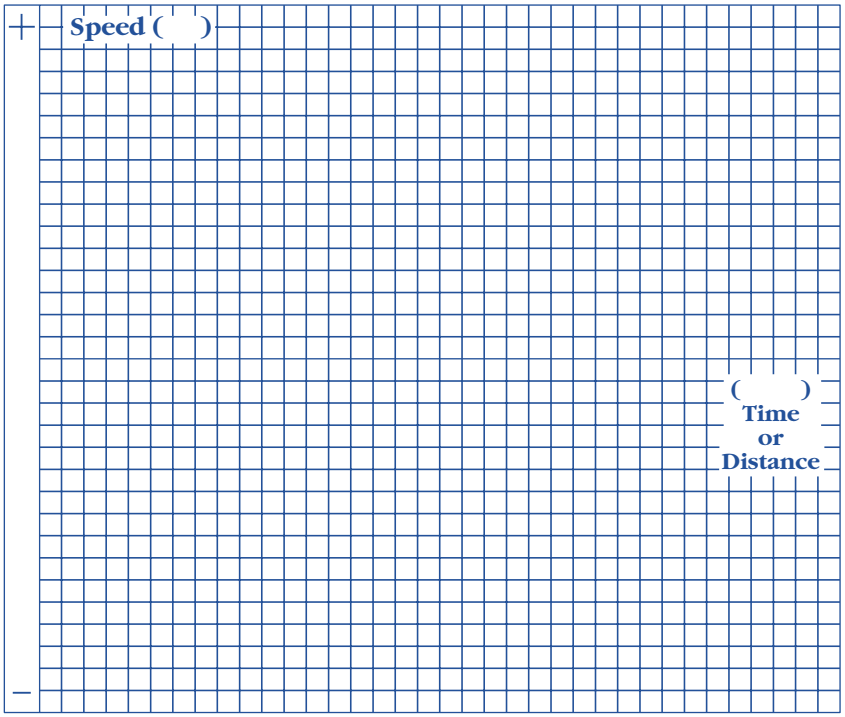
Motion Control Data (page 3 of 3)

Worksheet

Motion Profile

Graph your most demanding cycle, include 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.



Control Method

☐ Programmable

☐ Manual Jog

☐ Limit Switches

External Control Signal

☐ Digital (Step & Direction) ☐ Analog Velocity

☐ Analog Torque ☐ Analog Position

Description of Application

Motor Type Preferred

☐ Servo ☐ Stepper

☐ Other _____

Axes of Motion

☐ Single ☐ Multiple # _____

☐ Synchronized

Interface

Host

☐ PLC ☐ Computer

☐ Analog I/O ☐ RS232

☐ Digital I/O Control

☐ Other _____

Operator

☐ Keypad/LCD Display

☐ Pushbuttons

☐ Potentiometer/Joystick

☐ Thumbwheels

Supply Voltage

☐ 110 AC ☐ 220 AC

☐ Other _____

Feedback Required

☐ Encoder ☐ Linear Potentiometer

☐ Other _____

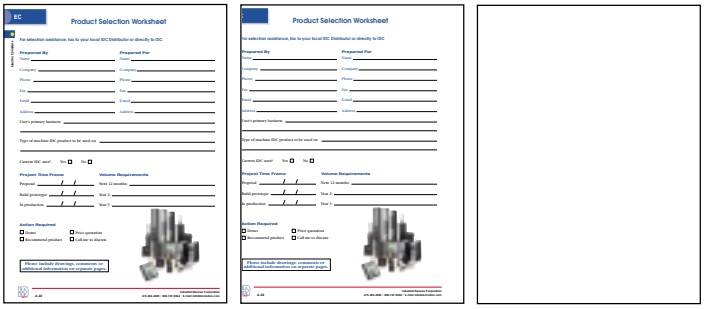
Input Functions

Output Functions

Electric Cylinder Selection Checklist

Product Selection Checklist

The following details the recommnended step-by-step process of selecting an electric cylinder model which best matches your application requirements.



☐ 1) **Complete Product Selection Worksheet (see pages A-17 to A-19)**

Effort and accuracy invested here can be directly proportional to the success of your applications. We encourage you to invest heavily in this critical and early phase of your applications development.

☐ 2) **Maximum Thrust Required**

Determine thrust requirement for your application, then adjust with safety factor for selected motor technology. *(See Engineering Section)*

Formula: Max Thrust = $F_{applied} + F_{gravity} + F_{accel} + F_{friction}$

Sample Calculation:

50 + 30 + 1 + 5 = 86 lbs thrust (required by application)

Adjust the required thrust to ensure appropriate safety margin. Multiply by the appropriate safety factor, from the table shown:

Thrust Safety Factors

Motor Type	Safety Factor
Brushed DC Servo Motor	1.20 (20%)
Step Motors	1.30 (30%)
Brushless Servo Motors	1.20 (20%)

Sample Calculation:

86 x 1.20 = 103.2 lbs thrust (required for selection of brushless servo)

☐ 3) **Duty Cycle**

Determine the operating Duty Cycle, over a maximum ten-minute time interval. The thrust available from a given actuator is higher when thrust duration is less than continuous. *(See Engineering Section)*

Formula: Duty Cycle = ON time ÷ TOTAL time

Sample Calculation:

REPEATED MOTION: 30 seconds ON, 15 seconds DWELL, then repeat.
DUTY CYCLE = **30 seconds ON ÷ 45 seconds TOTAL CYCLE TIME = 66% Duty Cycle**

☐ 4) **Peak Speed Requirement** *(see Engineering Section)*

Calculate the peak speed required to complete the desired motion profile.
Formula: Trapezoidal Move Profile (peak speed = 1.5 times average speed)

SampleCalculation:

Desired Motion: Move 10 inches in 2.0 seconds.
Peak Speed Requirement: **10 inches ÷ 2.0 seconds x 1.5 = 7.5 inches per second**

☐ 5) **Select Cylinder Family and Motor/Drive Technology**

Use the charts and information on pages A-2, A-3, A-8, and A-9 to ball park a cylinder that comes closest to your performance requirements. Review the introductory section of the specific cylinder family (e.g., EC2, EC3, NV, etc.). You will find that each family of cylinders is subdivided by motor technology (e.g., EC2-D & EC2-H (DC Motors), EC2-S (Step Motor), and EC2-B (Servo)). Refer to the chart at the bottom of the next page A-21. For tips on motor/drive technology selection, refer to pages A-12 and A-13.

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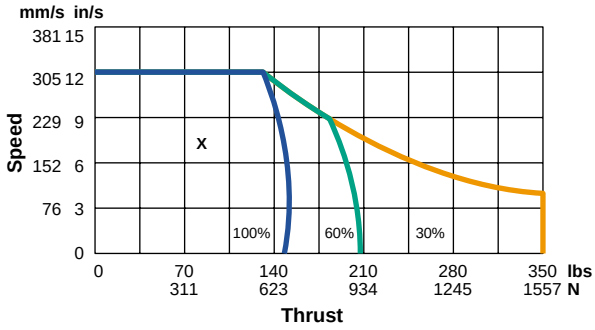
Product Selection Checklist

☐ **6) Select Speed-Thrust Curve**

Search through the performance curves to select an actuator which can provide both the speed and thrust calculated above. You might want to narrow your search using one of the following criteria:

Control Features • Price Range • Motor Technology



☐ **7) Stroke Lengh**

Select the stroke length required for your application. Add extra travel at each end for placement of end-of-travel position sensors. The following formula can be used as a guideline for determining the appropriate added distance.

a) Operating Stroke Distance

Start with the required operating stroke distance. If you need to move 18 inches back and forth in a repeated cycle, then this distance is 18 inches.

b) Increase Stroke Length for End-of-travel Position Sensors

Include a short 'over-travel distance' to prevent hard-stopping when an end-of-travel sensor is triggered.

Use this formula to calculate how much additional stroke is required in your application:

1. Stopping Distance: $X = m\ v^2 \div (2F)$

Where: X = deceleration distance *(inches)*
m = mass of payload *(lbf/386)*
v = velocity before deceleration *(inches per second)*
F = force available to decelerate, from performance curve *(lbf)*

2. Add twice the X value to your required motion distance.

High Speed Example: You require 18" actual travel. Payload = 100 lb. Max Speed = 30 in/sec. The actuator model you have selected shows 80 lb peak thrust capacity. The equation above predicts stopping distance (X) is 1.46 inches. This safety area is needed at each end-of-travel, ~3 inches (two times 1.46 inches) is added to 18", so you need to order an actuator with a stroke of 21" or greater.

NOTE: When utilizing a pivot mounting option (MP2 or MT4) in conjunction with a pivot rod end (FS2 or FC2) it is recommended that the cylinder be extended to only 90-95% of its fully extended length. This increases the system's rigidity and extends the life of the guide bearings and rod seal.

☐ **8) Critcal Speed, Column Loading Limits**

Verify that the speed and thrust performance are not limited by the stroke length of your actuator. Compare the *Critical Speed* and *Column Loading* limits shown on the chart at the bottom page where you found your performance curve. Many shorter stroke actuators are not limited, which makes the entire performance curve available. See the Engineering Section for more information.

☐ **9) Proceed to How To Order Section**

The motor, transmission ratio, and stroke have now been selected. Next, continue with the selection of mounting and other required options as directed in the ***How To Order*** section for your selected motor type (see chart below). Consider the added benefits of ordering an IDeal System from IDC (see page A-22).

	Continue to Page:					
Motor Type	**NV**	**N2**	**EC2**	**EC3**	**EC4**	**EC5**
D: 24 VDC Motors	A-204	A-160	A-28	—	—	—
H: 160 VDC Motors	A-208	A-166	A-32	A-68	A-106	—
S/P: Step Motors	A-212	A-172	A38	A-74	A-110	A-134
B: Brushless Servo Motors	A-216	A-182	A-46	A-80	A-114	A-138

Overview

The EC2 series is a low cost linear motion package for light to moderate thrust loads ranging up to 3600 N [810 lb] and travel up to 750 mm [29.5 in]. Precision rolled ballscrews are standard, yielding quiet operation, low backlash and high accuracy. (See the following pages for detailed specifications).

EC2 Series electric cylinders are available with brushless servo, step motors, or DC servo for compatibility with every motion control environment.

Both ballscrew and acme screw models provide a variety of speed and thrust capabilities. Ballscrew models are used in applications that require higher speed and duty cycles. Acme screw models generally perform best in low duty cycle applications, and where load holding is required without a brake or in the case of electrical power loss. The life expectancy of a ballscrew is generally better than an acme screw. Standard ballscrews are 5 mm and 16 mm lead, and acme screws are available in 4 mm lead.

EC2 timing belt or gear reductions between the motor and leadscrew allow selection of the best match between motor power and your linear speed and thrust range.

Metric Series Advantages

- meets the needs of customers who manufacture for the international marketplace
- both English and Metric versions of threaded mounting options are standard

Options

Options include rotary encoders or linear potentiometers for position feedback, load-holding brakes, protective boots, and quick-disconnect cables. Industrial Devices will also discuss unique modifications at your request.

	EC2-D Series	EC2-H Series	EC2-S/P Series	EC2-B Series
Motor Type	24 volt DC Servo	160 volt DC Servo	1.8° Hybrid Stepper	Brushless Servo
Max Thrust Load Capacity	3230 N [740 lbs]	3600 N [810 lbs]	3600 N [810 lbs]	3600 N [810 lbs]
Max No Load Speed	840 mm/sec [33 in/sec]	930 mm/sec [36.5 in/sec]	800 mm/sec [31.5 in/sec]	1280 mm/sec [50.5 in/sec]
Repeatability	0.13mm [±0.005in]	0.013mm [±0.0005in]	0.013mm [±0.0005in]	0.013mm [±0.0005in]
Compatible Controls Offered	D2200 D2300 D2400 D2500B	H3301B H3321B H3501	NextStep SmartStep S6002 S6961 S6962	B8001 B8961 B8962
Performance Curves	Page A-27	Page A-32	Page A-38	Page A-46

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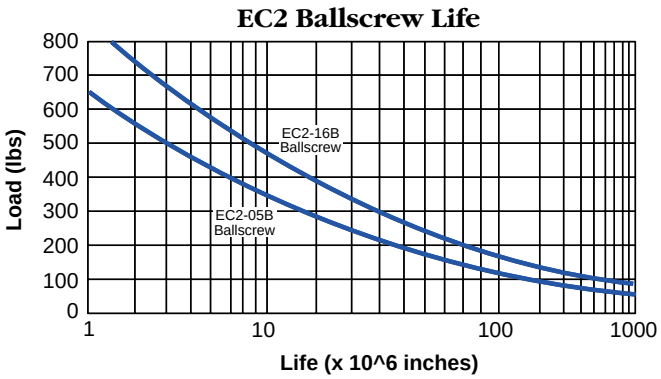
General Specifications

Travel Lengths	50, 100, 150, 200, 250, 300, 450, 600, 750 mm. Custom strokes available in increments of 1 mm.
Construction Materials	
Bearing & Drive Housing	6063-T6 aluminum, anodized
Cylinder Body	6063-T6 aluminum, hard anodized with PTFE impregnation
Mounting Plates	6061-T6 aluminum and cast aluminum plate, anodized
Thrust Tube	300 Series Stainless Steel, 1/8 hard, ground
Speed Reducer Options	
Belt/Pulley	AT-5, polyurethane with steel tensile cords
Gears	Alloy steel, case hardened
Transport Screw Options	
Ballscrew/Ballnut	Lead: 16 mm [0.630 in], or 5 mm [0.197 in] Heat treated carbon steel alloy
Acme Screw/Nut	Lead: 4 mm [0.157 in] Bronze; carbon steel alloy acme screw
Thrust Bearings	Angular contact, high thrust ball bearings
Weight (Approximate, without options)	
EC2-D	kg = 4.28 + 0.006 × [mm stroke]; lb = 9.4 + 0.33 × [inches stroke]
EC2-H	kg = 6.82 + 0.006 × [mm stroke]; lb = 15.0 + 0.33 × [inches stroke]
EC2-P22	kg = 4.04 + 0.006 × [mm stroke]; lb = 8.9 + 0.33 × [inches stroke]
EC2-S32	kg = 5.94 + 0.006 × [mm stroke]; lb = 13.1 + 0.33 × [inches stroke]
EC2-B23	kg = 4.63 + 0.006 × [mm stroke]; lb = 10.2 + 0.33 × [inches stroke]
Motor	
Specifications/Dimensions	See pages A-58 to A-61.
Environmental Operation	
Temperature	-30° to 70°C [-22° to 158°F] When operating below 2°C [35°F], vent tubing fitting must be installed. Consult the factory for more information.
Moisture/Contaminants	**IP 54 rated:** Polyurethane thrust tube wiper seal. Mating surfaces gasket sealed. Protected against dust and splashing water (non-corrosive, non-abrasive). Limited ingress permitted. **Vent Tube Fitting:** A vent tube fitting is included, which can be installed to permit the actuator to breathe from a non-contaminated area, or receive a positive pressure continuous purge (14-20kPa [2-3 psi]). **PB Protective Boot (IP65) Option:** An optional thrust tube boot prevents moisture and dry contaminants from bypassing the thrust tube wiper seal, providing IP65 protection when used with included vent tube fitting. The boot also prevents contaminant buildup on the thrust tube. **Clean Room & Vacuum Applications:** IDC has designed special actuators for clean room and vacuum applications. Please consult the factory if your application requires special environmental compatibility.
Maintenance	The EC2 Series actuator design eliminates the need for most routine maintenance. Re-lubrication is required in high cycle applications. Acme screw models include a lube port and adapter for a standard grease gun. See the EC Series Operator's Manual for replacement parts.

General Specifications

Ballscrew

Ballscrew life is rated in inches of travel at a given load. The values in the chart to the right indicate the travel life where 90% of all units in a sample will continue to work, while 10% have failed. This is similar to the B10 rating of a ball bearing mechanism. Be sure to consider acceleration loads as well as thrust, gravity and friction loads.



Acme Screw

Usable life for an acme screw is defined as the length of travel completed before backlash (of leadscrew/nut) exceeds 0.020" [0.5 mm].

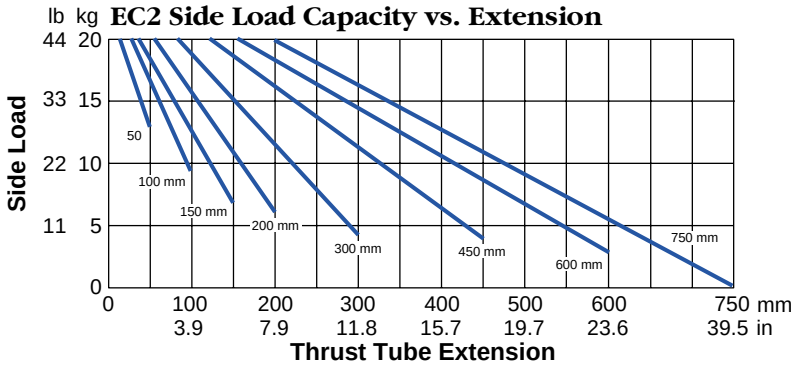
A travel life of 25km [1 million inches] under the maximum rated load can be used as a general approximation. However, since life is directly dependent on application conditions (load, duty cycle, move profiles, and environment), it is difficult to predict a statistical travel life.

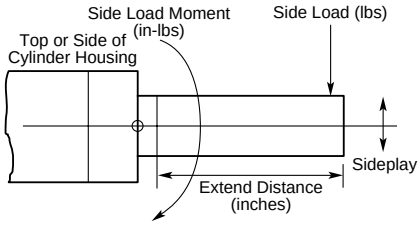
Thrust Tube Capacity

Thrust Tube Torque Capacity

Thrust tube does not rotate during operation. Maximum allowable torque during operation and installation is 5.0 N-m [45 lb-in]

Thrust Tube Side Load Capacity





EC2 Series Actuator Inertia

Equations

Rotary Inertia (reflected to motor) = A + B* (stroke, in) + C* (load, lb)

Model	Ratio	Screw	A (lb-in-s²)	B (lb-in-s²/in)	C (lb-in-s²/lb)
EC2-...-10-16B	1:1	16 x 16	3.184 E-04	1.072 E-05	2.604 E-05
EC2-...-15-16B	1.5:1		1.541 E-04	4.958 E-06	1.204 E-05
EC2-...-20-16B	2:1		1.005 E-04	2.680 E-06	6.510 E-06
EC2-...-50-16B	5:1		5.368 E-05	4.252 E-07	1.033 E-06
EC2-...-100-16B	10:1		4.595 E-05	1.071 E-07	2.601 E-07
EC2-...-10-05B	1:1	16 x 5	2.895 E-04	8.296 E-06	2.543 E-06
EC2-...-15-05B	1.5:1		1.408 E-04	3.836 E-06	1.176 E-06
EC2-...-20-05B	2:1		9.332 E-05	2.074 E-06	6.357 E-07
EC2-...-50-05B	5:1		5.254 E-05	3.290 E-07	1.008 E-07
EC2-...-100-05B	10:1		4.566 E-05	8.287 E-08	2.540 E-08
EC2-...-10-04A	1:1	16 x 4 ACME	2.894 E-04	8.202 E-06	1.627 E-06
EC2-...-15-04A	1.5:1		1.407 E-04	3.792 E-06	7.525 E-07
EC2-...-20-04A	2:1		9.328 E-05	2.050 E-06	4.069 E-07
EC2-...-50-04A	5:1		5.253 E-05	3.252 E-07	6.454 E-08
EC2-...-100-04A	10:1		4.566 E-05	8.1928 E-08	1.6257 E-08

Motor	Inertia (lb-in-s²)
D	1.125 E-03
H	3.063 E-03
P22	3.813 E-04
S32	1.063 E-03
B23	1.188 E-04

Metric Conversions:

1 mm = 0.03937 in

1 kg = 2.205 lb

1 lb-in-s² = 1129 kg-cm² = 1.152 kg-cm-s²

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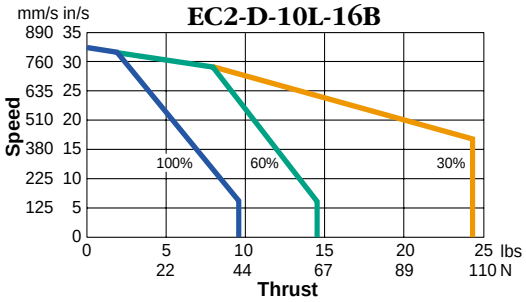
16 mm Lead Ballscrew Models

—100% Duty Cycle —60% Duty Cycle —30% Duty Cycle

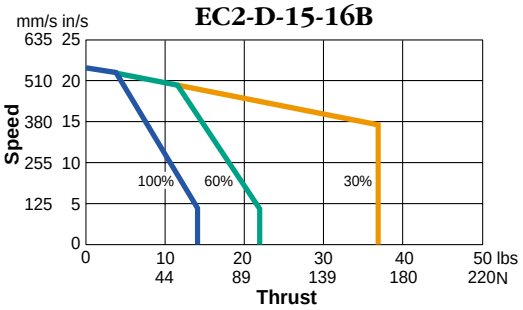
EC2-D-10-16B
EC2-D-10L-16B



EC2-D-10-16B: 1:1 Timing Belt, 16 mm/rev Ballscrew
EC2-D-10L-16B: 1:1 Inline Coupling, 16 mm/rev Ballscrew

Max. No-Load Accel.	176 in/sec²	[4.46 m/s²]
Repeatability	±0.25 mm	[±0.010 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

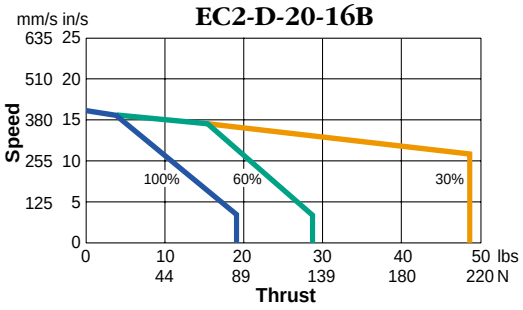
EC2-D-15-16B



EC2-D-15-16B: 1.5:1 Timing Belt, 16 mm/rev Ballscrew

Max. No-Load Accel.	3.49 m/s²	[137 in/s²]
Repeatability	±0.25 mm	[±0.010 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

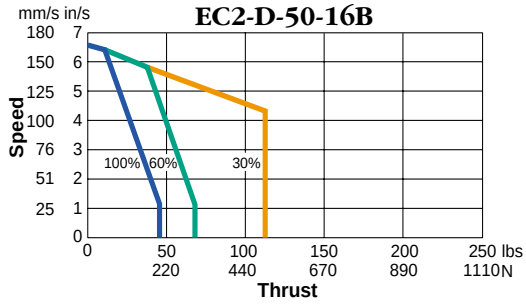
EC2-D-20-16B



EC2-D-20-16B: 2.0:1 Timing Belt, 16 mm/rev Ballscrew

Max. No-Load Accel.	2.7 m/s²	[110 in/s²]
Repeatability	±0.25 mm	[±0.010 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

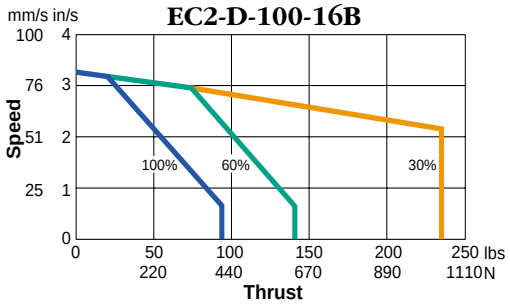
EC2-D-50-16B



EC2-D-50-16B: 5:1 Gears, 16 mm/rev Ballscrew

Max. No-Load Accel.	1.18 m/s²	[47 in/s²]
Repeatability	±0.25 mm	[±0.010 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC2-D-100-16B



EC2-D-100-16B: 10:1 Gears, 16 mm/rev Ballscrew

Max. No-Load Accel.	0.60 m/s²	[24 in/s²]
Repeatability	±0.25 mm	[±0.010 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using D2200, D2300 and D2400 Series Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.
- **For D2500B control, derate thrust by 50%.**
- Repeatability achievable with D2300 control. Reduce cylinder speed prior to final positioning.

- Consider leadscrew **critical speed** and c**olumn load limits** when specifying longer lengths.

16mm lead ballscrew

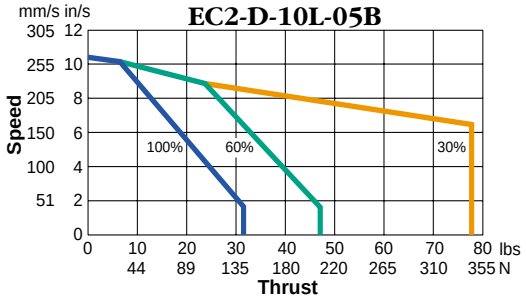
1280	1280	1280	993	550	331	230	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	*Column Load Limit (N)*

Performance

5mm Lead Ballscrew Models

—100% Duty Cycle —60% Duty Cycle —30% Duty Cycle

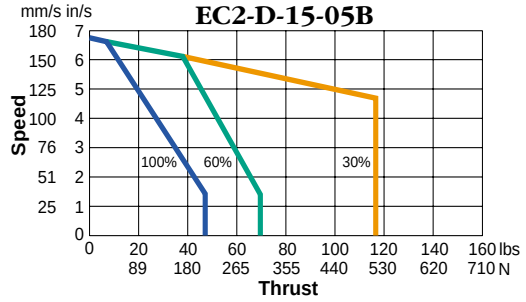
EC2-D-10-05B
EC2-D-10L-05B



EC2-D-10-05B: 1:1 Timing Belt, 5 mm/rev Ballscrew
EC2-D-10L-05B: 1:1 Inline Coupling, 5 mm/rev Ballscrew

Max. No-Load Accel.	1.45 m/s²	[57 in/s²]
Repeatability	±0.13 mm	[±0.005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

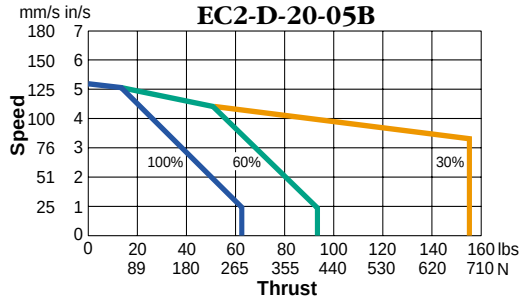
EC2-D-15-05B



EC2-D-15-05B: 1.5:1 Timing Belt, 5 mm/rev Ballscrew

Max. No-Load Accel.	1.11 m/s²	[44 in/s²]
Repeatability	±0.13 mm	[±0.005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

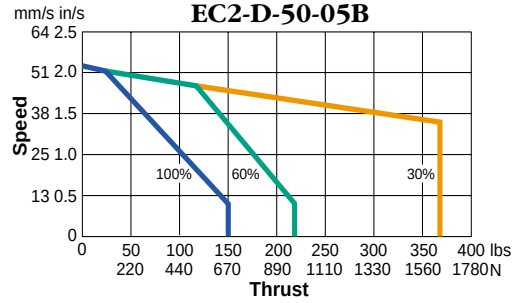
EC2-D-20-05B



EC2-D-20-05B: 2:1 Timing Belt, 5 mm/rev Ballscrew

Max. No-Load Accel.	0.88 m/s²	[35 in/s²]
Repeatability	±0.13 mm	[±0.005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

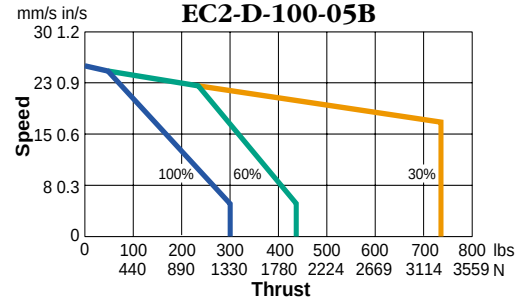
EC2-D-50-05B



EC2-D-50-05B: 5:1 Gears, 5 mm/rev Ballscrew

Max. No-Load Accel.	0.37 m/s²	[15 in/s²]
Repeatability	±0.13 mm	[±0.005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC2-D-100-05B



EC2-D-100-05B: 10:1 Gears, 5 mm/rev Ballscrew

Max. No-Load Accel.	0.19 m/s²	[7 in/s²]
Repeatability	±0.13 mm	[±0.005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using D2200, D2300 and D2400 Series Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.
- **For D2500B control, derate thrust by 50%.**
- Repeatability achievable with D2300 control. Reduce cylinder speed prior to final positioning.

- Consider leadscrew **critical speed** and c**olumn load limits** when specifying longer lengths.

5mm lead ballscrew

414	414	414	310	172	103	71	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	*Column Load Limit (N)*

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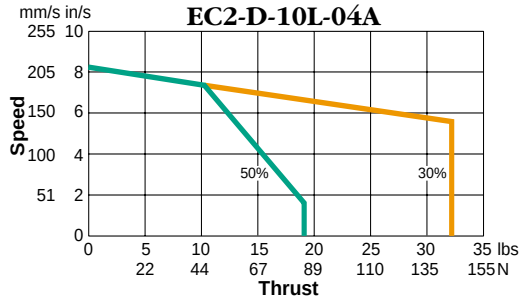
Performance

4 mm Lead Acme Screw Models

—50% Duty Cycle —30% Duty Cycle

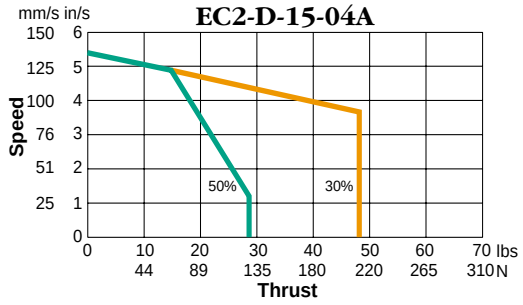
EC2-D-10-04A
EC2-D-10L-04A



EC2-D-10-04A: 1:1 Timing Belt, 4 mm/rev Acme Screw
EC2-D-10L-04A: 1:1 Inline Coupling, 4 mm/rev Acme Screw

Max. No-Load Accel.	1.16 m/s²	[46 in/s²]
Repeatability	±0.13 mm	[±0.005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

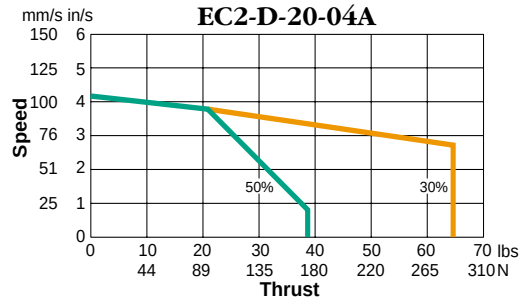
EC2-D-15-04A



EC2-D-15-04A: 1.5:1 Timing Belt, 4 mm/rev Acme Screw

Max. No-Load Accel.	0.89 m/s²	[35 in/s²]
Repeatability	±0.13 mm	[±0.005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

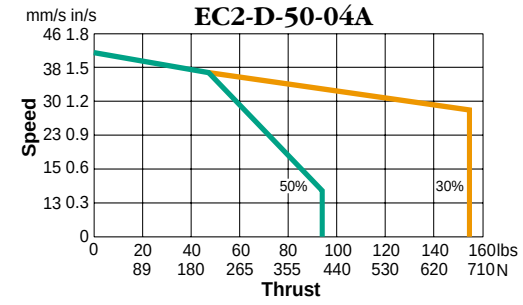
EC2-D-20-04A



EC2-D-20-04A: 2:1 Timing Belt, 4 mm/rev Acme Screw

Max. No-Load Accel.	0.70 m/s²	[28 in/s²]
Repeatability	±0.13 mm	[±0.005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

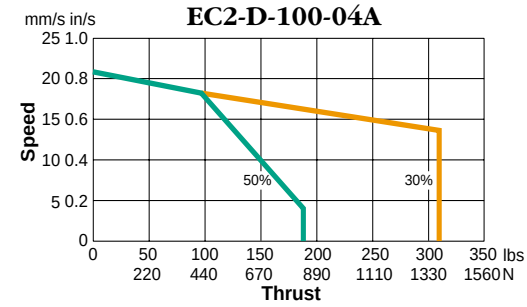
EC2-D-50-04A



EC2-D-50-04A: 5:1 Gears, 4 mm/rev Acme Screw

Max. No-Load Accel.	0.30 m/s²	[12 in/s²]
Repeatability	±0.13 mm	[±0.005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

EC2-D-100-04A



EC2-D-10-04A: 10:1 Gears, 4 mm/rev Acme Screw

Max. No-Load Accel.	0.15 m/s²	[6 in/s²]
Repeatability	±0.13 mm	[±0.005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

- Performance using D2200, D2300 and D2400 Series Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.
- **For D2500B control, derate thrust by 50%.**
- Repeatability achievable with D2300 control. Reduce cylinder speed prior to final positioning.

To configure your system see page A-30 to A-31.

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

4mm lead acme screw

233	233	233	219	119	72	48	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	2500	*Column Load Limit (N)*

How To Order

Steps to Ordering a Complete EC2-D System

You are ready to specify an EC2-D actuator model number after you have:

a. completed and verified all necessary information on an IDC Product Selection Worksheet.

b. completed the steps in the EC Selection Guidelines on pages (A-20 to A-21).

c. selected a control that is compatible with the D-series motor.

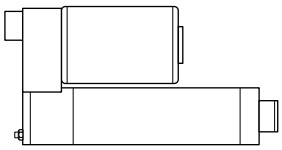
Your local IDC Distributor and our Applications Engineering Department are available to help with your selection process.

1. Base Model

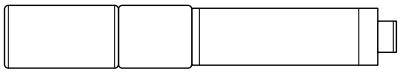
Choose the model with sufficient speed and thrust with a comfortable safety margin. Refer to the EC2-D Speed vs. Thrust curves in this section.

EC2-D cylinders with gear or timing belt drive reductions have the motor mounted parallel to the lead screw. Inline models have the motor coupled directly to the leadscrew with no reduction.

Parallel Models



Inline Models



2. Stroke Length

Eight standard lengths are available from 50 to 750 mm. Custom lengths are also available. Consult your IDC distributor or the factory for details.

To maximize cylinder life, the thrust tube should not impact the physical end-of-travel on either end. Extra travel length is necessary to decelerate the load to a stop when an end-of-travel limit switch is encountered. This extra travel distance depends on load and speed. For further information on this refer to the EC Selection Guidelines on pages (A-20 to A-21) or the Engineering Section.

1 Base Model				2 Stroke Length	3 Cylinder Mounting	4 Rod End		5 Options	
Electric Cylinder	Motor	Drive Ratio	Screw Lead, Type	(mm)					
EC2	D								

Ballscrew

EC2-D-10-16B-	EC2-D-10-05B-	EC2-D-10-04A-
EC2-D-15-16B-	EC2-D-15-05B-	EC2-D-15-04A-
EC2-D-20-16B-	EC2-D-20-05B-	EC2-D-20-04A-
EC2-D-50-16B-	EC2-D-50-05B-	EC2-D-50-04A-
EC2-D-100-16B-	EC2-D-100-05B-	EC2-D-100-04A-

Acme Screw

Inline Models (Direct Drive)

EC2-D-10L-16B-	EC2-D-10L-05B-	EC2-D-10L-04A-

Stroke Length (mm)

50
100
150
200
250
300
450
600
750
Custom lengths available

Cylinder Mounting

No Charge

-MF1	-MP2	-FT1M
-MF2	-MS6M	-FT1E
-MF3	-MS6E	-MT1M
-MS1	-MT4	-MT1E
-MS2		

Additional Charge

-MP3	-FC2	
	-FS2	

Rod End

Options

-BS
-EMK
-L
-LR
-PB

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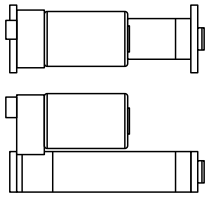
How To Order

3. Cylinder Mounting

Specify any one of these cylinder mounting options. Dimensional drawings start on page A-52.

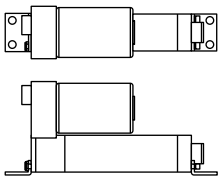
Cylinder base mount options -MS1, -MP2, -MP3, -MF2, and -MF3 cannot be ordered with inline models.

MF1, 2, 3 Rectangular Flanges

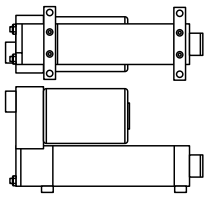


MF1 Front Flange
MF2 Rear Flange
MF3 Both Flanges

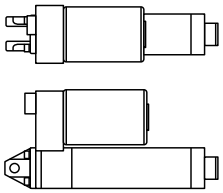
MS1 Side End Angles



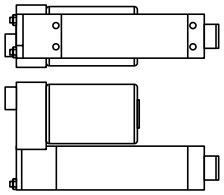
MS2 Side Lugs



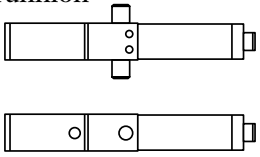
MP2 Rear Clevis (MP3 includes pivot base)



MS6M and MS6E Side Tapped Holes



MT4 Trunnion



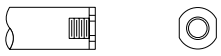
Pivot Mount Caution:

When utilizing a pivot mounting option (MP2 or MT4) in conjunction with a pivot rod end (FS2 or FC2), it is recommended that the actuator be extended only to 90–95% of its full stroke. This increases the system's rigidity and extends the life of the guide bearings and rod seal.

4. Rod Ends

Industrial Devices offers 4 rod end options for EC2-D series cylinders.

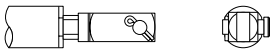
-FT1M or -FT1E Female Thread



-MT1M or -MT1E Male Thread

-FS2 Spherical Joint

-FC2 Clevis



5. Other Options

See the Options and Accessories section for complete specifications.

BS – Holding Brake

35 in-lb holding brake mounted on the rear lead screw shaft extension. *Not available on inline models or with cylinder base mount options. (-MF2, -MF3, -MS1, -MP2, -MP3).*

EMK – Encoder

1000 line incremental encoder mounted on the rear shaft of the motor. *Not available on EC2-D series with -Q quick disconnect option.*

L – Linear Potentiometer Output

Linear potentiometer mounted on inside the EC2-D cylinder. For use with D2500B Series control.

LR – Linear Rod Bearing

Linear rod bearing support for the thrust tube. Increases side load rating.

PB – Protective Boot

Protects the thrust tube from solid contaminants and prevents liquids from entering the cylinder through the rod end bearing. (Not available with –MS1.)

6. Accessories

Magnetic Position Sensors

Position sensors are available for triggering stop, speed/direction change, or end-of-travel.

To maximize cylinder life, IDC recommends the use of end-of-travel sensors with all cylinders.

Either Reed or Hall Effect (NPN transistor) switches are compatible with IDC controls.

	3m Leads	4m Quick
Reed		
Normally open	PSR-1	PSR-1Q
Normally closed	PSR-2	PSR-2Q
Hall Effect		
Normally open, NPN	PSN-1	PSN-1Q
Normally closed, NPN	PSN-2	PSN-2Q

See page A-240 for more limit switch options, including quick-disconnect versions.

7. Compatible Controls

Details of controls are in Sections F. The EC2-D is compatible with:

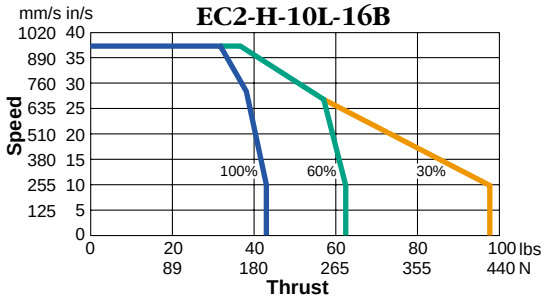
Model	Description
D2200	Simple limit switch
D2300	Limit switch
D2400	Limit switch w/delay
D2500B	Analog position

Performance

16 mm Lead Ballscrew Models

—100% Duty Cycle —60% Duty Cycle —30% Duty Cycle

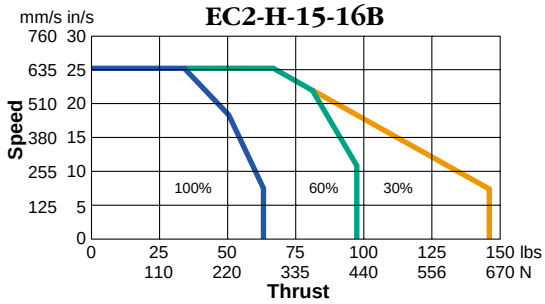
EC2-H-10-16B
EC2-H-10L-16B



EC2-H-10-16B: 1:1 Timing Belt, 16 mm/rev Ballscrew
EC2-H-10L-16B: 1:1 Inline Coupling, 16 mm/rev Ballscrew

Max. No-Load Accel.	4.90 m/s²	[193 in/s²]
Repeatability	±0.25 mm	[±0.010 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

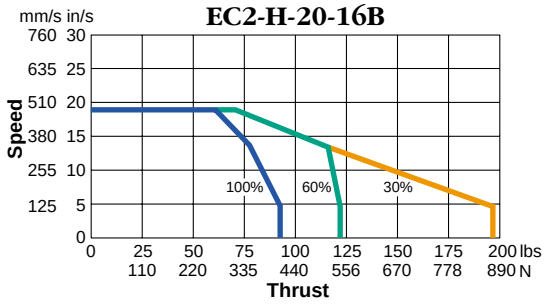
EC2-H-15-16B



EC2-H-15-16B: 1.5:1 Timing Belt, 16 mm/rev Ballscrew

Max. No-Load Accel.	3.50 m/s²	[138 in/s²]
Repeatability	±0.25 mm	[±0.010 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

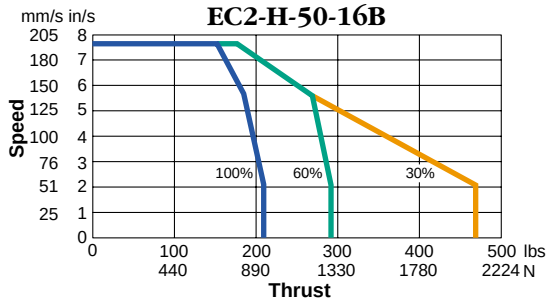
EC2-H-20-16B



EC2-H-20-16B: 2.0:1 Timing Belt, 16 mm/rev Ballscrew

Max. No-Load Accel.	2.69 m/s²	[106 in/s²]
Repeatability	±0.25 mm	[±0.010 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

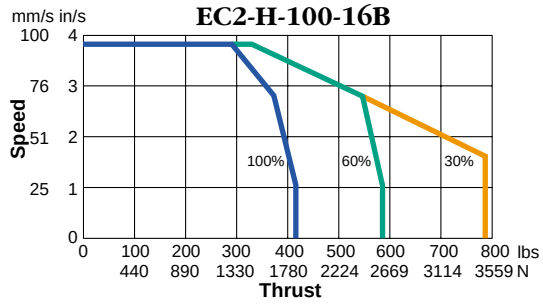
EC2-H-50-16B



EC2-H-50-16B: 5:1 Gears, 16 mm/rev Ballscrew

Max. No-Load Accel.	1.10 m/s²	[43 in/s²]
Repeatability	±0.25 mm	[±0.010 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC2-H-100-16B



EC2-H-100-16B: 10:1 Gears, 16 mm/rev Ballscrew

Max. No-Load Accel.	0.55 m/s²	[22 in/s²]
Repeatability	±0.25 mm	[±0.010 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using H3000 Series Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

16mm lead ballscrew

1280	1280	1280	993	550	331	230	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	*Column Load Limit (N)*

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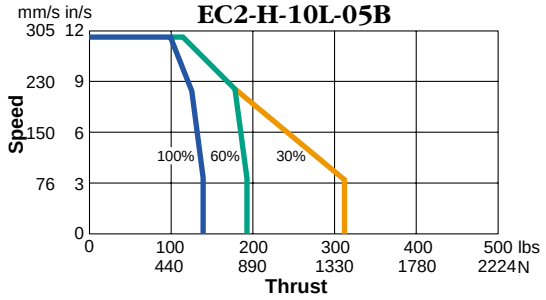
5 mm Lead Ballscrew Models

—100% Duty Cycle —60% Duty Cycle —30% Duty Cycle

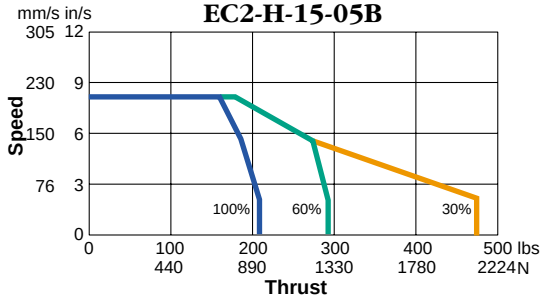
EC2-H-10-05B
EC2-H-10L-05B



EC2-H-10-05B: 1:1 Timing Belt, 5 mm/rev Ballscrew
EC2-H-10L-05B: 1:1 Inline Coupling, 5 mm/rev Ballscrew

Max. No-Load Accel.	1.56 m/s²	[61 in/s²]
Repeatability	±0.13 mm	[±0.005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

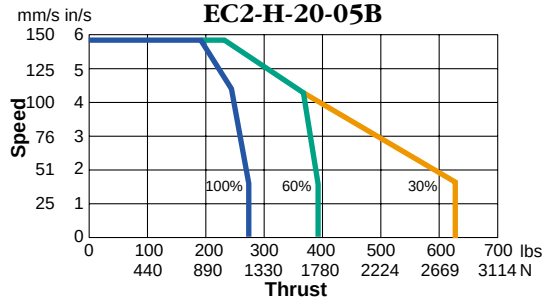
EC2-H-15-05B



EC2-H-15-05B: 1.5:1 Timing Belt, 5 mm/rev Ballscrew

Max. No-Load Accel.	1.10 m/s²	[43 in/s²]
Repeatability	±0.13 mm	[±0.005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

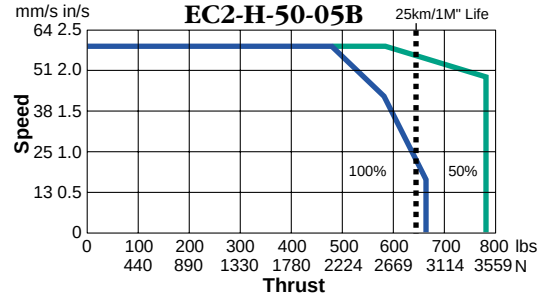
EC2-H-20-05B



EC2-H-20-05B: 2:1 Timing Belt, 5 mm/rev Ballscrew

Max. No-Load Accel.	0.84 m/s²	[33 in/s²]
Repeatability	±0.13 mm	[±0.005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

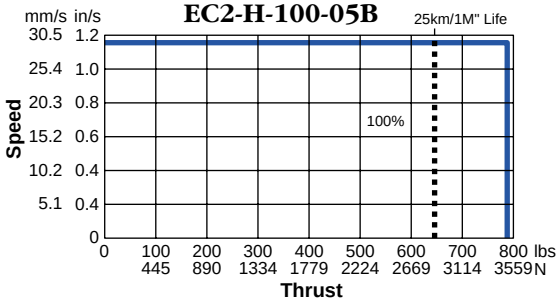
EC2-H-50-05B



EC2-H-50-05B: 5:1 Gears, 5 mm/rev Ballscrew

Max. No-Load Accel.	0.34 m/s²	[14 in/s²]
Repeatability	±0.13 mm	[±0.005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC2-H-100-05B



EC2-H-100-05B: 10:1 Gears, 5 mm/rev Ballscrew

Max. No-Load Accel.	0.17 m/s²	[7 in/s²]
Repeatability	±0.13 mm	[±0.005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using H3000 Series Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

5mm lead ballscrew

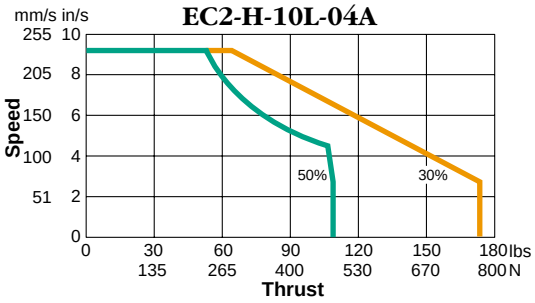
414	414	414	310	172	103	71	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	*Column Load Limit (N)*

Performance

4 mm Lead Acme Screw Models

—50% Duty Cycle —30% Duty Cycle

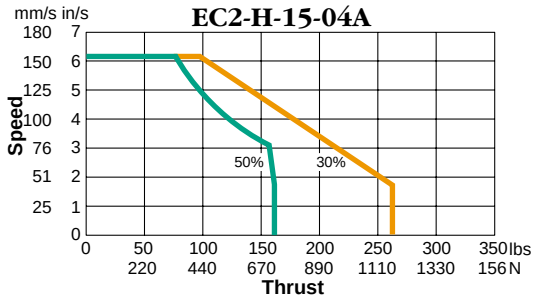
EC2-H-10-04A
EC2-H-10L-04A



EC2-H-10-04A: 1:1 Timing Belt, 4 mm/rev Acme Screw
EC2-H-10L-04A: 1:1 Inline Coupling, 4 mm/rev Acme Screw

Max. No-Load Accel.	1.35 m/s²	[49 in/s²]
Repeatability	±0.13 mm	[±0.005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

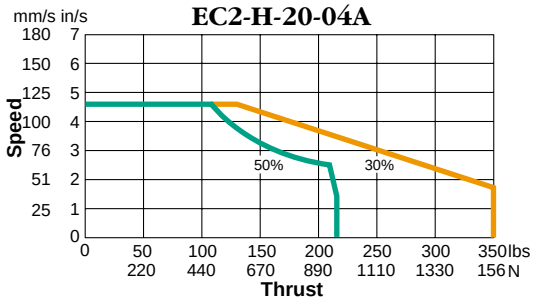
EC2-H-15-04A



EC2-H-15-04A: 1.5:1 Timing Belt, 4 mm/rev Acme Screw

Max. No-Load Accel.	0.88 m/s²	[35 in/s²]
Repeatability	±0.13 mm	[±0.005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.006 in/ft]

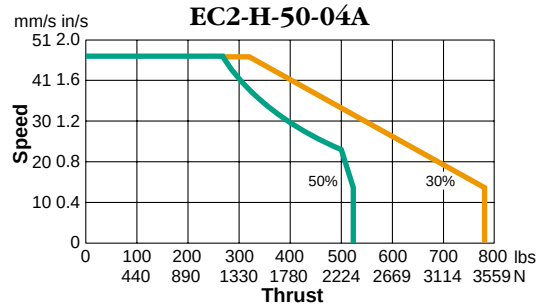
EC2-H-20-04A



EC2-H-20-04A: 2:1 Timing Belt, 4 mm/rev Acme Screw

Max. No-Load Accel.	0.68 m/s²	[27 in/s²]
Repeatability	±0.13 mm	[±0.005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

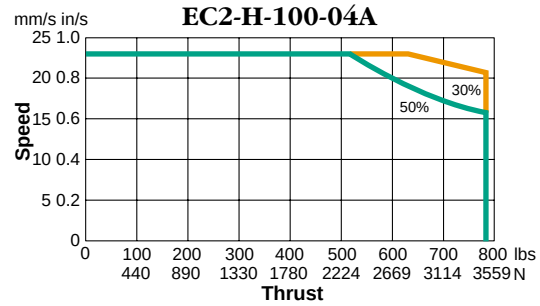
EC2-H-50-04A



EC2-H-50-04A: 5:1 Gears, 4 mm/rev Acme Screw

Max. No-Load Accel.	0.28 m/s²	[11 in/s²]
Repeatability	±0.13 mm	[±0.005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

EC2-H-100-04A



EC2-H-100-04A: 10:1 Gears, 4 mm/rev Acme Screw

Max. No-Load Accel.	0.14 m/s²	[5 in/s²]
Repeatability	±0.13 mm	[±0.005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

To configure your system see page A-36 to A-37.

- Performance using H3000 or Series Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

4mm lead acme screw

233	233	233	219	119	72	48	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	2500	*Column Load Limit (N)*

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How To Order

Steps to Ordering a Complete EC2-H System

You are ready to specify an EC2-H actuator model number after you have:

a. completed and verified all necessary information on an IDC Product Selection Worksheet.

b. completed the steps in the EC Selection Guidelines on pages (A-20 to A-21).

c. selected a control that is compatible with the H-series motor.

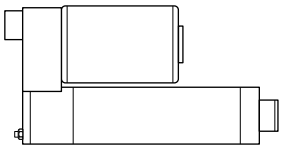
Your local IDC Distributor and our Applications Engineering Department are available to help with your selection process.

1. Base Model

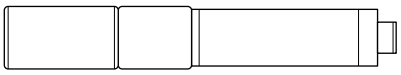
Choose the model with sufficient speed and thrust with a comfortable safety margin. Refer to the EC2-H Speed vs. Thrust curves in this section.

EC2-H cylinders with gear or timing belt drive reductions have the motor mounted parallel to the lead screw. Inline models have the motor coupled directly to the leadscrew with no reduction.

Parallel Models



Inline Models

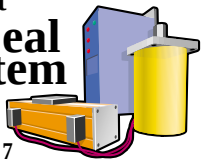


2. Stroke Length

Eight standard lengths are available from 50 to 750 mm. Custom lengths are also available. Consult your IDC distributor or the factory for details.

To maximize cylinder life, the thrust tube should not impact the physical end-of-travel on either end. Extra travel length is necessary to decelerate the load to a stop when an end-of-travel limit switch is encountered. This extra travel distance depends on load and speed. For further information on this refer to the EC Selection Guidelines on pages (A-20 to A-21) or the Engineering Section.

Make It An IDeal System



See Intro Pages 6 & 7

1 Base Model				2 Stroke Length		3 Cylinder Mounting	4 Rod End	5 Options		
Electric Cylinder	Motor	Drive Ratio	Screw Lead, Type	(mm)						
EC2	– H	–	–		—		—	—	–	–

Ballscrew		Acme Screw
EC2-H-10-16B-	EC2-H-10-05B-	EC2-H-10-04A-
EC2-H-15-16B-	EC2-H-15-05B-	EC2-H-15-04A-
EC2-H-20-16B-	EC2-H-20-05B-	EC2-H-20-04A-
EC2-H-50-16B-	EC2-H-50-05B-	EC2-H-50-04A-
EC2-H-100-16B-	EC2-H-100-05B-	EC2-H-100-04A-

Inline Models (Direct Drive)		
EC2-H-10L-16B-	EC2-H-10L-05B-	EC2-H-10L-04A-

50
100
150
200
250
300
450
600
750
Custom lengths available

No Charge

-MF1	-MP2	-FT1M
-MF2	-MS6M	-FT1E
-MF3	-MS6E	-MT1M
-MS1	-MT4	-MT1E
-MS2		

Additional Charge

-MP3	-FC2	-BM
	-FS2	-BS
		-EM
		-L
		-LR
		-PB

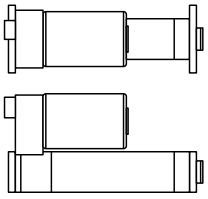
How To Order

3. Cylinder Mounting

Specify any one of these cylinder mounting options. Dimensional drawings start on page A-52.

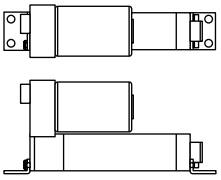
Cylinder base mount options -MS1, -MP2, -MP3, -MF2, and -MF3 cannot be ordered with inline models.

MF1, 2, 3 Rectangular Flanges

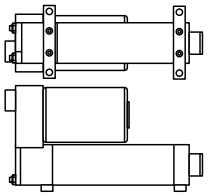


MF1 Front Flange
MF2 Rear Flange
MF3 Both Flanges

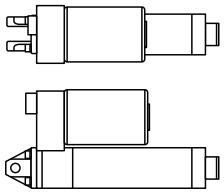
MS1 Side End Angles



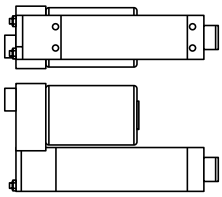
MS2 Side Lugs



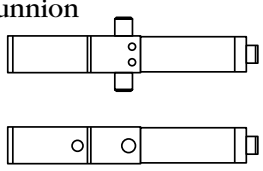
MP2 Rear Clevis (MP3 includes pivot base)



MS6M and MS6E Side Tapped Holes



MT4 Trunnion



Pivot Mount Caution:

When utilizing a pivot mounting option (MP2 or MT4) in conjunction with a pivot rod end (FS2 or FC2), it is recommended that the actuator be extended only to 90–95% of its full stroke. This increases the system's rigidity and extends the life of the guide bearings and rod seal.

4. Rod Ends

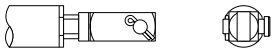
Industrial Devices offers 4 rod end options for EC2-H series cylinders.

-FT1M or -FT1E Female Thread

-MT1M or -MT1E Male Thread

-FS2 Spherical Joint

-FC2 Clevis



5. Other Options

See the Options and Accessories section for complete specifications.

BM – Motor Holding Brake

10 in-lb holding brake mounted on the rear shaft of the H-series motor. *Not available on EC2-H with -EM encoder option.*

BS – Holding Brake

35 in-lb holding brake mounted on the rear lead screw shaft extension. *Not available on inline models or with cylinder base mount options. (-MF2, -MF3, -MS1, -MP2, -MP3).*

EMK – Encoder

Reverse-compatible 500 line incremental encoder mounted on the rear shaft of the motor. *Not available on EC2-H with -BM motor holding brake option.*

L – Linear Potentiometer Output

Linear potentiometer mounted on inside the EC2-H cylinder. For use with H3501 control.

LR – Linear Rod Bearing

Linear rod bearing support for the thrust tube. Increases side load rating.

PB – Protective Boot

Protects the thrust tube from solid contaminants and prevents liquids from entering the cylinder through the rod end bearing. (Not available with –MS1.)

6. Accessories

Magnetic Position Sensors

Position sensors are available for triggering stop, speed/direction change, or end-of-travel.

To maximize cylinder life, IDC recommends the use of end-of-travel sensors with all cylinders.

Either Reed or Hall Effect (NPN transistor) switches are compatible with IDC controls.

	3m Leads	4m Quick
Reed		
Normally open	PSR-1	PSR-1Q
Normally closed	PSR-2	PSR-2Q
Hall Effect		
Normally open, NPN	PSN-1	PSN-1Q
Normally closed, NPN	PSN-2	PSN-2Q

See page A-240 for more limit switch options, including quick-disconnect versions.

7. Compatible Controls

Details of controls are in Sections F. The EC2-H is compatible with:

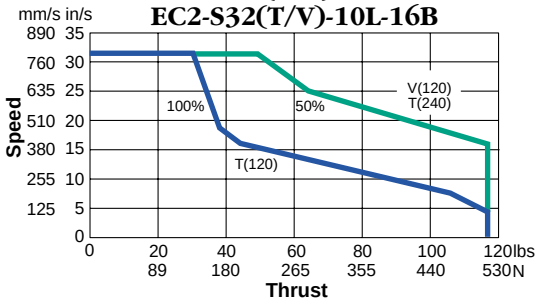
Model	Description
H3301B	Limit switch
H3321B	Edge guide
H3501	Analog position

Performance

16mm Lead Ballscrew Models

—100% Duty Cycle —50% Duty Cycle

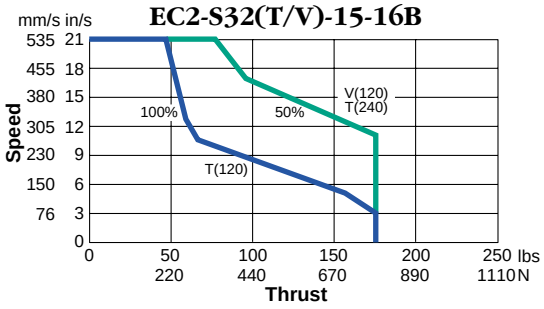
EC2-S32(T/V)-10-16B
EC2-S32(T/V)-10L-16B



EC2-S32(T/V)-10-16B: 1:1 Timing Belt, 16 mm/rev Ballscrew
EC2-S32(T/V)-10L-16B: 1:1 Inline Coupling, 16 mm/rev Ballscrew

Max. No-Load Accel.	31.7 m/s²	[1247 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

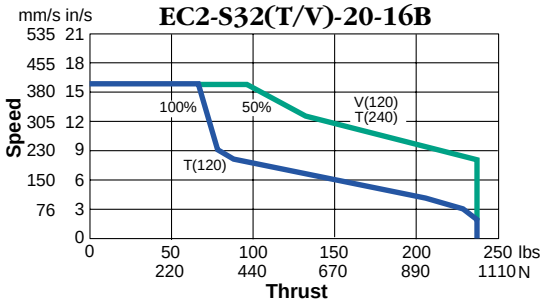
EC2-S32(T/V)-15-16B



EC2-S32(T/V)-15-16B: 1.5:1 Timing Belt, 16 mm/rev Ballscrew

Max. No-Load Accel.	25.0 m/s²	[983 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

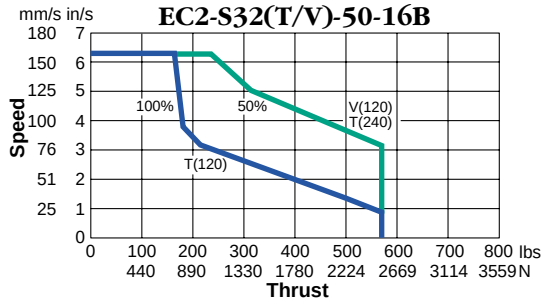
EC2-S32(T/V)-20-16B



EC2-S32(T/V)-20-16B: 2.0:1 Timing Belt, 16 mm/rev Ballscrew

Max. No-Load Accel.	20.0 m/s²	[787 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

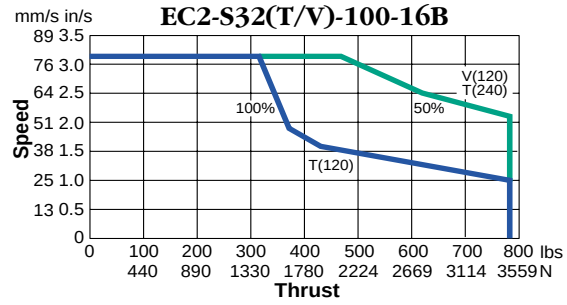
EC2-S32(T/V)-50-16B



EC2-S32(T/V)-50-16B: 5:1 Gears, 16 mm/rev Ballscrew

Max. No-Load Accel.	8.52 m/s²	[335 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC2-S32(T/V)-100-16B



EC2-S32(T/V)-100-16B: 10:1 Gears, 16 mm/rev Ballscrew

Max. No-Load Accel.	4.30 m/s²	[169 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using S6000 Series, *NextStep*, and *SmartStep* Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

16mm lead ballscrew

1280	1280	1280	993	550	331	230	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	*Column Load Limit (N)*

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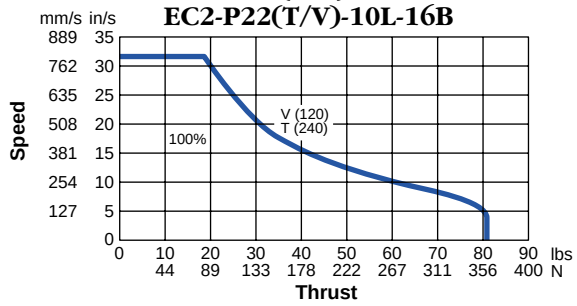
16mm Lead Ballscrew Models

—100% Duty Cycle —50% Duty Cycle

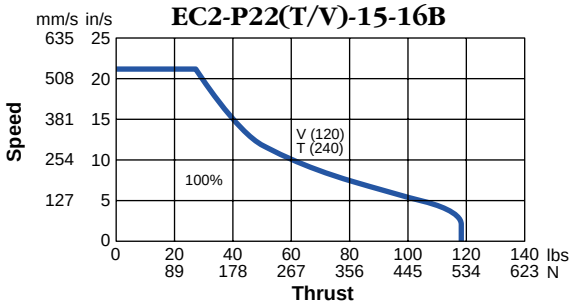
EC2-P22(T/V)-10-16B
EC2-P22(T/V)-10L-16B



EC2-P22(T/V)-10-16B: 1:1 Timing Belt, 16 mm/rev Ballscrew
EC2-P22(T/V)-10L-16B: 1:1 Inline Coupling, 16 mm/rev Ballscrew

Max. No-Load Accel.	28.4 m/s²	[1119 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

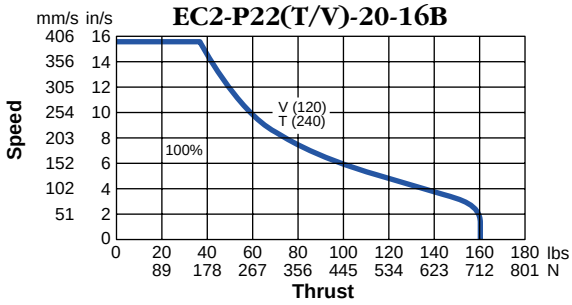
EC2-P22(T/V)-15-16B



EC2-P22(T/V)-15-16B: 1.5:1 Timing Belt, 16 mm/rev Ballscrew

Max. No-Load Accel.	27.4 m/s²	[1078 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

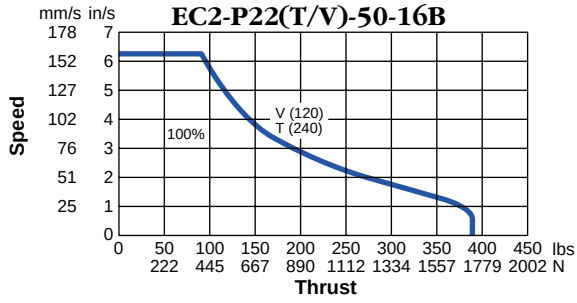
EC2-P22(T/V)-20-16B



EC2-P22(T/V)-20-16B: 2.0:1 Timing Belt, 16 mm/rev Ballscrew

Max. No-Load Accel.	24.3 m/s²	[955 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

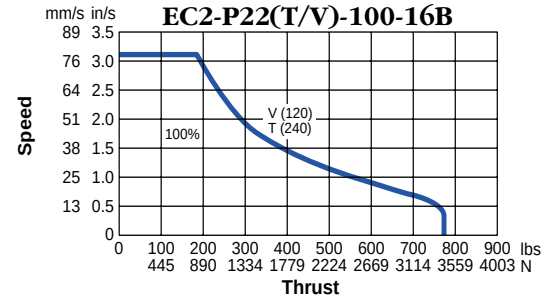
EC2-P22(T/V)-50-16B



EC2-P22(T/V)-50-16B: 5:1 Gears, 16 mm/rev Ballscrew

Max. No-Load Accel.	11.6 m/s²	[458 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC2-P22(T/V)-100-16B



EC2-P22(T/V)-100-16B: 10:1 Gears, 16 mm/rev Ballscrew

Max. No-Load Accel.	6.0 m/s²	[236 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using S6000 Series, *NextStep*®, and *SmartStep*® Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

16mm lead ballscrew

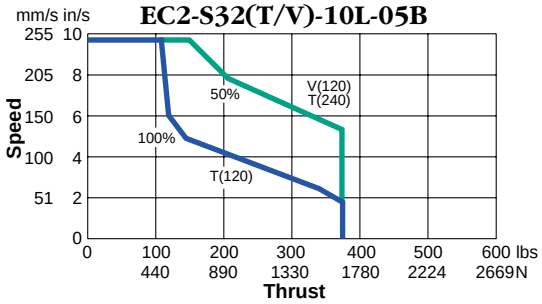
1280	1280	1280	993	550	331	230	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	*Column Load Limit (N)*

Performance

5mm Lead Ballscrew Models

—100% Duty Cycle —50% Duty Cycle

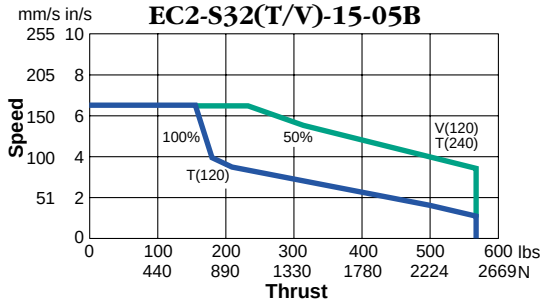
EC2-S32(T/V)-10-05B
EC2-S32(T/V)-10L-05B



EC2-S32(T/V)-10-05B: 1:1 Timing Belt, 5 mm/rev Ballscrew
EC2-S32(T/V)-10L-05B: 1:1 Inline Coupling, 5 mm/rev Ballscrew

Max. No-Load Accel.	10.3 m/s²	[405 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

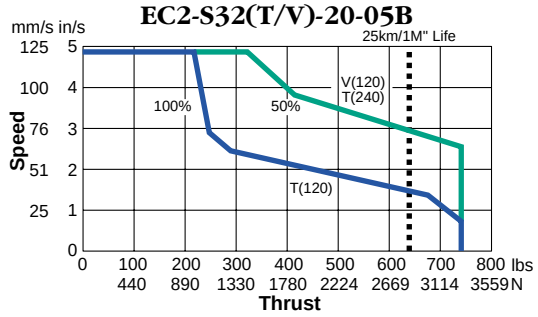
EC2-S32(T/V)-15-05B



EC2-S32(T/V)-15-05B: 1.5:1 Timing Belt, 5 mm/rev Ballscrew

Max. No-Load Accel.	8.00 m/s²	[314 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

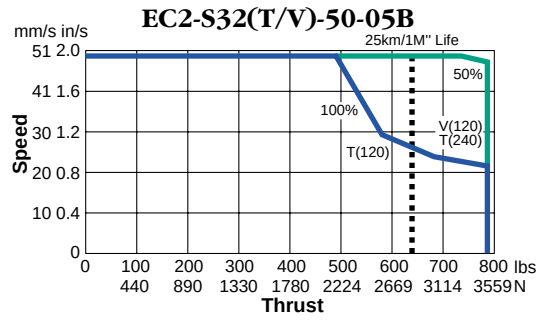
EC2-S32(T/V)-20-05B



EC2-S32(T/V)-20-05B: 2:1 Timing Belt, 5 mm/rev Ballscrew

Max. No-Load Accel.	6.32 m/s²	[249 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC2-S32(T/V)-50-05B



EC2-S32(T/V)-50-05B: 5:1 Gears, 5 mm/rev Ballscrew

Max. No-Load Accel.	2.67 m/s²	[105 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using S6000 Series, *NextStep*, and *SmartStep* Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

5mm lead ballscrew

414	414	414	310	172	103	71	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	*Column Load Limit (N)*

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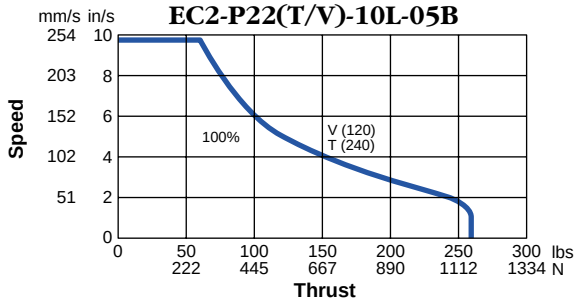
5mm Lead Ballscrew Models

—100% Duty Cycle —50% Duty Cycle

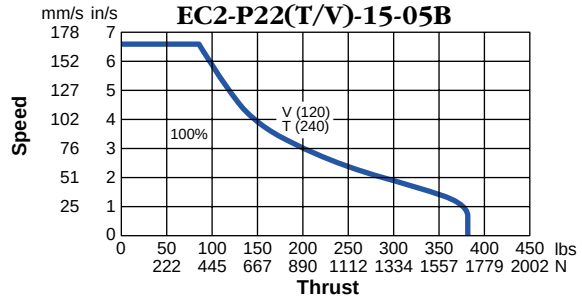
EC2-P22(T/V)-10-05B
EC2-P22(T/V)-10L-05B



EC2-P22(T/V)-10-05B: 1:1 Timing Belt, 5 mm/rev Ballscrew
EC2-P22(T/V)-10L-05B: 1:1 Inline Coupling, 5 mm/rev Ballscrew

Max. No-Load Accel.	9.62 m/s²	[379 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

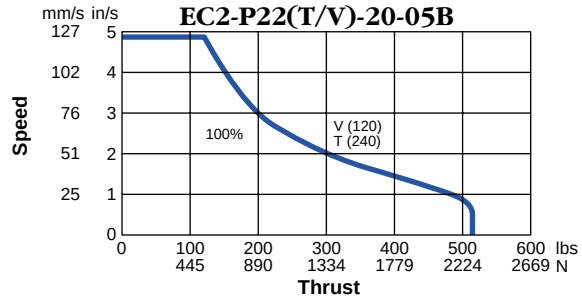
EC2-P22(T/V)-15-05B



EC2-P22(T/V)-15-05B: 1.5:1 Timing Belt, 5 mm/rev Ballscrew

Max. No-Load Accel.	9.01 m/s²	[355 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

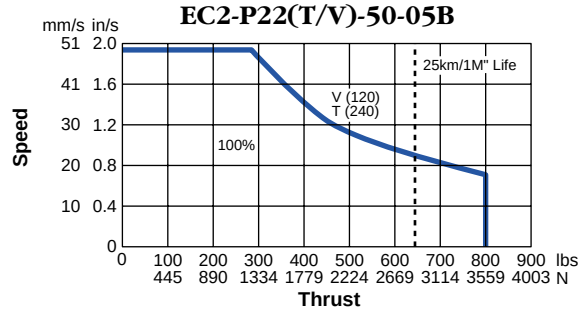
EC2-P22(T/V)-20-05B



EC2-P22(T/V)-20-05B: 2:1 Timing Belt, 5 mm/rev Ballscrew

Max. No-Load Accel.	7.84 m/s²	[308 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

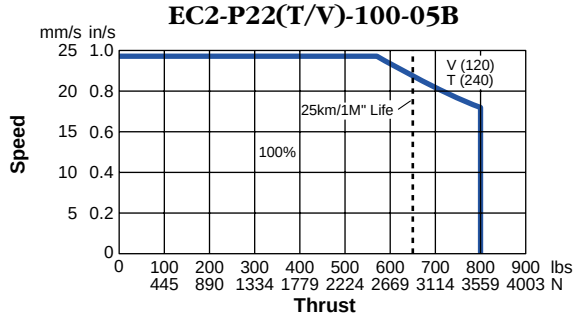
EC2-P22(T/V)-50-05B



EC2-P22(T/V)-50-05B: 5:1 Gears, 5 mm/rev Ballscrew

Max. No-Load Accel.	3.66 m/s²	[144 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC2-P22(T/V)-100-05B



EC2-P22(T/V)-100-05B: 10:1 Gears, 5 mm/rev Ballscrew

Max. No-Load Accel.	1.88 m/s²	[74 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using S6000 Series, *NextStep*, and *SmartStep* Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

5mm lead ballscrew

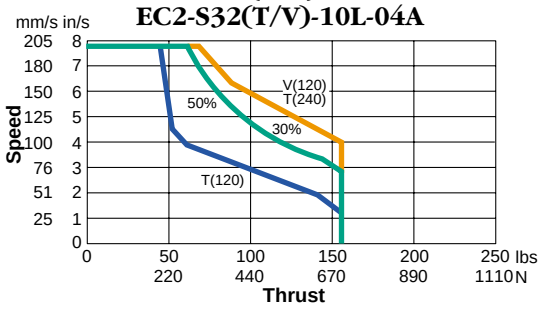
414	414	414	310	172	103	71	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	*Column Load Limit (N)*

Performance

4mm Lead Acme Screw Models

—50% Duty Cycle —30% Duty Cycle

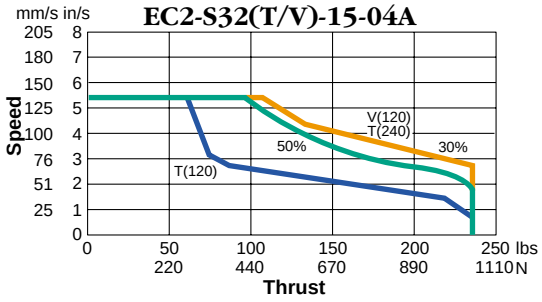
EC2-S32(T/V)-10-04A
EC2-S32(T/V)-10L-04A



EC2-S32(T/V)-10-04A: 1:1 Timing Belt, 4 mm/rev Acme Screw
EC2-S32(T/V)-10L-04A: 1:1 Inline Coupling, 4 mm/rev Acme Screw

Max. No-Load Accel.	8.24 m/s²	[324 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

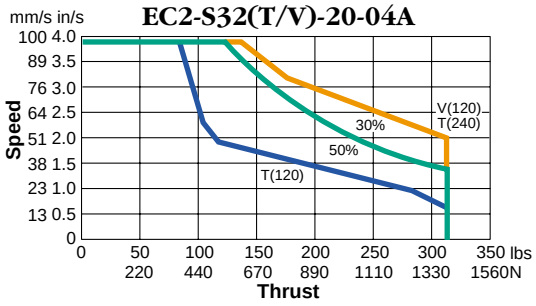
EC2-S32(T/V)-15-04A



EC2-S32(T/V)-15-04A: 1.5:1 Timing Belt, 4 mm/rev Acme Screw

Max. No-Load Accel.	6.38 m/s²	[251 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

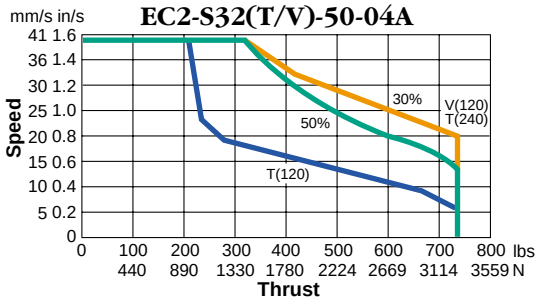
EC2-S32(T/V)-20-04A



EC2-S32(T/V)-20-04A: 2:1 Timing Belt, 4 mm/rev Acme Screw

Max. No-Load Accel.	5.06 m/s²	[199 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

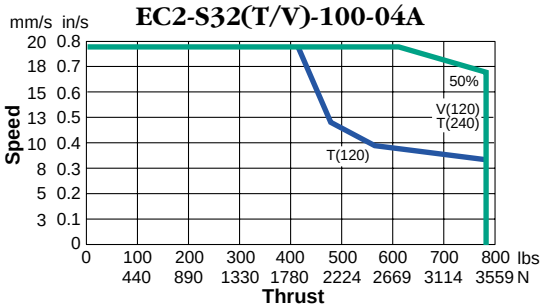
EC2-S32(T/V)-50-04A



EC2-S32(T/V)-50-04A: 5:1 Gears, 4 mm/rev Acme Screw

Max. No-Load Accel.	2.13 m/s²	[84 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

EC2-S32(T/V)-100-04A



EC2-S32(T/V)-100-04A: 10:1 Gears, 4 mm/rev Acme Screw

Max. No-Load Accel.	1.08 m/s²	[42 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

To configure your system see page A-44 to A-45.

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

4mm lead acme screw

233	233	233	219	119	72	48	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	2500	*Column Load Limit (N)*

- Performance using S6000 Series, *Next*Step®, and *Smart*Step® Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

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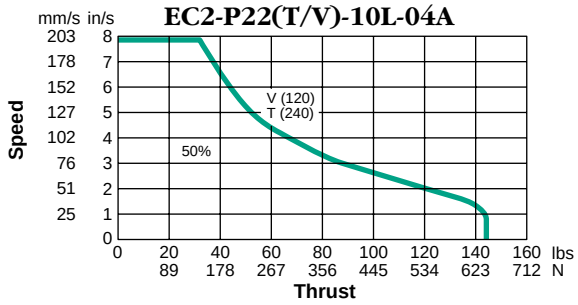
4mm Lead Acme Screw Models

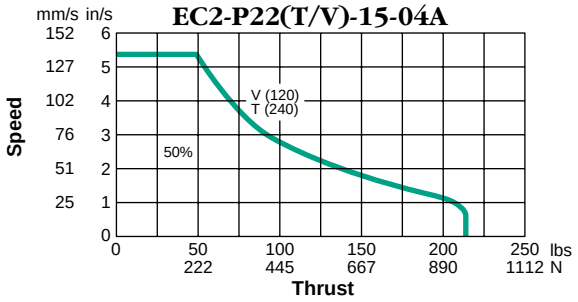
—50% Duty Cycle —30% Duty Cycle

EC2-P22(T/V)-10-04A
EC2-P22(T/V)-10L-04A



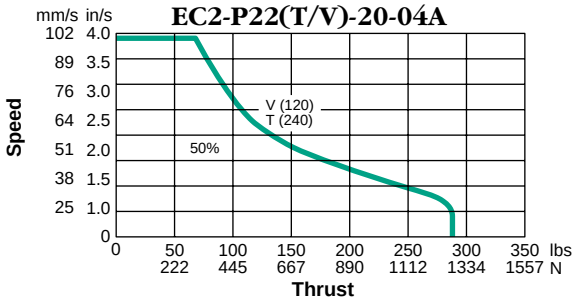
EC2-P22(T/V)-10-04A: 1:1 Timing Belt, 4 mm/rev Acme Screw EC2-P22(T/V)-10L-04A: 1:1 Inline Coupling, 4 mm/rev Acme Screw		
Max. No-Load Accel.	7.71 m/s²	[303 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

EC2-P22(T/V)-15-04A



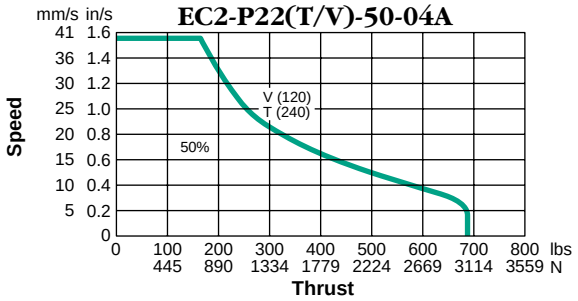
EC2-P22(T/V)-15-04A: 1.5:1 Timing Belt, 4 mm/rev Acme Screw		
Max. No-Load Accel.	7.22 m/s²	[284 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

EC2-P22(T/V)-20-04A



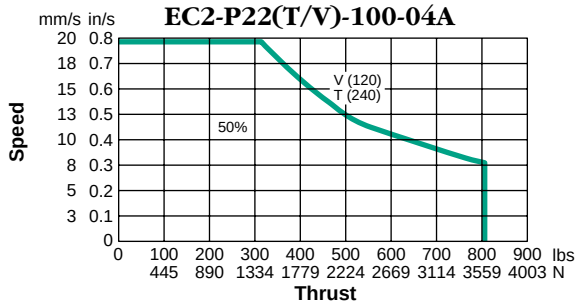
EC2-P22(T/V)-20-04A: 2:1 Timing Belt, 4 mm/rev Acme Screw		
Max. No-Load Accel.	6.27 m/s²	[247 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

EC2-P22(T/V)-50-04A



EC2-P22(T/V)-50-04A: 5:1 Gears, 4 mm/rev Acme Screw		
Max. No-Load Accel.	2.93 m/s²	[115 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

EC2-P22(T/V)-100-04A



EC2-P22(T/V)-100-04A: 10:1 Gears, 4 mm/rev Acme Screw		
Max. No-Load Accel.	1.50 m/s²	59
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

- Performance using S6000 Series, *NextStep*, and *SmartStep* Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and c**olumn load limits** when specifying longer lengths.

4mm lead acme screw

233	233	233	219	119	72	48	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	2500	*Column Load Limit (N)*

How To Order

Steps to Ordering a Complete EC2-S/P System

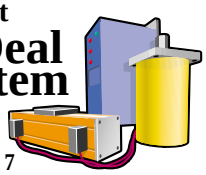
You are ready to specify an EC2-S/P actuator model number after you have:

a. completed and verified all necessary information on an IDC Product Selection Worksheet.

b. completed the steps in the EC Selection Guidelines on pages (A-20 to A-21).

c. selected a control that is compatible with the P- or S-series motor.

Your local IDC Distributor and our Applications Engineering Department are available to help with your selection process.



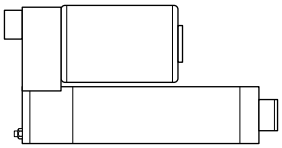
1. Base Model Number

Choose the model with sufficient speed and thrust with a comfortable safety margin. **IDC recommends at least 30% reserve thrust for step motor driven systems.**

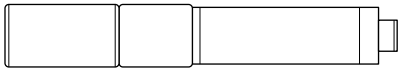
The EC2-S/P Series offers two motor wiring choices, 'T' (Series), and 'V' (Parallel). The 'T' and 'V' versions include a 12 foot motor quick disconnect cable.

EC2-S/P cylinders with gear or timing belt drive reductions have the motor mounted parallel to the lead screw. Inline models have the motor coupled directly to the leadscrew with no reduction.

Parallel Models



Inline Models



2. Stroke Length

Eight standard lengths are available from 50 to 750 mm. Custom lengths are also available. Consult your IDC distributor or the factory for details.

To maximize cylinder life, the thrust tube should not impact the physical end-of-travel on either end. Extra travel length is necessary to decelerate the load to a stop when an end-of-travel limit switch is encountered. This extra travel distance depends on load and speed. For further information on this refer to the EC Selection Guidelines on pages (A-20 to A-21) or the Engineering Section.

1 Base Model				2 Stroke Length	3 Cylinder Mounting	4 Rod End	5 Options		
Electric Cylinder	Motor	Drive Ratio	Screw Lead, Type	(mm)					
EC2	S/P								

Ballscrew

EC2-S32*x*-10-16B-	EC2-S32*x*-10-05B-	EC2-S32*x*-10-04A-
EC2-S32*x*-15-16B-	EC2-S32*x*-15-05B-	EC2-S32*x*-15-04A-
EC2-S32*x*-20-16B-	EC2-S32*x*-20-05B-	EC2-S32*x*-20-04A-
EC2-S32*x*-50-16B-	EC2-S32*x*-50-05B-	EC2-S32*x*-50-04A-
EC2-S32*x*-100-16B-	EC2-S32*x*-100-05B-	EC2-S32*x*-100-04A-
EC2-P22*x*-10-16B-	EC2-P22*x*-10-05B-	EC2-P22*x*-10-04A-
EC2-P22*x*-15-16B-	EC2-P22*x*-15-05B-	EC2-P22*x*-15-04A-
EC2-P22*x*-20-16B-	EC2-P22*x*-20-05B-	EC2-P22*x*-20-04A-
EC2-P22*x*-50-16B-	EC2-P22*x*-50-05B-	EC2-P22*x*-50-04A-
EC2-P22*x*-100-16B-	EC2-P22*x*-100-05B-	EC2-P22*x*-100-04A-

x = T (Series) or V (Parallel)

Inline Models (Direct Drive)

EC2-S32*x*-10L-16B-	EC2-S32*x*-10L-05B-	EC2-S32*x*-10L-04A-
EC2-P22*x*-10L-16B-	EC2-P22*x*-10L-05B-	EC2-P22*x*-10L-04A-

x = T (Series) or V (Parallel)

50
100
150
200
250
300
450
600
750
Custom lengths available

No Charge

-MF1	-MP2	-FT1M
-MF2	-MS6M	-FT1E
-MF3	-MS6E	-MT1M
-MS1	-MT4	-MT1E
-MS2		

Additional Charge

-MP3	-FC2	-BS
	-FS2	-EMK
		-L
		-LR
		-PB

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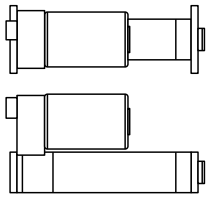
How To Order

3. Cylinder Mounting

Specify any one of these cylinder mounting options. Dimensional drawings start on page A-52.

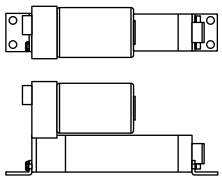
Cylinder base mount options -MS1, -MP2, -MP3, -MF2, and -MF3 cannot be ordered with inline models.

MF1, 2, 3 Rectangular Flanges

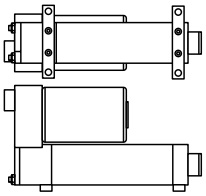


MF1 Front Flange
MF2 Rear Flange
MF3 Both Flanges

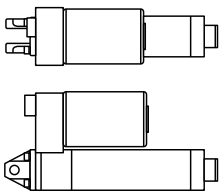
MS1 Side End Angles



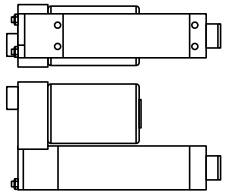
MS2 Side Lugs



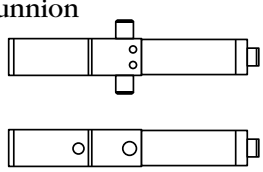
MP2 Rear Clevis (MP3 includes pivot base)



MS6M and MS6E Side Tapped Holes



MT4 Trunnion



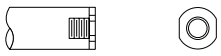
Pivot Mount Caution:

When utilizing a pivot mounting option (MP2 or MT4) in conjunction with a pivot rod end (FS2 or FC2), it is recommended that the actuator be extended only to 90–95% of its full stroke. This increases the system's rigidity and extends the life of the guide bearings and rod seal.

4. Rod Ends

Industrial Devices offers 4 rod end options for EC2 series cylinders.

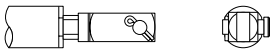
-FT1M or -FT1E Female Thread



-MT1M or -MT1E Male Thread

-FS2 Spherical Joint

-FC2 Clevis



5. Other Options

See the Options and Accessories section for complete specifications.

BS – Holding Brake

35 in-lb holding brake mounted on the rear lead screw shaft extension. *Not available on inline models or with cylinder base mount options. (-MF2, -MF3, -MS1, -MP2, -MP3).*

EMK – Encoder

1000 line incremental encoder mounted on the rear shaft of the motor.

L – Linear Potentiometer Output

Linear potentiometer mounted on inside the EC2 cylinder.

LR – Linear Rod Bearing

Linear rod bearing support for the thrust tube. Increases side load rating.

PB – Protective Boot

Protects the thrust tube from solid contaminants and prevents liquids from entering the cylinder through the rod end bearing. (Not available with –MS1.)

6. Accessories

Magnetic Position Sensors

Position sensors are available for indicating end-of-travel and home positions, or for use with user supplied controls.

To maximize cylinder life, IDC recommends the use of end-of-travel sensors with all cylinders.

Common Application Requirements: For most applications, one home and two end-of-travel sensors are required for each cylinder. Either Reed or Hall Effect (NPN transistor) switches are compatible with IDC controls.

	3m Leads	4m Quick
Reed		
Home (N.O.)	PSR-1	PSR-1Q
End-of-travel (N.C.)	PSR-2	PSR-2Q
Hall Effect		
Home (N.O./NPN)	PSN-1	PSN-1Q
End-of-travel (N.C./NPN)	PSN-2	PSN-2Q

See page A-240 for more limit switch options, including quick-disconnect versions.

7. Compatible Controls

Details of controls are in Sections G. The EC2-S/P is compatible with:

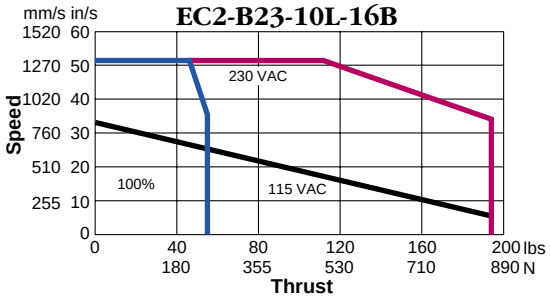
Model	Description
NextStep®	Stepper drive
S6002	2-Axis Stepper drive
SmartStep®	*IDeal*™ programmable
S6961	*IDeal*™ programmable
S6962	2-Axis *IDeal*™ programmable

Performance

16mm Lead Ballscrew Models

—100% Duty Cycle —Intermittent (<2 sec)

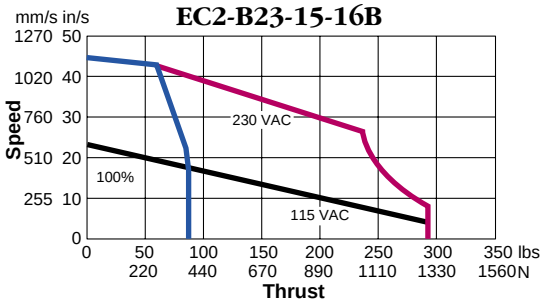
EC2-B23-10-16B
EC2-B23-10L-16B



EC2-B23-10-16B: 1:1 Timing Belt, 16 mm/rev Ballscrew
EC2-B23-10L-16B: 1:1 Inline Coupling, 16 mm/rev Ballscrew

Max. No-Load Accel.	85.0 m/s²	[3330 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

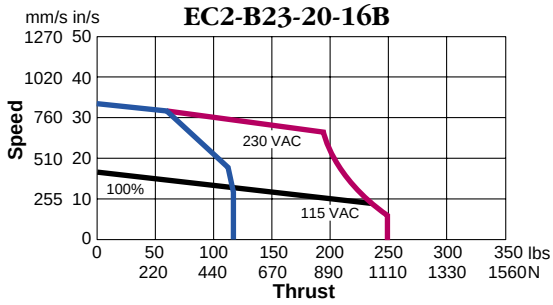
EC2-B23-15-16B



EC2-B23-15-16B: 1.5:1 Timing Belt, 16 mm/rev Ballscrew

Max. No-Load Accel.	96.0 m/s²	[3780 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

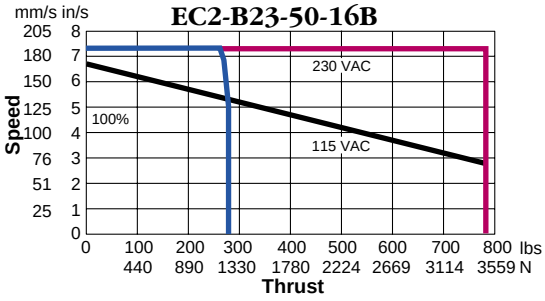
EC2-B23-20-16B



EC2-B23-20-16B: 2.0:1 Timing Belt, 16 mm/rev Ballscrew

Max. No-Load Accel.	95.1 m/s²	[3750 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

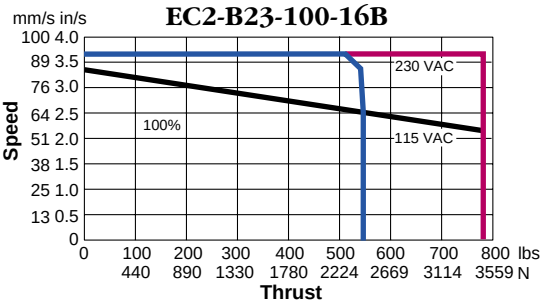
EC2-B23-50-16B



EC2-B23-50-16B: 5:1 Gears, 16 mm/rev Ballscrew

Max. No-Load Accel.	53.8 m/s²	[2120 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC2-B23-100-16B



EC2-B23-100-16B: 10:1 Gears, 16 mm/rev Ballscrew

Max. No-Load Accel.	28.8 m/s²	[1130 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using B8000 Series Controls (not B8501).
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

16mm lead ballscrew

1280	1280	1280	993	550	331	230	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	*Column Load Limit (N)*

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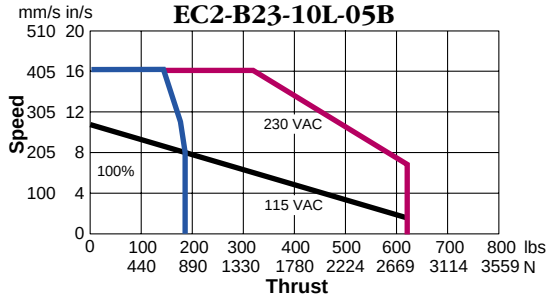
5mm Lead Ballscrew Models

—100% Duty Cycle —Intermittent (<2 sec)

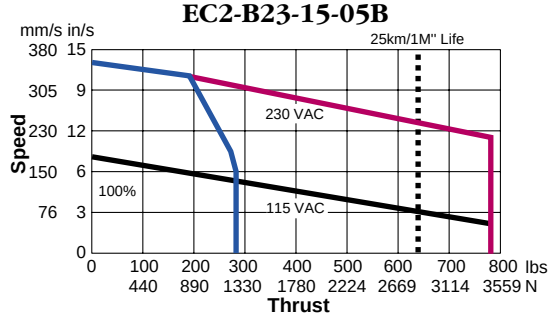
EC2-B23-10-05B
EC2-B23-10L-05B



EC2-B23-10-05B: 1:1 Timing Belt, 5 mm/rev Ballscrew
EC2-B23-10L-05B: 1:1 Inline Coupling, 5 mm/rev Ballscrew

Max. No-Load Accel.	29.5 m/s²	[1160 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

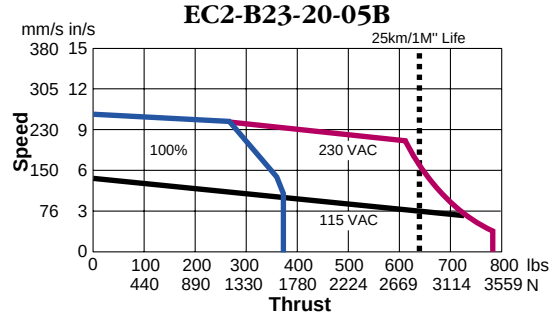
EC2-B23-15-05B



EC2-B23-15-05B: 1.5:1 Timing Belt, 5 mm/rev Ballscrew

Max. No-Load Accel.	32.6 m/s²	[1285 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

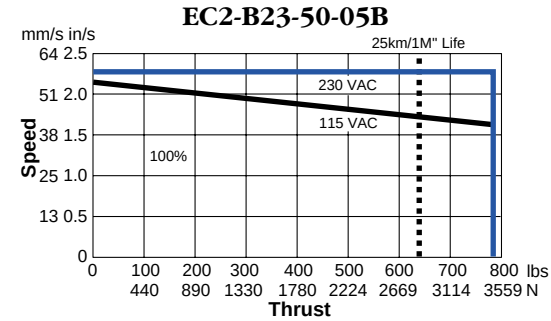
EC2-B23-20-05B



EC2-B23-20-05B: 2:1 Timing Belt, 5 mm/rev Ballscrew

Max. No-Load Accel.	31.5 m/s²	[1240 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC2-B23-50-05B



EC2-B23-50-05B: 5:1 Gears, 5 mm/rev Ballscrew

Max. No-Load Accel.	17.0 m/s²	[670 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using B8000 Series Controls (not B8501).
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and c**olumn load limits** when specifying longer lengths.

5mm lead ballscrew

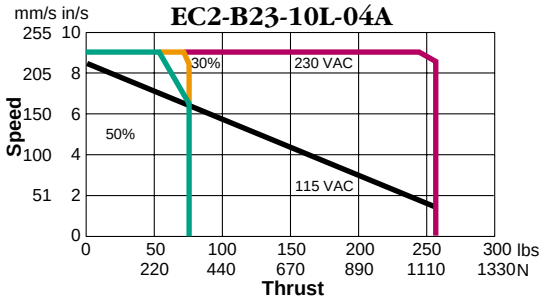
414	414	414	310	172	103	71	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	*Column Load Limit (N)*

Performance

4mm Lead Acme Screw Models

—50% Duty Cycle —30% Duty Cycle —10% Duty Cycle —Intermittent (<2 sec)

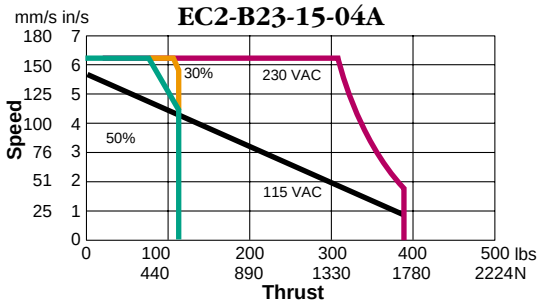
EC2-B23-10-04A
EC2-B23-10L-04A



EC2-B23-10-04A: 1:1 Timing Belt, 4 mm/rev Acme Screw
EC2-B23-10L-04A: 1:1 Inline Coupling, 4 mm/rev Acme Screw

Max. No-Load Accel.	23.6 m/s²	[930 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

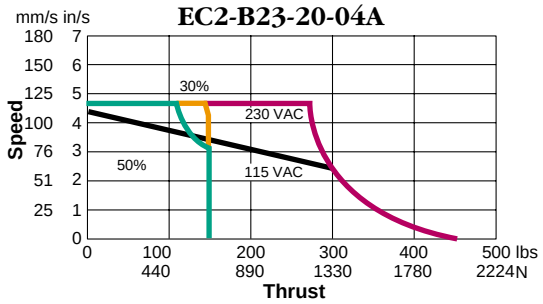
EC2-B23-15-04A



EC2-B23-15-04A: 1.5:1 Timing Belt, 4 mm/rev Acme Screw

Max. No-Load Accel.	26.2 m/s²	[1030 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

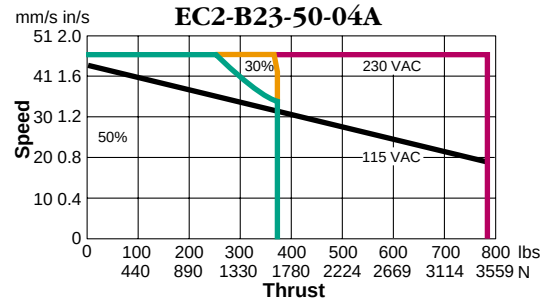
EC2-B23-20-04A



EC2-B23-20-04A: 2:1 Timing Belt, 4 mm/rev Acme Screw

Max. No-Load Accel.	25.3 m/s²	[995 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

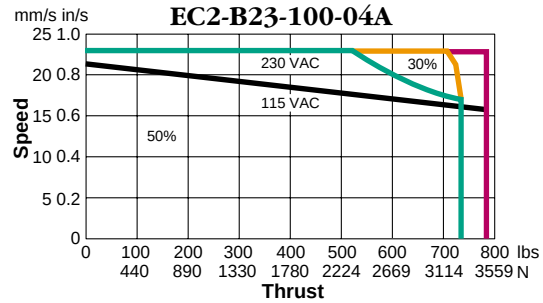
EC2-B23-50-04A



EC2-B23-50-04A: 5:1 Gears, 4 mm/rev Acme Screw

Max. No-Load Accel.	13.6 m/s²	[540 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

EC2-B23-100-04A



EC2-B23-100-04A: 10:1 Gears, 4 mm/rev Acme Screw

Max. No-Load Accel.	7.1 m/s²	[280 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

To configure your system see page A-50 to A-51.

- Consider leadscrew **critical speed** and c**olumn load limits** when specifying longer lengths.

4mm lead acme screw

233	233	233	219	119	72	48	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	2500	*Column Load Limit (N)*

- Performance using B8000 Series Controls (not B8501).
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

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How To Order

Steps to Ordering a Complete EC2-B System

You are ready to specify an EC2-B actuator model number after you have:

a. completed and verified all necessary information on an IDC Product Selection Worksheet.

b. completed the steps in the EC Selection Guidelines on pages (A20-A21).

c. selected a control that is compatible with the B-series motor.

Your local IDC Distributor and our Applications Engineering Department are available to help with your selection process.

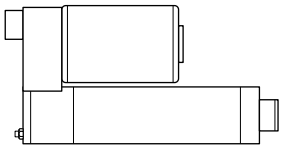
1. Base Model Number

Choose the model with sufficient speed and thrust with a comfortable safety margin. Refer to the EC2-B Speed vs. Thrust curves in this section.

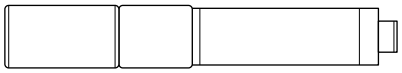
EC2-B cylinders with gear or timing belt drive reductions have the motor mounted parallel to the lead screw. Inline models have the motor coupled directly to the leadscrew with no reduction.

Note: All EC2-B cylinders include an encoder.

Parallel Models



Inline Models



2. Stroke Length

Eight standard lengths are available from 50 to 750 mm. Custom lengths are also available. Consult your IDC distributor or the factory for details.

To maximize cylinder life, the thrust tube should not impact the physical end-of-travel on either end. Extra travel length is necessary to decelerate the load to a stop when an end-of-travel limit switch is encountered. This extra travel distance depends on load and speed. For further information on this refer to the EC Selection Guidelines on pages (A-20 to A-21) or the Engineering Section.

1 Base Model				2 Stroke Length	3 Cylinder Mounting	4 Rod End	5 Options		
Electric Cylinder	Motor	Drive Ratio	Screw Lead, Type	(mm)					
EC2	B								

Ballscrew

EC2-B23-10-16B-	EC2-B23-10-05B-	EC2-B23-10-04A-
EC2-B23-15-16B-	EC2-B23-15-05B-	EC2-B23-15-04A-
EC2-B23-20-16B-	EC2-B23-20-05B-	EC2-B23-20-04A-
EC2-B23-50-16B-	EC2-B23-50-05B-	EC2-B23-50-04A-
EC2-B23-100-16B-	EC2-B23-100-05-B-	EC2-B23-100-04A-

Acme Screw

Inline Models (Direct Drive)

EC2-B23-10L-16B-	EC2-B23-10L-05B-	EC2-B23-10L-04A-

Stroke Length (mm)

50
100
150
200
250
300
450
600
750
Custom lengths available

Cylinder Mounting

No Charge

-MF1	-MP2	-FT1M
-MF2	-MS6M	-FT1E
-MF3	-MS6E	-MT1M
-MS1	-MT4	-MT1E
-MS2		

Additional Charge

-MP3	-FC2	-BM
	-FS2	-BS
		-L
		-LR
		-PB

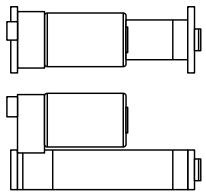
How To Order

3. Cylinder Mounting

Specify any one of these cylinder mounting options. Dimensional drawings start on page A-52.

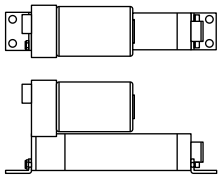
Cylinder base mount options -MS1, -MP2, -MP3, -MF2, -MF3 cannot be ordered with inline models.

MF1, 2, 3 Rectangular Flanges

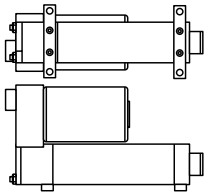


MF1 Front Flange
MF2 Rear Flange
MF3 Both Flanges

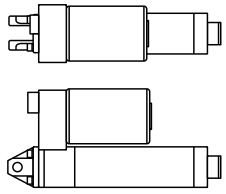
MS1 Side End Angles



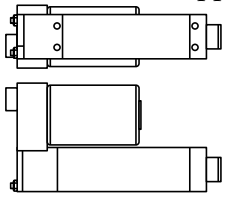
MS2 Side Lugs



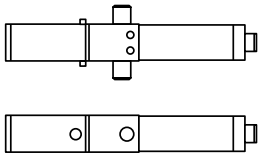
MP2 Rear Clevis (MP3 includes pivot base)



MS6M and MS6E Side Tapped Holes



MT4 Trunnion



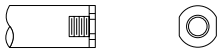
Pivot Mount Caution:

When utilizing a pivot mounting option (MP2 or MT4) in conjunction with a pivot rod end (FS2 or FC2), it is recommended that the actuator be extended only to 90–95% of its full stroke. This increases the system's rigidity and extends the life of the guide bearings and rod seal.

4. Rod Ends

Industrial Devices offers 4 rod end options for EC2-B series cylinders.

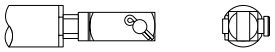
-FT1M or -FT1E Female Thread



-MT1M or -MT1E Male Thread

-FS2 Spherical Joint

-FC2 Clevis



5. Other Options

See the Options and Accessories section for complete specifications.

BM – Motor Holding Brake

10 in-lb holding brake mounted on th B23 motor.

BS – Holding Brake

35 in-lb holding brake mounted on the rear lead screw shaft extension. *Not available on inline models or with cylinder base mount options. (-MF2, -MF3, -MS1, -MP2, -MP3).*

L – Linear Potentiometer Output

Linear potentiometer mounted on inside the EC2-B cylinder. For use with B8501 control.

LR – Linear Rod Bearing

Linear rod bearing support for the thrust tube. Increases side load rating.

PB – Protective Boot

Protects the thrust tube from solid contaminants and prevents liquids from entering the cylinder through the rod end bearing. (Not available with –MS1.)

6. Accessories

Magnetic Position Sensors

Position sensors are available for indicating end-of-travel and home positions, or for use with user supplied controls.

To maximize cylinder life, IDC recommends the use of end-of-travel sensors with all cylinders.

Common Application Requirements: For most applications, one home and two end-of-travel sensors are required for each cylinder. Either Reed or Hall Effect (NPN transistor) switches are compatible with IDC controls.

	3m Leads	4m Quick
Reed		
Home (N.O.)	PSR-1	PSR-1Q
End-of-travel (N.C.)	PSR-2	PSR-2Q
Hall Effect		
Home (N.O./NPN)	PSN-1	PSN-1Q
End-of-travel (N.C./NPN)	PSN-2	PSN-2Q

See page A-240 for more limit switch options, including quick-disconnect versions.

7. Compatible Controls

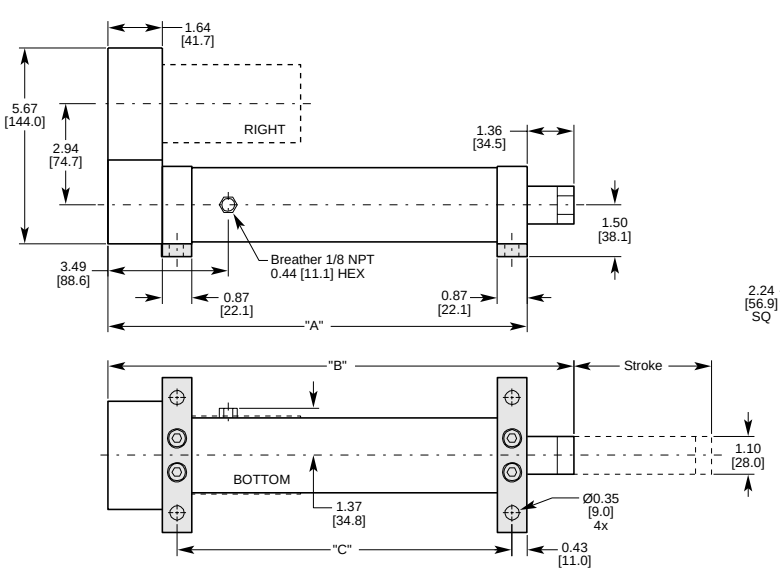
Details of controls are in Sections H. The EC2-B is compatible with:

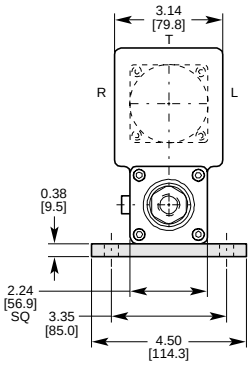
Model	Description
B8001	Digital servo drive
B8501	Analog position
B8961	*IDeal*™ programmable servo
B8962	2 Axis *IDeal*™ programmable servo

Dimensions

MS2 Side Lugs Mounting

Parallel



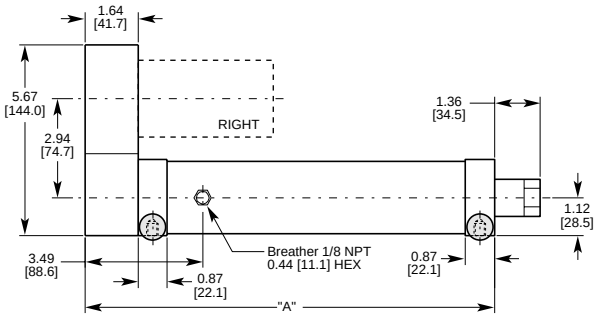


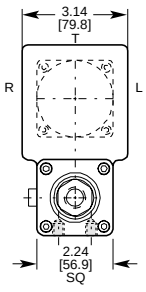
DIMENSION		LENGTH
A	CYLINDER LENGTH	8.22 [208.8] + STROKE
B	RETRACT LENGTH	9.58 [243.4] + STROKE
C	MOUNTING LENGTH	5.70 [144.8] + STROKE

- For AutoCAD® DXF drawings, go to our website, or call the factory for a diskette
- For motor dimensions, go to pages A-58 to A-61
- For rod-end dimensions, go to page A-62

MS6 Side Tapped Holes Mounting

Parallel





DIMENSION		LENGTH	DIM	OPTION CODE	SIZE
A	CYLINDER LENGTH	8.22 [208.8] + STROKE	D	MS6E	5/16-18 UNC-2B x 0.33 Dp
B	RETRACT LENGTH	9.58 [243.4] + STROKE		MS6M	M8 x 1.25-6H x 8.4mm Dp
C	MOUNTING LENGTH	5.70 [144.8] + STROKE			

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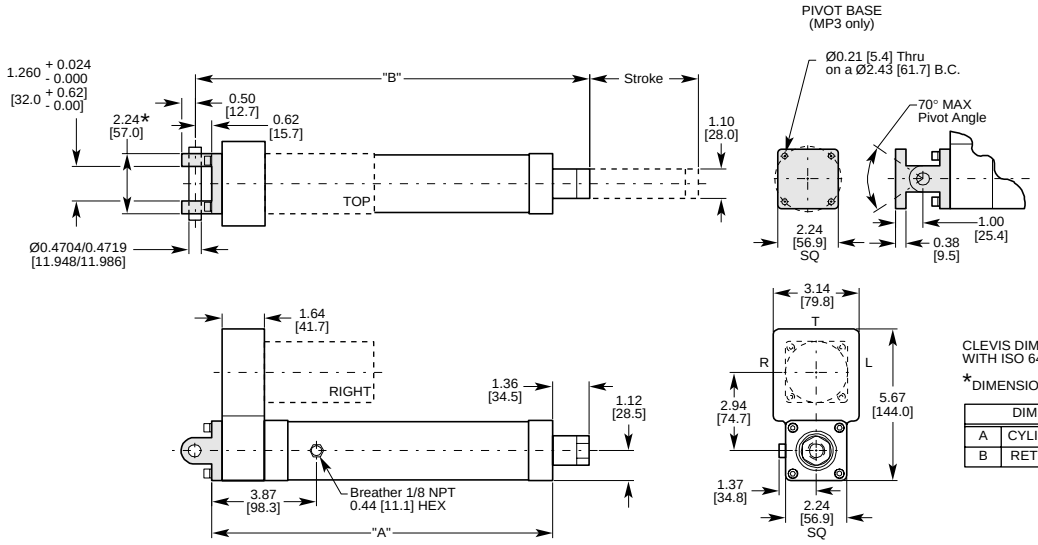
Dimensions

MP2/MP3 Clevis Mount with Pivot Base and Pin

Parallel



- For AutoCAD® DXF drawings, go to our website, or call the factory for a diskette
- For motor dimensions, go to pages A-58 to A-61
- For rod-end dimensions, go to page A-62

CLEVIS DIMENSIONS IN ACCORDANCE WITH ISO 6431 50mm BORE EXCEPT AS INDICATED

*DIMENSION NOT ISO 6431 FOR 50mm BORE SIZE

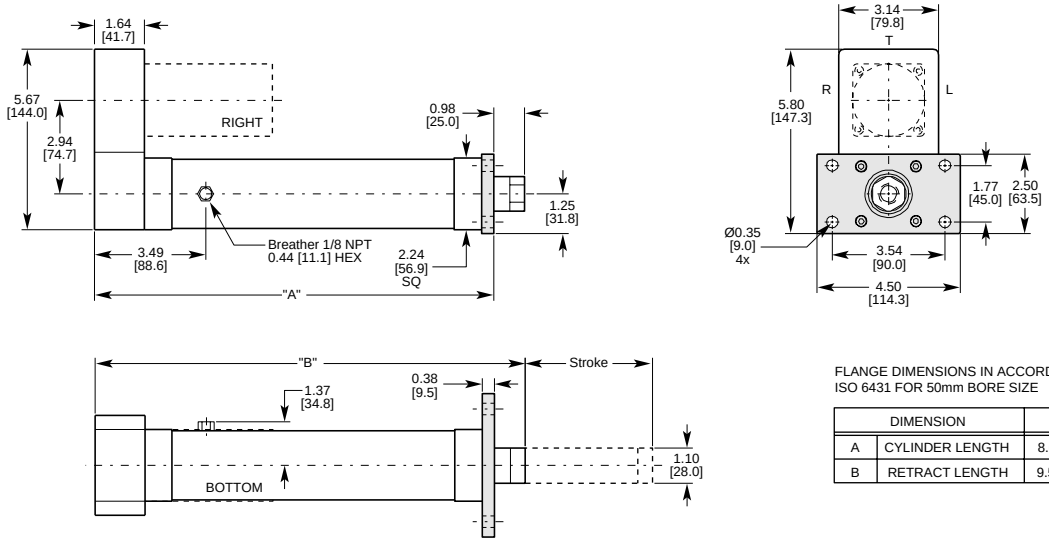
DIMENSION		LENGTH
A	CYLINDER LENGTH	8.60 [218.5] + STROKE
B	RETRACT LENGTH	10.53 [267.5] + STROKE

Note:

- Order MP3 to specify complete mounting kit, including actuator clevis, pin and pivot base.
- Order MP2 to omit the pivot base.

MF1 Head Rectangular Flange Mounting

Parallel



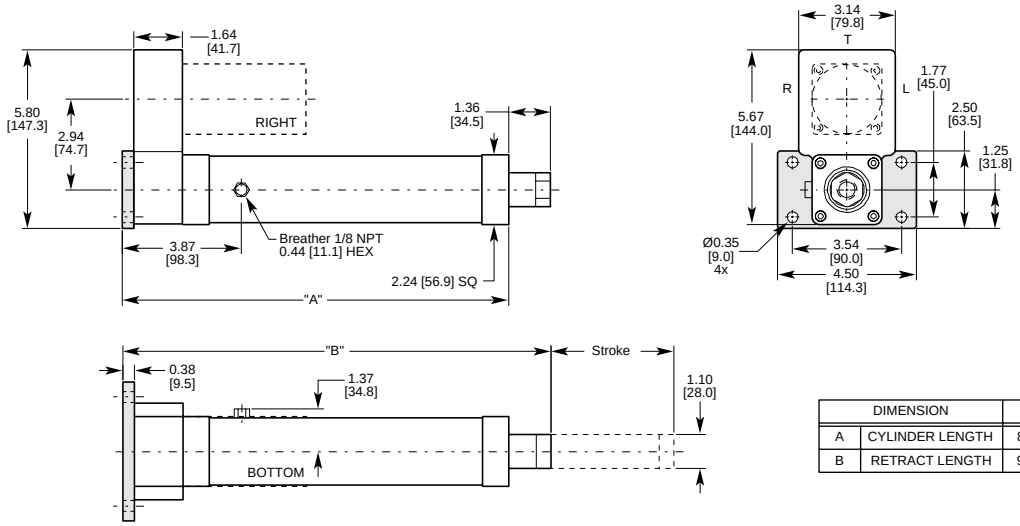
FLANGE DIMENSIONS IN ACCORDANCE WITH ISO 6431 FOR 50mm BORE SIZE

DIMENSION		LENGTH
A	CYLINDER LENGTH	8.60 [218.5] + STROKE
B	RETRACT LENGTH	9.58 [243.4] + STROKE

Dimensions

MF2 Cap Rectangular Flange Mounting

Parallel



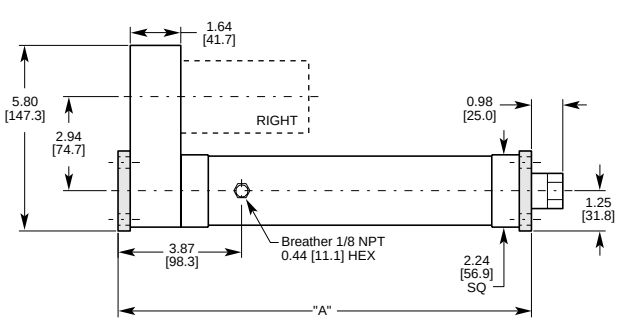
FLANGE DIMENSIONS IN ACCORDANCE WITH ISO 6431 FOR 50mm BORE SIZE

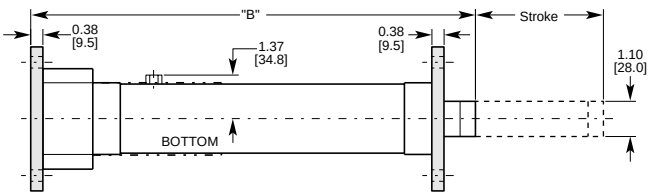
DIMENSION		LENGTH
A	CYLINDER LENGTH	8.60 [218.5] + STROKE
B	RETRACT LENGTH	9.96 [253.0] + STROKE

- For AutoCAD® DXF drawings, go to our website, or call the factory for a diskette
- For motor dimensions, go to pages A-58 to A-61
- For rod-end dimensions, go to page A-62

MF3 Both Ends Rectangular Flange Mounting

Parallel





FLANGE DIMENSIONS IN ACCORDANCE WITH ISO 6431 FOR 50mm BORE SIZE

DIMENSION		LENGTH
A	CYLINDER LENGTH	8.98 [228.1] + STROKE
B	RETRACT LENGTH	9.96 [253.0] + STROKE

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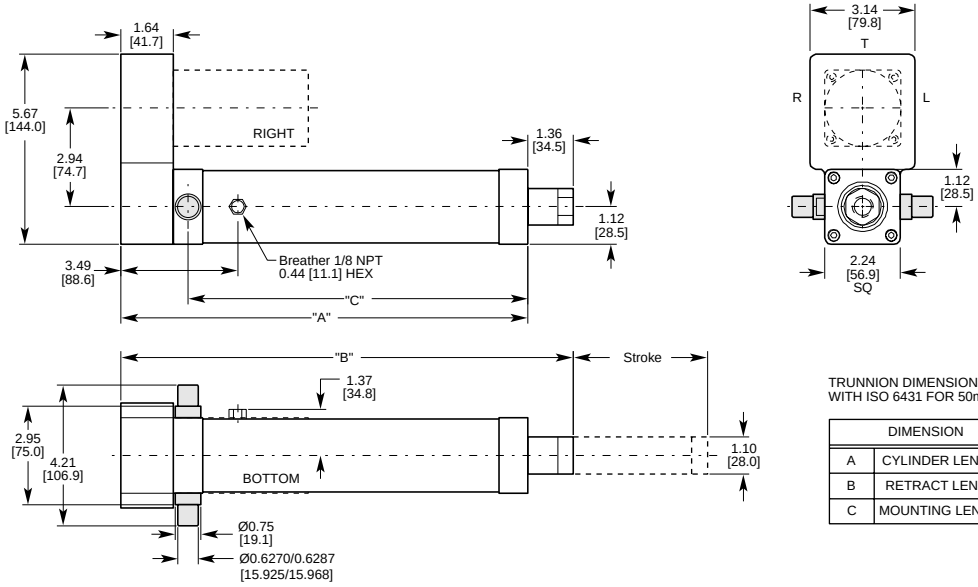
Dimensions

MT4 Trunnion Mounting

Parallel



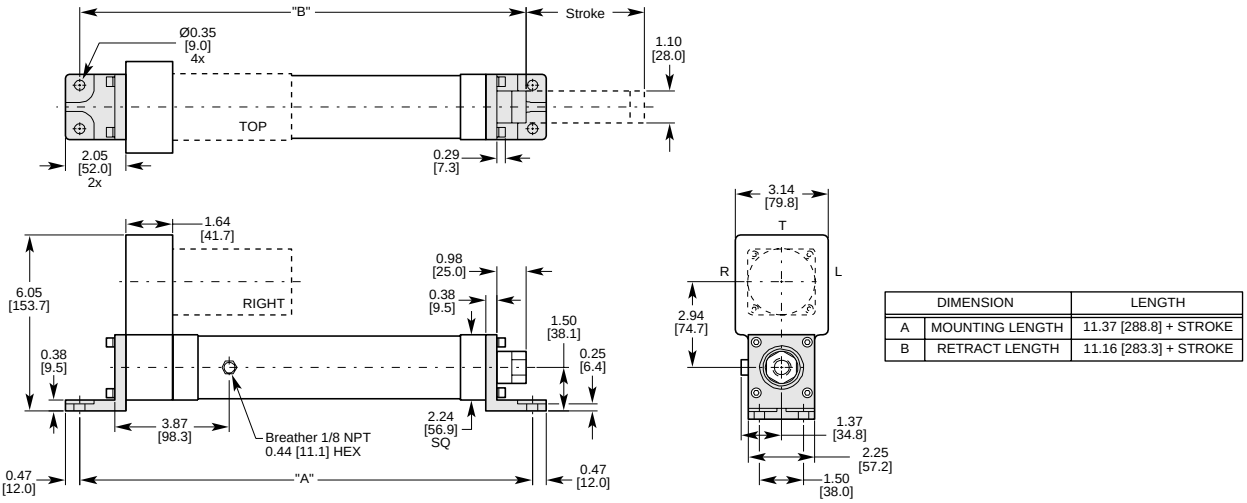
- For AutoCAD® DXF drawings, go to our website, or call the factory for a diskette
- For motor dimensions, go to pages A-58 to A-61
- For rod-end dimensions, go to page A-62

TRUNNION DIMENSIONS IN ACCORDANCE WITH ISO 6431 FOR 50mm BORE SIZE

DIMENSION		LENGTH
A	CYLINDER LENGTH	8.22 [208.8] + STROKE
B	RETRACT LENGTH	9.58 [243.4] + STROKE
C	MOUNTING LENGTH	6.13 [155.8] + STROKE

MS1 Side End Angles Mounting

Parallel



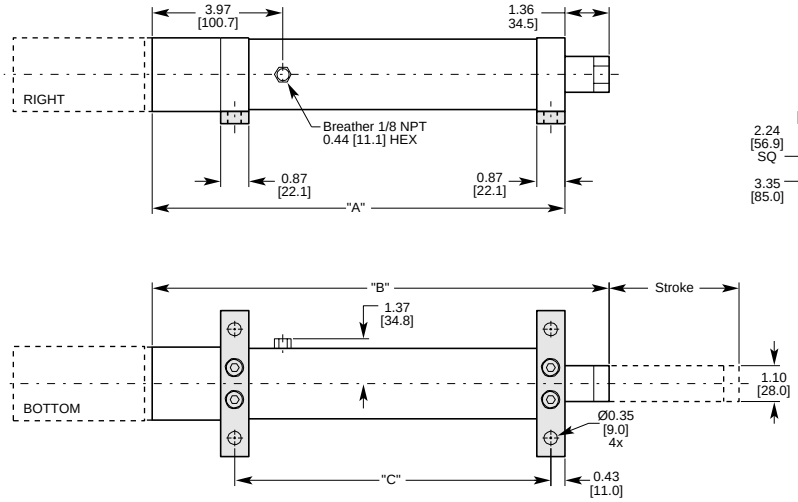
DIMENSION		LENGTH
A	MOUNTING LENGTH	11.37 [288.8] + STROKE
B	RETRACT LENGTH	11.16 [283.3] + STROKE

Not available with -PB option.

Dimensions

MS2 Side Lugs Mounting

Inline

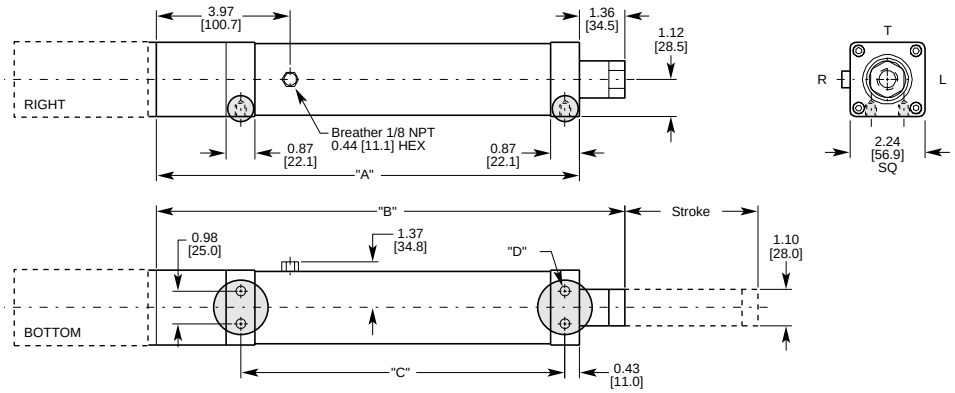


DIMENSION		LENGTH
A	CYLINDER LENGTH	8.70 [220.9] + STROKE
B	RETRACT LENGTH	10.06 [255.5] + STROKE
C	MOUNTING LENGTH	5.70 [144.8] + STROKE

- For AutoCAD® DXF drawings, go to our website, or call the factory for a diskette
- For motor dimensions, go to pages A-58 to A-61
- For rod-end dimensions, go to page A-62

MS6 Side Tapped Holes Mounting

Inline



DIMENSION		LENGTH	DIMENSION	OPTION CODE	SIZE
A	CYLINDER LENGTH	8.70 [220.9] + STROKE	D	MS6E	5/16-18 UNC-2B x 0.33 Dp
B	RETRACT LENGTH	10.06 [255.5] + STROKE		MS6M	M8 x 1.25-6H x 8.4mm Dp
C	MOUNTING LENGTH	5.70 [144.8] + STROKE			

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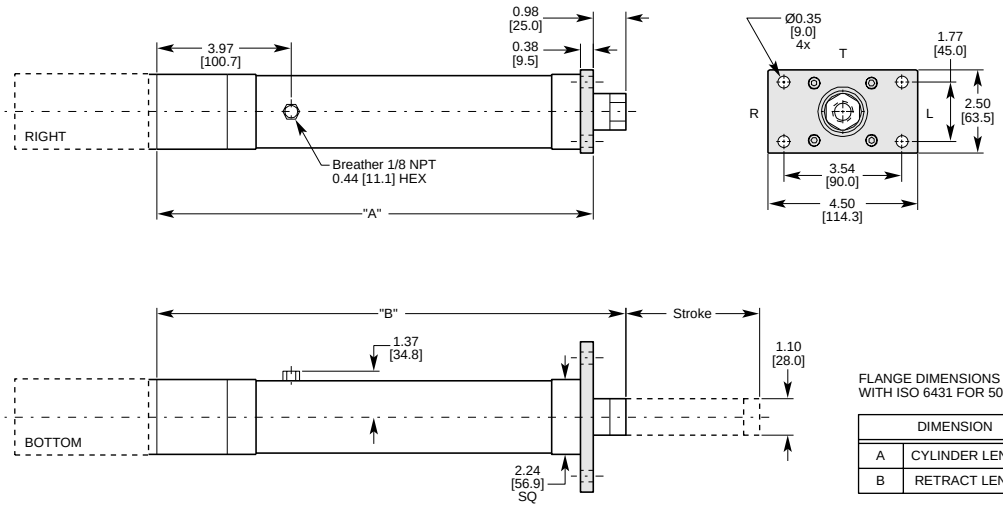
Dimensions

MF1 Head Rectangular Flange Mounting

Inline



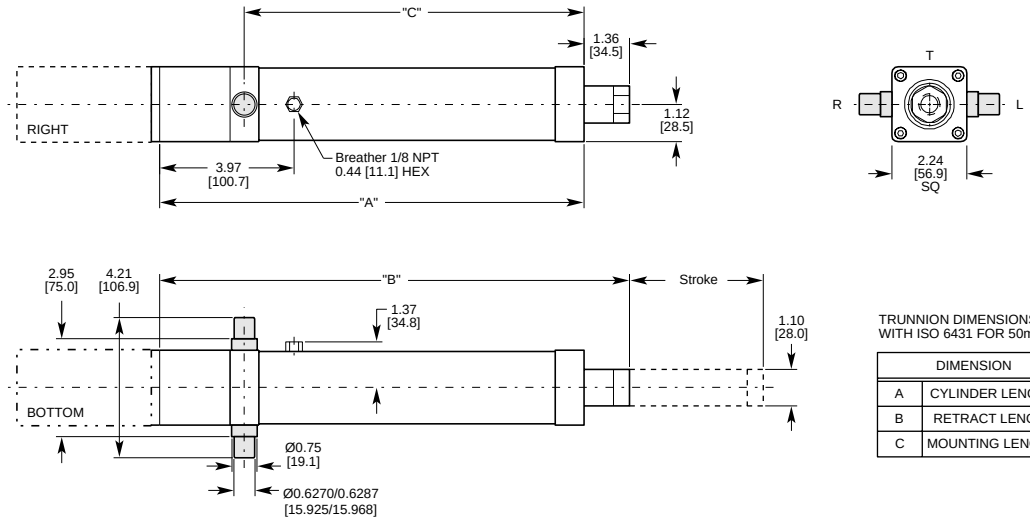
- For AutoCAD® DXF drawings, go to our website, or call the factory for a diskette
- For motor dimensions, go to pages A-58 to A-61
- For rod-end dimensions, go to page A-62

FLANGE DIMENSIONS IN ACCORDANCE WITH ISO 6431 FOR 50mm BORE SIZE

DIMENSION		LENGTH
A	CYLINDER LENGTH	9.08 [230.5] + STROKE
B	RETRACT LENGTH	10.06 [255.5] + STROKE

MT4 Trunnion Mounting

Inline



TRUNNION DIMENSIONS IN ACCORDANCE WITH ISO 6431 FOR 50mm BORE SIZE

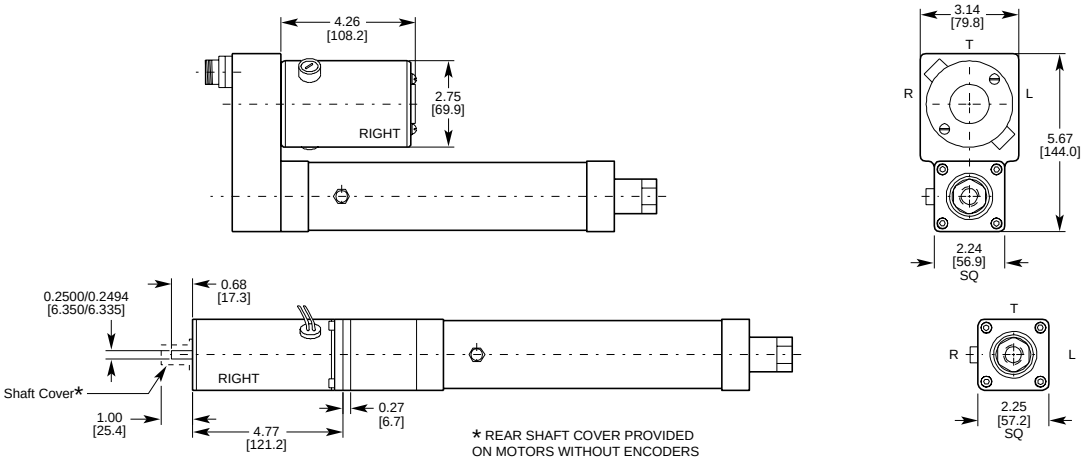
DIMENSION		LENGTH
A	CYLINDER LENGTH	8.70 [220.9] + STROKE
B	RETRACT LENGTH	10.06 [255.5] + STROKE
C	MOUNTING LENGTH	6.13 [155.8] + STROKE

Motor Specifications

EC2-D Series — Permanent Magnet 2-pole, 24 volt DC Motor

Winding Data	D motor
Inductance	1.8 mH
Resistance	1.0
Torque Constant	8.8 oz-in/Amp
Voltage Constant	6.5 V/krpm
Torque	
Continuous	39.6 oz-in (4.5 Amps)
Peak	88 oz-in (10 Amps)
Rotor Inertia	0.018 oz-in-sec^2
Connections	Inline Models – 2 leads, 6 inch [150 mm] length Parallel Models – Quick Disconnect: 3 contact receptacle in anodized or painted aluminum shell, includes 12 ft. [3.7 m] cable with molded plug. (Not available on inline models).
Temperature	180°F [82°C] maximum allowable motor case temperature Actual motor case temperature is ambient, duty cycle, speed and load dependent. Refer to speed vs. thrust curves for system duty ratings.

D Motor



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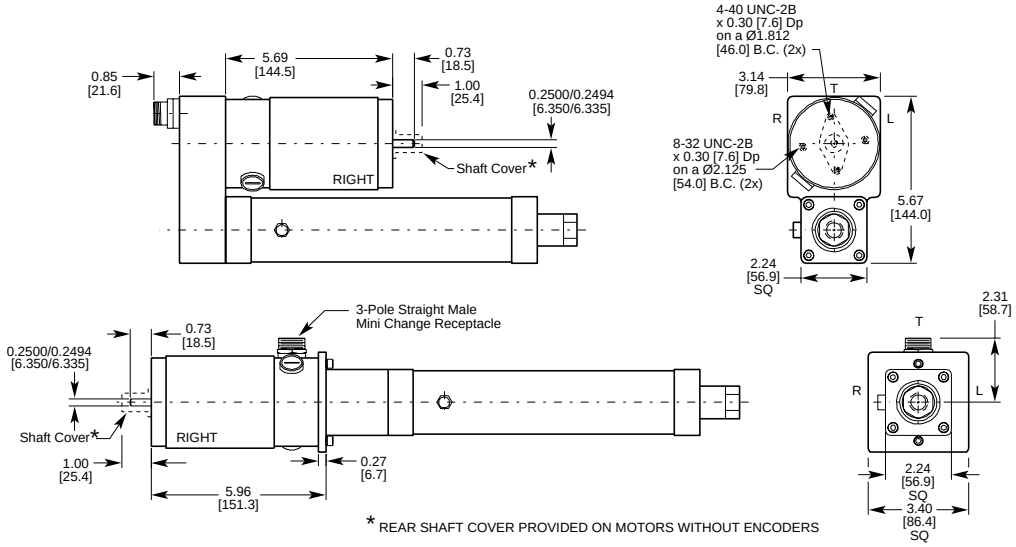
Motor Specifications

EC2-H Series — Permanent Magnet 2-pole, 160 volt DC Motor

Winding Data	H motor
Inductance	19 mH
Resistance	6.4
Torque Constant	54 oz-in/Amp
Voltage Constant	40 V/krpm
Torque	
Continuous	108 oz-in (2.0 Amps)
Peak	432 oz-in (8.0 Amps)
Rotor Inertia	0.049 oz-in-sec^2
Connections	Quick Disconnect: 3 contact receptacle in anodized or painted aluminum shell, includes 12 ft. [3.7 m] cable with molded plug.
Temperature	180°F [82°C] maximum allowable motor case temperature Actual motor case temperature is ambient, duty cycle, speed and load dependent. Refer to speed vs. thrust curves for system duty ratings.

H Motor

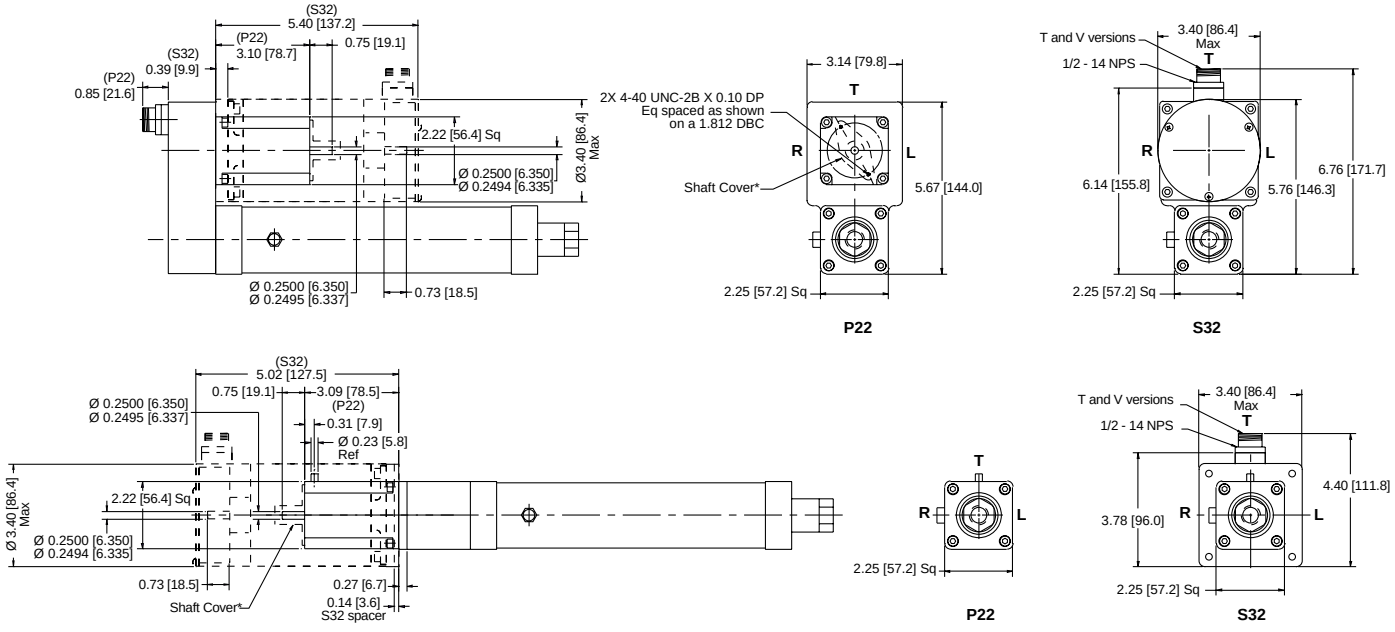


Motor Specifications

EC2-S/P Series — 1.8° Permanent Magnet Hybrid Step Motor

Winding Data	P22T and P22V	S32T and S32V
Inductance	Series (T),63mH; Parallel (V), 16mH	Series (T), 6.2mH; Parallel (V), 1.5mH
Resistance	Series (T), 14.8 ; Parallel (V), 3.7	Series (T), 1.03 ; Parallel (V), 0.26
Current Settings	Parallel (V) at 120 VAC, 1.5 Amps Series (T) at 240 VAC, 0.7 Amps	Series (T) at 120 VAC, 2.8 Amps Parallel (V) at 120 VAC or Series (T) at 240 VAC, 5.6 Amps
Static Torque	200 oz-in max	300 oz-in max
Rotor Inertia	3.81×10^{-4} oz-in-sec^2	0.017 oz-in-sec^2
Connections	EC2-P22N: 8 leads, 12 ft. sheathed cable for inline mount. EC2-S32T, EC2-S32V, EC2-P22T, and EC2-P22V: 5 contact quick disconnect receptacle in anodized or painted aluminum shell, includes 12 ft [3.7 m] cable with molded plug.	
Temperature	212°F [100°C] maximum allowable motor case temperature. Actual motor case temperature is ambient, duty cycle, speed and load dependent. Refer to speed vs. thrust curves for system duty ratings.	

P22/S32 Motor



* Rear shaft cover provided on motors without encoders

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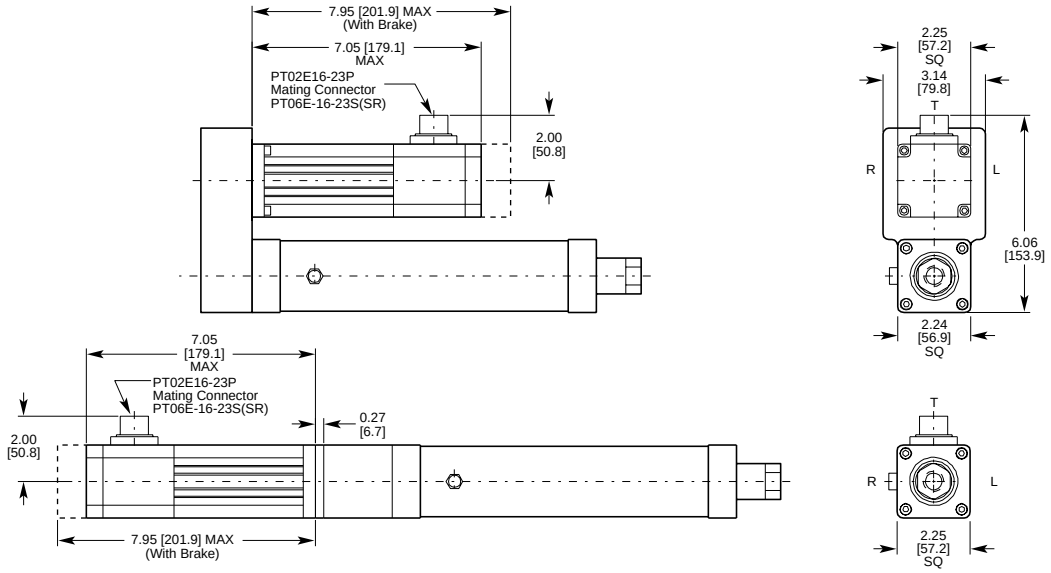
Motor Specifications

EC2-B Series

Rare Earth Magnet Brushless Servo Motor with 2,000 Line Encoder and Commutation Sensors

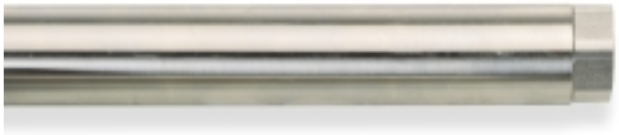
Winding Data	B23
Inductance	16 mH
Resistance	10.6
Torque Constant	57.6 oz-in/Amp
Voltage Constant	45.5 V/krpm
Torque	
Continuous	144 oz-in (2.5 Amps)
Peak	414 oz-in (7.2 Amps)
Rotor Inertia	0.0019 oz-in-sec^2
Connections	MS-type connectors for motor winding and encoder on motor. Includes 12 ft. [3.7 m] cable with mating connector.
Temperature	212°F [100°C] maximum allowed case temperature.
Environmental	IP65 Rating

B23 Motor

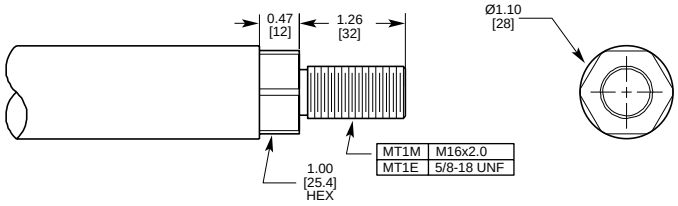


Rod End Dimensions

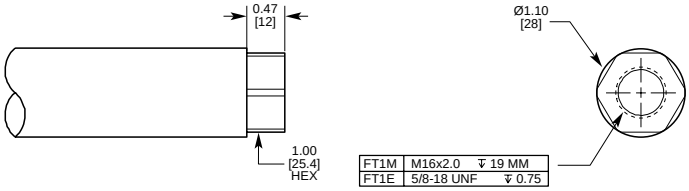
Dimensions in [mm]



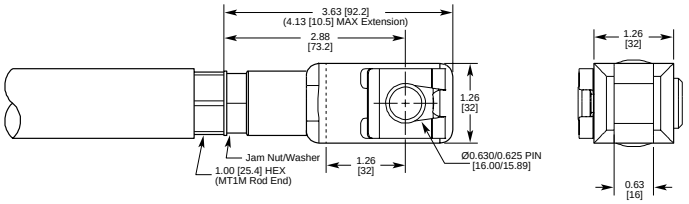
MT1 Male Threads



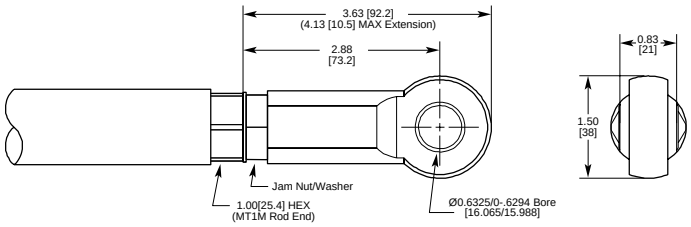
FT1 Female Threads



FC2 Clevis with Pin



FS2 Spherical



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Overview

The EC3 series is a robust linear motion package for moderate to heavy thrust loads ranging up to 7200 N [1620 lb] and travel up to 1000 mm [39.4 in]. Precision rolled ballscrews are standard, yielding quiet operation, low backlash and high accuracy. (See the following pages for detailed specifications).

EC3 Series electric cylinders are available with brushless servo, step motors, or DC servo for compatibility with every motion control environment.

Both ballscrew and acme screw models provide a variety of speed and thrust capabilities. Ballscrew models are used in applications that require higher speed and duty cycles. Acme screw models generally perform best in low duty cycle applications, and where load holding is required without a brake or in the case of electrical power loss. The life expectancy of a ballscrew is generally better than an acme screw. Standard ballscrews are 5 mm, 10 mm and 16 mm lead, and acme screws are available in 4 mm lead.

EC3 timing belt or gear reductions between the motor and leadscrew allow selection of the best match between motor power and your linear speed and thrust range.

Options

Options include rotary encoders or linear potentiometers for position feedback, load-holding brakes, protective boots, and quick-disconnect cables. Industrial Devices will also discuss unique modifications at your request.

	EC3-H Series	EC3-P Series	EC3-B Series
Motor Type	160 Volt DC Servo	1.8° Hybrid Stepper	Brushless Servo
Thrust Load Capacity	7200 N [1620 lbs]	7200 N [1620 lbs]	7200 N [1620 lbs]
No Load Speed	930 mm/sec [36.5 in/sec]	800 mm/sec [31.5 in/sec]	1280 mm/sec [50.5 in/sec]
Repeatability	0.025mm [±0.001]	0.013mm [±0.0005]	0.013mm [±0.0005]
Compatible Controls Offered	H3301B H3321B H3501	NextStep® SmartStep® S6002 S6961 S6962	B8001 B8961 B8962
Performance Curves	Page A-68	Page A-74	Page A-80

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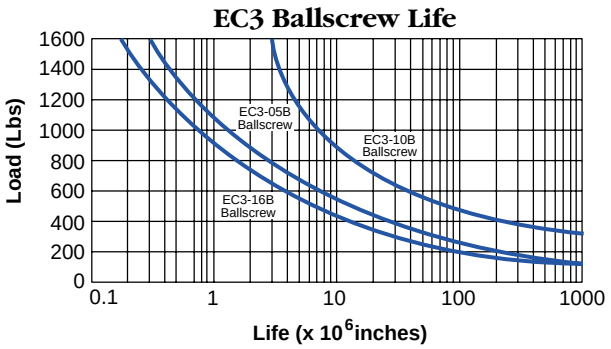
General Specifications

Travel Lengths	50, 100, 150, 200, 250, 300, 450, 600, 750, 1000 mm. Custom strokes available in increments of 1 mm.
Construction Materials	
Bearing & Drive Housing	6063 T6 aluminum, anodized
Cylinder Body	6063 T6 aluminum, hard anodized with PTFE impregnation
Mounting Plates	6061 T6 aluminum and cast aluminum plate, anodized
Thrust Tube	300 Series Stainless Steel, 1/8 hard and ground
Speed Reducer Options	
Belt/Pulley	AT-5, polyurethane with steel tensile cords
Gears	Alloy steel, case hardened
Transport Screw Options	
Ballscrew/Ballnut	Lead: 16 mm [0.630 in], 10 mm [0.394 in], or 5 mm [0.197 in] Heat treated carbon steel alloy
Acme Screw/Nut	Lead: 4 mm [0.157 in] Bronze acme drive nut; carbon steel alloy acme screw
Thrust Bearings	Angular contact, high thrust ball bearings
Weight (approximate, without options)	
EC3-H	kg = 8.4 + 0.008 × [mm stroke]; lb = 18.4 + 0.46 × [inches stroke]
EC3-P32	kg = 8.5 + 0.008 × [mm stroke]; lb = 18.7 + 0.46 × [inches stroke]
EC3-B23	kg = 6.2 + 0.008 × [mm stroke]; lb = 13.6 + 0.46 × [inches stroke]
EC3-B32	kg = 8.7 + 0.008 × [mm stroke]; lb = 19.2 + 0.46 × [inches stroke]
Motor	
Specifications/Dimensions	See pages A-96 to A-99.
Environmental Operation	
Temperature	-30° to 70°C [-22° to 158°F] When operating below 2°C [35°F], vent tubing fitting must be installed. Consult the factory for more information.
Moisture/Contaminants	**IP 54 rated:** Polyurethane thrust tube wiper seal. Mating surfaces gasket sealed. Protected against dust and splashing water (non-corrosive, non-abrasive). Limited ingress permitted. **Vent Tube Fitting:** A vent tube fitting is included, which can be installed to permit the actuator to breathe from a non-contaminated area, or receive a positive pressure continuous purge (14-20kPa [2-3 psi]). **PB Protective Boot (IP65) Option:** An optional thrust tube boot prevents moisture and dry contaminants from bypassing the thrust tube wiper seal, providing IP65 protection when used with included vent tube fitting. The boot also prevents contaminant buildup on the thrust tube. **Clean Room & Vacuum Applications:** IDC has designed special actuators for clean room and vacuum applications. Please consult the factory if your application requires special environmental compatibility.
Maintenance	The EC3 Series actuator design eliminates the need for most routine maintenance. Re-lubrication is required in high cycle applications. Acme screw models include a lube port and adapter for a standard grease gun. See the EC Series Operator's Manual for replacement parts.

General Specifications

Ballscrew

Ballscrew life is rated in inches of travel at a given load. The values in the chart to the right indicate the travel life where 90% of all units in a sample will continue to work, while 10% have failed. This is similar to the B10 rating of a roller bearing mechanism. Be sure to consider acceleration loads as well as thrust, gravity and friction loads.



Acme Screw

Usable life for an acme screw is defined as the length of travel completed before backlash (of leadscrew/nut) exceeds 0.020" [0.5 mm].

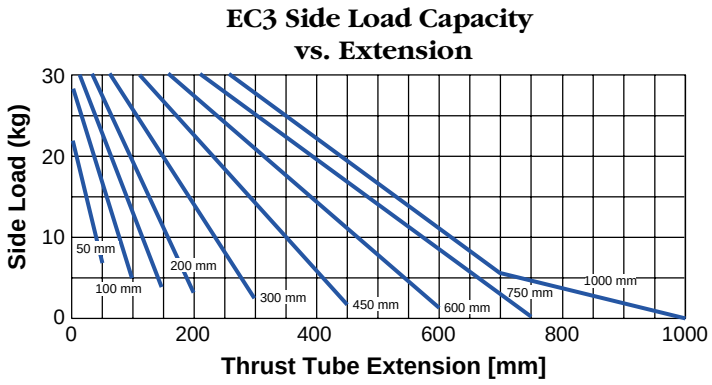
A travel life of 25km [1 million inches] under the maximum rated load can be used as a general approximation. However, since directly dependent on application conditions (load, duty cycle, move profiles, and environment), it is difficult to predict a statistical travel life.

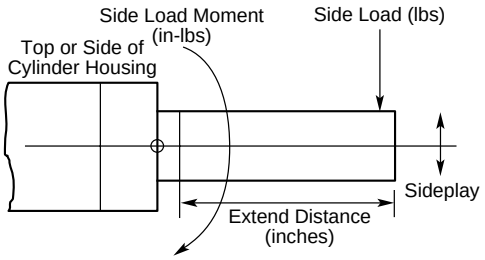
Thrust Tube Capacity

Thrust Tube Torque Capacity

Thrust tube does not rotate during operation. Maximum allowable torque during operation and installation is 7.5 N-m [67 lb-in]

Thrust Tube Side Load Capacity





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General Specifications

EC3 Series Actuator Inertia

Equations

Rotary Inertia (reflected to motor) = A + B* (stroke, in) + C* (load, lb)

Model	Ratio	Screw	A (lb-in-s²)	B (lb-in-s²/in)	C (lb-in-s²/lb)
EC3-...-10-16B	1:1	16 x 16	1.188 E-03	1.176 E-05	2.604 E-05
EC3-...-15-16B	1.5:1		7.435 E-04	5.228 E-06	1.157 E-05
EC3-...-20-16B	2:1		4.779 E-04	2.765 E-06	6.121 E-06
EC3-...-50-16B	5:1		2.280 E-04	4.635 E-07	1.026 E-06
EC3-...-70-16B	7:1		1.975 E-04	2.401 E-07	5.314 E-07
EC3-...-10-10B	1:1	20 x 10	1.199 E-03	1.874 E-05	1.017 E-05
EC3-...-15-10B	1.5:1		7.487 E-04	8.328 E-06	4.521 E-06
EC3-...-20-10B	2:1		4.806 E-04	4.405 E-06	2.391 E-06
EC3-...-50-10B	5:1		2.285 E-04	7.384 E-07	4.008 E-07
EC3-...-70-10B	7:1		1.977 E-04	3.824 E-07	2.076 E-07
EC3-...-10-05B	1:1	20 x 5	1.199 E-03	1.874 E-05	1.017 E-05
EC3-...-15-05B	1.5:1		7.487 E-04	8.328 E-06	4.521 E-06
EC3-...-20-05B	2:1		4.806 E-04	4.405 E-06	2.391 E-06
EC3-...-50-05B	5:1		2.278 E-04	6.953 E-07	1.002 E-07
EC3-...-70-05B	7:1		1.973 E-04	3.601 E-07	5.189 E-08
EC3-...-10-04A	1:1	20 x 4 ACME	2.894 E-04	8.202 E-06	1.627 E-06
EC3-...-15-04A	1.5:1		1.407 E-04	3.792 E-06	7.525 E-07
EC3-...-20-04A	2:1		9.328 E-05	2.050 E-06	4.069 E-07
EC3-...-50-04A	5:1		5.253 E-05	3.252 E-07	6.454 E-08
EC3-...-70-04A	7:1		4.566 E-05	8.1928 E-08	1.6257 E-08

Motor	Inertia (lb-in-s²)
H	3.063 E-03
P32	2.375 E-03
B23	1.188 E-04
B32	1.000 E-03

Metric Conversions:

1 mm = 0.03937 in

1 kg = 2.205 lb

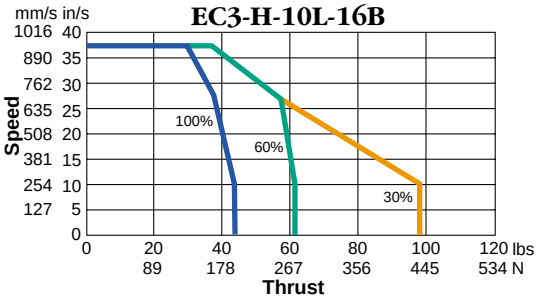
1 lb-in-s² = 1129 kg-cm² = 1.152 kg-cm-s²

Performance

16 mm Lead Ballscrew Models

—100% Duty Cycle —60% Duty Cycle —30% Duty Cycle

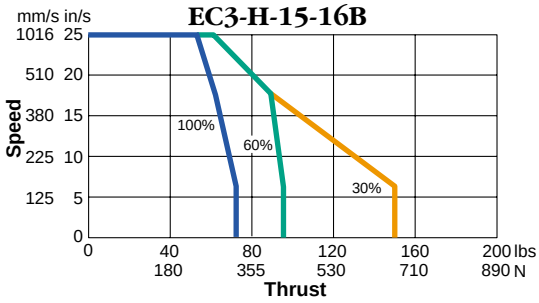
EC3-H-10-16B
EC3-H-10L-16B



EC3-H-10-16B: 1:1 Timing Belt, 16 mm/rev Ballscrew
EC3-H-10L-16B: 1:1 Inline Coupling, 16 mm/rev Ballscrew

Max. No-Load Accel.	3.92 m/s²	[154 in/s²]
Repeatability	±0.025 mm	[±0.001 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

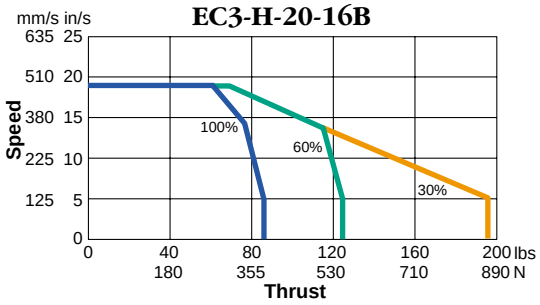
EC3-H-15-16B



EC3-H-15-16B: 1.5:1 Timing Belt, 16 mm/rev Ballscrew

Max. No-Load Accel.	2.96 m/s²	[117 in/s²]
Repeatability	±0.025 mm	[±0.001 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

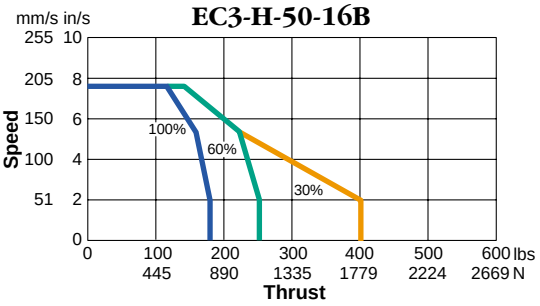
EC3-H-20-16B



EC3-H-20-16B: 2.0:1 Timing Belt, 16 mm/rev Ballscrew

Max. No-Load Accel.	2.41 m/s²	[95 in/s²]
Repeatability	±0.025 mm	[±0.001 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

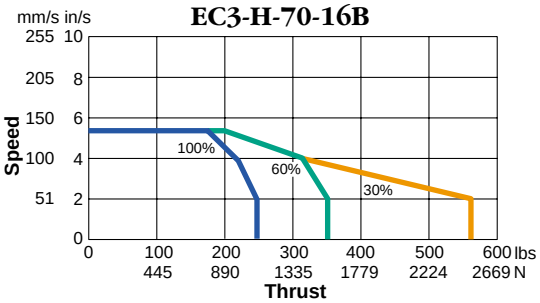
EC3-H-50-16B



EC3-H-50-16B: 5:1 Gears, 16 mm/rev Ballscrew

Max. No-Load Accel.	1.04 m/s²	[41 in/s²]
Repeatability	±0.025 mm	[±0.001 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC3-H-70-16B



EC3-H-70-16B: 7:1 Gears, 16 mm/rev Ballscrew

Max. No-Load Accel.	0.75 m/s²	[30 in/s²]
Repeatability	±0.25 mm	[±0.001 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using H3000 Series Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

16mm lead ballscrew

1280	1280	1280	866	530	318	216	127	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	1000	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	4900	2780	*Column Load Limit (N)*

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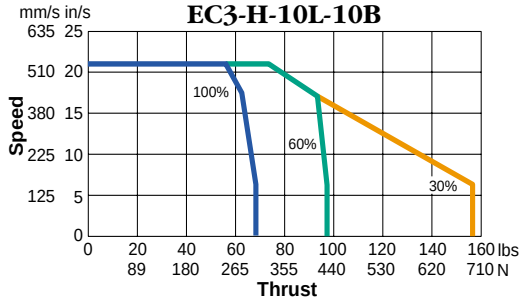
10 mm Lead Ballscrew Models

—100% Duty Cycle —60% Duty Cycle —30% Duty Cycle

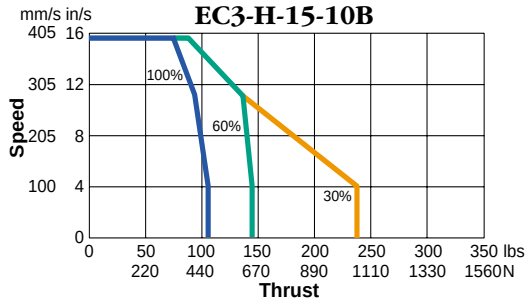
EC3-H-10-10B
EC3-H-10L-10B



EC3-H-10-10B: 1:1 Timing Belt, 10 mm/rev Ballscrew
EC3-H-10L-10B: 1:1 Inline Coupling, 10 mm/rev Ballscrew

Max. No-Load Accel.	2.40 m/s²	[94 in/s²]
Repeatability	±0.025 mm	[±0.001 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

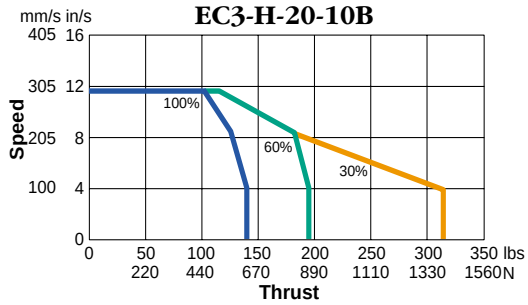
EC3-H-15-10B



EC3-H-15-10B: 1.5:1 Timing Belt, 10 mm/rev Ballscrew

Max. No-Load Accel.	1.83 m/s²	[72 in/s²]
Repeatability	±0.025 mm	[±0.001 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

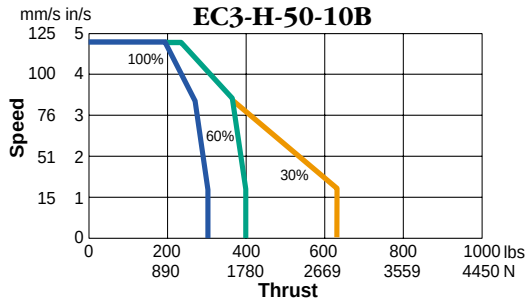
EC3-H-20-10B



EC3-H-20-10B: 2:1 Timing Belt, 10 mm/rev Ballscrew

Max. No-Load Accel.	1.49 m/s²	[59 in/s²]
Repeatability	±0.025 mm	[±0.001 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

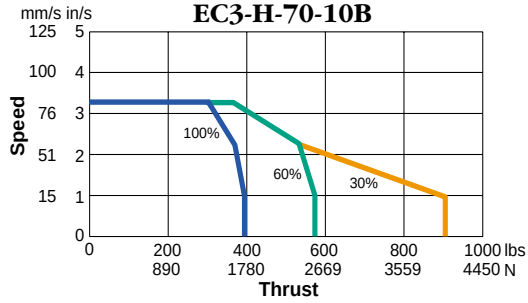
EC3-H-50-10B



EC3-H-50-10B: 5:1 Gears, 10 mm/rev Ballscrew

Max. No-Load Accel.	0.65 m/s²	[26 in/s²]
Repeatability	±0.025 mm	[±0.001 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC3-H-70-10B



EC3-H-70-10B: 7:1 Gears, 10 mm/rev Ballscrew

Max. No-Load Accel.	0.47 m/s²	[19 in/s²]
Repeatability	±0.25 mm	[±0.001 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using H3000 Series Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

To configure your system see page A-72 to A-73.

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

10mm lead ballscrew

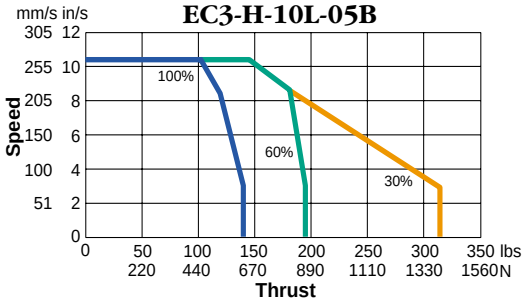
533	533	533	533	398	239	212	96	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	1000	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	5340	*Column Load Limit (N)*

Performance

5 mm Lead Ballscrew Models

—100% Duty Cycle —60% Duty Cycle —30% Duty Cycle

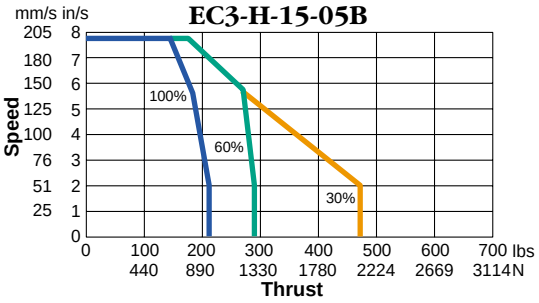
EC3-H-10-05B
EC3-H-10L-05B



EC3-H-10-05B: 1:1 Timing Belt, 5 mm/rev Ballscrew
EC3-H-10L-05B: 1:1 Inline Coupling, 5 mm/rev Ballscrew

Max. No-Load Accel.	1.25 m/s²	[49 in/s²]
Repeatability	±0.025 mm	[±0.001 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

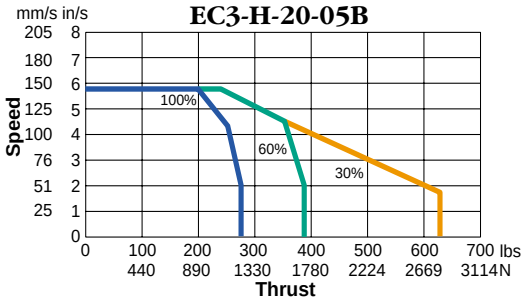
EC3-H-15-05B



EC3-H-15-05B: 1.5:1 Timing Belt, 5 mm/rev Ballscrew

Max. No-Load Accel.	0.93 m/s²	[37 in/s²]
Repeatability	±0.025 mm	[±0.001 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

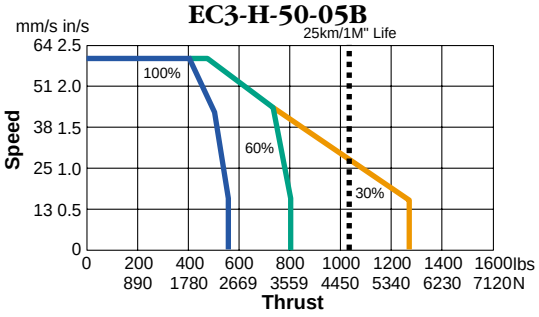
EC3-H-20-05B



EC3-H-20-05B: 2:1 Timing Belt, 5 mm/rev Ballscrew

Max. No-Load Accel.	0.76 m/s²	[30 in/s²]
Repeatability	±0.025 mm	[±0.001 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

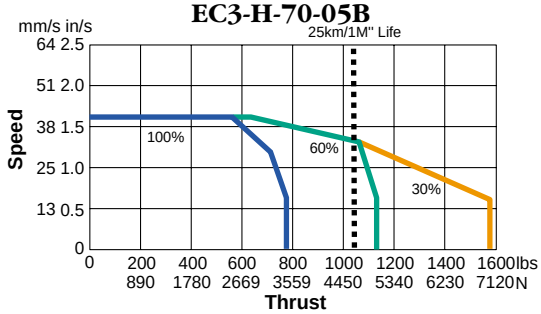
EC3-H-50-05B



EC3-H-50-05B: 5:1 Gears, 5 mm/rev Ballscrew

Max. No-Load Accel.	0.33 m/s²	[13 in/s²]
Repeatability	±0.025 mm	[±0.001 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC3-H-70-05B



EC3-H-70-05B: 7:1 Gears, 5 mm/rev Ballscrew

Max. No-Load Accel.	0.24 m/s²	[9 in/s²]
Repeatability	±0.25 mm	[±0.001 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using H3000 Series Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

5mm lead ballscrew

261	261	261	261	199	119	84	48	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	1000	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	6530	*Column Load Limit (N)*

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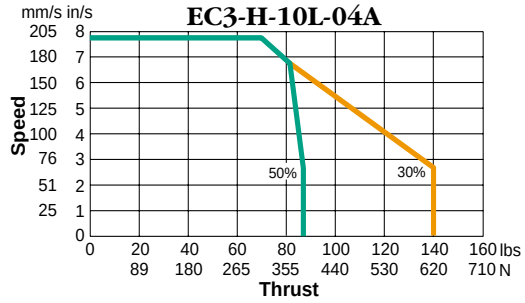
4 mm Lead Acme Screw Models

—50% Duty Cycle —30% Duty Cycle

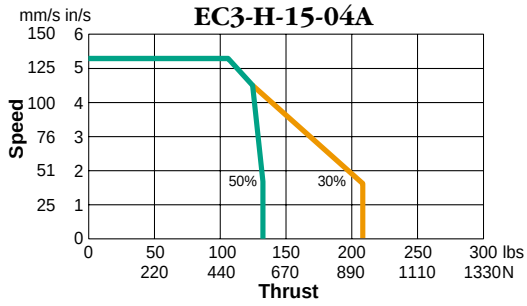
EC3-H-10-04A
EC3-H-10L-04A



EC3-H-10-04A: 1:1 Timing Belt, 4 mm/rev Acme Screw
EC3-H-10L-04A: 1:1 Inline Coupling, 4 mm/rev Acme Screw

Max. No-Load Accel.	0.97 m/s²	[38 in/s²]
Repeatability	±0.025 mm	[±0.001 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

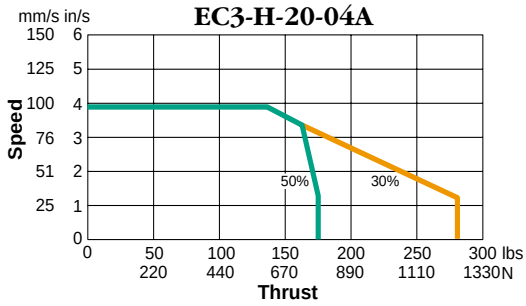
EC3-H-15-04A



EC3-H-15-04A: 1.5:1 Timing Belt, 4 mm/rev Acme Screw

Max. No-Load Accel.	0.74 m/s²	[29 in/s²]
Repeatability	±0.025 mm	[±0.001 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

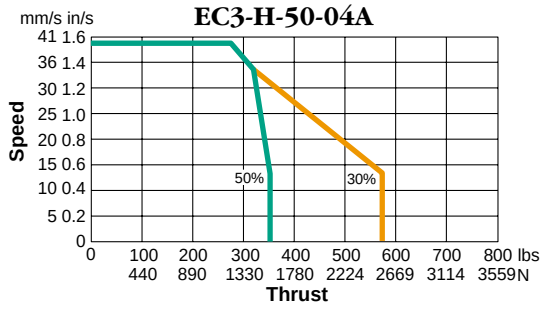
EC3-H-20-04A



EC3-H-20-04A: 2:1 Timing Belt, 4 mm/rev Acme Screw

Max. No-Load Accel.	0.60 m/s²	[24 in/s²]
Repeatability	±0.025 mm	[±0.001 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

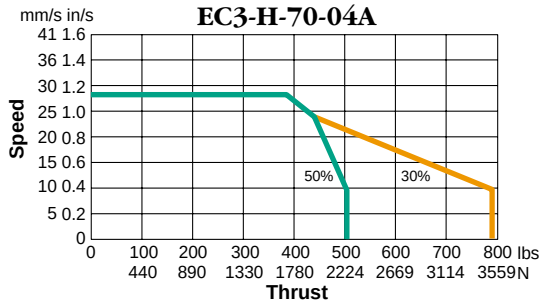
EC3-H-50-04A



EC3-H-50-04A: 5:1 Gears, 4 mm/rev Acme Screw

Max. No-Load Accel.	0.26 m/s²	[10 in/s²]
Repeatability	±0.025 mm	[±0.001 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

EC3-H-70-04A



EC3-H-70-04A: 7:1 Gears, 4 mm/rev Acme Screw

Max. No-Load Accel.	0.19 m/s²	[7 in/s²]
Repeatability	±0.25 mm	[±0.001 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

To configure your system see page A-98 to A-99.

- Performance using H3000 Series Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

4mm lead acme screw

200	200	200	200	144	89	61	33	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	1000	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	4650	*Column Load Limit (N)*

How To Order

Steps to Ordering a Complete EC3-H System

You are ready to specify an EC3-H actuator model number after you have:

a. completed and verified all necessary information on an IDC Product Selection Worksheet.

b. completed the steps in the EC Selection Guidelines on pages A-20 to A-21.

c. selected a control that is compatible with the H-series motor.

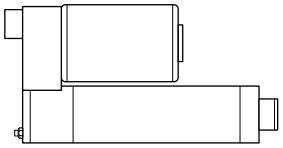
Your local IDC Distributor and our Applications Engineering Department are available to help with your selection process.

1. Base Model

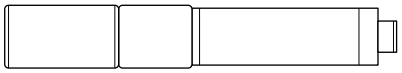
Choose the model with sufficient speed and thrust with a comfortable safety margin. Refer to the EC3-H Speed vs. Thrust curves in this section.

EC3-H cylinders with gear or timing belt drive reductions have the motor mounted parallel to the lead screw. Inline models have the motor coupled directly to the leadscrew with no reduction.

Parallel Models



Inline Models



2. Stroke Length

Nine standard lengths are available from 50 to 1000 mm. Custom lengths are also available. Consult your IDC distributor or the factory for details.

To maximize cylinder life, the thrust tube should not impact the physical end-of-travel on either end. Extra travel length is necessary to decelerate the load to a stop when an end-of-travel limit switch is encountered. This extra travel distance depends on load and speed. For further information on this refer to the EC Selection Guidelines on pages (A-20 to A-21) or the Engineering Section.

1 Base Model				2 Stroke Length	3 Cylinder Mounting	4 Rod End	5 Options		
Electric Cylinder	Motor	Drive Ratio	Screw Lead, Type	(mm)					
EC3	H								

Ballscrew

EC3-H-10-16B-	EC3-H-10-05B-	EC3-H-10-04A-
EC3-H-15-16B-	EC3-H-15-05B-	EC3-H-15-04A-
EC3-H-20-16B-	EC3-H-20-05B-	EC3-H-20-04A-
EC3-H-50-16B-	EC3-H-50-05B-	EC3-H-50-04A-
EC3-H-70-16B-	EC3-H-70-05B-	EC3-H-70-04A-
EC3-H-10-10B-		
EC3-H-15-10B-		
EC3-H-20-10B-		
EC3-H-50-10B-		
EC3-H-70-10B-		

Acme Screw

Inline Models (Direct Drive)

EC3-H-10L-16B-	EC3-H-10L-05B-	EC3-H-10L-04A-
EC3-H-10L-10B-		

50
100
150
200
250
300
450
600
750
1000
Custom lengths available

No Charge

-MF1	-MP2	-FT1M
-MF2	-MS6M	-FT1E
-MF3	-MS6E	-MT1M
-MS1	-MT4	-MT1E
-MS2		

Additional Charge

-MP3	-FC2	-BM
	-FS2	-BS
		-EM
		-L
		-PB

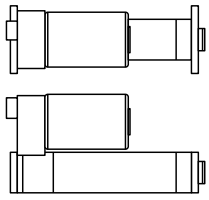
How To Order

3. Cylinder Mounting

Specify any one of these cylinder mounting options. Dimensional drawings start on page A-90.

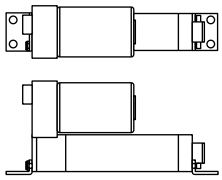
Cylinder base mount options -MS1, -MP2, -MP3, -MF2, -MF3 cannot be ordered with inline models.

MF1, 2, 3 Rectangular Flanges

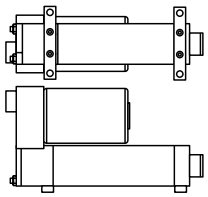


MF1 Front Flange
MF2 Rear Flange
MF3 Both Flanges

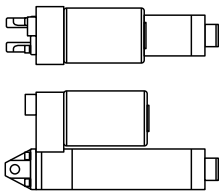
MS1 Side End Angles



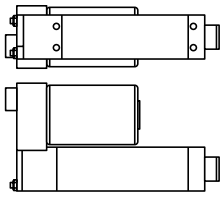
MS2 Side Lugs



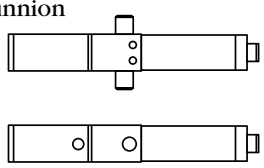
MP2 Rear Clevis (MP3 includes pivot base)



MS6M and MS6E Side Tapped Holes



MT4 Trunnion



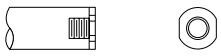
Pivot Mount Caution:

When utilizing a pivot mounting option (MP2 or MT4) in conjunction with a pivot rod end (FS2 or FC2), it is recommended that the actuator be extended only to 90–95% of its full stroke. This increases the system's rigidity and extends the life of the guide bearings and rod seal.

4. Rod Ends

Industrial Devices offers 4 rod end options for EC3-H series cylinders.

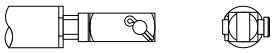
-FT1M or -FT1E Female Thread



-MT1M or -MT1E Male Thread

-FS2 Spherical Joint

-FC2 Clevis



5. Other Options

See the Options and Accessories section for complete specifications.

BM – Motor Holding Brake

10 in-lb holding brake mounted on the rear shaft of the H-series motor. *Not available on EC3-H with -EM encoder option.*

BS – Holding Brake

60 in-lb holding brake mounted on the rear lead screw shaft extension. *Not available on inline models or with cylinder base mount options. (-MF2, -MF3, -MS1, -MP2, -MP3).*

EM – Encoder

Reverse-compatible 500 line incremental encoder mounted on the rear shaft of the motor. *Not available on EC3-H with -BM motor holding brake option.*

L – Linear Potentiometer Output

Linear potentiometer mounted on inside the EC3-H cylinder. For use with H3501 control.

PB – Protective Boot

Protects the thrust tube from solid contaminants and prevents liquids from entering the cylinder through the rod end bearing.

6. Accessories

Magnetic Position Sensors

Position sensors are available for triggering stop, speed/direction change, or end-of-travel.

To maximize cylinder life, IDC recommends the use of end-of-travel sensors with all cylinders.

Either Reed or Hall Effect (NPN transistor) switches are compatible with IDC controls.

	3m Leads	4m Quick
Reed		
Normally open	PSR-1	PSR-1Q
Normally closed	PSR-2	PSR-2Q
Hall Effect		
Normally open, NPN	PSN-1	PSN-1Q
Normally closed, NPN	PSN-2	PSN-2Q

See page A-240 for more limit switch options, including quick-disconnect versions.

7. Compatible Controls

Details of controls are in Sections F. The EC3-H is compatible with:

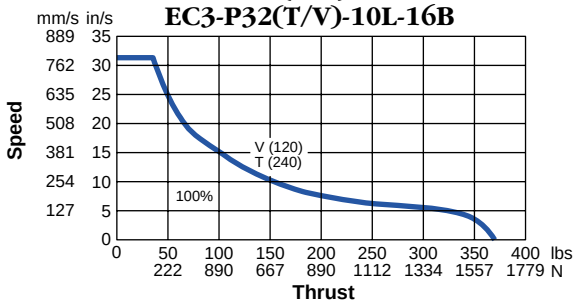
Model	Description
H3301B	Limit switch
H3321B	Edge guide
H3501	Analog position

Performance

16mm Lead Ballscrew Models

—100% Duty Cycle —50% Duty Cycle

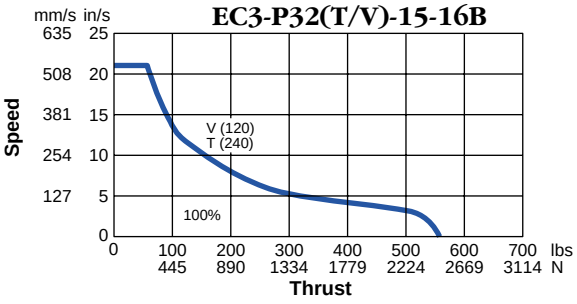
EC3-P32(T/V)-10-16B
EC3-P32(T/V)-10L-16B



EC3-P32(T/V)-10-16B: 1:1 Timing Belt, 16 mm/rev Ballscrew
EC3-P32(T/V)-10L-16B: 1:1 Inline Coupling, 16 mm/rev Ballscrew

Max. No-Load Accel.	21.34 m/s²	[840 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

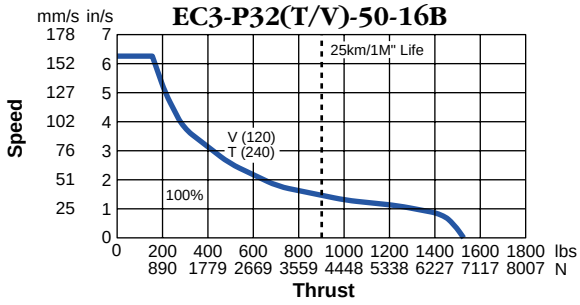
EC3-P32(T/V)-15-16B



EC3-P32(T/V)-15-16B: 1.5:1 Timing Belt, 16 mm/rev Ballscrew

Max. No-Load Accel.	17.24 m/s²	[679 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

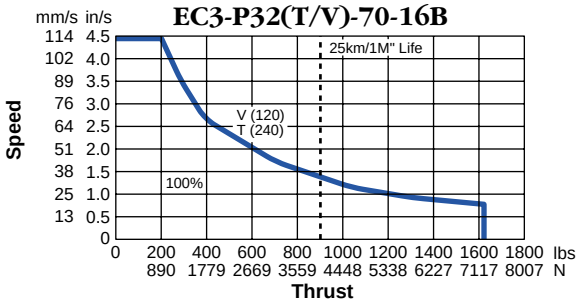
EC3-P32(T/V)-50-16B



EC3-P32(T/V)-50-16B: 5:1 Gears, 16 mm/rev Ballscrew

Max. No-Load Accel.	6.74 m/s²	[265 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC3-P32(T/V)-70-16B



EC3-P32(T/V)-70-16B: 7:1 Gears, 16 mm/rev Ballscrew

Max. No-Load Accel.	4.90 m/s²	[193 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using S6000 Series, *Next*Step®, and *Smart*Step® Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

16mm lead ballscrew

1280	1280	1280	866	530	318	216	127	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	1000	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	4900	2780	*Column Load Limit (N)*

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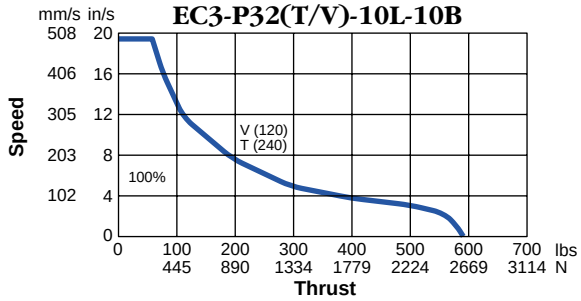
10mm Lead Ballscrew Models

—100% Duty Cycle —50% Duty Cycle

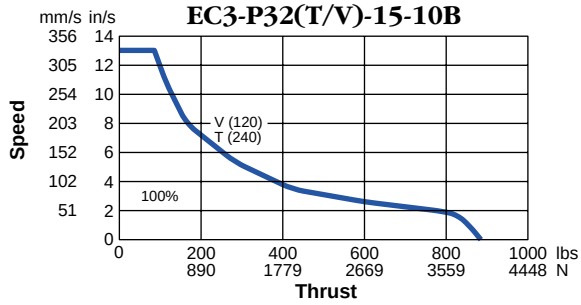
EC3-P32(T/V)-10-10B
EC3-P32(T/V)-10L-10B



EC3-P32(T/V)-10-10B: 1:1 Timing Belt, 10 mm/rev Ballscrew
EC3-P32(T/V)-10L-10B: 1:1 Inline Coupling, 10 mm/rev Ballscrew

Max. No-Load Accel.	12.93 m/s²	[509 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

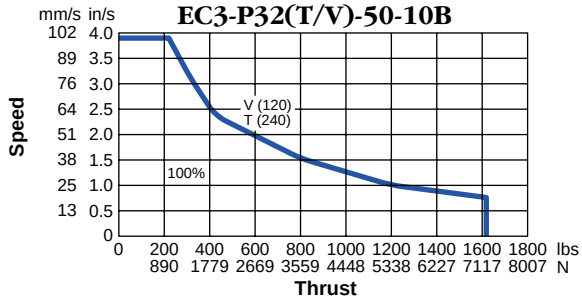
EC3-P32(T/V)-15-10B



EC3-P32(T/V)-15-10B: 1.5:1 Timing Belt, 10 mm/rev Ballscrew

Max. No-Load Accel.	10.60 m/s²	[417 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

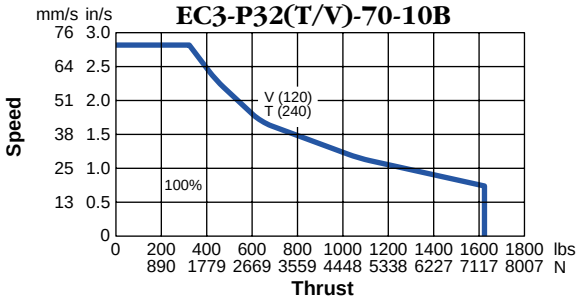
EC3-P32(T/V)-50-10B



EC3-P32(T/V)-50-10B: 5:1 Gears, 10 mm/rev Ballscrew

Max. No-Load Accel.	4.20 m/s²	[165 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC3-P32(T/V)-70-10B



EC3-P32(T/V)-70-10B: 7:1 Gears, 10 mm/rev Ballscrew

Max. No-Load Accel.	3.06 m/s²	[120 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using S6000 Series, *NextStep*®, and *SmartStep*® Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and c**olumn load limits** when specifying longer lengths.

10mm lead ballscrew

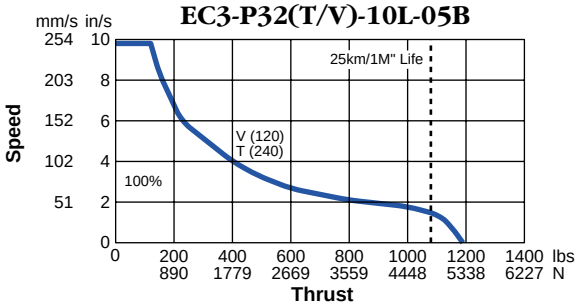
533	533	533	533	398	239	212	96	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	1000	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	5340	*Column Load Limit (N)*

Performance

5mm Lead Ballscrew Models

—100% Duty Cycle —50% Duty Cycle

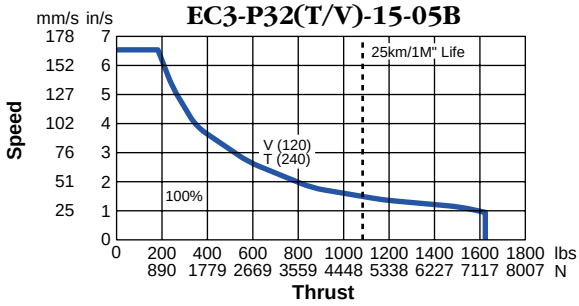
EC3-P32(T/V)-10-05B
EC3-P32(T/V)-10L-05B



EC3-P32(T/V)-10-05B: 1:1 Timing Belt, 5 mm/rev Ballscrew
EC3-P32(T/V)-10L-05B: 1:1 Inline Coupling, 5 mm/rev Ballscrew

Max. No-Load Accel.	6.85 m/s²	[270 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

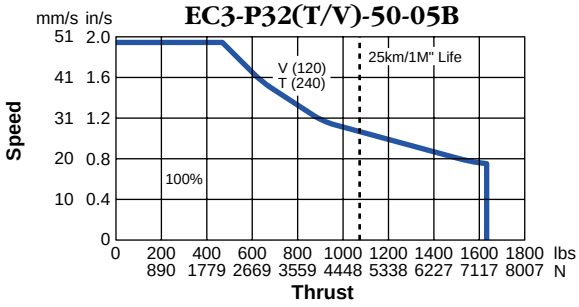
EC3-P32(T/V)-15-05B



EC3-P32(T/V)-15-05B: 1.5:1 Timing Belt, 5 mm/rev Ballscrew

Max. No-Load Accel.	5.46 m/s²	[215 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

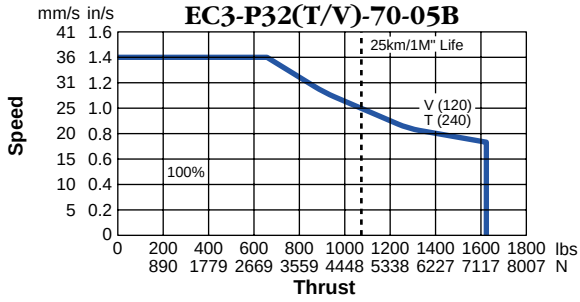
EC3-P32(T/V)-50-05B



EC3-P32(T/V)-50-05B: 5:1 Gears, 5 mm/rev Ballscrew

Max. No-Load Accel.	2.11 m/s²	[83 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC3-P32(T/V)-70-05B



EC3-P32(T/V)-70-05B: 7:1 Gears, 5 mm/rev Ballscrew

Max. No-Load Accel.	1.5 m/s²	[59 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using S6000 Series, *NextStep*, and *SmartStep* Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

5mm lead ballscrew

261	261	261	261	199	119	84	48	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	1000	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	6530	*Column Load Limit (N)*

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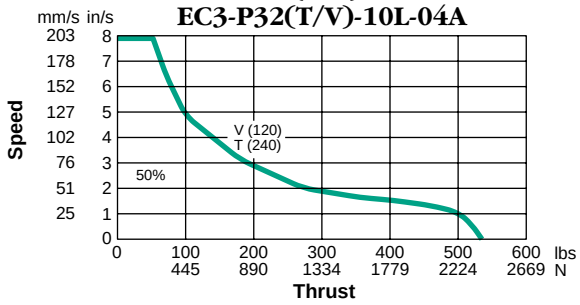
4mm Lead Acme Screw Models

—50% Duty Cycle —30% Duty Cycle

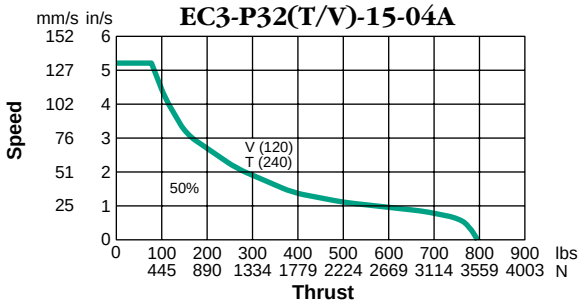
EC3-P32(T/V)-10-04A
EC3-P32(T/V)-10L-04A



EC3-P32(T/V)-10-04A: 1:1 Timing Belt, 4 mm/rev Acme Screw
EC3-P32(T/V)-10L-04A: 1:1 Inline Coupling, 4 mm/rev Acme Screw

Max. No-Load Accel.	5.23 m/s²	[206 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

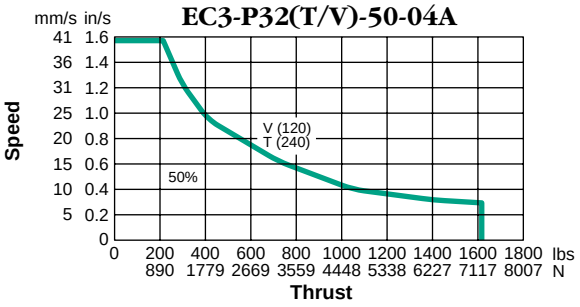
EC3-P32(T/V)-15-04A



EC3-P32(T/V)-15-04A: 1.5:1 Timing Belt, 4 mm/rev Acme Screw

Max. No-Load Accel.	4.26 m/s²	[168 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

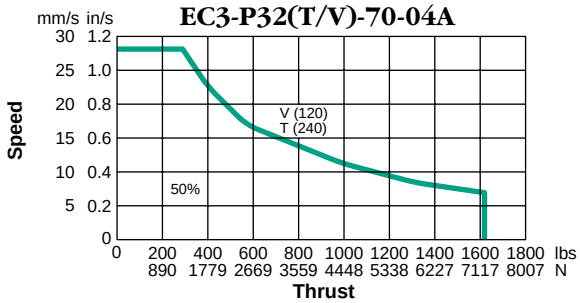
EC3-P32(T/V)-50-04A



EC3-P32(T/V)-50-04A: 5:1 Gears, 4 mm/rev Acme Screw

Max. No-Load Accel.	1.68 m/s²	[66 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

EC3-P32(T/V)-70-04A



EC3-P32(T/V)-70-04A: 7:1 Gears, 4 mm/rev Acme Screw

Max. No-Load Accel.	1.22 m/s²	[48 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

To configure your system see page A-78 to A-79.

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

4mm lead acme screw

200	200	200	200	144	89	61	33	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	1000	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	4650	*Column Load Limit (N)*

- Performance using S6000 Series, *NextStep*, and *SmartStep* Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

How To Order

Steps to Ordering a Complete EC3-P System

You are ready to specify an EC3-P actuator model number after you have:

a. completed and verified all necessary information on an IDC Product Selection Worksheet.

b. completed the steps in the EC Selection Guidelines on pages A-20 to A-21.

c. selected a control that is compatible with the S-series motor.

Your local IDC Distributor and our Applications Engineering Department are available to help with your selection process.

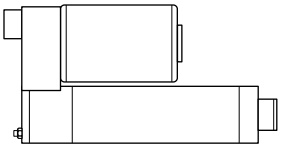
1. Base Model Number

Choose the model with sufficient speed and thrust with a comfortable safety margin. **IDC recommends at least 30% reserve thrust for step motor driven systems.**

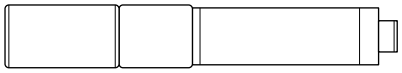
The EC3-P Series offers two motor wiring choices, 'T' (Series) and 'V' (Parallel). The 'T' and 'V' versions include a 12 foot motor quick disconnect cable.

EC3 cylinders with gear or timing belt drive reductions have the motor mounted parallel to the lead screw. Inline models have the motor coupled directly to the leadscrew with no reduction.

Parallel Models



Inline Models



2. Stroke Length

Nine standard lengths are available from 50 to 1000 mm. Custom lengths are also available. Consult your IDC distributor or the factory for details.

To maximize cylinder life, the thrust tube should not impact the physical end-of-travel on either end. Extra travel length is necessary to decelerate the load to a stop when an end-of-travel limit switch is encountered. This extra travel distance depends on load and speed. For further information on this refer to the EC Selection Guidelines on pages (A-20 to A-21) or the Engineering Section.

1 Base Model				2 Stroke Length	3 Cylinder Mounting	4 Rod End		5 Options	
Electric Cylinder	Motor	Drive Ratio	Screw Lead, Type	(mm)					
EC3	P								

Ballscrew

EC3-P32*x*-10-16B- EC3-P32*x*-10-05B- EC3-P32*x*-10-04A-
EC3-P32*x*-15-16B- EC3-P32*x*-15-05B- EC3-P32*x*-15-04A-
EC3-P32*x*-20-16B- EC3-P32*x*-20-05B- EC3-P32*x*-20-04A-
EC3-P32*x*-50-16B- EC3-P32*x*-50-05B- EC3-P32*x*-50-04A-
EC3-P32*x*-70-16B- EC3-P32*x*-70-05B- EC3-P32*x*-70-04A-

EC3-P32*x*-10-10B-
EC3-P32*x*-15-10B-
EC3-P32*x*-20-10B-
EC3-P32*x*-50-10B-
EC3-P32*x*-70-10B-
T (Series) or V (Parallel)

Inline Models (Direct Drive)

EC3-P32*x*-10L-16B- EC3-P32*x*-10L-05B- EC3-P32*x*-10L-04A-
EC3-P32*x*-10L-10B-
T (Series) or V (Parallel)

50
100
150
200
250
300
450
600
750
1000
Custom lengths available

No Charge

-MF1 -MP2 -FT1M
-MF2 -MS6M -FT1E
-MF3 -MS6E -MT1M
-MS1 -MT4 -MT1E
-MS2

Additional Charge

-MP3 -FC2 -BS
-FS2 -EMK
-L
-PB

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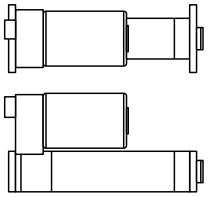
How To Order

3. Cylinder Mounting

Specify any one of these cylinder mounting options. Dimensional drawings start on page A-90.

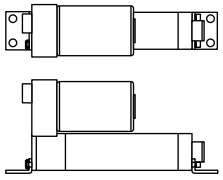
Cylinder base mount options -MS1, -MP2, -MP3, -MF2, -MF3 cannot be ordered with inline models.

MF1, 2, 3 Rectangular Flanges

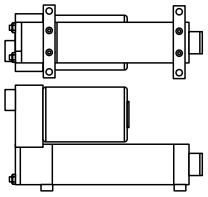


MF1 Front Flange
MF2 Rear Flange
MF3 Both Flanges

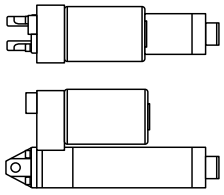
MS1 Side End Angles



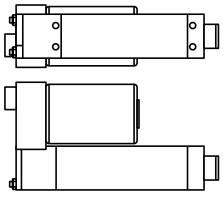
MS2 Side Lugs



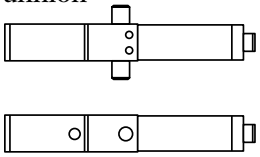
MP2 Rear Clevis (MP3 includes pivot base)



MS6M and MS6E Side Tapped Holes



MT4 Trunnion



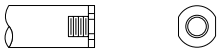
Pivot Mount Caution:

When utilizing a pivot mounting option (MP2 or MT4) in conjunction with a pivot rod end (FS2 or FC2), it is recommended that the actuator be extended only to 90–95% of its full stroke. This increases the system's rigidity and extends the life of the guide bearings and rod seal.

4. Rod Ends

Industrial Devices offers 4 rod end options for EC3 series cylinders.

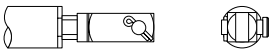
-FT1M or -FT1E Female Thread



-MT1M or -MT1E Male Thread

-FS2 Spherical Joint

-FC2 Clevis



5. Other Options

See the Options and Accessories section for complete specifications.

BS – Holding Brake

60 in-lb holding brake mounted on the rear lead screw shaft extension. *Not available on inline models or with cylinder base mount options. (-MF2, -MF3, -MS1, -MP2, -MP3).*

EMK – Encoder

1000 line incremental encoder mounted on the rear shaft of the motor.

L – Linear Potentiometer Output

Linear potentiometer mounted on inside the EC3 cylinder.

PB – Protective Boot

Protects the thrust tube from solid contaminants and prevents liquids from entering the cylinder through the rod end bearing.

6. Accessories

Magnetic Position Sensors

Position sensors are available for indicating end-of-travel and home positions, or for use with user supplied controls.

To maximize cylinder life, IDC recommends the use of end-of-travel sensors with all cylinders.

Common Application Requirements: For most applications, one home and two end-of-travel sensors are required for each cylinder. Either Reed or Hall Effect (NPN transistor) switches are compatible with IDC controls.

	3m Leads	4m Quick
Reed		
Home (N.O.)	PSR-1	PSR-1Q
End-of-travel (N.C.)	PSR-2	PSR-2Q
Hall Effect		
Home (N.O./NPN)	PSN-1	PSN-1Q
End-of-travel (N.C./NPN)	PSN-2	PSN-2Q

See page A-240 for more limit switch options, including quick-disconnect versions.

7. Compatible Controls

Details of controls are in Sections G. The EC3-P is compatible with:

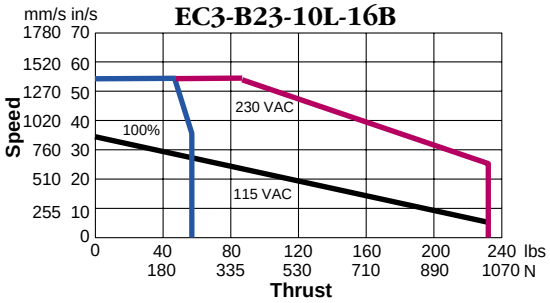
Model	Description
NextStep®	Stepper drive
S6002	2-Axis Stepper drive
SmartStep®	*IDeal*™ programmable
S6961	*IDeal*™ programmable
S6962	2-Axis *IDeal*™ programmable

Performance

16mm Lead Ballscrew Models

—100% Duty Cycle —Intermittent (<2 sec)

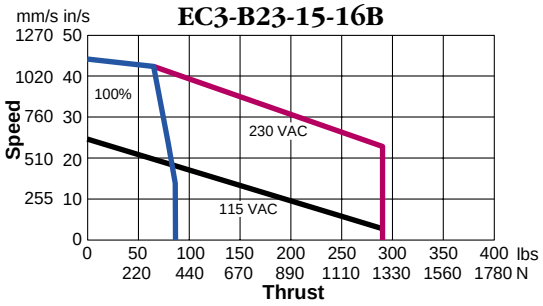
EC3-B23-10-16B
EC3-B23-10L-16B



EC3-B23-10-16B: 1:1 Timing Belt, 16 mm/rev Ballscrew
EC3-B23-10L-16B: 1:1 Inline Coupling, 16 mm/rev Ballscrew

Max. No-Load Accel.	33.03 m/s²	[1301 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

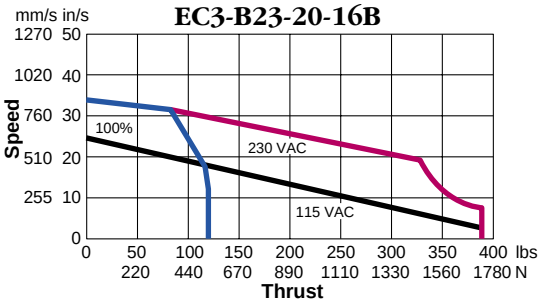
EC3-B23-15-16B



EC3-B23-15-16B: 1.5:1 Timing Belt, 16 mm/rev Ballscrew

Max. No-Load Accel.	34.45 m/s²	[1356 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

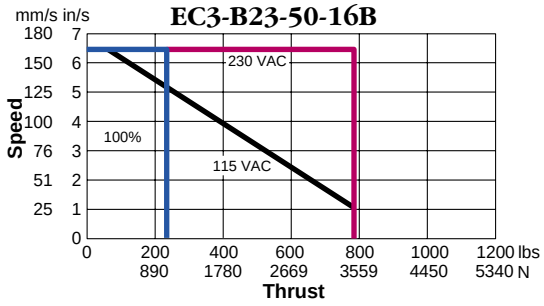
EC3-B23-20-16B



EC3-B23-20-16B: 2.0:1 Timing Belt, 16 mm/rev Ballscrew

Max. No-Load Accel.	37.93 m/s²	[1493 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

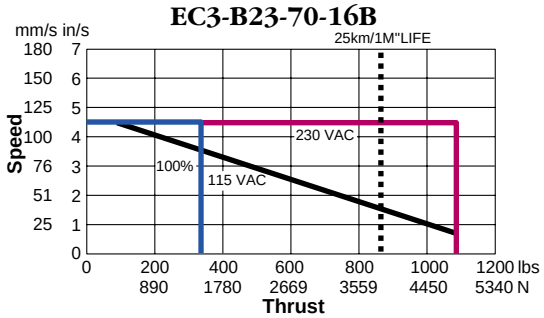
EC3-B23-50-16B



EC3-B23-50-16B: 5:1 Gears, 16 mm/rev Ballscrew

Max. No-Load Accel.	27.11 m/s²	[1067 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC3-B23-70-16B



EC3-B23-70-16B: 7:1 Gears, 16 mm/rev Ballscrew

Max. No-Load Accel.	21.38 m/s²	[842 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using B8000 Series Controls (not B8501).
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

16mm lead ballscrew

1280	1280	1280	866	530	318	216	127	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	1000	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	4900	2780	*Column Load Limit (N)*

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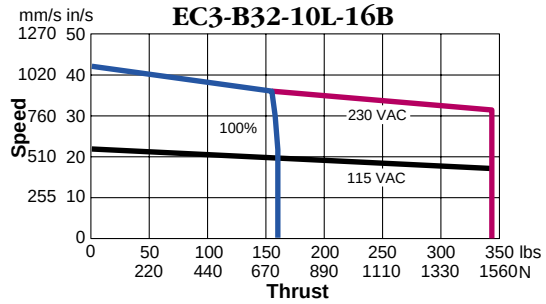
16mm Lead Ballscrew Models

—100% Duty Cycle —Intermittent (<2 sec)

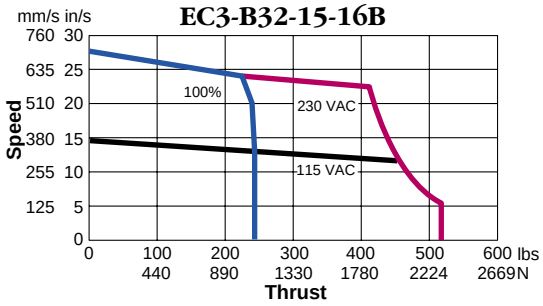
EC3-B32-10-16B
EC3-B32-10L-16B



EC3-B32-10-16B: 1:1 Timing Belt, 16 mm/rev Ballscrew
EC3-B32-10L-16B: 1:1 Inline Coupling, 16 mm/rev Ballscrew

Max. No-Load Accel.	27.36 m/s²	[1077 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

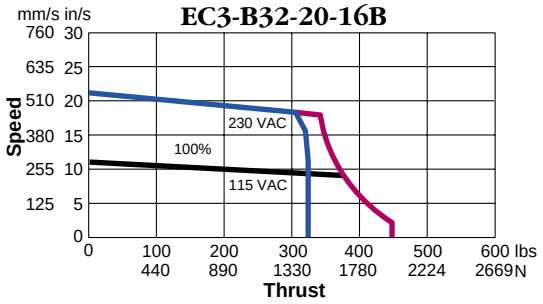
EC3-B32-15-16B



EC3-B32-15-16B: 1.5:1 Timing Belt, 16 mm/rev Ballscrew

Max. No-Load Accel.	23.51 m/s²	[926 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

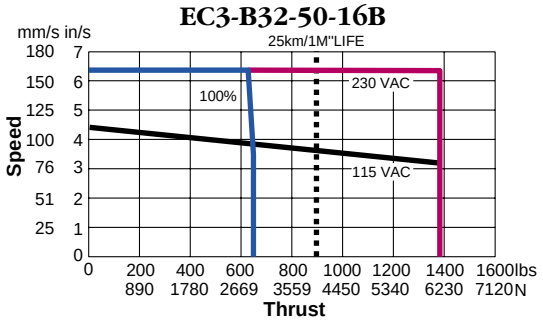
EC3-B32-20-16B



EC3-B32-20-16B: 2.0:1 Timing Belt, 16 mm/rev Ballscrew

Max. No-Load Accel.	21.07 m/s²	[830 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

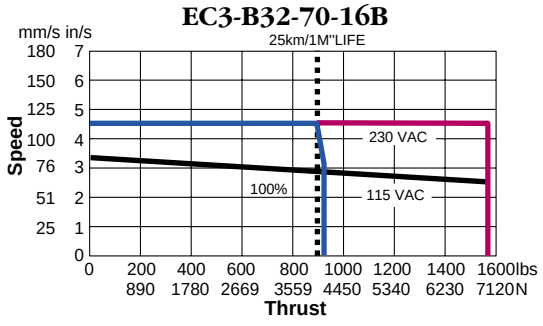
EC3-B32-50-16B



EC3-B32-50-16B: 5:1 Gears, 16 mm/rev Ballscrew

Max. No-Load Accel.	10.32 m/s²	[406 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC3-B32-70-16B



EC3-B32-70-16B: 7:1 Gears, 16 mm/rev Ballscrew

Max. No-Load Accel.	7.58 m/s²	[298 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using B8000 Series Controls (not B8501).
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

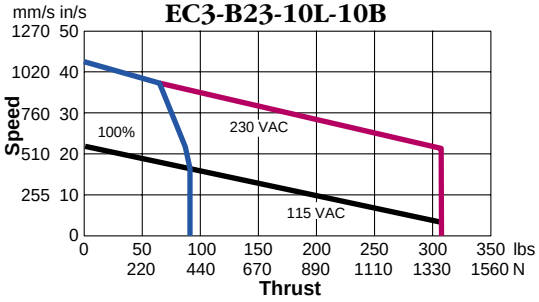
16mm lead ballscrew

1280	1280	1280	866	530	318	216	127	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	1000	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	4900	2780	*Column Load Limit (N)*

10mm Lead Ballscrew Models

—100% Duty Cycle —Intermittent (<2 sec)

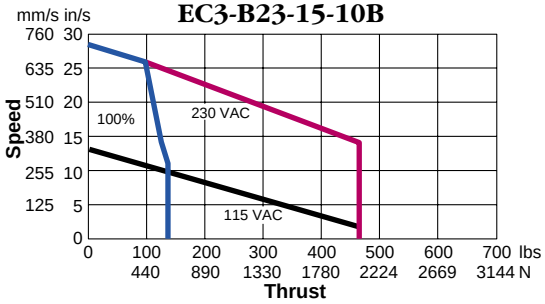
EC3-B23-10-10B
EC3-B23-10L-10B



EC3-B23-10-10B: 1:1 Timing Belt, 10 mm/rev Ballscrew
EC3-B23-10L-10B: 1:1 Inline Coupling, 10 mm/rev Ballscrew

Max. No-Load Accel.	19.39 m/s²	[763 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

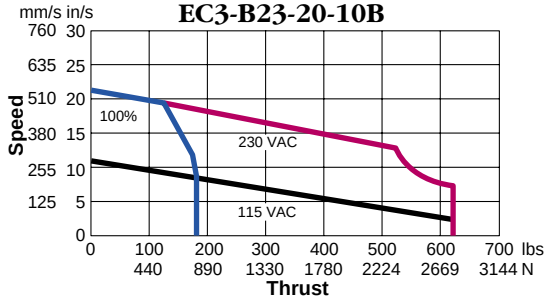
EC3-B23-15-10B



EC3-B23-15-10B: 1.5:1 Timing Belt, 10 mm/rev Ballscrew

Max. No-Load Accel.	20.60 m/s²	[811 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

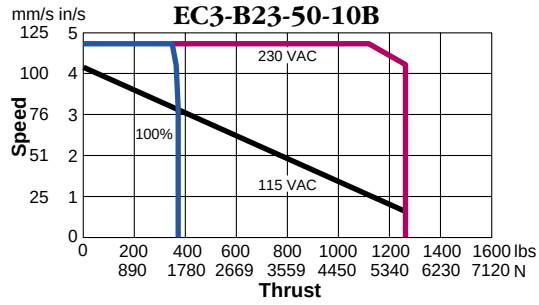
EC3-B23-20-10B



EC3-B23-20-10B: 2:1 Timing Belt, 10 mm/rev Ballscrew

Max. No-Load Accel.	22.91 m/s²	[902 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

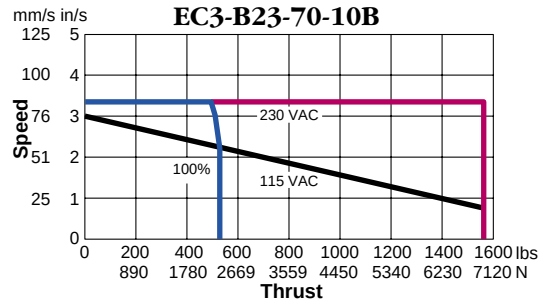
EC3-B23-50-10B



EC3-B23-50-10B: 5:1 Gears, 10 mm/rev Ballscrew

Max. No-Load Accel.	16.77 m/s²	[660 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC3-B23-70-10B



EC3-B23-70-10B: 7:1 Gears, 10 mm/rev Ballscrew

Max. No-Load Accel.	13.28 m/s²	[523 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using B8000 Series Controls (not B8501).
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

10mm lead ballscrew

533	533	533	533	398	239	212	96	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	1000	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	5340	*Column Load Limit (N)*

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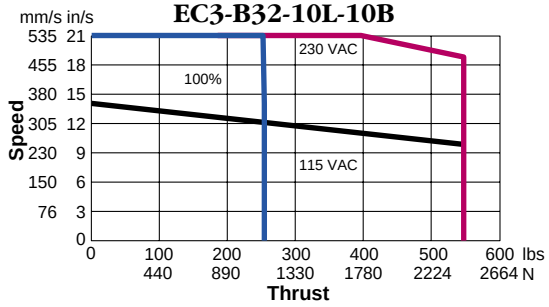
10mm Lead Ballscrew Models

—100% Duty Cycle —Intermittent (<2 sec)

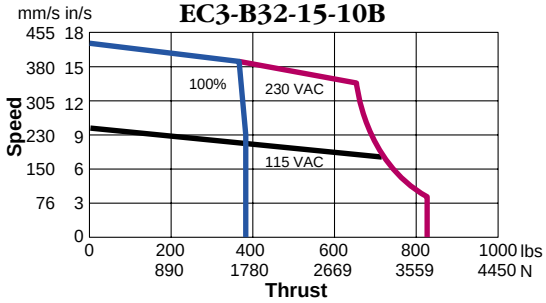
EC3-B32-10-10B
EC3-B32-10L-10B



EC3-B32-10-10B: 1:1 Timing Belt, 10 mm/rev Ballscrew
EC3-B32-10L-10B: 1:1 Inline Coupling, 10 mm/rev Ballscrew

Max. No-Load Accel.	16.44 m/s²	[647 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

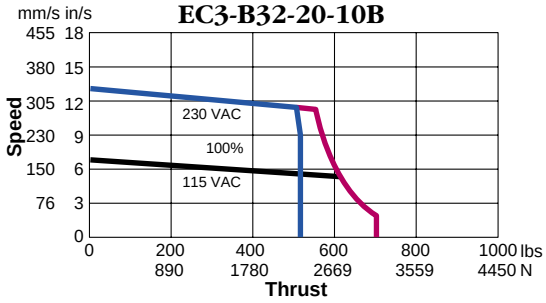
EC3-B32-15-10B



EC3-B32-15-10B: 1.5:1 Timing Belt, 10 mm/rev Ballscrew

Max. No-Load Accel.	14.36 m/s²	[565 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

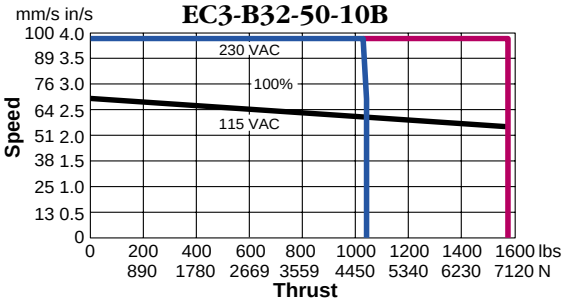
EC3-B32-20-10B



EC3-B32-20-10B: 2:1 Timing Belt, 10 mm/rev Ballscrew

Max. No-Load Accel.	12.98 m/s²	[511 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

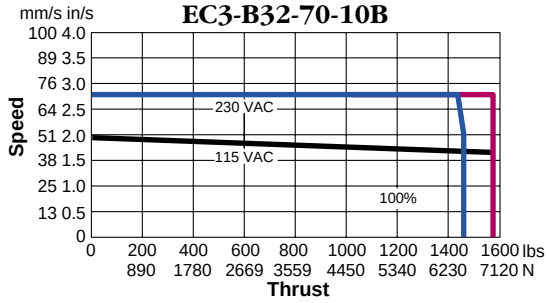
EC3-B32-50-10B



EC3-B32-50-10B: 5:1 Gears, 10 mm/rev Ballscrew

Max. No-Load Accel.	6.43 m/s²	[253 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC3-B32-70-10B



EC3-B32-70-10B: 7:1 Gears, 10 mm/rev Ballscrew

Max. No-Load Accel.	4.73 m/s²	[186 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using B8000 Series Controls (not B8501).
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

10mm lead ballscrew

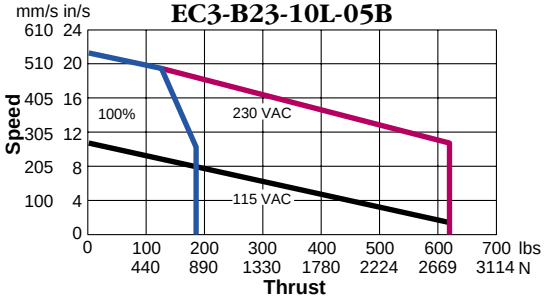
533	533	533	533	398	239	212	96	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	1000	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	5340	*Column Load Limit (N)*

Performance

5mm Lead Ballscrew Models

—100% Duty Cycle —Intermittent (<2 sec)

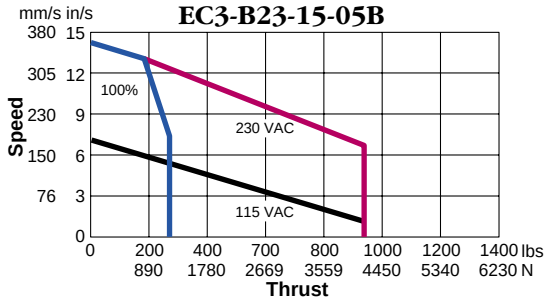
EC3-B23-10-05B
EC3-B23-10L-05B



EC3-B23-10-05B: 1:1 Timing Belt, 5 mm/rev Ballscrew
EC3-B23-10L-05B: 1:1 Inline Coupling, 5 mm/rev Ballscrew

Max. No-Load Accel.	10.90 m/s²	[429 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

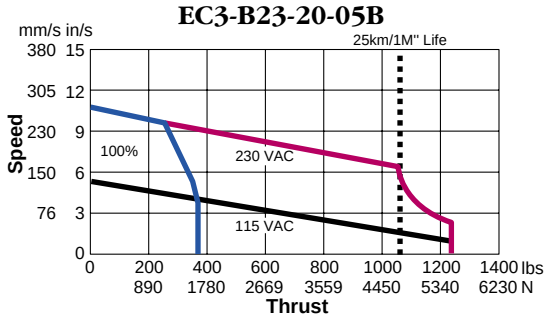
EC3-B23-15-05B



EC3-B23-15-05B: 1.5:1 Timing Belt, 5 mm/rev Ballscrew

Max. No-Load Accel.	11.18 m/s²	[440 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

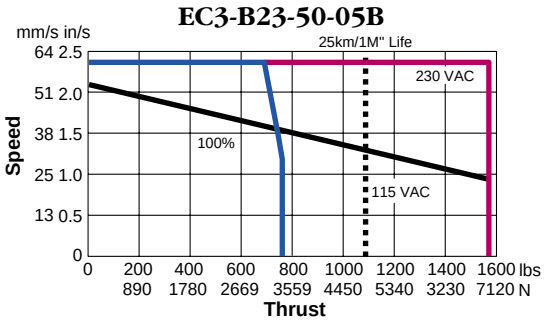
EC3-B23-20-05B



EC3-B23-20-05B: 2:1 Timing Belt, 5 mm/rev Ballscrew

Max. No-Load Accel.	12.21 m/s²	[481 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

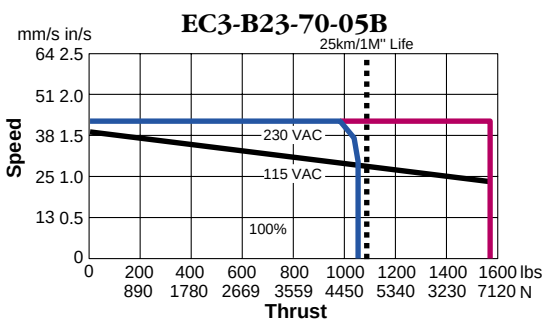
EC3-B23-50-05B



EC3-B23-50-05B: 5:1 Gears, 5 mm/rev Ballscrew

Max. No-Load Accel.	8.55 m/s²	[336 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC3-B23-70-05B



EC3-B23-70-05B: 7:1 Gears, 5 mm/rev Ballscrew

Max. No-Load Accel.	6.71 m/s²	[264 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using B8000 Series Controls (not B8501).
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and c**olumn load limits** when specifying longer lengths.

5mm lead ballscrew

261	261	261	261	199	119	84	48	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	1000	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	6530	*Column Load Limit (N)*

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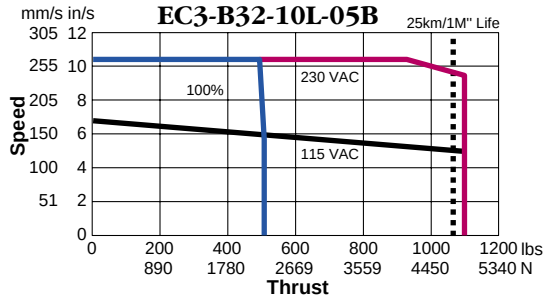
5mm Lead Ballscrew Models

—100% Duty Cycle —Intermittent (<2 sec)

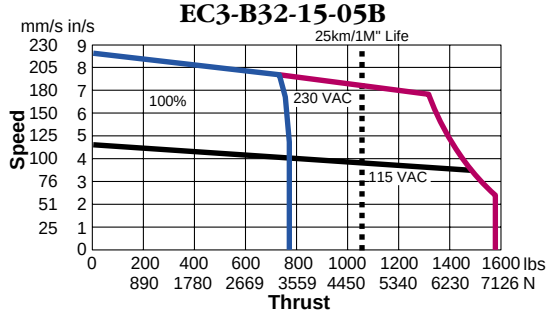
EC3-B32-10-05B
EC3-B32-10L-05B



EC3-B32-10-05B: 1:1 Timing Belt, 5 mm/rev Ballscrew
EC3-B32-10L-05B: 1:1 Inline Coupling, 5 mm/rev Ballscrew

Max. No-Load Accel.	8.84 m/s²	[348 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

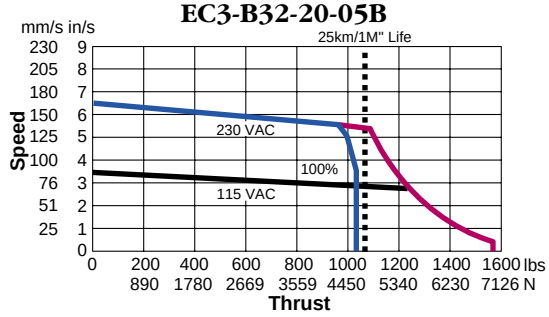
EC3-B32-15-05B



EC3-B32-15-05B: 1.5:1 Timing Belt, 5 mm/rev Ballscrew

Max. No-Load Accel.	7.49 m/s²	[295 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

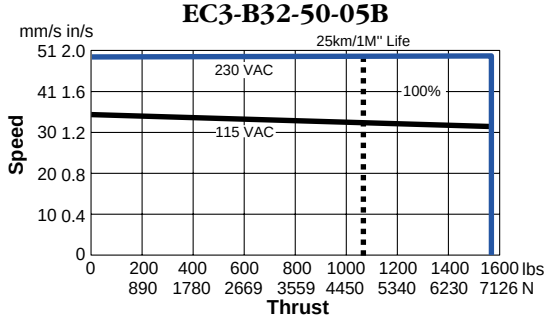
EC3-B32-20-05B



EC3-B32-20-05B: 2:1 Timing Belt, 5 mm/rev Ballscrew

Max. No-Load Accel.	6.66 m/s²	[262 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC3-B32-50-05B



EC3-B32-50-05B: 5:1 Gears, 5 mm/rev Ballscrew

Max. No-Load Accel.	3.23 m/s²	[127 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.25 mm	[0.010 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using B8000 Series Controls (not B8501).
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and c**olumn load limits** when specifying longer lengths.

5mm lead ballscrew

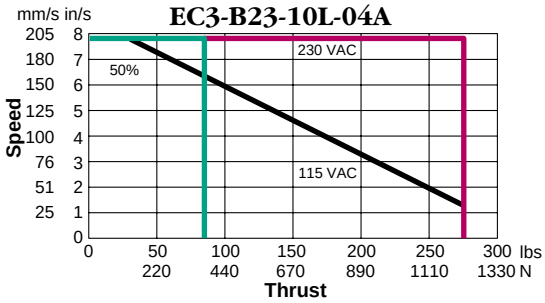
261	261	261	261	199	119	84	48	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	1000	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	6530	*Column Load Limit (N)*

Performance

4mm Lead Acme Screw Models

—50% Duty Cycle —30% Duty Cycle —10% Duty Cycle —Intermittent (<2 sec)

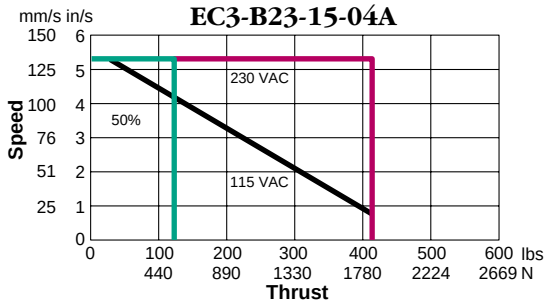
EC3-B23-10-04A
EC3-B23-10L-04A



EC3-B23-10-04A: 1:1 Timing Belt, 4 mm/rev Acme Screw
EC3-B23-10L-04A: 1:1 Inline Coupling, 4 mm/rev Acme Screw

Max. No-Load Accel.	7.93 m/s²	[312 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

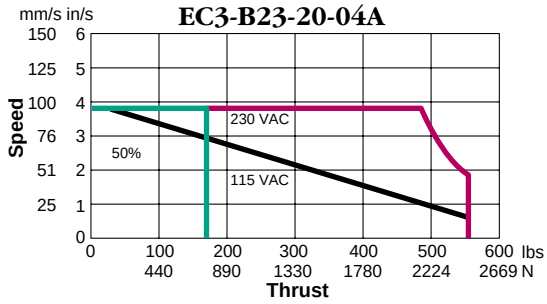
EC3-B23-15-04A



EC3-B23-15-04A: 1.5:1 Timing Belt, 4 mm/rev Acme Screw

Max. No-Load Accel.	8.37 m/s²	[330 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

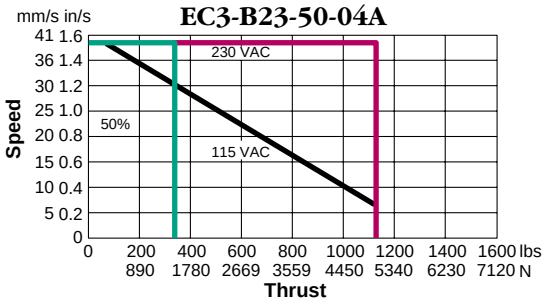
EC3-B23-20-04A



EC3-B23-20-04A: 2:1 Timing Belt, 4 mm/rev Acme Screw

Max. No-Load Accel.	9.28 m/s²	[365 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

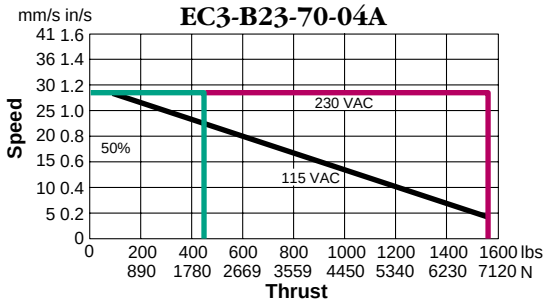
EC3-B23-50-04A



EC3-B23-50-04A: 5:1 Gears, 4 mm/rev Acme Screw

Max. No-Load Accel.	6.73 m/s²	[265 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

EC3-B23-70-04A



EC3-B23-70-04A: 7:1 Gears, 4 mm/rev Acme Screw

Max. No-Load Accel.	5.32 m/s²	[210 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

- Performance using B8000 Series Controls (not B8501).
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and c**olumn load limits** when specifying longer lengths.

4mm lead acme screw

200	200	200	200	144	89	61	33	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	1000	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	4650	*Column Load Limit (N)*

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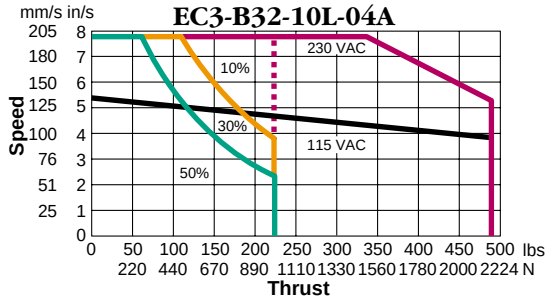
4mm Lead Acme Screw Models

—50% Duty Cycle —30% Duty Cycle —10% Duty Cycle —Intermittent (<2 sec)

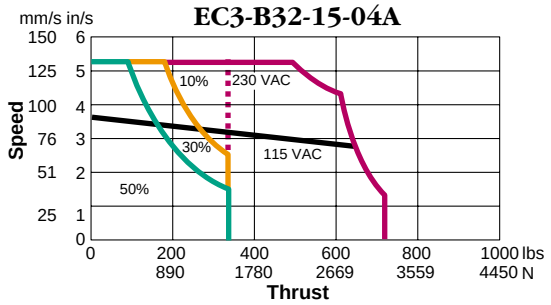
EC3-B32-10-04A
EC3-B32-10L-04A



EC3-B32-10-04A: 1:1 Timing Belt, 4 mm/rev Acme Screw
EC3-B32-10L-04A: 1:1 Inline Coupling, 4 mm/rev Acme Screw

Max. No-Load Accel.	6.67 m/s²	[263 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

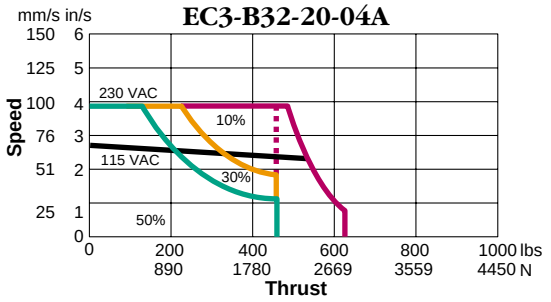
EC3-B32-15-04A



EC3-B32-15-04A: 1.5:1 Timing Belt, 4 mm/rev Acme Screw

Max. No-Load Accel.	5.79 m/s²	[228 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

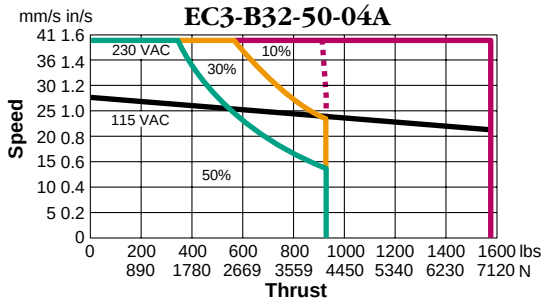
EC3-B32-20-04A



EC3-B32-20-04A: 2:1 Timing Belt, 4 mm/rev Acme Screw

Max. No-Load Accel.	5.22 m/s²	[206 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

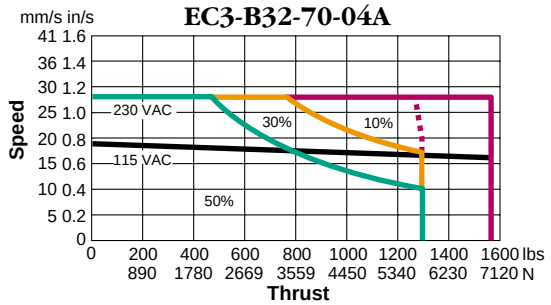
EC3-B32-50-04A



EC3-B32-50-04A: 5:1 Gears, 4 mm/rev Acme Screw

Max. No-Load Accel.	2.58 m/s²	[101 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

EC3-B32-70-04A



EC3-B32-70-04A: 7:1 Gears, 4 mm/rev Acme Screw

Max. No-Load Accel.	1.89 m/s²	[75 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.40 mm	[0.016 in]
Lead Accuracy	±0.10 mm/300 mm	[±0.004 in/ft]

To configure your system see page A-88 to A-89.

- Performance using B8000 Series Controls (not B8501).
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and c**olumn load limits** when specifying longer lengths.

4mm lead acme screw

200	200	200	200	144	89	61	33	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	1000	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	4650	*Column Load Limit (N)*

How To Order

Steps to Ordering a Complete EC3-B System

You are ready to specify an EC3-B actuator model number after you have:

a. completed and verified all necessary information on an IDC Product Selection Worksheet.

b. completed the steps in the EC Selection Guidelines on pages A-20 to A-21.

c. selected a control that is compatible with the B-series motor.

Your local IDC Distributor and our Applications Engineering Department are available to help with your selection process.

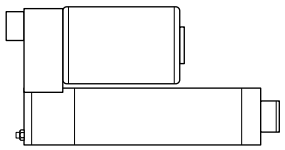
1. Base Model Number

Choose the model with sufficient speed and thrust with a comfortable safety margin. Refer to the EC3-B Speed vs. Thrust curves in this section.

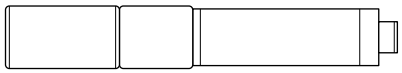
EC3-B cylinders with gear or timing belt drive reductions have the motor mounted parallel to the lead screw. Inline models have the motor coupled directly to the leadscrew with no reduction.

Note: All EC3-B cylinders include an encoder.

Parallel Models



Inline Models



2. Stroke Length

Nine standard lengths are available from 50 to 1000 mm. Custom lengths are also available. Consult your IDC distributor or the factory for details.

To maximize cylinder life, the thrust tube should not impact the physical end-of-travel on either end. Extra travel length is necessary to decelerate the load to a stop when an end-of-travel limit switch is encountered. This extra travel distance depends on load and speed. For further information on this refer to the EC Selection Guidelines on pages (A-20 to A-21) or the Engineering Section.

1 Base Model				2 Stroke Length	3 Cylinder Mounting	4 Rod End		5 Options	
Electric Cylinder	Motor	Drive Ratio	Screw Lead, Type	(mm)					
EC3	B								

Ballscrew		Acme Screw
EC3-B32-10-16B-	EC3-B23-10-16B-	EC3-B32-10-04A-
EC3-B32-15-16B-	EC3-B23-15-16B-	EC3-B32-15-04A-
EC3-B32-20-16B-	EC3-B23-20-16B-	EC3-B32-20-04A-
EC3-B32-50-16B-	EC3-B23-50-16B-	EC3-B32-50-04A-
EC3-B32-70-16B-	EC3-B23-70-16B-	EC3-B32-70-04A-
EC3-B32-10-10B-	EC3-B23-10-10B-	EC3-B23-10-04A-
EC3-B32-15-10B-	EC3-B23-15-10B-	EC3-B23-15-04A-
EC3-B32-20-10B-	EC3-B23-20-10B-	EC3-B23-20-04A-
EC3-B32-50-10B-	EC3-B23-50-10B-	EC3-B23-50-04A-
EC3-B32-70-10B-	EC3-B23-70-10B-	EC3-B23-70-04A-
EC3-B32-10-05B-	EC3-B23-10-05B-	
EC3-B32-15-05B-	EC3-B23-15-05B-	
EC3-B32-20-05B-	EC3-B23-20-05B-	
EC3-B32-50-05B-	EC3-B23-50-05B-	
EC3-B32-70-05B-	EC3-B23-70-05B-	

Inline Models (Direct Drive)		
EC3-B32-10L-16B-	EC3-B23-10L-16B-	EC3-B32-10L-04A-
EC3-B32-10L-10B-	EC3-B23-10L-10B	
EC3-B32-10L-05B-	EC3-B23-10L-05B-	EC3-B23-10L-04A-

50
100
150
200
250
300
450
600
750
1000
Custom lengths available

No Charge

-MF1	-MP2	-FT1M
-MF2	-MS6M	-FT1E
-MF3	-MS6E	-MT1M
-MS1	-MT4	-MT1E
-MS2		

Additional Charge

-MP3	-FC2	-BM
	-FS2	-BS
		-L
		-PB

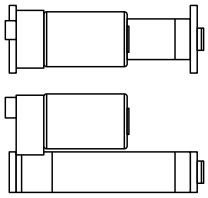
How To Order

3. Cylinder Mounting

Specify any one of these cylinder mounting options. Dimensional drawings start on page A-90.

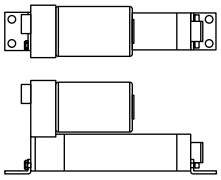
Cylinder base mount options -MS1, -MP2, -MP3, -MF2, and -MF3 cannot be ordered with inline models.

MF1, 2, 3 Rectangular Flanges

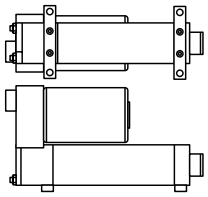


MF1 Front Flange
MF2 Rear Flange
MF3 Both Flanges

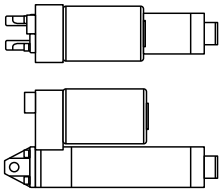
MS1 Side End Angles



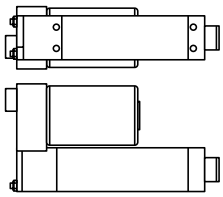
MS2 Side Lugs



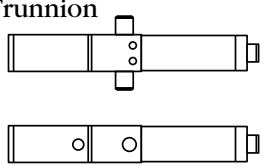
MP2 Rear Clevis (MP3 includes pivot base)



MS6M and MS6E Side Tapped Holes



MT4 Trunnion



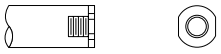
Pivot Mount Caution:

When utilizing a pivot mounting option (MP2 or MT4) in conjunction with a pivot rod end (FS2 or FC2), it is recommended that the actuator be extended only to 90–95% of its full stroke. This increases the system's rigidity and extends the life of the guide bearings and rod seal.

4. Rod Ends

Industrial Devices offers 4 rod end options for EC3-B series cylinders.

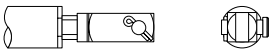
-FT1M or -FT1E Female Thread



-MT1M or -MT1E Male Thread

-FS2 Spherical Joint

-FC2 Clevis



5. Other Options

See the Options and Accessories section for complete specifications.

BM – Motor Holding Brake

10 in-lb holding brake mounted on th B23 motor.

60 in-lb holding brake mounted on the B32 motor.

BS – Holding Brake

60 in-lb holding brake mounted on the rear lead screw shaft extension. *Not available on inline models or with cylinder base mount options. (-MF2, -MF3, -MS1, -MP2, -MP3).*

L – Linear Potentiometer Output

Linear potentiometer mounted on inside the EC3 cylinder required for use with B8501 control.

PB – Protective Boot

Protects the thrust tube from solid contaminants and prevents liquids from entering the cylinder through the rod end bearing.

6. Accessories

Magnetic Position Sensors

Position sensors are available for indicating end-of-travel and home positions, or for use with user supplied controls.

To maximize cylinder life, IDC recommends the use of end-of-travel sensors with all cylinders.

Common Application Requirements: For most applications, one home and two end-of-travel sensors are required for each cylinder. Either Reed or Hall Effect (NPN transistor) switches are compatible with IDC controls.

	3m Leads	4m Quick
Reed		
Home (N.O.)	PSR-1	PSR-1Q
End-of-travel (N.C.)	PSR-2	PSR-2Q
Hall Effect		
Home (N.O./NPN)	PSN-1	PSN-1Q
End-of-travel (N.C./NPN)	PSN-2	PSN-2Q

See page A-240 for more limit switch options, including quick-disconnect versions.

7. Compatible Controls

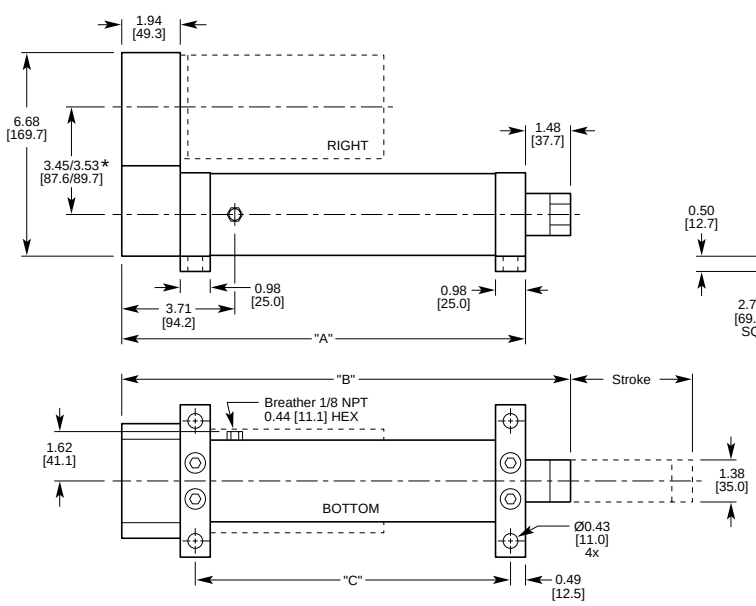
Details of controls are in Sections H. The EC3-B is compatible with:

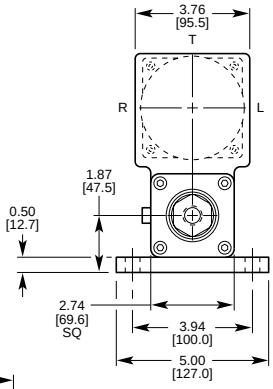
Model	Description
B8001	Digital servo drive
B8501	Analog position
B8961	*IDeal*™ programmable servo
B8962	2 Axis *IDeal*™ programmable servo

Dimensions

MS2 Side Lugs Mounting

Parallel





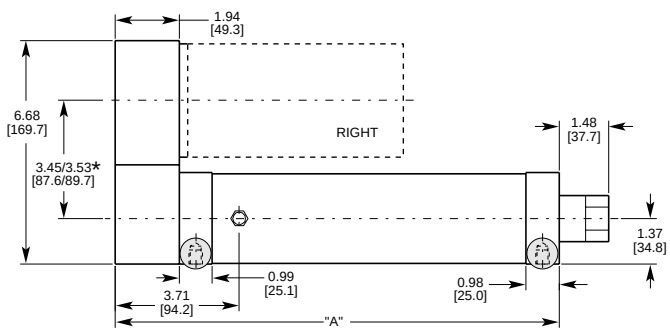
	DIMENSION	LENGTH
A	CYLINDER LENGTH	9.19 [233.4] + STROKE
B	RETRACT LENGTH	10.67 [271.1] + STROKE
C	MOUNTING LENGTH	6.25 [158.8] + STROKE

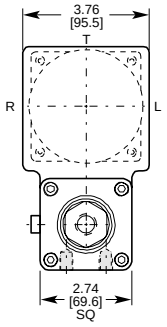
* Actual Distance Determined by Drive Ratio

- For AutoCAD® DXF drawings, go to our website, or call the factory for a diskette
- For motor dimensions, go to pages A-96 to A-99
- For rod-end dimensions, go to page A-100

MS6 Side Tapped Holes Mounting

Parallel





* ACTUAL DISTANCE DETERMINED BY DRIVE RATIO

DIMENSION		LENGTH	DIMENSION	OPTION CODE	SIZE
A	CYLINDER LENGTH	9.19 [233.4] + STROKE	D	MS6E	3/8-16 UNC-2B x 0.40 Dp
B	RETRACT LENGTH	10.67 [271.1] + STROKE		MS6M	M10 x 1.5-6H x 10.2mm Dp
C	MOUNTING LENGTH	6.25 [158.8] + STROKE			

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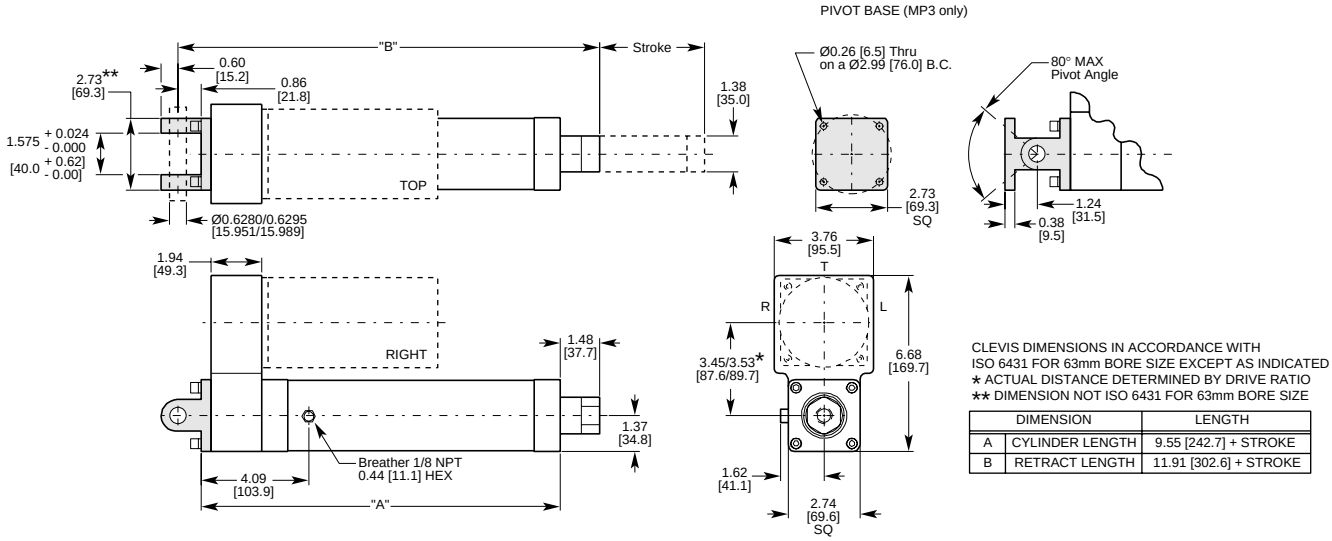
Dimensions

MP2/MP3 Clevis Mount with Pivot Base and Pin

Parallel



CLEVIS DIMENSIONS IN ACCORDANCE WITH
ISO 6431 FOR 63mm BORE SIZE EXCEPT AS INDICATED
★ ACTUAL DISTANCE DETERMINED BY DRIVE RATIO
★★ DIMENSION NOT ISO 6431 FOR 63mm BORE SIZE

DIMENSION		LENGTH
A	CYLINDER LENGTH	9.55 [242.7] + STROKE
B	RETRACT LENGTH	11.91 [302.6] + STROKE

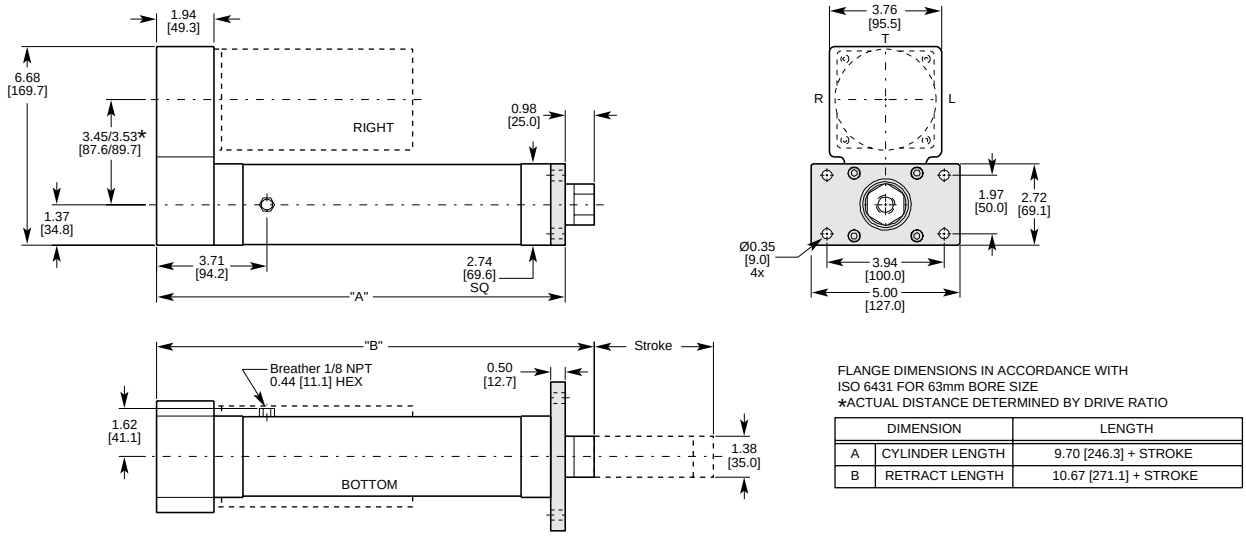
- For AutoCAD® DXF drawings, go to our website, or call the factory for a diskette
- For motor dimensions, go to pages A-96 to A-99
- For rod-end dimensions, go to page A-100

Note:

- Order MP3 to specify complete mounting kit, including actuator clevis, pin and pivot base.
- Order MP2 to omit the pivot base.

MF1 Head Rectangular Flange Mounting

Parallel



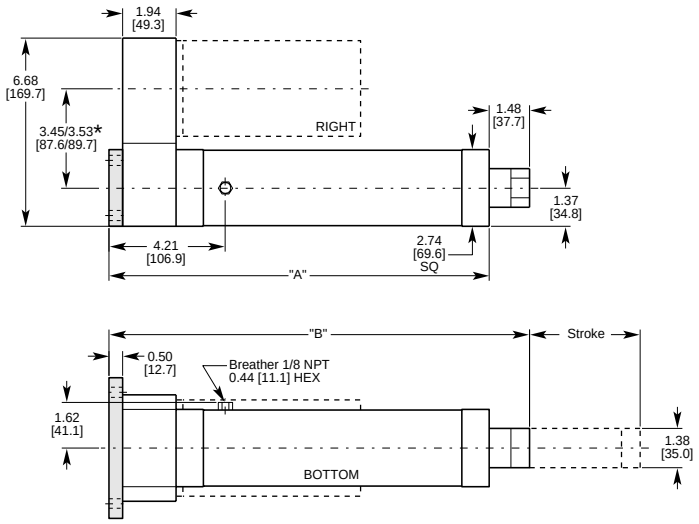
FLANGE DIMENSIONS IN ACCORDANCE WITH
ISO 6431 FOR 63mm BORE SIZE
★ACTUAL DISTANCE DETERMINED BY DRIVE RATIO

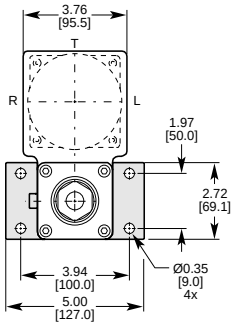
DIMENSION		LENGTH
A	CYLINDER LENGTH	9.70 [246.3] + STROKE
B	RETRACT LENGTH	10.67 [271.1] + STROKE

Dimensions

MF2 Cap Rectangular Flange Mounting

Parallel





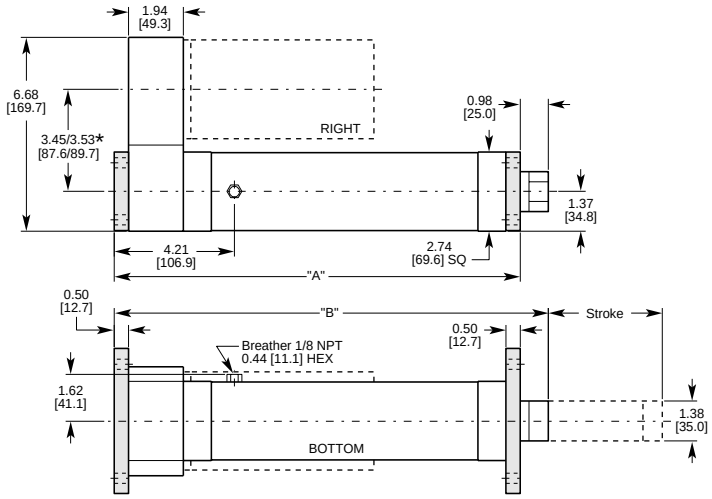
- For AutoCAD® DXF drawings, go to our website, or call the factory for a diskette
- For motor dimensions, go to pages A-96 to A-99
- For rod-end dimensions, go to page A-100

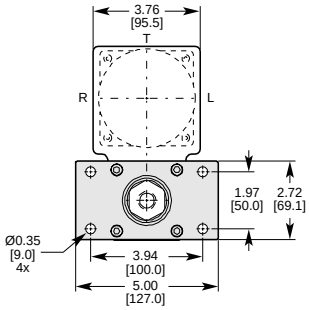
FLANGE DIMENSIONS IN ACCORDANCE WITH
ISO 6431 FOR 63mm BORE SIZE
★ACTUAL DISTANCE DETERMINED BY DRIVE RATIO

DIMENSION		LENGTH
A	CYLINDER LENGTH	9.70 [246.3] + STROKE
B	RETRACT LENGTH	11.19 [284.3] + STROKE

MF3 Both Ends Rectangular Flange Mounting

Parallel





FLANGE DIMENSIONS IN ACCORDANCE
WITH ISO 6431 FOR 63mm BORE SIZE
★ACTUAL DISTANCE DETERMINED BY DRIVE RATIO

DIMENSION		LENGTH
A	CYLINDER LENGTH	10.21 [259.3] + STROKE
B	RETRACT LENGTH	11.19 [284.3] + STROKE

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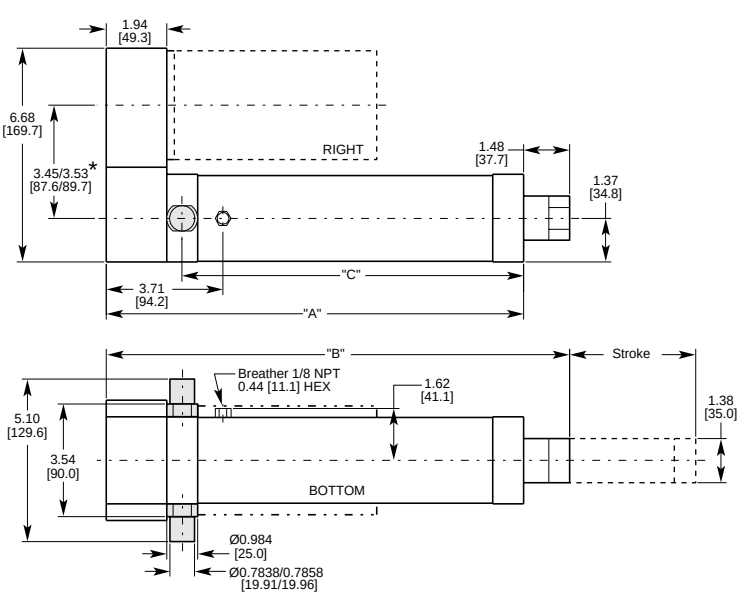
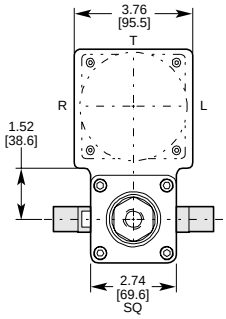
Dimensions

MT4 Trunnion Mounting

Parallel





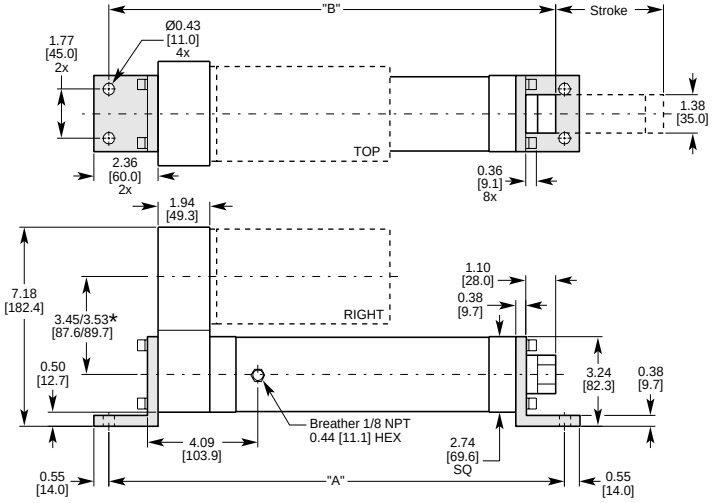
- For AutoCAD® DXF drawings, go to our website, or call the factory for a diskette
- For motor dimensions, go to pages A-96 to A-99
- For rod-end dimensions, go to page A-100

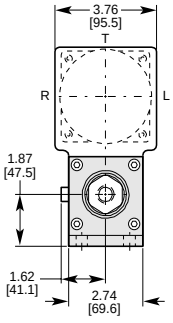
TRUNNION DIMENSIONS IN ACCORDANCE WITH ISO 6431 FOR 63mm BORE SIZE
* ACTUAL DISTANCE DETERMINED BY DRIVE RATIO

DIMENSION		LENGTH
A	CYLINDER LENGTH	9.19 [233.4] + STROKE
B	RETRACT LENGTH	10.67 [271.1] + STROKE
C	MOUNTING LENGTH	6.74 [171.2] + STROKE

MS1 Side Angles Mounting

Parallel





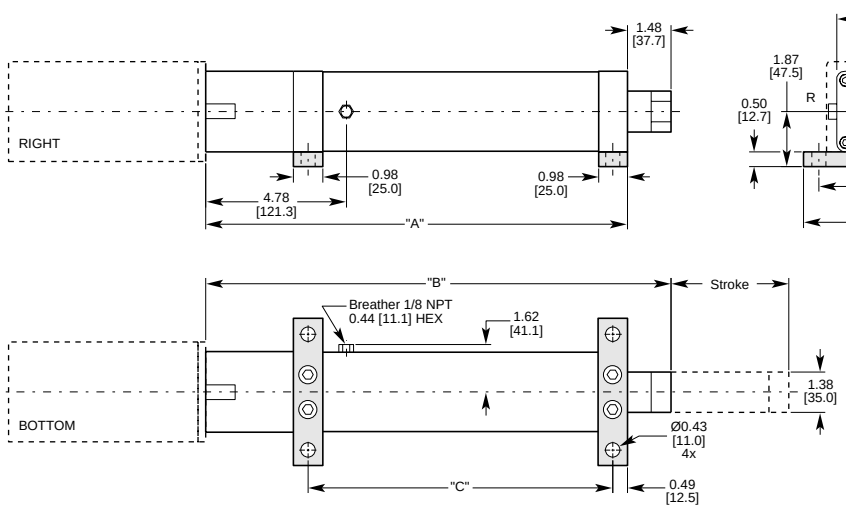
* ACTUAL DISTANCE DETERMINED BY DRIVE RATIO

DIMENSION		LENGTH
A	MOUNTING LENGTH	12.81 [325.4] + STROKE
B	RETRACT LENGTH	12.48 [317.1] + STROKE

Dimensions

MS2 Side Lugs Mounting

Inline

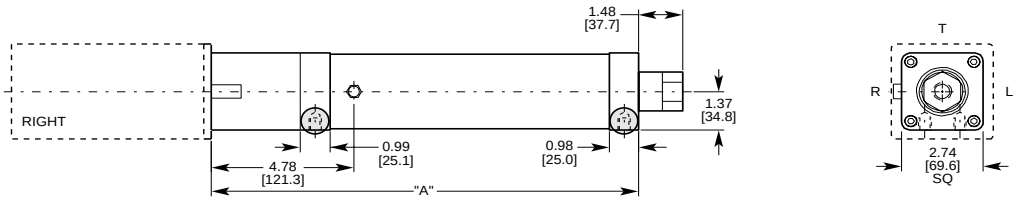


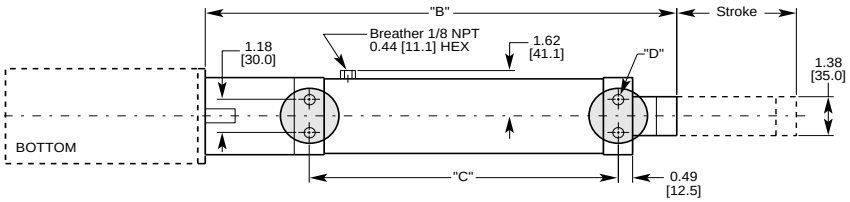
DIMENSION		LENGTH
A	CYLINDER LENGTH	10.25 [260.5] + STROKE
B	RETRACT LENGTH	11.74 [298.1] + STROKE
C	MOUNTING LENGTH	6.25 [158.8] + STROKE

- For AutoCAD® DXF drawings, go to our website, or call the factory for a diskette
- For motor dimensions, go to pages A-96 to A-99
- For rod-end dimensions, go to page A-100

MS6 Side Tapped Holes Mounting

Inline





DIMENSION		LENGTH	DIMENSION	OPTION CODE	SIZE
A	CYLINDER LENGTH	10.25 [260.5] + STROKE	D	MS6E	3/8-16 UNC-2B x 0.40 Dp
B	RETRACT LENGTH	11.74 [298.1] + STROKE		MS6M	M10 x 1.5-6H x 10.2mm Dp
C	MOUNTING LENGTH	6.25 [158.8] + STROKE			

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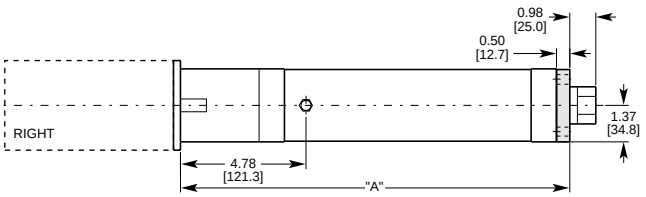
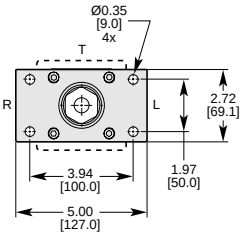
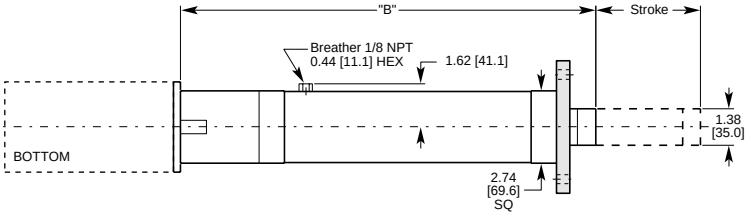
Dimensions

MF1 Head Rectangular Flange Mounting

Inline







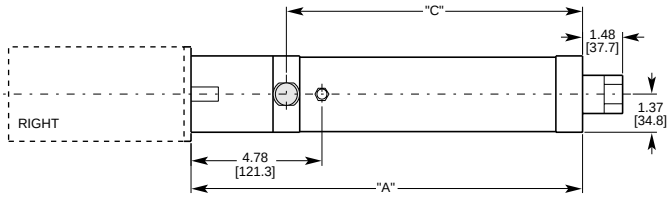
FLANGE DIMENSIONS IN ACCORDANCE WITH ISO 6431 FOR 63mm BORE SIZE

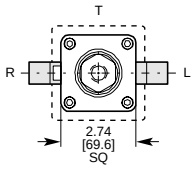
DIMENSION		LENGTH
A	CYLINDER LENGTH	10.76 [273.4] + STROKE
B	RETRACT LENGTH	11.74 [298.3] + STROKE

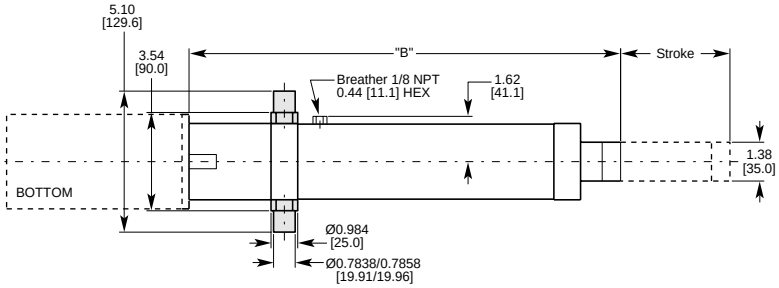
- For AutoCAD® DXF drawings, go to our website, or call the factory for a diskette
- For motor dimensions, go to pages A-96 to A-99
- For rod-end dimensions, go to page A-100

MT4 Trunnion Mounting

Inline







TRUNNION DIMENSIONS IN ACCORDANCE WITH ISO 6431 FOR 63mm BORE SIZE

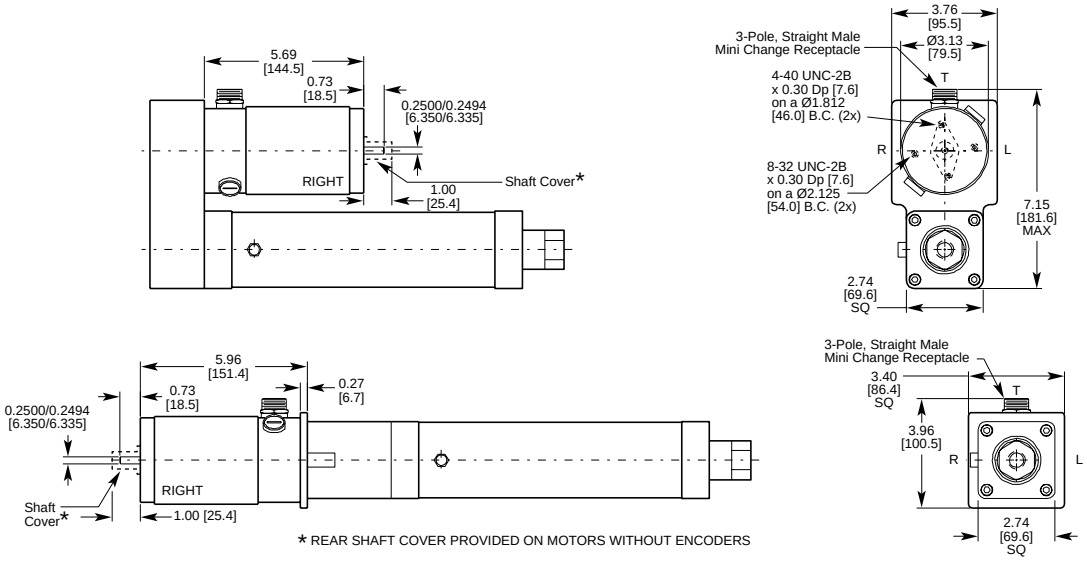
DIMENSION		LENGTH
A	CYLINDER LENGTH	10.25 [260.5] + STROKE
B	RETRACT LENGTH	11.74 [298.1] + STROKE
C	MOUNTING LENGTH	6.74 [171.2] + STROKE

Motor Specifications

EC3-H Series — Permanent Magnet 2-pole, 160 volt DC Motor

Winding Data	H motor
Inductance	19 mH
Resistance	6.4
Torque Constant	54 oz-in/Amp
Voltage Constant	40 V/krpm
Torque	
Continuous	108 oz-in (2.0 Amps)
Peak	432 oz-in (8.0 Amps)
Rotor Inertia	0.049 oz-in-sec^2
Connection	Quick Disconnect: 3 contact receptacle in anodized or painted aluminum shell, includes 12 ft. [3.7 m] cable with molded plug.
Temperature	180°F [82°C] maximum allowable motor case temperature Actual motor case temperature is ambient, duty cycle, speed and load dependent. Refer to speed vs. thrust curves for system duty ratings.

H Motor



* REAR SHAFT COVER PROVIDED ON MOTORS WITHOUT ENCODERS

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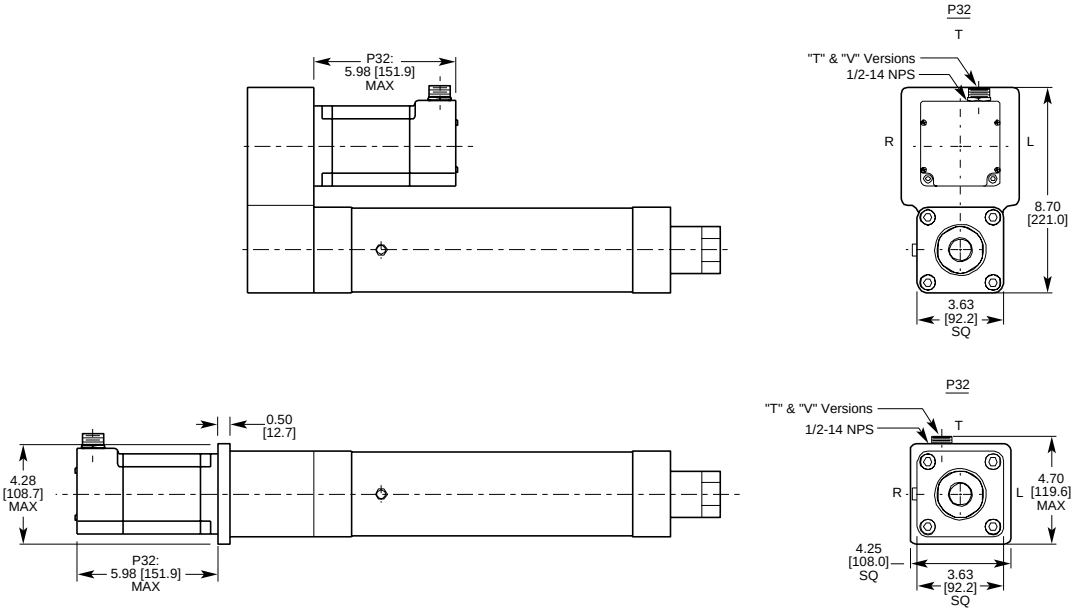
Motor Specifications

EC3-P32 Series

1.8° Permanent Magnet Hybrid Step Motor

Winding Data	P32T and P32V
Inductance	Series (T), 120mH; Parallel (V), 30mH
Resistance	Series (T), 8.4 ; Parallel (V), 1.8
Current Settings	Parallel (V) at 120 VAC, 3.3 Amps Series (T) at 240 VAC, 1.6 Amps
Static Torque	900 oz-in max
Rotor Inertia	0.038 oz-in-sec^2
Connections	EC3-P32T, EC3-P32V: 5 contant quick disconnect receptacle in anodized or painted aluminum shell, includes 12 ft [3.7 m] cable with molded plug.
Temperature	212°F [100°C] maximum allowable motor case temperature. Actual motor case temperature is ambient, duty cycle, speed and load dependent. Refer to speed vs. thrust curves for system duty ratings.

P32 Motor



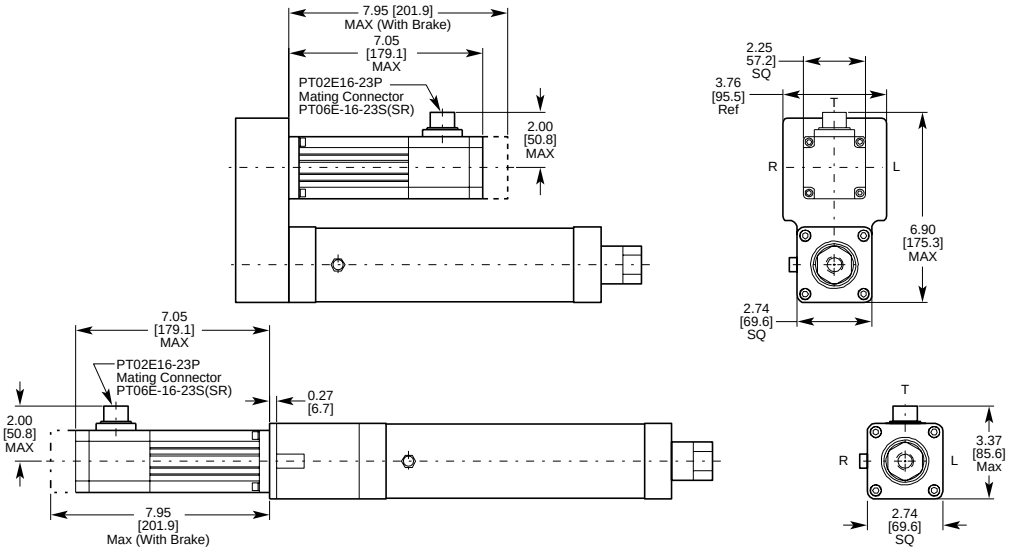
Motor Specifications

EC3-B23 Series

Rare Earth Magnet Brushless Servo Motor with 2,000 Line Encoder and Commutation Sensors

Winding Data	B23
Inductance	16 mH
Resistance	10.6
Torque Constant	57.6 oz-in/Amp
Voltage Constant	45.5 V/krpm
Torque	
Continuous	144 oz-in (2.5 Amps)
Peak	414 oz-in (7.2 Amps)
Rotor Inertia	0.0019 oz-in-sec^2
Connections	MS-type connectors for motor winding and encoder on motor. Includes 12 ft. [3.7 m] cable with mating connector.
Temperature	212°F [100°C] maximum allowed case temperature.
Environmental	IP65 Rating

B23 Motor



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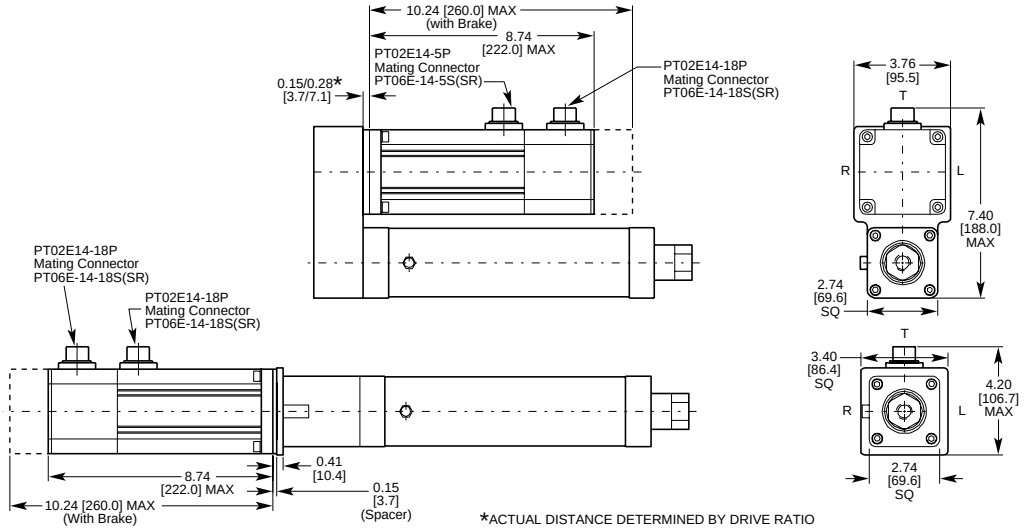
Motor Specifications

EC3-B32 Series

Rare Earth Magnet Brushless Servo Motor with 2,000 Line Encoder and Commutation Sensors

Winding Data	B32
Inductance	9.8 mH
Resistance	3.4
Torque Constant	99.2 oz-in/Amp
Voltage Constant	45.5 V/krpm
Torque	
Continuous	476 oz-in (2.5 Amps)
Peak	992 oz-in (7.2 Amps)
Rotor Inertia	0.016 oz-in-sec^2
Connections	MS-type connectors for motor winding and encoder on motor. Includes 12 ft. [3.7 m] cable with mating connector.
Temperature	212°F [100°C] maximum allowed case temperature.
Environmental	IP65 Rating

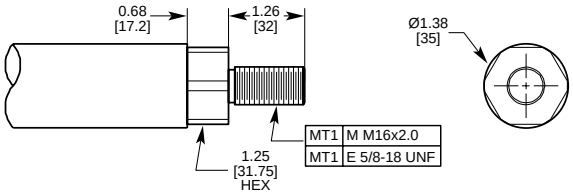
B32 Motor



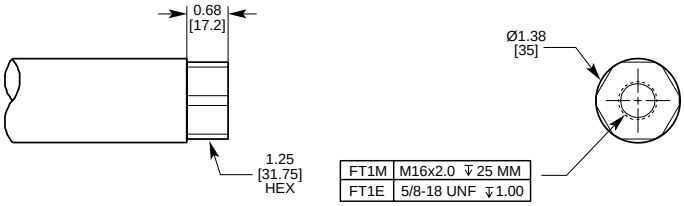
Rod End Dimensions

Dimensions in [mm]

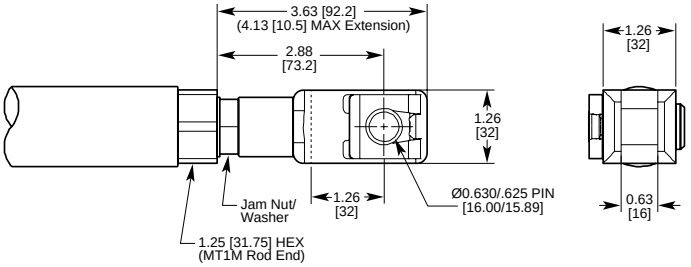
MT1 Male Threads



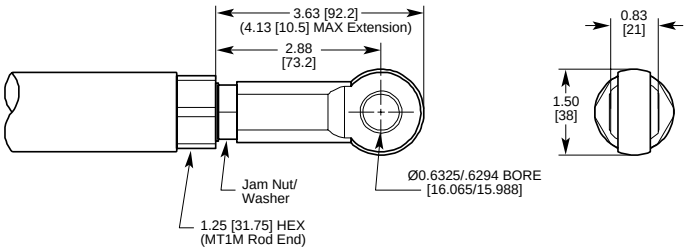
FT1 Female Threads



FC2 Clevis with Pin



FS2 Spherical



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Overview

The EC4 series is a heavy-duty cylinder, for thrust loads ranging up to 12000 N [2700 lb] and travel up to 1500 mm [59.1 in]. Precision rolled ballscrews are standard, yielding quiet operation, low backlash and high accuracy. (See the following pages for detailed specifications).

EC4 Series electric cylinders are available with brushless servo, step motors, or DC servo for compatibility with every motion control environment.

Both ballscrew models provide a variety of speed and thrust capabilities. Ball screw models are used in applications that require high speed and duty cycles. Standard ballscrews are 10 mm and 25 mm lead.

EC4 timing belt or gear reductions between the motor and leadscrew allow selection of the best match between motor power and your linear speed and thrust range.

Options

Options include rotary encoders or linear potentiometers for position feedback, load-holding brakes, protective boots, and quick-disconnect cables. Industrial Devices will also discuss unique modifications at your request.

	EC4-H Series	EC4-P Series	EC4-B Series
Motor Type	160 volt DC Servo	1.8° Hybrid Stepper	Brushless Servo
Thrust Load Capacity	12000 N [2700 lbs]	12000 N [2700 lbs]	12000 N [2700 lbs]
No Load Speed	1330 mm/sec [52.5 in/sec]	1330 mm/sec [52.5 in/sec]	1330 mm/sec [52.5 in/sec]
Repeatability	±0.025 mm [±0.001 in]	±0.013 mm [±0.0005 in]	±0.013 mm [±0.0005 in]
Compatible Controls Offered	H4301 H4321 H4501	NextStep SmartStep S6002 S6961 S6962	B8001 B8961 B8962
Performance Curves	Page A-106	Page A-110	Page A-114

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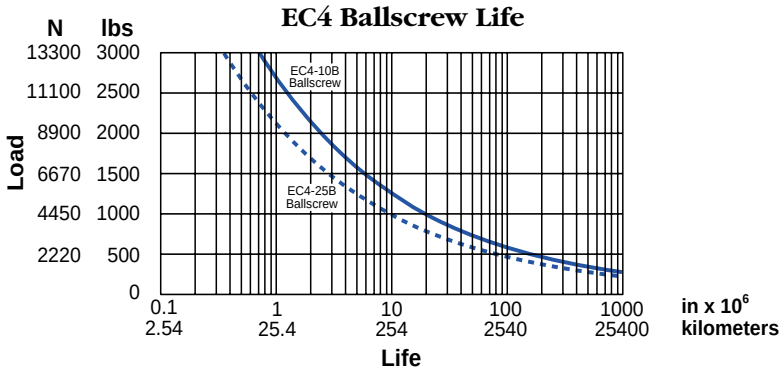
General Specifications

Travel Lengths	50, 100, 150, 200, 250, 300, 450, 600, 750, 1000, 1250, 1500 mm. Custom strokes available in increments of 1mm.
Construction Materials	
Bearing & Drive Housing	6063-T6 aluminum, anodized
Cylinder Body	6063-T6 aluminum, hard anodized with PTFE impregnation
Mounting Plates	6061-T6 aluminum and cast aluminum plate, anodized
Thrust Tube	300 Series Stainless Steel, 1/8 hard and ground
Speed Reducer Options	
Belt/Pulley	AT-5, polyurethane with steel tensile cords
Gears	Alloy steel, case hardened
Transport Screw Options	
Ballscrew/Ballnut	Lead: 25 mm [0.984 in], or 10 mm [0.394 in] Heat treated carbon steel alloy
Thrust Bearings	Angular contact, high thrust ball bearings
Weight (Approximate, without options)	
EC4-H	kg = 17.8 + 0.0188 × [mm stroke]; lb = 39.4 + 1.05 × [inches stroke]
EC4-P32	kg = 16.3 + 0.0188 × [mm stroke]; lb = 35.8 + 1.05 × [inches stroke]
EC4-B32	kg = 16.7 + 0.0188 × [mm stroke]; lb = 36.7 + 1.05 × [inches stroke]
Motor	
Specifications/Dimensions	See pages A-125 to A-126.
Environmental Operation	
Temperature	-30° to 70°C [-22° to 158°F] When operating below 2°C [35°F], vent tubing fitting must be installed. Consult the factory for more information.
Moisture/Contaminants	**IP 54 rated:** Polyurethane thrust tube wiper seal. Mating surfaces gasket sealed. Protected against dust and splashing water (non-corrosive, non-abrasive). Limited ingress permitted. **Vent Tube Fitting:** A vent tube fitting is included, which can be installed to permit the actuator to breathe from a non-contaminated area, or receive a positive pressure continuous purge (14-20kPa [2-3 psi]). **PB Protective Boot (IP65) Option:** An optional thrust tube boot prevents moisture and dry contaminants from bypassing the thrust tube wiper seal, providing IP65 protection when used with included vent tube fitting. The boot also prevents contaminant buildup on the thrust tube. **Clean Room & Vacuum Applications:** IDC has designed special actuators for clean room and vacuum applications. Please consult the factory if your application requires special environmental compatibility.
Maintenance	The EC4 Series actuator design eliminates the need for most routine maintenance. Re-lubrication is required in high cycle applications. All EC4 models include a lube port and adapter for a standard grease gun. See the EC Series Operator's Manual for replacement parts.

General Specifications

Ballscrew

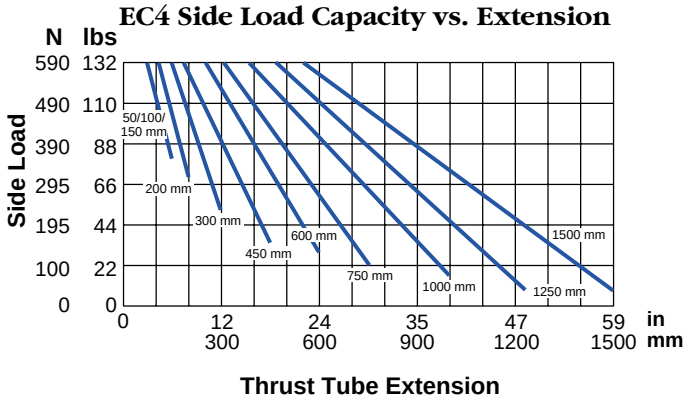
Ballscrew life is rated in inches of travel at a given load. The values in the chart to the right indicate the travel life where 90% of all units in a sample will continue to work, while 10% have failed. This is similar to the B10 rating of a roller bearing mechanism. Be sure to consider acceleration loads as well as thrust, gravity and friction loads.

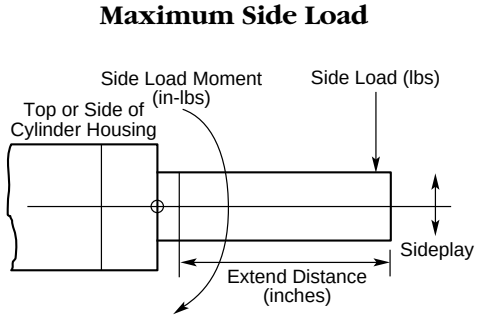


Thrust Tube Capacity

Thrust Tube Torque Capacity Thrust tube does not rotate during operation. Maximum allowable torque during operation and installation is 10 N-m [90 lb-in]

Thrust Tube Side Load Capacity





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General Specifications

EC4 Series Actuator Inertia

Equations

Rotary Inertia (reflected to motor) = A + B* (stroke, in) + C* (load, lb)

Model	Ratio	Screw	A (lb-in-s²)	B (lb-in-s²/in)	C (lb-in-s²/lb)
EC4-...-10-25B	1:1	25 x 25	4.908 E-03	7.014 E-05	6.357 E-05
EC4-...-15-25B	1.5:1		2.800 E-03	3.117 E-05	2.825 E-05
EC4-...-20-25B	2:1		2.711 E-03	1.753 E-05	1.589 E-05
EC4-...-50-25B	5:1		6.267 E-04	2.686 E-06	2.434 E-06
EC4-...-100-25B	10:1		3.473 E-04	7.004 E-07	6.348 E-07
EC4-...-10-10B	1:1	25 x 10	4.682 E-03	5.543 E-05	1.017 E-05
EC4-...-15-10B	1.5:1		2.699 E-03	2.463 E-05	4.521 E-06
EC4-...-20-10B	2:1		2.654 E-03	1.386 E-05	2.543 E-06
EC4-...-50-10B	5:1		6.180 E-04	2.122 E-06	3.895 E-07
EC4-...-100-10B	10:1		3.451 E-04	5.534 E-07	1.016 E-07

Motor	Inertia (lb-in-s²)
H	12.5 E-03
P32	2.375 E-03
B32	1.000 E-03

Metric Conversions:

1 mm = 0.03937 in

1 kg = 2.205 lb

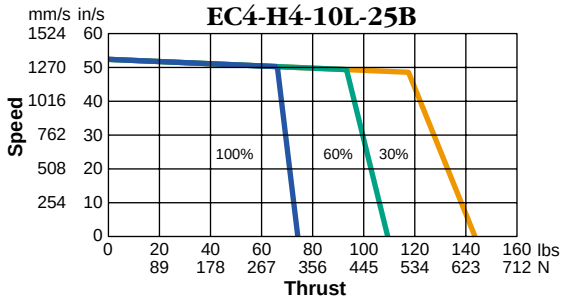
1 lb-in-s² = 1129 kg-cm² = 1.152 kg-cm-s²

Performance

25 mm Lead Ballscrew Models

—100% Duty Cycle —60% Duty Cycle —30% Duty Cycle

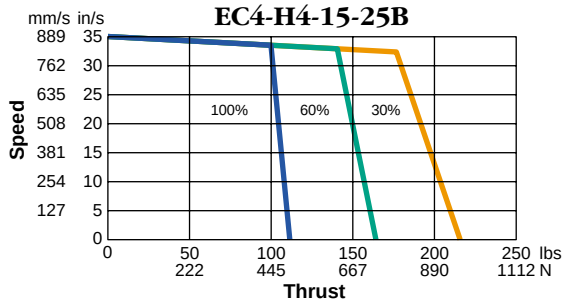
EC4-H4-10-25B
EC4-H4-10L-25B



EC4-H4-10-25B: 1:1 Timing Belt, 25 mm/rev Ballscrew
EC4-H4-10L-25B: 1:1 Inline Coupling, 25 mm/rev Ballscrew

Max. No-Load Accel.	4.57 m/s²	[180 in/s²]
Repeatability	±0.025 mm	[±0.001 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

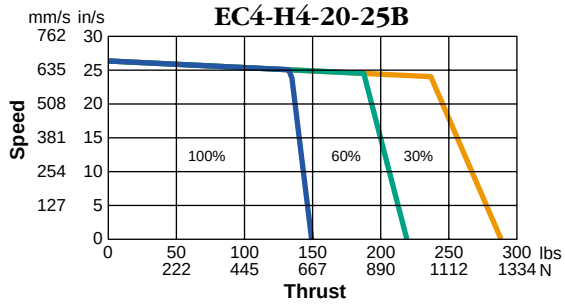
EC4-H4-15-25B



EC4-H4-15-25B: 1.5:1 Timing Belt, 25 mm/rev Ballscrew

Max. No-Load Accel.	3.54 m/s²	[140 in/s²]
Repeatability	±0.025 mm	[±0.001 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

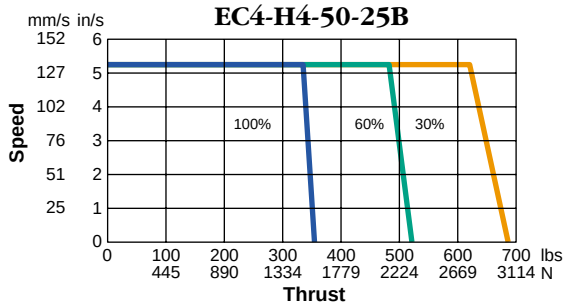
EC4-H4-20-25B



EC4-H4-20-25B: 2.0:1 Timing Belt, 25 mm/rev Ballscrew

Max. No-Load Accel.	2.70 m/s²	[106 in/s²]
Repeatability	±0.025 mm	[±0.001 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

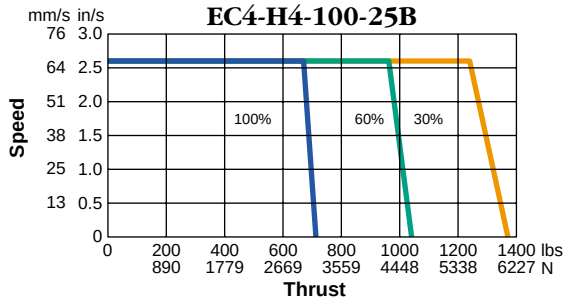
EC4-H4-50-25B



EC4-H4-50-25B: 5:1 Gears, 25 mm/rev Ballscrew

Max. No-Load Accel.	1.27m/s²	[50 in/s²]
Repeatability	±0.025 mm	[±0.001 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC4-H4-100-25B



EC4-H4-100-25B: 10:1 Gears, 25 mm/rev Ballscrew

Max. No-Load Accel.	0.65 m/s²	[26 in/s²]
Repeatability	±0.30 mm	[±0.010 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using H4000 Series Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

25mm lead ballscrew

1333	1333	1333	1333	1059	657	462	298	171	131	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	1000	1250	1500	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	8600	*Column Load Limit (N)*

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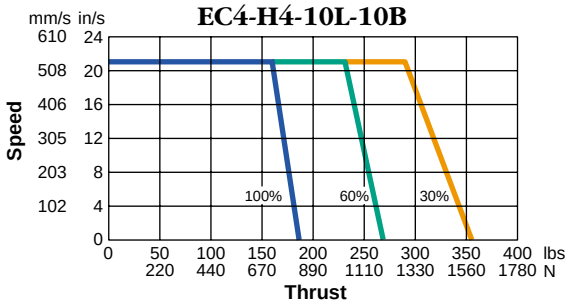
10 mm Lead Ballscrew Models

—100% Duty Cycle —60% Duty Cycle —30% Duty Cycle

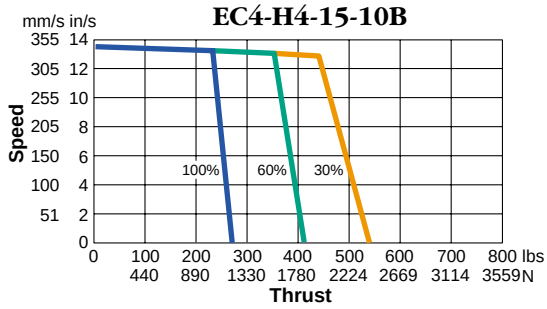
EC4-H4-10-10B
EC4-H4-10L-10B



EC4-H4-10-10B: 1:1 Timing Belt, 10 mm/rev Ballscrew
EC4-H4-10L-10B: 1:1 Inline Coupling, 10 mm/rev Ballscrew

Max. No-Load Accel.	1.72 m/s²	[68 in/s²]
Repeatability	±0.025 mm	[±0.001 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

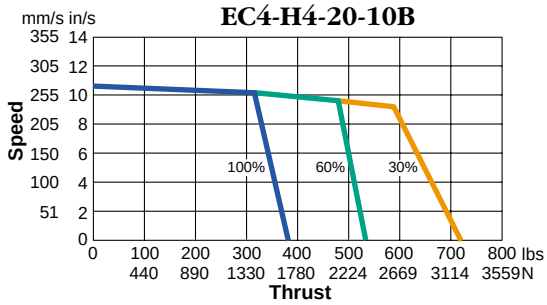
EC4-H4-15-10B



EC4-H4-15-10B: 1.5:1 Timing Belt, 10 mm/rev Ballscrew

Max. No-Load Accel.	1.38 m/s²	[54 in/s²]
Repeatability	±0.025 mm	[±0.001 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

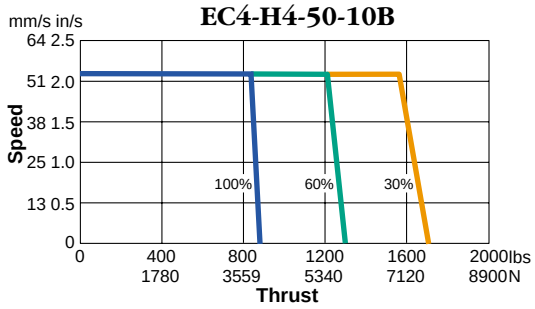
EC4-H4-20-10B



EC4-H4-20-10B: 2:1 Timing Belt, 10 mm/rev Ballscrew

Max. No-Load Accel.	1.06 m/s²	[42 in/s²]
Repeatability	±0.025 mm	[±0.001 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

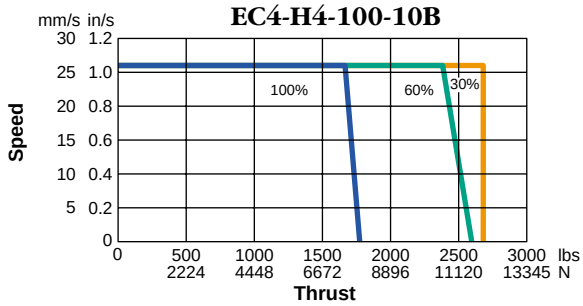
EC4-H4-50-10B



EC4-H4-50-10B: 5:1 Gears, 10 mm/rev Ballscrew

Max. No-Load Accel.	0.50 m/s²	[20 in/s²]
Repeatability	±0.025 mm	[±0.001 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC4-H4-100-10B



EC4-H4-100-10B: 10:1 Gears, 10 mm/rev Ballscrew

Max. No-Load Accel.	0.26 m/s²	[10 in/s²]
Repeatability	±0.25 mm	[±0.001 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using H4000 Series Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and c**olumn load limits** when specifying longer lengths.

10mm lead ballscrew

388	388	388	388	388	350	254	156	99	72	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	1000	1250	1500	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	*Column Load Limit (N)*

How To Order

Steps to Ordering a Complete EC4-H4 System

You are ready to specify an EC4-H4 actuator model number after you have:

a. completed and verified all necessary information on an IDC Product Selection Worksheet.

b. completed the steps in the EC Selection Guidelines on pages (A-20 to A-21).

c. selected a control that is compatible with the H4-series motor.

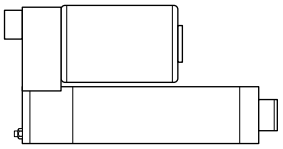
Your local IDC Distributor and our Applications Engineering Department are available to help with your selection process.

1. Base Model

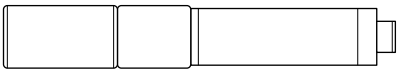
Choose the model with sufficient speed and thrust with a comfortable safety margin. Refer to the EC4-H4 Speed vs. Thrust curves in this section.

EC4-H4 cylinders with gear or timing belt drive reductions have the motor mounted parallel to the lead screw. Inline models have the motor coupled directly to the leadscrew with no reduction.

Parallel Models



Inline Models



2. Stroke Length

Twelve standard lengths are available from 50 to 1500 mm. Custom lengths are also available. Consult your IDC distributor or the factory for details.

To maximize cylinder life, the thrust tube should not impact the physical end-of-travel on either end. Extra travel length is necessary to decelerate the load to a stop when an end-of-travel limit switch is encountered. This extra travel distance depends on load and speed. For further information on this refer to the EC Selection Guidelines on pages (A-20 to A-21) or the Engineering Section.

1 Base Model				2 Stroke Length	3 Cylinder Mounting	4 Rod End	5 Options		
Electric Cylinder	Motor	Drive Ratio	Screw Lead, Type	(mm)					
EC4	H4								

Ballscrew

EC4-H4-10-25B-	EC4-H4-10-10B-
EC4-H4-15-25B-	EC4-H4-15-10B-
EC4-H4-20-25B-	EC4-H4-20-10B-
EC4-H4-50-25B-	EC4-H4-50-10B-
EC4-H4-100-25B-	EC4-H4-100-10B-

Inline Models (Direct Drive)

EC4-H4-10L-25B-	EC4-H4-10L-10B-

Stroke Length (mm)

50	450
100	600
150	750
200	1000
250	1250
300	1500

Custom lengths available

Cylinder Mounting

No Charge

-MF1	-MP2	-MT1M
-MF2	-MS6M	-MT1E
-MF3	-MS6E	-FT1M
-MS2		-FT1E
-MT4		-FC2
		-FS2

Additional Charge

-MP3

Options

-BM
-BS
-EM
-L
-PB

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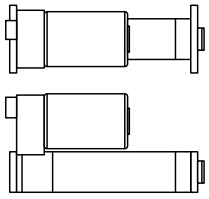
3. Cylinder Mounting

Specify any one of these cylinder mounting options. Dimensional drawings start on page A-118.

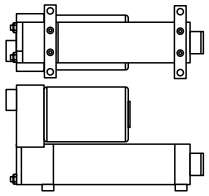
Cylinder base mount options -MP2, -MP3, -MF2, and -MF3 cannot be ordered with inline models.

MF1, 2, 3 Rectangular Flanges

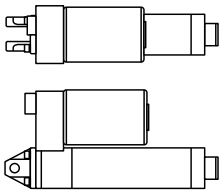


MF1 Front Flange
MF2 Rear Flange
MF3 Both Flanges

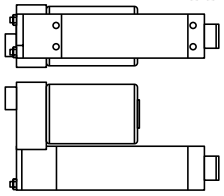
MS2 Side Lugs



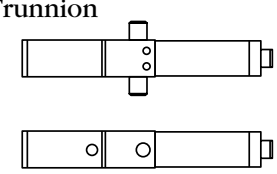
MP2 Rear Clevis (MP3 includes pivot base)



MS6M and MS6E Side Tapped Holes



MT4 Trunnion



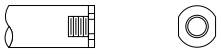
Pivot Mount Caution:

When utilizing a pivot mounting option (MP2 or MT4) in conjunction with a pivot rod end (FS2 or FC2), it is recommended that the actuator be extended only to 90–95% of its full stroke. This increases the system's rigidity and extends the life of the guide bearings and rod seal.

4. Rod Ends

Industrial Devices offers 4 rod end options for EC4-H4 series cylinders.

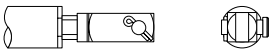
-FT1M or -FT1E Female Thread



-MT1M or -MT1E Male Thread

-FS2 Spherical Joint

-FC2 Clevis



5. Options

See the Options and Accessories section for complete specifications of these options.

BM – Motor Holding Brake

20 in-lb holding brake mounted on the rear shaft of the H4-series motor. *Not available on EC4-H4 with -EMK encoder option.*

BS – Holding Brake

350 in-lb holding brake mounted on the rear lead screw shaft extension. *Not available on inline models or with cylinder base mount options. (-MF2, -MF3, -MP2, -MP3).*

EM – Encoder

Reverse-compatible 500 line incremental encoder mounted on the rear shaft of the motor. *Not available on EC4-H4 with -BM motor holding brake option.*

L – Linear Potentiometer Output

Linear potentiometer mounted on inside the EC4-H4 cylinder. For use with H4501 control.

PB – Protective Boot

Protects the thrust tube from solid contaminants and prevents liquids from entering the cylinder through the rod end bearing.

6. Accessories

Magnetic Position Sensors

Position sensors are available for triggering stop, speed/direction change, or end-of-travel.

To maximize cylinder life, IDC recommends the use of end-of-travel sensors with all cylinders.

Either Reed or Hall Effect (NPN transistor) switches are compatible with IDC controls.

	3m Leads	4m Quick
Reed		
Normally open	PSR-1	PSR-1Q
Normally closed	PSR-2	PSR-2Q
Hall Effect		
Normally open, NPN	PSN-1	PSN-1Q
Normally closed, NPN	PSN-2	PSN-2Q

See page A-240 for more limit switch options, including quick-disconnect versions.

7. Compatible Controls

Details of controls are in Sections F. The EC4-H4 is compatible with:

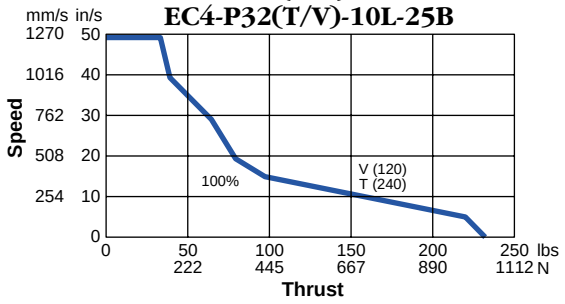
Model	Description
H4301	Limit switch
H4321	Edge guide
H4501	Analog position

Performance

25mm Lead Ballscrew Models

—100% Duty Cycle —50% Duty Cycle

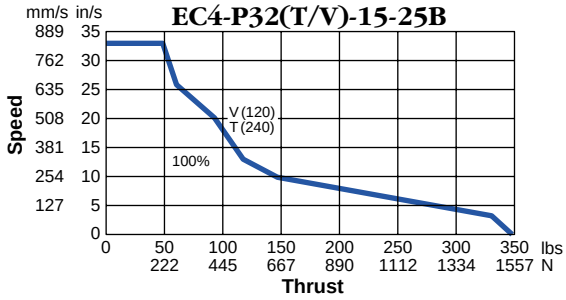
EC4-P32(T/V)-10-25B
EC4-P32(T/V)-10L-25B



EC4-P32(T/V)-10-25B: 1:1 Timing Belt, 25 mm/rev Ballscrew
EC4-P32(T/V)-10L-25B: 1:1 Inline Coupling, 25 mm/rev Ballscrew

Max. No-Load Accel.	27.59 m/s²	[1086 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

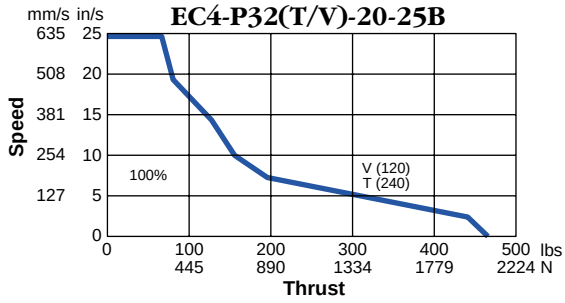
EC4-P32(T/V)-15-25B



EC4-P32(T/V)-15-25B: 1.5:1 Timing Belt, 25 mm/rev Ballscrew

Max. No-Load Accel.	26.92 m/s²	[1060 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

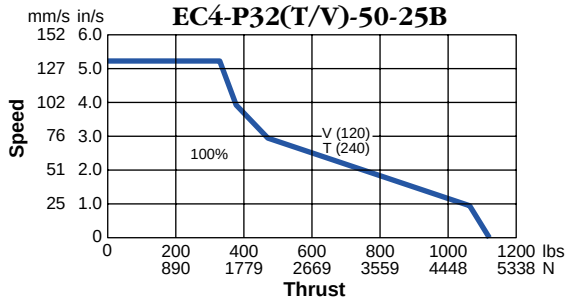
EC4-P32(T/V)-20-25B



EC4-P32(T/V)-20-25B: 2:1 Timing Belt, 25 mm/rev Ballscrew

Max. No-Load Accel.	21.14 m/s²	[832 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

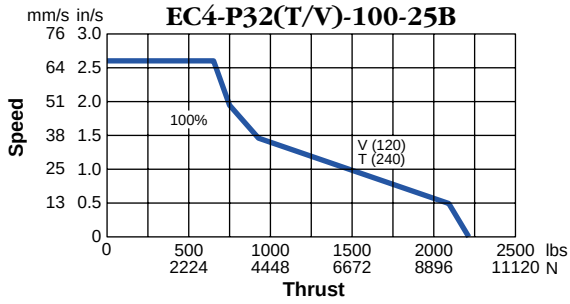
EC4-P32(T/V)-50-25B



EC4-P32(T/V)-50-25B: 5:1 Gears, 25 mm/rev Ballscrew

Max. No-Load Accel.	14.76 m/s²	[581 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC4-P32(T/V)-100-25B



EC4-P32(T/V)-100-25B: 10:1 Gears, 25 mm/rev Ballscrew

Max. No-Load Accel.	8.20 m/s²	[323 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using S6000 Series, *Next*Step®, and *Smart*Step® Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and c**olumn load limits** when specifying longer lengths.

25mm lead ballscrew

1333	1333	1333	1333	1059	657	462	298	171	131	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	1000	1250	1500	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	8600	*Column Load Limit (N)*

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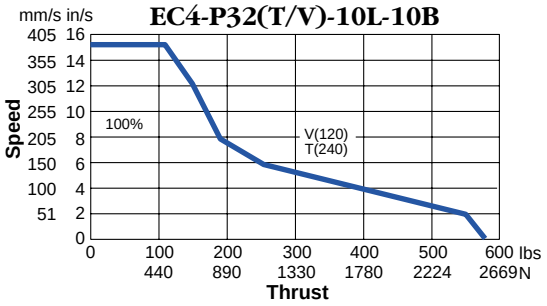
10mm Lead Ballscrew Models

—100% Duty Cycle —50% Duty Cycle

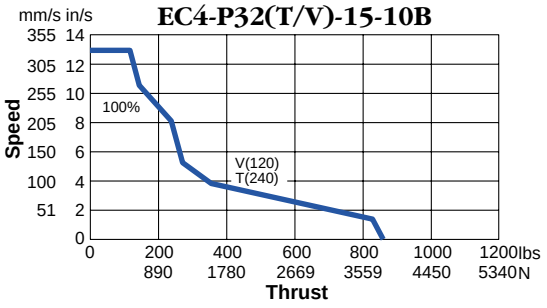
EC4-P32(T/V)-10-10B
EC4-P32(T/V)-10L-10B



EC4-P32(T/V)-10-10B: 1:1 Timing Belt, 10 mm/rev Ballscrew
EC4-P32(T/V)-10L-10B: 1:1 Inline Coupling, 10 mm/rev Ballscrew

Max. No-Load Accel.	9.73 m/s²	[383 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

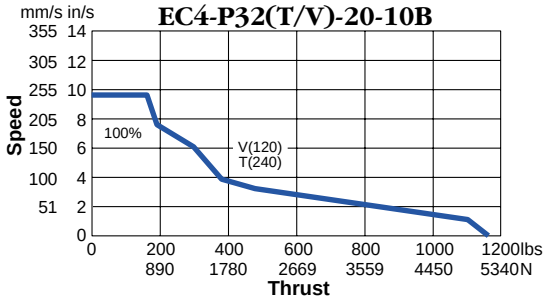
EC4-P32(T/V)-15-10B



EC4-P32(T/V)-15-10B: 1.5:1 Timing Belt, 10 mm/rev Ballscrew

Max. No-Load Accel.	9.90 m/s²	[390 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

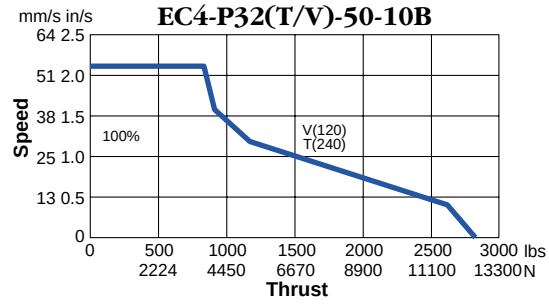
EC4-P32(T/V)-20-10B



EC4-P32(T/V)-20-10B: 2.0:1 Timing Belt, 10 mm/rev Ballscrew

Max. No-Load Accel.	8.04 m/s²	[317 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

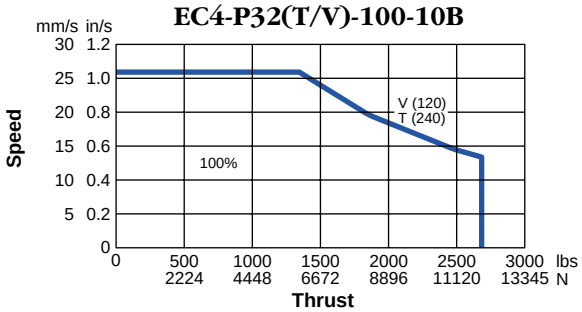
EC4-P32(T/V)-50-10B



EC4-P32(T/V)-50-10B: 5:1 Gears, 10 mm/rev Ballscrew

Max. No-Load Accel.	5.82 m/s²	[229 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC4-P32(T/V)-100-10B



EC4-P32(T/V)-100-10B: 10:1 Gears, 10 mm/rev Ballscrew

Max. No-Load Accel.	3.27 m/s²	[129 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using S6000 Series, NextStep, and SmartStep Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

10mm lead ballscrew

388	388	388	388	388	263	185	119	63	53	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	1000	1250	1500	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	10300	7400	*Column Load Limit (N)*

How To Order

Steps to Ordering a Complete EC4-P System

You are ready to specify an EC4-P actuator model number after you have:

a. completed and verified all necessary information on an IDC Product Selection Worksheet.

b. completed the steps in the EC Selection Guidelines on pages (A-20 to A-21).

c. selected a control that is compatible with the P-series motor.

Your local IDC Distributor and our Applications Engineering Department are available to help with your selection process.

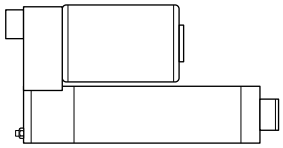
1. Base Model Number

Choose the model with sufficient speed and thrust with a comfortable safety margin. **IDC recommends at least 30% reserve thrust for step motor driven systems.**

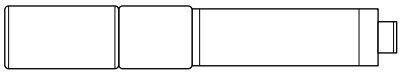
EC4-P Series offers two motor wiring choices, 'T' (Series) and 'V' (Parallel). They 'T' and 'V' versions include a 12-foot motor quick disconnect cable.

EC4-P cylinders with gear or timing belt drive reductions have the motor mounted parallel to the lead screw. Inline models have the motor coupled directly to the leadscrew with no reduction.

Parallel Models



Inline Models



2. Stroke Length

Twelve standard lengths are available from 50 to 1500 mm. Custom lengths are also available. Consult your IDC distributor or the factory for details.

To maximize cylinder life, the thrust tube should not impact the physical end-of-travel on either end. Extra travel length is necessary to decelerate the load to a stop when an end-of-travel limit switch is encountered. This extra travel distance depends on load and speed. For further information on this refer to the EC Selection Guidelines on pages (A-20 to A-21) or the Engineering Section.

1 Base Model				2 Stroke Length	3 Cylinder Mounting	4 Rod End		5 Options	
Electric Cylinder	Motor	Drive Ratio	Screw Lead, Type	(mm)					
EC4	P32								

EC4-P32*x*-10-25B- EC4-P32*x*-10-10B-
EC4-P32*x*-15-25B- EC4-P32*x*-15-10B-
EC4-P32*x*-20-25B- EC4-P32*x*-20-10B-
EC4-P32*x*-50-25B- EC4-P32*x*-50-10B-
EC4-P32*x*-100-25B- EC4-P32*x*-100-10B-
x = T (Series) or V (Parallel)

Inline Models (Direct Drive)
EC4-P32-10L-25B- EC4-P32-10L-10B-
x = T (Series) or V (Parallel)

50 450
100 600
150 750
200 1000
250 1250
300 1500
Custom lengths available

No Charge

-MF1	-MP2	-MT1M
-MF2	-MS6M	-MT1E
-MF3	-MS6E	-FT1M
-MS2	-MT4	-FT1E
		-FC2
		-FS2

Additional Charge

-MP3	-BS
	-EMK
	-L
	-PB

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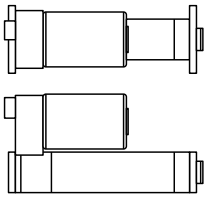
How To Order

3. Cylinder Mounting

Specify any one of these cylinder mounting options. Dimensional drawings start on page A-118.

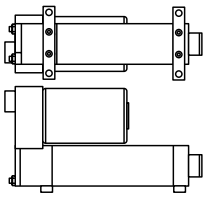
Cylinder base mount options -MP2, -MP3, -MF2, and -MF3 cannot be ordered with inline models.

MF1, 2, 3 Rectangular Flanges

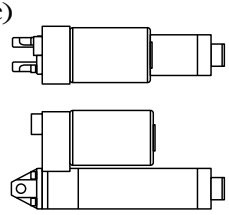


MF1 Front Flange
MF2 Rear Flange
MF3 Both Flanges

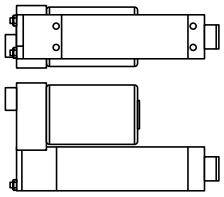
MS2 Side Lugs



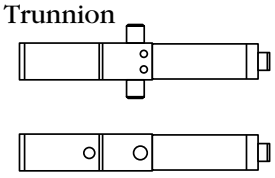
MP2 Rear Clevis (MP3 includes pivot base)



MS6M and MS6E Side Tapped Holes



MT4 Trunnion



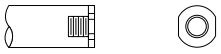
Pivot Mount Caution:

When utilizing a pivot mounting option (MP2 or MT4) in conjunction with a pivot rod end (FS2 or FC2), it is recommended that the actuator be extended only to 90–95% of its full stroke. This increases the system's rigidity and extends the life of the guide bearings and rod seal.

4. Rod Ends

Industrial Devices offers 4 rod end options for EC4-P series cylinders.

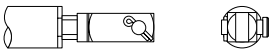
-FT1M or -FT1E Female Thread



-MT1M or -MT1E Male Thread

-FS2 Spherical Joint

-FC2 Clevis



5. Other Options

See the Options and Accessories section for complete specifications.

BS – Holding Brake

350 in-lb holding brake mounted on the rear lead screw shaft extension. *Not available on inline models or with cylinder base mount options. (-MF2, -MF3, -MP2, -MP3).*

EMK – Encoder

1000 line incremental encoder mounted on the rear shaft of the motor.

L – Linear Potentiometer Output

Linear potentiometer mounted on inside the EC4-P cylinder.

PB – Protective Boot

Protects the thrust tube from solid contaminants and prevents liquids from entering the cylinder through the rod end bearing.

6. Accessories

Magnetic Position Sensors

Position sensors are available for indicating end-of-travel and home positions, or for use with user supplied controls.

To maximize cylinder life, IDC recommends the use of end-of-travel sensors with all cylinders.

Common Application Requirements: For most applications, one home and two end-of-travel sensors are required for each cylinder. Either Reed or Hall Effect (NPN transistor) switches are compatible with IDC controls.

	3m Leads	4m Quick
Reed		
Home (N.O.)	PSR-1	PSR-1Q
End-of-travel (N.C.)	PSR-2	PSR-2Q
Hall Effect		
Home (N.O./NPN)	PSN-1	PSN-1Q
End-of-travel (N.C./NPN)	PSN-2	PSN-2Q

See page A-240 for more limit switch options, including quick-disconnect versions.

7. Compatible Controls

Details of controls are in Sections G. The EC4-P are compatible with:

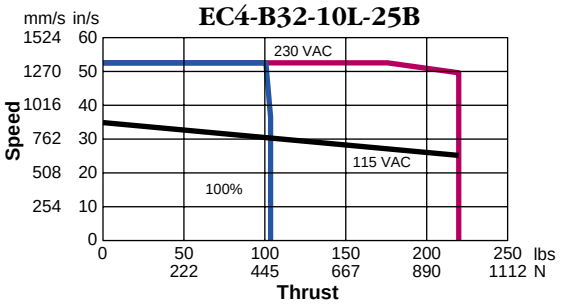
Model	Description
NextStep®	Stepper drive
S6002	2-Axis Stepper drive
SmartStep®	*IDeal*™ programmable
S6961	*IDeal*™ programmable
S6962	2-Axis *IDeal*™ programmable

Performance

25mm Lead Ballscrew Models

—100% Duty Cycle —Intermittent (<2 sec)

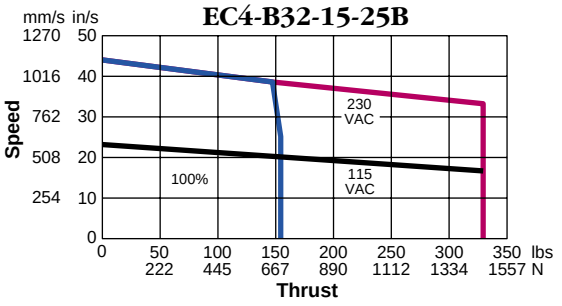
EC4-B32-10-25B
EC4-B32-10L-25B



EC4-B32-10-25B: 1:1 Timing Belt, 25 mm/rev Ballscrew
EC4-B32-10L-25B: 1:1 Inline Coupling, 25 mm/rev Ballscrew

Max. No-Load Accel.	14.77 m/s²	[581 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

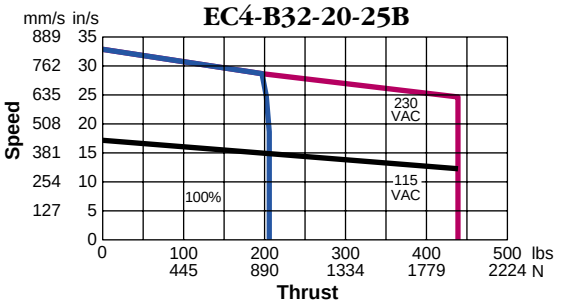
EC4-B32-15-25B



EC4-B32-15-25B: 1.5:1 Timing Belt, 25 mm/rev Ballscrew

Max. No-Load Accel.	15.91 m/s²	[626 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

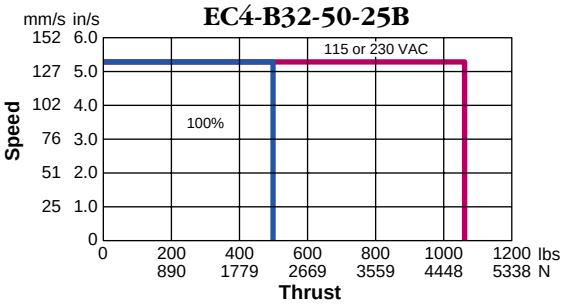
EC4-B32-20-25B



EC4-B32-20-25B: 2:1 Timing Belt, 25 mm/rev Ballscrew

Max. No-Load Accel.	12.69 m/s²	[500 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

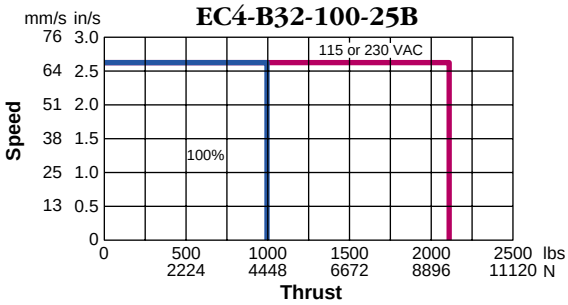
EC4-B32-50-25B



EC4-B32-50-25B: 5:1 Gears, 25 mm/rev Ballscrew

Max. No-Load Accel.	12.00 m/s²	[472 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC4-B32-100-25B



EC4-B32-100-25B: 10:1 Gears, 25 mm/rev Ballscrew

Max. No-Load Accel.	7.34 m/s²	[289 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

25mm lead ballscrew

1333	1333	1333	1333	1059	657	462	298	171	131	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	1000	1250	1500	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	8600	*Column Load Limit (N)*

- Performance using B8000 Series Controls (not B8501).
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

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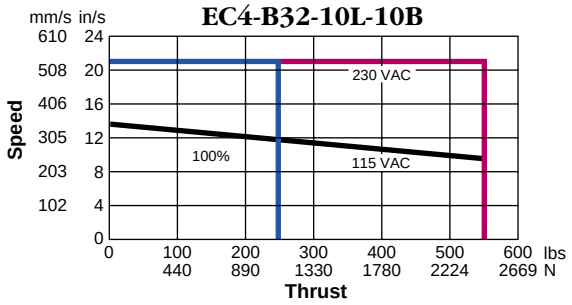
10mm Lead Ballscrew Models

—100% Duty Cycle —Intermittent (<2 sec)

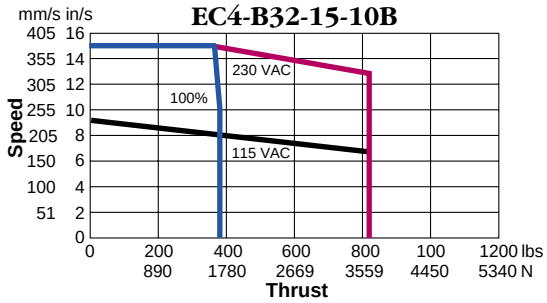
EC4-B32-10-10B
EC4-B32-10L-10B



EC4-B32-10-10B: 1:1 Timing Belt, 10 mm/rev Ballscrew
EC4-B32-10L-10B: 1:1 Inline Coupling, 10 mm/rev Ballscrew

Max. No-Load Accel.	5.08 m/s²	[200 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

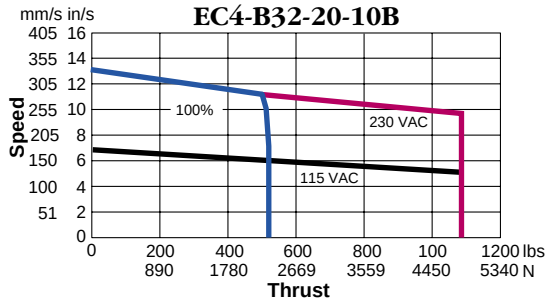
EC4-B32-15-10B



EC4-B32-15-10B: 1.5:1 Timing Belt, 10 mm/rev Ballscrew

Max. No-Load Accel.	5.70 m/s²	[224 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

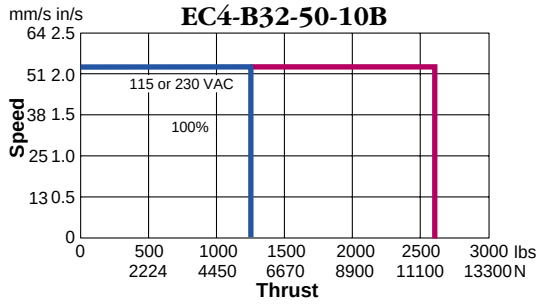
EC4-B32-20-10B



EC4-B32-20-10B: 2.0:1 Timing Belt, 10 mm/rev Ballscrew

Max. No-Load Accel.	4.75 m/s²	[187 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

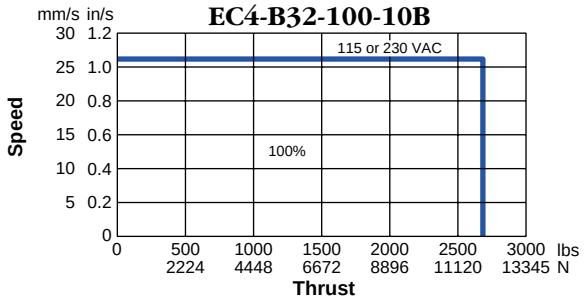
EC4-B32-50-10B



EC4-B32-50-10B: 5:1 Gears, 10 mm/rev Ballscrew

Max. No-Load Accel.	4.68 m/s²	[184 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC4-B32-100-10B



EC4-B32-100-10B: 10:1 Gears, 10 mm/rev Ballscrew

Max. No-Load Accel.	2.91 m/s²	[115 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using B8000 Series Controls (not B8501).
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

10mm lead ballscrew

50 thru 100	150	200	300	450	600	750	1000	1250	1500	
388	388	388	388	388	350	254	156	99	72	*Critical Speed (mm/sec)*
***Stroke** (mm)*										
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	*Column Load Limit (N)*

How To Order

Steps to Ordering a Complete EC4-B System

You are ready to specify an EC4-B actuator model number after you have:

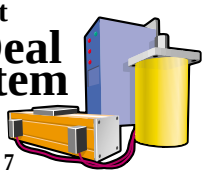
a. completed and verified all necessary information on an IDC Product Selection Worksheet.

b. completed the steps in the EC Selection Guidelines on pages (A-20 to A-21).

c. selected a control that is compatible with the B-series motor.

Your local IDC Distributor and our Applications Engineering Department are available to help with your selection process.

Make It An IDeal System



See Intro Pages 6 & 7

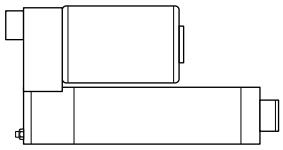
1. Base Model Number

Choose the model with sufficient speed and thrust with a comfortable safety margin. Refer to the EC4-B Speed vs. Thrust curves in this section.

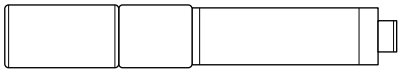
EC4-B cylinders with gear or timing belt drive reductions have the motor mounted parallel to the lead screw. Inline models have the motor coupled directly to the leadscrew with no reduction.

Note: All EC4-B cylinders include an encoder.

Parallel Models



Inline Models



2. Stroke Length

Twelve standard lengths are available from 50 to 1500 mm. Custom lengths are also available. Consult your IDC distributor or the factory for details.

To maximize cylinder life, the thrust tube should not impact the physical end-of-travel on either end. Extra travel length is necessary to decelerate the load to a stop when an end-of-travel limit switch is encountered. This extra travel distance depends on load and speed. For further information on this refer to the EC Selection Guidelines on pages (A-20 to A-21) or the Engineering Section.

1 Base Model				2 Stroke Length	3 Cylinder Mounting	4 Rod End	5 Options		
Electric Cylinder	Motor	Drive Ratio	Screw Lead, Type	(mm)					
EC4	B32								

EC4-B32-10-25B- EC4-B32-10-10B-
EC4-B32-15-25B- EC4-B32-15-10B-
EC4-B32-20-25B- EC4-B32-20-10B-
EC4-B32-50-25B- EC4-B32-50-10B-
EC4-B32-100-25B- EC4-B32-100-10B-

Inline Models (Direct Drive)
EC4-B32-10L-25B- EC4-B32-10L-10B-

50 450
100 600
150 750
200 1000
250 1250
300 1500
Custom lengths available

No Charge

-MF1 -MP2 -MT1M
-MF2 -MS6M -MT1E
-MF3 -MS6E -FT1M
-MS2 -MT4 -FT1E
-FC2
-FS2

Additional Charge

-MP3 -BM
-BS
-L
-PB

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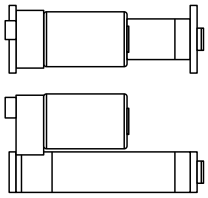
How To Order

3. Cylinder Mounting

Specify any one of these cylinder mounting options. Dimensional drawings start on page A-118.

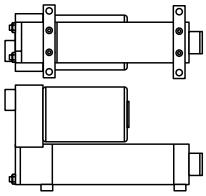
Cylinder base mount options -MP2, -MP3, -MF2, and -MF3 cannot be ordered with inline models.

MF1, 2, 3 Rectangular Flanges

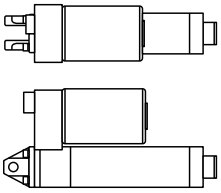


MF1 Front Flange
MF2 Rear Flange
MF3 Both Flanges

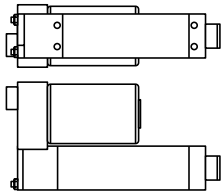
MS2 Side Lugs



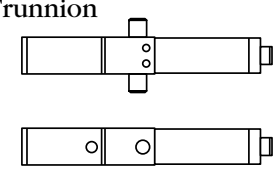
MP2 Rear Clevis (MP3 includes pivot base)



MS6M and MS6E Side Tapped Holes



MT4 Trunnion



Pivot Mount Caution:

When utilizing a pivot mounting option (MP2 or MT4) in conjunction with a pivot rod end (FS2 or FC2), it is recommended that the actuator be extended only to 90–95% of its full stroke. This increases the system's rigidity and extends the life of the guide bearings and rod seal.

4. Rod Ends

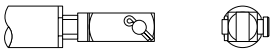
Industrial Devices offers 4 rod end options for EC4-B series cylinders.

-FT1M or -FT1E Female Thread

-MT1M or -MT1E Male Thread

-FS2 Spherical Joint

-FC2 Clevis



5. Other Options

See the Options and Accessories section for complete specifications.

BM – Motor Holding Brake

60 in-lb holding brake mounted on the B32 motor.

BS – Holding Brake

350 in-lb holding brake mounted on the rear lead screw shaft extension. *Not available on inline models or with cylinder base mount options. (-MF2, -MF3, -MP2, -MP3).*

L – Linear Potentiometer Output

Linear potentiometer mounted on inside the EC4-B cylinder. For use with B8501 control.

PB – Protective Boot

Protects the thrust tube from solid contaminants and prevents liquids from entering the cylinder through the rod end bearing.

6. Accessories

Magnetic Position Sensors

Position sensors are available for indicating end-of-travel and home positions, or for use with user supplied controls.

To maximize cylinder life, IDC recommends the use of end-of-travel sensors with all cylinders.

Common Application Requirements: For most applications, one home and two end-of-travel sensors are required for each cylinder. Either Reed or Hall Effect (NPN transistor) switches are compatible with IDC controls.

	3m Leads	4m Quick
Reed		
Home (N.O.)	PSR-1	PSR-1Q
End-of-travel (N.C.)	PSR-2	PSR-2Q
Hall Effect		
Home (N.O./NPN)	PSN-1	PSN-1Q
End-of-travel (N.C./NPN)	PSN-2	PSN-2Q

See page A-240 for more limit switch options, including quick-disconnect versions.

7. Compatible Controls

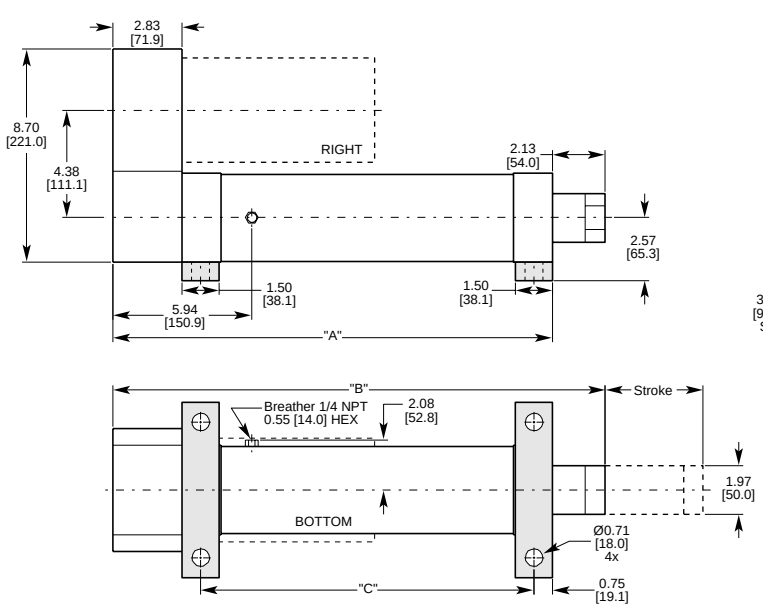
Details of controls are in Sections H. The EC4-B is compatible with:

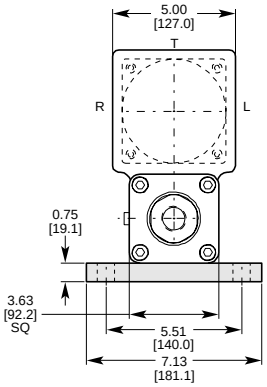
Model	Description
B8001	Digital servo drive
B8501	Analog position
B8961	*IDeal*™ programmable servo
B8962	2 Axis *IDeal*™ programmable servo

Dimensions

MS2 Side Lugs Mounting

Parallel



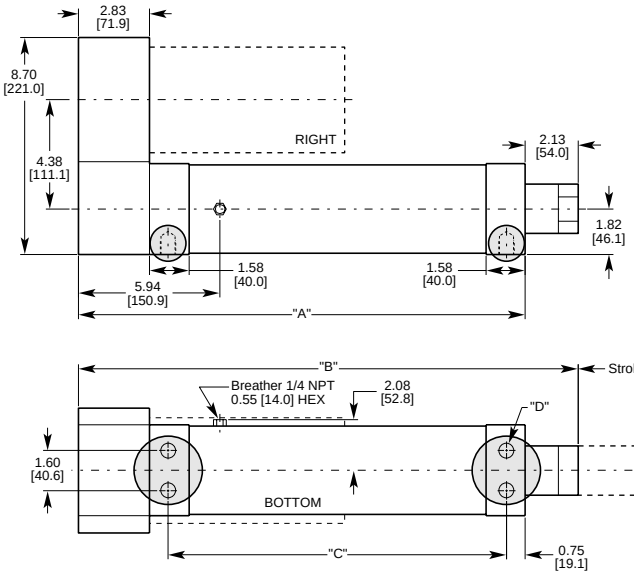


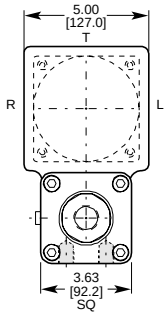
- For AutoCAD® DXF drawings, go to our website, or call the factory for a diskette
- For motor dimensions, go to pages A-124 to A-126
- For rod-end dimensions, go to page A-128

DIMENSION		LENGTH
A	CYLINDER LENGTH	13.90 [353.1] + STROKE
B	RETRACT LENGTH	16.02 [406.9] + STROKE
C	MOUNTING LENGTH	9.55 [242.6] + STROKE

MS6 Side Tapped Holes Mounting

Parallel





DIMENSION		LENGTH	DIM	OPTION CODE	SIZE
A	CYLINDER LENGTH	13.90 [353.1] + STROKE	D	MS6E	5/8-18 UNF-2B x 0.55 Dp
B	RETRACT LENGTH	16.02 [406.9] + STROKE		MS6M	M16 x 2-6H x 14mm Dp
C	MOUNTING LENGTH	9.55 [242.6] + STROKE			

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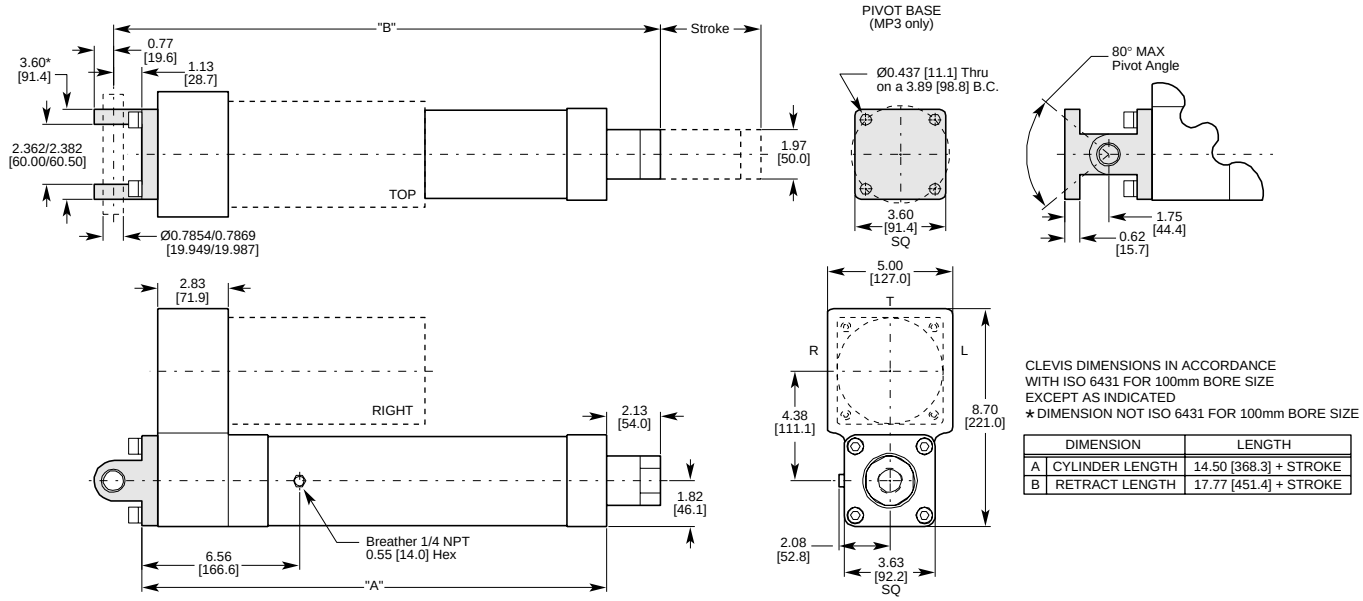
Dimensions

MP2/MP3 Clevis Mount with Pivot Base and Pin

Parallel



CLEVIS DIMENSIONS IN ACCORDANCE WITH ISO 6431 FOR 100mm BORE SIZE EXCEPT AS INDICATED
★ DIMENSION NOT ISO 6431 FOR 100mm BORE SIZE

DIMENSION		LENGTH
A	CYLINDER LENGTH	14.50 [368.3] + STROKE
B	RETRACT LENGTH	17.77 [451.4] + STROKE

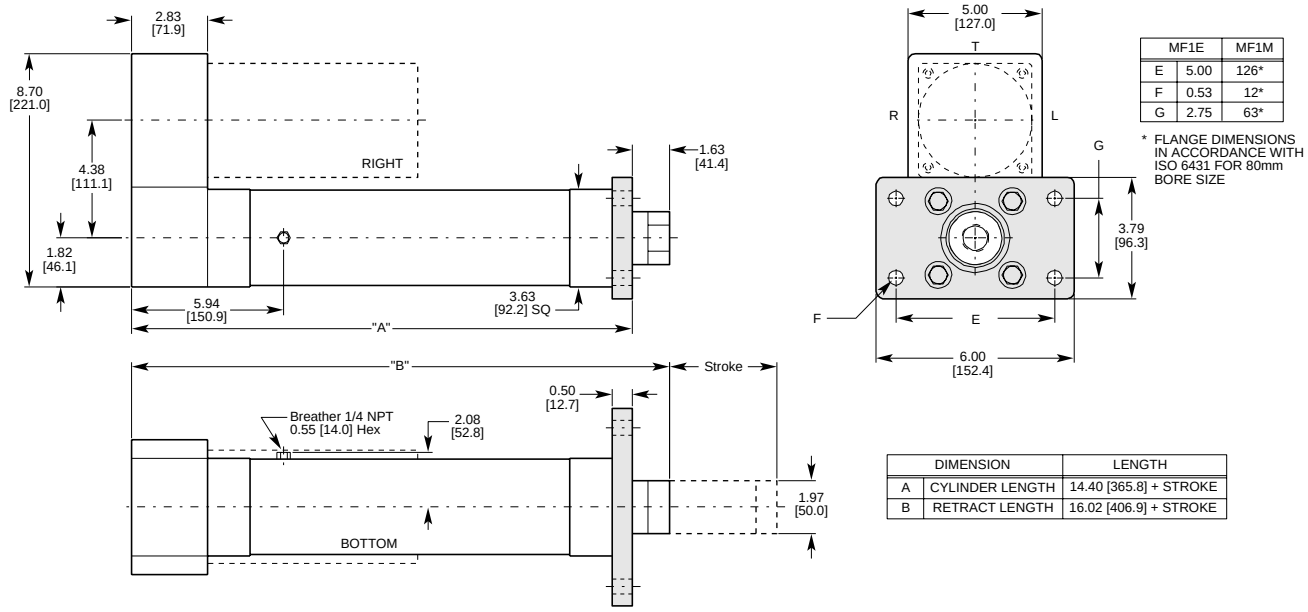
- For AutoCAD® DXF drawings, go to our website, or call the factory for a diskette
- For motor dimensions, go to pages A-124 to A-126
- For rod-end dimensions, go to page A-128

Note:

- Order MP3 to specify complete mounting kit, including actuator clevis, pin and pivot base.
- Order MP2 to omit the pivot base.

MF1 Head Rectangular Flange Mounting

Parallel



	MF1E	MF1M
E	5.00	126*
F	0.53	12*
G	2.75	63*

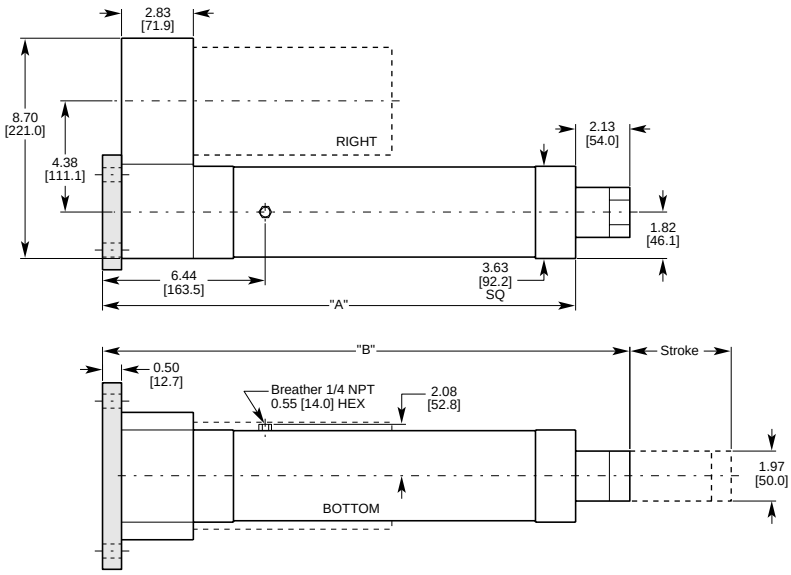
* FLANGE DIMENSIONS IN ACCORDANCE WITH ISO 6431 FOR 80mm BORE SIZE

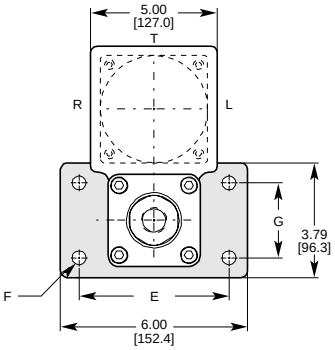
DIMENSION		LENGTH
A	CYLINDER LENGTH	14.40 [365.8] + STROKE
B	RETRACT LENGTH	16.02 [406.9] + STROKE

Dimensions

MF2 Cap Rectangular Flange Mounting

Parallel





* FLANGE DIMENSIONS IN ACCORDANCE WITH ISO 6431 FOR 80mm BORE SIZE

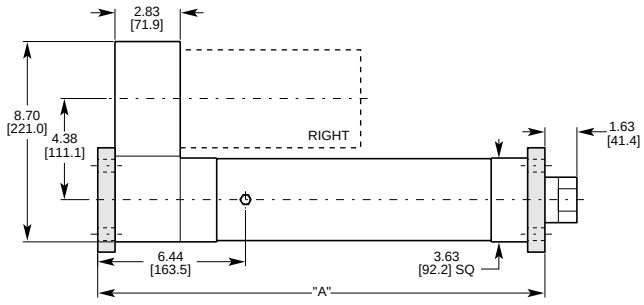
DIMENSION		LENGTH
A	CYLINDER LENGTH	14.40 [365.8] + STROKE
B	RETRACT LENGTH	16.52 [419.6] + STROKE

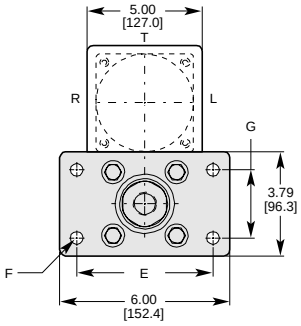
	MF2E (inches)	MF2M (mm)
E	5.00	126*
F	0.53	12*
G	2.75	63*

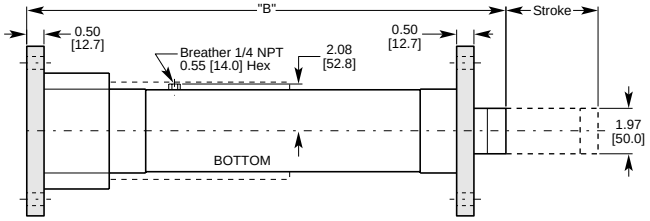
- For AutoCAD® DXF drawings, go to our website, or call the factory for a diskette
- For motor dimensions, go to pages A-124 to A-126
- For rod-end dimensions, go to page A-128

MF3 Both Ends Rectangular Flange Mounting

Parallel







* FLANGE DIMENSIONS IN ACCORDANCE WITH ISO 6431 FOR 80mm BORE SIZE

DIMENSION		LENGTH
A	CYLINDER LENGTH	14.90 [378.5] + STROKE
B	RETRACT LENGTH	16.52 [419.6] + STROKE

	MF3E (inches)	MF3M (mm)
E	5.00	126*
F	0.53	12*
G	2.75	63*

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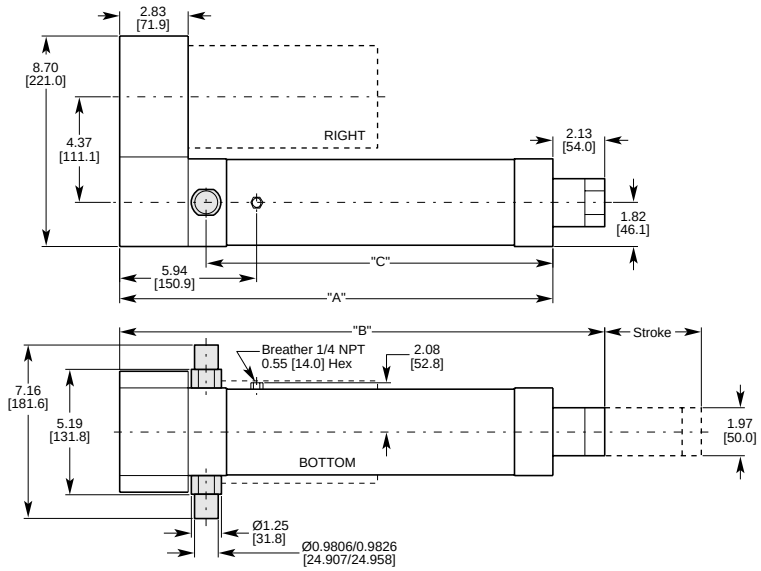
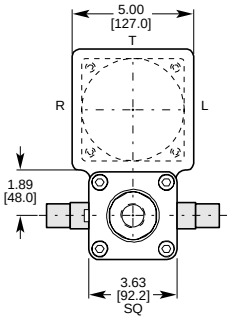
Dimensions

MT4 Trunnion Mounting

Parallel





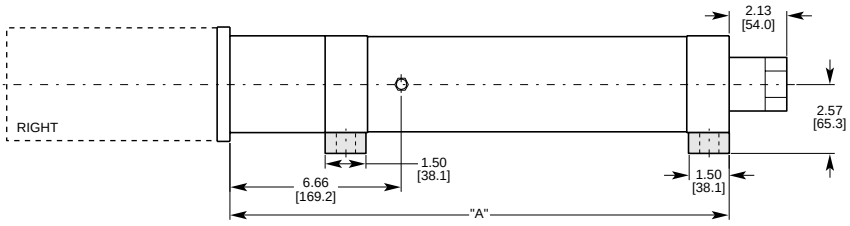
- For AutoCAD® DXF drawings, go to our website, or call the factory for a diskette
- For motor dimensions, go to pages A-124 to A-126
- For rod-end dimensions, go to page A-128

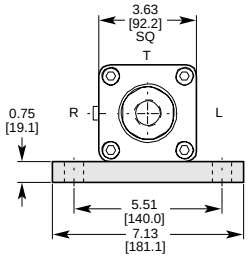
TRUNNION DIMENSIONS IN ACCORDANCE WITH ISO 6431 FOR 100mm BORE SIZE

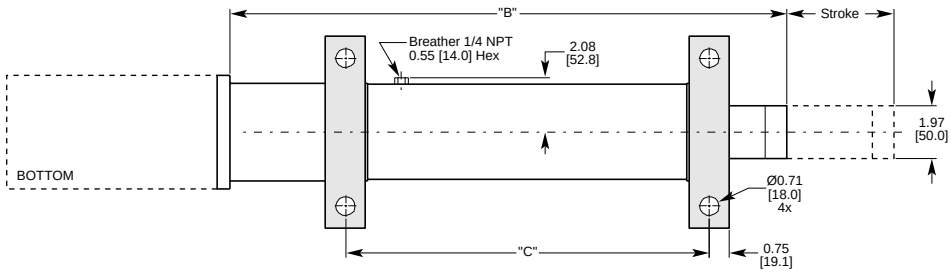
DIMENSION		LENGTH
A	CYLINDER LENGTH	13.90 [353.1] + STROKE
B	RETRACT LENGTH	16.02 [406.9] + STROKE
C	MOUNTING LENGTH	10.30 [261.6] + STROKE

MS2 Side End Angles Mounting

Inline





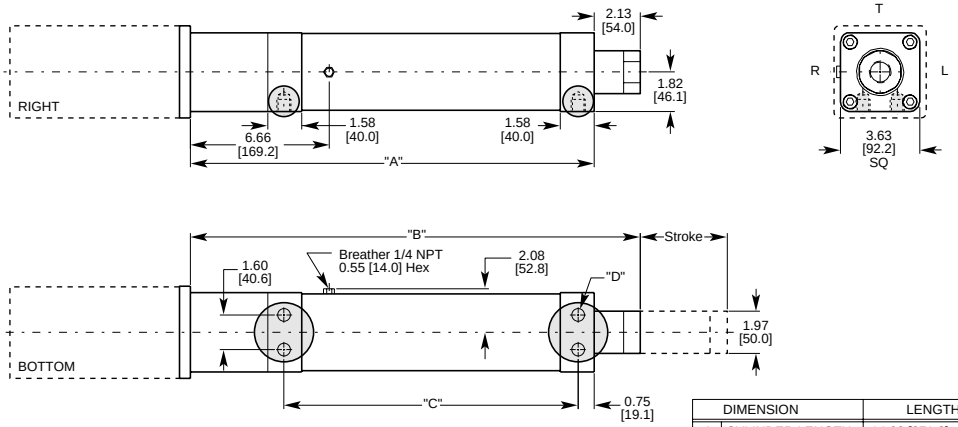


DIMENSION		LENGTH
A	CYLINDER LENGTH	14.62 [371.3] + STROKE
B	RETRACT LENGTH	16.74 [425.3] + STROKE
C	MOUNTING LENGTH	9.55 [242.6] + STROKE

Dimensions

MS6 Side Tapped Holes Mounting

Inline



- For AutoCAD® DXF drawings, go to our website, or call the factory for a diskette
- For motor dimensions, go to pages A-124 to A-126
- For rod-end dimensions, go to page A-128

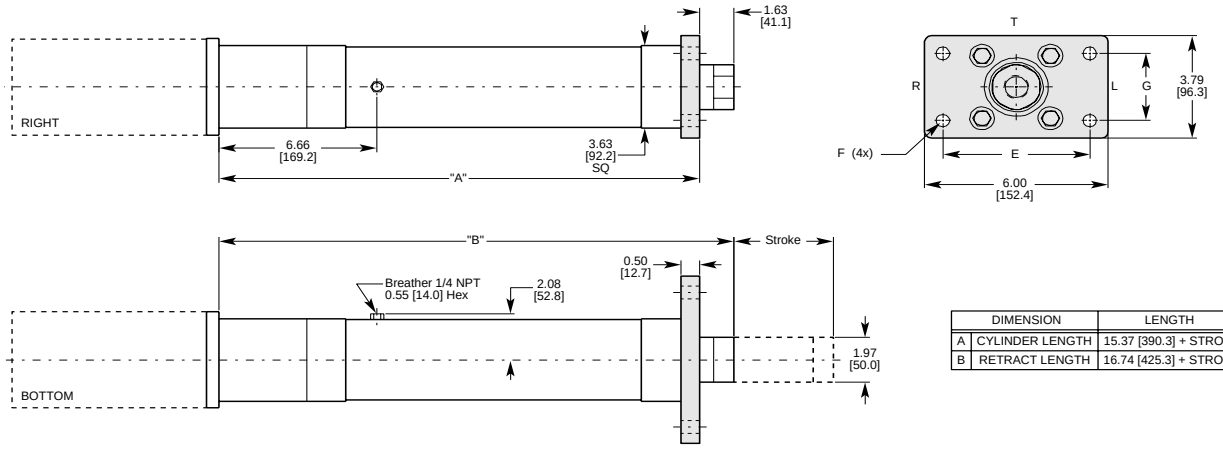
DIMENSION		LENGTH	DIM	OPTION CODE	SIZE
A	CYLINDER LENGTH	14.62 [371.3] + STROKE	D	MS6E	5/8-18 UNF-2B x 0.55 Dp
B	RETRACT LENGTH	16.74 [425.3] + STROKE		MS6M	M16 x 2-6H x 14mm Dp
C	MOUNTING LENGTH	9.55 [242.6] + STROKE			

MF1 Head Rectangular Flange Mounting

Inline

	English Option MF1 (inches)	Metric Option MF1M (mm)
E	5.00	126*
F	0.53	12*
G	2.75	63*

* FLANGE DIMENSIONS IN ACCORDANCE WITH ISO 6431 FOR 80mm BORE SIZE



DIMENSION		LENGTH
A	CYLINDER LENGTH	15.37 [390.3] + STROKE
B	RETRACT LENGTH	16.74 [425.3] + STROKE

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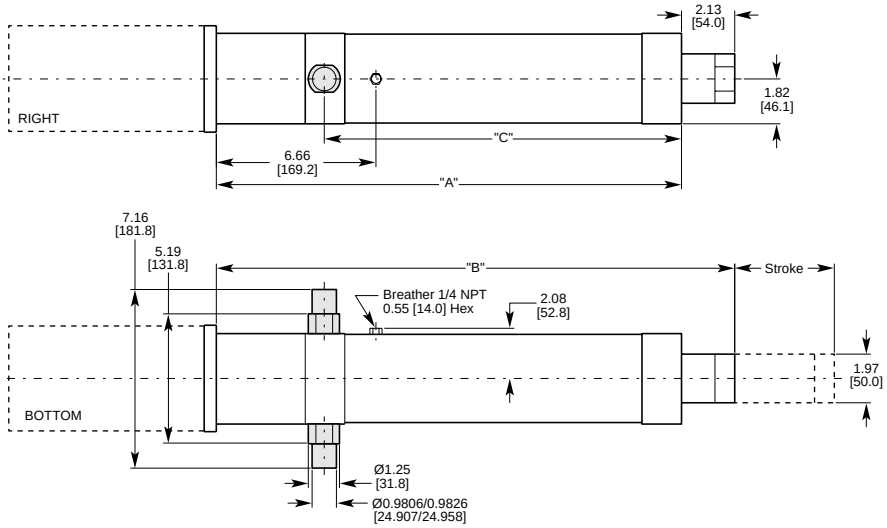
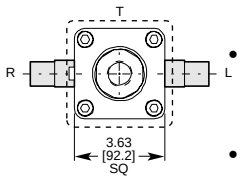
Dimensions

MT4 Trunnion Mounting

Inline





- For AutoCAD® DXF drawings, go to our website, or call the factory for a diskette
- For motor dimensions, go to pages A-124 to A-126
- For rod-end dimensions, go to page A-128

TRUNNION DIMENSIONS IN ACCORDANCE WITH ISO 6431 FOR 100mm BORE SIZE

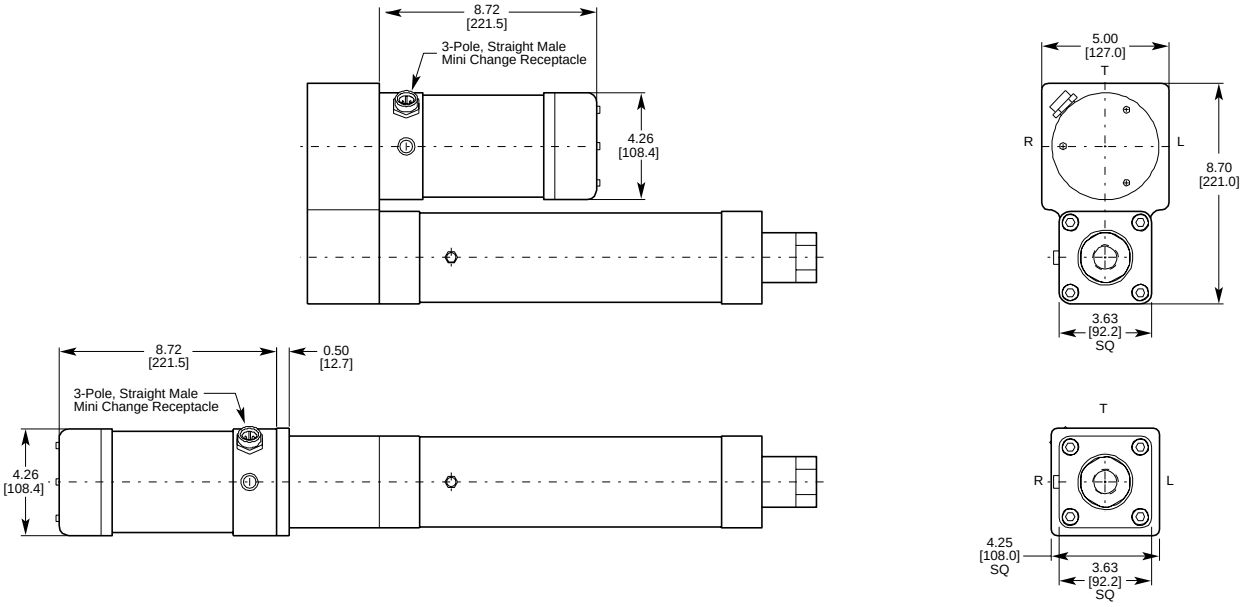
DIMENSION		LENGTH
A	CYLINDER LENGTH	14.62 [371.3] + STROKE
B	RETRACT LENGTH	16.74 [425.3] + STROKE
C	MOUNTING LENGTH	10.30 [261.6] + STROKE

Motor Specifications

EC4-H4 Series — Permanent Magnet 2-pole, 160 volt DC Motor

Winding Data	H4 motor
Inductance	12 mH
Resistance	1.5
Torque Constant	67 oz-in/Amp
Voltage Constant	49 V/krpm
Torque	
Continuous	335 oz-in (5.0 Amps)
Peak	670 oz-in (10.0 Amps)
Rotor Inertia	0.20 oz-in-sec^2
Connections	Quick Disconnect: 3 contact receptacle in anodized or painted aluminum shell, includes 12 ft. [3.7 m] cable with molded plug.
Temperature	180°F [82°C] maximum allowable motor case temperature Actual motor case temperature is ambient, duty cycle, speed and load dependent. Refer to speed vs. thrust curves for system duty ratings.

H4 Motor



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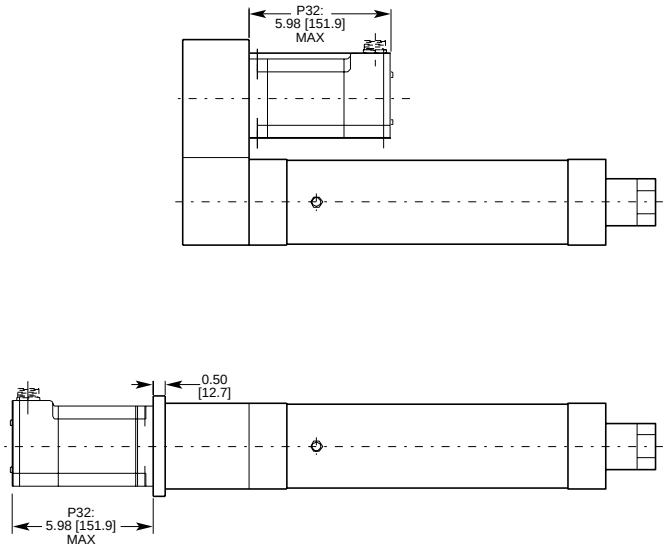
Motor Specifications

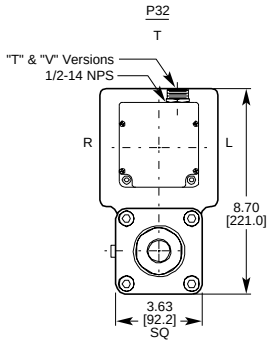
EC4-P Series

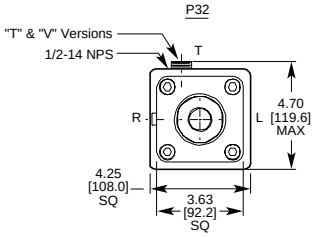
1.8° Permanent Magnet Hybrid Step Motor

Winding Data	P32T and P32V
Inductance	Series (T), 120mH; Parallel (V), 32mH
Resistance	Series (T), 6.5 ; Parallel (V), 1.8
Current Settings	Parallel (V) at 120 VAC, 1.6 Amps Series (T) at 240 VAC, 3.3 Amps
Static Torque	920 oz-in max
Rotor Inertia	0.038 oz-in-sec^2
Connections	EC4-P32T, EC4-P32V: 5 contact quick disconnect receptacle in anodized or painted aluminum shell, includes 12 ft [3.7 m] cable with molded plug.
Temperature	212°F [100°C] maximum allowable motor case temperature. Actual motor case temperature is ambient, duty cycle, speed and load dependent. Refer to speed vs. thrust curves for system duty ratings.

P32 Motor







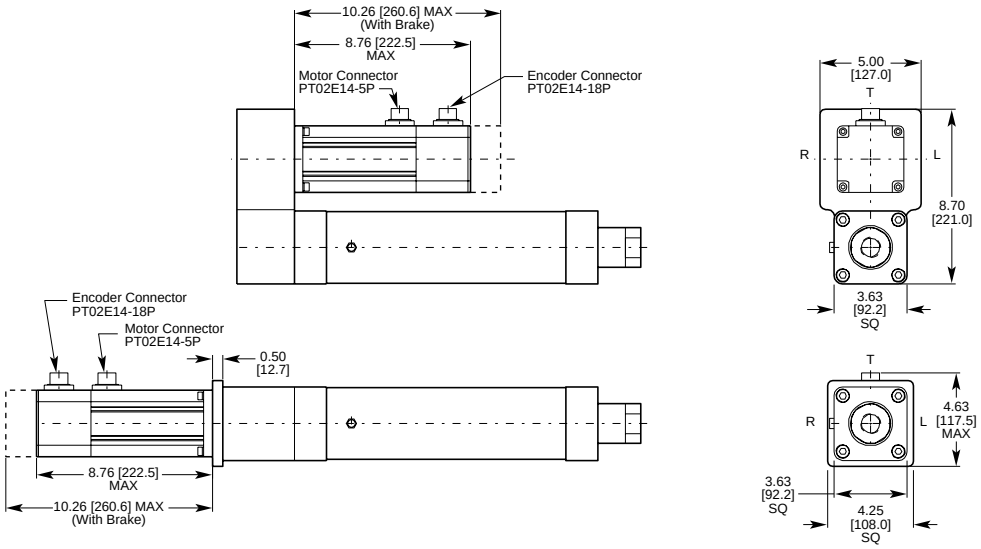
Motor Specifications

EC4-B Series

Rare Earth Magnet Brushless Servo Motor with 2,000 Line Encoder and Commutation Sensors

Winding Data	B32
Inductance	9.8 mH
Resistance	3.4
Torque Constant	99.2 oz-in/Amp
Voltage Constant	45.5 V/krpm
Torque	
Continuous	476 oz-in (4.8 Amps)
Peak	992 oz-in (10.0 Amps)
Rotor Inertia	0.016 oz-in-sec^2
Connections	MS-type connectors for motor winding and encoder on motor. Includes 12 ft. [3.7 m] cable with mating connector.
Temperature	212°F [100°C] maximum allowed case temperature.
Environmental	IP65 Rating

B32 Motor



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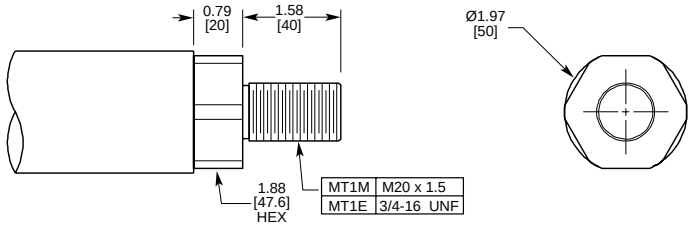
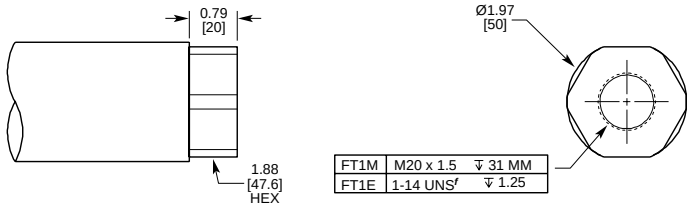
Rod End Dimensions

Dimensions in [mm]

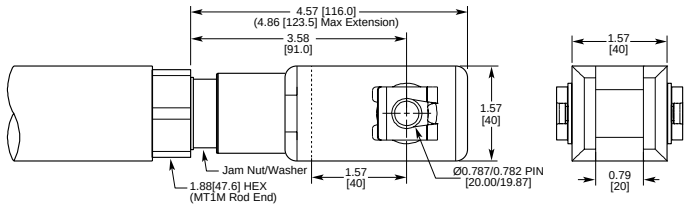
MT1 Male Threads



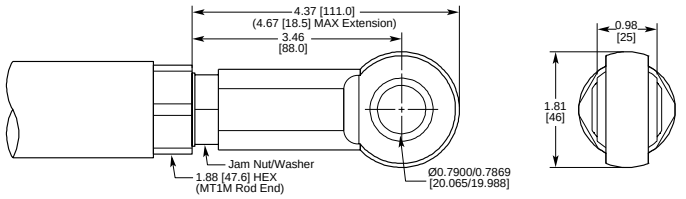
FT1 Female Threads



FC2 Clevis with Pin



FS2 Spherical



Overview

The EC5 series is our highest thrust cylinder, for heavy thrust loads ranging up to 25000 N [5620 lb] and travel up to 1500 mm [59.1 in]. Precision rolled ballscrews are standard, yielding quiet operation, low backlash and high accuracy. (See the following pages for detailed specifications).

EC5 Series electric cylinders are available with brushless servo or step motors for compatibility with every motion control environment.

Ballscrew models are used in applications that require high speed and duty cycles. Standard ballscrews are 10 mm and 32 mm lead.

EC5 timing belt or gear reductions between the motor and leadscrew allow selection of the best match between motor power and your linear speed and thrust range.

Options

Options include rotary encoders or linear potentiometers for position feedback, load-holding brakes, protective boots, and quick-disconnect cables. Industrial Devices will also discuss unique modifications at your request.

	EC5-S Series	EC5-B Series
Motor Type	1.8° Hybrid Stepper	Brushless Servo
Thrust Load Capacity	25,000 N [5620 lbs]	25,000 N [5620 lbs]
No Load Speed	1330 mm/sec [52.5 in/sec]	1330 mm/sec [52.5 in/sec]
Repeatability	±0.013 mm [±0.0005 in]	±0.013 mm [±0.0005 in]
Compatible Controls Offered	*NextStep*™ *SmartStep*™ S6002 S6961 S6962	B8001 B8961 B8962
Performance Curves	Page A-134	Page A-138

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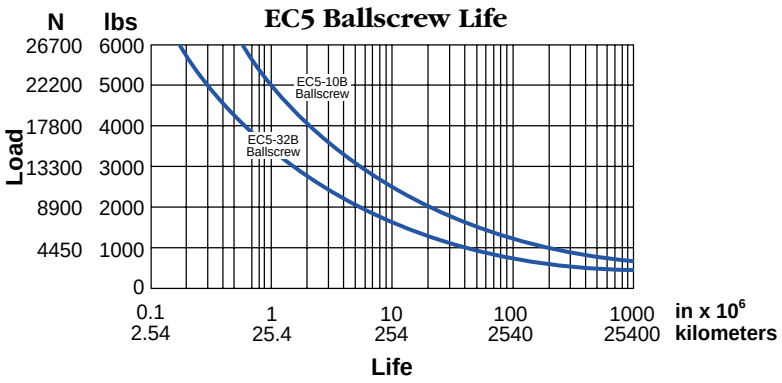
General Specifications

Travel Lengths	50, 100, 150, 200, 250, 300, 450, 600, 750, 1000, 1250, 1500 mm. Custom strokes available in increments of 1mm.
Construction Materials	
Bearing & Drive Housing	6063-T6 aluminum, anodized
Cylinder Body	6063-T6 aluminum, hard anodized with PTFE impregnation
Mounting Plates	6061-T6 aluminum and cast aluminum plate, anodized
Thrust Tube	300 Series Stainless Steel, 1/8 hard and ground
Speed Reducer Options	
Belt/Pulley	AT-5, polyurethane with steel tensile cords
Gears	Alloy steel, case hardened
Transport Screw Options	
Ballscrew/Ballnut	Lead: 32 mm [0.630 in], or 10 mm [0.394 in] Heat treated carbon steel alloy
Thrust Bearings	Angular contact, high thrust ball bearings
Weight (approximate, without options)	
EC5-S42	kg = 21.0 + 0.0188 × [mm stroke]; lb = 46.4 + 1.05 × [inches stroke]
EC5-B32	kg = 16.7 + 0.0188 × [mm stroke]; lb = 36.7 + 1.05 × [inches stroke]
EC5-B41	kg = 20.4 + 0.0188 × [mm stroke]; lb = 44.9 + 1.05 × [inches stroke]
Motor	
Specifications/Dimensions	See pages A-150 to A-152.
Environmental Operation	
Temperature	-30° to 70°C [-22° to 158°F] When operating below 2°C [35°F], vent tubing fitting must be installed. Consult the factory for more information.
Moisture/Contaminants	**IP 54 rated:** Polyurethane thrust tube wiper seal. Mating surfaces gasket sealed. Protected against dust and splashing water (non-corrosive, non-abrasive). Limited ingress permitted. **Vent Tube Fitting:** A vent tube fitting is included, which can be installed to permit the actuator to breathe from a non-contaminated area, or receive a positive pressure continuous purge (14-20kPa [2-3 psi]). **PB Protective Boot (IP65) Option:** An optional thrust tube boot prevents moisture and dry contaminants from bypassing the thrust tube wiper seal, providing IP65 protection when used with included vent tube fitting. The boot also prevents contaminant buildup on the thrust tube. **Clean Room & Vacuum Applications:** IDC has designed special actuators for clean room and vacuum applications. Please consult the factory if your application requires special environmental compatibility.
Maintenance	The EC5 Series actuator design eliminates the need for most routine maintenance. Re-lubrication is required in high cycle applications. See the EC Series Operator's Manual for replacement parts.
Lube Port	All EC5 models include a lube port and adapter for a standard grease gun.

General Specifications

Ballscrew

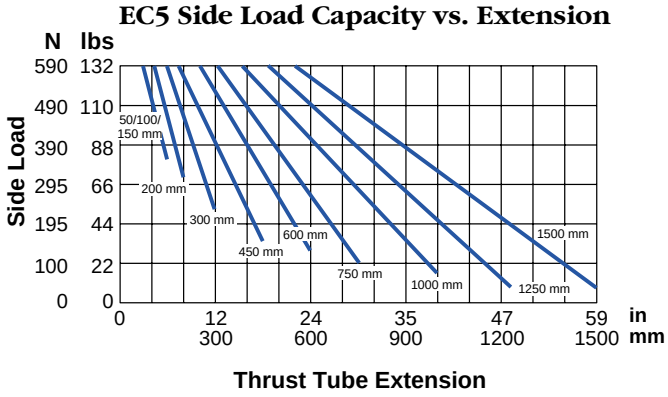
Ballscrew life is rated in inches of travel at a given load. The values in the chart to the right indicate the travel life where 90% of all units in a sample will continue to work, while 10% have failed. This is similar to the B10 rating of a roller bearing mechanism. Be sure to consider acceleration loads as well as thrust, gravity and friction loads.

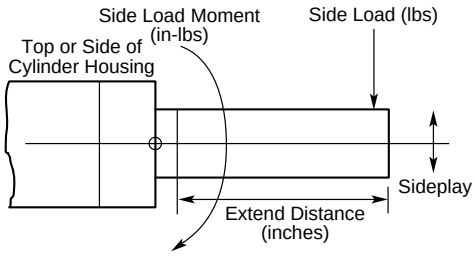


Thrust Tube Capacity

Thrust Tube Torque Capacity Thrust tube does not rotate during operation. Maximum allowable torque during operation and installation is 10 N-m [90 lb-in]

Thrust Tube Side Load Capacity





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General Specifications

EC5 Series Actuator Inertia

Equations

Rotary Inertia (reflected to motor) = A + B* (stroke, in) + C* (load, lb)

Model	Ratio	Screw	A (lb-in-s²)	B (lb-in-s²/in)	C (lb-in-s²/lb)
EC5-...-10-32B	1:1	32 x 32	5.627 E-03	1.666 E-04	1.042 E-04
EC5-...-15-32B	1.5:1		3.119 E-03	7.406 E-05	4.629 E-05
EC5-...-20-32B	2:1		2.890 E-03	4.166 E-05	2.604 E-05
EC5-...-50-32B	5:1		6.541 E-04	6.380 E-06	3.988 E-06
EC5-...-100-32B	10:1		3.545 E-04	1.664 E-06	1.040 E-06
EC5-...-10-10B	1:1	32 x 10	5.164 E-03	1.407 E-04	1.017 E-05
EC5-...-15-10B	1.5:1		2.914 E-03	6.255 E-05	4.521 E-06
EC5-...-20-10B	2:1		2.775 E-03	3.518 E-05	2.543 E-06
EC5-...-50-10B	5:1		6.365 E-04	5.389 E-06	3.895 E-07
EC5-...-100-10B	10:1		3.499 E-04	1.405 E-06	1.016 E-07

Motor	Inertia (lb-in-s²)
S42	7.13 E-03
B32	1.00 E-03
B41	2.63 E-03

Metric Conversions:

1 mm = 0.03937 in

1 kg = 2.205 lb

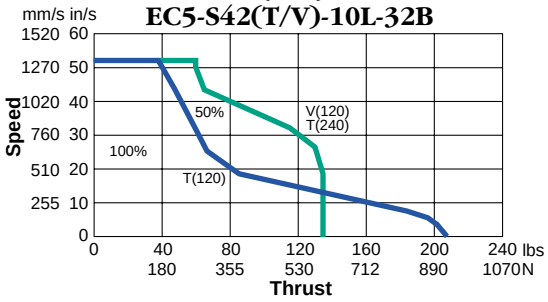
1 lb-in-s² = 1129 kg-cm² = 1.152 kg-cm-s²

Performance

32mm Lead Ballscrew Models

—100% Duty Cycle —50% Duty Cycle

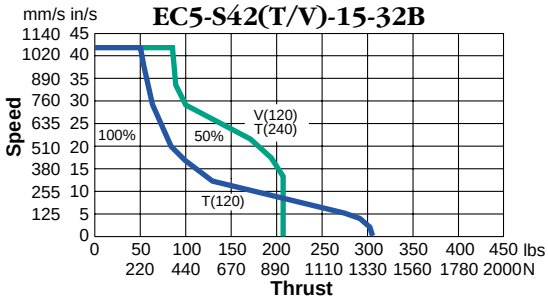
EC5-S42(T/V)-10-32B
EC5-S42(T/V)-10L-32B



EC5-S42(T/V)-10-32B: 1:1 Timing Belt, 32 mm/rev Ballscrew
EC5-S42(T/V)-10L-32B: 1:1 Inline Coupling, 32 mm/rev Ballscrew

Max. No-Load Accel.	21.62 m/s²	[851 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

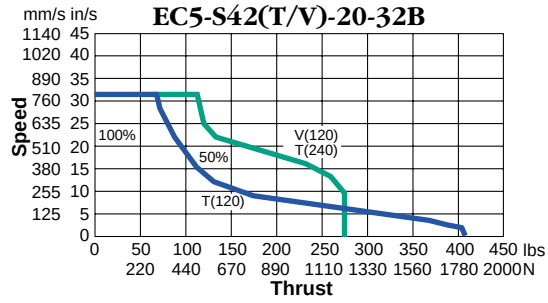
EC5-S42(T/V)-15-32B



EC5-S42(T/V)-15-32B: 1.5:1 Timing Belt, 32 mm/rev Ballscrew

Max. No-Load Accel.	19.08 m/s²	[751 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

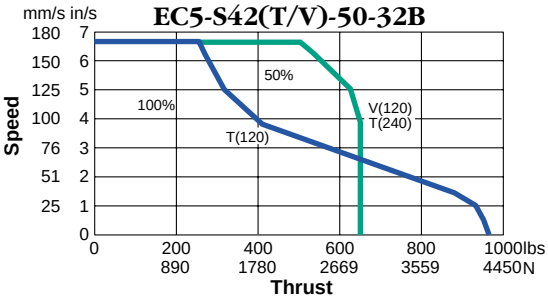
EC5-S42(T/V)-20-32B



EC5-S42(T/V)-20-32B: 2.0:1 Timing Belt, 32 mm/rev Ballscrew

Max. No-Load Accel.	15.15 m/s²	[596 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

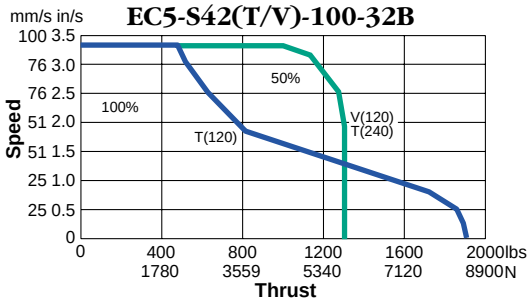
EC5-S42(T/V)-50-32B



EC5-S42(T/V)-50-32B: 5:1 Gears, 32 mm/rev Ballscrew

Max. No-Load Accel.	8.11 m/s²	[319 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC5-S42(T/V)-100-32B



EC5-S42(T/V)-100-32B: 10:1 Gears, 32 mm/rev Ballscrew

Max. No-Load Accel.	4.24 m/s²	[167 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using S6000 Series, *NextStep*®, and *SmartStep*® Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

32mm lead ballscrew

1333	1333	1333	1333	1333	1120	814	499	316	229	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	1000	1250	1500	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	*Column Load Limit (N)*

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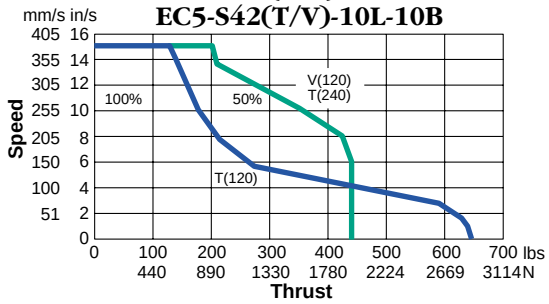
10mm Lead Ballscrew Models

—100% Duty Cycle —50% Duty Cycle

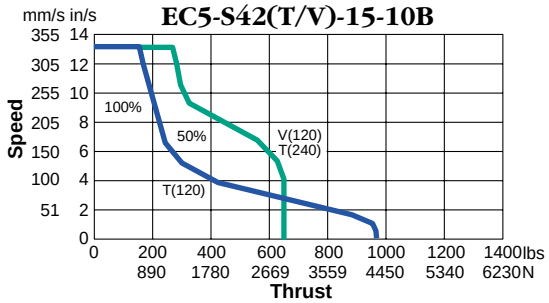
EC5-S42(T/V)-10-10B
EC5-S42(T/V)-10L-10B



EC5-S42(T/V)-10-10B: 1:1 Timing Belt, 10 mm/rev Ballscrew
EC5-S42(T/V)-10L-10B: 1:1 Inline Coupling, 10 mm/rev Ballscrew

Max. No-Load Accel.	7.13 m/s²	[281 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

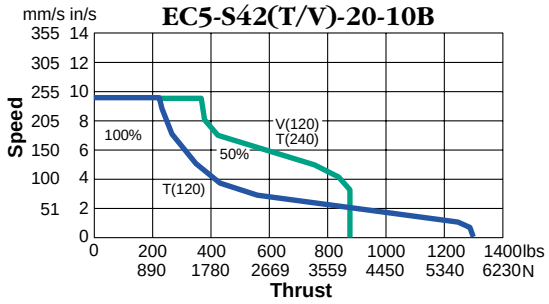
EC5-S42(T/V)-15-10B



EC5-S42(T/V)-15-10B: 1.5:1 Timing Belt, 10 mm/rev Ballscrew

Max. No-Load Accel.	6.15 m/s²	[242 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

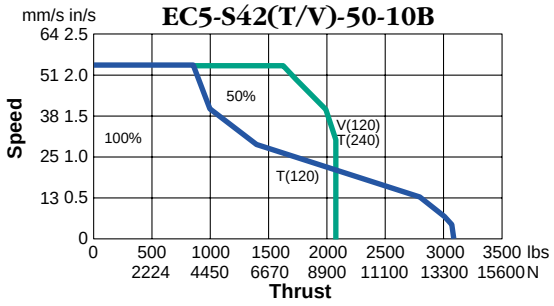
EC5-S42(T/V)-20-10B



EC5-S42(T/V)-20-10B: 2.0:1 Timing Belt, 10 mm/rev Ballscrew

Max. No-Load Accel.	4.82 m/s²	[190 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

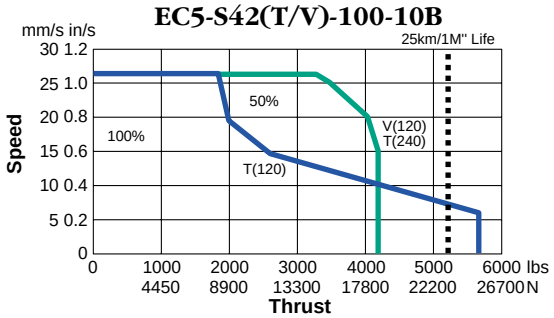
EC5-S42(T/V)-50-10B



EC5-S42(T/V)-50-10B: 5:1 Gears, 10 mm/rev Ballscrew

Max. No-Load Accel.	2.54 m/s²	[100 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC5-S42(T/V)-100-10B



EC5-S42(T/V)-100-10B: 10:1 Gears, 10 mm/rev Ballscrew

Max. No-Load Accel.	1.33 m/s²	[52 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using S6000 Series, NextStep, and SmartStep Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

10mm lead ballscrew

388	388	388	388	388	350	254	156	99	72	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	1000	1250	1500	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	*Column Load Limit (N)*

How To Order

Steps to Ordering a Complete EC5 System

You are ready to specify an EC5-S actuator model number after you have:

a. completed and verified all necessary information on an IDC Product Selection Worksheet.

b. completed the steps in the EC Selection Guidelines on pages (A-20 to A-21).

c. selected a control that is compatible with the S series motor.

Your local IDC Distributor and our Applications Engineering Department are available to help with your selection process.

1. Base Model Number

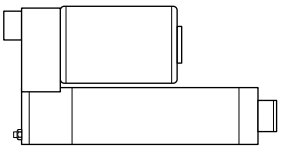
Choose the model with sufficient speed and thrust with a comfortable safety margin. **IDC recommends at least 30% reserve thrust for step motor driven systems.**

The EC5-S Series offers two motor wiring choices, 'T' (Series) and 'V' (Parallel). The 'T' and 'V' versions include a 12 foot motor quick disconnect cable.

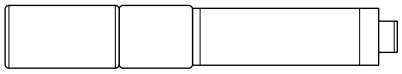
EC5-S cylinders with gear or timing belt drive reductions have the motor mounted parallel to the lead screw. Inline models have the motor coupled directly to the leadscrew with no reduction.

2. Stroke Length

Parallel Models



Inline Models



Twelve standard lengths are available from 50 to 1500 mm. Custom lengths are also available. Consult your IDC distributor or the factory for details.

To maximize cylinder life, the thrust tube should not impact the physical end-of-travel on either end. Extra travel length is necessary to decelerate the load to a stop when an end-of-travel limit switch is encountered. This extra travel distance depends on load and speed. For further information on this refer to the EC Selection Guidelines on pages (A-20 to A-21) or the Engineering Section.

1 Base Model				2 Stroke Length	3 Cylinder Mounting	4 Rod End		5 Options	
Electric Cylinder	Motor	Drive Ratio	Screw Lead, Type	(mm)					
EC5	– S	–	–		—	—	—	–	–

Ball Screw
EC5-S42*x*-10-32B- EC5-S42*x*-10-10B-
EC5-S42*x*-15-32B- EC5-S42*x*-15-10B-
EC5-S42*x*-20-32B- EC5-S42*x*-20-10B-
EC5-S42*x*-50-32B- EC5-S42*x*-50-10B-
EC5-S42*x*-100-32B- EC5-S42*x*-100-10B-
x = T (Series) or V (Parallel)

In-Line Models (Direct Drive)
EC5-S42*x*-10L-32B- EC5-S42*x*-10L-10B-
x = T (Series) or V (Parallel)

50 450
100 600
150 750
200 1000
250 1250
300 1500
Custom lengths available in 1 mm increments

No Charge
-MF1 -MP2 -MT1M
-MF2 -MS6M -MT1E
-MF3 -MS6E -FT1M
-MS2 -MT4 -FT1E
-FC2
-FS2

Additional Charge
-MP3
-BS
-EMK
-L
-PB

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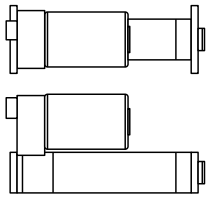
How To Order

3. Cylinder Mounting

Specify any one of these cylinder mounting options. Dimensional drawings start on page A-144.

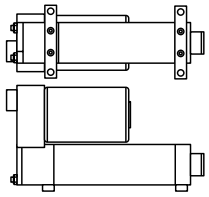
Cylinder base mount options -MP2, -MP3, -MF2, and -MF3 cannot be ordered with inline models.

MF1, 2, 3 Rectangular Flanges

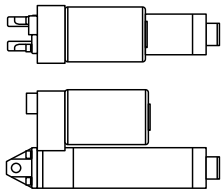


MF1 Front Flange
MF2 Rear Flange
MF3 Both Flanges

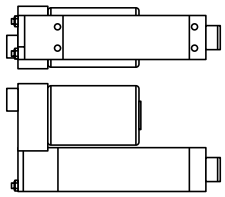
MS2 Side Lugs



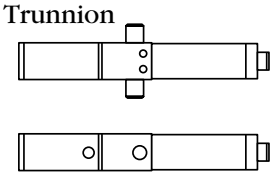
MP2 Rear Clevis (MP3 includes pivot base)



MS6M and MS6E Side Tapped Holes



MT4 Trunnion



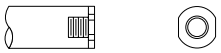
Pivot Mount Caution:

When utilizing a pivot mounting option (MP2 or MT4) in conjunction with a pivot rod end (FS2 or FC2), it is recommended that the actuator be extended only to 90–95% of its full stroke. This increases the system's rigidity and extends the life of the guide bearings and rod seal.

4. Rod Ends

Industrial Devices offers 4 rod end options for EC5 series cylinders.

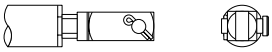
-FT1M or -FT1E Female Thread



-MT1M or -MT1E Male Thread

-FS2 Spherical Joint

-FC2 Clevis



5. Other Options

See the Options and Accessories section for complete specifications.

BS – Holding Brake

350 in-lb holding brake mounted on the rear lead screw shaft extension. *Not available on inline models or with cylinder base mount options. (-MF2, -MF3, -MP2, -MP3).*

EMK– Encoder

1000 line incremental encoder mounted on the rear shaft of the motor.

L – Linear Potentiometer Output

Linear potentiometer mounted on inside the EC5-S cylinder.

PB – Protective Boot

Protects the thrust tube from solid contaminants and prevents liquids from entering the cylinder through the rod end bearing.

6. Accessories

Magnetic Position Sensors

Position sensors are available for indicating end-of-travel and home positions, or for use with user supplied controls.

To maximize cylinder life, IDC recommends the use of end-of-travel sensors with all cylinders.

Common Application Requirements: For most applications, one home and two end-of-travel sensors are required for each cylinder. Either Reed or Hall Effect (NPN transistor) switches are compatible with IDC controls.

	3m Leads	4m Quick
Reed		
Home (N.O.)	PSR-1	PSR-1Q
End-of-travel (N.C.)	PSR-2	PSR-2Q
Hall Effect		
Home (N.O./NPN)	PSN-1	PSN-1Q
End-of-travel (N.C./NPN)	PSN-2	PSN-2Q

See page A-240 for more limit switch options, including quick-disconnect versions.

7. Compatible Controls

Details of controls are in Sections G. The EC5-S are compatible with:

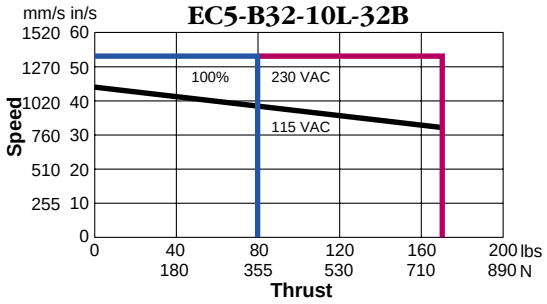
Model	Description
NextStep™	Stepper drive
S6002	2-Axis Stepper drive
SmartStep™	*IDeal*™ programmable
S6961	*IDeal*™ programmable
S6962	2-Axis *IDeal*™ programmable

Performance

32mm Lead Ballscrew Models

—100% Duty Cycle —Intermittent (<2 sec)

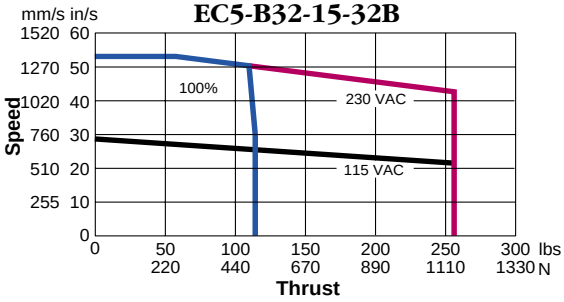
EC5-B32-10-32B
EC5-B32-10L-32B



EC5-B32-10-32B: 1:1 Timing Belt, 32 mm/rev Ballscrew
EC5-B32-10L-32B: 1:1 Inline Coupling, 32 mm/rev Ballscrew

Max. No-Load Accel.	14.81 m/s²	[583 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

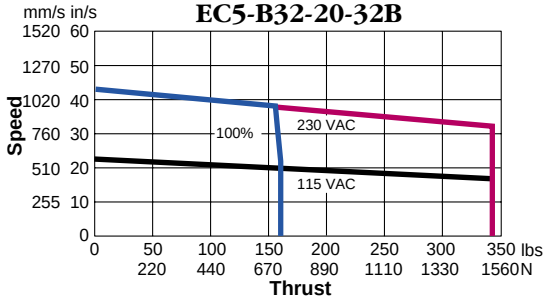
EC5-B32-15-32B



EC5-B32-15-32B: 1.5:1 Timing Belt, 32 mm/rev Ballscrew

Max. No-Load Accel.	17.00 m/s²	[669 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

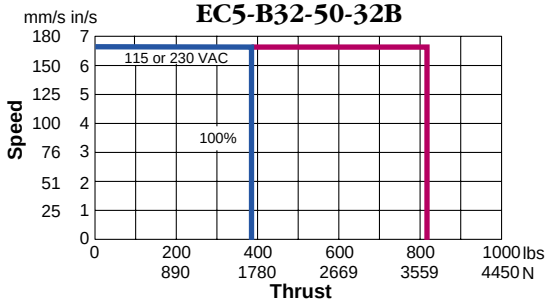
EC5-B32-20-32B



EC5-B32-20-32B: 2.0:1 Timing Belt, 32 mm/rev Ballscrew

Max. No-Load Accel.	14.53 m/s²	[572 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

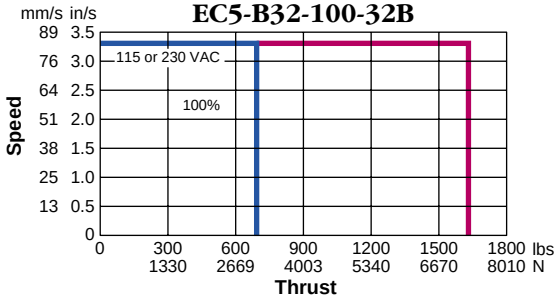
EC5-B32-50-32B



EC5-B32-50-32B: 5:1 Gears, 32 mm/rev Ballscrew

Max. No-Load Accel.	14.72 m/s²	[580 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC5-B32-100-32B



EC5-B32-100-32B: 10:1 Gears, 32 mm/rev Ballscrew

Max. No-Load Accel.	9.27 m/s²	[365 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using B8000 Series Controls (not B8501).
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and c**olumn load limits** when specifying longer lengths.

32mm lead ballscrew

1333	1333	1333	1333	1333	1120	814	499	316	229	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	1000	1250	1500	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	*Column Load Limit (N)*

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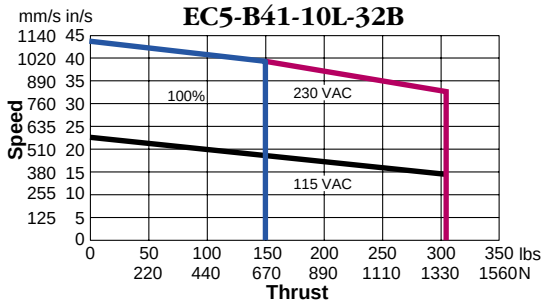
32mm Lead Ballscrew Models

—100% Duty Cycle —Intermittent (<2 sec)

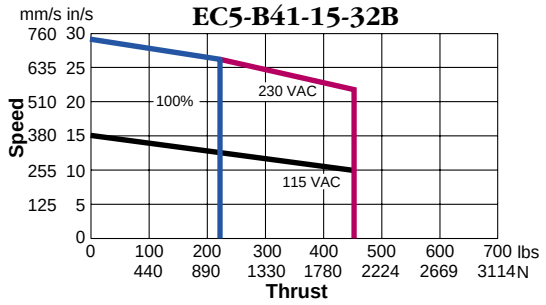
EC5-B41-10-32B
EC5-B41-10L-32B



EC5-B41-10-32B: 1:1 Timing Belt, 32 mm/rev Ballscrew
EC5-B41-10L-32B: 1:1 Inline Coupling, 32 mm/rev Ballscrew

Max. No-Load Accel.	24.98 m/s²	[983 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

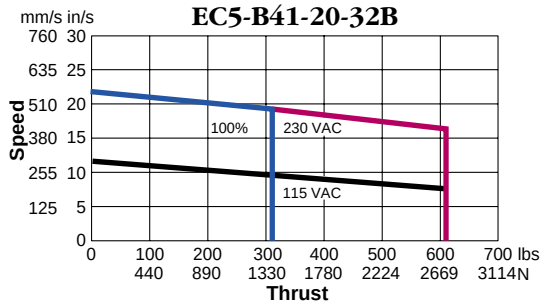
EC5-B41-15-32B



EC5- B41-15-32B: 1.5:1 Timing Belt, 32 mm/rev Ballscrew

Max. No-Load Accel.	25.75 m/s²	[1014 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

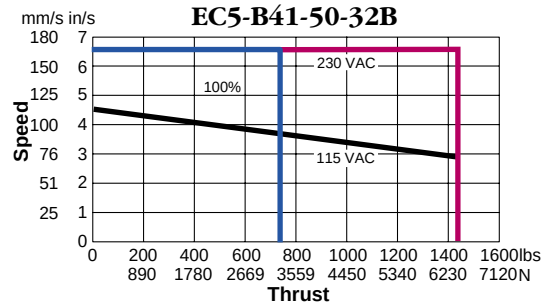
EC5-B41-20-32B



EC5-B41-20-32B: 2.0:1 Timing Belt, 32 mm/rev Ballscrew

Max. No-Load Accel.	21.28 m/s²	[838 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

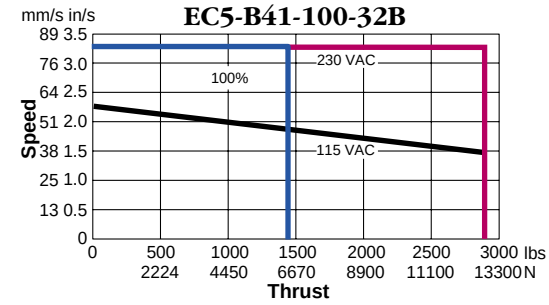
EC5-B41-50-32B



EC5-B41-50-32B: 5:1 Gears, 32 mm/rev Ballscrew

Max. No-Load Accel.	15.30 m/s²	[602 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC5-B41-100-32B



EC5-B41-100-32B: 10:1 Gears, 32 mm/rev Ballscrew

Max. No-Load Accel.	8.56 m/s²	[337 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using B8000 Series Controls (not B8501).
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

32mm lead ballscrew

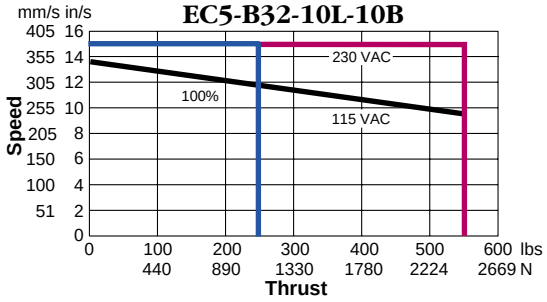
50 thru 100	150	200	300	450	600	750	1000	1250	1500	
1333	1333	1333	1333	1333	1120	814	499	316	229	*Critical Speed (mm/sec)*
Stroke *(mm)*										
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	*Column Load Limit (N)*

Performance

10mm Lead Ballscrew Models

—100% Duty Cycle —Intermittent (<2 sec)

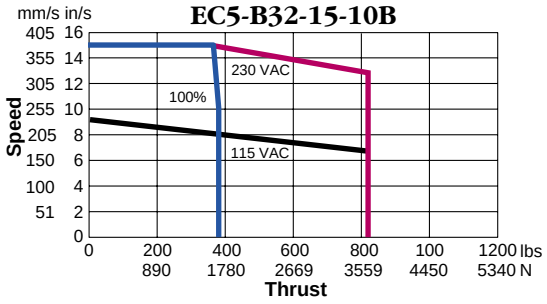
EC5-B32-10-10B
EC5-B32-10L-10B



EC5-B32-10-10B: 1:1 Timing Belt, 10 mm/rev Ballscrew
EC5-B32-10L-10B: 1:1 Inline Coupling, 10 mm/rev Ballscrew

Max. No-Load Accel.	5.08 m/s²	[200 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

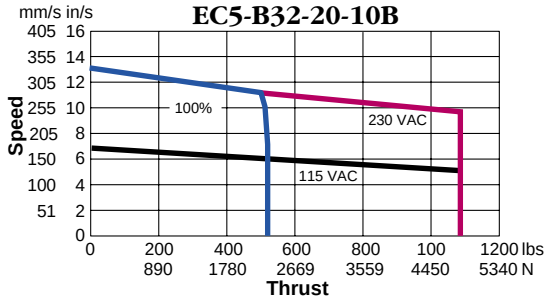
EC5-B32-15-10B



EC5-B32-15-10B: 1.5:1 Timing Belt, 10 mm/rev Ballscrew

Max. No-Load Accel.	5.70 m/s²	[224 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

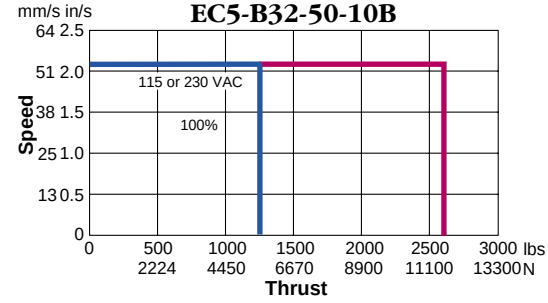
EC5-B32-20-10B



EC5-B32-20-10B: 2.0:1 Timing Belt, 10 mm/rev Ballscrew

Max. No-Load Accel.	4.75 m/s²	[187 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

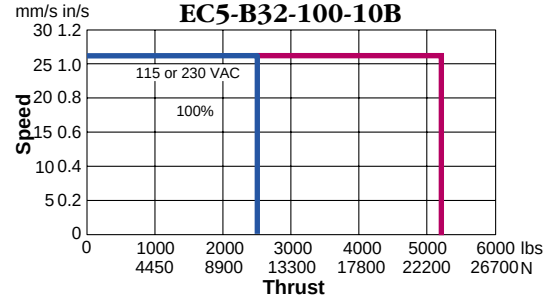
EC5-B32-50-10B



EC5-B32-50-10B: 5:1 Gears, 10 mm/rev Ballscrew

Max. No-Load Accel.	4.68 m/s²	[184 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC5-B32-100-10B



EC5-B32-100-10B: 10:1 Gears, 10 mm/rev Ballscrew

Max. No-Load Accel.	2.91 m/s²	[115 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using B8000 Series Controls (not B8501).
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and c**olumn load limits** when specifying longer lengths.

10mm lead ballscrew

388	388	388	388	388	350	254	156	99	72	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	1000	1250	1500	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	*Column Load Limit (N)*

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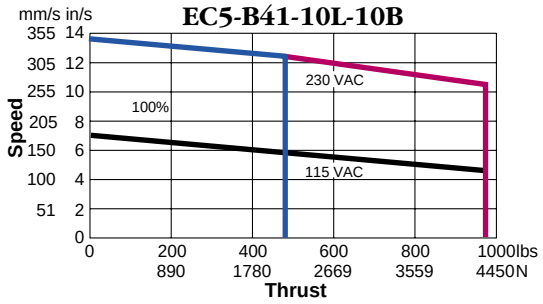
10mm Lead Ballscrew Models

—100% Duty Cycle —Intermittent (<2 sec)

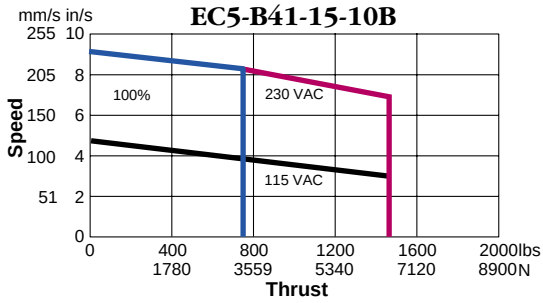
EC5-B41-10-10B
EC5-B41-10L-10B



EC5-B41-10-10B: 1:1 Timing Belt, 10 mm/rev Ballscrew
EC5-B41-10L-10B: 1:1 Inline Coupling, 10 mm/rev Ballscrew

Max. No-Load Accel.	8.44 m/s²	[332 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

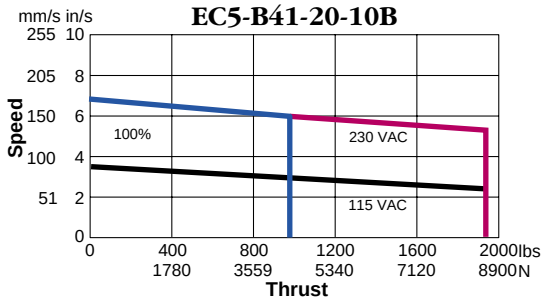
EC5-B41-15-10B



EC5-B41-15-10B: 1.5:1 Timing Belt, 10 mm/rev Ballscrew

Max. No-Load Accel.	8.48 m/s²	[334 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

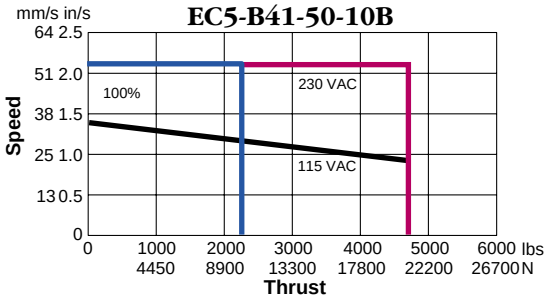
EC5-B41-20-10B



EC5-B41-20-10B: 2:1 Timing Belt, 10 mm/rev Ballscrew

Max. No-Load Accel.	6.87 m/s²	[271 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

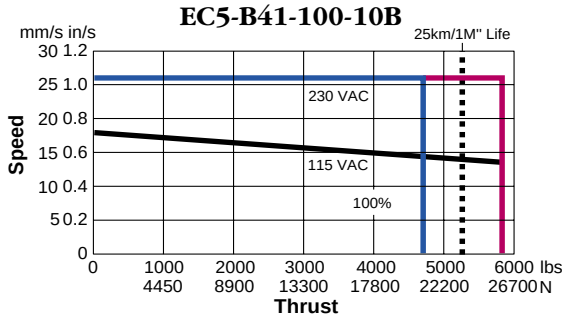
EC5-B41-50-10B



EC5-B41-50-10B: 5:1 Gears, 10 mm/rev Ballscrew

Max. No-Load Accel.	4.82 m/s²	[190 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

EC5-B41-100-10B



EC5-B41-100-10B: 10:1 Gears, 10 mm/rev Ballscrew

Max. No-Load Accel.	2.68 m/s²	[106 in/s²]
Repeatability	±0.013 mm	[±0.0005 in]
Backlash	0.30 mm	[0.012 in]
Lead Accuracy	±0.05 mm/300 mm	[±0.002 in/ft]

- Performance using B8000 Series Controls (not B8501).
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

10mm lead ballscrew

388	388	388	388	388	350	254	156	99	72	*Critical Speed (mm/sec)*
50 thru 100	150	200	300	450	600	750	1000	1250	1500	***Stroke** (mm)*
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	*Column Load Limit (N)*

How To Order

Steps to Ordering a Complete EC5-B System

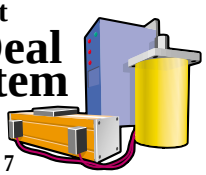
You are ready to specify an EC5-B actuator model number after you have:

a. completed and verified all necessary information on an IDC Product Selection Worksheet.

b. completed the steps in the EC Selection Guidelines on pages (A-20 to A-21).

c. selected a control that is compatible with the B-series motor.

Your local IDC Distributor and our Applications Engineering Department are available to help with your selection process.

Make It An IDeal System

See Intro Pages 6 & 7

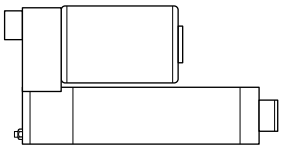
1. Base Model Number

Choose the model with sufficient speed and thrust with a comfortable safety margin. Refer to the EC5-B Speed vs. Thrust curves in this section.

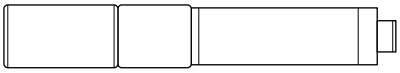
EC5-B cylinders with gear or timing belt drive reductions have the motor mounted parallel to the lead screw. Inline models have the motor coupled directly to the leadscrew with no reduction.

Note: All EC5-B cylinders include an encoder.

Parallel Models



Inline Models



2. Stroke Length

Twelve standard lengths are available from 50 to 1500 mm. Custom lengths are also available. Consult your IDC distributor or the factory for details.

To maximize cylinder life, the thrust tube should not impact the physical end-of-travel on either end. Extra travel length is necessary to decelerate the load to a stop when an end-of-travel limit switch is encountered. This extra travel distance depends on load and speed. For further information on this refer to the EC Selection Guidelines on pages (A-20 to A-21) or the Engineering Section.

1 Base Model				2 Stroke Length	3 Cylinder Mounting	4 Rod End	5 Options		
Electric Cylinder	Motor	Drive Ratio	Screw Lead, Type	(mm)					
EC5	B								

Ballscrew

EC5-B41-10-32B-	EC5-B41-10-10B-
EC5-B41-15-32B-	EC5-B41-15-10B-
EC5-B41-20-32B-	EC5-B41-20-10B-
EC5-B41-50-32B-	EC5-B41-50-10B-
EC5-B41-100-32B-	EC5-B41-100-10B-
EC5-B32-10-32B-	EC5-B32-10-10B-
EC5-B32-15-32B-	EC5-B32-15-10B-
EC5-B32-20-32B-	EC5-B32-20-10B-
EC5-B32-50-32B-	EC5-B32-50-10B-
EC5-B32-100-32B-	EC5-B32-100-10B-

Inline Models (Direct Drive)

EC5-B41-10L-32B-	EC5-B41-10L-10B-
EC5-B32-10L-32B-	EC5-B32-10L-10B-

Stroke Length (mm)

50	450
100	600
150	750
200	1000
250	1250
300	1500

Custom lengths available in 1 mm increments

Cylinder Mounting

No Charge

-MF1	-MP2	-MT1M
-MF2	-MS6M	-MT1E
-MF3	-MS6E	-FT1M
-MS2	-MT4	-FT1E
		-FC2
		-FS2

Additional Charge

-MP3	-BM
	-BS
	-L
	-PB

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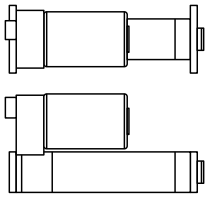
How To Order

3. Cylinder Mounting

Specify any one of these cylinder mounting options. Dimensional drawings start on page A-144.

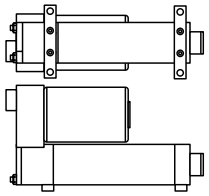
Cylinder base mount options -MP2, -MP3, -MF2, and -MF3 cannot be ordered with inline models.

MF1, 2, 3 Rectangular Flanges

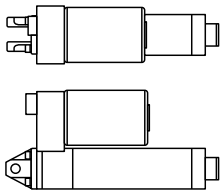


MF1 Front Flange
MF2 Rear Flange
MF3 Both Flanges

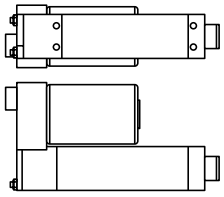
MS2 Side Lugs



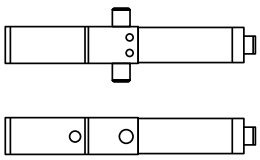
MP2 Rear Clevis (MP3 includes pivot base)



MS6M and MS6E Side Tapped Holes



MT4 Trunnion



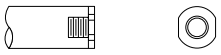
Pivot Mount Caution:

When utilizing a pivot mounting option (MP2 or MT4) in conjunction with a pivot rod end (FS2 or FC2), it is recommended that the actuator be extended only to 90–95% of its full stroke. This increases the system's rigidity and extends the life of the guide bearings and rod seal.

4. Rod Ends

Industrial Devices offers 4 rod end options for EC5-B series cylinders.

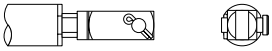
-FT1M or -FT1E Female Thread



-MT1M or -MT1E Male Thread

-FS2 Spherical Joint

-FC2 Clevis



5. Other Options

See the Options and Accessories section for complete specifications.

BM – Motor Holding Brake

240 in-lb holding brake mounted on the B41 motor.

BS – Screw Holding Brake

350 in-lb holding brake mounted on the rear lead screw shaft extension. *Not available on inline models or with cylinder base mount options. (-MF2, -MF3, -MP2, -MP3).*

L – Linear Potentiometer Output

Linear potentiometer mounted on inside the EC5-B cylinder. For use with B8501 control.

PB – Protective Boot

Protects the thrust tube from solid contaminants and prevents liquids from entering the cylinder through the rod end bearing.

6. Accessories

Magnetic Position Sensors

Position sensors are available for indicating end-of-travel and home positions, or for use with user supplied controls.

To maximize cylinder life, IDC recommends the use of end-of-travel sensors with all cylinders.

Common Application Requirements: For most applications, one home and two end-of-travel sensors are required for each cylinder. Either Reed or Hall Effect (NPN transistor) switches are compatible with IDC controls.

	3m Leads	4m Quick
Reed		
Home (N.O.)	PSR-1	PSR-1Q
End-of-travel (N.C.)	PSR-2	PSR-2Q
Hall Effect		
Home (N.O./NPN)	PSN-1	PSN-1Q
End-of-travel (N.C./NPN)	PSN-2	PSN-2Q

See page A-240 for more limit switch options, including quick-disconnect versions.

7. Compatible Controls

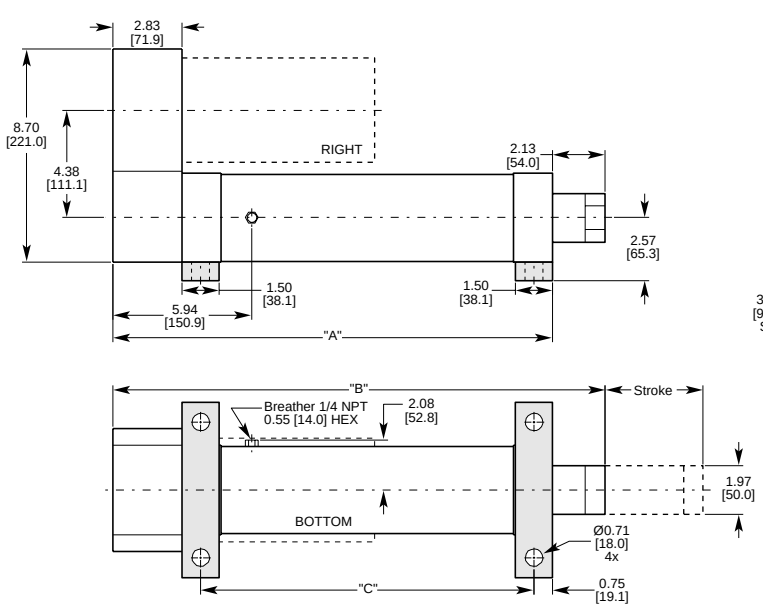
Details of controls are in Sections H. The EC5-B is compatible with:

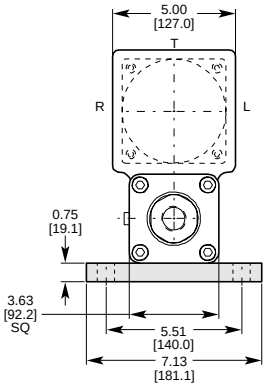
Model	Description
B8001	Digital servo drive
B8501	Analog position
B8961	*IDeal*™ programmable servo
B8962	2 Axis *IDeal*™ programmable servo

Dimensions

MS2 Side Lugs Mounting

Parallel



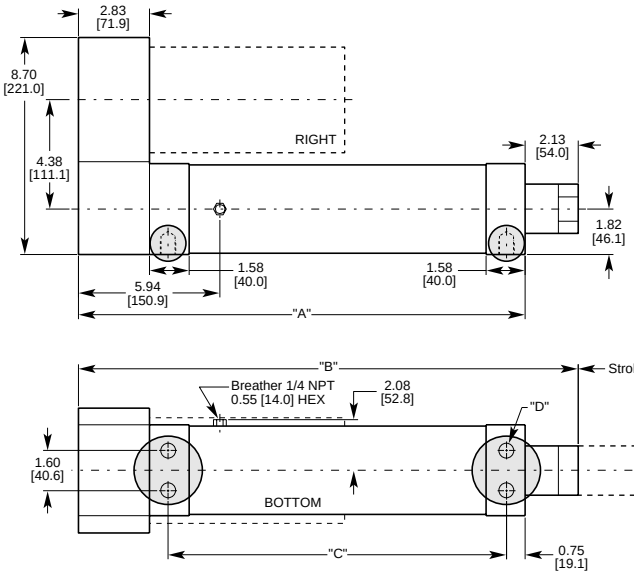


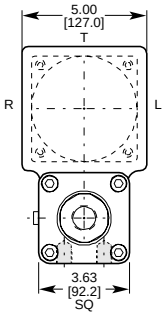
- For AutoCAD® DXF drawings, go to our website, or call the factory for a diskette
- For motor dimensions, go to pages A-150 to A-152
- For rod-end dimensions, go to page A-154

DIMENSION		LENGTH
A	CYLINDER LENGTH	13.90 [353.1] + STROKE
B	RETRACT LENGTH	16.02 [406.9] + STROKE
C	MOUNTING LENGTH	9.55 [242.6] + STROKE

MS6 Side Tapped Holes Mounting

Parallel





DIMENSION		LENGTH	DIM	OPTION CODE	SIZE
A	CYLINDER LENGTH	13.90 [353.1] + STROKE	D	MS6E	5/8-18 UNF-2B x 0.55 Dp
B	RETRACT LENGTH	16.02 [406.9] + STROKE		MS6M	M16 x 2-6H x 14mm Dp
C	MOUNTING LENGTH	9.55 [242.6] + STROKE			

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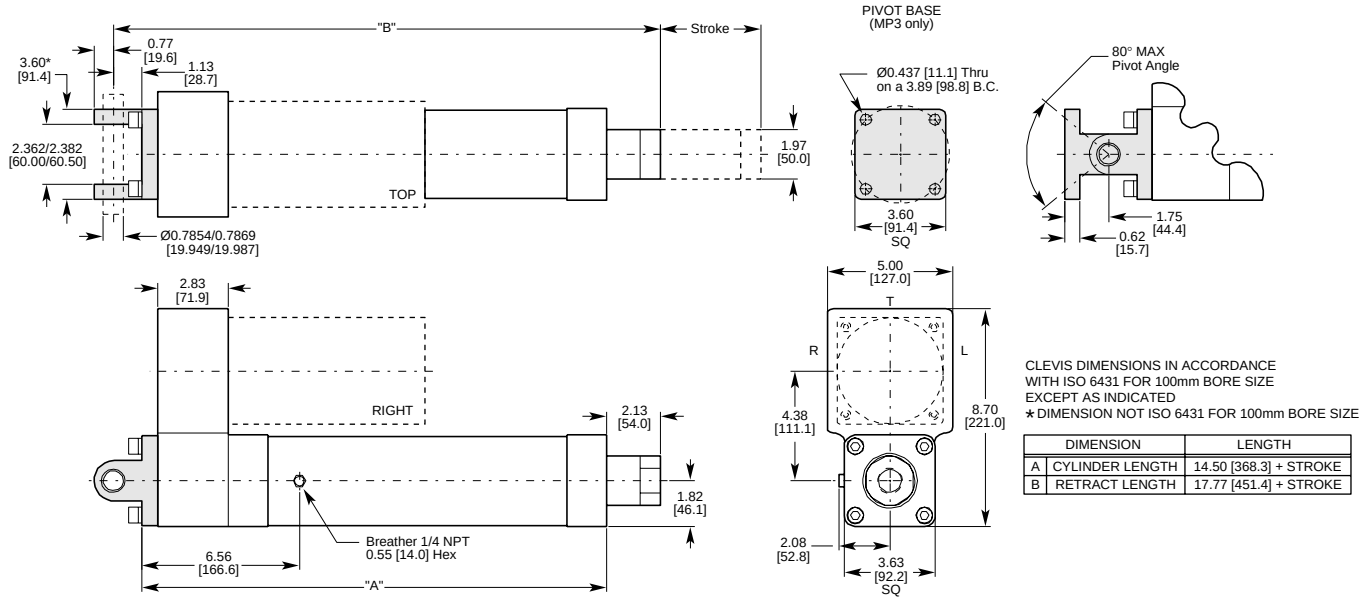
Dimensions

MP2/MP3 Clevis Mount with Pivot Base and Pin

Parallel



CLEVIS DIMENSIONS IN ACCORDANCE WITH ISO 6431 FOR 100mm BORE SIZE EXCEPT AS INDICATED
★ DIMENSION NOT ISO 6431 FOR 100mm BORE SIZE

DIMENSION		LENGTH
A	CYLINDER LENGTH	14.50 [368.3] + STROKE
B	RETRACT LENGTH	17.77 [451.4] + STROKE

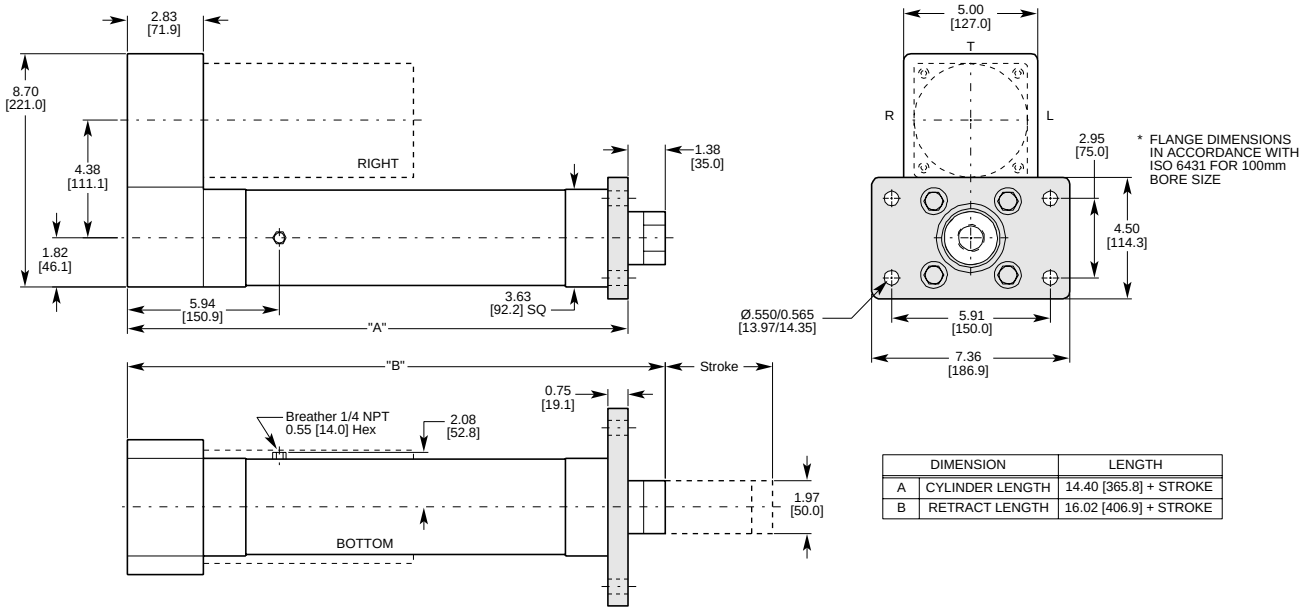
- For AutoCAD® DXF drawings, go to our website, or call the factory for a diskette
- For motor dimensions, go to pages A-150 to A-152
- For rod-end dimensions, go to page A-154

Note:

- Order MP3 to specify complete mounting kit, including actuator clevis, pin and pivot base.
- Order MP2 to omit the pivot base.

MF1 Head Rectangular Flange Mounting

Parallel



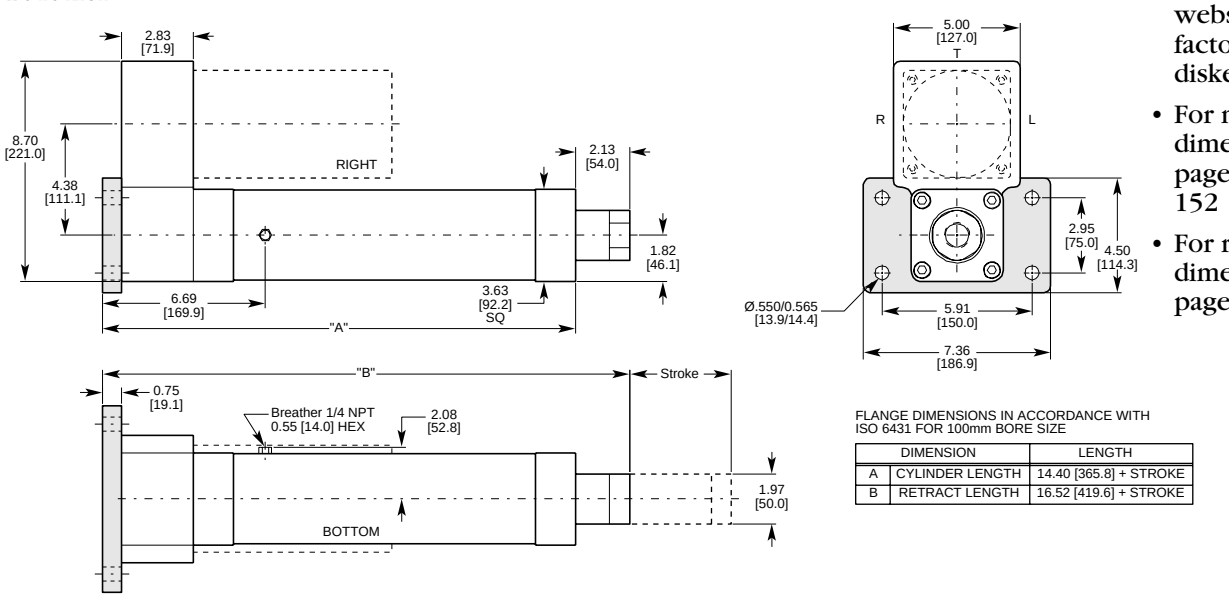
* FLANGE DIMENSIONS IN ACCORDANCE WITH ISO 6431 FOR 100mm BORE SIZE

DIMENSION		LENGTH
A	CYLINDER LENGTH	14.40 [365.8] + STROKE
B	RETRACT LENGTH	16.02 [406.9] + STROKE

Dimensions

MF2 Cap Rectangular Flange Mounting

Parallel



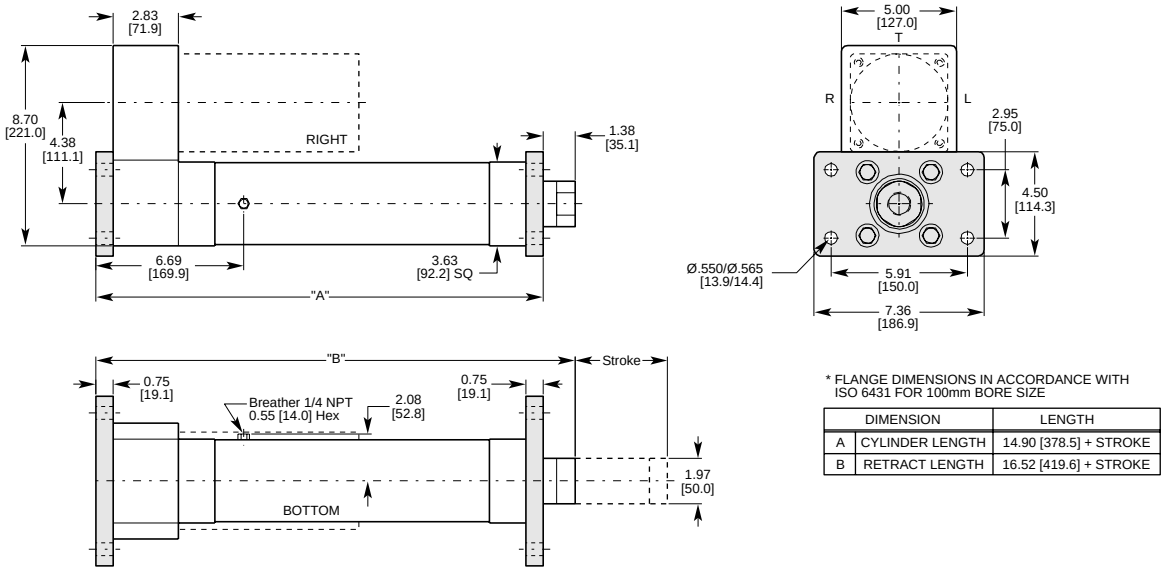
FLANGE DIMENSIONS IN ACCORDANCE WITH ISO 6431 FOR 100mm BORE SIZE

DIMENSION	LENGTH
A CYLINDER LENGTH	14.40 [365.8] + STROKE
B RETRACT LENGTH	16.52 [419.6] + STROKE

- For AutoCAD® DXF drawings, go to our website, or call the factory for a diskette
- For motor dimensions, go to pages A-150 to A-152
- For rod-end dimensions, go to page A-154

MF3 Both Ends Rectangular Flange Mounting

Parallel



* FLANGE DIMENSIONS IN ACCORDANCE WITH ISO 6431 FOR 100mm BORE SIZE

DIMENSION	LENGTH
A CYLINDER LENGTH	14.90 [378.5] + STROKE
B RETRACT LENGTH	16.52 [419.6] + STROKE

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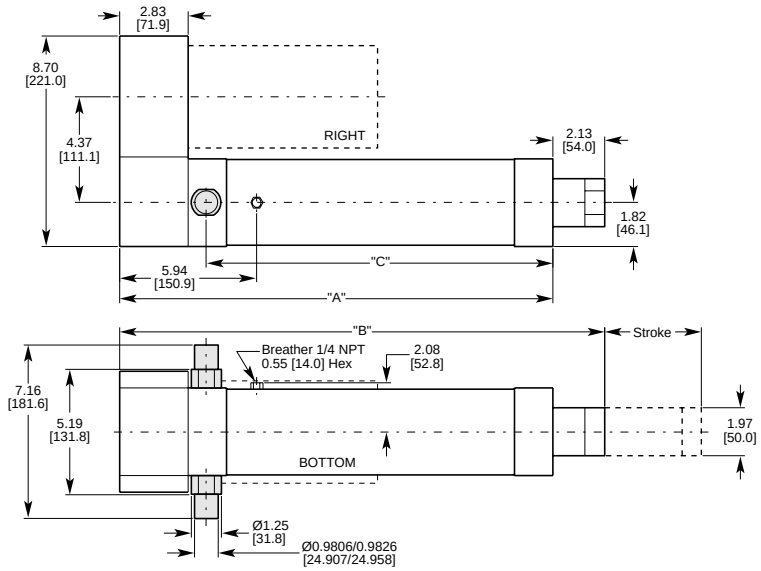
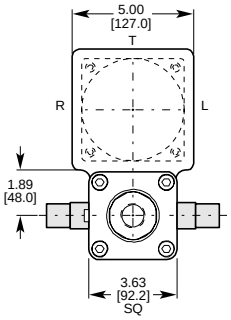
Dimensions

MT4 Trunnion Mounting

Parallel





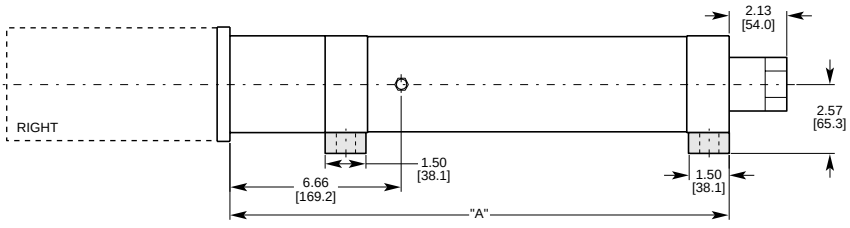
- For AutoCAD® DXF drawings, go to our website, or call the factory for a diskette
- For motor dimensions, go to pages A-150 to A-152
- For rod-end dimensions, go to page A-154

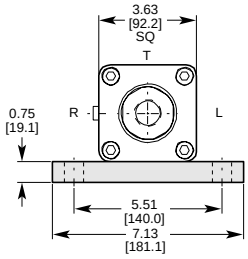
TRUNNION DIMENSIONS IN ACCORDANCE WITH ISO 6431 FOR 100mm BORE SIZE

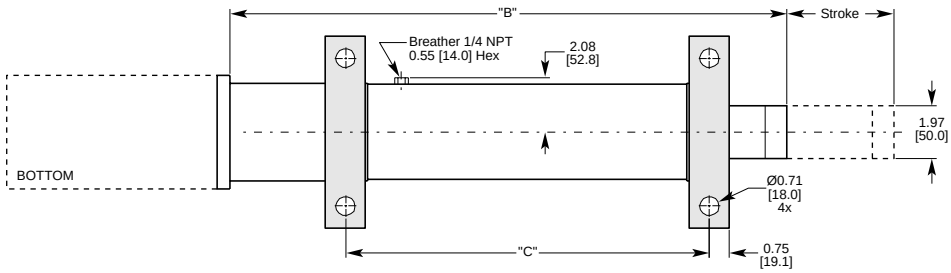
DIMENSION		LENGTH
A	CYLINDER LENGTH	13.90 [353.1] + STROKE
B	RETRACT LENGTH	16.02 [406.9] + STROKE
C	MOUNTING LENGTH	10.30 [261.6] + STROKE

MS2 Side End Angles Mounting

Inline





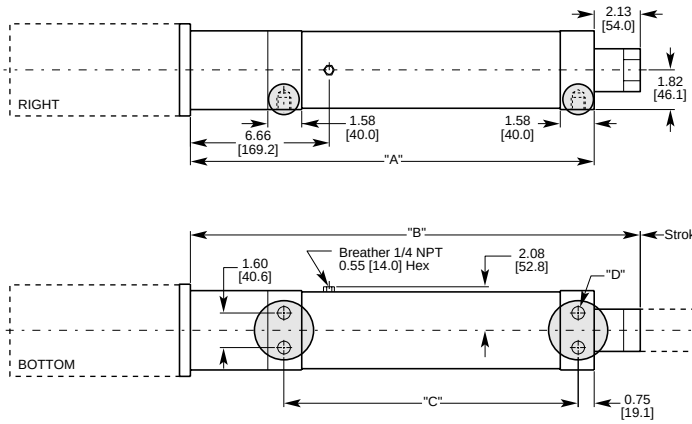


DIMENSION		LENGTH
A	CYLINDER LENGTH	14.62 [371.3] + STROKE
B	RETRACT LENGTH	16.74 [425.3] + STROKE
C	MOUNTING LENGTH	9.55 [242.6] + STROKE

Dimensions

MS6 Side Tapped Holes Mounting

Inline

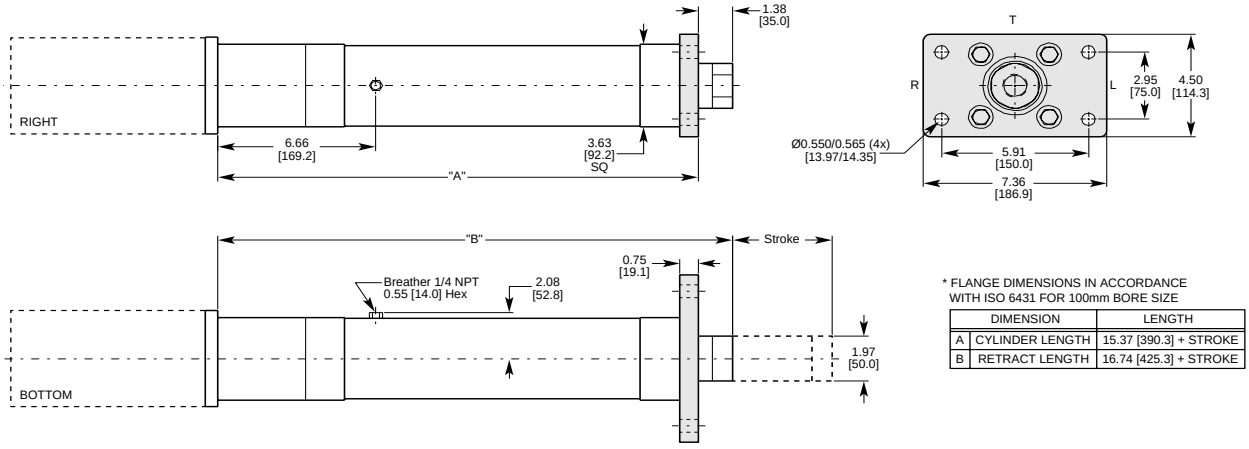


- For AutoCAD® DXF drawings, go to our website, or call the factory for a diskette
- For motor dimensions, go to pages A-150 to A-152
- For rod-end dimensions, go to page A-154

DIMENSION		LENGTH	DIM	OPTION CODE	SIZE
A	CYLINDER LENGTH	14.62 [371.3] + STROKE	D	MS6E	5/8-18 UNF-2B x 0.55 Dp
B	RETRACT LENGTH	16.74 [425.3] + STROKE		MS6M	M16 x 2-6H x 14mm Dp
C	MOUNTING LENGTH	9.55 [242.6] + STROKE			

MF1 Head Rectangular Flange Mounting

Inline



* FLANGE DIMENSIONS IN ACCORDANCE WITH ISO 6431 FOR 100mm BORE SIZE

DIMENSION		LENGTH
A	CYLINDER LENGTH	15.37 [390.3] + STROKE
B	RETRACT LENGTH	16.74 [425.3] + STROKE

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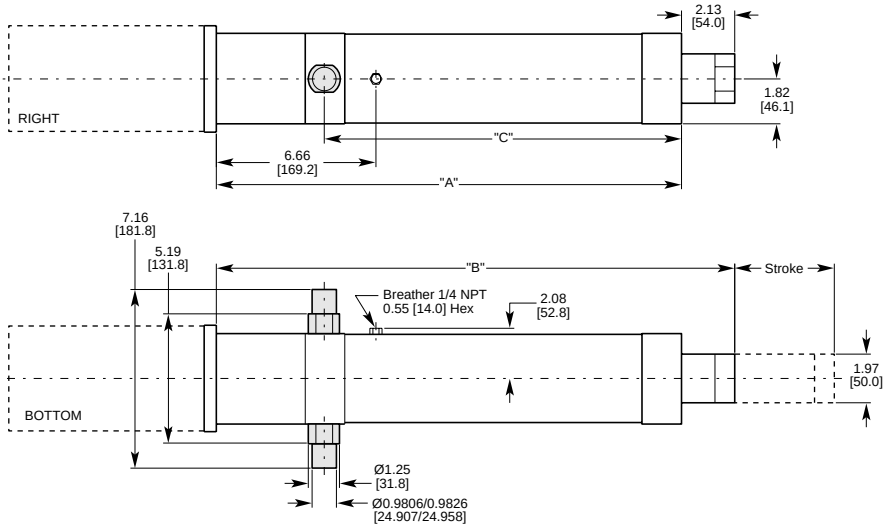
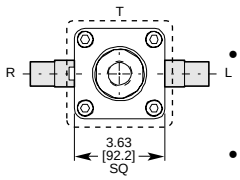
Dimensions

MT4 Trunnion Mounting

Inline





- For AutoCAD® DXF drawings, go to our website, or call the factory for a diskette
- For motor dimensions, go to pages A-150 to A-152
- For rod-end dimensions, go to page A-154

TRUNNION DIMENSIONS IN ACCORDANCE WITH ISO 6431 FOR 100mm BORE SIZE

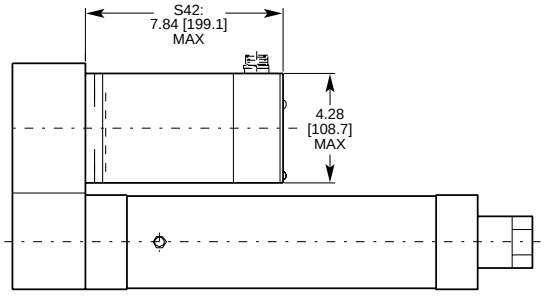
DIMENSION		LENGTH
A	CYLINDER LENGTH	14.62 [371.3] + STROKE
B	RETRACT LENGTH	16.74 [425.3] + STROKE
C	MOUNTING LENGTH	10.30 [261.6] + STROKE

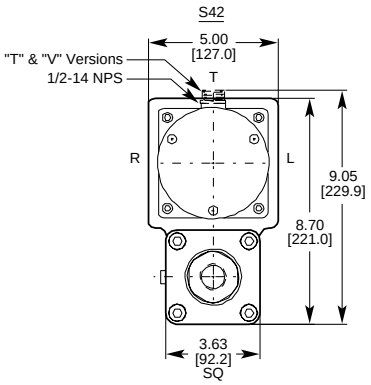
Motor Specifications

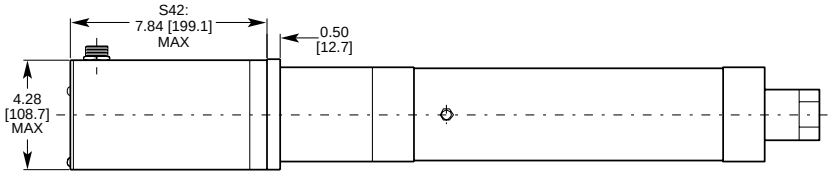
EC5-S Series — 1.8° Permanent Magnet Hybrid Step Motor

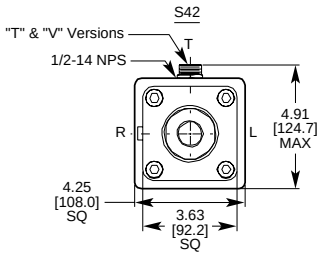
Winding Data	S42T and S42V
Inductance	Series (T), 8mH; Parallel (V), 2mH
Resistance	Series (T), 4.4 ; Parallel (V), 1.1
Current Settings	Series (T) at 120 VAC, 6.0 Amps Parallel (V) at 120 VAC or Series (T) at 240 VAC, 7.9 Amps
Static Torque	Series (T) 1000 oz-in, Parallel (V) 725 oz-in
Rotor Inertia	0.114 oz-in-sec^2
Connections	EC5-S42T, and EC5-S42V: 5 contant quick disconnect receptacle in anodized or painted aluminum shell, includes 12 ft [3.7 m] cable with molded plug.
Temperature	212°F [100°C] maximum allowable motor case temperature. Actual motor case temperature is ambient, duty cycle, speed and load dependent. Refer to speed vs. thrust curves for system duty ratings.

S42 Motor









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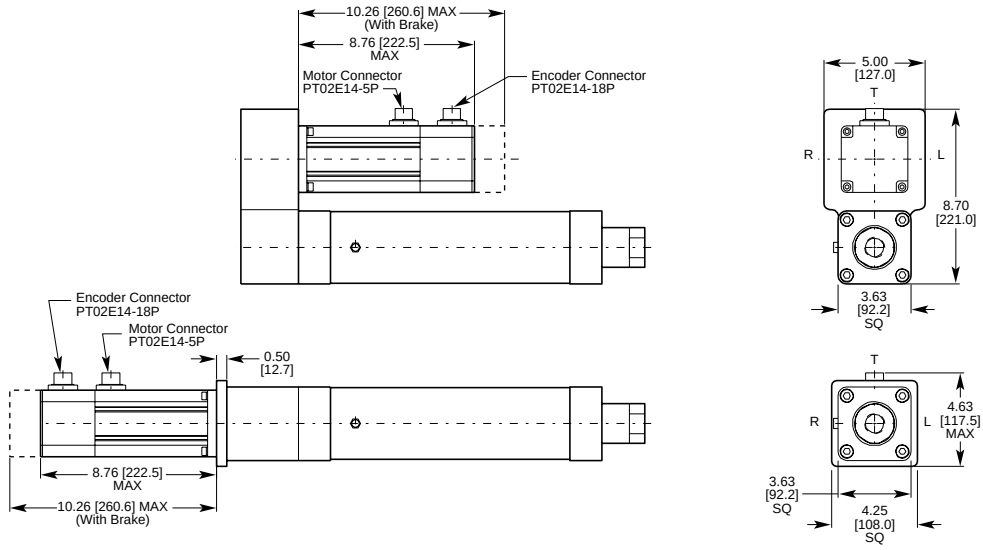
Motor Specifications

EC5-B Series

Rare Earth Magnet Brushless Servo Motor with 2,000 Line Encoder and Commutation Sensors

Winding Data	B32
Inductance	9.8 mH
Resistance	3.4
Torque Constant	99.2 oz-in/Amp
Voltage Constant	45.5 V/krpm
Torque	
Continuous	476 oz-in (4.8 Amps)
Peak	992 oz-in (10.0 Amps)
Rotor Inertia	0.016 oz-in-sec^2
Connections	MS-type connectors for motor winding and encoder on motor. Includes 12 ft. [3.7 m] cable with mating connector.
Temperature	212°F [100°C] maximum allowed case temperature.
Environmental	IP65 Rating

B32 Motor



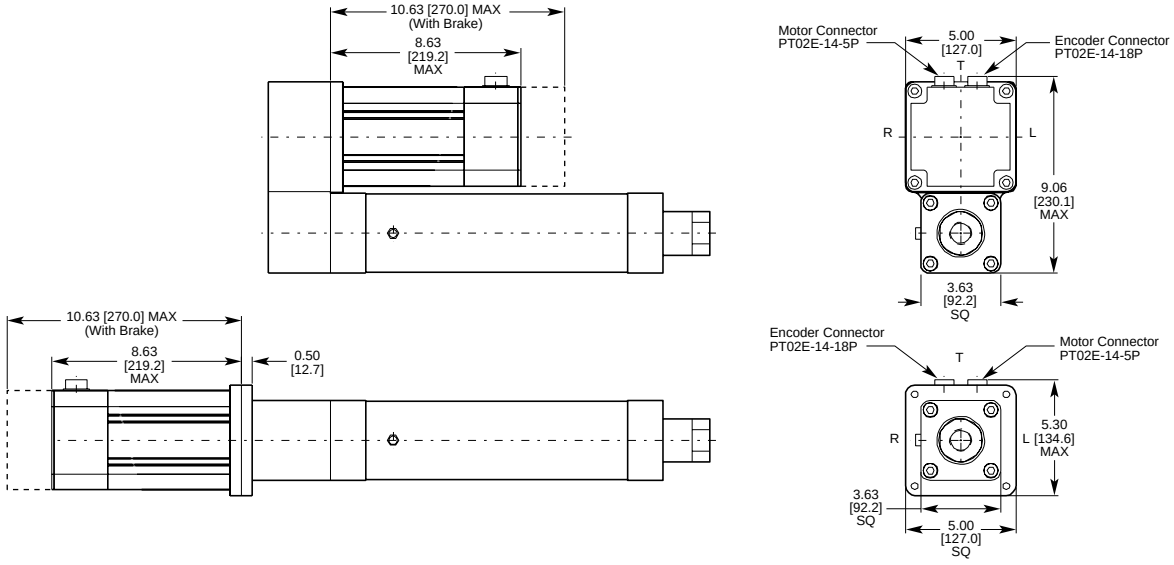
Motor Specifications

EC5-B Series

Rare Earth Magnet Brushless Servo Motor with 2,000 Line Encoder and Commutation Sensors

Winding Data	B41
Inductance	24.0 mH
Resistance	3.6
Torque Constant	187 oz-in/Amp
Voltage Constant	148 V/krpm
Torque	
Continuous	935 oz-in (4.8 Amps)
Peak	1870 oz-in (10.0 Amps)
Rotor Inertia	0.0416 oz-in-sec^2
Connections	MS-type connectors for motor winding and encoder on motor. Includes 12 ft. [3.7 m] cable with mating connector.
Temperature	212°F [100°C] maximum allowed case temperature.
Environmental	IP65 Rating

B41 Motor



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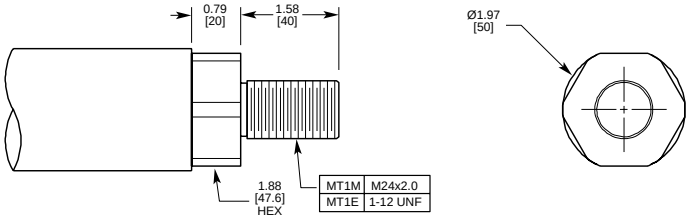
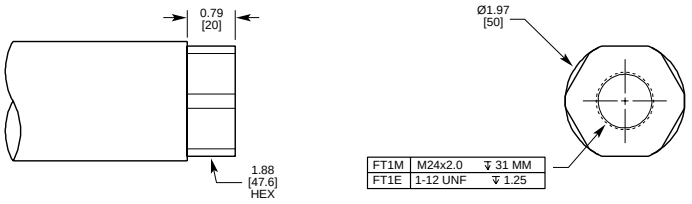
Rod End Dimensions

Dimensions in [mm]

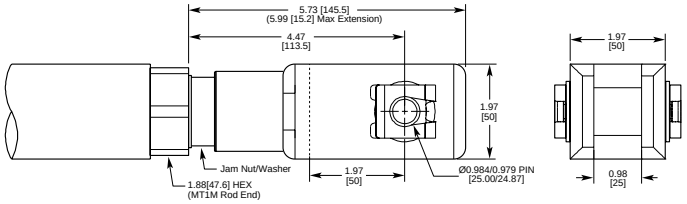
MT1 Male Threads



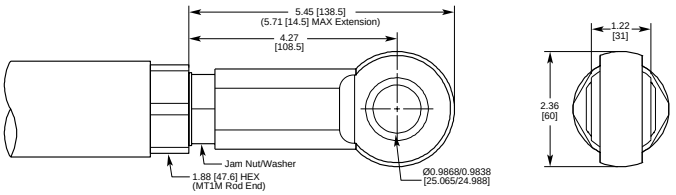
FT1 Female Threads



FC2 Clevis with Pin



FS2 Spherical



Overview

N2 Series electric cylinders are available with four motor types to meet a variety of application requirements. The N2-D family features a cost effective 24 VDC motor. When combined with D Series controls, the complete system provides simple extend–retract motion, positioning to pre-determined stopping locations, or positioning to an analog voltage command; all at the lowest installed cost.

Operating with a powerful 160 VDC motor, the N2-H family of cylinders are ideally suited for high load and duty cycle applications. Controls provide simple limit switch positioning and edge guiding, or positioning to an analog voltage command.

The N2-S/P family is a step motor based linear actuator. These systems are selected for applications that require high load and duty cycle, in-position holding, open loop operation, repeatable positioning to 0.0005 inches [0.013 mm] and maintenance-free operation.

Industrial Devices' N2-B Series Electric Cylinders offer very high acceleration and duty cycle for the most demanding automated motion applications. The B8000 Servo Drives are designed to optimize the performance of the brushless servo motor.

All N2 Series Cylinders are available with several time-proven options to enhance operation in the industrial environment. Options include holding brakes, linear potentiometers or encoders for position feedback, dual rod-end bearings to increase side load and more. See the end of this section for more information.

		N2-D Series	N2-H Series	N2-S/P Series	N2-B Series
Motor Type		24 VDC Permanent Magnet	160 VDC Permanent Magnet Servo	1.8° Hybrid Stepper	Rare Earth Magnet Brushless Servo
Performance Curves		Page A-160	Page A-166	Page A-172	Page A-182
Load Capacity	lbs [N]	600 [2,670]	600 [2,670]	600 [2,670]	600 [2,670]
No Load Speed	in/s [mm/s]	24 [610]	25 [635]	25 [635]	30 [760]
Repeatability	in [mm]	±0.005 [.127]	± 0.005 [.127]	± 0.0005 [.0127]	± 0.001 [.025]
Compatible Controls Offered		D2200 D2300 D2400 D2500	H3301B B8001 H3321B B8961 H3501 B8962	NextStep SmartStep S6002 S6961 S6962	B8001 B8501 B8961 B8962

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General Specifications

System Backlash	0.015 inches [0.38 mm]
Thrust Tube	
Side Load Moment	Consult factory.
Rotation	Does not rotate.
Standard Travel Lengths	2, 4, 6, 8, 10, 12, and 16.5 (18–DB); custom stroke lengths available

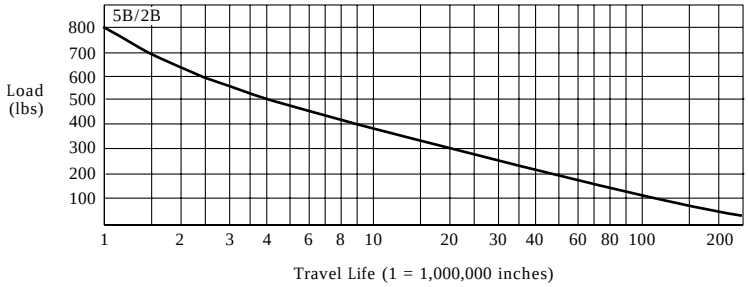
Construction Materials

Bearing Housings	Type 380 die cast aluminum, epoxy coated
Cylinder Housing	6063 T-6 aluminum, hard-coated anodized and Teflon impregnated
Thrust Tube	300 Series stainless steel, 1/8 hard, ground
Wiper Seal	Polyurethane
Lead Screw	
Pitch Choices	2, 5 Ball; 5, 8 Acme
Support Bearings	Ball bearings
Acme Screw; drive nut	0.625 inch diameter, carbon steel screw; lubricated polyacetal plastic (N2-D, N2-P) or bronze (N2-H, N2-S, N2-B) nut
Ball Screw; drive nut	0.625 inch diameter, carbon steel screw; alloy steel, heat-treated ball nut

Life

Acme Screw Life: Usable life for an acme screw is defined as the length of travel completed before backlash (of leadscrew/nut) exceeds 0.020 inches [0.5 mm]. A travel life of 1 million inches under the maximum rated load can be used as a general approximation, however, since wear is directly dependent on application conditions (load, duty cycle, move profiles and environment) it is difficult to quantify an accurate travel life.

Ball Screw Life: Load vs. Travel Life Chart



Weight (Approximate, 2 inch stroke unit without options. Add 0.25 lbs [0.11kg] per additional inch of stroke.)

N2-D Series	7 lbs [3.2 kg]
N2-H Series	9 lbs [4.1 kg]
N2-S/P Series	
N2-P22	6 lbs [2.7 kg]
N2-S32	9 lbs [4.1 kg]
N2-B Series	6 lbs [2.7 kg]

Motor

Specifications/Dimensions — See pages A-194 to A-198

Environmental Operation (See the Options and Accessories section, page A-231.)

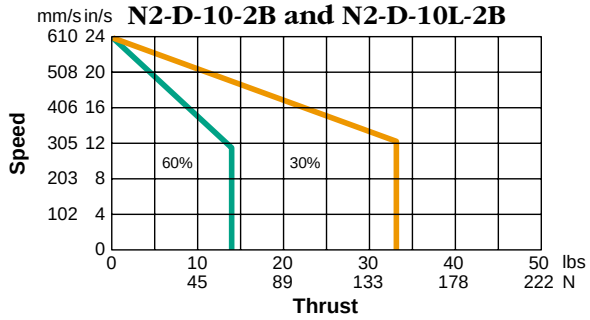
Temperature Range	32° to 140°F, [0° to 60°C] -H high temperature option allows 32° to 160°F [0° to 70°C] -F sub-freezing temperature option allows –20° to 105°F [-29° to 40°C]
Moisture	Humid, but not direct moisture contact -W water resistant option allows some direct moisture contact
Contaminants	Non-corrosive, non-abrasive -PB protective boot option prevents moisture and dry contaminants from entering the cylinder through the wiper ring on the rod

Performance

High-Speed Ballscrew Models

—100% Duty Cycle —60% Duty Cycle —30% Duty Cycle

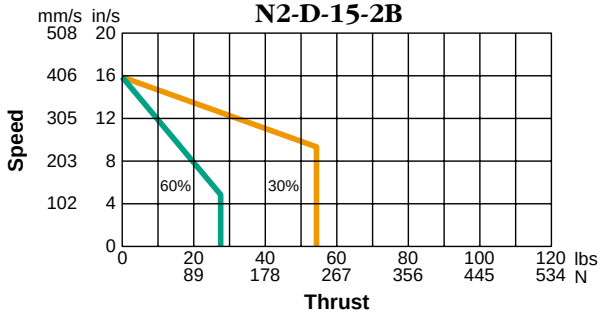
N2-D-10-2B and N2-D-10L-2B



N2-D-10-2B: 1:1 Timing Belt, 2 rev/inch Ballscrew
N2-D-10L-2B: Inline Coupling, 2 rev/inch Ballscrew

Min. Backdrive Load	10 lbs	45 N
Max. No-Load Accel.	180 in/s²	4572 mm/s²
Repeatability	±0.010 in	±0.254 mm

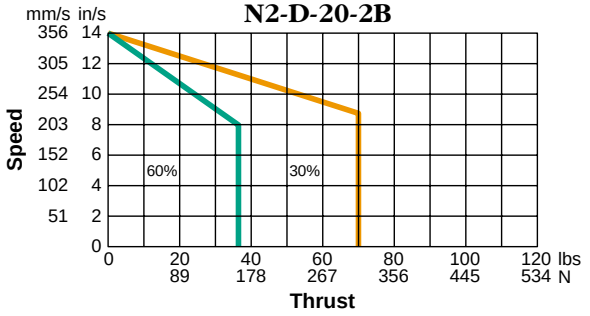
N2-D-15-2B



N2-D-15-2B: 1.5:1 Timing Belt, 2 rev/inch Ballscrew

Min. Backdrive Load	10 lbs	45 N
Max. No-Load Accel.	150 in/s²	3810 mm/s²
Repeatability	±0.010 in	±0.254 mm

N2-D-20-2B



N2-D-20-2B: 2:1 Timing Belt, 2 rev/inch Ballscrew

Min. Backdrive Load	10 lbs	45 N
Max. No-Load Accel.	150 in/s²	3810 mm/s²
Repeatability	±0.010 in	±0.254 mm

- Performance using D2200 or D2300 Series Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.
- **For D2500B control, derate thrust by 50%.**
- Repeatability achievable with D2300 control. Reduce cylinder speed prior to final positioning.

- Consider leadscrew **critical speed** and c**olumn load limits** when specifying longer lengths.

2B

30.0 *Critical Speed (in/sec)*

2 thru 18-DB ***Stroke** (in)*

n/a *Column Load Limit (lb)*

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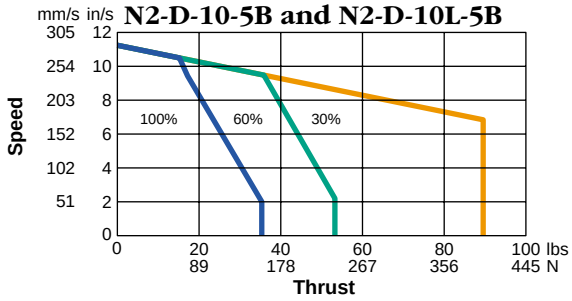
Ballscrew Models

—100% Duty Cycle —60% Duty Cycle —30% Duty Cycle

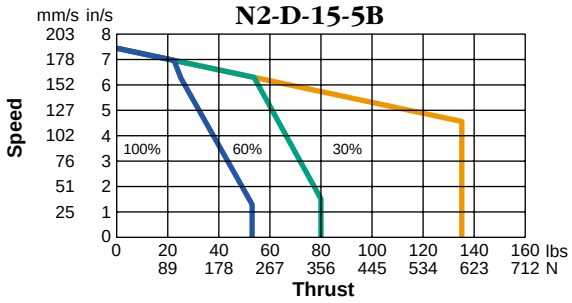
N2-D-10-5B and N2-D-10L-5B



N2-D-10-5B: 1:1 Timing Belt, 5 rev/inch Ballscrew
N2-D-10L-5B: Inline Coupling, 5 rev/inch Ballscrew

Min. Backdrive Load	10 lbs	45 N
Max. No-Load Accel.	180 in/s²	4572 mm/s²
Repeatability	±0.010 in	±0.254 mm

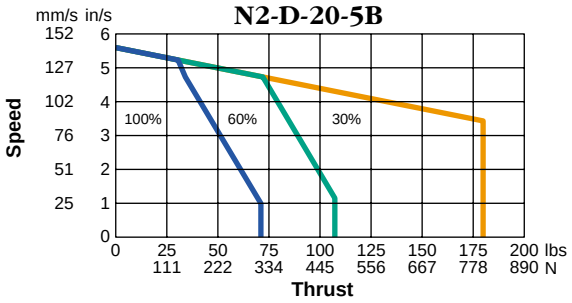
N2-D-15-5B



N2-D-15-5B: 1.5:1 Timing Belt, 5 rev/inch Ballscrew

Min. Backdrive Load	20 lbs	89 N
Max. No-Load Accel.	80 in/s²	2032 mm/s²
Repeatability	±0.005 in	±0.127 mm

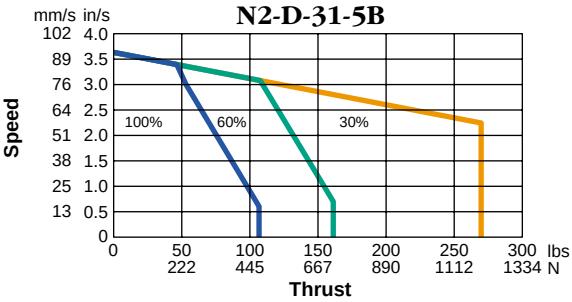
N2-D-20-5B



N2-D-20-5B: 2:1 Timing Belt, 5 rev/inch Ballscrew

Min. Backdrive Load	20 lbs	89 N
Max. No-Load Accel.	70 in/s²	1778 mm/s²
Repeatability	±0.005 in	±0.127 mm

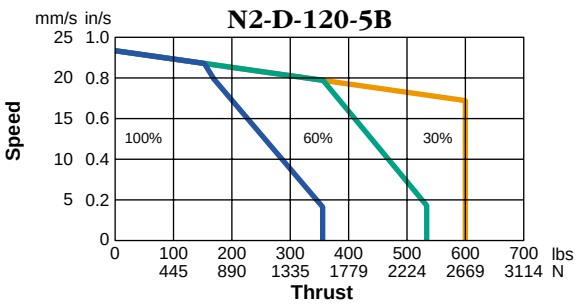
N2-D-31-5B



N2-D-31-5B: 3:1 Helical Gear, 5 rev/inch Ballscrew

Min. Backdrive Load	20 lbs	89 N
Max. No-Load Accel.	40 in/s²	1016 mm/s²
Repeatability	±0.005 in	±0.127 mm

N2-D-120-5B



N2-D-120-5B: 12:1 Helical Gear, 5 rev/inch Ballscrew

Min. Backdrive Load	20 lbs	89 N
Max. No-Load Accel.	13 in/s²	330 mm/s²
Repeatability	±0.005 in	±0.127 mm

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

5B

15.0 *Critical Speed (in/sec)*

2 thru 18-DB ***Stroke** (in)*

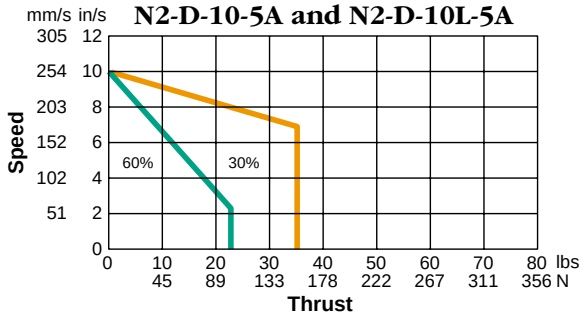
n/a *Column Load Limit (lb)*

Performance

Acme Screw Models

—100% Duty Cycle —60% Duty Cycle —30% Duty Cycle

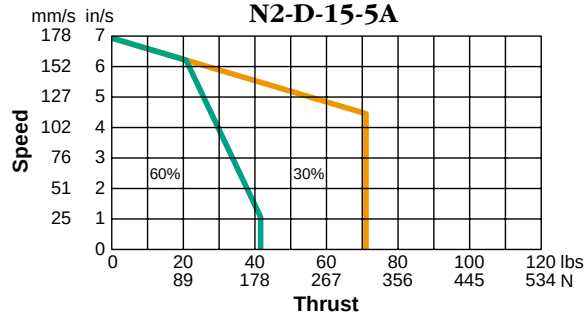
N2-D-10-5A and N2-D-10L-5A



N2-D-10-5A: 1:1 Timing Belt, 5 rev/inch Acme Screw
N2-D-10L-5A: 1:1 Inline Coupling, 5 rev/inch Acme Screw

Min. Backdrive Load	100 lbs	445 N
Max. No-Load Accel.	100 in/s²	2540 mm/s²
Repeatability	±0.005 in	±0.127 mm

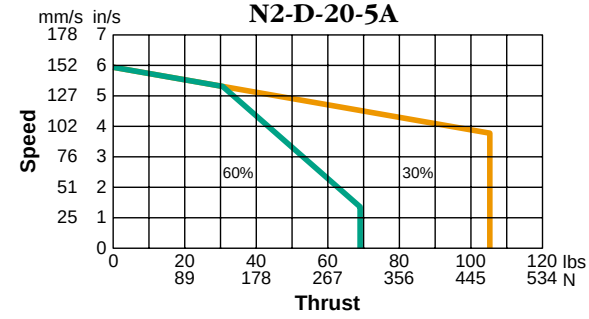
N2-D-15-5A



N2-D-15-5A: 1.5:1 Timing Belt, 5 rev/inch Acme Screw

Min. Backdrive Load	100 lbs	445 N
Max. No-Load Accel.	80 in/s²	2032 mm/s²
Repeatability	±0.005 in	±0.127 mm

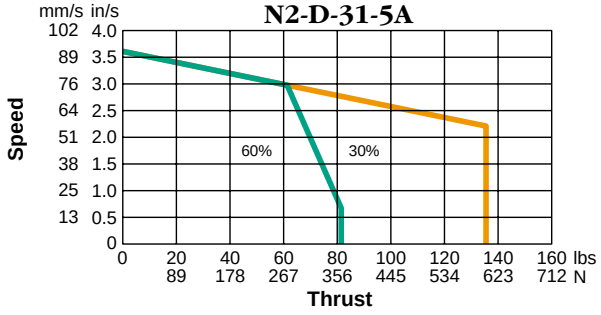
N2-D-20-5A



N2-D-20-5A: 2:1 Timing Belt, 5 rev/inch Acme Screw

Min. Backdrive Load	100 lbs	445 N
Max. No-Load Accel.	70 in/s²	1778 mm/s²
Repeatability	±0.005 in	±0.127 mm

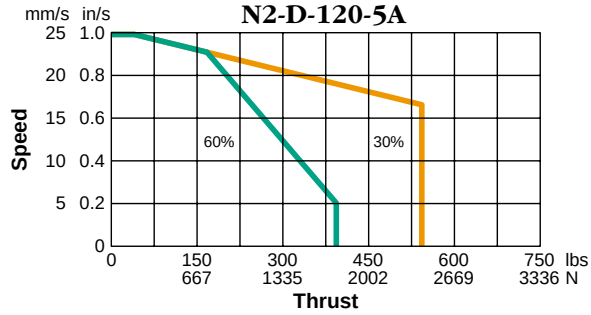
N2-D-31-5A



N2-D-31-5A: 3.1:1 Helical Gear, 5 rev/inch Acme Screw

Min. Backdrive Load	100 lbs	445 N
Max. No-Load Accel.	40 in/s²	1016 mm/s²
Repeatability	±0.005 in	±0.127 mm

N2-D-120-5A



N2-D-120-5A: 12:1 Helical Gear, 5 rev/inch Acme Screw

Min. Backdrive Load	100 lbs	445 N
Max. No-Load Accel.	13 in/s²	330 mm/s²
Repeatability	±0.005 in	±0.127 mm

- Performance using D2200 or D2300 Series Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.
- **For D2500B control, derate thrust by 50%.**
- Repeatability achievable with D2300 control. Reduce cylinder speed prior to final positioning.

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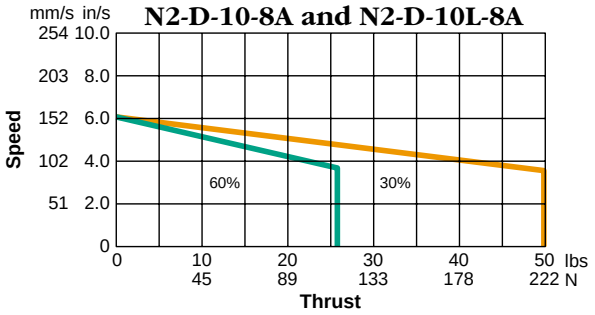
Acme Screw Models

—100% Duty Cycle —60% Duty Cycle —30% Duty Cycle

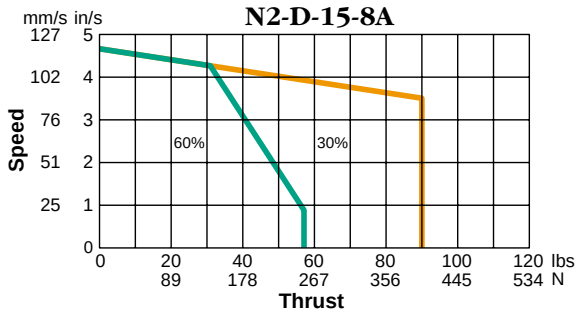
N2-D-10-8A and N2-D-10L-8A



N2-D-10-8A: 1:1 Timing Belt, 8 rev/inch Acme Screw
N2-D-10L-8A: 1:1 Inline Coupling, 8 rev/inch Acme Screw

Min. Backdrive Load	600 lbs	2669 N
Max. No-Load Accel.	60 in/s²	1524 mm/s²
Repeatability	±0.005 in	±0.127 mm

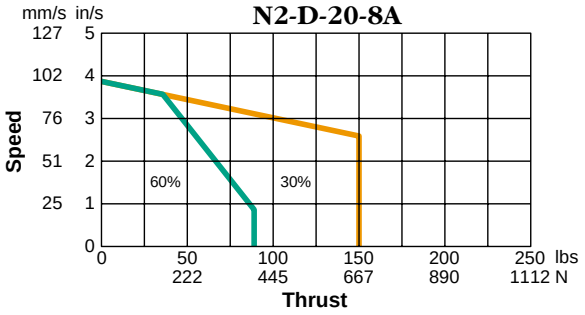
N2-D-15-8A



N2-D-15-8A: 1.5:1 Timing Belt, 8 rev/inch Acme Screw

Min. Backdrive Load	600 lbs	2669 N
Max. No-Load Accel.	50 in/s²	1270 mm/s²
Repeatability	±0.005 in	±0.127 mm

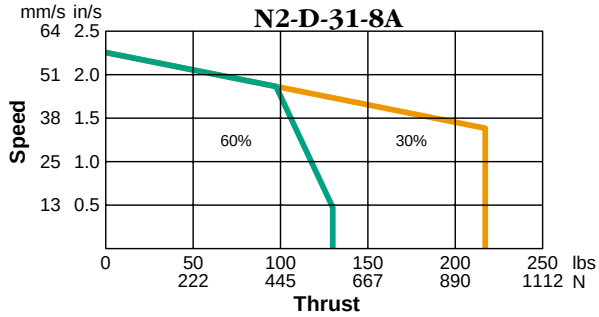
N2-D-20-8A



N2-D-20-8A: 2:1 Timing Belt, 8 rev/inch Acme Screw

Min. Backdrive Load	600 lbs	2669 N
Max. No-Load Accel.	40 in/s²	1016 mm/s²
Repeatability	±0.005 in	±0.127 mm

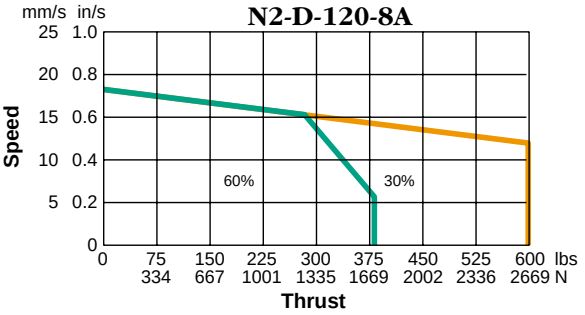
N2-D-31-8A



N2-D-31-8A: 3.1:1 Helical Gear, 8 rev/inch Acme Screw

Min. Backdrive Load	600 lbs	2669 N
Max. No-Load Accel.	25 in/s²	635 mm/s²
Repeatability	±0.005 in	±0.127 mm

N2-D-120-8A



N2-D-120-8A: 12:1 Helical Gear, 8 rev/inch Acme Screw

Min. Backdrive Load	600 lbs	2669 N
Max. No-Load Accel.	8 in/s²	203 mm/s²
Repeatability	±0.005 in	±0.127 mm

5A

15.0	13.8	*Critical Speed (in/sec)*
2 thru 12	18-DB	***Stroke** (in)*
n/a	n/a	*Column Load Limit (lb)*

8A

9.4	*Critical Speed (in/sec)*
2 thru 18-DB	***Stroke** (in)*
n/a	*Column Load Limit (lb)*

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

How To Order

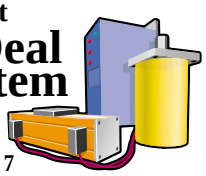
Steps To Ordering A Complete N2-D System

The following steps will guide you to a complete N2-D Series system for your application.

For help:

- Complete Application Data Form.
- Review the N2-D Series specifications on pages A-159 to A-163.
- Refer to the Engineering section for selection assistance.
- Consult your local Industrial Devices distributor, or call the factory.

Make It An IDeal System



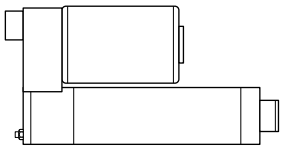
See Intro Pages 6 & 7

1. Base Model Number

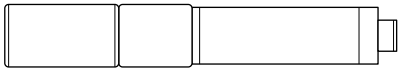
Select the N2-D model which provides sufficient thrust and speed for the application, with a comfortable margin of safety. Refer to the N2-D Speed vs. Thrust curves in this section. When making this selection, be sure to consider duty cycle, side loading, back driving, and the other design considerations from the IDC Application Data Form.

N2-D cylinders with gear or timing belt drive reductions have the motor mounted parallel to the lead screw. With in-line units, the motor is always coupled directly to the screw shaft, with no reduction.

Parallel Models



In-Line Models



2. Stroke Length

Seven standard travel lengths are available from 2 to 16.5 inches. Longer lengths and custom in-between lengths also are available. Consult your IDC distributor or the factory for details.

To maximize cylinder life, the thrust tube should not impact either physical end-of-stroke during normal operation. Extra travel length is needed to decelerate the load to a stop when an end-of-travel limit switch is encountered. This extra travel distance depends on load and speed.

Dual Rod End Bearing (-DB) is

- **required above 12 inch stroke**
- **optional with 12 inches and below**

The -DB option reduces actual travel by 1.5 inches (e.g., N2-18-DB has 16.5 in travel).

Pivot Mount Caution:

When utilizing a pivot mounting option (MP2 or MT4) in conjunction with a pivot rod end (FS2 or FC2), it is recommended that the actuator be extended only to 90–95% of its full stroke. This increases the system's rigidity and extends the life of the guide bearings and rod seal.

1 Base Model				2 Stroke Length	3 Cylinder Mounting	4 Rod End	5 Options
Electric Cylinder	Motor	Drive Ratio	Screw Pitch, Type	(in)			
N2	D						

Ball Screw

		Acme Screw	
N2-D-10-2B	N2-D-10-5B	N2-D-10-5A	N2-D-10-8A
N2-D-15-2B	N2-D-15-5B	N2-D-15-5A	N2-D-15-8A
N2-D-20-2B	N2-D-20-5B	N2-D-20-5A	N2-D-20-8A
	N2-D-31-5B	N2-D-31-5A	N2-D-31-8A
	N2-D-120-5B	N2-D-120-5A	N2-D-120-8A

Inline Models

N2-D-10L-2B
N2-D-10L-5B
N2-D-10L-5A
N2-D-10L-8A

2 Stroke Length (in)

2
4
6
8
10
12
18 [1] 16.5 in actual travel

[1] 16.5 inches actual stroke with required -DB dual rod end bearing installed.

3 Cylinder Mounting

No Charge

-MF1*	-MS1	-FE2
-MF2*	-MS2	-FT1*
-MF3*	-MS6*	-MT1*
-MP2	-MT4	

Additional Charge

-MP3	-FC2	
	-FS2	

4 Rod End

-DB

5 Options

-BS
-EMK
-F
-H
-L
-PB
-Q
-W

* Available in metric; add M after designation. Example: MF1 becomes MF1M

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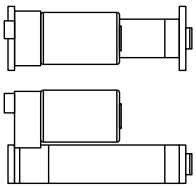
How To Order

3. Cylinder Mounting

Specify any one of these cylinder mounting options. Dimensional drawings start on page A-189.

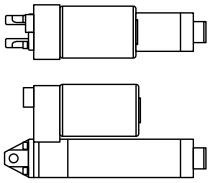
Cylinder base mount options -MP2, -MP3, -MF2, and -MF3 cannot be ordered with in-line models.

MF1, 2, 3 Rectangular Flanges

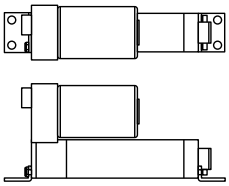


MF1 Front Flange (Metric MF1M)
MF2 Rear Flange (Metric MF2M)
MF3 Both Flanges (Metric MF3M)

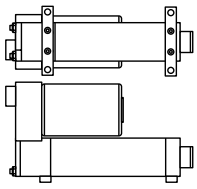
MP2 Rear Clevis (MP3 includes pivot base)



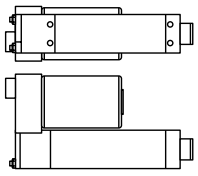
MS1 Side End Angles



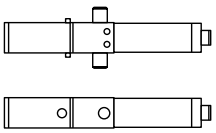
MS2 Side Lugs



MS6 Side Tapped Holes (Metric MS6M)



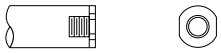
MT4 Trunnion (In-Line Models Only)



4. Rod Ends

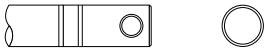
Industrial Devices offers 5 rod end options for N2-D Series cylinders.

-FT1 Female Thread



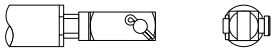
-MT1 Male Thread

-FE2 Female Eye



-FS2 Spherical Joint

-FC2 Clevis



5. Options

See the Options and Accessories section for complete specifications.

-BS Holding Brake

20 in-lb holding brake mounted on the rear lead screw shaft extension. *Not available on in-line models or with cylinder base mount options (-MF2, -MF3, -MS1, -MP2, -MP3).*

-DB Dual Rod End Bearing

Increases side load rating. *Reduces actual stroke length by 1.5 inches.*

-EMK Encoder

1000 line incremental encoder mounted on the rear shaft of the motor. *Not available on N2-D Series with -Q quick disconnect option.*

-F Sub-Freezing Environment

For operation to -20°F. Increases system backlash to 0.025 inches max.

-H High Temperature

Increases maximum cylinder operating temperature to 180°F. *Note: -F and -H are not compatible.*

-L Linear Potentiometer Output

Linear potentiometer mounted inside the N2-D cylinder.

-PB Protective Boot

Protects the thrust tube from solid contaminants and prevents liquids from entering the cylinder through the rod end bearing. *Includes the -W option.* (Not included with –MS1.)

-W Water Resistant Option

Provides protection from moisture contact with cylinder.

-Q Motor Quick Disconnect

Male quick disconnect receptacle installed in the back of the cylinder drive housing, including a 12 ft. motor cable with molded quick disconnect plug. *Cannot be ordered with N2-D inline models.*

6. Accessories

Magnetic Position Sensors

Position sensors are available for triggering stop, speed/direction change, or end-of-travel.

To maximize cylinder life, IDC recommends the use of end-of-travel limit switches with all cylinders.

Either Reed or Hall Effect (NPN transistor) switches are compatible with IDC controls.

	3m Leads	4m Quick
Reed		
Normally open	PSR-1	PSR-1Q
Normally closed	PSR-2	PSR-2Q
Hall Effect		
Normally open, NPN	PSN-1	PSN-1Q
Normally closed, NPN	PSN-2	PSN-2Q

See page A-240 for more limit switch options, including quick-disconnect versions.

7. D2000 Series Controls

Details of the D2000 Series 24 volt DC controls are in Section F.

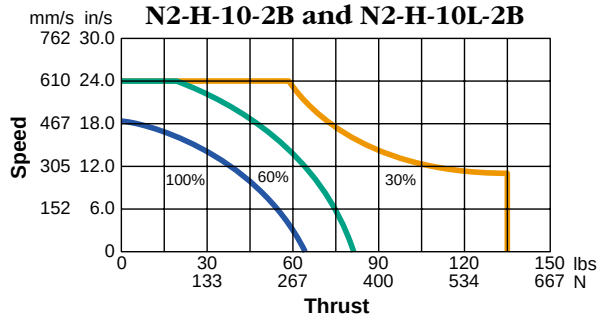
Model	Description
D2200	Simple limit switch
D2300	Limit switch
D2500	Analog position

Performance

High-Speed Ball Screw Models

—100% Duty Cycle —60% Duty Cycle —30% Duty Cycle

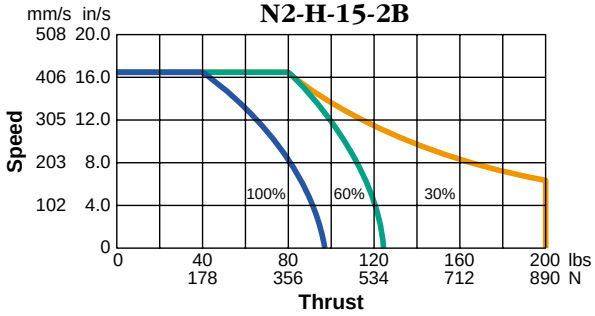
N2-H-10-2B and N2-H-10L-2B



N2-H-10-2B: 1:1 Timing Belt, 2 rev/inch Ballscrew
N2-H-10L-2B: 1:1 Inline Coupling, 2 rev/inch Ballscrew

Min. Backdrive Load	10 lbs	45 N
Max. No-Load Accel.	200 in/s²	5080 mm/s²
Repeatability	±0.010 in	±0.254 mm

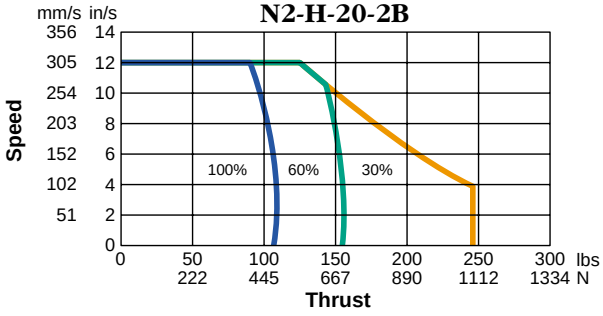
N2-H-15-2B



N2-H-15-2B: 1.5:1 Timing Belt, 2 rev/inch Ballscrew

Min. Backdrive Load	10 lbs	45 N
Max. No-Load Accel.	140 in/s²	3556 mm/s²
Repeatability	±0.010 in	±0.254 mm

N2-H-20-2B



N2-H-20-2B: 2:1 Timing Belt, 2 rev/inch Ballscrew

Min. Backdrive Load	10 lbs	45 N
Max. No-Load Accel.	140 in/s²	3556 mm/s²
Repeatability	±0.010 in	±0.254 mm

- Performance using H3000 Series Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval. For operation in the 60% or 30% region, motor temperature rise due to load, speed, number of acceleration/decelerations, and ambient temperature require consideration.

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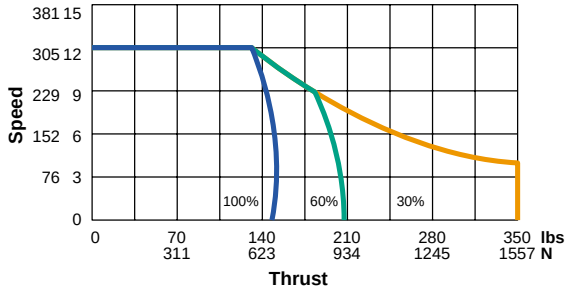
Ball Screw Models

—100% Duty Cycle —60% Duty Cycle —30% Duty Cycle

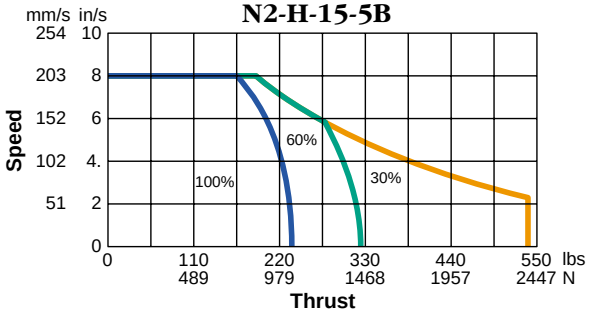
N2-H-10-5B and N2-H-10L-5B



N2-H-10-5B: 1:1 Timing Belt, 5 rev/inch Ballscrew
N2-H-10L-5B: 1:1 Inline Coupling, 5 rev/inch Ballscrew

Min. Backdrive Load	20 lbs	89 N
Max. No-Load Accel.	110 in/s²	2794 mm/s²
Repeatability	±0.005 in	±0.127 mm

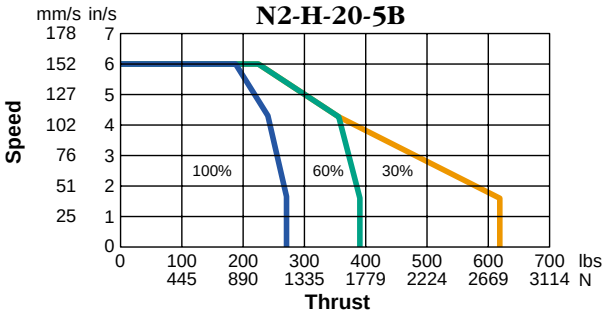
N2-H-15-5B



N2-H-15-5B: 1.5:1 Timing Belt, 5 rev/inch Ballscrew

Min. Backdrive Load	20 lbs	89 N
Max. No-Load Accel.	90 in/s²	2286 mm/s²
Repeatability	±0.005 in	±0.127 mm

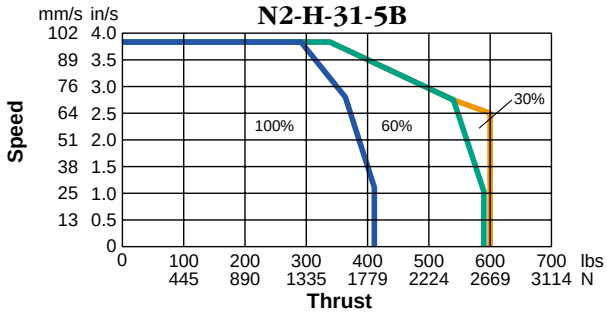
N2-H-20-5B



N2-H-20-5B: 2:1 Timing Belt, 5 rev/inch Ballscrew

Min. Backd2-rive Load	20 lbs	89 N
Max. No-Load Accel.	70 in/s²	1778 mm/s²
Repeatability	±0.005 in	±0.127 mm

N2-H-31-5B



N2-H-31-5B: 3.1:1 Helical Gears, 5 rev/inch Ballscrew

Min. Backdrive Load	20 lbs	89 N
Max. No-Load Accel.	40 in/s²	1016 mm/s²
Repeatability	±0.005 in	±0.127 mm

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

2B

30.0 *Critical Speed (in/sec)*
2 thru 18-DB ***Stroke** (in)*
n/a *Column Load Limit (lb)*

5B

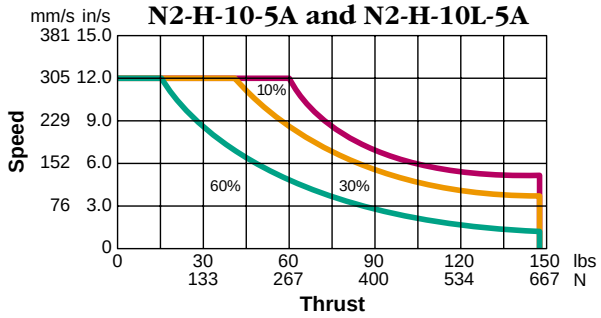
15.0 *Critical Speed (in/sec)*
2 thru 18-DB ***Stroke** (in)*
n/a *Column Load Limit (lb)*

Performance

Acme Screw Models

—60% Duty Cycle —30% Duty Cycle —10% Duty Cycle

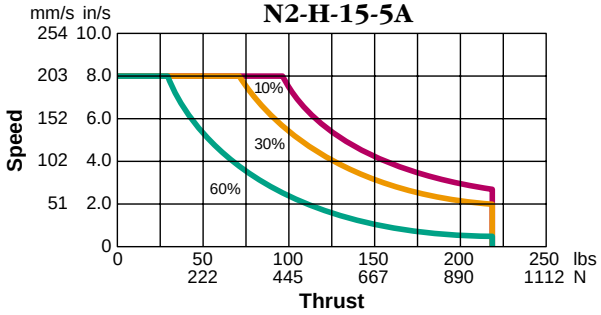
N2-H-10-5A and N2-H-10L-5A



N2-H-10-5A: 1:1 Timing Belt, 5 rev/inch Acme Screw
N2-H-10L-5A: 1:1 Inline Coupling, 5 rev/inch Acme Screw

Min. Backdrive Load	400 lbs	1779 N
Max. No-Load Accel.	110 in/s²	2794 mm/s²
Repeatability	±0.005 in	±0.127 mm

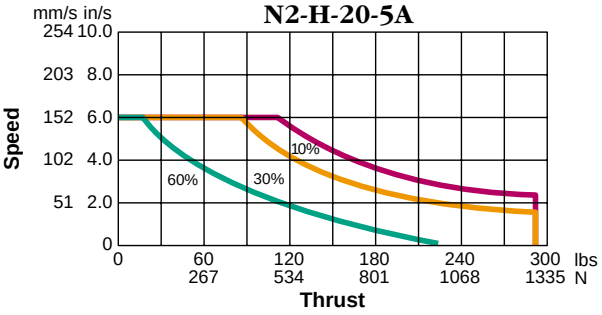
N2-H-15-5A



N2-H-15-5A: 1.5:1 Timing Belt, 5 rev/inch Acme Screw

Min. Backdrive Load	400 lbs	1779 N
Max. No-Load Accel.	90 in/s²	2286 mm/s²
Repeatability	±0.005 in	±0.127 mm

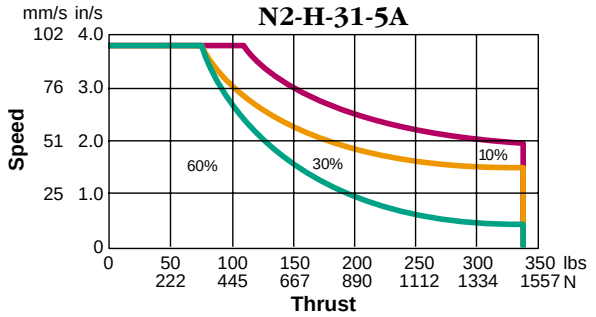
N2-H-20-5A



N2-H-20-5A: 2:1 Timing Belt, 5 rev/inch Acme Screw

Min. Backdrive Load	400 lbs	1779 N
Max. No-Load Accel.	70 in/s²	1778 mm/s²
Repeatability	±0.005 in	±0.127 mm

N2-H-31-5A



N2-H-31-5A: 3.1:1 Helical Gears, 5 rev/inch Acme Screw

Min. Backdrive Load	400 lbs	1779 N
Max. No-Load Accel.	40 in/s²	1016 mm/s²
Repeatability	±0.005 in	±0.127 mm

- Performance using H3000 Series Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval. For operation in the 60% or 30% region, motor temperature rise due to load, speed, number of acceleration/decelerations, and ambient temperature require consideration.

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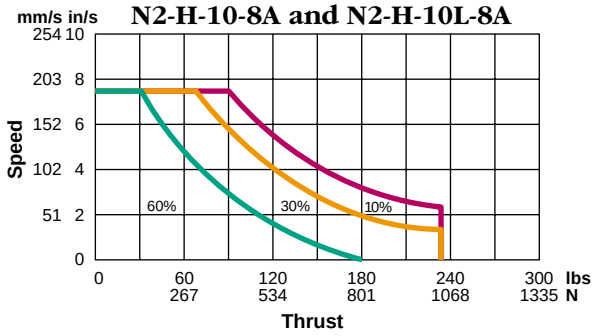
Acme Screw Models

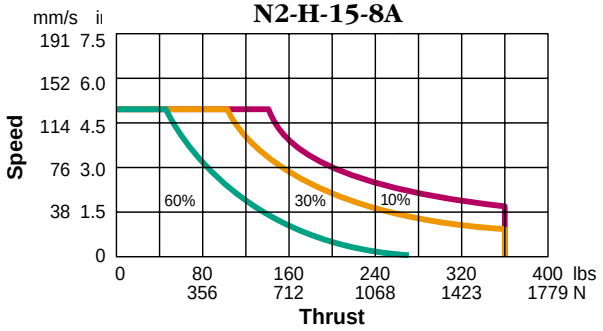
—60% Duty Cycle —30% Duty Cycle —10% Duty Cycle

N2-H-10-8A and N2-H-10L-8A



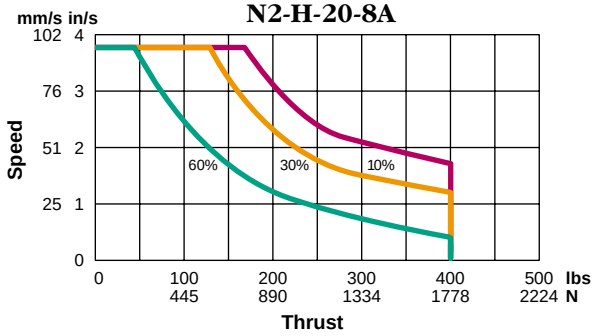
N2-H-10-8A: 1:1 Timing Belt, 8 rev/inch Acme Screw N2-H-10L-8A: 1:1 Inline Coupling, 8 rev/inch Acme Screw		
Min. Backdrive Load	600 lbs	2669 N
Max. No-Load Accel.	60 in/s²	1524 mm/s²
Repeatability	±0.005 in	±0.127 mm

N2-H-15-8A



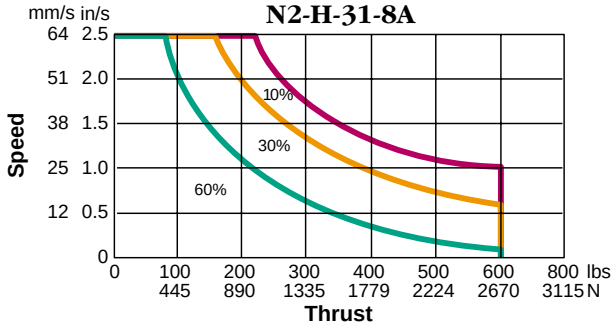
N2-H-15-8A: 1.5:1 Timing Belt, 8 rev/inch Acme Screw		
Min. Backdrive Load	600 lbs	2669 N
Max. No-Load Accel.	50 in/s²	1270 mm/s²
Repeatability	±0.005 in	±0.127 mm

N2-H-20-8A



N2-H-20-8A: 2:1 Timing Belt, 8 rev/inch Acme Screw		
Min. Backdrive Load	600 lbs	2669 N
Max. No-Load Accel.	45 in/s²	1143 mm/s²
Repeatability	±0.005 in	±0.127 mm

N2-H-31-8A



N2-H-31-8A: 3.1:1 Helical Gears, 8 rev/inch Acme Screw		
Min. Backdrive Load	600 lbs	2669 N
Max. No-Load Accel.	25 in/s²	635 mm/s²
Repeatability	±0.005 in	±0.127 mm

- Consider leadscrew **critical speed** and c**olumn load limits** when specifying longer lengths.

5A

15.0	13.8	*Critical Speed (in/sec)*
2 thru 12	18-DB	***Stroke** (in)*
n/a	n/a	*Column Load Limit (lb)*

8A

9.4	*Critical Speed (in/sec)*
2 thru 18-DB	***Stroke** (in)*
n/a	*Column Load Limit (lb)*

How To Order

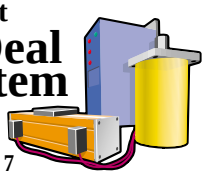
Steps To Ordering A Complete N2-H System

The following steps will guide you to a complete N2-H Series system for your application.

For help:

- Complete Application Data Form.
- Review the N2-H Series specifications on pages A-159 and A-166 to A-169.
- Refer to the Engineering section for selection assistance.
- Consult your local Industrial Devices distributor, or call the factory.

Make It An IDeal System
See Intro Pages 6 & 7

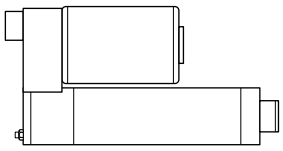


1. Base Model Number

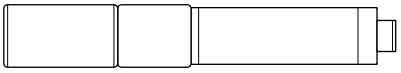
Select the N2-H model which provides sufficient thrust and speed for the application, with a comfortable margin of safety. Refer to the N2-H Speed vs. Thrust curves in this section. When making this selection, be sure to consider duty cycle, side loading, back driving, and the other design considerations from the IDC Application Data Form.

N2-H cylinders with gear or timing belt drive reductions have the motor mounted parallel to the lead screw. With in-line units, the motor is always coupled directly to the screw shaft, with no reduction.

Parallel Models



In-Line Models



2. Stroke Length

Seven standard travel lengths are available from 2 to 16.5 inches. Longer lengths and custom in-between lengths also are available. Consult your IDC distributor or the factory for details.

To maximize cylinder life, the thrust tube should not impact either physical end-of-stroke during normal operation. Extra travel length is needed to decelerate the load to a stop when an end-of-travel limit switch is encountered. This extra travel distance depends on load and speed.

Dual Rod End Bearing (-DB) is

- **required above 12 inch stroke**
- **optional with 12 inches and below**

The -DB option reduces actual travel by 1.5 inches (e.g., N2-18-DB has 16.5 in travel).

Pivot Mount Caution:

When utilizing a pivot mounting option (MP2 or MT4) in conjunction with a pivot rod end (FS2 or FC2), it is recommended that the actuator be extended only to 90–95% of its full stroke. This increases the system's rigidity and extends the life of the guide bearings and rod seal.

1 Base Model					2 Stroke Length	3 Cylinder Mounting	4 Rod End	5 Options		
Electric Cylinder	Motor	Drive Ratio	Screw Pitch, Type		(in)					
N2	H									

Ball Screw

N2-H-10-2B	N2-H-10-5B	N2-H-10-5A	N2-H-10-8A
N2-H-15-2B	N2-H-15-5B	N2-H-15-5A	N2-H-15-8A
N2-H-20-2B	N2-H-20-5B	N2-H-20-5A	N2-H-20-8A
	N2-H-31-5B	N2-H-31-5A	N2-H-31-8A

Acme Screw

N2-H-10-5A	N2-H-10-8A		
N2-H-15-5A	N2-H-15-8A		
N2-H-20-5A	N2-H-20-8A		
N2-H-31-5A	N2-H-31-8A		

Inline Models

N2-H-10L-2B
N2-H-10L-5B
N2-H-10L-5A
N2-H-10L-8A

Stroke Length (in)

2
4
6
8
10
12
18 [1] 16.5 in actual travel

[1] 16.5 inches actual stroke with required -DB dual rod end bearing installed.

Cylinder Mounting

No Charge

-MF1*	-MS1	-MS2
-MF2*	-MS2	
-MF3*	-MS6*	
-MP2	-MT4	

Additional Charge

-MP3	-FC2	
	-FS2	

Rod End

-FE2	-FT1*	-MT1*

Options

-DB		
-BM	-PB	
-BS	-Q	
-EMK	-W	
-F		
-H		
-L		

* Available in metric; add M after designation. Example: MF1 becomes MF1M

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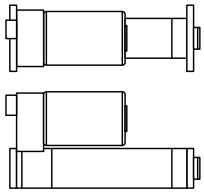
How To Order

3. Cylinder Mounting

Specify any one of these cylinder mounting options. Dimensional drawings start on page A-189.

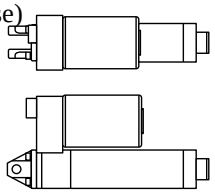
Cylinder base mount options -MP2, -MP3, -MF2, and -MF3 cannot be ordered with in-line models.

MF1, 2, 3 Rectangular Flanges

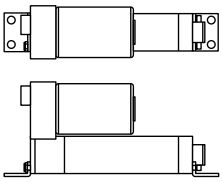


MF1 Front Flange (Metric MF1M)
MF2 Rear Flange (Metric MF2M)
MF3 Both Flanges (Metric MF3M)

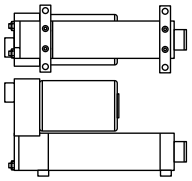
MP2 Rear Clevis (MP3 options includes pivot base)



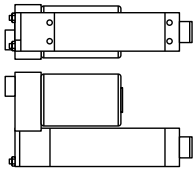
MS1 Side End Angles



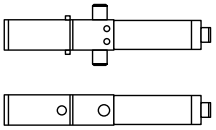
MS2 Side Lugs



MS6 Side Tapped Holes (Metric MS6M)



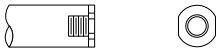
MT4 Trunnion (In-Line Models Only)



4. Rod Ends

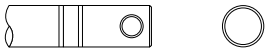
Industrial Devices offers 5 rod end options for N2-H Series cylinders.

-FT1 Female Thread



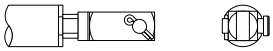
-MT1 Male Thread

-FE2 Female Eye



-FS2 Spherical Joint

-FC2 Clevis



5. Options

See the Options and Accessories section for complete specifications.

BM – Motor Holding Brake
10 in-lb holding brake mounted on the rear shaft of the H-series motor. *Not available on EC2-H with -EM encoder option.*

-BS Holding Brake
20 in-lb holding brake mounted on the rear lead screw shaft extension. *Not available on in-line models or with cylinder base mount options (-MF2, -MF3, -MS1, -MP2, -MP3).*

-DB Dual Rod End Bearing
Increases side load rating. *Reduces actual stroke length by 1.5 inches.*

-EMK Encoder
1000 line incremental encoder mounted on the rear shaft of the motor.

-F Sub-Freezing Environment
For operation to -20°F. *Increases system backlash to 0.025 inches max.*

-H High Temperature
Increases maximum cylinder operating temperature to 180°F. *Note: -F and -H are not compatible.*

-L Linear Potentiometer Output
Linear potentiometer mounted inside the N2-H cylinder.

-PB Protective Boot
Protects the thrust tube from solid contaminants and prevents liquids from entering the cylinder through the rod end bearing. *Includes the -W option.* (Not available with –MS1.)

-Q Motor Quick Disconnect
Male quick disconnect receptacle installed in the back of the cylinder drive housing, including a 12 ft. motor cable with molded quick disconnect plug. *In-line N2-H models have the disconnect receptacle installed in the motor.*

-W Water Resistant Option
Provides protection from light moisture contact with cylinder.

6. Accessories

Magnetic Position Sensors

Position sensors are available for triggering stop, speed/direction change, or end-of-travel.

To maximize cylinder life, IDC recommends the use of end-of-travel limit switches with all cylinders.

Either Reed or Hall Effect (NPN transistor) switches are compatible with IDC controls.

	3m Leads	4m Quick
Reed		
Normally open	PSR-1	PSR-1Q
Normally closed	PSR-2	PSR-2Q
Hall Effect		
Normally open, NPN	PSN-1	PSN-1Q
Normally closed, NPN	PSN-2	PSN-2Q

See page A-240 for more limit switch options, including quick-disconnect versions.

7. Compatible IDC Controls

Details of controls are in Section F. The N2-H is compatible with:

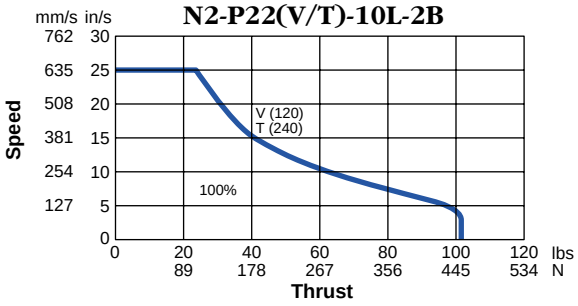
Model	Control Description
H3301B	Limit Switch
H3321B	Edge Guide Control
H3501	Analog Position

Performance

Ball Screw Models

—100% Duty Cycle —50% Duty Cycle

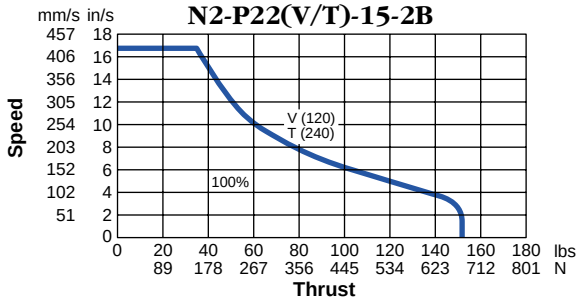
N2-P22(V/T)-10-2B
N2-P22(V/T)-10L-2B



N2-P22(V/T)-10-2B: 1:1 Timing Belt, 2 rev/inch Ballscrew
N2-P22(V/T)-10L-2B: 1:1 Inline Coupling, 2 rev/inch Ballscrew

Min. Backdrive Load	10 lbs	45 N
Repeatability	±0.0005 in	±0.0127 mm

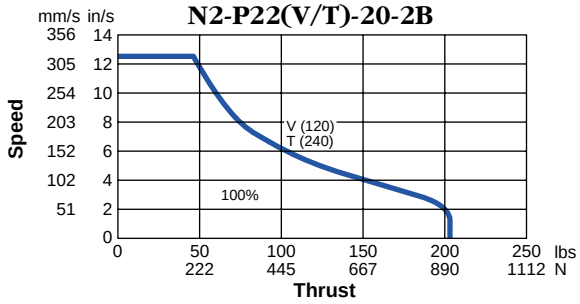
N2-P22(V/T)-15-2B



N2-P22(V/T)-15-2B: 1.5:1 Timing Belt, 2 rev/inch Ballscrew

Min. Backdrive Load	10 lbs	45 N
Repeatability	±0.0005 in	±0.0127 mm

N2-P22(V/T)-20-2B



N2-P22(V/T)-20-2B: 2:1 Timing Belt, 2 rev/inch Ballscrew

Min. Backdrive Load	10 lbs	45 N
Repeatability	±0.0005 in	±0.0127 mm

- Performance using S6000 Series, *Next*Step®, and *Smart*Step® Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and c**olumn load limits** when specifying longer lengths.

2B

30.0	*Critical Speed (in/sec)*
2 thru 18-DB	***Stroke** (in)*
n/a	*Column Load Limit (lb)*

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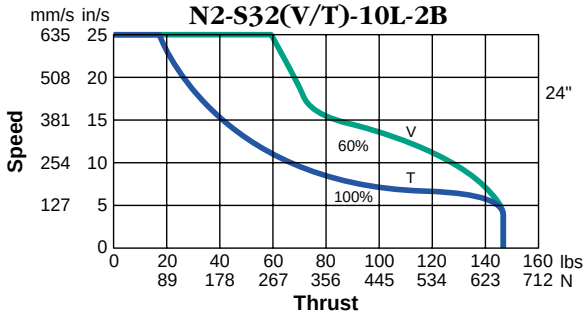
Ball Screw Models

—100% Duty Cycle —60% Duty Cycle

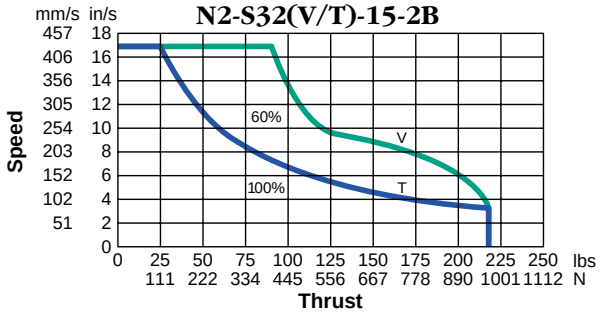
N2-S32(V/T)-10-2B
N2-S32(V/T)-10L-2B



N2-S32(V/T)-10-2B: 1:1 Timing Belt, 2 rev/inch Ballscrew
N2-S32(V/T)-10L-2B: 1:1 Inline Coupling, 2 rev/inch Ballscrew

Min. Backdrive Load	10 lbs	45 N
Repeatability	±0.0005 in	±0.0127 mm

N2-S32(V/T)-15-2B



N2-S32(V/T)-15-2B: 1.5:1 Timing Belt, 5 rev/inch Ballscrew

Min. Backdrive Load	10 lbs	45 N
Repeatability	±0.0005 in	±0.0127 mm

- Performance using S6000 Series, NextStep®, and SmartStep® Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and c**olumn load limits** when specifying longer lengths.

2B

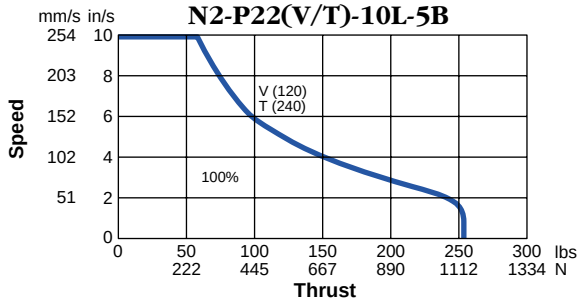
30.0	*Critical Speed (in/sec)*
2 thru 18-DB	***Stroke** (in)*
n/a	*Column Load Limit (lb)*

Performance

Ball Screw Models

—100% Duty Cycle —60% Duty Cycle

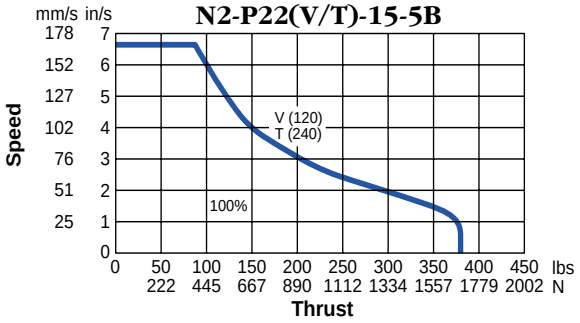
N2-P22(V/T)-10-5B
N2-P22(V/T)-10L-5B



N2-P22(V/T)-10-5B: 1:1 Timing Belt, 5 rev/inch Ballscrew
N2-P22(V/T)-10L-5B: 1:1 Inline Coupling, 5 rev/inch Ballscrew

Min. Backdrive Load	20 lbs	89 N
Repeatability	±0.0005 in	±0.0127 mm

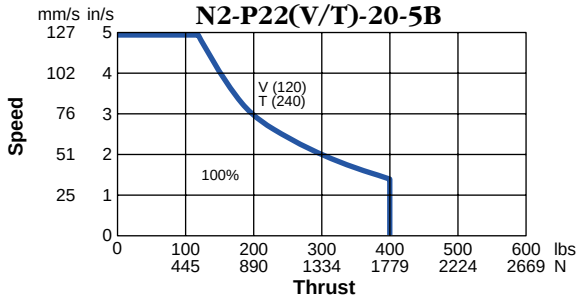
N2-P22(V/T)-15-5B



N2-P22(V/T)-15-5B: 1.5:1 Timing Belt, 5 rev/inch Ballscrew

Min. Backdrive Load	20 lbs	89 N
Repeatability	±0.0005 in	±0.0127 mm

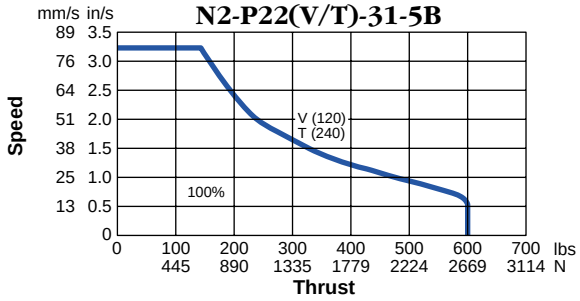
N2-P22(V/T)-20-5B



N2-P22(V/T)-20-5B: 2:1 Timing Belt, 5 rev/inch Ballscrew

Min. Backdrive Load	20 lbs	89 N
Repeatability	±0.0005 in	±0.0127 mm

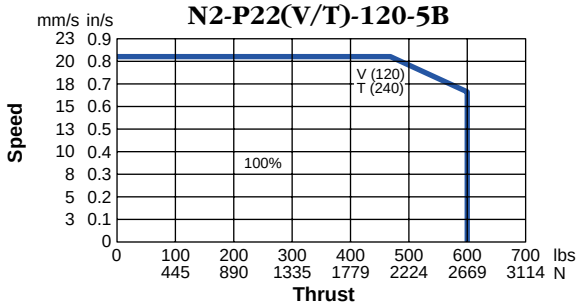
N2-P22(V/T)-31-5B



N2-P22(V/T)-31-5B: 3.1:1 Helical Gear, 5 rev/inch Ballscrew

Min. Backdrive Load	20 lbs	89 N
Repeatability	±0.0005 in	±0.0127 mm

N2-P22(V/T)-120-5B



N2-P22(V/T)-120-5B: 12:1 Helical Gear, 5 rev/inch Ballscrew

Min. Backdrive Load	20 lbs	89 N
Repeatability	±0.0005 in	±0.0127 mm

- Performance using S6000 Series, *NextStep*®, and *SmartStep*® Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

5B

15.0	*Critical Speed (in/sec)*
2 thru 18-DB	***Stroke** (in)*
n/a	*Column Load Limit (lb)*

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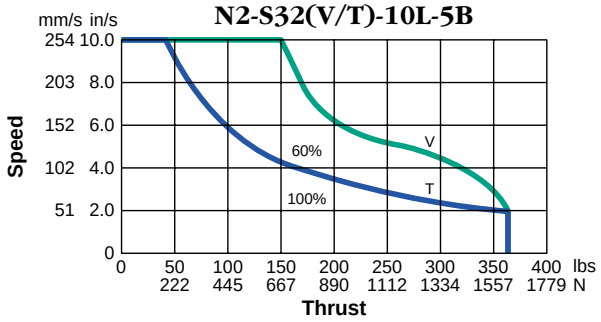
Ball Screw Models

—100% Duty Cycle —60% Duty Cycle

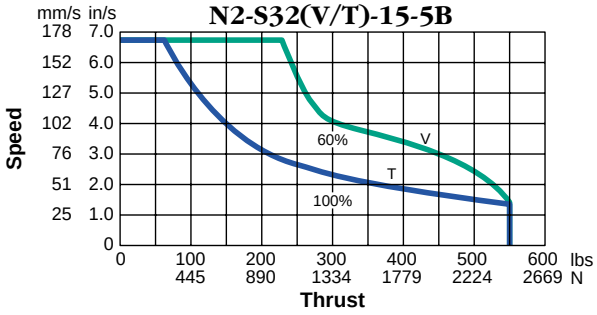
N2-S32(V/T)-10-5B
N2-S32(V/T)-10L-5B



N2-S32(V/T)-10-5B: 1:1 Timing Belt, 5 rev/inch Ballscrew
N2-S32(V/T)-10L-5B: 1:1 Inline Coupling, 5 rev/inch Ballscrew

Min. Backdrive Load	20 lbs	89 N
Repeatability	±0.0005 in	±0.0127 mm

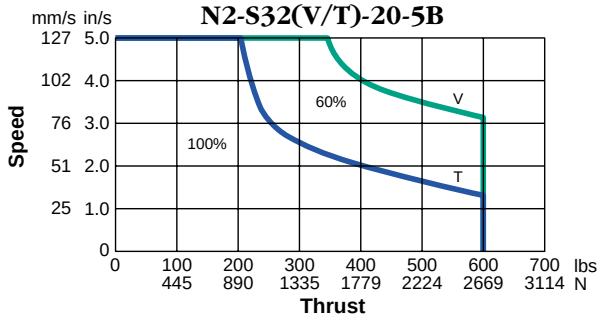
N2-S32(V/T)-15-5B



N2-S32(V/T)-15-5B: 1.5:1 Timing Belt, 5 rev/inch Ballscrew

Min. Backdrive Load	20 lbs	89 N
Repeatability	±0.0005 in	±0.0127 mm

N2-S32(V/T)-20-5B



N2-S32(V/T)-20-5B: 2.5:1 Helical Gear, 5 rev/inch Ballscrew

Min. Backdrive Load	20 lbs	89 N
Repeatability	±0.0005 in	±0.0127 mm

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

5B

15.0	*Critical Speed (in/sec)*
2 thru 18-DB	***Stroke** (in)*
n/a	*Column Load Limit (lb)*

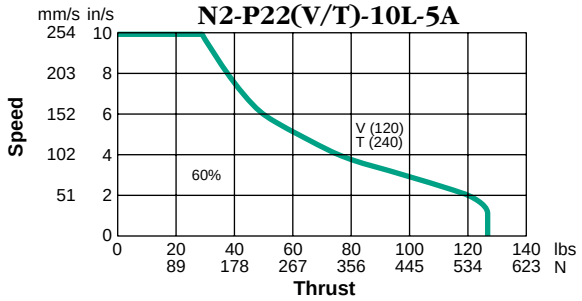
- Performance using S6000 Series, *Next*Step®, and *Smart*Step® Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

Performance

Acme Screw Models

—60% Duty Cycle —30% Duty Cycle

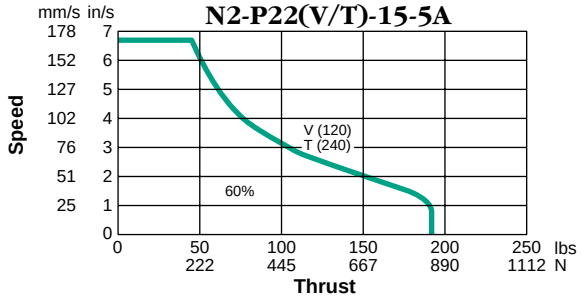
N2-P22(V/T)-10-5A
N2-P22(V/T)-10L-5A



N2-P22(V/T)-10-5A: 1:1 Timing Belt, 5 rev/inch Acme Screw
N2-P22(V/T)-10L-5A: 1:1 Inline Coupling, 5 rev/inch Acme Screw

Min. Backdrive Load	100 lbs	445 N
Repeatability	±0.0005 in	±0.0127 mm

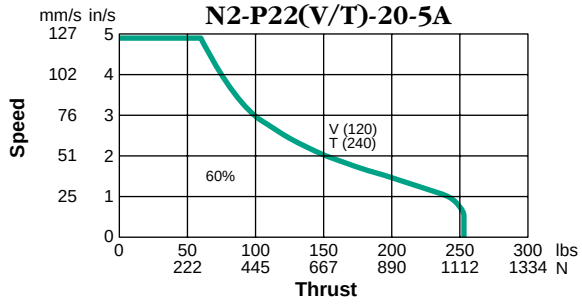
N2-P22(V/T)-15-5A



N2-P22(V/T)-15-5A: 1.5:1 Timing Belt, 5 rev/inch Acme Screw

Min. Backdrive Load	100 lbs	445 N
Repeatability	±0.0005 in	±0.0127 mm

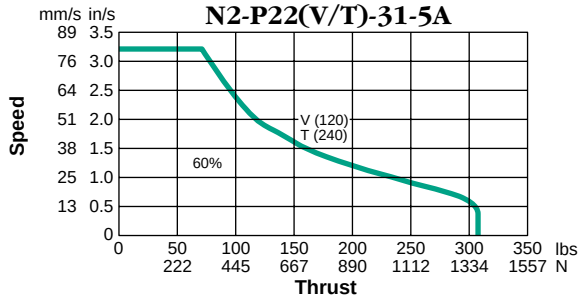
N2-P22(V/T)-20-5A



N2-P22(V/T)-20-5A: 2:1 Timing Belt, 5 rev/inch Acme Screw

Min. Backdrive Load	100 lbs	445 N
Repeatability	±0.0005 in	±0.0127 mm

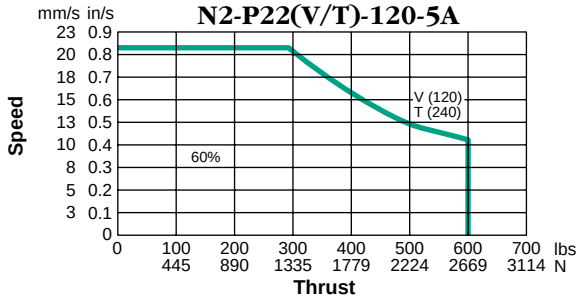
N2-P22(V/T)-31-5A



N2-P22(V/T)-31-5A: 3.1:1 Helical Gear, 5 rev/inch Acme Screw

Min. Backdrive Load	100 lbs	445 N
Repeatability	±0.0005 in	±0.0127 mm

N2-P22(V/T)-120-5A



N2-P22(V/T)-120-5A: 12:1 Helical Gear, 5 rev/inch Acme Screw

Min. Backdrive Load	100 lbs	445 N
Repeatability	±0.0005 in	±0.0127 mm

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

5A

15.0	13.8	*Critical Speed (in/sec)*
2 thru 12	18-DB	***Stroke** (in)*
n/a	n/a	*Column Load Limit (lb)*

- Performance using S6000 Series, *NextStep*, and *SmartStep* Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

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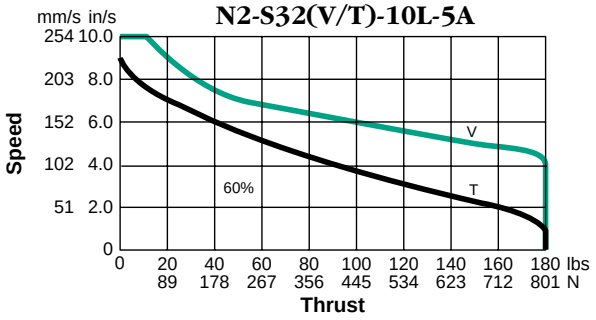
Acme Screw Models

—60% Duty Cycle

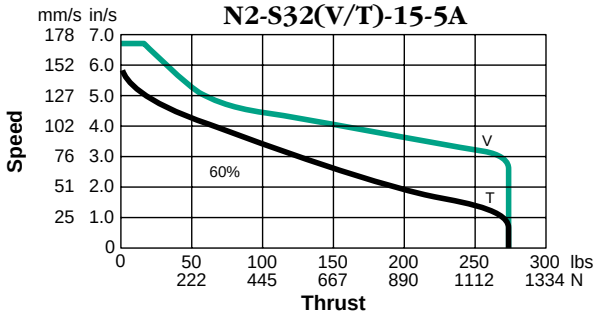
N2-S32(V/T)-10-5A
N2-S32(V/T)-10L-5A



N2-S32(V/T)-10-5A: 1:1 Timing Belt, 5 rev/inch Acme Screw
N2-S32(V/T)-10L-5A: 1:1 Inline Coupling, 5 rev/inch Acme Screw

Min. Backdrive Load	400 lbs	1779 N
Repeatability	±0.0005 in	±0.0127 mm

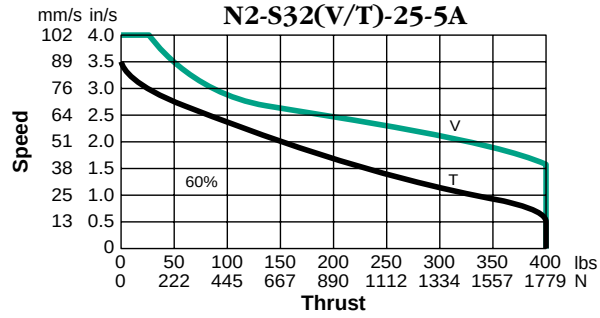
N2-S32(V/T)-15-5A



N2-S32(V/T)-15-5A: 1.5:1 Timing Belt, 5 rev/inch Acme Screw

Min. Backdrive Load	400 lbs	1779 N
Repeatability	±0.0005 in	±0.0127 mm

N2-S32(V/T)-25-5A



N2-S32(V/T)-25-5A: 2.5:1 Helical Gear, 5 rev/inch Acme Screw

Min. Backdrive Load	400 lbs	1779 N
Repeatability	±0.0005 in	±0.0127 mm

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

5A

15.0	13.8	*Critical Speed (in/sec)*
2 thru 12	18-DB	***Stroke** (in)*
n/a	n/a	*Column Load Limit (lb)*

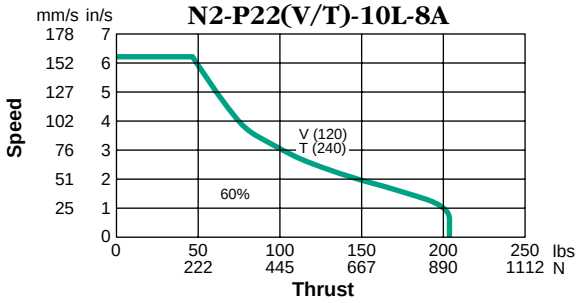
- Performance using S6000 Series, *NextStep*, and *SmartStep* Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

Performance

Acme Screw Models

—60% Duty Cycle —30% Duty Cycle

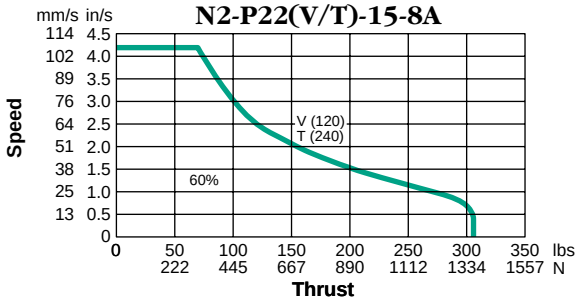
N2-P22(V/T)-10-8A
N2-P22(V/T)-10L-8A



N2-P22(V/T)-10-8A: 1:1 Timing Belt, 8 rev/inch Acme Screw
N2-P22(V/T)-10L-8A: 1:1 Inline Coupling, 8 rev/inch Acme Screw

Min. Backdrive Load	600 lbs	2670 N
Repeatability	±0.0005 in	±0.0127 mm

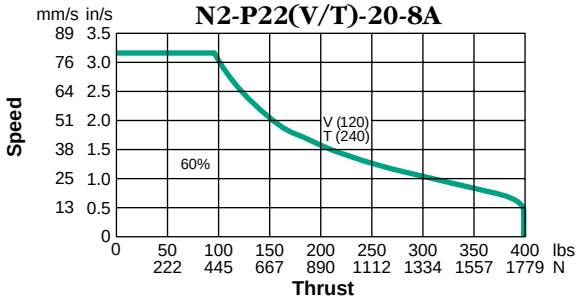
N2-P22(V/T)-15-8A



N2-P22(V/T)-15-8A: 1.5:1 Timing Belt, 8 rev/inch Acme Screw

Min. Backdrive Load	600 lbs	2670 N
Repeatability	±0.0005 in	±0.0127 mm

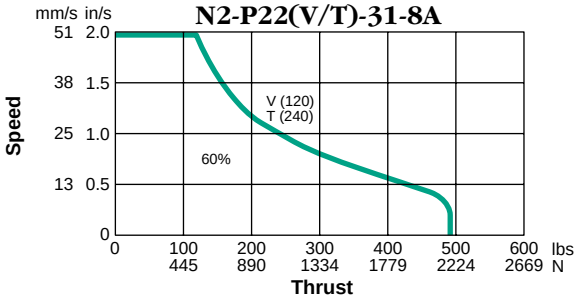
N2-P22(V/T)-20-8A



N2-P22(V/T)-20-8A: 2:1 Timing Belt, 8 rev/inch Acme Screw

Min. Backdrive Load	600 lbs	2670 N
Repeatability	±0.0005 in	±0.0127 mm

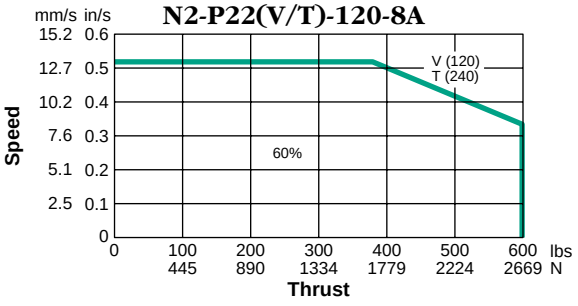
N2-P22(V/T)-31-8A



N2-P22(V/T)-31-8A: 3.1:1 Helical Gear, 8 rev/inch Acme Screw

Min. Backdrive Load	600 lbs	2670 N
Repeatability	±0.0005 in	±0.0127 mm

N2-P22(V/T)-120-8A



N2-P22(V/T)-120-8A: 12:1 Helical Gear, 8 rev/inch Acme Screw

Min. Backdrive Load	600 lbs	2670 N
Repeatability	±0.0005 in	±0.0127 mm

- Performance using S6000 Series, *NextStep*®, and *SmartStep*® Controls.
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

8A

9.4	*Critical Speed (in/sec)*
2 thru 18-DB	***Stroke** (in)*
n/a	*Column Load Limit (lb)*

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

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How To Order

Steps To Ordering A Complete N2-S/P System

The following steps will guide you to a complete N2-S/P Series system for your application.

For help:

- Complete Application Data Form.
- Review the N2-S/P Series specifications on pages A-159 and A-172 to A-178.
- Refer to the Engineering section for selection assistance.
- Consult your local Industrial Devices distributor, or call the factory.

1. Base Model Number

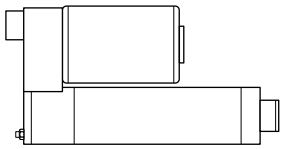
Select the N2-S/P model which provides sufficient thrust and speed for the application, with a comfortable margin of safety. **IDC recommends at least a 30% reserve thrust for step motor driven systems.**

The NS-S/P Series offers three motor wiring Choices.

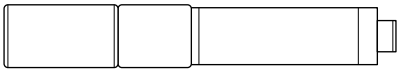
The "T" and the "V" versions include a male quick disconnect receptable, and a 12-foot [3.7 m] motor cable with molded quick disconnect plug.

N2-S/P cylinders with gear or timing belt drive reductions have the motor mounted parallel to the lead screw. With inline units, the motor is always coupled directly to the screw shaft, with no reduction.

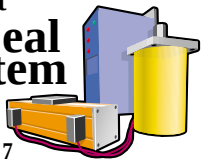
Parallel Models



Inline Models



Make It An IDeal System
See Intro Pages 6 & 7



2. Stroke Length

Seven standard travel lengths are available from 2 to 16.5 inches. Longer lengths and custom in-between lengths also are available. Consult your IDC distributor or the factory for details.

To maximize cylinder life, the thrust tube should not impact either physical end-of-stroke during normal operation. Extra travel length is needed to decelerate the load to a stop when an end-of-travel limit switch is encountered. This extra travel distance depends on load and speed.

Dual Rod End Bearing (-DB) is

- **required above 12 inch stroke**
- **optional with 12 inches and below**

The -DB option reduces actual travel by 1.5 inches (e.g., N2-18-DB has 16.5 in travel).

1 Base Model				2 Stroke Length	3 Cylinder Mounting		4 Rod End		5 Options		
Electric Cylinder	Motor		Drive Ratio	Screw Pitch, Type	(Inches)						
N2	– S/P	–		–	–			—		–	–

Ball Screw Parallel Models	Acme Screw
N2-P22*x*-10-2B-	N2-P22*x*-10-5A-
N2-P22*x*-15-2B-	N2-P22*x*-15-5A-
N2-P22*x*-20-2B-	N2-P22*x*-20-5A-
N2-S32*x*-10-2B-	N2-P22*x*-31-5A-
N2-S32*x*-15-2B-	N2-P22*x*-120-5A-
N2-P22*x*-10-5B-	N2-S32*x*-10-5A-
N2-P22*x*-15-5B-	N2-S32*x*-15-5A-
N2-P22*x*-20-5B-	N2-S32*x*-25-5A-
N2-P22*x*-31-5B-	
N2-P22*x*-120-5B-	N2-P22*x*-10-8A-
	N2-P22*x*-15-8A-
N2-S32*x*-10-5B-	N2-P22*x*-20-8A-
N2-S32*x*-15-5B-	N2-P22*x*-31-8A
N2-S32*x*-25-5B-	

The "*x*" in the motor code is replaced with **N**, **T**, or **V**, where:

N = 8 leads, can be field wired in *series* or *parallel*.

T = *series* winding with factory-wired quick disconnect.

V = *parallel* winding with factory-wired quick disconnect.

Inline Models	
N2-P22*x*-10L-2B	N2-P22*x*-10L-5A
N2-P22*x*-10L-5B	N2-P22*x*-10L-8A
N2-S32*x*-10L-2B	N2-S32*x*-10L-5A
N2-S32*x*-10L-5B	

2
4
6
8
10
12
18 [1] 16.5 in actual travel

[1] 16.5 inches actual stroke with required -DB dual rod end bearing installed.

No Charge

-MF1*	-MS1	-FE2	-DB
-MF2*	-MS6*	-FT1*	
-MF3*	-MT4	-MT1*	
-MP2	-MS2		

Additional Charge

-MP3	-FC2	-BS
	-FS2	-EMK
		-F
		-H
		-L
		-PB
		-W

* Available in metric; add M after designation. Example: MF1 becomes MF1M

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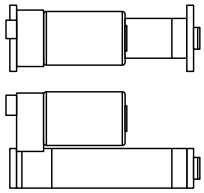
How To Order

3. Cylinder Mounting

Specify any one of these cylinder mounting options. Dimensional drawings start on page A-189.

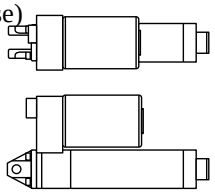
Cylinder base mount options -MP2, -MP3, -MF2, and -MF3 cannot be ordered with in-line models.

MF1, 2, 3 Rectangular Flanges

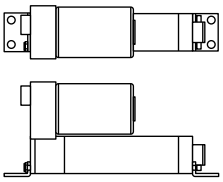


MF1 Front Flange (Metric MF1M)
MF2 Rear Flange (Metric MF2M)
MF3 Both Flanges (Metric MF3M)

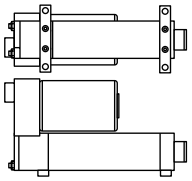
MP2 Rear Clevis (MP3 options includes pivot base)



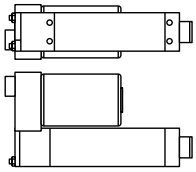
MS1 Side End Angles



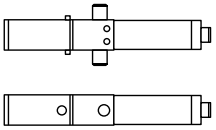
MS2 Side Lugs



MS6 Side Tapped Holes (Metric MS6M)



MT4 Trunnion (Inline Models Only)



Pivot Mount Caution:
When utilizing a pivot mounting option (MP2 or MT4) in conjunction with a pivot rod end (FS2 or FC2), it is recommended that the actuator be extended only to 90–95% of its full stroke. This increases the system's rigidity and extends the life of the guide bearings and rod seal.

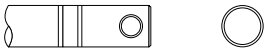
4. Rod Ends

Industrial Devices offers 5 rod end options for N2 Series cylinders.

-FT1 Female Thread

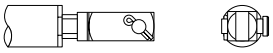
-MT1 Male Thread

-FE2 Female Eye



-FS2 Spherical Joint

-FC2 Clevis



5. Options

See the Options and Accessories section for complete specifications.

-BS Holding Brake
20 in-lb holding brake mounted on the rear lead screw shaft extension. *Not available on inline models or with cylinder base mount options (-MF2, -MF3, -MS1, -MP2, -MP3).*

-DB Dual Rod End Bearing
Increases side load rating. *Reduces actual stroke length by 1.5 inches.*

-EMK Encoder
1000 line incremental encoder mounted on the rear shaft of the motor.

-F Sub-Freezing Environment
For operation to -20°F. *Increases system backlash to 0.025 inches max.*

-H High Temperature
Increases maximum cylinder operating temperature to 180°F. *Note: -F and -H are not compatible.*

-L Linear Potentiometer Output
Linear potentiometer mounted inside the N2 cylinder.

-PB Protective Boot
Protects the thrust tube from solid contaminants and prevents liquids from entering the cylinder through the rod end bearing. *Includes the -W option.* (Not available with –MS1.)

-W Water Resistant Option
Provides protection from light moisture contact with cylinder.

6. Accessories

Magnetic Position Sensors

Position sensors are available for triggering stop, speed/direction change, or end-of-travel.

To maximize cylinder life, IDC recommends the use of end-of-travel limit switches with all cylinders.

Either Reed or Hall Effect (NPN transistor) switches are compatible with IDC controls.

	3m Leads	4m Quick
Reed		
Normally open	PSR-1	PSR-1Q
Normally closed	PSR-2	PSR-2Q
Hall Effect		
Normally open, NPN	PSN-1	PSN-1Q
Normally closed, NPN	PSN-2	PSN-2Q

See page A-240 for more limit switch options, including quick-disconnect versions.

7. S6000 Controls

Details of the S Series controls are in Section G. The N2-S/P is compatible with:

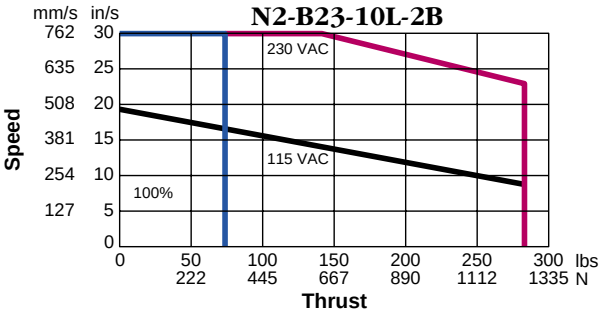
Model	Control Description
NextStep®	Microstepping Drive
S6002	2-axis Drive
SmartStep®	*IDeal*™ programmable
S6961	*IDeal*™ programmable
S6962	2-axis *IDeal*™ programmable

Performance

Ball Screw Models

—100% Duty Cycle —Intermittent (<2 sec)

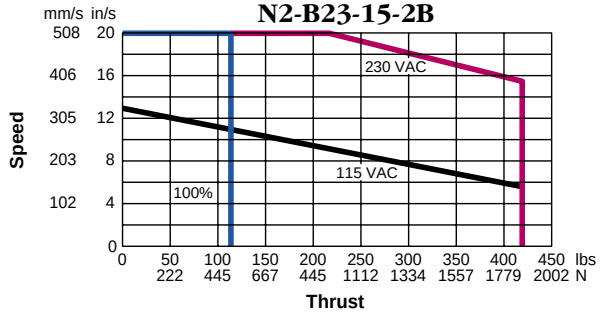
N2-B23-10-2B and N2-B23-10L-2B



N2-B23-10-2B: 1:1 Timing Belt, 2 rev/inch Ballscrew
N2-B23-10L-2B: 1:1 Inline Coupling, 2 rev/inch Ballscrew

Min. Backdrive Load	10 lbs	45 N
Max. No-Load Accel	700 in/s²	17.8 m/s²
Repeatability	±0.001 in	±0.025 mm

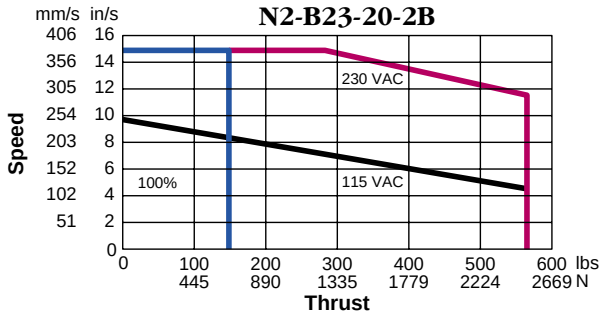
N2-B23-15-2B



N2-B23-15-2B: 1.5:1 Timing Belt, 2 rev/inch Ballscrew

Min. Backdrive Load	10 lbs	45 N
Max. No-Load Accel	770 in/s²	19.6 m/s²
Repeatability	±0.001 in	±0.025 mm

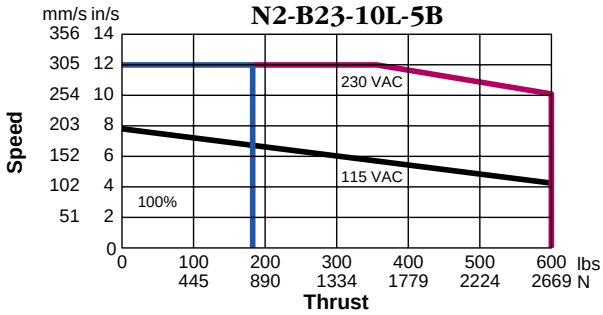
N2-B23-20-2B



N2-B23-20-2B: 2:1 Timing Belt, 2 rev/inch Ballscrew

Min. Backdrive Load	10 lbs	45 N
Max. No-Load Accel	760 in/s²	19.3 m/s²
Repeatability	±0.001 in	±0.025 mm

N2-B23-10-5B and N2-B23-10L-5B



N2-B23-10-5B: 1:1 Timing Belt, 5 rev/inch Ballscrew
N2-B23-10L-5B: 1:1 Inline Coupling, 5 rev/inch Ballscrew

Min. Backdrive Load	20 lbs	89 N
Max. No-Load Accel	303 in/s²	7.7 m/s²
Repeatability	±0.001 in	±0.025 mm

- Performance using B8000 Series Controls (not B8501).
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

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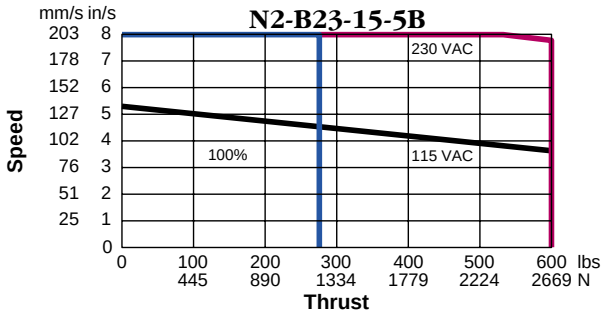
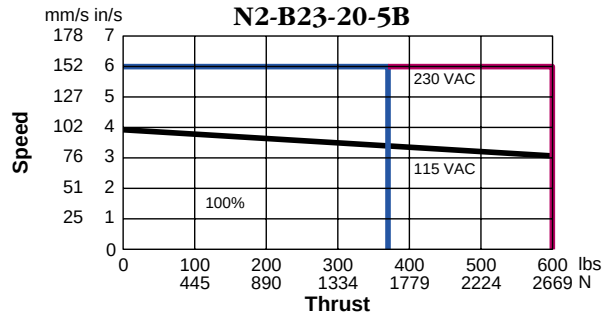
Ball Screw Models

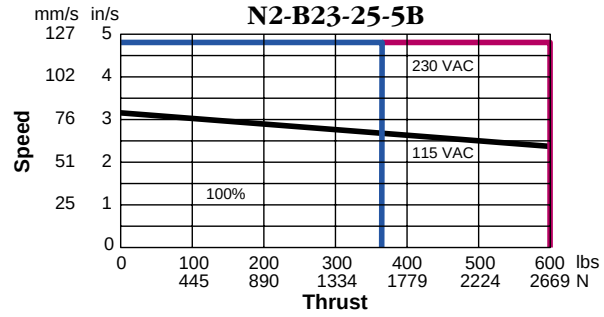
—100% Duty Cycle —Intermittent (<2 sec)



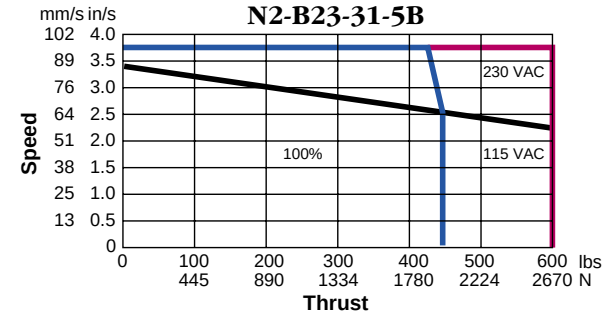
N2-B23-15-5B: 1.5:1 Timing Belt, 5 rev/inch Ballscrew		
Min. Backdrive Load	20 lbs	89 N
Max. No-Load Accel	340 in/s²	7.7 m/s²
Repeatability	±0.001 in	±0.025 mm



N2-B23-20-5B: 2:1 Timing Belt, 5 rev/inch Ballscrew		
Min. Backdrive Load	20 lbs	89 N
Max. No-Load Accel	320 in/s²	8.1 m/s²
Repeatability	±0.001 in	±0.025 mm



N2-B23-25-5B: 2.5:1 Helical Gears, 5 rev/inch Ballscrew		
Min. Backdrive Load	20 lbs	89 N
Max. No-Load Accel	295 in/s²	7.5 m/s²
Repeatability	±0.001 in	±0.025 mm



N2-B23-31-5B: 3.1:1 Helical Gears, 5 rev/inch Ballscrew		
Min. Backdrive Load	20 lbs	89 N
Max. No-Load Accel	260 in/s²	6.7 m/s²
Repeatability	±0.001 in	±0.025 mm

2B

30.0 *Critical Speed (in/sec)*

2 thru 18-DB ***Stroke** (in)*

n/a *Column Load Limit (lb)*

5B

15.0 *Critical Speed (in/sec)*

2 thru 18-DB ***Stroke** (in)*

n/a *Column Load Limit (lb)*

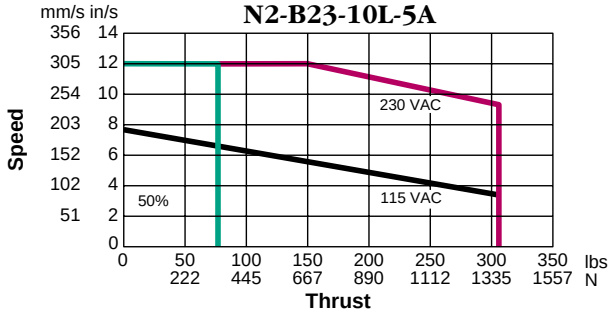
- Consider leadscrew **critical speed** and c**olumn load limits** when specifying longer lengths.

Performance

Acme Screw Models

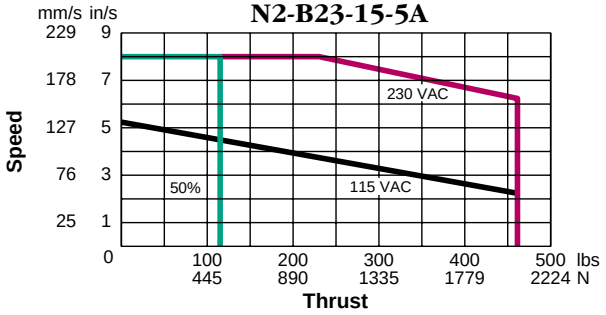
—50% Duty Cycle —30% Duty Cycle —10% Duty Cycle —Intermittent (<2 sec)

N2-B23-10-5A and N2-B23-10L-5A



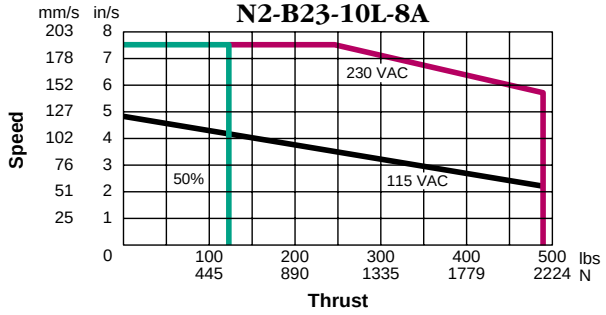
N2-B23-10-5A: 1:1 Timing Belt, 5 rev/inch Acme Screw N2-B23-10L-5A: 1:1 Inline Coupling, 5 rev/inch Acme Screw		
Min. Backdrive Load	400 lbs	1779 N
Max. No-Load Accel	300 in/s²	7.7 m/s²
Repeatability	±0.001 in	±0.025 mm

N2-B23-15-5A



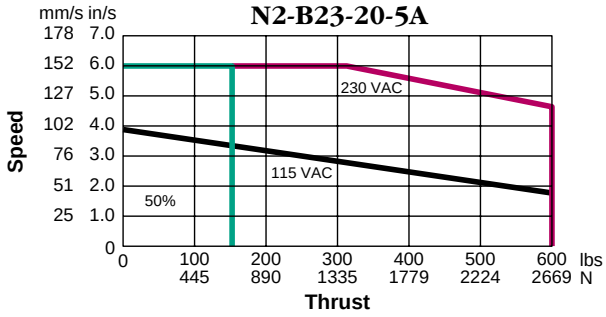
N2-B23-15-5A: 1.5:1 Timing Belt, 5 rev/inch Acme Screw		
Min. Backdrive Load	400 lbs	1779 N
Max. No-Load Accel	330 in/s²	8.36 m/s²
Repeatability	±0.001 in	±0.025 mm

N2-B23-10-8A and N2-B23-10L-8A



N2-B23-10-8A: 1:1 Timing Belt, 8 rev/inch Acme Screw N2-B23-10L-8A: 1:1 Inline Coupling, 8 rev/inch Acme Screw		
Min. Backdrive Load	600 lbs	2670 N
Max. No-Load Accel	190 in/s²	4.8 m/s²
Repeatability	±0.001 in	±0.025 mm

N2-B23-20-5A



N2-B23-20-5A: 2:1 Timing Belt, 5 rev/inch Acme Screw		
Min. Backdrive Load	400 lbs	1779 N
Max. No-Load Accel	320 in/s²	8.1 m/s²
Repeatability	±0.001 in	±0.025 mm

- Performance using B8000 Series Controls (not B8501).
- Duty Cycle is percentage of actuator "on time" or movement over 10 minute interval.

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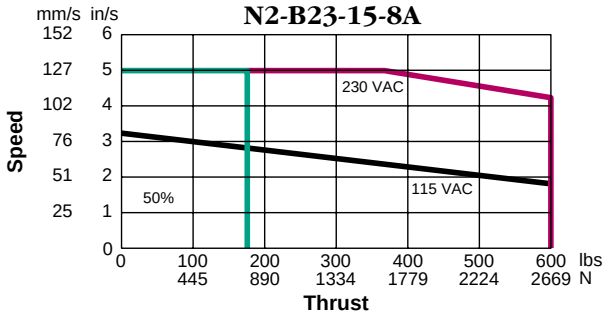
Acme Screw Models

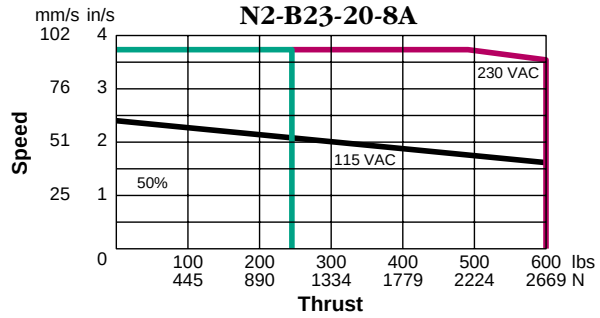
—50% Duty Cycle —30% Duty Cycle —10% Duty Cycle —Intermittent (<2 sec)

N2-B23-15-8A



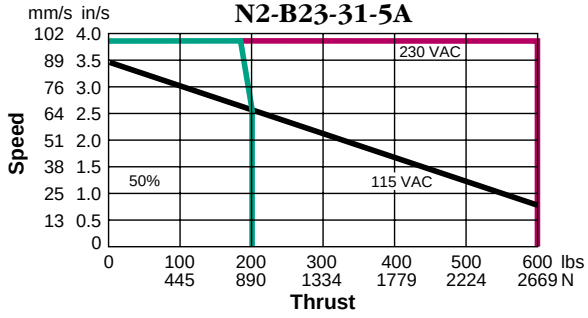
N2-B23-15-8A: 1.5:1 Timing Belt, 8 rev/inch Acme Screw		
Min. Backdrive Load	600 lbs	2670 N
Max. No-Load Accel	210 in/s²	5.2 m/s²
Repeatability	±0.001 in	±0.025 mm

N2-B23-20-8A



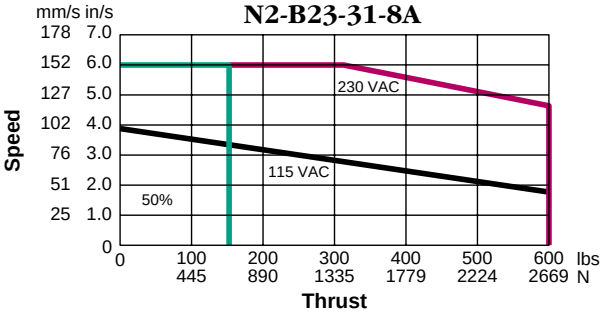
N2-B23-20-8A: 2:1 Timing Belt, 8 rev/inch Acme Screw		
Min. Backdrive Load	600 lbs	2670 N
Max. No-Load Accel	200 in/s²	5.0 m/s²
Repeatability	±0.001 in	±0.025 mm

N2-B23-31-5A



N2-B23-31-5A: 3.1:1 Helical Gear, 5 rev/inch Acme Screw		
Min. Backdrive Load	400 lbs	1779 N
Max. No-Load Accel	260 in/s²	6.7 m/s²
Repeatability	±0.001 in	±0.025 mm

N2-B23-31-8A



N2-B23-31-8A: 3.1:1 Helical Gear, 8 rev/inch Acme Screw		
Min. Backdrive Load	600 lbs	2670 N
Max. No-Load Accel	165 in/s²	4.2 m/s²
Repeatability	±0.001 in	±0.025 mm

5A

15.0	13.8	*Critical Speed (in/sec)*
2 thru 12	18-DB	***Stroke** (in)*
n/a	n/a	*Column Load Limit (lb)*

8A

9.4	*Critical Speed (in/sec)*
2 thru 18-DB	***Stroke** (in)*
n/a	*Column Load Limit (lb)*

- Consider leadscrew **critical speed** and **column load limits** when specifying longer lengths.

How To Order

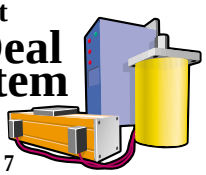
Steps To Ordering A Complete N2-B System

The following steps will guide you to a complete N2-B Series system for your application.

For help:

- Complete Application Data Form.
- Review the N2-B Series specifications on pages A-159 and A-182 to A-185.
- Refer to the Engineering section for selection assistance.
- Consult your local Industrial Devices distributor, or call the factory.

Make It An IDeal System
See Intro Pages 6 & 7

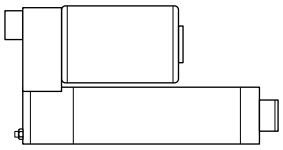


1. Base Model Number

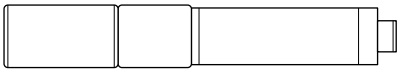
Select the N2-B model which provides sufficient thrust and speed for the application, with a comfortable margin of safety. Refer to the N2-B Speed vs. Thrust curves in this section. Be sure to consider duty cycle, side loading, back driving, and the other design considerations from the IDC Application Data From.

N2-B cylinders with gear or timing belt drive reductions have the motor mounted parallel to the lead screw. With in-line units, the motor is always coupled directly to the screw shaft, with no reduction.

Parallel Models



In-Line Models



Note: NB motors include an encoder.

2. Stroke Length

Seven standard travel lengths are available from 2 to 16.5 inches. Longer lengths and custom in-between lengths are also available. Consult your IDC distributor or the factory for details.

To maximize cylinder life, the thrust tube should not impact either physical end-of-stroke during normal operation. Extra travel length is needed to decelerate the load to a stop when an end-of-travel limit switch is encountered. This extra travel distance depends on load and speed.

Dual Rod End Bearing (-DB) is

- **required above 12 inch stroke**
- **optional with 12 inches and below**

The -DB option reduces actual travel by 1.5 inches (e.g., N2-18-DB has 16.5 in travel).

1 Base Model				2 Stroke Length	3 Cylinder Mounting	4 Rod End		5 Options		
Electric Cylinder	Motor	Drive Ratio	Screw Pitch, Type	(Inches)						
N2	B23									

Parallel Models

Ball Screw	Acme Screw
N2-B23-10-2B-	N2-B23-10-5A-
N2-B23-15-2B-	N2-B23-15-5A-
N2-B23-20-2B-	N2-B23-20-5A-
	N2-B23-31-5A-
N2-B23-10-5B-	
N2-B23-15-5B-	N2-B23-10-8A-
N2-B23-20-5B-	N2-B23-15-8A-
N2-B23-31-5B-	N2-B23-20-8A-
	N2-B23-31-8A

Inline Models

N2-B23-10L-2B	N2-B23-10L-5A
N2-B23-10L-5B	N2-B23-10L-8A

2 Stroke Length (Inches)

2
4
6
8
10
12
18 [1] 16.5 in actual travel

[1] 16.5 inches actual stroke with required -DB dual rod end bearing installed.

3 Cylinder Mounting

No Charge

-MF1*	-MS1	-FE2	-DB
-MF2*	-MS6*	-FT1*	
-MF3*	-MT4	-MT1*	
-MP2	-MS2		

Additional Charge

-MP3	-FC2	-BS
	-FS2	-F
		-H
		-L
		-PB
		-W

4 Rod End

5 Options

* Available in metric; add M after designation. Example: MF1 becomes MF1M

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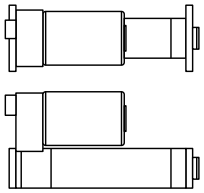
How To Order

3. Cylinder Mounting

Specify any one of these cylinder mounting options. Dimensional drawings start on page A-189.

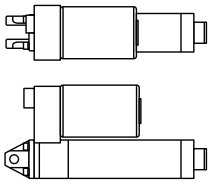
Cylinder base mount options -MP2, -MP3, -MF2, and -MF3 cannot be ordered with in-line models.

MF1, 2, 3 Rectangular Flanges

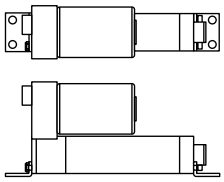


MF1 Front Flange (Metric MF1M)
MF2 Rear Flange (Metric MF2M)
MF3 Both Flanges (Metric MF3M)

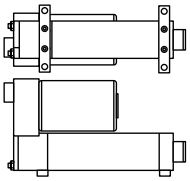
MP2 Rear Clevis (MP3 option includes the pivot base)



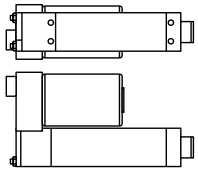
MS1 Side End Angles



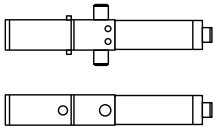
MS2 Side Lugs



MS6 Side Tapped Holes (Metric MS6M)



MT4 Trunnion (Inline Models Only)

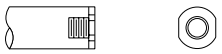


Pivot Mount Caution:
When utilizing a pivot mounting option (MP2 or MT4) in conjunction with a pivot rod end (FS2 or FC2), it is recommended that the actuator be extended only to 90–95% of its full stroke. This increases the system's rigidity and extends the life of the guide bearings and rod seal.

4. Rod Ends

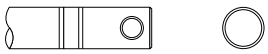
Industrial Devices offers 5 rod end options for N2-B Series cylinders.

-FT1 Female Thread



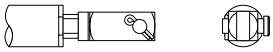
-MT1 Male Thread

-FE2 Female Eye



-FS2 Spherical Joint

-FC2 Clevis



5. Options

See the Options and Accessories section for complete specifications.

-BS Holding Brake
20 in-lb holding brake mounted on the rear lead screw shaft extension. *Not available on inline models or with cylinder base mount options (-MF2, -MF3, -MS1, -MP2, -MP3).*

-DB Dual Rod End Bearing
Increases side load rating. *Reduces actual stroke length by 1.5 inches.*

-EMK Encoder
1000 line incremental encoder mounted on the rear shaft of the motor.

-F Sub-Freezing Environment
For operation to -20°F. *Increases system backlash to 0.025 inches max.*

-H High Temperature
Increases maximum cylinder operating temperature to 180°F. *Note: -F and -H are not compatible.*

-L Linear Potentiometer Output
Linear potentiometer mounted inside the N2-B cylinder.

-PB Protective Boot
Protects the thrust tube from solid contaminants and prevents liquids from entering the cylinder through the rod end bearing. *Includes the -W option.* (Not available with –MS1.)

-W Water Resistant Option
Provides protection from light moisture contact with cylinder.

6. Accessories

Magnetic Position Sensors

Position sensors are available for triggering stop, speed/direction change, or end-of-travel.

To maximize cylinder life, IDC recommends the use of end-of-travel limit switches with all cylinders.

Either Reed or Hall Effect (NPN transistor) switches are compatible with IDC controls.

	3m Leads	4m Quick
Reed		
Normally open	PSR-1	PSR-1Q
Normally closed	PSR-2	PSR-2Q
Hall Effect		
Normally open, NPN	PSN-1	PSN-1Q
Normally closed, NPN	PSN-2	PSN-2Q

See page A-240 for more limit switch options, including quick-disconnect versions.

7. B8000 SeriesControls

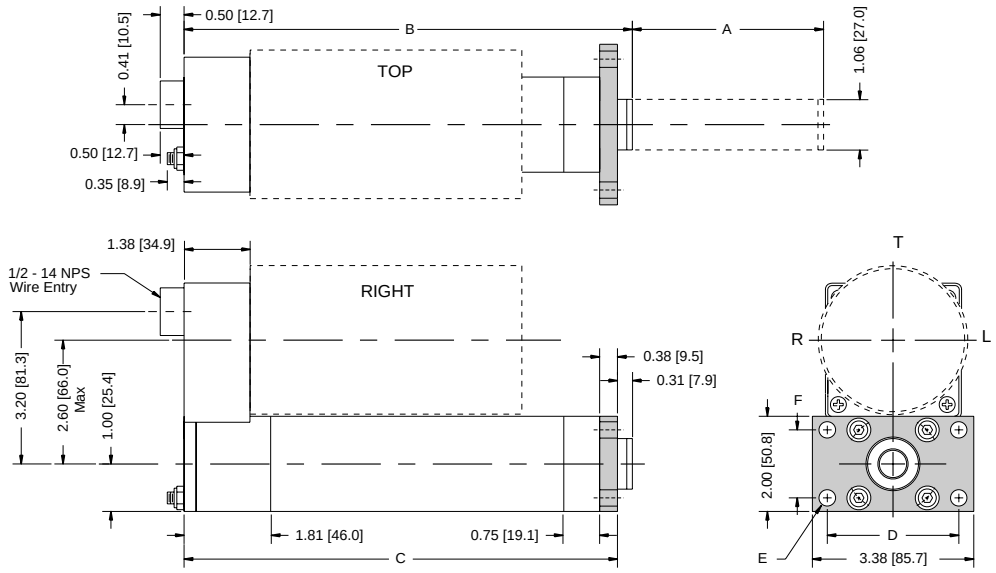
Details of the B8000 Series controls are in Section H. The N2-B is compatible with:

Model	Control Description
B8001	Digital Drive
B8501	Analog Position
B8961	*IDeal*™ programmable servo Smart Drive
B8962	2-axis *IDeal*™ Smart Drive

Dimensions

MF1 Head Rectangular Flange Mounting

Parallel



- For AutoCAD® DXF drawings, go to our website, or call the factory for a diskette
- For motor dimensions, go to pages A-194 to A-198
- For rod-end dimensions, go to page A-199

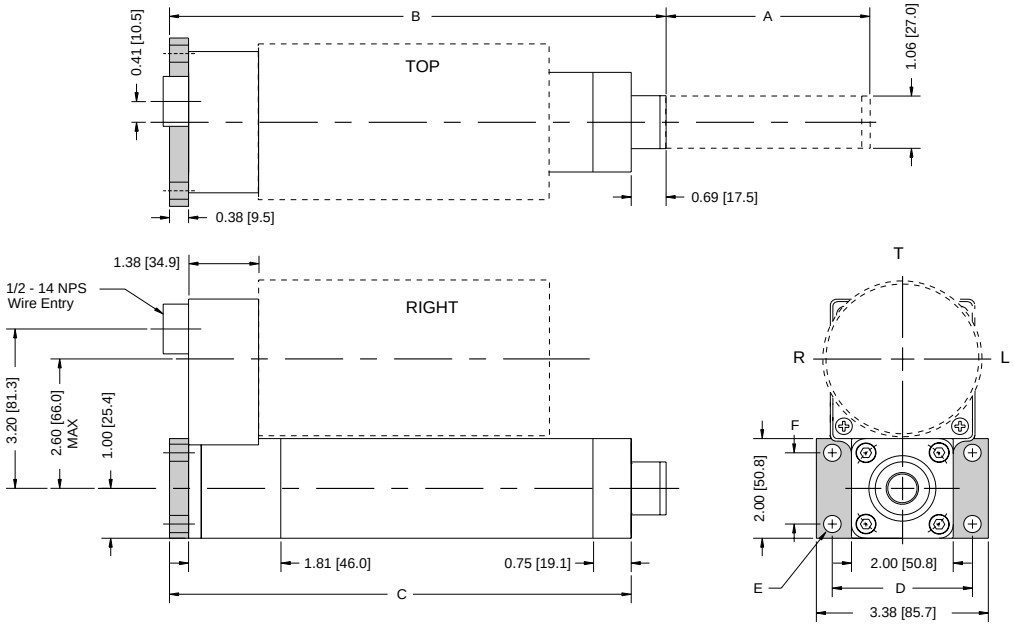
	English Option	Metric Option
	MF1 (inches)	MF1M (mm)
D	2.75	72*
E	0.34	9*
F	1.43	36*

* Meets ISO 40mm bore standard

A Strokes	2.00	(50.8)	8.00	(203.2)	24.00	(609.6)	**B Retract**	stroke + 5.37 (136.4)
	4.00	(101.6)	10.00	(254.0)			**C Mounting**	stroke + 5.06 (128.5)
	6.00	(152.4)	12.00	(304.8)				

MF2 Cap Rectangular Flange Mounting

Parallel



	English Option	Metric Option
	MF2 (inches)	MF2M (mm)
D	2.75	72*
E	0.34	9*
F	1.43	36*

* Meets ISO 40mm bore standard

A Strokes	2.00	(50.8)	8.00	(203.2)	24.00	(609.6)	**B Retract**	stroke + 5.75 (146.1)
	4.00	(101.6)	12.00	(304.8)			**C Mounting**	stroke + 5.06 (128.5)
	6.00	(152.4)	18.00	(457.2)				

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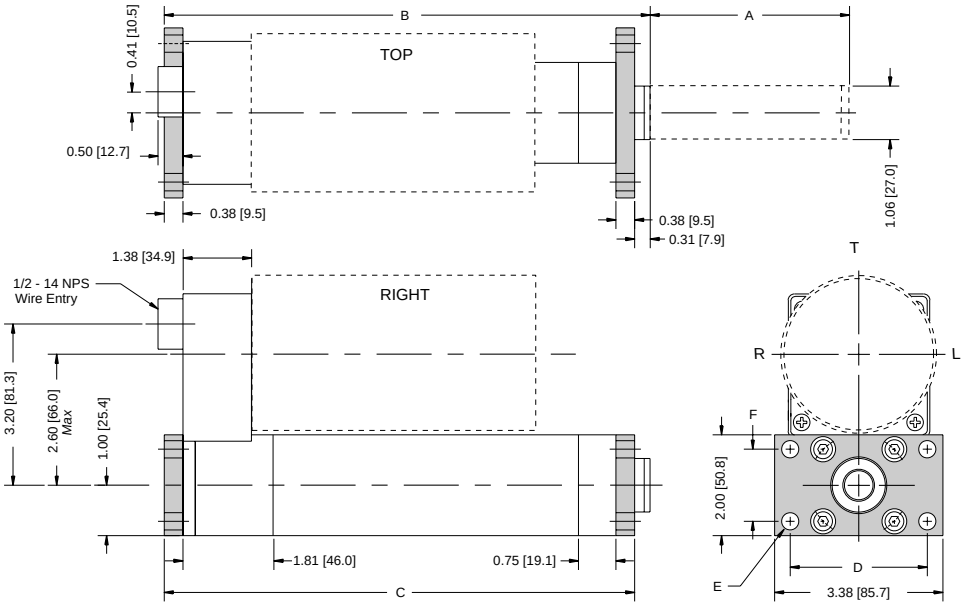
Dimensions

MF3 Rectangular Mounting Flanges

Parallel



- For AutoCAD® DXF drawings, go to our website, or call the factory for a diskette
- For motor dimensions, go to pages A-194 to A-198
- For rod-end dimensions, go to page A-199

	English Option	Metric Option
	MF3 (inches)	MF3M (mm)
D	2.75	72*
E	0.34	9*
F	1.43	36*

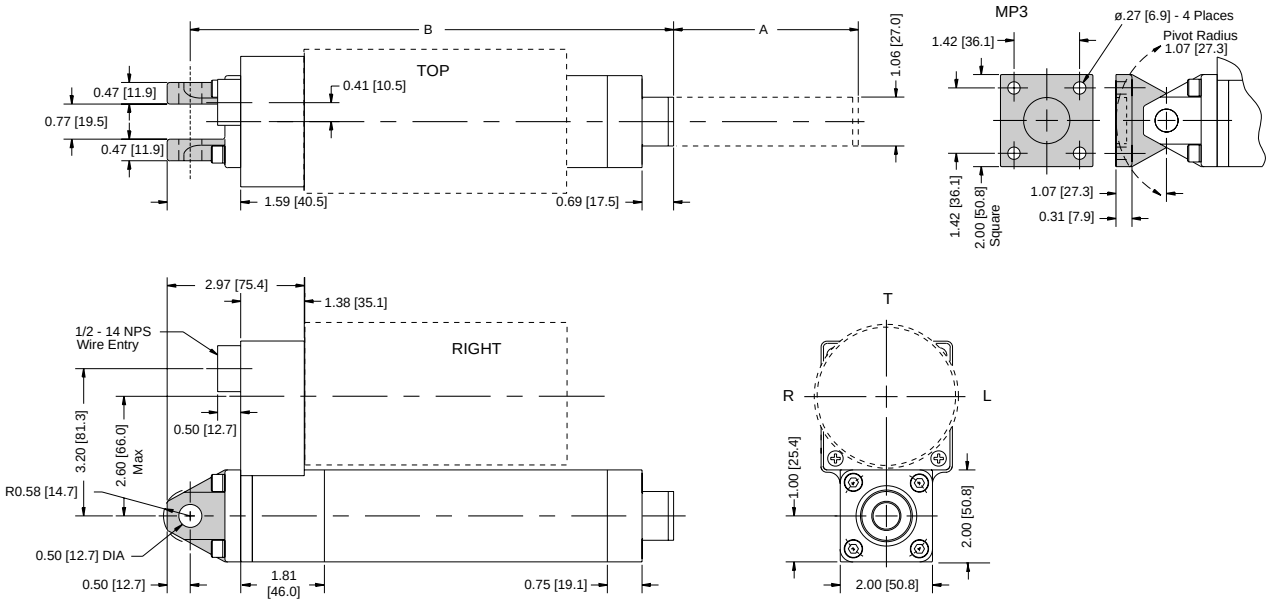
* Meets ISO 40mm bore standard

A Strokes	2.00	(50.8)	8.00	(203.2)	24.00	(609.6)	**B Retract**	stroke +	5.75 (146.1)
	4.00	(101.6)	12.00	(304.8)			**C Mounting**	stroke +	5.44 (138.2)
	6.00	(152.4)	18.00	(457.2)					

MP2 Cap Double Clevis Mounting

Parallel

Pivot Base (MP3 only)

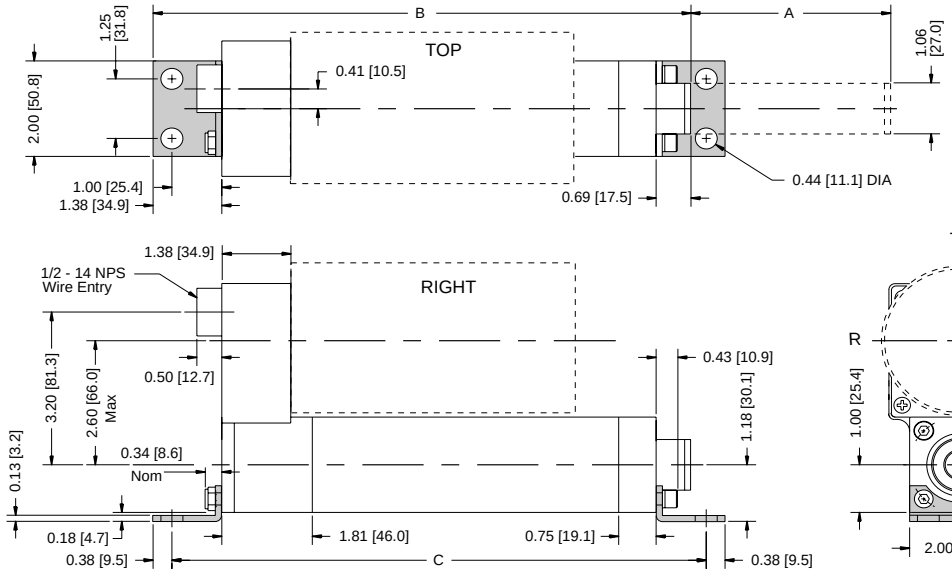


A Strokes	2.00	(50.8)	8.00	(203.2)	24.00	(609.6)	**B Retract**	stroke +	6.47 (164.3)
	4.00	(101.6)	12.00	(304.8)					
	6.00	(152.4)	18.00	(457.2)					

Dimensions

MS1 Side End Angles Mounting

Parallel

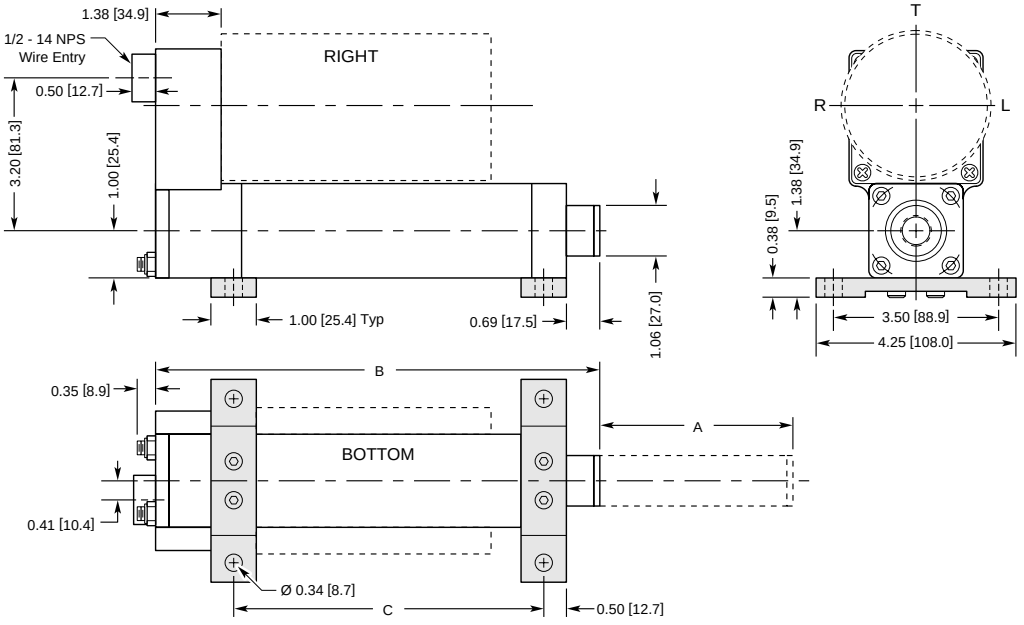


- For AutoCAD® DXF drawings, go to our website, or call the factory for a diskette
- For motor dimensions, go to pages A-194 to A-198
- For rod-end dimensions, go to page A-199

A Strokes	2.00	(50.8)	8.00	(203.2)	24.00	(609.6)	**B Retract**	stroke +	6.75 (171.5)
	4.00	(101.6)	12.00	(304.8)			**C Mounting**	stroke +	6.69 (169.9)
	6.00	(152.4)	18.00	(457.2)					

MS2 Side Lugs

Parallel



A Strokes	2.00	(50.8)	8.00	(203.2)	24.00	(609.6)	**B Retract**	stroke +	5.37 (136.4)
	4.00	(101.6)	12.00	(304.8)			**C Mounting**	stroke +	2.56 (65.0)
	6.00	(152.4)	18.00	(457.2)					

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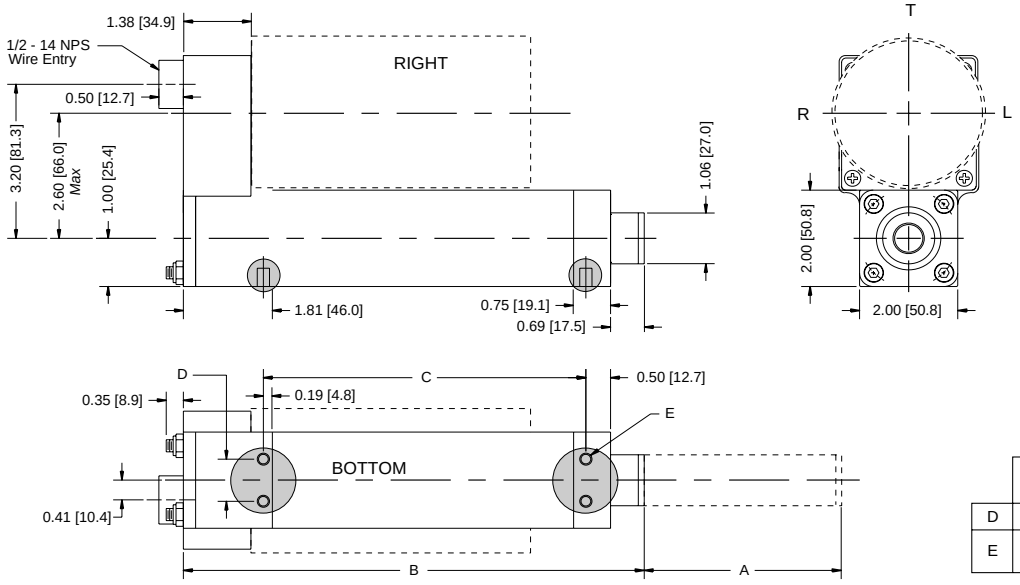
Dimensions

MS6 Side Tapped Mounting

Parallel



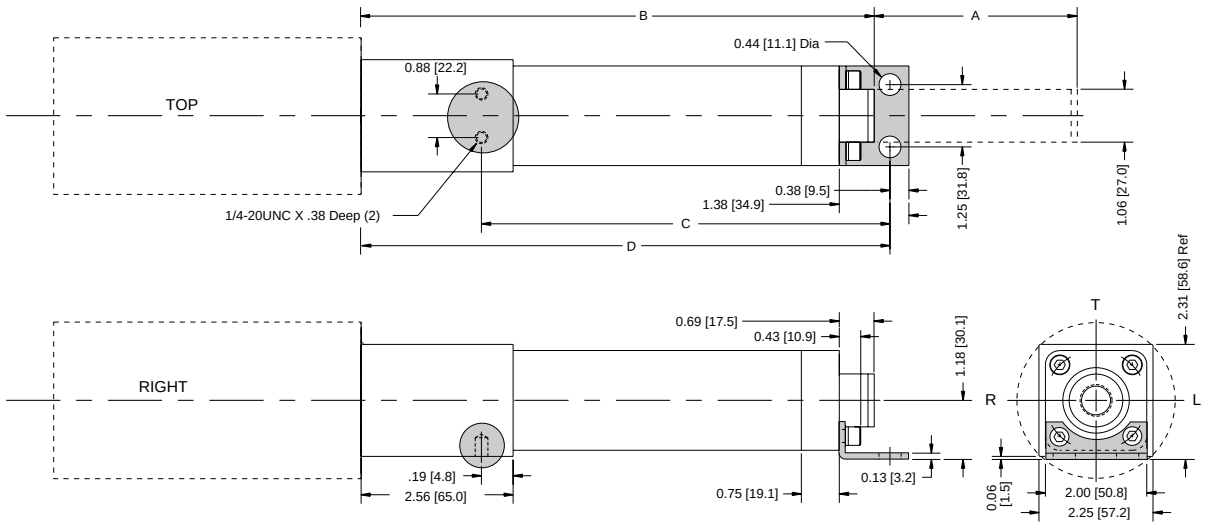
	English Option	Metric Option
	MS6 (inches)	MS6M (mm)
D	0.88	16
E	1/4-20 UNC x 0.38 deep	M6 x 1 x 8 deep

- For AutoCAD® DXF drawings, go to our website, or call the factory for a diskette
- For motor dimensions, go to pages A-194 to A-198
- For rod-end dimensions, go to page A-199

A Strokes	2.00	(50.8)	8.00	(203.2)	24.00	(609.6)	**B Retract**	stroke +	5.37 (136.4)
	4.00	(101.6)	12.00	(304.8)			**C Mounting**	stroke +	2.56 (65.0)
	6.00	(152.4)	18.00	(457.2)					

MS1 Side End Angles Mounting

Inline



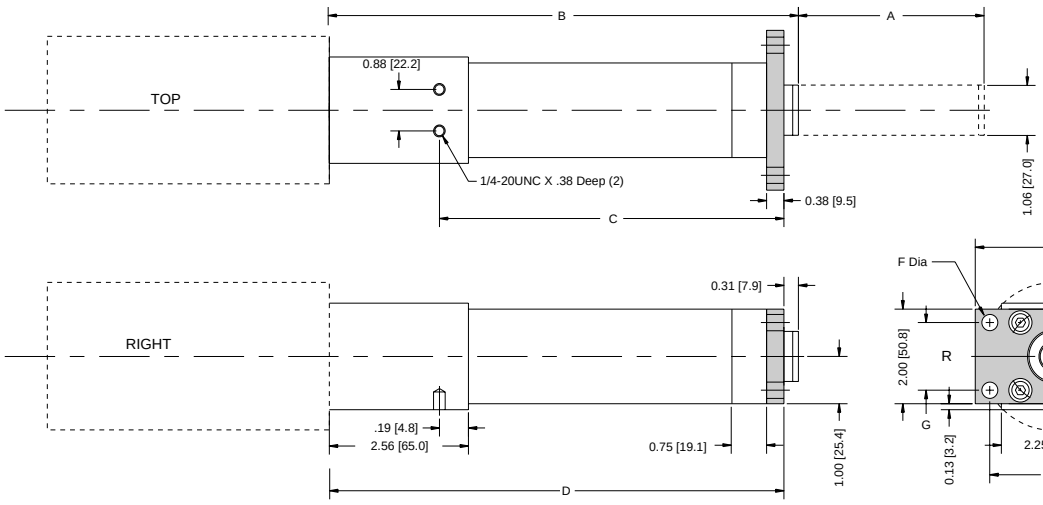
A Strokes	2.00	(50.8)	8.00	(203.2)	24.00	(609.6)	**B Retract**	stroke +	6.12 (155.4)
	4.00	(101.6)	12.00	(304.8)			**C Mounting**	stroke +	4.06 (103.1)
	6.00	(152.4)	18.00	(457.2)			**D Overall**	stroke +	6.43 (163.2)

Dimensions

MF1 Head Rectangular Flange

Inline

- For AutoCAD® DXF drawings, go to our website, or call the factory for a diskette
- For motor dimensions, go to pages A-194 to A-198
- For rod-end dimensions, go to page A-199



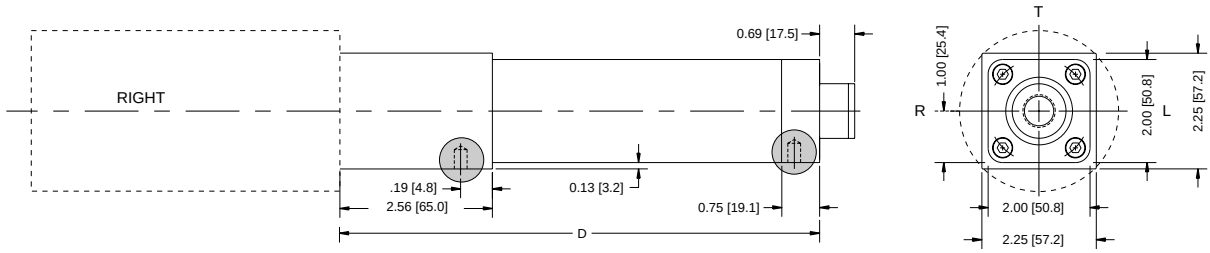
	English Option	Metric Option
	MF1 (inches)	MF1M (mm)
E	2.75	72*
F	0.34	9*
G	1.43	36*
H	3.38	85.7*

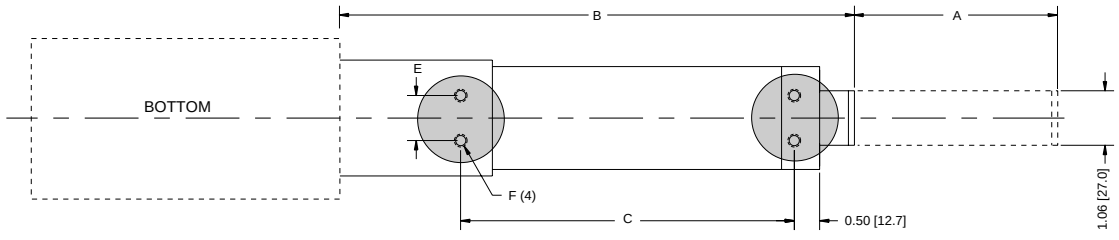
* Meets ISO 40mm bore standard

A Strokes	2.00	(50.8)	8.00	(203.2)	24.00	(609.6)	**B Retract**	stroke +	6.12 (155.4)
	4.00	(101.6)	12.00	(304.8)			**C Mounting**	stroke +	3.44 (87.4)
	6.00	(152.4)	18.00	(457.2)			**D Overall**	stroke +	5.81 (147.5)

MS6 Side Tapped Mounting

Inline





	English Option	Metric Option
	MS6 (inches)	MS6M (mm)
E	0.88	16
F	1/4-20 UNC x 0.38 deep	M6 x 1 x 8 deep

A Strokes	2.00	(50.8)	8.00	(203.2)	24.00	(609.6)	**B Retract**	stroke +	6.12 (155.4)
	4.00	(101.6)	12.00	(304.8)			**C Mounting**	stroke +	2.56 (65.0)
	6.00	(152.4)	18.00	(457.2)			**D Overall**	stroke +	5.43 (137.8)

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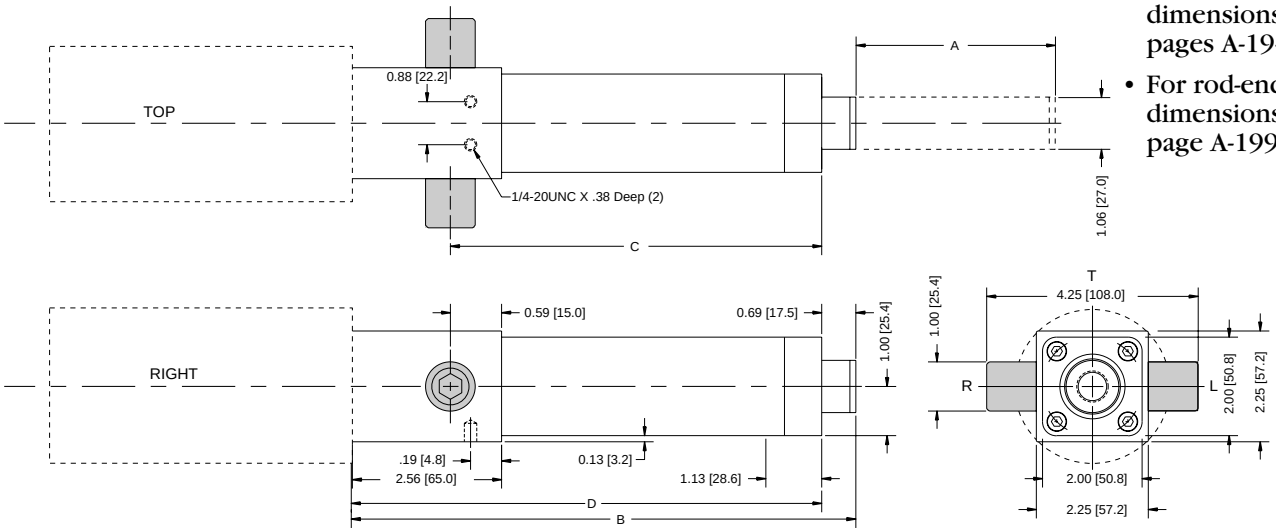
Dimensions

MT4 Trunnion Mounting

Inline

The MT4 mounting replaces the identical MT2 mounting with the same dimensions. The name was changed to be consistent with the EC Series.

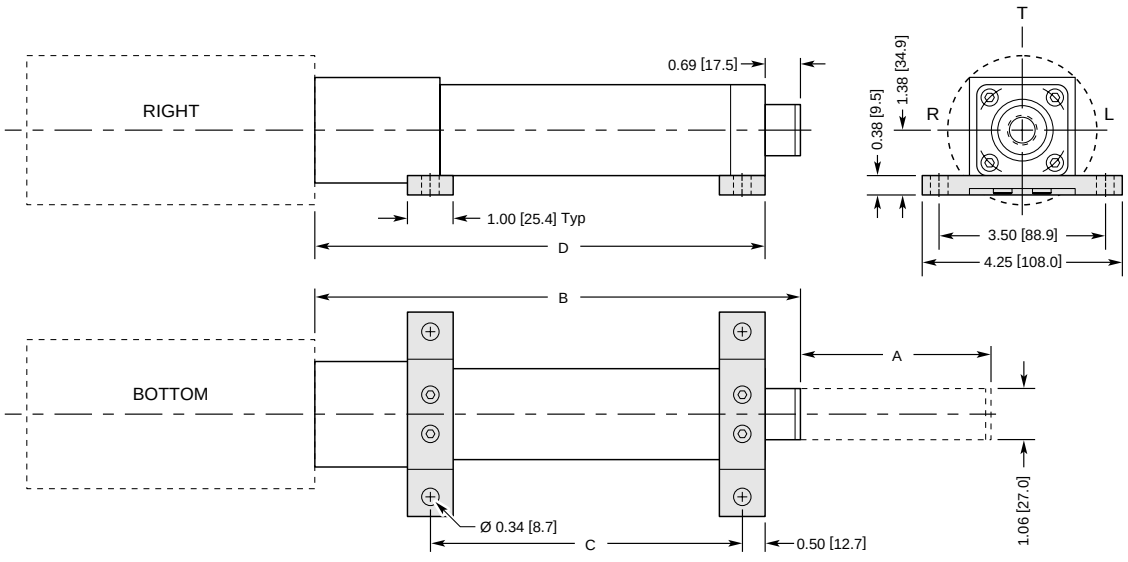
- For AutoCAD® DXF drawings, go to our website, or call the factory for a diskette
- For motor dimensions, go to pages A-194 to A-198
- For rod-end dimensions, go to page A-199



A Strokes	2.00	(50.8)	8.00	(203.2)	24.00	(609.6)	B Retract	stroke +	6.12	(155.4)
	4.00	(101.6)	12.00	(304.8)			C Mounting	stroke +	3.47	(88.1)
	6.00	(152.4)	18.00	(457.2)			D Overall	stroke +	5.43	(137.8)

MS2 Side Foot Mounting

Inline



A Strokes	2.00	(50.8)	8.00	(203.2)	24.00	(609.6)	B Retract	stroke +	6.12	(155.4)
	4.00	(101.6)	12.00	(304.8)			C Mounting	stroke +	2.56	(65.0)
	6.00	(152.4)	18.00	(457.2)			D Overall	stroke +	5.43	(137.9)

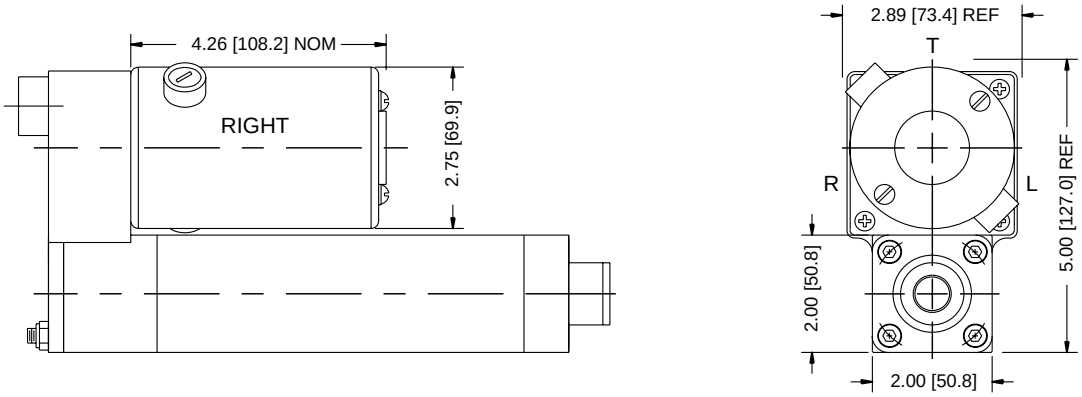
Motor Specifications

N2-D Series — Permanent magnet 2-pole, 24 volt DC motor

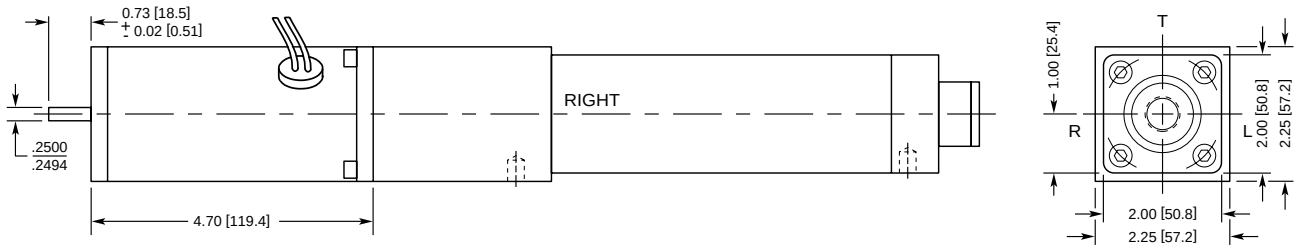
Winding Data	D Motor
Inductance	1.8 mH
Resistance	1.0
Torque Constant	8.8 oz-in/Amp
Voltage Constant	6.5 V/krpm
Torque	
Continuous	39.6 oz-in (4.5 Amps)
Peak	88 oz-in (10 Amps)
Rotor Inertia	0.018 oz-in-sec^2
Connections	2 leads, 6 inch [150 mm] length -Q Quick Disconnect option: 3 contact receptacle in anodized or painted aluminum shell, includes 12 ft [3.7 m] cable with molded plug.
Temperature	180°F [82°C] maximum allowable motor case temperature Actual motor case temperature is ambient, duty cycle, speed and load dependent. Refer to speed vs. thrust curves for system duty ratings.

D Motor Dimensions

Parallel



Inline



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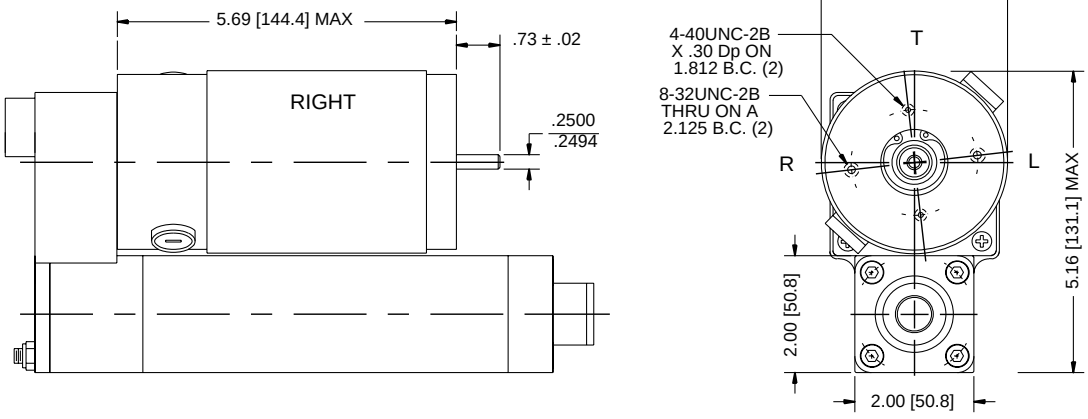
Motor Specifications

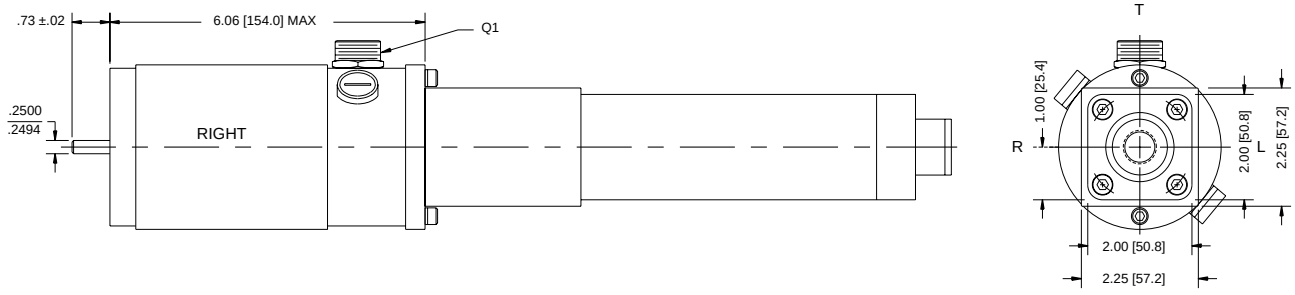
N2-H Series	Permanent magnet 2-pole, 160 volt DC motor
Winding Data	H Motor
Inductance	19 mH
Resistance	6.4
Torque Constant	54 oz-in/Amp
Voltage Constant	40 V/krpm
Torque	
Continuous	108 oz-in (2.0 Amps)
Peak	432 oz-in (8.0 Amps)
Rotor Inertia	0.049 oz-in-sec^2
Connections	2 leads, 6 inch [150 mm] length -Q Quick Disconnect option: 3 contact receptacle in anodized or painted aluminum shell, includes 12 ft [3.7 m] cable with molded plug.
Temperature	180°F [82°C] maximum allowable motor case temperature Actual motor case temperature is ambient, duty cycle, speed and load dependent. Refer to speed vs. thrust curves for system duty ratings.

H Motor Dimensions

Parallel



Inline



Motor Specifications

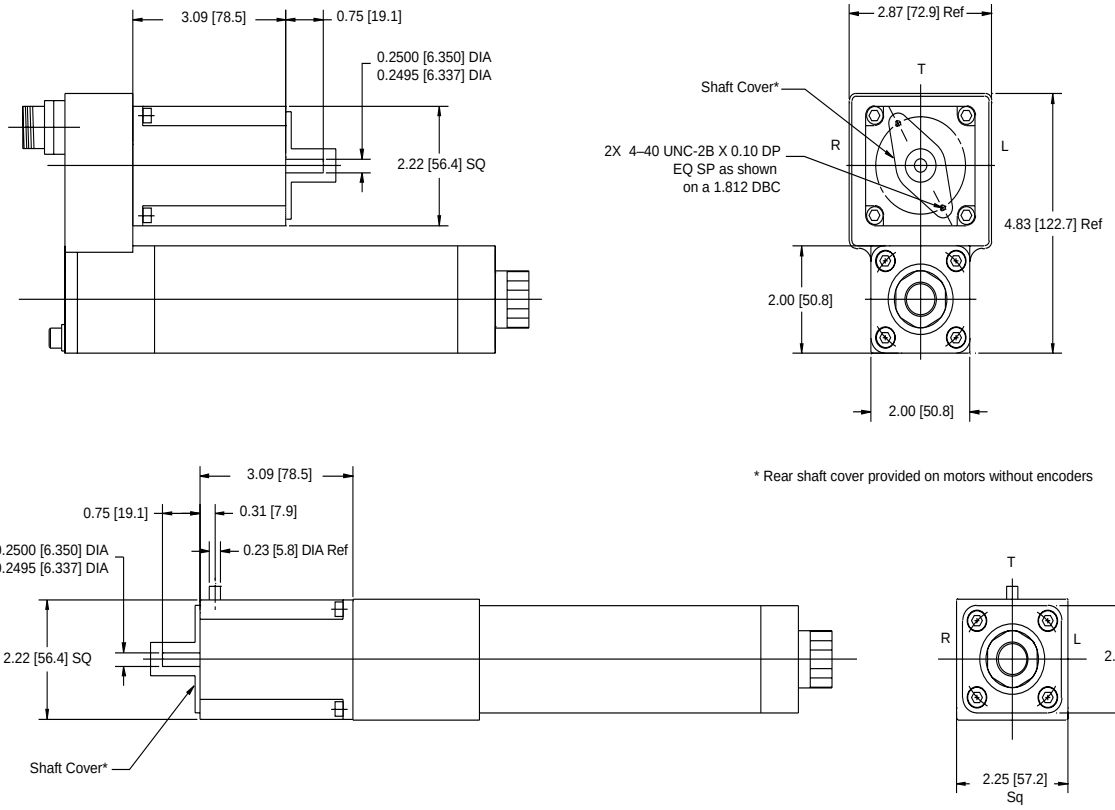
N2-P22 Series — 1.8° Permanent magnet hybrid step motor

P22 Motor

Inductance	63.2 mH in Series (P22T), 15.8 mH in Parallel (P22V)
Motor Current	0.7 Amps in Series (P22T), 1.5 Amps in Parallel (P22V)
Hipot Breakdown	500 VAC/1800 VDC (phase-to-phase, phase-to-ground)
Connections	P22N: 8 leads, each 12" long P22T/P22V: quick disconnect receptacle on actuator timing belt housing; includes 12 ft [3.7 m] cable with molded plug
User Cabling	Less than 100 feet (20 AWG), 100–200 ft (18 AWG)
Temperature	212°F (100°C) maximum allowable case temperature Actual motor case temperature is dependent on ambient temperature, duty cycle, speed and load. Refer to speed vs. thrust performance curves for system duty ratings.

Dimensions in [mm]

Parallel



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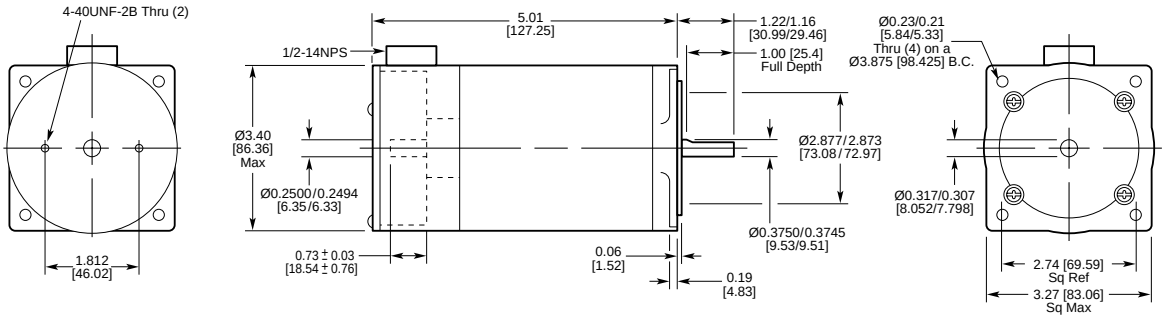
Motor Specifications

N2-S Series — 1.8° Permanent Magnet Hybrid Step Motor

Inductance	NS32T 10 mH; NS32V 2.5 mH
HIPOT breakdown	750 VAC
Static Torque	300 oz-in [2.1 N-m] max N2-S32N: 8 leads, 8 inch length (except inline models with 12 ft [3.7 m] cable)
Connections	N2-S32T, N2-S32V: 5 contact quick disconnect receptacle in anodized aluminum shell, includes 12 ft [3.7 m] cable with molded plug
Temperature	212°F [100°C] maximum allowable motor case temperature Actual motor case temperature is ambient, duty cycle and speed dependent. Refer to speed vs. thrust performance curves for system duty ratings.

S32 Motor Dimensions



Motor Specifications

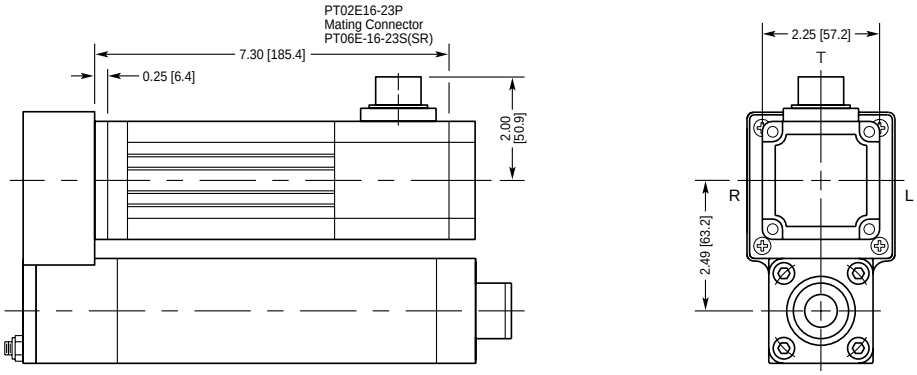
N2-B Series

Rare Earth Magnet Brushless Servo Motor with 2,000 Line Encoder and Commutation Sensors

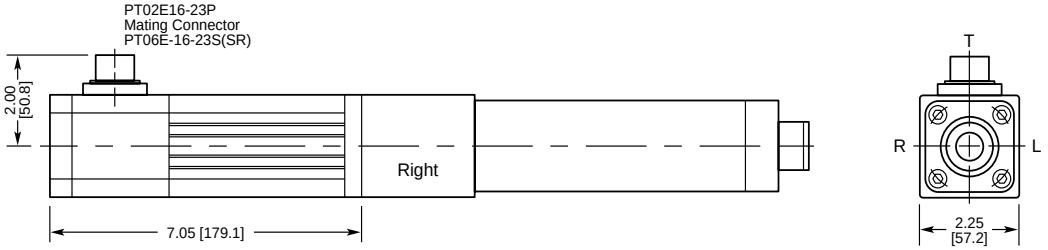
Winding Data	
Inductance	16 mH
Resistance	10.6 Ohms
Torque Constant (K_T)	3.6 in-lbs/Amp
Torque	
Continuous	6 in-lbs [0.68 N-m]
Peak 30 in-lbs [3.4 N-m]	
Rotor Inertia	0.00012 in-lb-sec^2 [0.135 kg-cm^2]
Connections	MS-type connectors for motor winding and encoder, and 12 ft [3.7 m] cables with mating connectors
Temperature	212°F [100°C] max allowed case temperature
Environmental	Rugged IP65 dust and waterproof construction

B23 Motor Dimensions

Parallel



Inline



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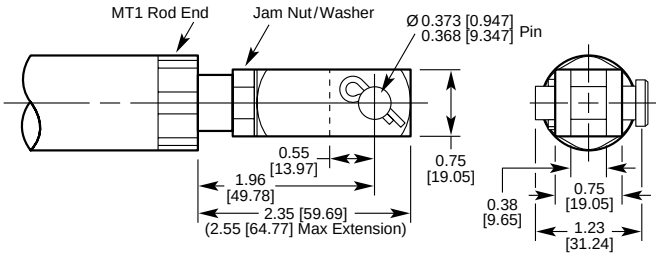
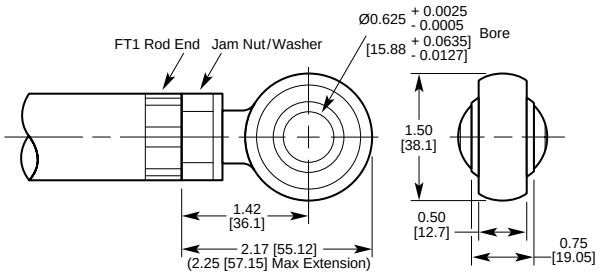
Rod End Dimensions

Dimensions in [mm]

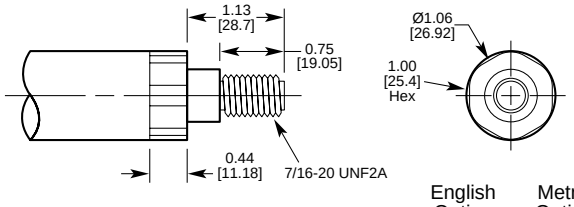
FC2



FS2



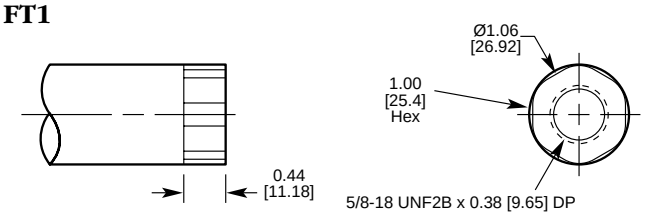
MT1



	English Option	Metric Option
	MT1 (inches)	MT1M (mm)
A	7/16-20 UNF	M12 x 1.25*
B	0.75	24*

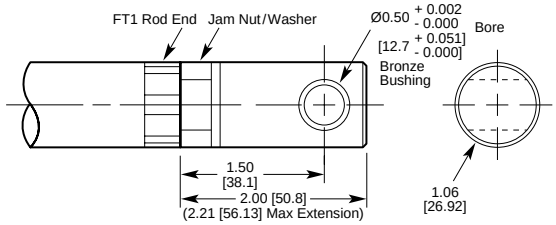
* Meets ISO 40mm bore standard

FT1



	English Option	Metric Option
	FT1 (inches)	FT1M (mm)
A	5/8-18 UNF	M12 x 1.25
B	0.94	24

FE2



Brake Option

The -BS and -BM brake options are typically used with electric cylinders employing ball screw drive assemblies. The electrically released, spring set brake prevents backdriving when the unit is at rest, or in case of a power failure.

When power is applied, the brake releases and the cylinder is free to move. When power is off, springs engage the brake to hold the load in position.

The -BS brake is mounted directly to the leadscrew to provide holding torque, without relying on the rest of the drive train.

The -BM brake is mounted to the motor shaft. This is advantageous because the brake torque is multiplied by the belt or gear reduction, and does not interfere with certain rear mounting options. But if the belt fails, the brake will be inoperative.

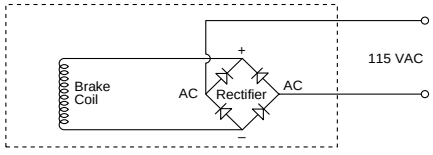
-BS is not available with:

- Inline motor orientation
- NV models
- Rear mounting options: -MP2, -MP3, -MS1, -MF2, -MF3

-BM is only available with:

- EC2-H, EC2-B
- EC3-H, EC4-H, EC3-B, EC4-B
- EC5-B
- N2-H, N2-B

Connections



Specifications

-BS Leadscrew Brake Option

Mounting Location	Leadscrew (see dimensions)
Voltage Options	115 VAC (-BS115), 24 VDC (-BS24), 230 VAC (-BS230)
Cable Type/Length	EC2/3/4/5 – 3.7 m [12 ft] with quick disconnect N2 – 3.7 m [12 ft] flying leads (no quick disconnect)
Holding Torque	EC2 – 3.9 N-m [35 in-lb], 12.5 W electrical power EC3 – 6.7 N-m [60 in-lb], 17 W electrical power EC4/5 – 39.2 N-m [350 in-lb], 15 W electrical power N2 – 3.4 N-m [30 in-lb], 13 W electrical power

Holding Force		With -BS Option	Without -BS Option
EC2	-16B Ball	1550 N [350 lb]	—
	-05B Ball	3600 N [810 lb]	—
	-04A Acme	3600 N [810 lb]	3600 N [810 lb]
EC3	-16B Ball	2660 N [600 lb]	—
	-10B Ball	4260 N [960 lb]	—
	-05B Ball	7200 N [1620 lb]	—
	-04A Acme	7200 N [1620 lb]	7200 N [1620 lb]
EC4	-25B Ball	9940 N [2230 lb]	—
	-10B Ball	12000 N [2700 lb]	—
EC5	-32B Ball	7770 N [1750 lb]	—
	-10B Ball	24800 N [5590 lb]	—
N2	-2B Ball	1100 N [240 lb]	—
	-5B Ball	2670 N [600 lb]	—
	-5A Acme (N2-D/P)	2670N [600 lb]	445 [100]
	-5A Acme (N2-other)	2670 N [600 lb]	1780 N [400 lb]
	-8A Acme		2670 N [600 lb]

-BM Motor Brake Option

(additional lead time may apply. Consult factory for current lead time.)

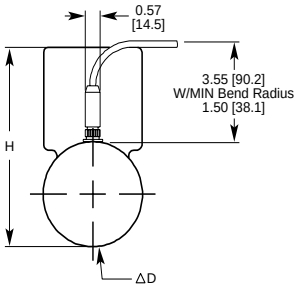
Mounting Location	Rear motor shaft
Voltage Options	B23/32/41 – 24 VDC (-BM24) H/H4 – 115 VAC (-BM115), 24VDC (-BM24); 230 VAC (-BM230)
Cable Type/Length	3.7 m [12 ft] flying leads (no quick disconnect)
Holding Torque	Consult factory

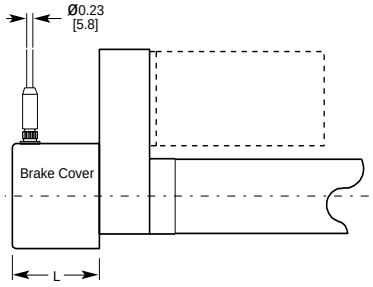
Notes:

- High vibration in a machine may cause an acme screw to backdrive at lower values than indicated above. In such applications, a brake may be necessary.
- The -BS and -BM brakes should only be used to hold static (already stopped) leads. They are not designed for repeated use as dynamic brakes.

Dimensions [in mm]

-BS Option





Note:
Quick-disconnect cable provided only on EC models. N2 includes flying leads cable from grommet on brake can.

Model	Dim "D"	Dim "H"	Dim "L"
EC2 Series	3.08 [78.2]	6.10 [155.1]	2.73 [69.3]
EC3 Series	3.83 [97.3]	7.22 [183.3]	3.32 [84.3]
EC4/EC5 Series	5.58 [141.7]	9.64 [245.0]	3.94 [99.9]
N2 Series	3.08 [78.2]	5.34 [135.6]	2.73 [69.3]

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N2 Dual Rod-End Bearing

-DB Dual Rod-End Bearing

Our standard N2 Series electric cylinder contains a single rod-end bearing. The dual rod-end bearing (-DB) option increases thrust tube side load capacity and reduces undesirable thrust tube runout, while reducing the stroke by 1.5 inches. (All EC Series cylinders are equipped with a dual rod-end bearing automatically, so this option does not apply to them.)

-DB available with:

- N2 Series 12 inch stroke and below

-DB required with:

- N2 Series above 12 inch stroke

Notes:

- The -DB option reduces stroke by 1.5 inches (e.g. 18" with -DB yields only 16.5" actual stroke.)

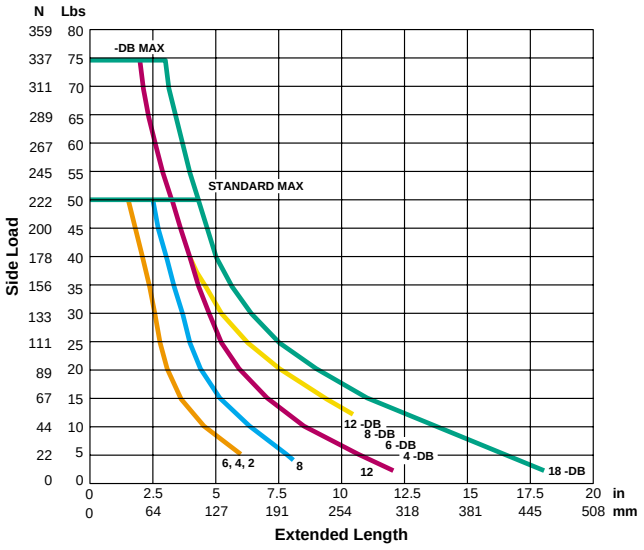
Side Load

All IDC electric cylinders are designed to withstand a limited amount of side load on the thrust tube. The thrust tube in a standard N2 Series cylinder is supported by a single rod-end bearing and by a *patented* internal guide assembly. This bearing system has a limited capacity to handle side loads, shown in the curve below.

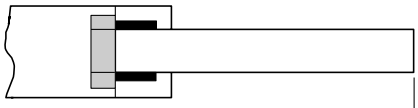
When increased side load capacity or stiffness is required, or when moving a load that is not externally supported, the dual rod-end bearing (-DB) option is recommended. This option adds a second thrust tube rod-end bearing for additional support, while subtracting 1.5 inches from the available stroke. N2 models above 12 inches stroke require the -DB option.

Another means of increasing side load capacity is to use the higher capacity EC series, which includes the dual rod-end bearing in its standard configuration.

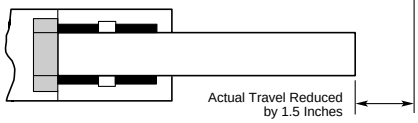
N2 Series — Side Load Capacity vs. Extended Length



Standard N2 Cylinder (Single Bearing)



-DB Option (Dual Bearings)



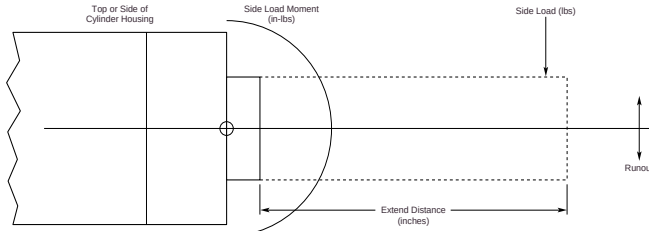
Runout

The -DB option reduces thrust tube runout by lengthening the thrust tube support bearing in the rod-end housing.

IDC recommends the -DB option to reduce runout whenever the thrust tube is the only means of guiding the load. Performance improvement is most observable for cylinders with stroke length above 12 inches, or whenever runout is critical as the thrust tube approaches full extension.

For the least amount of runout possible for a standard product, specify the -DB option and also increase the stroke of the cylinder while "short-stroking" the unit.

If the load is guided externally by linear bearings, the standard bearing is preferred since it allows greater mounting misalignment and minimal friction.



Selection Criteria

-DB Option	Standard
• When using clevis or trunnion mount	• When rigidly mounted
• >12 inches	• <12 inches
• Unguided thrust tube	• Guided thrust tube (externally)
• High side load	
• Low runout critical	

Encoder Option

-EMK/-EM Encoder Option

The -EMK/-EM encoder option provides an incremental rotary encoder coupled to the rear shaft of the motor. -EMK is an industry-standard, 1000-line version, while -EM is a reverse-compatible 500-line version

Step Motor Models (EC*x*-S, EC*x*-P, N*x*-S, N*x*-P)

An encoder is typically used to improve system accuracy, and provide stall detection.

DC Motor Models (EC*x*-D, EC*x*-H, N*x*-D, N*x*-H)

While encoders are not required for IDC DC motor controls, some applications use them to provide precise position feedback when using external control or monitoring devices.

Brushless Servo Models (EC*x*-B, N2-B, NV-BN)

All brushless servo motors are by default equipped with an encoder. Therefore, the -EMK/-EM encoder option is not required.

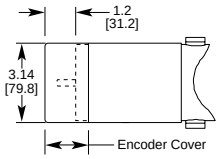
-EMK/-EM available with:

- EC2-D/H/S/P
- EC3-H/P
- EC4-H/P
- EC5-S
- N2-D/H/S/P
- NV-D/H/P

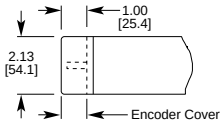
Dimensions in [mm]

S32, S33, S42, and H4 Motors: Encoder is enclosed within the standard housing. No dimensional changes occur when the -EMK or -EM option is specified.

H Motor (N2/NV/EC2/EC3)



D/P22 Motor (N2/NV/EC2)



Electrical Specifications

Motor Model		D/H/H4 P22/S32/S33/S42	P32/P33	B23/B32/B41
Pulses per Revolution		-EMK 1000 line (4000 post-quad) -EM 500 line (2000 post-quad)	-EMK 1000 line (4000 post-quad) -EM 500 line(2000 post-quad)	Std: 2000 line (8000 post-quad)
Output Pulse Format		Incremental, Dual Square Wave Quadrature, with Index Pulse		
Cable Length/Type	m[ft]	3.7 [12]/Leads	3.7 [12]/Leads[See Note 1]	3.7 [12]/MS Connector
Voltage		5 VDC ±5%	5 VDC ±5%	5 VDC ±5%
Current	mA	120	135	200
Max. Speed	rpm	6000	6000	6000
Weight	kg [oz]	0.17 [6.0]	0.057 [2.0]	0.25 [8.8]
Inertia	kg-m^2 [oz-in-sec^2]	5.1 x 10^{-9} [7.3 x 10^{-7}]	3.1 x 10^{-7} [4.4 x 10^{-5}]	1.0 x 10^{-6} [1.4 x 10^{-4}]
Operating Temperature	°C [°F]	-10 to +70 [+14 to +158]	-10 to +100 [+14 to +212]	-20 to +100 [-4 to +212]
Storage Temperature	°C [°F]	-20 to +80 [-4 to +176]	-30 to +110 [-22 to +230]	-25 to +100 [-13 to +212]

Note: [1]Quick disconnect encoder fitting and extension cable is included when ordered as -EQ instead of -EM.

Wiring Color Codes for -EMK/EM Encoders

(applies to D, H, H4, P22, S32, S33 and S42 motors).

+5 VDC	White
Ground	Black
Ch A+	Red
Ch A-	Pink or Purple
Ch B+	Green
Ch B-	Blue
Index Ch Z+	Yellow
Index Ch Z-	Orange

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Linear Potentiometer Option

-L Linear Potentiometer Option

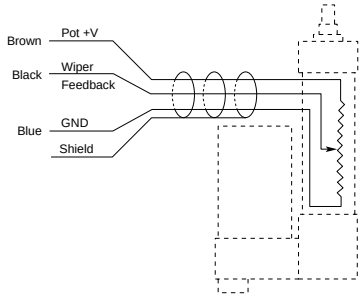
The -L linear potentiometer option is required for operation with our Analog Position Controls, and is used in applications where analog position feedback Voltage signal is needed.

The linear potentiometer resides within the cylinder housing and is energized by an external DC voltage source. The potentiometer wiper arm is attached to the drive nut/guide flange assembly, and moves the same distance as the thrust tube. The signal from the linear potentiometer is an absolute voltage, proportional to linear displacement of the cylinder.

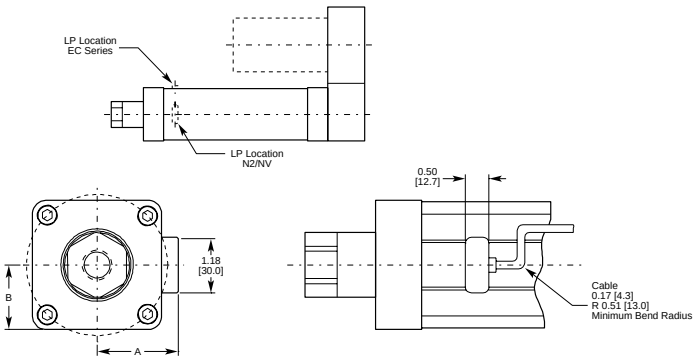
-L available with:

- All EC, N2 and NV cylinders

Connections



Dimensions in [mm]



Cylinder Model	Dimensions Dim. A in [mm]	Dim. B in [mm]
EC2	1.47 [37.3]	1.12 [28.5]
EC3	1.72 [43.7]	1.37 [34.8]
EC4	2.15 [54.5]	1.82 [46.1]
EC5	2.15 [54.5]	1.82 [46.1]
N2	1.38 [35.1]	1.01 [25.7]
NV	1.38 [35.1]	1.01 [25.7]

Specifications

Operating Temperature	-28° to +70°C [-20° to +160°F]
Power Rating	1.0 Watt max. (11 mA at 24V; 6mA at 12V; 3mA at 5V)
Resistance	see table below
Linearity	see table below
Stroke	Available in the lengths shown below. Consult factory for lengths.

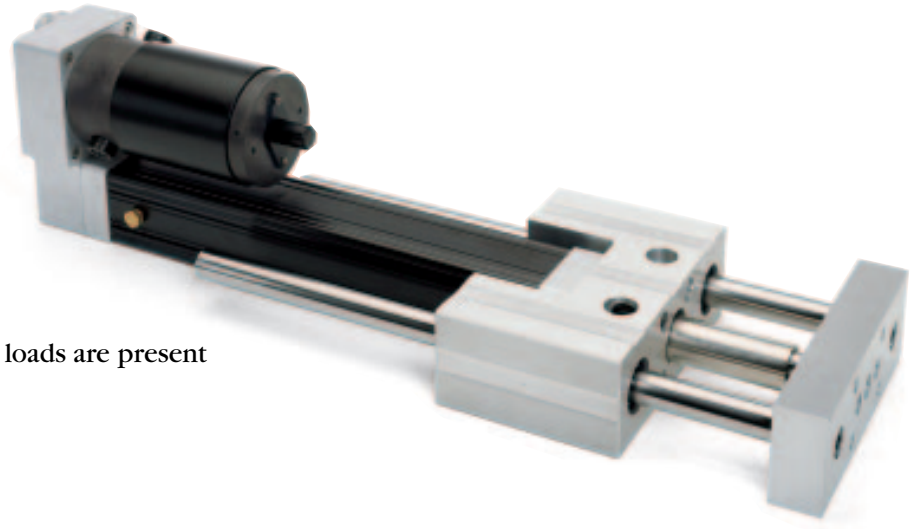
Cylinder Model	Stroke		Resistance (±30%)	Linearity
EC2, EC3, EC4, EC5	50 mm	[1.97 in]*	3000	
	100 mm	[3.94 in]	6000	
	150 mm	[5.91 in]	9000	
	200 mm	[7.87 in]	9000	±1% of full stroke
	250 mm	[9.84 in]	9000	
	300 mm	[11.81 in]	7000	
	450 mm	[17.72 in]	7000	
	600 mm	[23.62 in]	7000	
N2, NV	50.8mm	[2.00 in]	3000	
	101.6 mm	[4.00 in]	6000	
	152.4 mm	[6.00 in]	9000	±1% of full stroke
	203.2 mm	[8.00 in]	9000	
	254.0 mm	[10.00 in]	9000	
	304.8 mm	[12.00 in]	7000	
	419.1 mm	[16.50 in]	7000	

*50mm stroke not available with EC5-B41 cylinder, due to motor interference.

Linear Rod Bearing Option

-LR Linear Rod Bearing Option

The -LR linear rod bearing option is used in applications where side loads are present, or when the load is not externally supported.



Reasons for using the -LR Linear Rod Bearing are:

- Increased side load capacity
- Anti-rotation–reduces any rotational motion of the moving load
- Higher actuator efficiency when side loads are present
- Lower thrust tube runout

-LR available with:

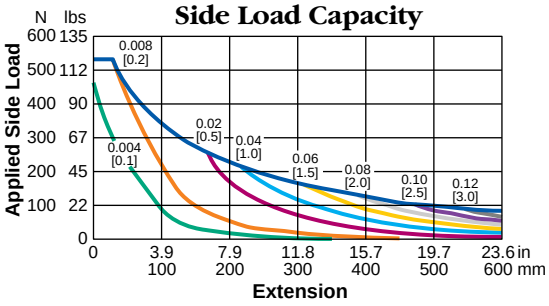
- EC2

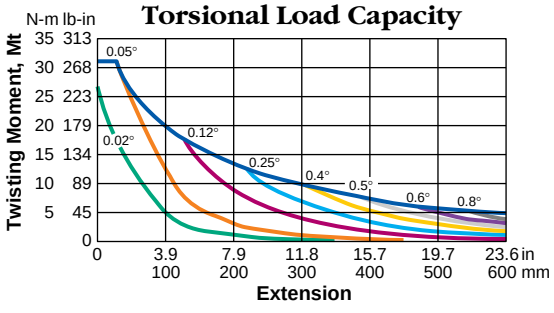
-LR not available with:

- MF1, MF3, MS1, MS2 mounting options

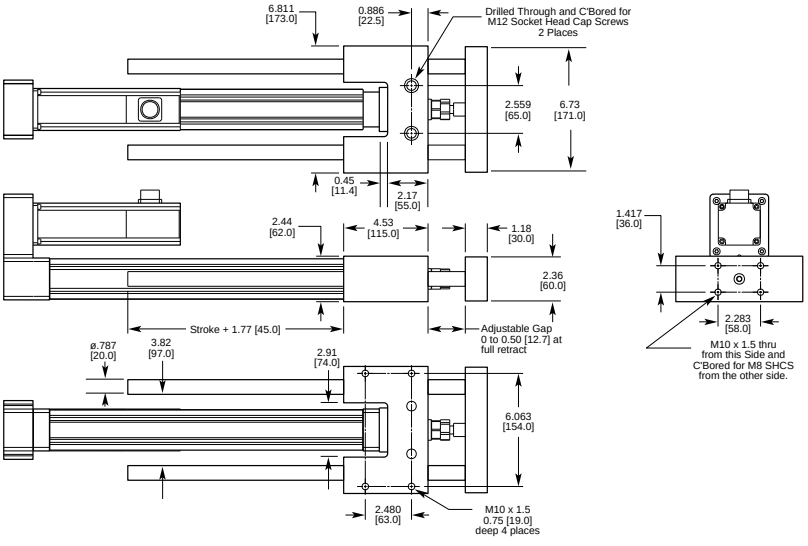
Weight calculation:

Weight (lb_f) = 0.0147 stroke (mm) + 7.6 lb_f





Dimensions in [mm]



To order the Linear Rod Bearing as a separate component:

Linear Rod Bearing Part Number

Example: LR-EC2-0200-A

LR	—	EC2	—	0200	—	A
LR		EC2		Stroke in mm		Revision

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Protective Boot Option

-PB Protective Boot Option

With the -PB option, a durable polyurethane boot protects the thrust tube area from solid contaminants (dust, wood and metal shavings), and splashed liquids, etc.

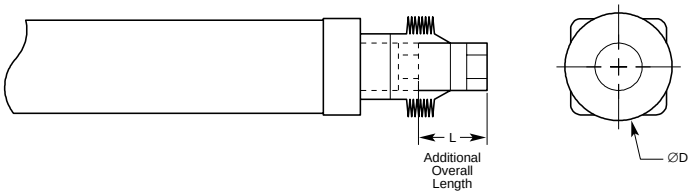
EC Series cylinders equipped with the -PB are protected to the IP65 standard. Note that some IDC motor options are not protected to this level.

Consult the factory for assistance when special environmental protection is required.

We also have special options for clean room applications, where outgassing and contamination by the cylinder are a concern.

Dimensions in [mm]

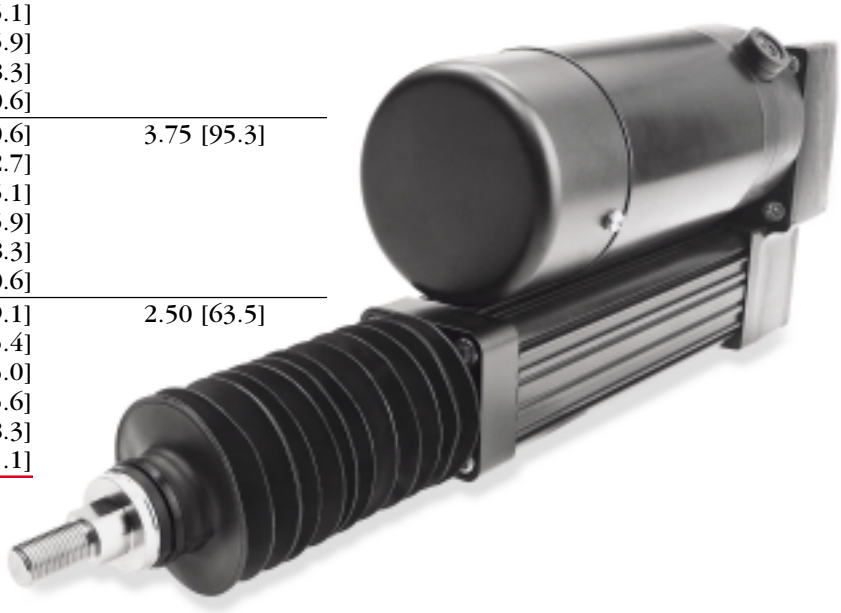
When fully retracted, the boot gathers on an extra length of thrust tube. The extra thrust tube length is tabulated below.



-PB available with:

- All cylinders except NV series

Cylinder Model		Dimensions	
		Dim. L Add'l Length	Boot Diameter
Series	Stroke Length	in [mm]	in [mm]
EC2	0-149 mm	1.16 [29.5]	2.50 [63.5]
	150-299	1.83 [46.5]	
	300-449	2.54 [64.5]	
	450-600	3.21 [81.5]	
	601-750	3.75 [95.3]	
EC3	0-199 mm	1.46 [37.1]	3.00 [76.2]
	200-399	2.13 [54.0]	
	400-599	2.83 [71.9]	
	600-800	3.54 [89.9]	
	801-1000	4.06 [103.1]	
EC4	0-249 mm	1.60 [40.6]	3.75 [95.3]
	250-499	2.47 [62.7]	
	500-749	3.35 [85.1]	
	750-999	4.17 [105.9]	
	1000-1249	5.05 [128.3]	
	1250-1500	5.93 [150.6]	
EC5	0-249 mm	1.60 [40.6]	3.75 [95.3]
	250-499	2.47 [62.7]	
	500-749	3.35 [85.1]	
	750-999	4.17 [105.9]	
	1000-1249	5.05 [128.3]	
	1250-1500	5.93 [150.6]	
N2	0-2.57 in	0.75 [19.1]	2.50 [63.5]
	2.58-5.08	1.00 [25.4]	
	5.09-7.59	1.30 [33.0]	
	7.60-10.11	1.40 [35.6]	
	10.12-15.19	1.90 [48.3]	
	15.20-16.50	2.80 [71.1]	



Quick Disconnect Option

The optional -Q quick disconnect option gives the machine builder or user a convenient method of connecting the motor to the control. A male quick disconnect receptacle is installed in the cylinder drive housing, or in some cases, the motor. The -Q option includes a 3.7m [12 ft] motor power cable, with mating molded quick disconnect plug.

-Q available with:

- NV-D, -H, -P*
- N2-D, -H, -S*, -P*

* included when ordered as a T (series) or V (parallel)

-Q Included with:

(-Q does not need to be in model number):

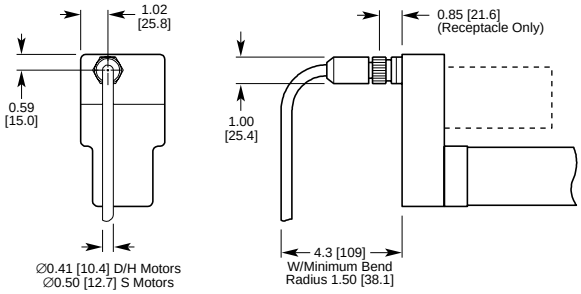
- All B Series cylinders
- All EC Series cylinders

B Series brushless servo cylinders (EC*x*-B, N2-B) include an MS-style quick disconnect fitting(s) and cable(s), with the standard actuator. The -Q option is not required for these models.

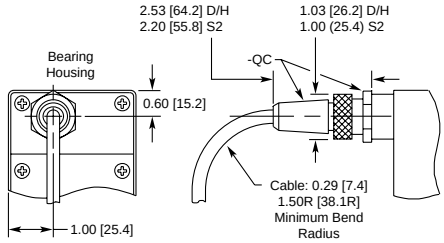
All EC models include quick disconnect fitting(s) where applicable, with the standard actuator. The -Q option is not required for these models.

Dimensions in [mm]

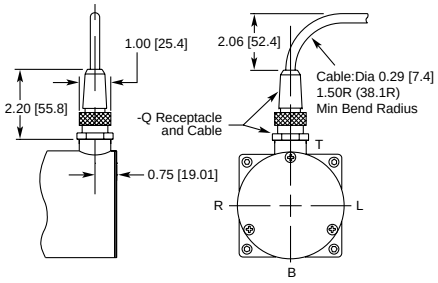
EC Series



N2/NV Series Parallel Model



N2-S32



Features

- D & H motors: 3 conductor cable (2 motor and chassis ground)
- S & P motors: 5 conductor shielded cable (4 motor, shield)
- Keyed to prevent mis-wiring.
- Forms a contaminant resistant seal to protect the conductors from the environment.
- A 3.7m [12 ft] cable is supplied with the -Q option.

Notes:

- Inline Models with D and P22 motors: The -Q option is not available with "-10L" inline models when D or P22 motors are used.
- Inline Models with H motors: The -Q option is included with EC2-H-10L, N2-H-10L and EC3-H-10L models.
- Contact the factory when custom quick disconnect mounting locations are required.

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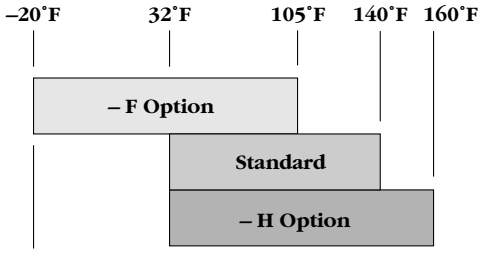
N2 Environmental Options

Temperature Ranges (N2 Series)

	Operating	Storage
Standard N2	32° to 140°F	-40 to 185°F
	[0° to 60°C]	[-40° to 85°C]
-F Freezing	-20° to 105°F	-40° to 185°F
	[-29° to 41°C]	[-40° to 85°C]
-H High Temp	32° to 160°F	-40° to 185°F
	[0° to 70°C]	[-40° to 85°C]



Note: -F and -H can not be ordered on the same cylinder.

-H High Temperature

The -H high temperature option allows operation in high temperature environments (to 160°F [70°C]) by changing certain plastic parts within the cylinder to bronze.

-H available with:

- All N2 Series

Notes:

- Consideration must be given to the operating temperature ranges of the motor, encoder, and limit switches.

-F Sub-Freezing Environment

In extremely cold conditions the lubricating grease in the actuator thickens, rubber parts (belts and stops) stiffen, and mechanical clearances tighten. This option includes two alterations:

1. Bearing grease is replaced with a less viscous lubricant.
2. Acme drive nut tolerances are increased. Both thread clearance and pitch length are increased to allow for the varying coefficients of expansion between the steel leadscrew and polyacetal or bronze drive nut.

The result is a device which can operate at these low temperatures, but with reduced life (due to the pre-worn acme nut surfaces).

Contact IDC for more details. No change is necessary in ball nut models since there is steel to steel contact (same coefficient of thermal expansion).

-F available with:

- All N2 Series

Notes:

- This option increases system backlash to 0.025 inches (0.64mm) max. for acme screw units.
- Should a -F sub-freezing option acme screw unit be operated at room temperature or above, noisy operation and increased backlash are normal.

-W Water Resistant Option

The water resistant option (-W) is recommended in applications where the cylinder is exposed to light mist or occasional splashing with water or non-corrosive liquids. In addition to a sealant on all mating surfaces, a 10 foot (3m) breather tube and fitting is provided to allow the unit to breathe from a non-contaminated dry area. Or, the customer may choose to apply positive, low pressure (2-3 psi [14-20 kPa]) dry air to the cylinder through this fitting.

-W available with:

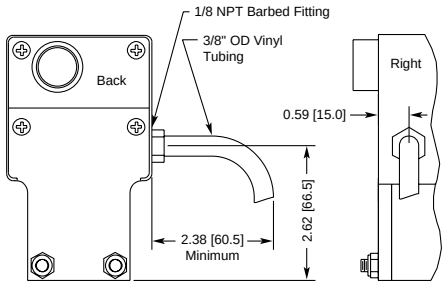
- All N2 Series

Notes:

- The -W option does not provide a waterproof cylinder. The cylinder cannot be submerged or immersed repeatedly in water.

-W Breather Dimensions

N2 Series Cylinders



Accessories

Magnetic Position Sensors

Electric cylinders are equipped with position indicating magnets installed internally on both sides of the guide cylinder. Six non-contacting position sensors are available to sense the magnet as it passes by.

All six position sensors mount directly to standard EC, N2 and NV Series cylinders. Three sensors, PSR-1, PSN-1 and PSP-1 are normally open switches. Three PSR-2, PSN-2 and PSP-2 are normally closed switches. Type PSR sensors consist of a reed switch, and type PSN and PSP sensors use a Hall-effect sensing element and a simple solid state electrical circuit.

End-of-Travel Limits

To maximize cylinder life, Industrial Devices recommends the use of end-of-travel "limit switches" (position sensors) with all cylinders.

The purpose of an end-of-travel sensor is to signal the controller that the cylinder is about to travel beyond its normal safe operating region, and is nearing its physical end of stroke. The controller brings the cylinder to a stop to prevent physical contact, and to avoid damage to the cylinder, the load, or the machine. The sensors must be located such that an adequate stopping distance is provided between the sensing position and the physical end of stroke. Normally closed switches are generally used for end-of-travel sensing. Normally closed switches are considered "fail safe" because when a cable becomes accidentally severed or disconnected, motion is prevented.

Position Sensing

Limit Switch controls use position sensors as inputs for extend and retract position indication, or for reversing direction. The D2300, H3301B and H4301 also use position sensors for changing speed during a move, usually to reduce cylinder speed before reaching the final stopping position for greater repeatability.

Programmable position controls use position sensors for two purposes. A normally open switch is generally used to establish a home, or zero reference position. Normally closed switches are used for extend and retract end-of-travel limits.

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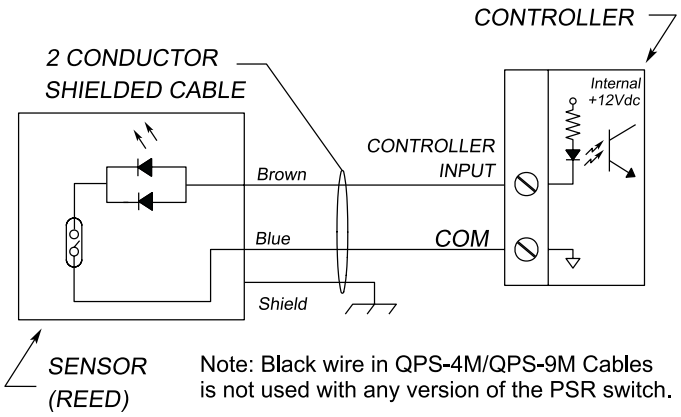
Position Sensors

Position Sensor Specifications

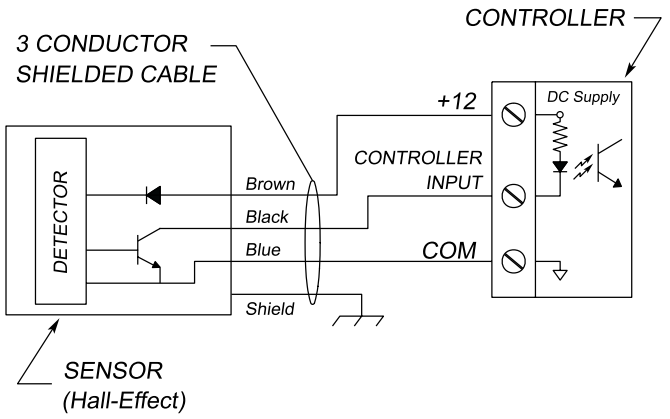
	PSR-1	PSR-2	PSN-1	PSN-2	PSP-1	PSP-2
Connection	Norm. open	Norm. closed	Norm. open	Norm. closed	Norm. open	Norm. closed
Led Color	Green	Red	Green	Red	Yellow	Red
Switch Type	Mechanical Reed		Hall-effect		Hall-effect	
Output Type	Contact closure		Open collector, sinking output (NPN)		Sourcing (PNP)	
Number of Leads	2 + Shield		3 + Shield		3 + Shield	
Supply						
Voltage	4–120 V AC or DC		10–24 VDC		10–24 VDC	
Current	n/a		7 mA @ 12 VDC; 13 mA @ 24 VDC		7 mA @ 12 VDC; 13 mA @ 24 VDC	
Power	n/a		0.24 W		0.24 W	
Output						
DC Voltage max	120VDC		24VDC		24VDC	
AC Voltage max	120VAC		AC not allowed		AC not allowed	
Current max	50mA		100mA		100mA	
Power max	6W		3W		3W	
Operating Temperature	-4° to 158°F [-20° to 70°C]					
Storage Temperature	-4° to 176°F [-20° to 80°C]					
Protection Rating	IP67					
CE Approved	Yes					

Wiring for PSR-1 and PSR-2



Note: Black wire in QPS-4M/QPS-9M Cables is not used with any version of the PSR switch.

Wiring for PSN-1 and PSN-2



Comparison of Hall-Effect and Reed Switches

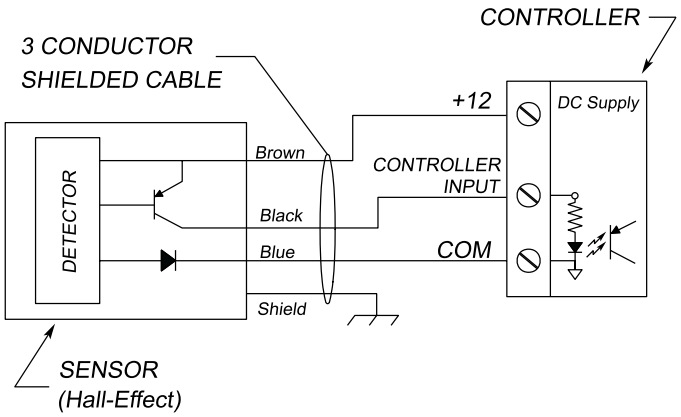
PSR Reed Switch

- More noise immune (EMI)
- Does not require a power supply
- Slightly lower cost
- Does not work with inductive loads
- Switches AC voltages

PSN & PSP Hall-Effect Switch

- Higher tolerance to vibration
- Greater durability and reliability (no moving parts)
- Requires external DC power. Available on IDC controls.

Wiring for PSP-1 and PSP-2



Position Sensors

Position Sensor Mounting

The diagrams below show sensor mounting location when cylinder magnet and sensor are physically aligned.

This location is recommended as a starting point when setting up a cylinder for the first time. Depending on the speed and payload of the application, switches may need to be moved inward to prevent hard-stop crash when the load travels at full speed past a limit switch.

Notes:

- Position sensors can be mounted along either side of a cylinder.
- Recommended minimum distance between switches is 0.65 inches.
- D2200, D2300 and D2400 series controls use only Normally Open (N.O.), Reed or NPN position sensors (PSR-1, PSN-1)
- Using position sensors for end-of-travel protection reduces effective travel distance. Consult the factory.

Ordering Information

Position Sensors

Model Number		Description	Led
Wire Leads 10 ft [3 m]	Quick Disconnect 13 ft [4 m[1]]		
PSR-1	PSR-1Q	N.O. (Normally Open) Reed	Green
PSR-2	PSR-2Q	N.C. (Normally Closed) Reed	Red
PSN-1	PSN-1Q	N.O. NPN Hall Effect	Green
PSN-2	PSN-2Q	N.C. NPN Hall Effect	Red
PSP-1[2]	PSP-1Q[2]	N.O. PNP Hall Effect	Yellow
PSP-2[2]	PSP-2Q[2]	N.C. PNP Hall Effect	Red

Notes: [1] Long length 30 ft [9m] quick-disconnect cables are available, specify by adding –C9M to part number (example: PSN-1Q-C9M).

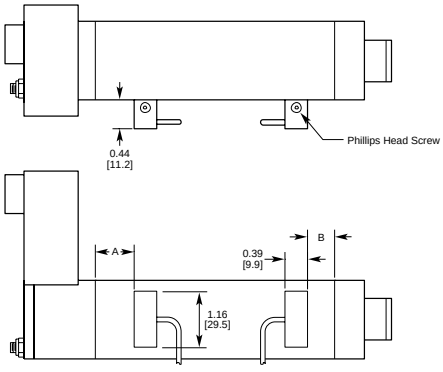
[2] PNP Hall Effect Switches are not compatible with IDC controls. These versions are offered for compatibility with devices which require PNP style sensors.

Spare Quick Disconnect Cables

Model Number	Description
QPS-4M	13 ft [4 m] extension cable
QPS-9M	30 ft [9 m] extension cable

Dimensions in [mm]

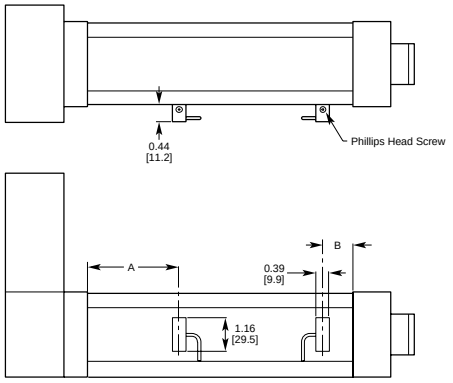
N2/NV Cylinder Position Sensor Mounting



NOTE: Dimensions "A" and "B" are Approximate End of Stroke Locations for the Position Sensors.

Model	Dim "A"	Dim "B"
N2/NV Acme	1.00 [25.4]	0.70 [17.8]
N2/NV Ball	1.40 [35.6]	0.30 [7.6]

EC Cylinder Position Sensor Mounting



NOTE: Dimensions "A" and "B" are Approximate End of Stroke Locations for the Position Sensors.

Model	Dim "A"	Dim "B"
EC2 Series	2.90 [73.7]	1.90 [48.3]
EC3 Series	3.03 [77.0]	2.23 [56.6]
EC4 Series	5.39 [137.0]	2.48 [63.0]
EC5 Series	5.39 [137.0]	2.48 [63.0]

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