

# WARNER ELECTRIC



Electric  
Linear  
Actuators  
and Controls

# Warner Linear... Customer Focused, Quality Driven

*Products designed and manufactured for reliable, long-lasting performance*

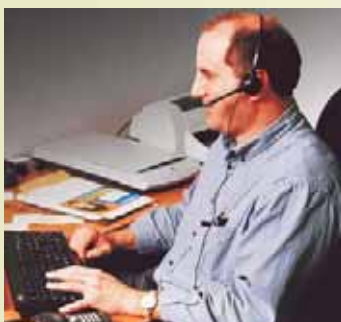


## Quality Processes

Warner Linear is dedicated to designing and manufacturing "Best-in-class" electromechanical actuators and controls.

We subscribe to a standard of quality derived from the Altra Business System (ABS), a series of progressive manufacturing methods designed to continuously improve production within our flexible work cell environment.

Our quality starts in product design. It is demonstrated in the attention given to design details and the refinement of prototypes. It is apparent in our fast response to requests for quotes, and our strict adherence to deadlines in every stage of the work flow.



## Custom Solutions

We recognize how critical our actuators are to the overall performance of your equipment. Working closely with your engineering and development staff, we strive for an early understanding of how you want your linear actuator to perform.

Building a direct communication line from our engineer to your engineer provides a number of significant benefits.

- A teaming of creative resources.
- Joint understanding of our actuator capabilities and how they can be tailored to your application.
- An understanding of the lowest cost solution to meet your actuator requirements.
- Providing a complete solution that includes controls as required.



## Service to our Customers

Our team takes pride in serving our customers with excellence and enthusiasm and demonstrates this in all aspects of our business relationships.

Our knowledgeable staff is involved on a daily basis in customer communications, team based problem solving, and continuous improvement. We are sensitive to satisfying specific customer requirements and expectations.





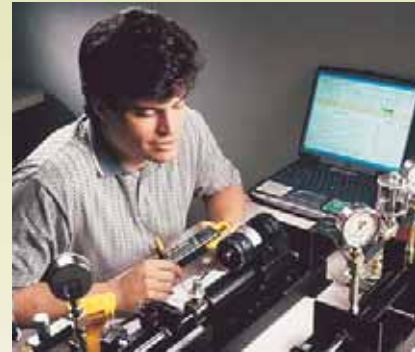
## Design and Testing

Our engineers and design specialists work closely with our customers to define both lab and field testing requirements. Our solid model design capabilities, computer assisted testing, and manufacturing floor pre-shipment cycle test, all provide assurance that your Warner Linear actuators will meet or exceed your expectations.

Our linear actuator testing capabilities include dual load life cycling stands, low and high pressure wash down test tanks, lift test stands and thermal shock submersion. Our test service providers add material analysis, noise and vibration evaluation capabilities.

## State-of-the-Art Facilities

Our division headquarter's facility is a full function design and manufacturing centre located in Belvidere, Illinois. The facility is dedicated to the engineering, testing and assembly of Warner Linear actuators. Selective global sourcing of high quality components from low cost countries provides the ultimate in actuator value.



# Contents

<b>Applications/ Performance Features</b>	4-5
<b>M-Track Design Features</b>	6
<b>M-Track Configurator</b>	7
<b>M-Track 1</b>	8-9
<b>A-Track Design Features</b>	10
<b>A-Track Configurator</b>	11
<b>A-Track 2</b>	12-13
<b>A-Track 5</b>	14-15
<b>A-Track 5</b>	16-17
<b>A-Track 10</b>	18-19
<b>B-Track Design Features</b>	20
<b>B-Track Configurator</b>	21
<b>B-Track K2vL</b>	22-23
<b>B-Track K2</b>	24-25
<b>B-Track K2x</b>	26-27
<b>B-Track K2PL/K2XPL</b>	28-29
<b>B-Track K2Js/K2XJs</b>	30-31
<b>B-Track K2RA</b>	32-33
<b>Custom Actuators</b>	34
<b>Mounting Information</b>	35
<b>Performance Features</b>	36
<b>Controls – Simple &amp; Basic</b>	37-38
<b>Controls – Advanced</b>	39
<b>Controls – BTc P1-DC</b>	40-41
<b>Controls – BTc PQS-DC</b>	42-43
<b>Controls – BTc P2-DC</b>	44-45
<b>Glossary</b>	46-47
<b>Application Data Form</b>	48

## Linear actuators to meet your specific requirements

Warner Linear offers a full line of standard electric actuators, each specifically designed to meet the needs of light-duty, general-duty, or rugged-duty applications. All are engineered for maintenance-free, long-life service, providing maximum value for our customers.

### QUICK SELECTION GUIDE

#### Light Duty



#### M-Track 1

Compact, completely self-contained and sealed to allow for use in small spaces without sacrificing power or capability.

Drive Type:  
**Acme Screw**

Load Capacity & Speed:  
**120 N @ 45 mm/s**  
**240 N @ 24 mm/s**  
**500 N @ 13 mm/s**  
**750 N @ 06 mm/s**

Stroke Length (mm):  
**50, 100, 150, 250, 300**

Input Voltage (VDC):  
**12, 24**

#### Typical Applications:

Throttle Control  
 Air Vent Opening  
 Remote Window Operation  
 Remote Mirror Positioning  
 Gate Opening  
 Shutter Control

**Pages 8-9**

#### General Duty



#### A-Track 2

Efficient design offering low cost power capability. For use in applications where moisture or environmental contamination exist.

Drive Type:  
**Acme Screw**

Load Capacity & Speed:  
**1500 N @ 25 mm/s**  
**2300 N @ 46 mm/s**

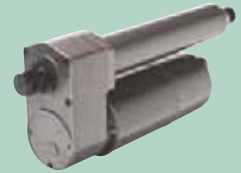
Stroke Length (mm):  
**100, 150, 200, 300, 450, 600**

Input Voltage (VDC):  
**12, 24**

#### Typical Applications:

Drum Lifts  
 Access Panel Lifts  
 Walk Behind Sweeper/Polishers  
 Tractor Hood Lifts  
 Spout Positioning

**Pages 12-13**



#### A-Track 5

Efficient design offering moderate power capability. For indoor use or where AC power is available.

Drive Type:  
**Acme or Ball Screw**

Load Capacity & Speed:  
**1500 N @ 25 mm/s**  
**2300 N @ 46 mm/s**  
**4500 N @ 25 mm/s**  
**6000 N @ 12 mm/s**

Stroke Length (mm):  
**100, 150, 200, 300, 450, 600**

Input Voltage (VAC):  
**115, 230**

#### Typical Applications:

Work Table Positioning  
 Conveyor Positioning  
 Remote Louver Control  
 Door Opening  
 Vent Control  
 Scissor Lift Tables

**Pages 14-17**

# Actuator Controls

## Simple extend/retract switch boxes

- SBC-DC, SBC-AC

## Basic controls and digital electronic options

- Adjustable stroke limits
- Fixed electronic stroke limits – ESL
- QS Quick Stop bi-directional current limit control
- Position feedback options – potentiometer or digital outputs

## Microprocessor based controls (for special needs)

- Quick Switch and Twin Track control functions
- Programming pendant
- Adjustable position and current limit options
- Remote mounting capable



### A-Track 10

Completely self-contained for more demanding outdoor applications requiring moderate load and duty cycle capability.

Drive Type:  
**Ball Screw**

Load Capacity & Speed:  
**2300 N @ 45 mm/s**  
**3500 N @ 22 mm/s**  
**4500 N @ 13 mm/s**

Stroke Length (mm):  
**100, 150, 200, 300, 450, 600**

Input Voltage (VDC):  
**12, 24**

#### Typical Applications:

Boat Engine Covers  
Round Baler Covers  
Engine Hoods  
Scooter Lifts

Pages 18-19

## Rugged Duty



### B-Track K2vL

Intended for severe service requirements and loads up to 3500 N. Lowest priced model in the B-Track family.

Drive Type:  
**Hybrid Acme**

Load Capacity & Speed:  
**900 N @ 50 mm/s**  
**1500 N @ 25 mm/s**  
**3400 N @ 12 mm/s**

Stroke Length (mm):  
**50-600 in 50 mm increments**

Input Voltage (VDC):  
**12, 24, 48, 90**

#### Typical Applications:

Fertilizer Gate Control  
Mower Decks  
Gate Openers  
Scooter & Cycle Lifts  
Pull Behind Implement Lifts

Pages 22-23



### B-Track K2

Uses a patented straight line load transfer offering high load capability in a small package size. Bronze or Delrin<sup>®</sup> nut options available for high impact load applications.

Drive Type:  
**Hybrid Acme**

Load Capacity & Speed:  
**1300 N @ 50 mm/s**  
**2700 N @ 25 mm/s**  
**5400 N @ 12 mm/s**

Stroke Length (mm):  
**50-900 in 50 mm increments**

Input Voltage (VDC):  
**12, 24, 48, 90**

#### Typical Applications:

Residential Mower Decks  
Gate & Valve Operation  
Snow Blowers  
Spouts & Chutes  
Engine Lifts  
Tables  
Wagon Lifts  
Combine Concaves

Pages 24-25



### B-Track K2x

Completely sealed, designed for tough, high load applications. Able to perform in harsh environments providing years of trouble-free service.

Drive Type:  
**Ball Screw & Ball Nut**

Load Capacity & Speed:  
**2600 N @ 50 mm/s**  
**5400 N @ 25 mm/s**  
**9800 N @ 12 mm/s**

Stroke Length (mm):  
**50-900 in 50 mm increments**

Input Voltage (VDC):  
**12, 24, 48, 90**

#### Typical Applications:

Paving Outriggers  
Commercial Mower Decks  
Spray Booms  
ATV Dump Box Lifts  
Boat Engine Lifts  
Hydraulic Cylinder Replacement  
Construction Equipment  
Hood Lifts

Pages 26-27

## **Warner Linear Actuators are available for a wide variety of applications**

Golf Cart Height Adjust

Mower Blade Lift

Solar Panel Adjust

55 Gallon Drum Lift

Fire Engine Valve Adjust

Automated Dumpster

Scissor Lift Table

Round Baler Cover Lift

Walk Behind Floor Washer

Bulldozer Engine Cover

Air Foil Adjust

Construction Sign Positioning

Forage Harvester Spout Positioning

Combine Spout Positioning

Adjustable Height Work Table

Conveyor Lateral Guide Positioning

Street Sweeper Bristle Lift

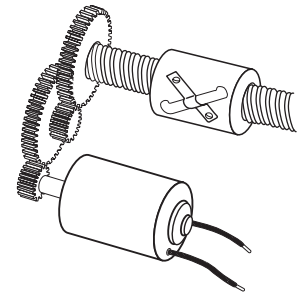
RV/Bus Compartment Extension

## **Performance Features**

### **Dependable Operation**

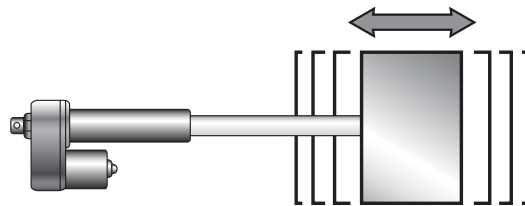
#### **Compact design**

A Warner Linear actuator with a 50 mm stroke can provide up to 9000 N of force capacity in a compact package.



#### **Maintenance-free**

Units are lubricated for life during assembly. There are no adjustments or maintenance required for units after they have left the factory. Consistent performance is provided for the entire life of the actuator.



#### **Equal capacity in both directions**

Warner Linear actuators can push-and-pull or lift-and-lower loads ranging from 5 N to over 9000 N up to 600 mm with equal capacity in both directions of travel.

#### **Efficient operation**

Warner Linear actuators consist of an electric motor combined with a high efficiency gear train and lead screw. This direct conversion of electrical to mechanical energy results in effective, economic linear movement. Units are completely self contained and require minimal installation hardware or wiring.

#### **Superb load holding power**

Warner Linear actuators operate loads in both tension and compression equally well. They will hold a load stationary without power in either direction. Static load holding capability will always exceed the dynamic load moving capability.

#### **Advantages**

- No hydraulic pumps, hoses, valves, or leaks
- Holds load when power is off
- Overload clutches prevent damage due to excess weight
- Simple to install and use
- Easily adaptable for position control
- Integrated sensors provide electrical position signals



## Rugged and reliable

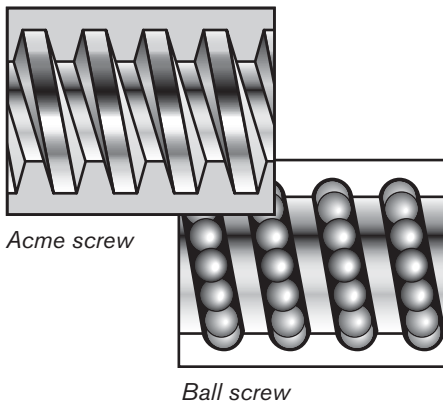
Warner Linear actuators incorporate high strength, high quality components and are designed to assure trouble-free service. Rugged spur gearing, industrial quality synthetic lubricants and high performance motors combine to provide maximum capability and value for the end user. Units are gasketed and sealed for operation in industrial and mobile outdoor applications. Thermal overload switches are included for motor protection; and high performance corrosion protection features are standard.

## Energy efficient

Electric control provides clean, smooth linear motion without fluids, plumbing or other expensive components. Warner Linear actuators require power only when in motion. No power is required to hold loads stationary.

## Lead screw drive systems

Warner Linear actuators use either acme, hybrid rolled, or highly efficient ball bearing screws. Models which use acme or hybrid rolled screws with bronze or plastic nuts will not backdrive when power is off. A bi-directional load holding brake is a standard feature on all ball bearing units and holds loads in position when power is off.



## Overload protection

Motors incorporate thermal switches in their windings to shut the actuator motor off in case of overheating or high overcurrent. Reset is automatic after the motor has cooled. A standard overload clutch detents if the load is excessive or reaches end of stroke.

**Note:** Clutch is not incorporated in M-Track due to size constraints.

## Versatile

With their compact size, Warner Linear actuators can be located in confined areas, and move loads from 0 to 9000 N. Their static load holding ability ensures that a load will remain in position when power is turned off. Gearing ratios create speeds that range from 12 to over 50 mm per second. Standard models are mounted using two parallel pins and require only simple wiring and switches. They are self-contained, lubricated for life, and designed for use where rugged and durable performance is required for almost any lift-and-lower or push-and-pull application.

## Available customized features

- Direct drive manual override
- Mounting and end fitting variations
- DC Motor voltage variations
- AC and DC motor options
- Motor lead wire connectors
- Adjustable stroke limit switches – fixed and adjustable
- Position feedback outputs – potentiometer and digital

## Also available

- Basic switch box controls
- Integrated electronic position controls

# M-Track - Features

## Light Duty Actuators

### Key Features

- Compact size
- Efficient design
- Easy to use and install

### Standard models

M1



## How to select

### Step 1 – Determine load and stroke length requirements

Use the Quick Selection guide to identify the model that will provide the load capacity and stroke length needed for your application.

### Step 2 – Identify motor type and voltage

Select DC motor and motor voltage.

### Step 3 – Confirm speed and current draw requirements

Using the charts provided, confirm that unit speed and current draw is appropriate for the intended use.

### Step 4 – Confirm the application duty cycle

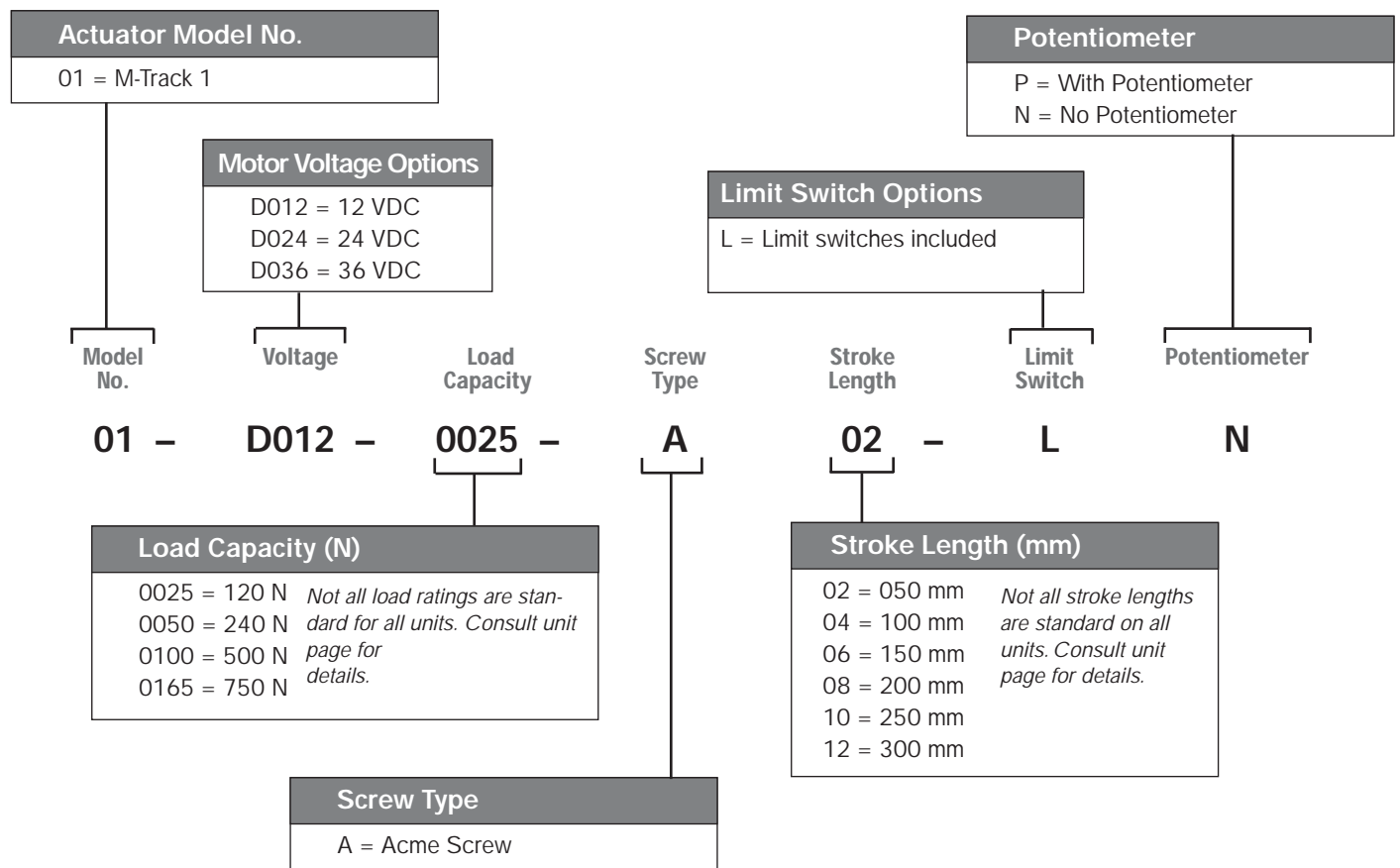
At full load capacity, actuators have a 25% duty cycle. Duty cycle is the amount of 'on-time' compared to cooling time. A unit that runs for 15 seconds should be off for 45 seconds.

### Important unit restrictions

Side loading and shock loads must be considered in actuator applications. Side loading and cantilevered mounting should be eliminated through proper machine design. Side loading will dramatically reduce unit life. While actuators can withstand limited shock loads, it is recommended that shock loading be avoided wherever possible. (See page 35)

### Step 5 – Unit options

M-Track units include end-of-travel limit switches as a standard feature. For positional feedback, a 10K ohm potentiometer can be factory installed. The changing potentiometer value provides unit movement feedback for units that are not visible to the machine operator.



# M-Track 1

## DC motor acme screw

750 N load rated



**M-Track 1** compact units are completely self-contained and sealed to allow use in small spaces without sacrificing power or capability. The load and length capabilities provide solutions for a diverse range of intermittent duty applications.

Functionally, **M-Track 1** actuators are easily interchanged with comparable size hydraulic or pneumatic cylinders on intermittent duty applications. The actuator provides consistent, repeatable performance even for applications with operating conditions including temperature extremes, high humidity, or significant dust.

### Features

- An Acme Screw drive delivers up to 750 N of force at a minimum extension rate of 6 mm per second
- The aluminum zinc alloy housing resists corrosion and provides protection from dirt, dust and humidity
- The M-Track 1 has a temperature operating range of  $-25^{\circ}\text{C}$  to  $+65^{\circ}\text{C}$
- Standard stroke lengths of 50, 100, 150, 200, 250 and 300 mm are available
- Internal limit switches automatically shut off the unit at end of stroke
- Optional potentiometer can provide positional location feedback

### Typical applications

- Light load and short distance applications such as:
  - Valve and vent adjustments
  - Light weight tilt or lift positioning
  - Vise and clamp operations

### Specifications

Load Capacity	N	120	240	500	750
Speed at Full Load	mm/s	45	24	13	06
Input Voltage	VDC	12 or 24 VDC (36 VDC optional)			
Static Load Capacity	N	1300			
Stroke Length	mm	50, 100, 150, 200, 250, 300			
Clevis Ends	mm	$\varnothing 6,4$			
Duty Cycle	%	25%			
Operation Temperature Range	$^{\circ}\text{C}$	$-25^{\circ}\text{C}$ to $+65^{\circ}\text{C}$			
Limit Switch	-	Fixed end of stroke limit switches standard			
Potentiometer	Ohm	10K, 10 turn pot optional			
Restraining Torque	Nm	2,24			



# A-Track - Features

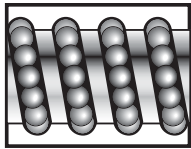
## General Duty Actuators

### Key Features

- Totally sealed
- Long life motor
- Easy to use and install
- Best value in its class

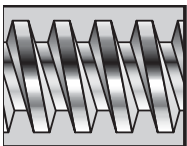
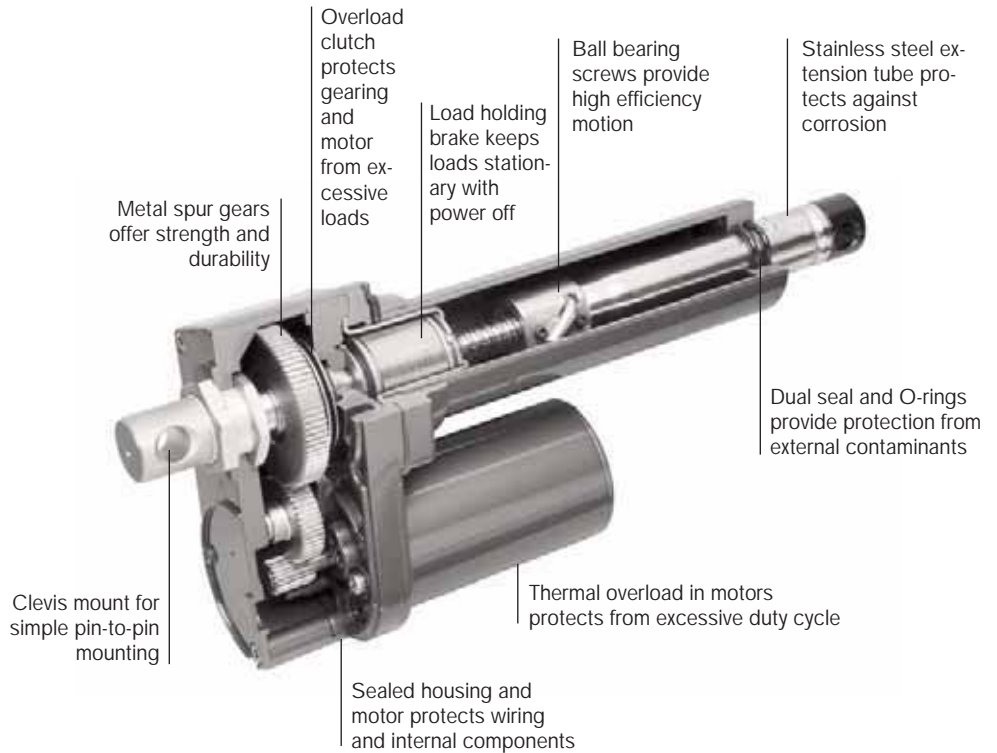
### Standard models

A-Track 2, A-Track 5  
A-Track 10



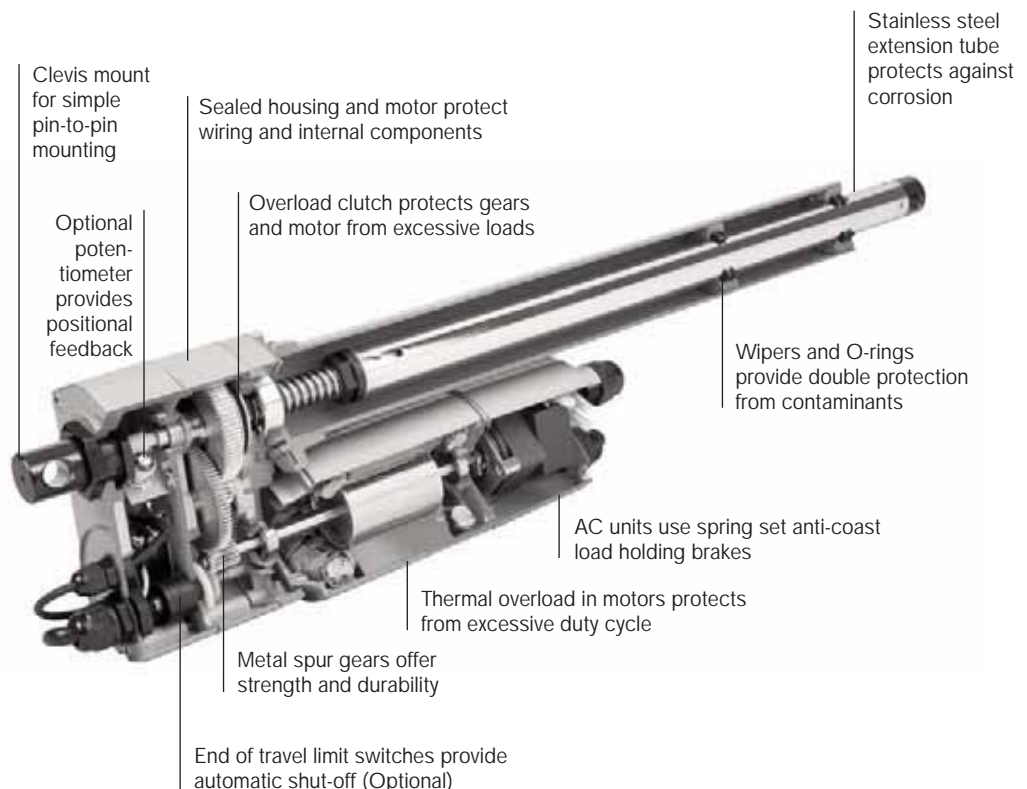
### Ball Screw Driven Actuators...

designed for industrial and commercial applications requiring high load capacities.



### Acme Screw Driven Actuators...

designed for light to moderate duty applications.



## How to select

### Step 1 – Determine load and stroke length requirements

Use the Quick Selection guide to identify the model that will provide the load capacity and stroke length needed for your application.

### Step 2 – Identify motor type and voltage

Select AC or DC motor and motor voltage.

### Step 3 – Confirm speed and current draw requirements

Using the charts provided with each model family, confirm that unit speed and current draw is appropriate for the system design.

### Step 4 – Confirm the application duty cycle

At full load capacity, actuators have a 25% duty cycle. Duty cycle is the amount of 'on-time' compared to cooling time. A unit that runs for 15 seconds should be off for 45 seconds.

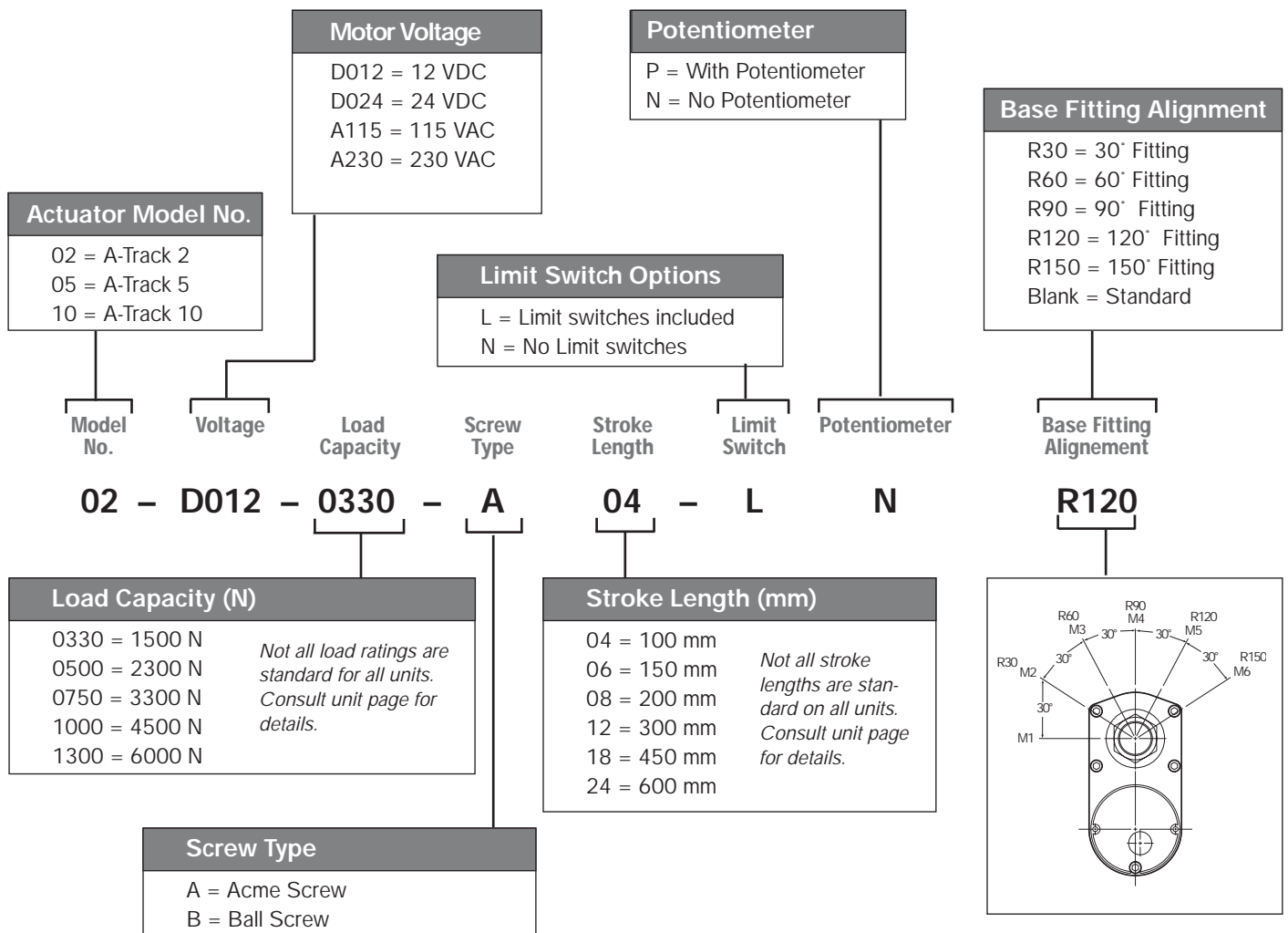
### Important unit restrictions

Side loading and shock loads must be considered in actuator applications. Side loading and cantilevered mounting should be eliminated through proper machine design. Side loading will dramatically reduce unit life. While actuators can withstand limited shock loads, it is recommended that shock loading be avoided wherever possible. (See page 35)

### Step 5 – Unit options

A-Track units include end-of-travel limit switches as an optional feature. \*For positional feedback, a 10K ohm potentiometer can be factory installed. The changing potentiometer value provides unit movement feedback for units that are not visible to the machine operator.

*\*Limit switches are only available in the maximum load configuration for each model.*



# A-Track 2

## DC motor acme screw

Up to 2300 N load rated

Up to 25 mm/s Speed



### Features

- Sealed and gasketed for mobile or outdoor applications
- Overload clutch standard
- 100, 150, 200, 300, 450 and 600 mm stroke lengths
- 12 or 24 VDC motors
- Acme screw drive
- Thermal overload included in double ball bearing motor

### Typical applications

- Gate and valve positioning
- Tailgate lifts
- Mobile equipment spout positioning control

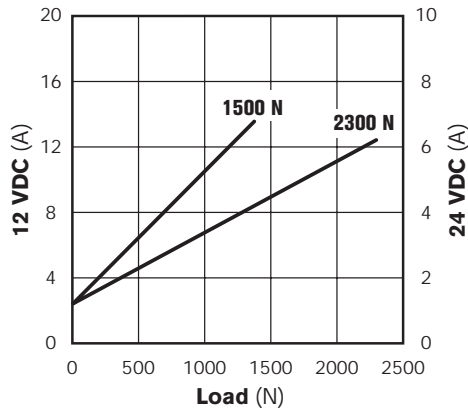
The **A-Track 2** incorporates an Acme screw drive system that provides a value priced unit for moderate duty applications. The **A-Track 2** includes lubrication for the life of the unit, combined with robust seal and O-ring design, creating a maintenance free design, even when used in applications with high humidity or dust.

### Specifications

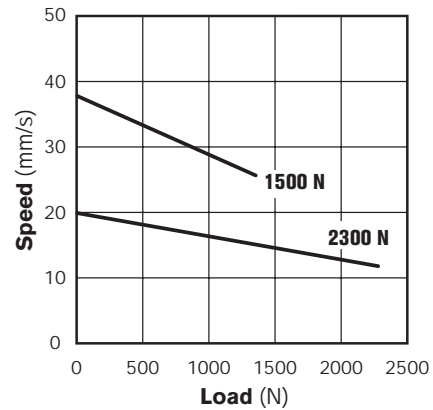
Load Capacity	N	1500	2300
Speed at Full Load	mm/s	25	13
Input Voltage	VDC	12 or 24 VDC	
Static Load Capacity	N	4500	
Stroke Length	mm	100, 150, 200, 300, 450 and 600	
Clevis Ends	mm	Ø 13	
Duty Cycle	%	25%	
Operation Temperature Range	°C	-25°C to +65°C	
Limit Switch	-	Optional adjustable travel limit switches (20:1 only) (2300 N)	
Potentiometer	Ohm		Optional feedback potentiometer
Restraining Torque	Nm	11,2	
Thermal Overload	-	Thermal Overload included all motors	

## Performance curves

### Current vs load



### Speed vs load



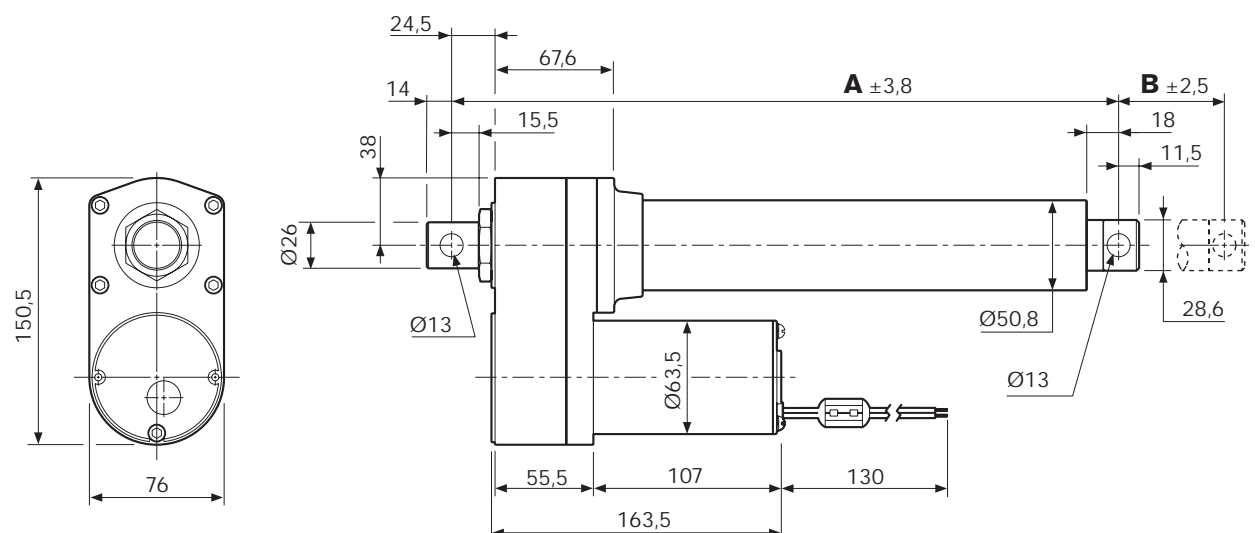
## Dimensions (mm)

### With Limit Switches

A-Track 2 Acme Screw	Stroke	100	150	200	300	450	600
	A	338	389	438	540	772	924
	B	102	153	203	305	457	610

### Without Limit Switches

A-Track 2 Acme Screw	Stroke	100	150	200	300	450	600
	A	262	313	364	465	696	848
	B	102	153	203	305	457	610



# A-Track 5

## AC motor acme screw

Up to 2300 N load rated

Up to 25 mm/s Speed



The **A-Track 5 Acme screw** actuator is a general purpose AC actuator with load capacities of 1500 and 2300 N for use in moderate duty interior applications. The unit includes a power off motor stopping brake for faster stops and extra load holding capability. The Model 5 allows for stroke lengths of 100 to 600 mm for in-plant or protected applications.

### Features

- Acme screw drive system
- 115 VAC (60hz) and 230 VAC (50hz) motors available
- 100, 150, 200, 300, 450 and 600 mm strokes
- Acme screw drive train
- Overload clutch standard
- Lubricated for life
- Capacitor included with motor

### Typical applications

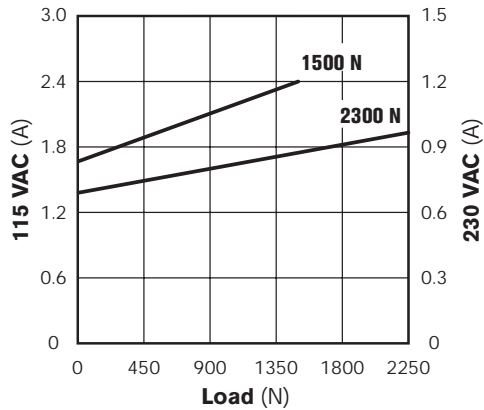
- Ergonomic lift tables
- Conveyor diverters
- Bin/tank cover lifts
- Roof vents

### Specifications

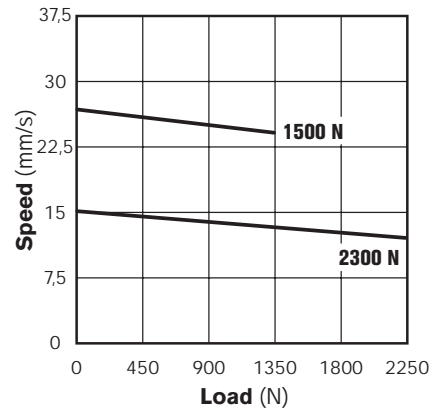
Specification	Unit	1500 N	2300 N
Load Capacity	N	1500	2300
Speed at Full Load	mm/s	25	14
Input Voltage	VAC	115 VAC (60 Hz) and 230 VAC (50 Hz)	
Static Load Capacity	N	4500	
Stroke Length	mm	100, 150, 200, 300, 450 and 600	
Clevis Ends	mm	Ø 13	
Duty Cycle	%	25%	
Operation Temperature Range	°C	-25°C to +65°C	
Limit Switch	-	Optional adjustable travel limit switches (20:1 only) (2300 N)	
Potentiometer	Ohm		Optional feedback potentiometer
Restraining Torque	Nm	11,2	
Thermal Overload	-	Thermal Overload included in all motors	

## Performance curves

### Current vs load



### Speed vs load



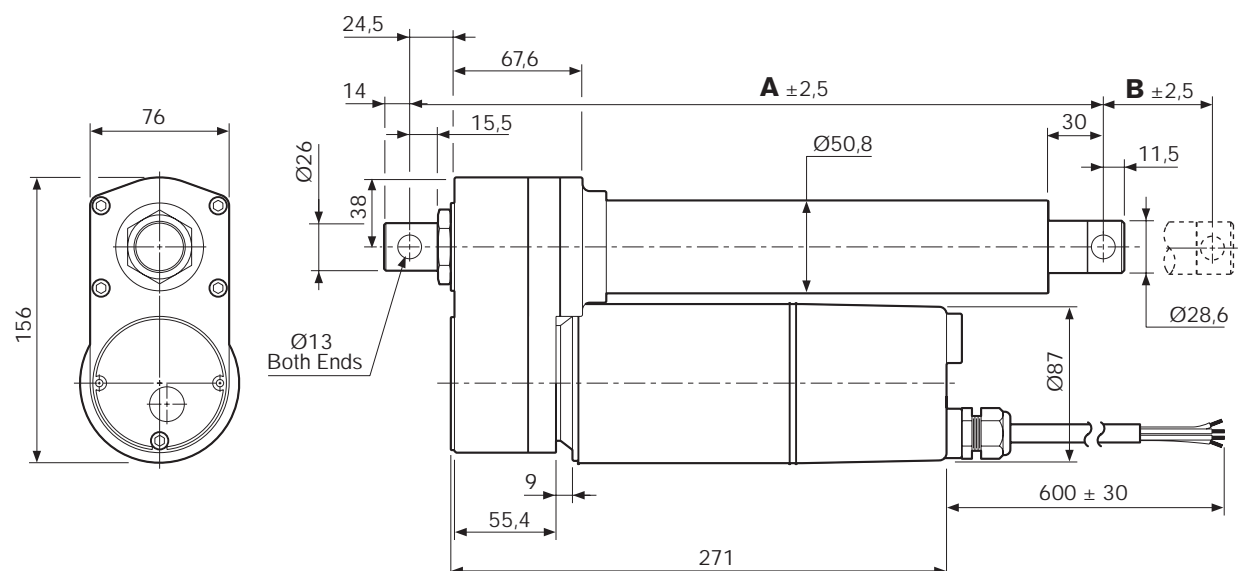
## Dimensions (mm)

### With Limit Switches

A-Track 5 Acme Screw	Stroke	100	150	200	300	450	600
	A	456	506	556	658	810	962
	B	102	153	203	305	457	610

### Without Limit Switches

A-Track 5 Acme Screw	Stroke	100	150	200	300	450	600
	A	380	431	481	583	735	887
	B	102	153	203	305	457	610



# A-Track 5

## AC motor ball screw

Up to 6000 N load rated

Up to 48 mm/s Speed



The **A-Track 5 Ball Screw** is a ball screw drive linear actuator for industrial and commercial applications. The unit provides load capacity up to 6000 N with either 115 or 230 VAC motors. This unit includes a power off load holding brake which stops the motor from turning when power is off. The Model 5 allows for stroke lengths of 100 to 600 mm for in-plant or protected applications.

### Features

- Ball bearing screw drive system
- Anti-coast load holding brake
- 100–600 mm stroke length capability
- Load limiting clutch standard
- Thermal overload protection in the motor
- Capacitor included in motor

### Typical applications

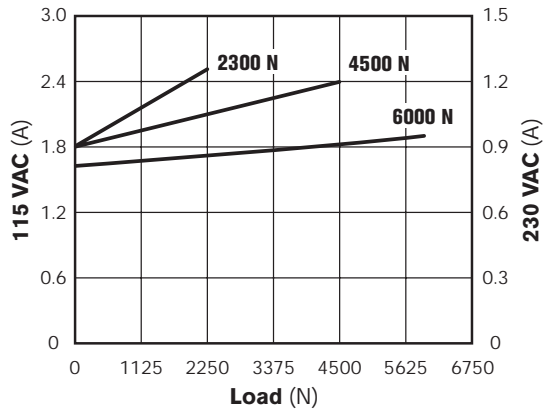
- Ergonomic lift tables
- Conveyor diverters
- Bin or tank cover lifts
- Die transfer carts

### Specifications

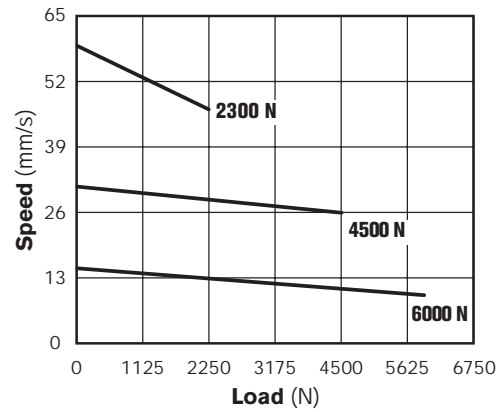
Load Capacity	N	2300	4500	6000
Speed at Full Load	mm/s	48	25	12
Input Voltage	VAC	115 VAC (60 Hz) / 230 VAC (50 Hz)		
Static Load Capacity	N	13500		
Stroke Length	mm	100, 150, 200, 300, 450 and 600 mm		
Clevis Ends	mm	Ø 13		
Duty Cycle	%	25%		
Operation Temperature Range	°C	-25°C to +65°C		
Limit Switch	-	Optional adjustable travel limit switch (20:1 only) (6000 N)		
Potentiometer	Ohm		Optional	
Restraining Torque	Nm	11,2		
Thermal Overload	-	Optional feedback potentiometer		

## Performance curves

### Current vs load



### Speed vs load



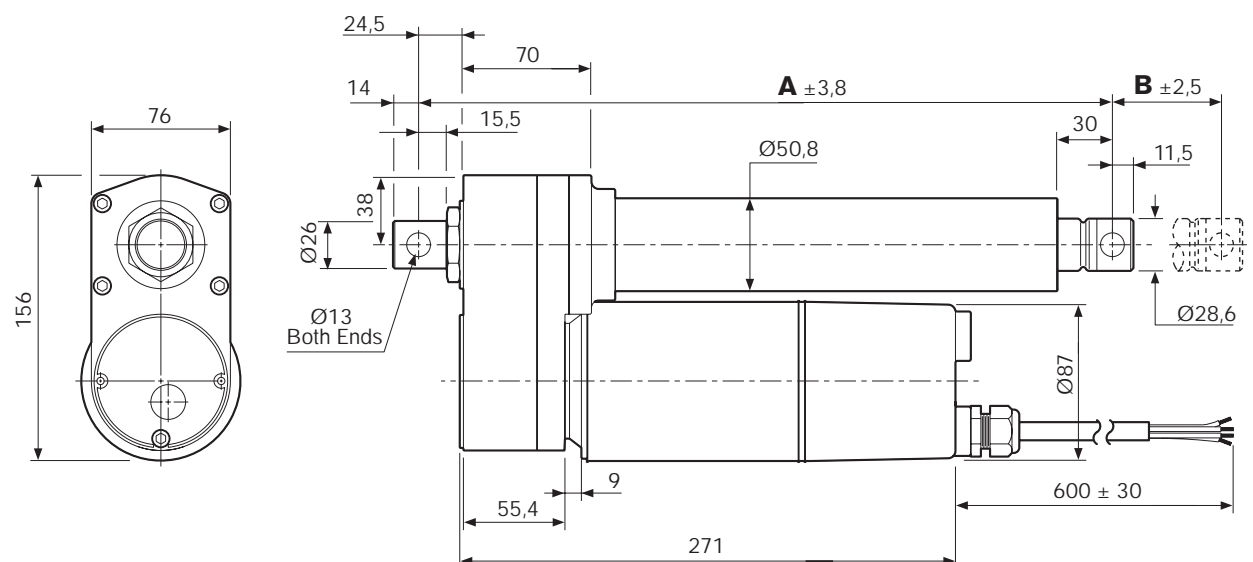
## Dimensions (mm)

### With Limit Switches

A-Track 5 Ball screw	Stroke	100	150	200	300	450	600
	A	456	506	556	658	810	962
B	102	153	203	305	457	610	

### Without Limit Switches

A-Track 5 Ball screw	Stroke	100	150	200	300	450	600
	A	380	431	481	583	735	887
B	102	153	203	305	457	610	



# A-Track 10

## DC motor ball screw

Up to 4500 N load rated

Up to 45 mm/s Speed



The **A-Track 10** actuator is a DC motor driven, ball screw design suitable for applications requiring high load capacity. The **A-Track 10** incorporates seals and O-rings to provide protection when used in outdoor, mobile or ambient contamination environments. This unit includes an integral load holding brake to provide stationary load holding while still providing the efficiency of a ball screw design actuator. The Model 10 provides load capacities up to 4500 N with stroke lengths to 600 mm.

## Features

- Efficient ball screw drive system
- Load holding brake standard
- Overload clutch standard
- 100 to 600 mm stroke lengths
- Thermal overload incorporated into the motor

## Typical applications

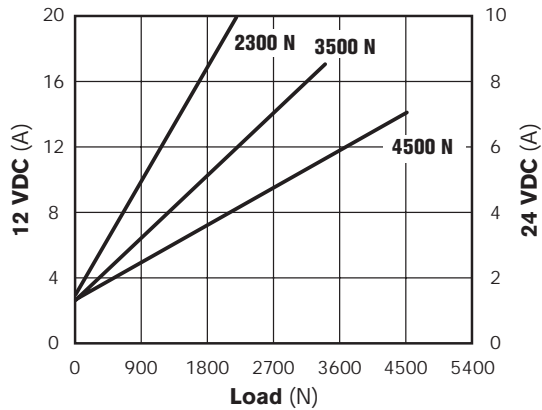
- Heavy duty platform lifts
- Deck and implement lifts for tractors and mobile applications
- Wheelchair and scooter lifts
- Bin and tank cover lifts

## Specifications

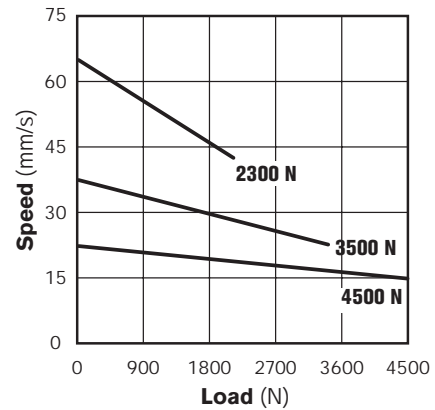
Load Capacity	N	2300	3500	4500
Speed at Full Load	mm/s	45	22	13
Input Voltage	VDC	12 or 24 VDC		
Static Load Capacity	N	13500		
Stroke Length	mm	100, 150, 200, 300, 450 and 600		
Clevis Ends	mm	Ø 13		
Duty Cycle	%	25%		
Operation Temperature Range	°C	-25°C to +65°C		
Limit Switch	-	Optional adjustable travel limit switch (20:1 only) (4500 N)		
Potentiometer	Ohm	Optional		
Restraining Torque	Nm	11,2		
Thermal Overload	-	Overload clutch and motor thermal overload		

## Performance curves

### Current vs load



### Speed vs load



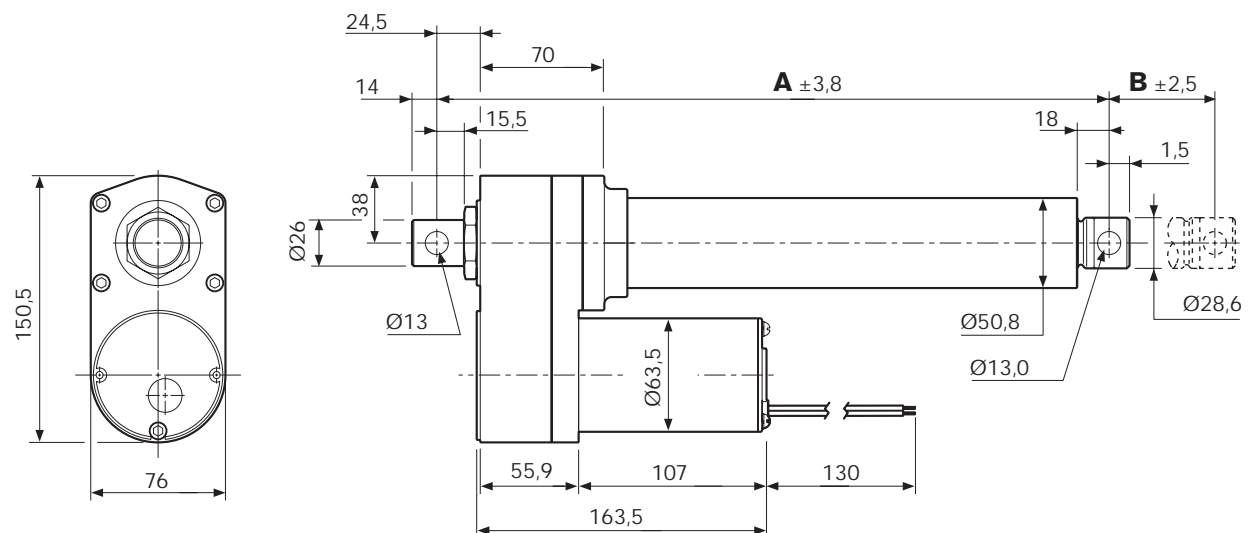
## Dimensions (mm)

### With Limit Switches

A-Track 10 Ball screw	Stroke	100	150	200	300	450	600
	A	378	429	479	580	810	962
	B	98	150	201	302	457	610

### Without Limit Switches

A-Track 10 Ball screw	Stroke	100	150	200	300	450	600
	A	302	353	404	505	735	887
	B	98	150	201	302	457	610



# B-Track - Features

## Rugged Duty Actuators

### Key Features

- Weather-tight sealed
- Patented in-line load transfer
- Heavy wall rod and cover tube
- High performance motors
- Up to 9800 N capacity

### Standard models

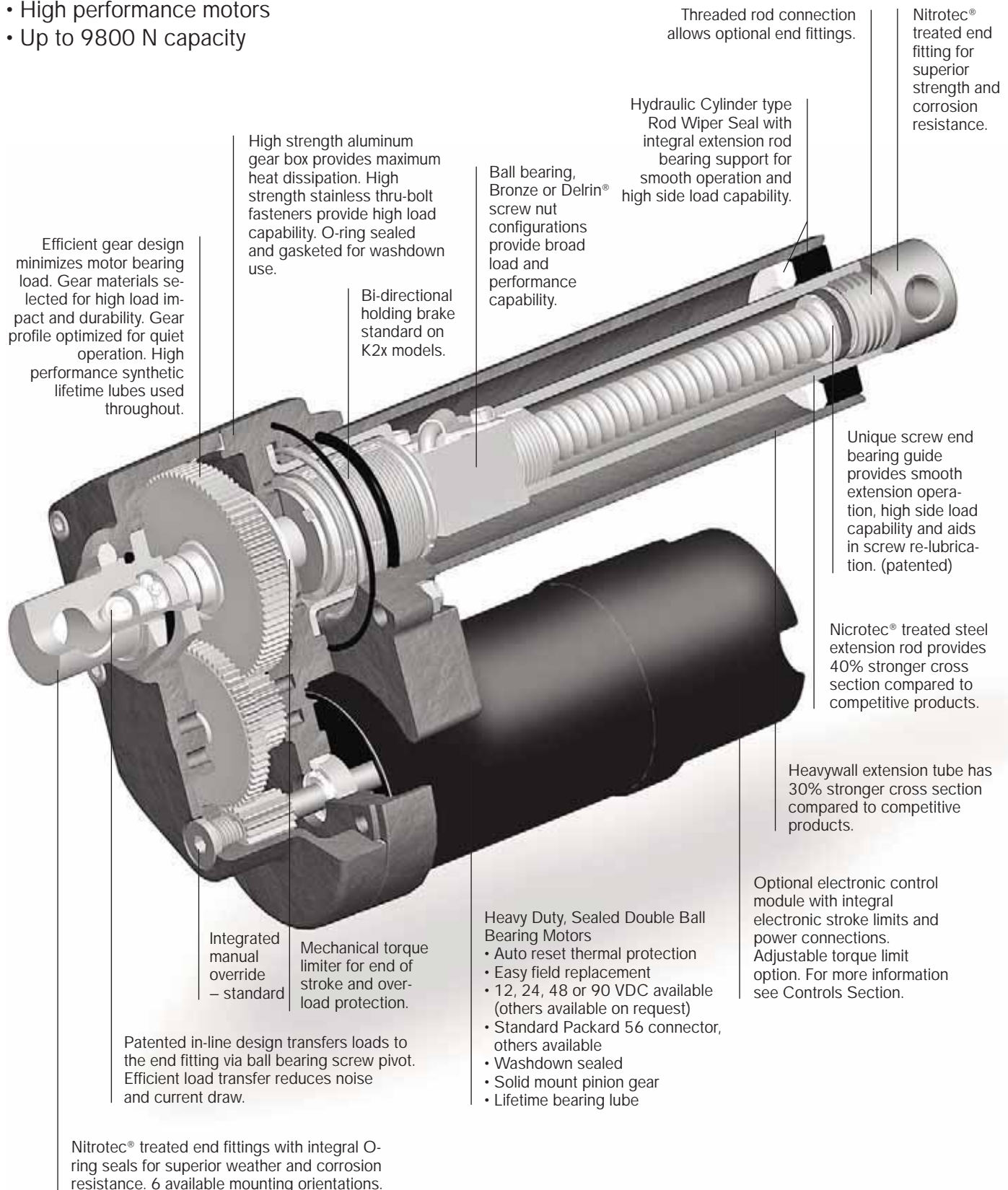
K2VL, K2, K2X

### Option models

K2PL/K2XPL

K2JS/K2XJS

K2RA



## How to select

### Step 1 – Determine load and stroke length requirements

Use the Quick Selection guide to identify the model family that will provide the load capacity and stroke length needed for your application

### Step 2 – Determine Gear Ratio

Select gear ratio from performance curves for allowable current draw and needed load

### Step 3 – Identify motor type and voltage

Select DC motor and motor voltage.

### Step 4 – Motor Type

Select M for ignition protected motor. Select needed motor voltage.

### Step 5 – Confirm the application Duty Cycle

At full load capacity, actuators have a 25% duty cycle. Duty cycle is the amount of 'on-time' compared to cooling time. A unit that runs for 15 seconds should be off for 45 seconds.

### Step 6 – Select Nut Type

Select nut for unit selected. (K2x are all ball bearing).

### Step 7 – Select Stroke Length

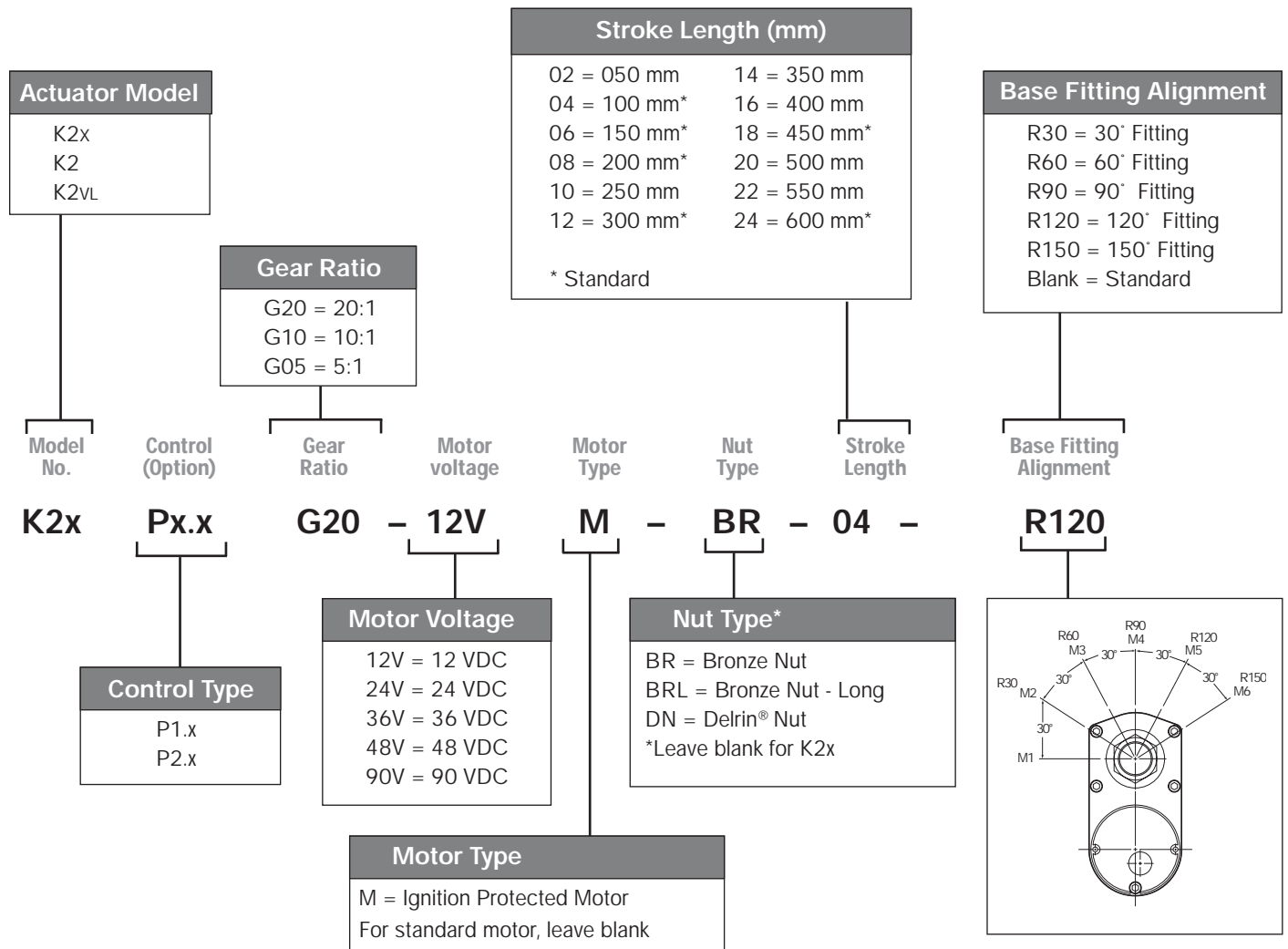
Choose standard lengths from chart. For special length consult factory.

### Step 8 – Select end fitting orientation

Leave blank for standard orientation.

### Important Unit Restrictions

Side loading and shock loads must be considered in actuator applications. Side loading and cantilevered mounting should be eliminated through proper machine design. Side loading will dramatically reduce unit life. While actuators can withstand limited shock loads, it is recommended that shock loading be avoided wherever possible. (See page 35).



# B-Track - K2vL

## Rugged Duty Actuator DC Motor Acme Screw

Up to 3400 N load rated

Up to 50 mm/s Speed



This value model of the B-track family is well suited for the toughest applications not needing the full load capability of standard K2 models. The **K2vL** uses a flange bronze bearing configuration for internal load transfer, offering the lowest cost while maintaining the rugged-duty performance capabilities of the B-track family.

**K2vL** units feature Nicrotec® corrosion protection on end fittings and rods, high performance powder coat paint on cover tubes and gear box covers, providing a totally sealed, weatherproof, and durable finish for years of trouble-free service.

### Features

- Protective coatings and O-ring seals throughout
- Hybrid nut and screw design, no brake needed
- Ball detent overload clutch
- 50 to 600 mm stroke lengths
- Up to 3400 N load capacities
- Speeds up to 50 mm/s travel
- Thermal overload incorporated into the motor
- Heavy wall construction
- Double ball bearing motors
- Heat treated gears
- Rugged extension rod bearing support
- Optional 90 VDC motor for use with SBC-AC control
- Custom mounting options available

### Typical applications

- Flow gate open/close
- Deck and implement lifts for tractors and mobile applications
- Wheelchair and scooter lifts
- Bin and tank cover lifts
- Remote engine clutch engagement

### Load/Current/Speed/Duty Cycle

- Maximum Static Rating: 13500 N Static (in-line load)
- Refer to performance chart for load/current/speed capabilities
- Stroke Length Tolerance: +/- 1,5 mm
- Motor is protected with auto reset breaker inside motor housing (temperature/current/time dependent)
- Overload clutch setting: +25% over rated dynamic load
- Duty cycle is time/temperature/load dependent, suggested guidelines are:
  - 50% max on-time/50% off-time for loads up to 50% of capability
  - 25% max on-time/75% off-time for loads between 50%-80% of capability
  - 10% max on-time/90% off-time for loads between 80%-100% of capability(Load/stroke profiles will allow some adjustment variation from these guidelines.)

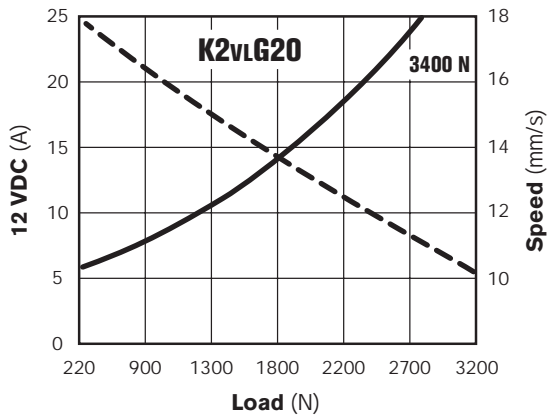
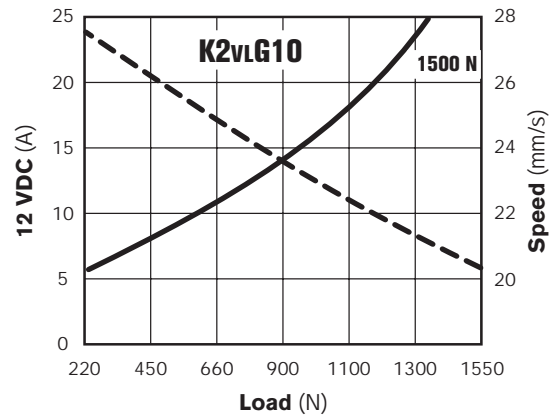
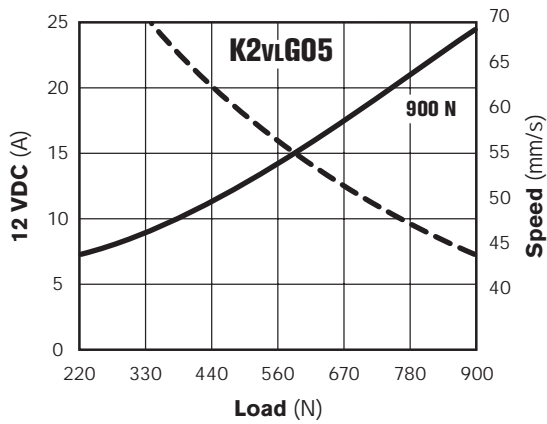
### Operating Environment

- Ambient temp range: -35°C to +65°C
- Weather resistant enclosure & seals (IP 65 capable, 250 hour salt spray, 500 hour for paint)
- Normal operating voltage: 10-16 vdc (Ratings are at 12 vdc Normal.)

### Control/Connections

- 14 gauge stranded lead wires-UL style 1230 w/PVC insulation Class F 105°C
- Lead wires abrasion protected with braided covering
- Use momentary contact double pole/double throw switch in powering unit for extend/retract operation. (ON)-OFF-(ON) DPDT
- Connectors:
  - Packard 56 series or Delphi Weather-Pack
  - Packard 56 series with 56 series blades (#2984883 & #2962987)
  - Delphi Weather-Pack series (#121015792 & #12010973)

## Performance curves

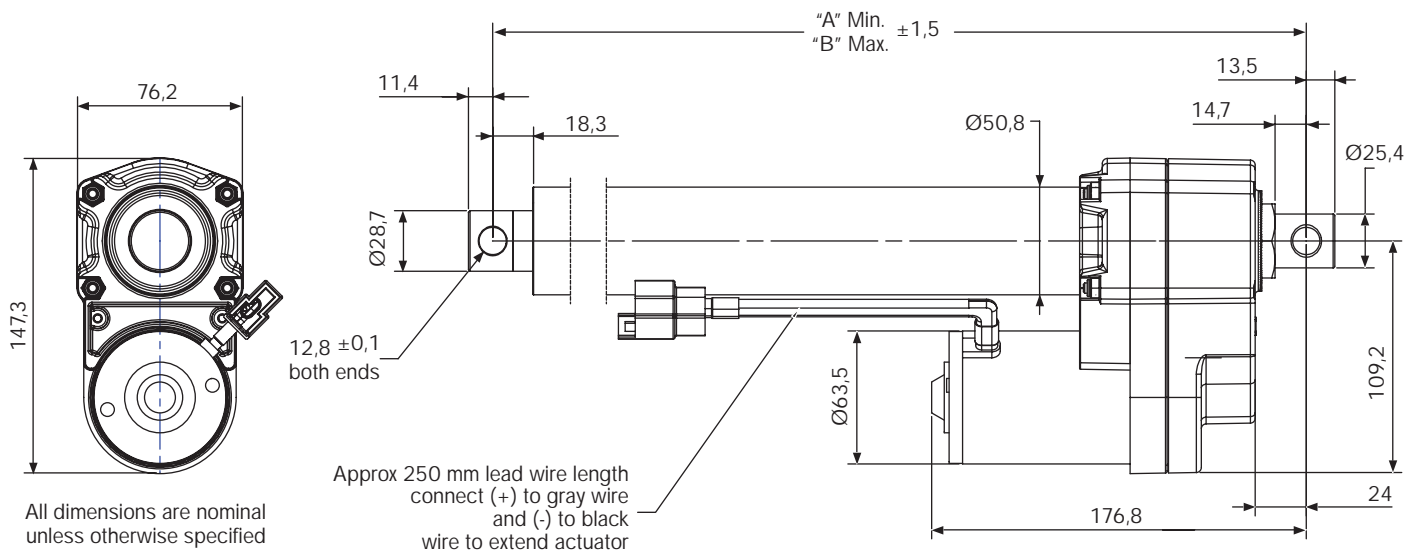


Current draw ———  
Speed - - - - -

## Dimensions (mm)

B-Track K2vL	Stroke	050	100	150	200	250	300	350	400	450	500	550	600
	A Min.	211	262	312	364	414	465	516	567	618	745	795	846
	B Max.	262	363	465	567	668	770	872	973	1075	1253	1354	1456

Note: Special lengths available



# B-Track - K2

## Rugged Duty Actuator DC Motor Acme Screw

Up to 5400 N load rated

Up to 50 mm/s Speed



Shown with optional BTC control

The **K2** is the base model in the **B-Track** family. It incorporates a patented in-line load transfer design which provides high load capability for rugged-duty use, efficient power use, compact package size, excellent corrosion and washdown protection, and high performance synthetic lubrication for life, all at an affordable price.

The **K2** uses a solid bronze or Delrin® nut with a rolled hybrid screw yielding high impact capability and long screw life. Heavy-duty double-ended ball bearing motors, hardened gears, O-ring seals and an extension rod bearing system that provides best in class capabilities.

### Features

- Protective coatings and O-ring seals throughout
- Patented in-line load system
- Hybrid nut and screw design, no brake needed
- Ball detent overload clutch
- 50 to 600 mm inch stroke lengths
- Up to 5400 N load capacities
- Speeds up to 50 mm/s travel
- Thermal overload incorporated into the motor
- Heavy wall construction
- Double ball bearing motors and heat treated gears
- Rugged extension rod bearing support
- Optional 90 VDC motor for use with SBC-AC control
- Custom mounting options available

### Typical applications

- Heavy duty platform and engine lifts
- Deck and implement lifts for tractors and mobile applications
- Wheelchair and scooter lifts
- Bin and tank cover lifts
- Flow gate open/close
- Table positioning

### Load/Current/Speed/Duty Cycle

- Maximum Static Rating: 13500 Nm Static (in-line load)
- Refer to performance chart for load/current/speed capabilities
- Stroke Length Tolerance: +/- 1,5 mm
- Motor is protected with auto reset breaker inside motor housing (temperature/current/time dependent)
- Overload clutch setting: +25% over rated dynamic load
- Duty cycle is time/temperature/load dependent, suggested guidelines are:
  - 50% max on-time/50% off-time for loads up to 50% of capability
  - 25% max on-time/75% off-time for loads between 50%-80% of capability
  - 10% max on-time/90% off-time for loads between 80%-100% of capability(Load/stroke profiles will allow some adjustment variation from these guidelines.)

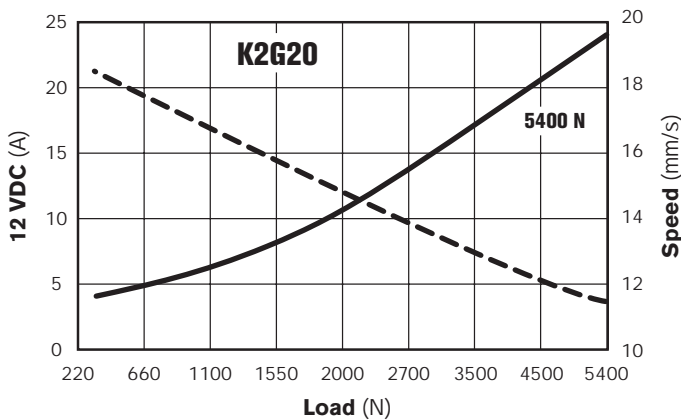
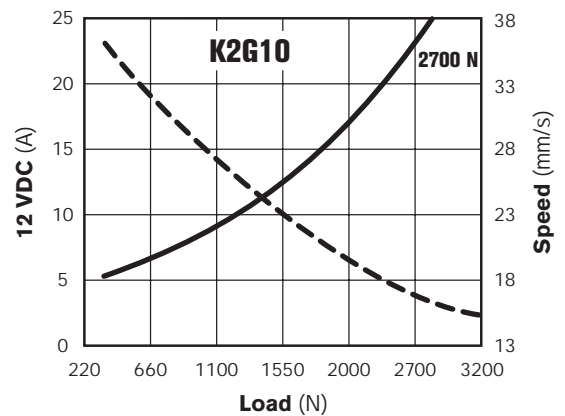
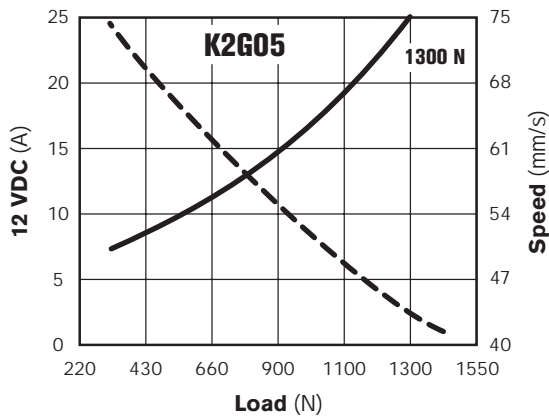
### Operating Environment

- Ambient temp range: -35°C to +65°C
- Weather resistant enclosure & seals (IP 65 capable, 250 hour salt spray, 500 hour for paint)
- Normal operating voltage: 10-16 VDC (Ratings are at 12 VDC Normal.)

### Control/Connections

- 14 gauge stranded lead wires-UL style 1230 w/PVC insulation Class F 105°C
- Lead wires abrasion protected with braided covering
- Use momentary contact double pole/double throw switch in powering unit for extend/retract operation. (ON)-OFF-(ON) DPDT
- Connectors:
  - Packard 56 series or Delphi Weather-Pack
  - Packard 56 series with 56 series blades (#2984883 & #2962987)
  - Delphi Weather-Pack series (#121015792 & #12010973)

## Performance curves

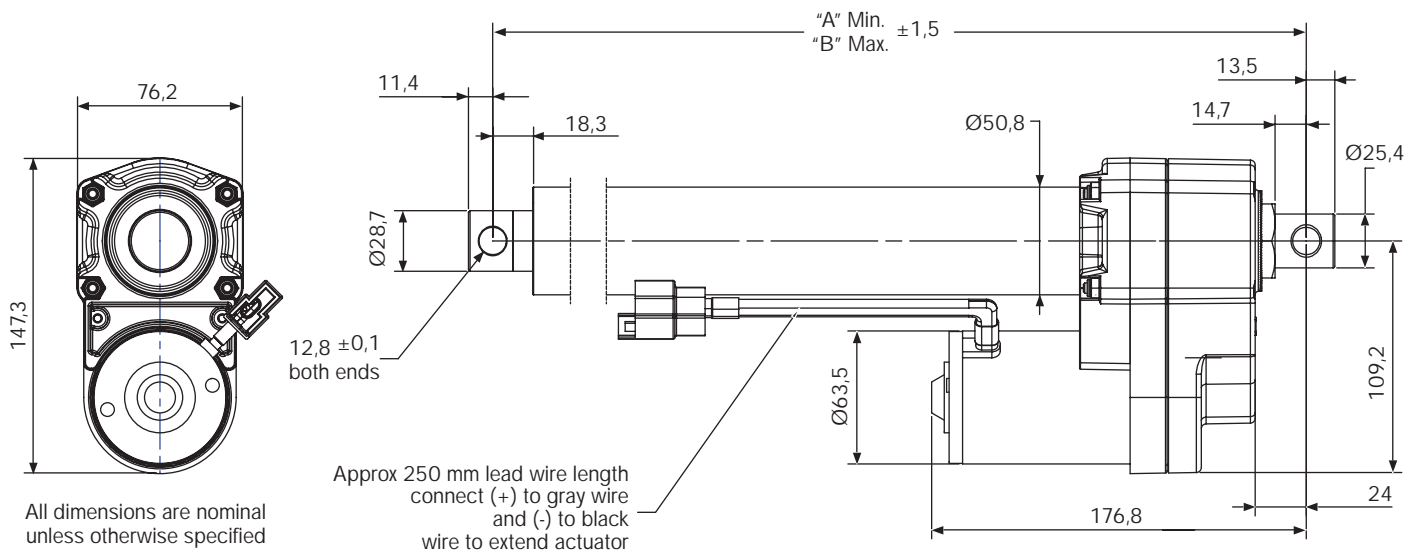


Current draw ———  
Speed - - - - -

## Dimensions (mm)

B-Track K2	Stroke	050	100	150	200	250	300	350	400	450	500	550	600
	A Min.	211	262	312	364	414	465	516	567	618	745	795	846
	B Max.	262	363	465	567	668	770	872	973	1075	1253	1354	1456

Note: Special lengths available



# B-Track - K2x

## Rugged Duty Actuator DC Motor - Ball Screw

Up to 9800 N load rated

Up to 50 mm/s. Travel Speed



CE

The **K2x** model provides the highest load rating in its class. This model incorporates all of the base K2 features with a ball nut screw for a 9800 N load capability within a compact package size. The **K2x** includes a bi-directional wrap spring brake for load holding capability. These units are well suited for the most demanding applications where an alternative to hydraulic or air cylinders is needed or where hydraulic power sources are not available.

Combining the **K2x** actuator with BTc control functionality results in precision actuator control at a fraction of the cost of more complicated servo actuator systems. See Controls Section for more information on BTc controls.

### Features

- Protective coatings and O-ring seals throughout
- Efficient in-line ball screw system
- Integral load holding brake
- Ball detent overload clutch
- 50 to 600 mm stroke lengths
- Up to 9800 N load capacities
- Speeds up to 50 mm/s travel
- Thermal overload incorporated into the motor
- Heavy wall construction
- Double ball bearing motors and heat treated gears
- Rugged extension rod bearing support
- Optional 90 VDC motor for use with SBC-AC control
- Custom mounting options available

### Typical applications

- Paving equipment
- Deck and implement lifts for tractors and mobile applications
- Spray booms
- Scissor and dump box lifts

### Load/Current/Speed/Duty Cycle

- Maximum Static Rating: 13500 Static (in-line load)
- Refer to performance chart for load/current/speed capabilities
- Stroke Length Tolerance: +/- 1,5 mm
- Motor is protected with auto reset breaker inside motor housing (temperature/current/time dependent)
- Overload clutch setting: +25% over rated dynamic load
- Duty cycle is time/temperature/load dependent, suggested guidelines are:
  - 50% max on-time/50% off-time for loads up to 50% of capability
  - 25% max on-time/75% off-time for loads between 50%-80% of capability
  - 10% max on-time/90% off-time for loads between 80%-100% of capability(Load/stroke profiles will allow some adjustment variation from these guidelines.)

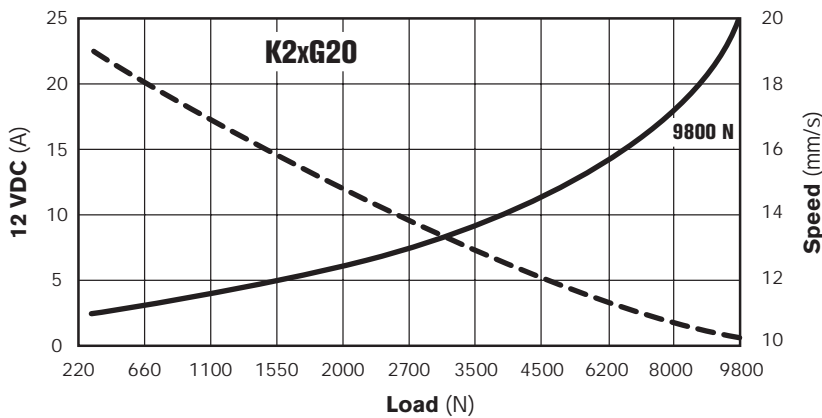
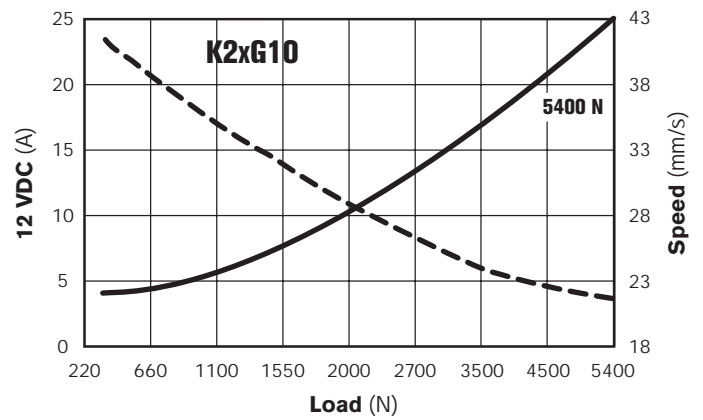
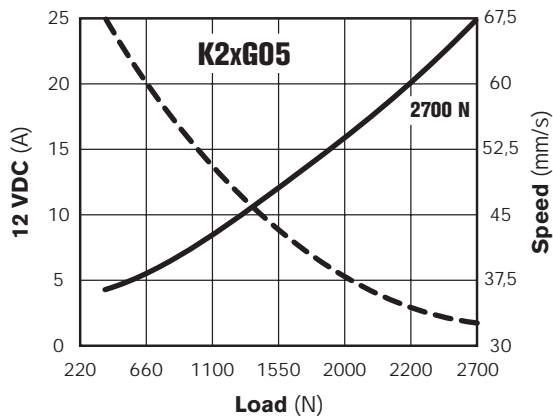
### Operating Environment

- Ambient temp range: -35°C to +65°C
- Weather resistant enclosure & seals (IP 65 capable, 250 hour salt spray, 500 hour for paint)
- Normal operating voltage: 10-16 VDC (Ratings are at 12 VDC Normal.)

### Control/Connections

- 14 gauge stranded lead wires-UL style 1230 w/PVC insulation Class F 105°C
- Lead wires abrasion protected with braided covering
- Use momentary contact double pole/double throw switch in powering unit for extend/retract operation. (ON)-OFF-(ON) DPDT
- Connectors:
  - Packard 56 series or Delphi Weather-Pack
  - Packard 56 series with 56 series blades (#2984883 & #2962987)
  - Delphi Weather-Pack series (#121015792 & #12010973)

## Performance curves

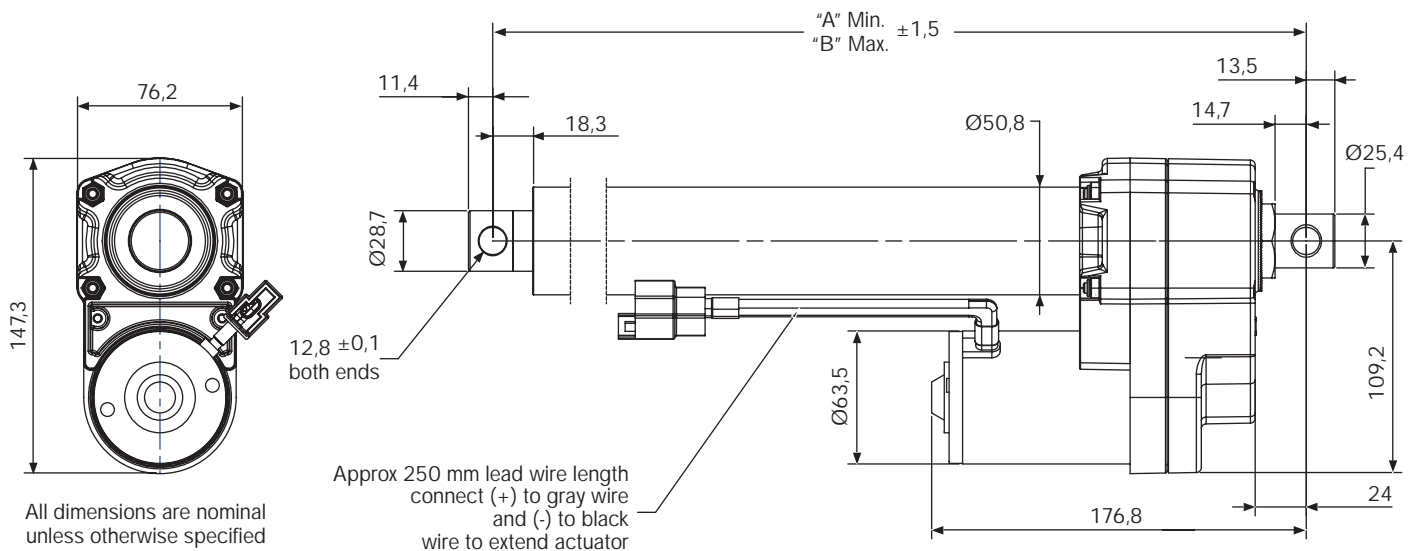


**Current draw** ———  
**Speed** - - - - -

## Dimensions (mm)

B-Track K2x	Stroke	050	100	150	200	250	300	350	400	450	500	550	600
	A Min.	251	302	353	404	454	505	556	607	658	785	835	886
	B Max.	302	404	505	607	708	810	912	1013	1115	1293	1394	1490

**Note:** Special lengths available

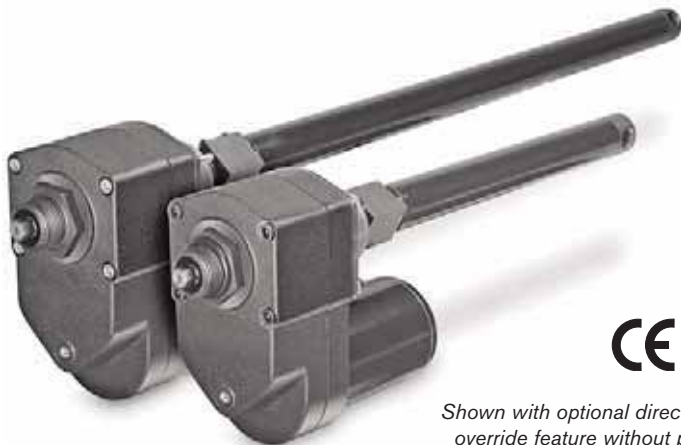


# B-Track - K2PL / K2XPL

## Power Lift Actuator DC Motor - Acme or Ball Screw

Up to 9800 N load rated

Up to 50 mm/s Travel Speed



Shown with optional direct drive manual override feature without protective cap.

**B-Track Power Lift** models are modified K2 or K2x actuators. Power Lift units utilize all the standard components and retain all the performance features of the K2 family, without the external cover tube. This allows the Power Lift actuator features to be integrated into a variety of customer designed structures, where a cover tube is not needed.

Extended gear box screws are provided allowing easy attachment to a customer frame. A straight through manual override option is available as shown above.

## Features

- Protective coatings and O-ring seals throughout
- Efficient in-line ball screw system
- Patented hybrid nut and screw design, no brake needed in K2 model.
- Integral load holding brake on K2x model
- Ball detent overload clutch
- 100 to 600 mm stroke lengths
- Up to 9800 N load capacities
- Speeds up to 50 mm/s travel
- Thermal overload incorporated into the motor
- Heavy wall construction
- Double ball bearing motors and heat treated gears
- Optional 90 VDC motor for use with SBC-AC control
- Custom mounting options available

## Typical applications

- Wheelchair and scooter lifts
- Traffic signs
- Beds and tables
- Light masts

## Load/Current/Speed/Duty Cycle

- Maximum Static Rating: 13500 N Static (in-line load)
- Refer to performance chart for load/current/speed capabilities
- Stroke Length Tolerance: +/- 1,5 mm
- Motor is protected with auto reset breaker inside motor housing (temperature/current/time dependent)
- Overload clutch setting: +25% over rated dynamic load
- Duty cycle is time/temperature/load dependent, suggested guidelines are:
  - 50% max on-time/50% off-time for loads up to 50% of capability
  - 25% max on-time/75% off-time for loads between 50%-80% of capability
  - 10% max on-time/90% off-time for loads between 80%-100% of capability(Load/stroke profiles will allow some adjustment variation from these guidelines.)

## Operating Environment

- Ambient temp range: -30°C to +65°C
- Weather resistant enclosure & seals (IP 65 capable, 250 hour salt spray, 500 hour for paint)
- Normal operating voltage: 10-16 VDC (Ratings are at 12 VDC Normal.)

## Control/Connections

- 14 gauge stranded lead wires-UL style 1230 w/PVC insulation Class F 105°C
- Lead wires abrasion protected with braided covering
- Use momentary contact double pole/double throw switch in powering unit for extend/retract operation. (ON)-OFF-(ON) DPDT
- Connectors:
  - Packard 56 series or Delphi Weather-Pack
  - Packard 56 series with 56 series blades (#2984883 & #2962987)
  - Delphi Weather-Pack series (#121015792 & #12010973)

# B-Track - K2PL / K2XPL

## Performance curves

See page 25 for K2PL and page 27 for K2XPL

## Dimensions (mm)

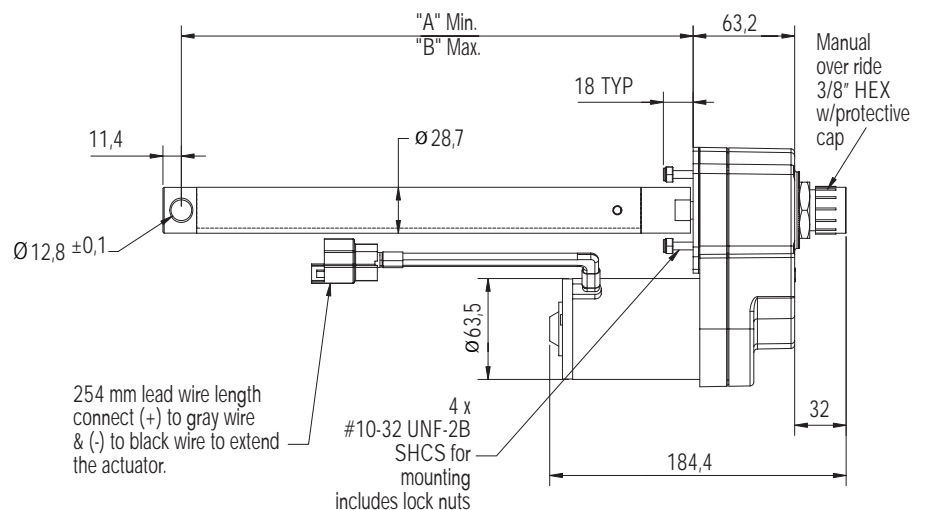
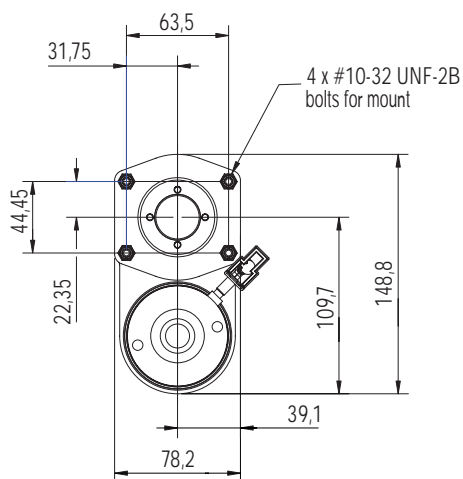
B-Track K2PL	Stroke	100	150	200	250	300	350	400	450	500	550	600
	A Min.	178	229	280	331	382	432	483	534	585	636	687
	B Max.	357	459	560	662	764	865	967	1068	1170	1272	1373

Note: Special lengths available

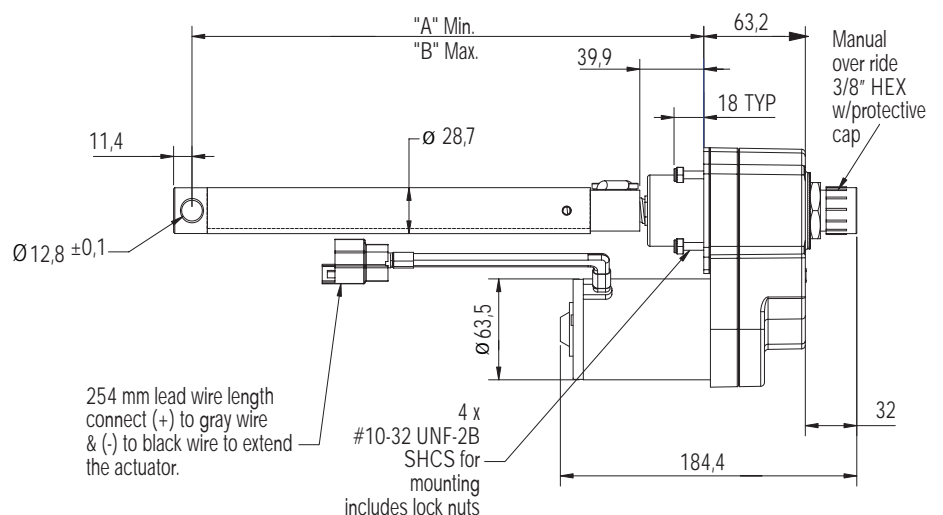
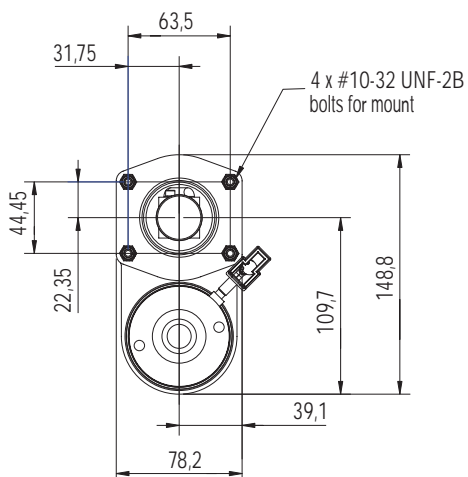
B-Track K2XPL	Stroke	100	150	200	250	300	350	400	450	500	550	600
	A Min.	216	267	318	369	420	470	521	572	623	674	725
	B Max.	318	420	521	623	725	826	928	1029	1131	1233	1334

Note: Special lengths available

### B-Track K2PL



### B-Track K2XPL



# B-Track - K2Js / K2xJs

## Jack Stand Actuator DC Motor – Acme or Ball Screw

Up to 9800 N load rated

Up to 50 mm/s Travel Speed



*Shown with optional switch box, direct drive manual override and footpad.*

The **B-Track Jack Stand** actuator incorporates a large diameter extension rod providing the maximum offset load capability within the K2 family. The extension rod is slightly smaller than the cover tube and slides on Teflon® bearings within the cover tube. This feature makes the K2JS suitable for large load free-standing use.

A number of mounting options are available including trunnion mounts, or with standard flange plate (as shown). These units can be customized with an integral switch box, direct drive manual override, or pivoting footpad.

## Features

- Protective coatings and O-ring seals throughout
- Efficient in-line ball screw system
- Integral load holding brake on K2x model
- Ball detent overload clutch
- 200 to 400 mm stroke lengths
- Up to 9800 N load capacities
- Speeds up to 50 mm/s travel
- Thermal overload incorporated into the motor
- Heavy wall construction
- Double ball bearing motors and heat treated gears
- Rugged extension rod bearing support
- Optional 90 VDC motor for use with SBC-AC control
- Custom mounting options available

## Typical applications

- Trailer jack stands
- Trailer and vehicle outriggers
- Implement lifts
- Machine height adjustment
- Camper lifts & Load Levelers

## Load/Current/Speed/Duty Cycle

- Maximum Static Rating: 13500 N Static (in-line load)
- Refer to performance chart for load/current/speed capabilities
- Stroke Length Tolerance: +/- 1,5 mm
- Motor is protected with auto reset breaker inside motor housing (temperature/current/time dependent)
- Overload clutch setting: +25% over rated dynamic load
- Duty cycle is time/temperature/load dependent, suggested guidelines are:
  - 50% max on-time/50% off-time for loads up to 50% of capability
  - 25% max on-time/75% off-time for loads between 50%-80% of capability
  - 10% max on-time/90% off-time for loads between 80%-100% of capability(Load/stroke profiles will allow some adjustment variation from these guidelines.)

## Operating Environment

- Ambient temp range: -35°C to +65°C
- Weather resistant enclosure & seals (IP 65 capable, 250 hour salt spray, 500 hour for paint)
- Normal operating voltage: 10-16 VDC (Ratings are at 12 VDC Normal.)

## Control/Connections

- 14 gauge stranded lead wires-UL style 1230 w/PVC insulation Class F 105°C
- Lead wires abrasion protected with braided covering
- Use momentary contact double pole/double throw switch in powering unit for extend/retract operation. (ON)-OFF-(ON) DPDT
- Connectors:
  - Packard 56 series or Delphi Weather-Pack
  - Packard 56 series with 56 series blades (#2984883 & #2962987)
  - Delphi Weather-Pack series (#121015792 & #12010973)



# B-Track - K2RA

## Rotary Actuator DC Motor

Up to 15,8 Nm load rated

Speeds from 250 to 850 RPM



Shown with extended gear box screws for ease of attachment.



Optional configurations

### Features

- Protective coatings and O-ring seals throughout
- Efficient in-line ball screw system
- Ball detent overload clutch
- Speeds up to 850 RPM
- Thermal overload incorporated into the motor
- Heavy wall construction
- Double ball bearing motors and heat treated gears
- Rugged output bearing support
- Customized mounting configurations available
- Optional 24 VDC motor available to provide more speed selections

### Typical applications

- Salt/seed spreaders
- Scooter lift mechanisms
- Spout rotation
- Turntables
- Cable winch

**K2RA** rotary actuators are motor driven gear boxes and use the base drive design and components of the K2 linear actuator. **K2RA** models incorporate all of the features of the K2 model providing excellent weatherproofing for outdoor applications. The same long-life motors, hardened gears, corrosion protection, and lubrication are utilized. Several output shaft and mounting configurations are available with the standard configuration shown above.

### Load/Current/Speed/Duty Cycle

- Maximum Static Rating: 13500 N Static (in-line load)
- Refer to performance chart for load/current/speed capabilities
- Motor is protected with auto reset breaker inside motor housing (temperature/current/time dependent)
- Overload clutch setting: match customer requirements
- Duty cycle is time/temperature/load dependent, suggested guidelines are:
  - 50% max on-time/50% off-time for loads up to 50% of capability
  - 25% max on-time/75% off-time for loads between 50%-80% of capability
  - 10% max on-time/90% off-time for loads between 80%-100% of capability(Load/stroke profiles will allow some adjustment variation from these guidelines.)

### Operating Environment

- Ambient temp range: -35°C to +65°C
- Weather resistant enclosure & seals (IP 65 capable, 250 hour salt spray, 500 hour for paint)
- Normal operating voltage: 12, 24, 36, 48 VDC (Ratings are at 12 VDC Normal.)

### Control/Connections

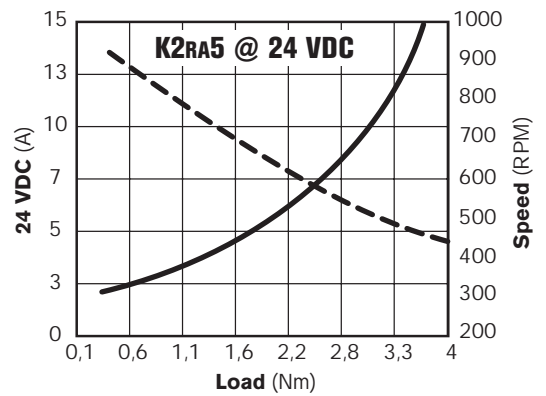
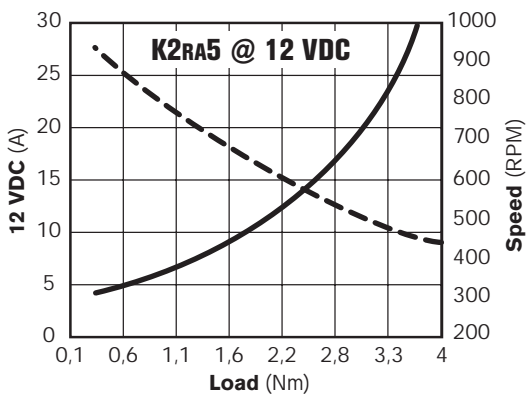
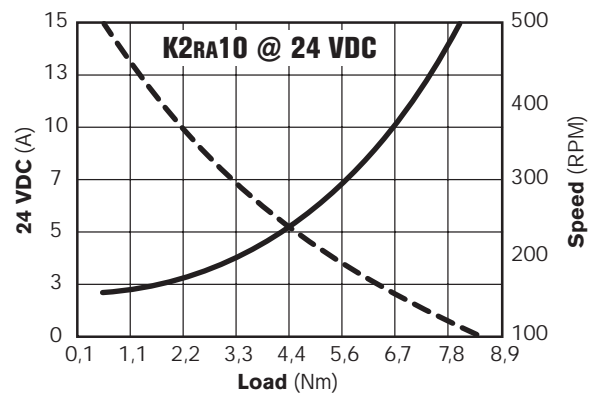
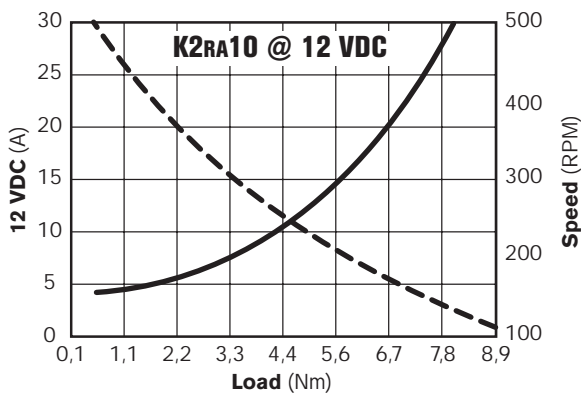
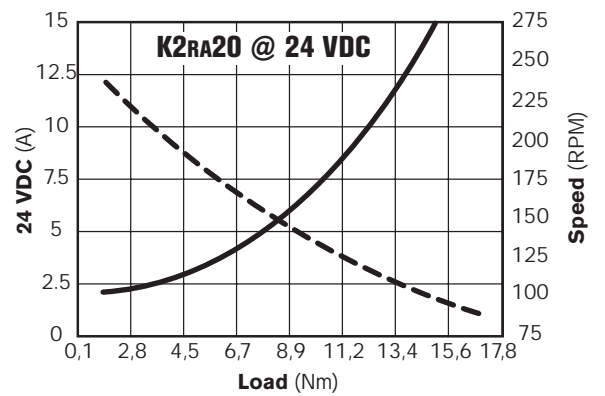
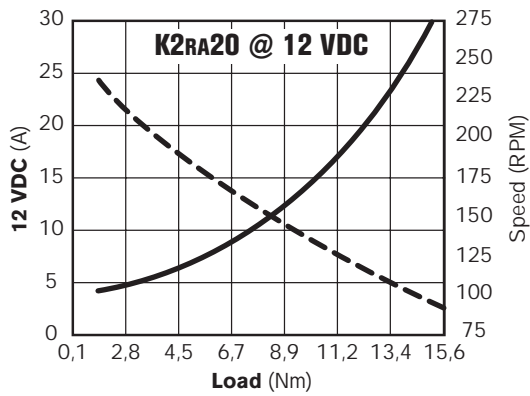
- 14 gauge stranded lead wires-SAE J1128 SXL cross linked polyethylene insulation class F 125°C
- Lead wires abrasion protected with braided covering
- Use momentary contact double pole/double throw switch in powering unit. (ON)-OFF-(ON) DPDT
- Connectors:
  - Packard 56 series or Delphi Weather-Pack
  - Packard 56 series with 56 series blades (#2984883 & #2962987)
  - Delphi Weather-Pack series (#121015792 & #12010973)

## Performance curves

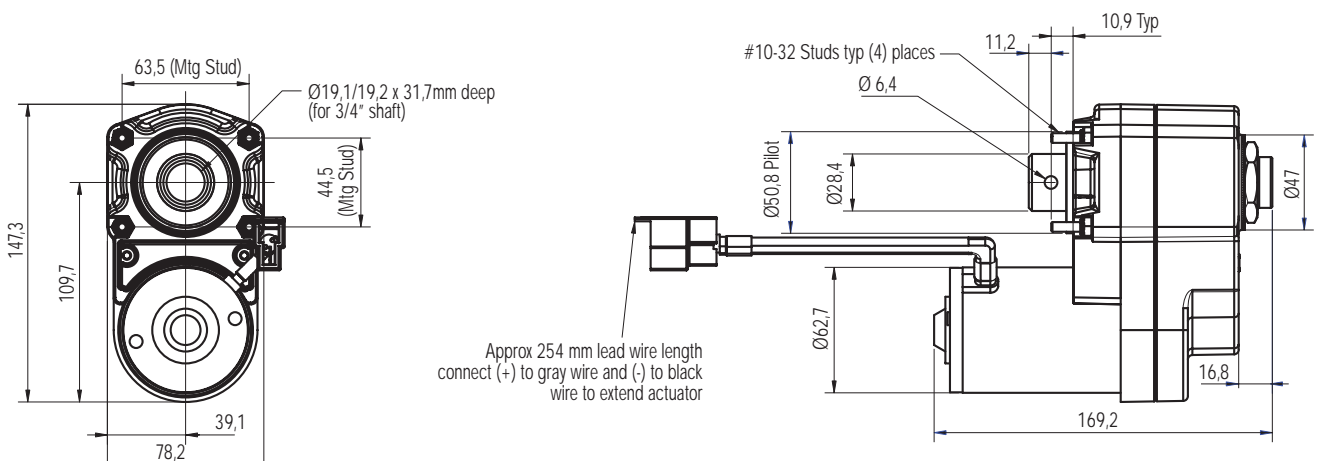
## Speed & load

Current draw ———

Speed - - - - -



## Dimensions (mm)



# Custom Actuators

Warner Linear offers a broad range of standard actuators to suit many needs. We realize though, that often special application parameters dictate special actuator configurations and modifications. Warner Linear actuators are designed with this in mind, as many of our products can be readily customized to suit specific requirements.

Our products are built on modules that can be mixed and matched in final assembly. Our final assembly operations are configured to provide flexible assembly to accommodate custom orders, quickly and cost effectively.

If your application has a special need that our standard catalogue products are unable to fit, please contact your Warner Linear representative or consult with our technical specialists so we can configure a product to fit your need.

## A few of our standard special offerings:

- Special pin to pin lengths and stroke lengths
- Special end fittings and mounting configurations
- Special paints and motor lead wire lengths and connectors



*Examples of special request features (shown above)*

## Rod End Mounting Option Examples

(consult factory for more options)

1. 1/2" (12,7 mm) Threaded rod end
2. 5/8" (15,9 mm) Threaded rod end
3. 1/2" (12,7 mm) Spherical rod end
4. 5/8" (15,9 mm) Spherical rod end
5. 1" (25,4 mm) Extended rod end
6. Flat sided rod end
7. Vibra mount rod end
8. 1/2" (12,7 mm) Threaded gear box end
9. 3/8" (9,4 mm) Rod end insert

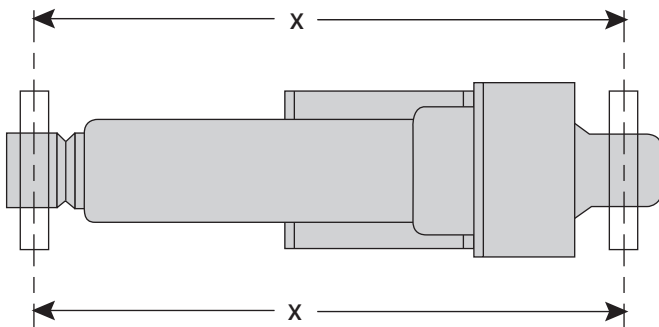


Consult with factory for specific mounting configuration needs.

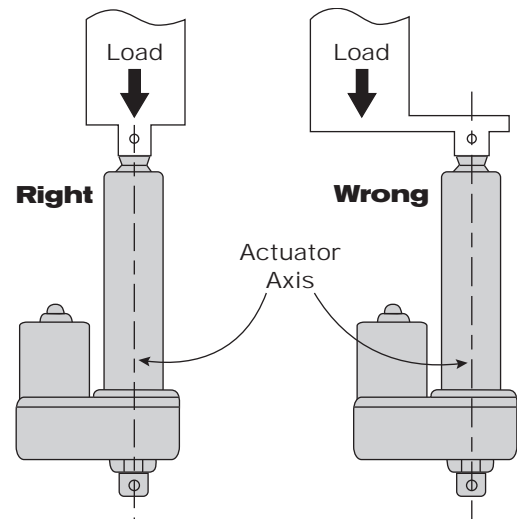
# General Mounting Information

Warner Linear actuators are quickly and easily mounted by slipping pins through the holes at each end of the unit and into the brackets on the machine frame and load to be moved.

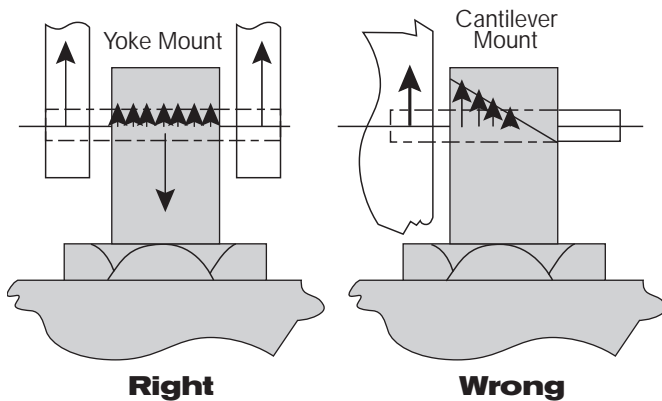
Use of solid pins provide maximum holding capability with a retaining ring or cotter pin on each end to prevent the solid pin from falling out of the mounting bracket (it is best to avoid roll pins and spring pins).



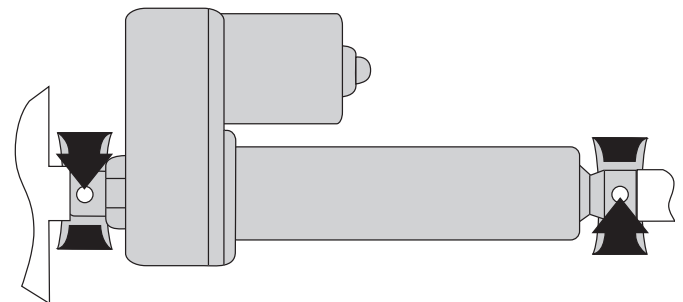
Mounting pins must be parallel to each other as shown above. Pins which are not parallel can cause excess vibration or actuator binding.



Loads should act along the axis of the actuator. Off-center loads may cause binding and lead to premature unit failure.



Ensure that mounting pins are supported at both ends. Cantilevered mounting is unacceptable. Failure to provide proper support will shorten unit life.



Do not attempt to mount M-Track or A-Track actuators by the cover tube. The tube is not designed to support the forces required for tube mounting.

It is very important to use the right cable size in order to supply enough current to the actuator. Otherwise we may face a huge voltage drop which will affect the operation speed and the motor lifetime. Please find below a guide line for the cable size :

Wire section (mm <sup>2</sup> )	Current (A)	Remark
1,5	16	
2,5	20*	*or 16 A for long lead length
4	25	
6	32	

All actuator mounting supports must be capable of withstanding the load and torque developed when the unit extends or retracts. Restraining torque values are also provided with the details on each unit.

- M-Track** Torque created 2,24 Nm
- All others** Torque created 11,2 Nm

## **Warner Linear Actuator Controls available for a wide variety of applications**

Warner Linear provides a full line of actuator controls well suited for a broad range of application needs.

They range from simple to use switch box controls for basic extend/retract function, to state-of-the-art micro-processor based digital electronic controls using SMT design and manufacturing processes.

### **Offered functions:**

**Basic extend and retract**

**Electric switch and electronic stroke limits**

**End of stroke outputs**

**Position feedback potentiometer and encoder outputs**

**Electronic current limit – fixed and programmable**

**Electronic dynamic braking**

**Fixed, manual and electronic adjustable end stops**

**Signal follower**

## **Performance Features**

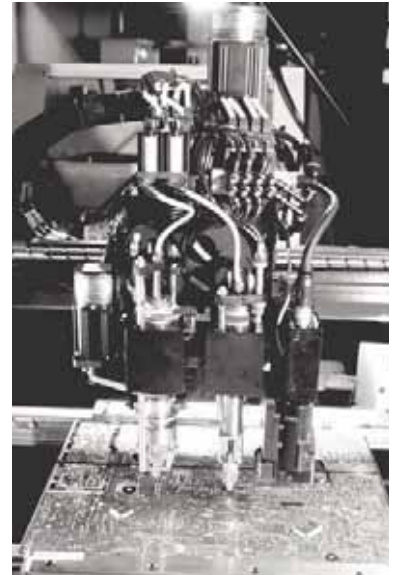
### **Dependable Operation**

Warner Linear controls are state-of-the-art using surface mount electronic components and automated circuit board manufacturing methods. Each control is field durability tested for use in demanding applications.

### **Rugged and Reliable**

Use of SMT manufacturing processes assures consistent performance from control to control.

- Integrated actuator sensors are protected from the environment
- Solid-state electronic components and non-contact sensors (hall effect)
- Actuator mounted or remote mountable



### **Easy To Use**

- Simple plug-and-play switch box controls are hassle-free – just plug in and connect the power clips.
- Basic position controls are integrated with the actuators to simplify ease of use and maintain the rugged duty capabilities of Warner Linear actuators. They are easy to use and plug-and-play ready.
- Advanced microprocessor based controls are also available. They employ digital electronics using SMT processes and offer a broad range of intelligent actuator control options. Consult your Warner Linear technical specialist on how advanced controls might suit your needs.

Warner Linear BTc controls are specifically designed for use with the B-Track line of actuators. Some controls and options are also suitable for use with the M-Track and A-Track models.

## B-Track BTc examples:



**Switch Box Control**



**Basic Position Control**



**Advanced Electronic Control**

## How to select

- Step 1** – Determine what type of control function is needed.
- Step 2** – Compare control function needed with the different controls and control capabilities described on the following pages (pages 38-45).
- Step 3** – If your choice is a simple switch box control, order the control as a separate part number, including connecting cables as needed.
- Step 4** – If you are selecting an integrated control feature with a B-Track actuator, insert applicable BTc control function into the selected actuator model configuration scheme as shown below.

## B-Track BTc Configurator

Actuator Type	Control Model	Gear ratio	Motor Voltage	Motor Type	Nut Type	Stroke Length	Base Fitting
<b>K2</b>	<b>Px.x</b>	<b>G20</b>	<b>- 12V</b>	<b>M</b>	<b>- BR</b>	<b>- 03</b>	<b>- R120</b>

Control Model
P1.x
P2.x

**Note:** See control pages for full listing of model numbers.

When ordering a BTc control with a B-Track actuator, insert BTc model prefix after the base actuator model number, such as K2 P1.1 or K2xP1.1.

# Simple and Basic Controls

## SBC-DC & SBC-AC Simple Switch Box Controls



**DC Switch Box  
SBC-DC**



**AC Switch Box  
SBC-AC**

- Easy to use with 12, 24 and 48 VDC actuators.
- Comes with 6 m power connecting cable, two-way momentary toggle switch, dust tight abs enclosure and output connector with 0,25 m lead.
- 3 m and 2,40 m connecting cables available (switch box to actuator).

- Easy to use with 12 VDC (M-Track), 24 VDC or 90 VDC motors converting 115/230 VAC to 90 VDC.
- Comes with AC to DC converter in weather tight polycarbonate enclosure.
- Two way momentary toggle switch, and weather tight output connector, with 0,25 m lead.
- 3 m and 2,40 m connecting cables available (switch box to actuator).
- 90 cm plug in power cord also available.

**When ordering, order part numbers (see page 39):**

SBC-DC	DC Switch box
SBPC-DC-10 or 8	DC Power cable
SBC-AC	AC Switch box, order with or without power cord
SBPC-AC-10 or 8	AC Power cable

## BTc – PQS, P1 & P2 Basic Position Controls



*BTc Control*



*A-Track with sensors*

- M-Track and A-Track actuators are available with onboard potentiometer outputs and adjustable limit switches for use with control schemes provided by the actuator user.
- B-Track actuators are available with digital electronics integrated into the actuator referred to as BTc or B-track controls.
- Electronic Stroke Limit Control (ESL) is an integrated motor mounted control which uses rugged long life non-contact hall effect switches mounted inside the actuator.

The switches are magnetically triggered turning power off to the actuator until power is reversed. Options

include outputs for PLC interface or indicator lights. Control is potted for rugged environments.

- Quick Stop Control (QS) is a bi-directional current limit control which is motor mounted. This control is set to turn off power to the actuator when a set current level is reached. A different current setting is possible for each direction. The current settings are factory set and the control is potted for rugged environments.
- A Digital Position Feedback Control is also offered. It is motor mounted and uses pulse signals from two inductive sensors integrated into the B-track actuator. Digital pulses are converted to an analog output voltage of 0 to 10 V relative to the position of the extension rod. The control provides electronic end stroke function, dynamic electronic braking, current limit protection and is potted for rugged environments. Optional end of stroke output signals are available for use with PLC's and to power indicator lights.

When ordering, order by inserting selected model into the actuator configuration as shown on page 37.

# Power Supplies and Configuration

## AC Power Supply / 24 V Output

AC Power Supply SBC	Input Power AC2	Output Power 24 V	Connector Style 2	Input Wire Style A	Amp Output H	Live Power L	Switch S
<b>Input power</b> AC = 115 VAC Input AC2 = 230 VAC Input	<b>Connector Style (Female Gender)</b> 1 = Mini Packard (M-Track Only) 2 = Packard 56 (A & B-Track) 3 = WeatherPack (A & B-Track) 4 = Deutsch DT06-2S (A & B-Track)		<b>Input Wire Style</b> Blank = 150 mm Open (3) Strand Wire A = 150 mm Long 3 Prong Plug		<b>AMP Output</b> Blank = Standard 12 Amp Output H = High Current 20 Amp Output (Can run 2 actuators from same power supply, required for most twin track systems).		<b>Switch</b> S = Rocker Switch Blank = No Switch
<b>Output power</b> 24 V = 24 VDC		<b>Live Power</b> (Required on P2, P3 P4 Control Systems) Blank = No Live Power					

## AC Power Supply / 90 V Output

AC Power Supply SBC	Input Power AC	Output Power 90 V	Connector Style 4	Input Wire Style A	Switch S	Potentiometer P
<b>Input power</b> AC = 115 VAC Input	<b>Output power</b> 90 V = 90 VDC	<b>Connector Style (Female Gender)</b> 4 = Deutsch DT06-3S		<b>Input Wire Style</b> Blank = 150 mm Open (3) Strand Wire A = 150 mm Long 3 Prong Plug		<b>Switch</b> S = Rocker Switch Blank = No Switch
						<b>Potentiometer</b> Potentiometer (used for speed control) Blank = No Pot

## AC Power Supply / 12 V Output

AC Power Supply SBC	Input Power AC2	Output Power 12 V	Connector Style 1	Input Wire Style A	Switch S
<b>Input power</b> AC = 115 VAC Input AC2 = 230 VAC Input	<b>Output power</b> 12 V = 12 VDC (M-Track Only)	<b>Connector Style (Female Gender)</b> 1 = Mini Packard 56 (M-Track)		<b>Input Wire Style</b> Blank = 150 mm Open (3) Strand Wire A = 150 mm Long 3 Prong Plug	
<b>Switch</b> S = Rocker Switch Blank = No Switch					

## AC Switch Box Control

AC Power Supply SBC	Input Power AC	Input Wire Style A
<b>Input Wire Style</b> Blank = 150 mm Open (3) Strand Wire A = 150 mm Long 3 Prong Plug		

## DC Switch Box Control

DC Power Supply SBC	Input Power DC	Connector Style 3	Mating Cable 10
<b>Connector Style: (One End Female Weatherpack) Other End is Male version of:</b> 1 = Mini Packard 56 (M-Track) 2 = Packard 56 3 = WeatherPack 4 = Deutsch (DT06-2S)			<b>Length of Mating Cable in cm</b> (If blank, switch has no mating connector)

## Cable Part Number

AC Power Supply SBC	Number of Conductors 2	Cable Type PC	Connector Style 3	Dual Output Y	Length in cm 50
<b>Cable Type</b> PC = Power Cable (Carol "J" Cord with Shrink Sleeves) SC = Signal Cable (with Shrink Sleeves Only) LP = Live Power (22 AWG, 4 conductor wire but only use red & black wires. Trim white & green wires flush with insulation)		<b>Connector Style: One End Male One End Female</b> 1 = Mini Packard 56 (M-Track) 2 = Packard 56 3 = WeatherPack 4 = Deutsch		<b>Dual Output "Y" Cable</b> (Used only on PC & LP options)	

# BTc Controls - P1-DC

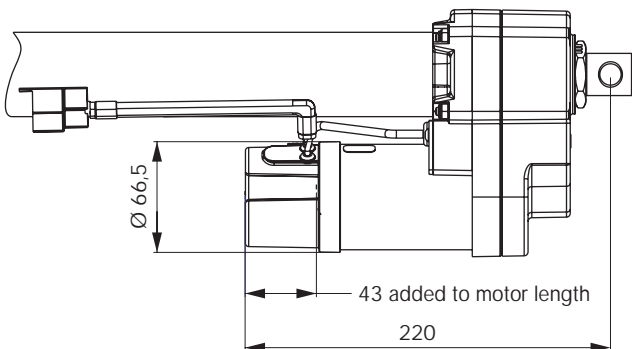
## P1-DC Electronic Stroke Limit Control



The **P1-DC** Control provides end of stroke stopping by turning off power to the motor via an on board relay. Input power polarity must be reversed for the actuator to move again. The control uses solid-state hall effect sensors in combination with electronic dynamic braking to accurately stop at the end of stroke travel. The sensors are non-adjustable and are mounted inside the actuator cover tube for protection where they are switched via a non-contact magnet attached to the rod. The switches are sealed for life and will never wear out.

### Specifications

- Supply Power: 12 or 24 VDC versions available  
Maximum Current: 25 A @ 12 VDC/12.5 A @ 24 VDC (at 25% duty cycle)
- Operating Temperature: -30°C to +60°C



### Features

- **Motor Power:** Switched by on board relay. The relay allows power to the motor as long as the actuator is not being commanded to go past the end limits.
- **End Limits:** Integrated end of stroke hall effect sensors trigger the control to turn power off to the motor until input power is reversed. Position in factory set.
- **Faster Stopping:** Electronic dynamic braking, (EDB) is applied after every move for accurate and fast stops.
- **Enclosure:** Attaches to back of motor or other surface and is potted to work in harsh environments.
- **Protection:** Zener diode suppression on the input and output for extra protection in noisy (electrical) environments.

### Options

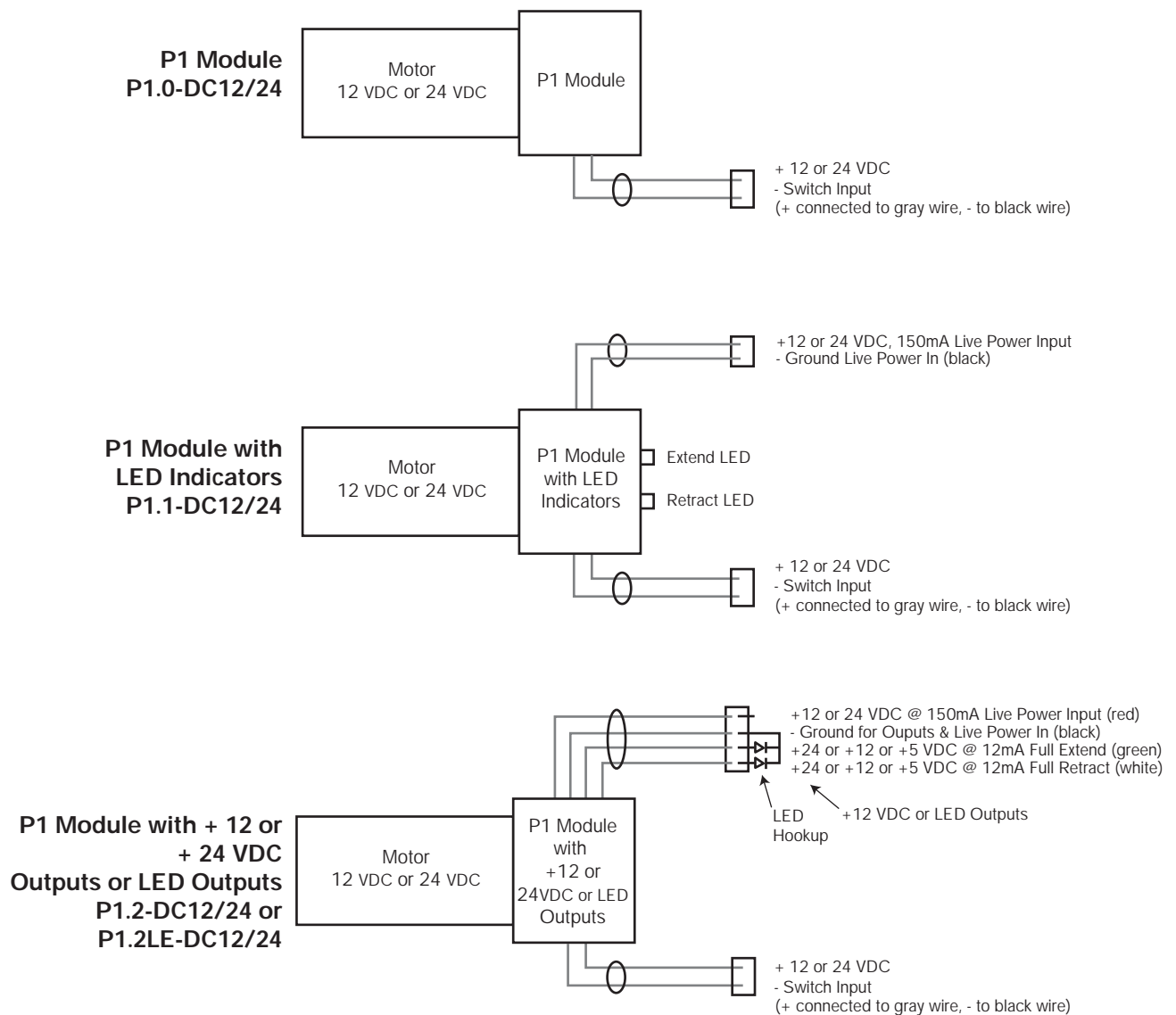
- **LED Indicators:** Two LED's on the outside of the control module to indicate when the end of stroke is reached. Included with the LED's is a live power input that can be used to keep the outputs on when switch power is off. 12/24 VDC, 150 mA is needed.
- **+12 VDC Outputs:** Two +12 VDC, 12 mA outputs plus a ground to indicate when the end of stroke is reached. This output can signal a relay, lamp, or isolated PLC input. Included with the outputs is a live power input which can be used to keep the outputs on when switch power is off. 12/24 VDC, 150 mA is needed.
- **LED Outputs:** Two +5 V, 25 mA outputs plus a ground to indicate when the end of stroke is reached. This output can be used to light an LED. Included with the outputs is a live power input that can be used to keep the outputs on when switch power is off. A 12/24 VDC, 150 mA supply is needed.

## P1 Electronic Stroke Limit Control

### Model Selection

Model No.	Input Voltage (VDC)	Maximum Output Current (A)	Features	
P1.0	(DC12)	12	25	Base = Electronic Stroke Limit with Electronic Dynamic Braking
P1.0	(DC24)	24	12.5	Base = Electronic Stroke Limit with Electronic Dynamic Braking
P1.1	(DC12)	12	25	Base & LED Indicators on housing
P1.1	(DC24)	24	12.5	Base & LED Indicators on housing
P1.2	(DC12)	12	25	Base & +12 VDC Outputs
P1.2	(DC24)	24	12.5	Base & +24 VDC Outputs
P1.2LE	(DC12)	12	25	Base & LED Outputs +5 VDC
P1.2LE	(DC24)	24	12.5	Base & LED Outputs +5 VDC

### Wiring Diagrams

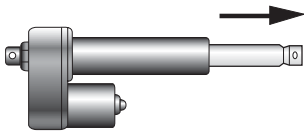




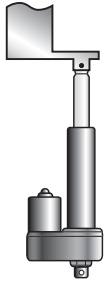




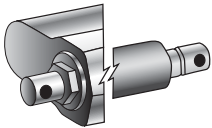




**Figure 1** Axial load



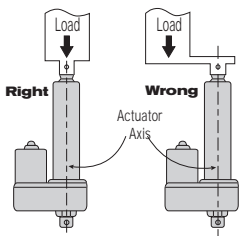
**Figure 2** Cantilevered mount



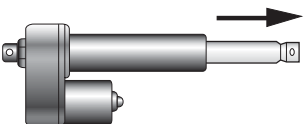
**Figure 3** Clevis mount



**Figure 4** Compression load



**Figure 5** Eccentric load



**Figure 6** Extended length

### **Axial load**

A load along the axis of the actuator screw (see figure 1).

### **Back drive**

Force applied on a ball bearing nut that causes rotational torque to reverse direction. A force sufficient to cause a unit to reverse direction.

### **BTc**

B-Track control family.

### **Cantilevered mount**

A mounting where the mounting pin is not supported on both sides. Cantilevered mounts are common causes of failure (see figure 2).

### **Clevis mount**

A U-shaped metal piece that has the ends drilled to accept a pin or bolt (see figure 3).

### **Compression load**

Compression loading will press on the unit (see figure 4).

### **Cover tube**

The outer tube or cover that encloses the screw and extension tube for an actuator.

### **Current vs. load**

The load on the motor is measured by amperes (current). Current draw will increase as load increases.

### **Cycle**

Movement from a fully retracted to fully extended position and back to fully retracted.

### **Duty cycle**

The amount of 'on-time' vs total time. A 25% duty cycle means that a unit operates for 10 seconds out of 40 seconds, or 4 seconds out of 16 seconds.

### **Eccentric load**

An off-center load which may cause binding and shorten actuator life (see figure 5).

### **Efficiency**

Ratio of input power to output power.

### **End play**

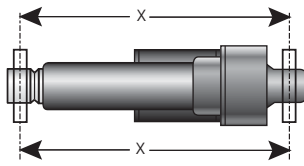
The amount of backlash or movement between the extension tube and the body of the actuator.

### **ESL**

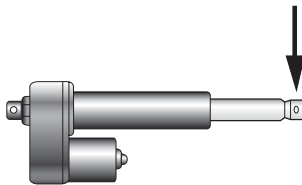
Electronic Stroke Limit magnetically activated hall effect switches that turn power off at end of stroke.

### **Extension rate**

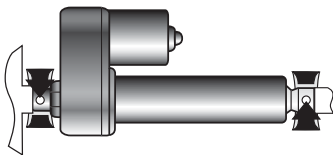
The rate of speed at which the actuator extends or retracts. This will vary based on loading (impact of load on speed is greater on DC units than on AC units).



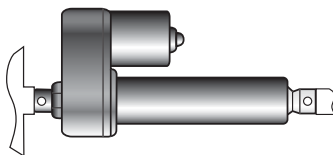
**Figure 7** Pin mount



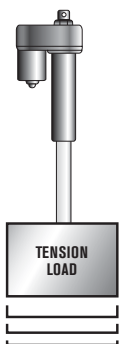
**Figure 8** Radial load also side bearing



**Figure 9** Restraining torque



**Figure 10** Retracted length



**Figure 11** Tension load

### Extended length

The overall length of the actuator from the center of the rear clevis to the center of the extension tube pin hole when the unit is at full extension (see figure 6).

### Load

The force, measured in pounds, that is applied as an axial load on the actuator.

### Load holding

The ability of the actuator to hold a load stationary when power is off.

### Peak load

The maximum dynamic load that will be applied to the actuator, or that the actuator is capable of moving.

### Pin mount

The use of a dowel or pin through the hole in the clevis mount (on the rear of an actuator) or the extension tube (on the front of an actuator) (see figure 7).

### Radial load

A load applied to the side of the extension tube or across the body of the actuator. Normally radial loading will have a negative impact on unit life (see figure 8).

### Restraining torque

The torque required to prevent torque within the unit from causing rotation on the body or extension tube of the unit (see figure 9).

### Retracted length

The overall length of the actuator from the center of the rear clevis to the center of the extension tube pin hole when the unit is at full retracted position (see figure 10).

### Side load

See radial loading (see figure 8).

### Static load

The maximum non-operating (or non-moving) load. Static load is the load holding capability of an actuator.

### Synchronous position

Having more than one actuator extend and retract together maintaining  $\pm 5$  mm position relative to each other.

### Tension load

A load that will tend to pull on the unit (see figure 11).

### Thermal overload

A switch within the motor that will open if the motor exceeds a predetermined heat level



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