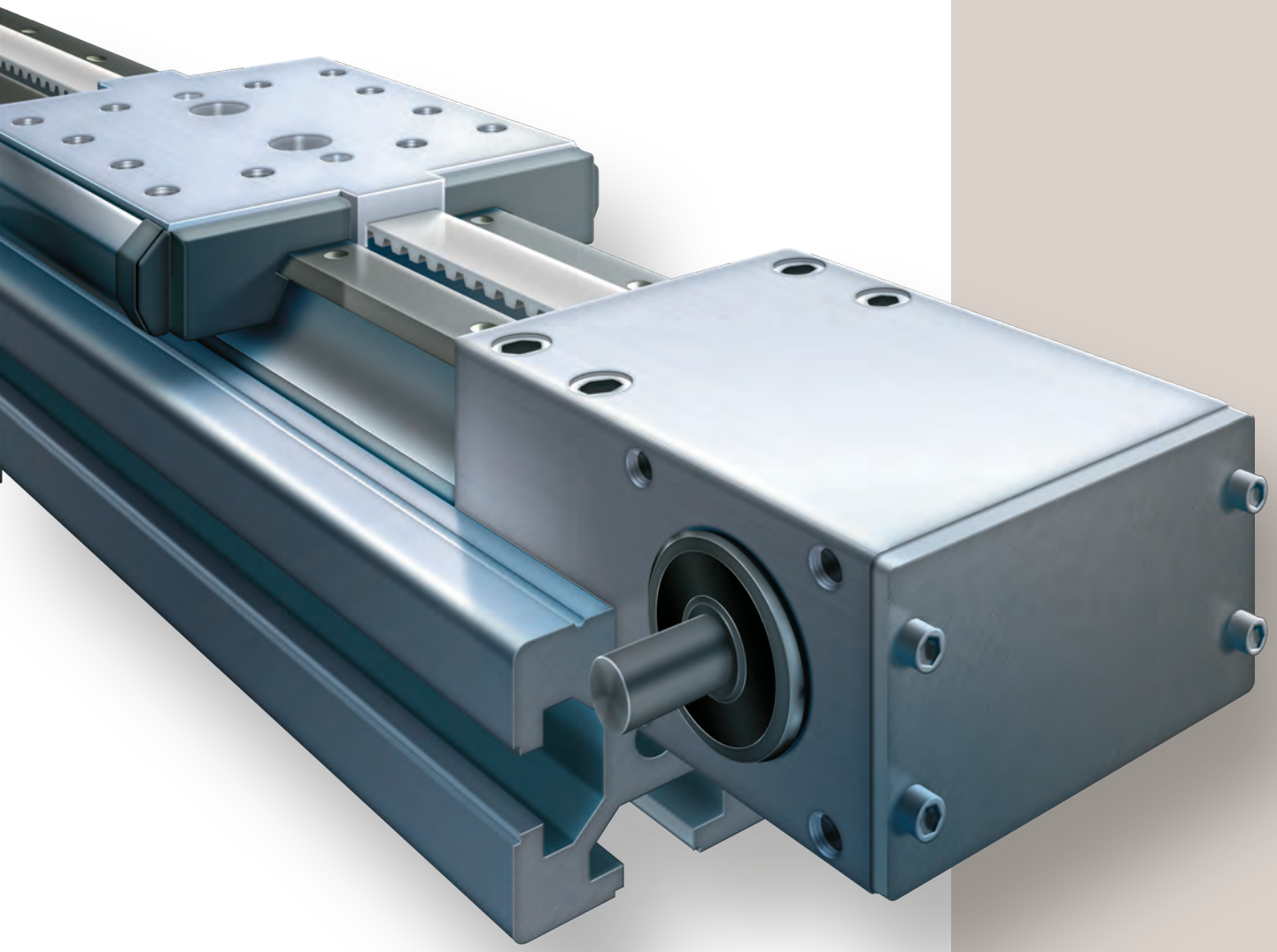
BISHOPWISECARVER GROUP
A FAMILY OF SOLUTIONS

LoPro®

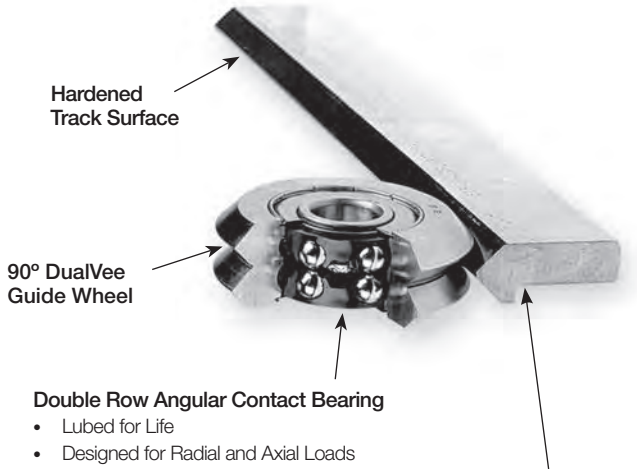
Actuated Linear Guidance System

Built on
DUALVEE
Motion Technology®



DUALVEE Motion Technology®

Bishop-Wisecarver, manufacturer of the ORIGINAL DualVee® guide wheel, is recognized as the market leader for guide wheel technology. In 1968, Bud Wisecarver invented DualVee Motion Technology® (DMT). Three main components define DMT – the DualVee guide wheel, its mating vee profile track with mounting shoulder, and support bushings. DMT is one of the most popular guided motion technologies due to its self-cleaning action and self-aligning track, which result in an overall lower installation cost.



Double Row Angular Contact Bearing
- Lubed for Life
- Designed for Radial and Axial Loads

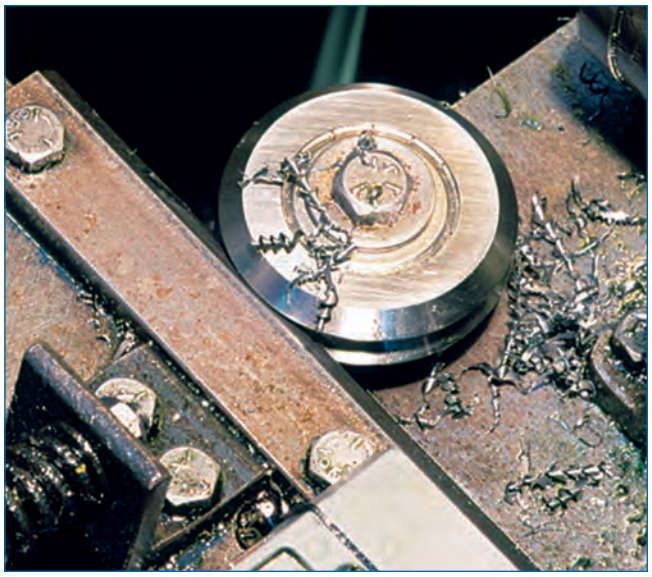
Mounting Shoulder
- Quick and Accurate Installation
- Unlimited Travel Lengths
- Easily Joined Track

Features and Benefits

DualVee Motion Technology is ideal for a wide range of applications, from the clean room to the sawmill. DualVee's recirculating elements are self-contained and isolated from the environment. Without direct contact with the rail that can subject bearings to contamination, and ultimately, premature failure, DMT excels in dirty and extreme environments.

DMT's circular bearing design also allows for faster acceleration and speeds.

- Carbon or stainless steel components
- Speeds up to 5.5 m/s
- Acceleration up to 5 g's
- High accuracy and repeatability
- High temperature and clean room options
- Corrosion resistant versions available
- Ground mounting surfaces not required
- Low noise
- Smooth action
- Long lengths



Designed for Dirty and Severe Environments

The 90° DualVee design creates a velocity gradient, since the circumference of the wheel is greater at the major diameter, resulting in a constant sweeping action that cleans debris from the track.

Product Overview

LoPro® Linear Motion Systems

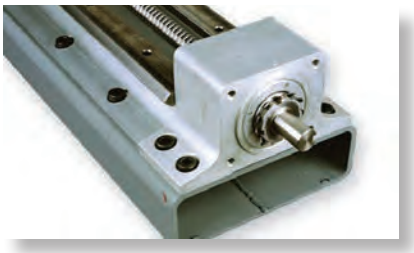
LoPro linear motion systems are available in four sizes and in belt, lead screw, ball screw and chain driven configurations, as well as un-driven. LoPro provides a tough, cost effective, low friction, low profile modular solution, built to withstand a wide range of operating environments. LoPro is the system of choice for wood, packaging and textile machinery, as well as the clean room or laboratory.

LoPro has the lowest profile in the industry, accomplished by mounting two lengths of our hardened steel track to a low profile milled aluminum track plate. The veeways are pre-aligned and parallel to within .002in (0.05mm). Track plate is available in single piece lengths up to 10 feet (3m), but are routinely butt-joined with a staggered track arrangement for long custom lengths.

Complete Integrated Package

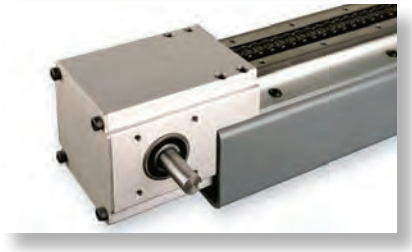
- Belt, chain, ball screw, lead screw, or un-driven
- 4 wheel plate sizes to accommodate axial loads from 222 lbs to 3,526 lbs (988N to 15,684N)
- Corrosion resistant versions available

Belt Drive
AT style steel reinforced polyurethane belting



Lead Screw
Lead accuracies to .0006 in/in (mm/mm)

Ball Screw
Accurate to .004 in/ft (100 µm/300mm)



Chain Drive
Standard or corrosion resistant ANSI roller chain

Table of Contents

Application and Design Assistance

888.580.8272 925.439.8272

3D Modeling and CAD Drawings

www.bwc.com

Product Overview

Proven Technology
DualVee Motion Technology® has been successfully employed in industrial linear motion systems for over 40 years.

High Speed
Speeds up to 5.5 m/s, and acceleration up to 5 g's.

Low Profile
Sleek, compact design.

Low Noise/Low Vibration
Reduces noise and vibration substantially over recirculating ball designs.

Long Stroke Lengths
Tracks can be butt-joined to create systems of virtually any length (screw driven system lengths are limited by available screw lengths).

Tolerant of Contamination and Debris
Inherent surface velocity gradient provides a constant sweeping action.

Flexibility and Simplicity
Modular system permits optimized engineered solutions for specific application requirements. Wheel-to-track fit-up makes assembly and field maintenance easy to perform.

System Components

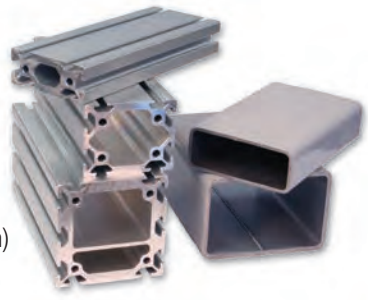
Linear Guide
The linear guide consists of a track plate assembly(ies) and wheel plate assembly(ies), each wheel plate assembly containing four DualVee wheels.

Wiper wheel plate assembly shown consisting of four DualVee wheels, bushings and a carriage plate

Track plate assembly consisting of two or more lengths of induction hardened steel track mounted to an anodized aluminum substrate

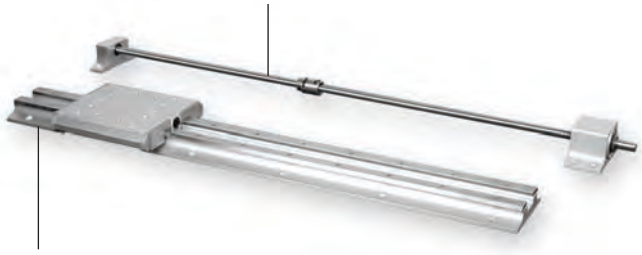
Support Beams

- Aluminum (standard)
- Steel (standard)
- Stainless Steel (custom)



Linear Actuator
Belt, chain, lead screw, or ball screw driven.

Linear Actuator (ball screw shown)



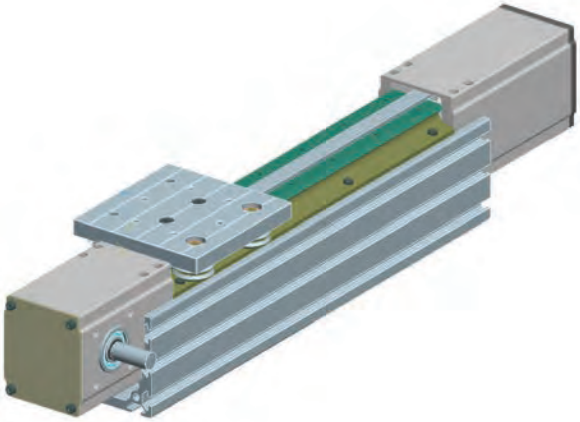
Linear Guide with wheel plate

Drive Ends

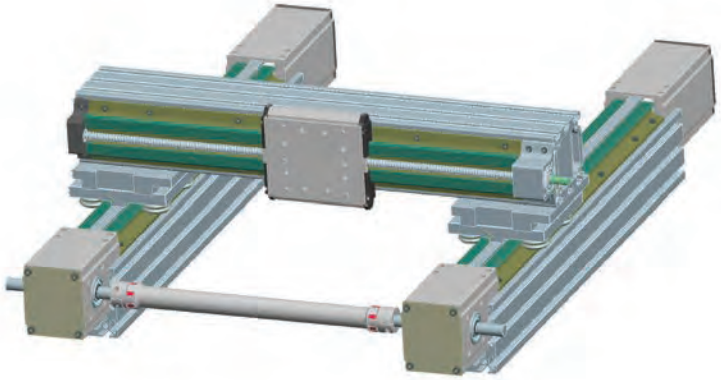
Motor Mounts (Optional)

Typical Configurations

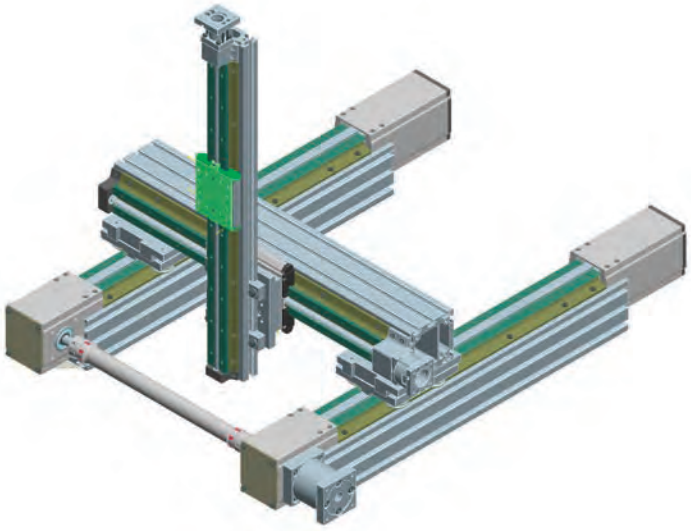
Single Axis Linear Motion

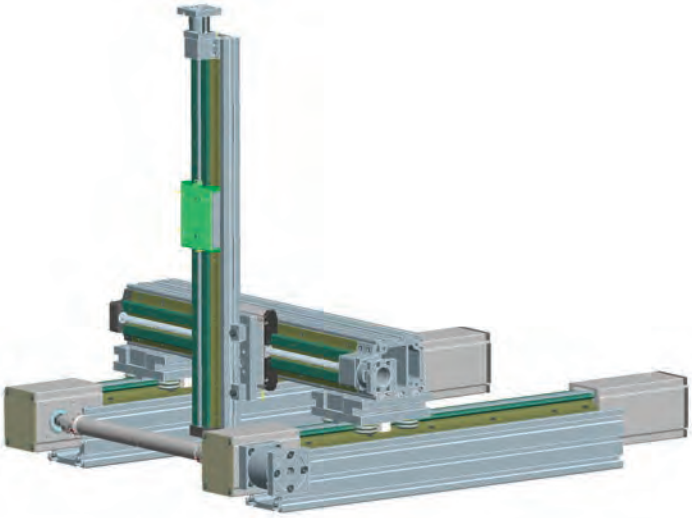


X-Y Gantry Arrangement



X-Y-Z Multi-Axis Arrangement





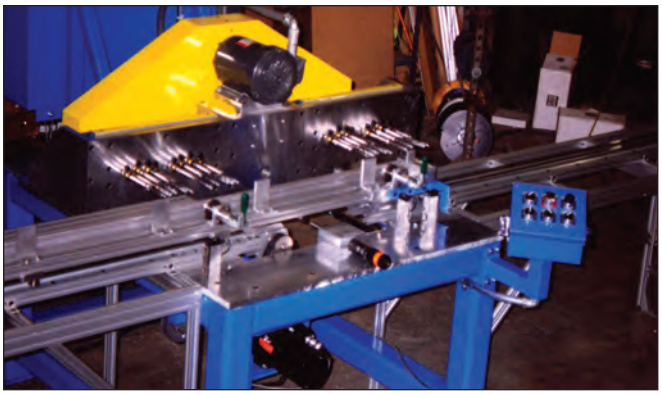
Multi-Industry Applications

DualVee-based linear guides are popular worldwide and used throughout a broad range of industries.

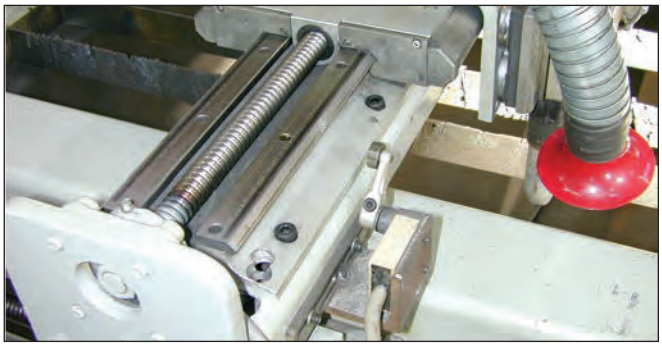
- Machine tool
- Laboratory
- Automotive production
- Industrial automation
- Biomedical
- Inspection equipment
- Material handling equipment
- Textile machinery
- Paper processing and converting
- Semiconductor
- Packaging machinery
- Electronics assembly
- Non-contact machining equipment

Bishop-Wisecarver specializes in long length challenges. Belt and chain driven LoPro linear actuators have been fabricated up to 80 feet.

Automotive assembly plant. LoPro is used to carry an air gun and parts for assembly, minimizing the possibility of workers tripping over long hoses and carrying heavy loads.



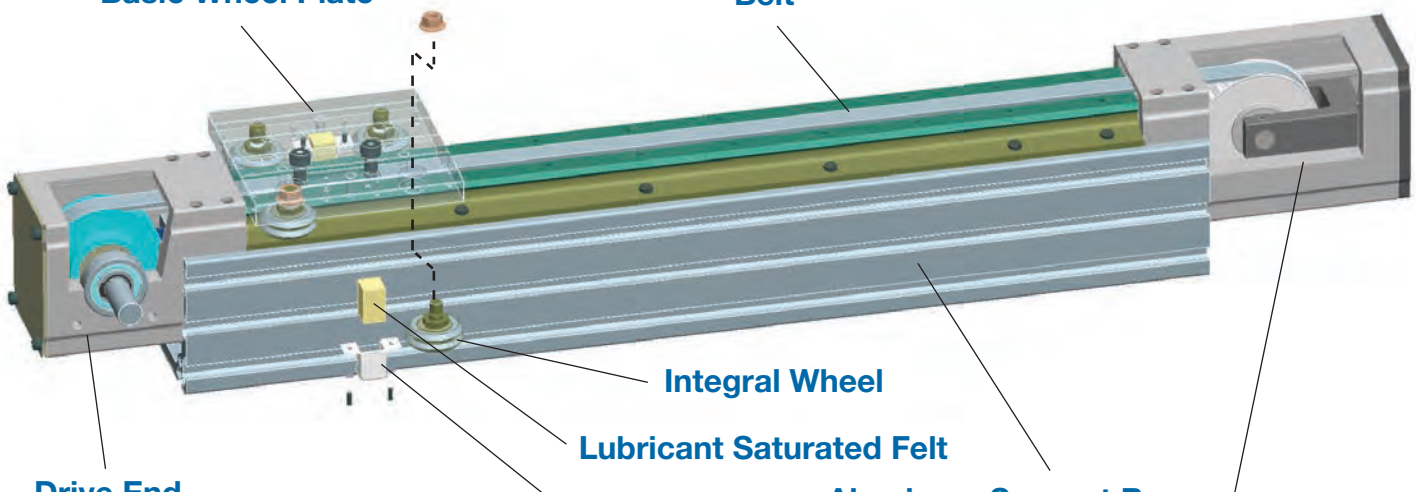
Door frame drilling jig. With LoPro's precise travel and fast acceleration, exact placement of holes for production door frames is easy and repeatable every time.



This "X-Y" Plasma cutter, using a LoPro ball screw driven system, operates in a harsh environment consisting of smoke, abrasive dust, weld splatter, hot sparks and elevated temperatures.

A chain driven LoPro is used on a vinyl fence production machine pushing vinyl fence components into a drill press.

Belt Driven Systems

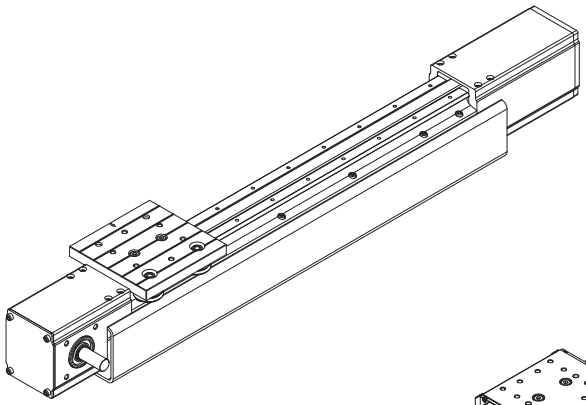


Drive End

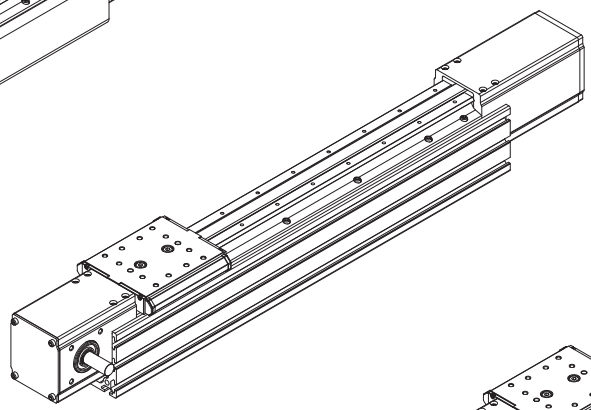
Constructed with anodized aluminum housing with a stainless steel drive shaft. The pulley and shaft are supported by two single row ball bearings.

Idler End with Belt Tensioning Adjustment

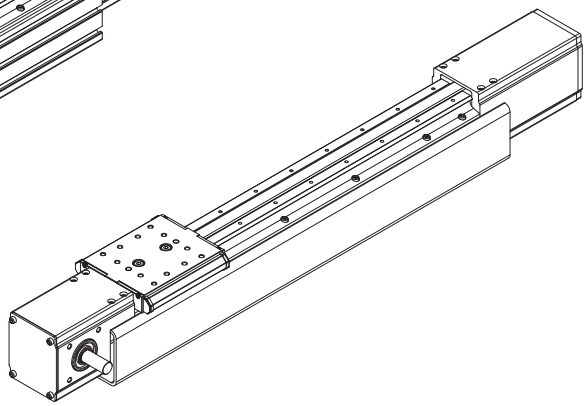
Rugged anodized aluminum housing; pulley is supported by two single row ball bearings. Tension adjustment screw is easily accessed on the back plate of the idler end assembly.



- Basic Wheel Plate
- Steel Support Beam



- Wiper Wheel Plate
- Aluminum Support Beam

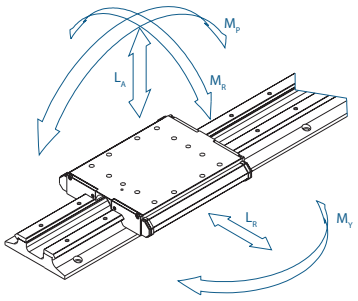


- Wiper Wheel Plate
- Steel Support Beam

Belt Driven Systems

- Complete belt actuated system, ready for installation
- Long stroke, high speed and acceleration capability
- AT style reinforced polyurethane belting
- Linear accuracy of .008 in/ft (0.2mm/300mm)
- Repeatable within .004 in (0.1mm)
- Small and large drive options available on size 2
- Aluminum support beams, steel beams or un-mounted (without beams)
- Basic wheel plate or wiper wheel plate
- Optional NEMA and IEC motor mounts
- Standard and corrosion resistant versions available
- Aluminum alloy drive end pulleys with aluminum or plated steel flanges

Carriage Assembly Load Capacities										
System Size	Axial Load Capacity L_A		Radial Load Capacity L_R		Pitch Moment Capacity M_p		Yaw Moment Capacity M_Y		Roll Moment Capacity M_R	
	N	lbs	N	lbs	N·m	ft·lbf	N·m	ft·lbf	N·m	ft·lbf
1	988	222	2391	538	26	18.9	62	45.7	27	19.8
2S/2L	2450	551	5194	1168	95	70.3	202	148.9	100	73.8
3	6668	1499	11564	2600	346	254.9	599	442.1	372	274.1
4	15684	3526	19012	4274	1220	899.5	1478	1090.3	1174	865.6



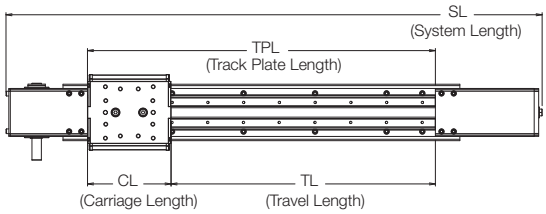
LoPro System Belt Load Capacities				Drive End Pulleys Pitch Diameter	Belt Teeth Shear Strength Formula (N)* (Approx.)	Belt Teeth Shear Strength at V=0 m/s (N)*	Belt Teeth Shear Strength at V=5.5 m/s (N)*
System Size	Belt Size	Working Tensile Load					
		N	lbs				
1	10AT5	630	142	28.7mm (1.128in)	$F=315-1.17V^3+15.3V^2-75.3V$	315	169
2S	16AT5	1008	227	38.2mm (1.504in)	$F=672-1.06V^3+18.4V^2-120V$	672	392
2L	16AT10	2085	469	79.6mm (3.133in)	$F=1407-2.59V^3+34.2V^2-208V$	1407	867
3	20AT10	2606	586	95.5mm (3.759in)	$F=1761-2.98V^3+37.3V^2-230V$	1761	1128
4	32AT10	4170	937	95.5mm (3.759in)	$F=2818-4.80V^3+60.0V^2-369V$	2818	1805

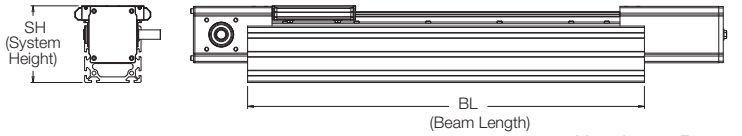
If the customer plate will be subjected to shock loads, divide the permissible linear force by a safety factor of 1.4 (light shock) to 2 (high shock). V = Linear Speed.

*The belt teeth shear strength is the permissible linear force which the drive pulley can apply to the carriage. The sum of the linear force applied to the carriage and the belt pretension load must not exceed the working tensile load.

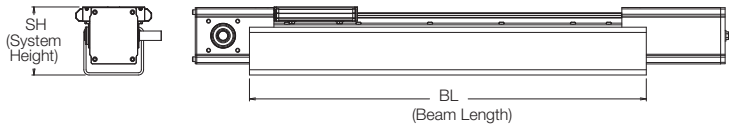
Belt Driven Systems - Wiper Wheel Plate

Beam Mounted



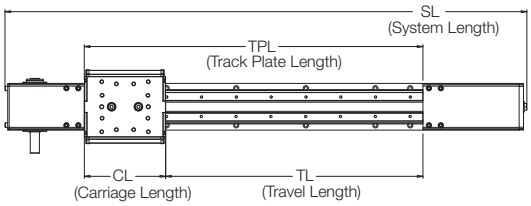


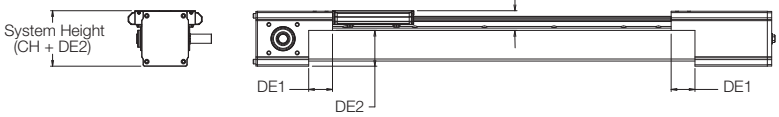
Aluminum Beam



Steel Beam

Un-mounted*





Size	Track Plate Length TPL (=TL+CL)	System Length SL	System Height SH			Beam Length BL	Carriage Height CH
			Aluminum	Steel	Un-mounted	Beam Mounted	Un-mounted
1	TL+94.0mm TL+3.701in	TPL+173.6mm TPL+6.833in	63.0mm 2.482in	61.1mm 2.407in	39.0mm 1.537in	TL+154.0mm TL+6.063in	23.0mm .907in
2S	TL+129.9mm TL+5.114in	TPL+227.6mm TPL+8.960in	73.0mm 2.874in	71.1mm 2.799in	61.0mm 2.401in	TL+209.9mm TL+8.264in	33.0mm 1.299in
2L	TL+129.9mm TL+5.114in	TPL+318.1mm TPL+12.522in	113.0mm 4.449in	109.2mm 4.299in	101.0mm 3.976in	TL+209.9mm TL+8.264in	33.0mm 1.299in
3	TL+177.6mm TL+6.990in	TPL+400.1mm TPL+15.751in	163.0mm 6.417in	144.6mm 5.693in	121.1mm 4.768in	TL+281.6mm TL+11.084in	43.0mm 1.693in
4	TL+243.8mm TL+9.600in	TPL+440.9mm TPL+17.358in	N/A	156.6mm 6.167in	130.0mm 5.120in	TL+351.8mm TL+13.852in	55.0mm 2.167in

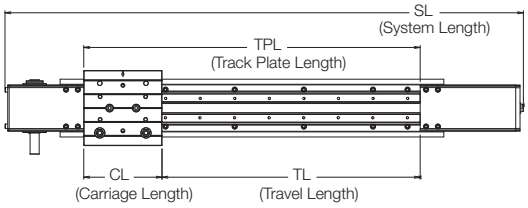
Size	Drive End Cutout Width DE1	Drive End Cutout Height DE2	System Inertia J (A + B + C)		
	Un-mounted	Un-mounted	A	B[1]	C[2]
1	30.0mm 1.181in	16.0mm .630in	68.4kg•mm² .234lb•in²	.0164kg•mm x TL .00142lb•in x TL	205mm² x M .318in² x M
2S	40.0mm 1.575in	28.0mm 1.102in	355kg•mm² 1.21lb•in²	.0438kg•mm x TL .00380lb•in x TL	365mm² x M .566in² x M
2L	40.0mm 1.575in	68.0mm 2.677in	2090kg•mm² 7.15lb•in²	.317kg•mm x TL .0275lb•in x TL	1580mm² x M 2.45in² x M
3	52.0mm 2.047in	78.1mm 3.075in	6690kg•mm² 22.9lb•in²	.593kg•mm x TL .0515lb•in x TL	2280mm² x M 3.53in² x M
4	54.0mm 2.126in	75.0mm 2.953in	14600kg•mm² 49.9lb•in²	.912kg•mm x TL .0792lb•in x TL	2280mm² x M 3.53in² x M

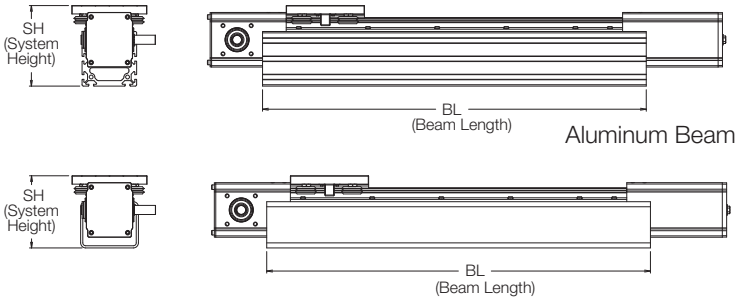
*Un-mounted systems are designed for mounting to a customer-supplied mounting surface. System straightness and flatness are determined by mounting surface accuracy. Continuous support along the entire track plate length and under drive end mounting surfaces is required.

1. TL (Travel Length) must be in mm for metric calculation, inches for English calculation.
2. M (Mass of payload on the carriage) must be in kg for metric calculation, lbm for English calculation.

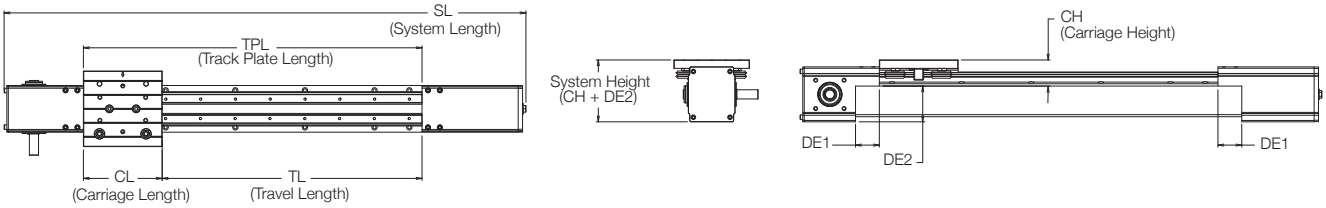
Belt Driven Systems - Basic Wheel Plate

Beam Mounted





Un-mounted*



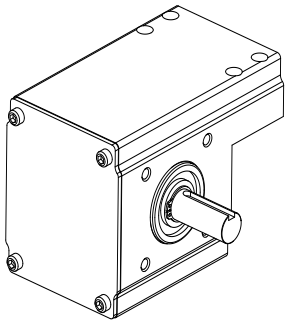
Size	Track Plate Length TPL (=TL+CL)	System Length SL	System Height SH			Beam Length BL	Carriage Height CH
			Aluminum	Steel	Un-mounted	Beam Mounted	Un-mounted
1	TL+90.0mm TL+3.543in	TPL+173.6mm TPL+6.833in	72.1mm 2.840in	70.2mm 2.765in	48.1mm 1.895in	TL+150.0mm TL+5.906in	32.1mm 1.265in
2S	TL+127.0mm TL+5.000in	TPL+227.6mm TPL+8.960in	83.0mm 3.269in	81.1mm 3.194in	71.0mm 2.796in	TL+207.0mm TL+8.150in	43.0mm 1.694in
2L	TL+127.0mm TL+5.000in	TPL+318.1mm TPL+12.522in	123.0mm 4.844in	119.2mm 4.694in	111.0mm 4.371in	TL+207.0mm TL+8.150in	43.0mm 1.694in
3	TL+172.0mm TL+6.772in	TPL+400.1mm TPL+15.751in	177.0mm 6.969in	158.6mm 6.245in	135.1mm 5.320in	TL+276.0mm TL+10.866in	57.0mm 2.244in
4	TL+242.0mm TL+9.528in	TPL+440.9mm TPL+17.358in	N/A	170.6mm 6.718in	144.0mm 5.671in	TL+350.0mm TL+13.780in	69.0mm 2.718in

Size	Drive End Cutout Width DE1	Drive End Cutout Height DE2	System Inertia J (A + B + C)		
	Un-mounted	Un-mounted	A	B[1]	C[2]
1	30.0mm 1.181in	16.0mm .630in	92.2kg•mm² .315lb•in²	.0164kg•mm x TL .00142lb•in x TL	205mm² x M .318in² x M
2S	40.0mm 1.575in	28.0mm 1.102in	433kg•mm² 1.48lb•in²	.0438kg•mm x TL .00380lb•in x TL	365mm² x M .566in² x M
2L	40.0mm 1.575in	68.0mm 2.677in	2440kg•mm² 8.35lb•in²	.317kg•mm x TL .0275lb•in x TL	1580mm² x M 2.45in² x M
3	52.0mm 2.047in	78.1mm 3.075in	7930kg•mm² 27.1lb•in²	.593kg•mm x TL .0515lb•in x TL	2280mm² x M 3.53in² x M
4	54.0mm 2.126in	75.0mm 2.953in	16900kg•mm² 57.8lb•in²	.912kg•mm x TL .0792lb•in x TL	2280mm² x M 3.53in² x M

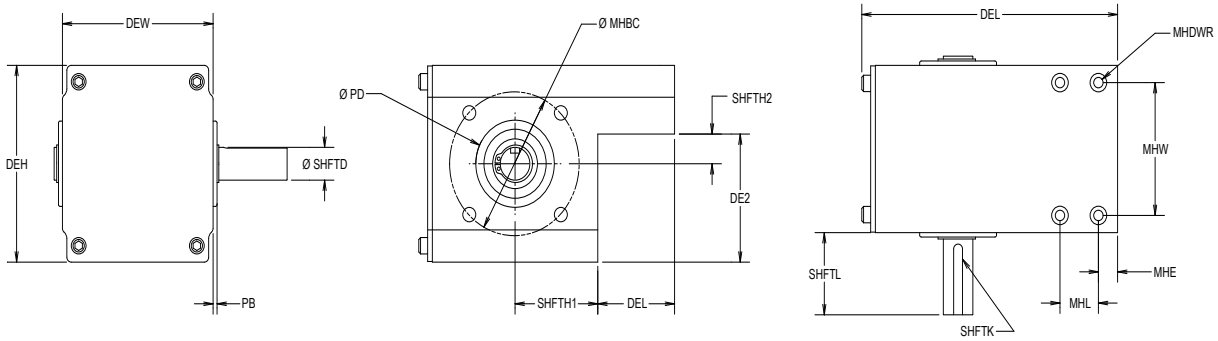
*Un-mounted systems are designed for mounting to a customer-supplied mounting surface. System straightness and flatness are determined by mounting surface accuracy. Continuous support along the entire track plate length and under drive end mounting surfaces is required.

1. TL (Travel Length) must be in mm for metric calculation, inches for English calculation.
2. M (Mass of payload on the carriage) must be in kg for metric calculation, lbm for English calculation.

Drive Ends for Belt Driven Systems



- Designed for high performance, high cycling linear motion
- Incorporates high quality radial bearings with a high strength aircraft grade aluminum housing
- Drive ends are available with optional relief holes for extremely aggressive environments with high particulate matter. Contact Bishop-Wisecarver for details.



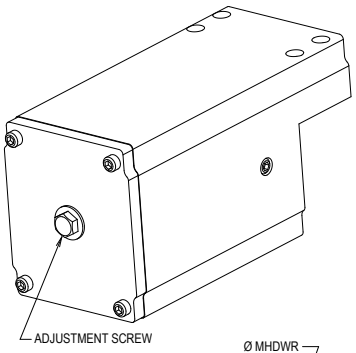
Size	Drive End Length	Drive End Width	Drive End Height	Shaft Length	Shaft Diameter	Shaft Square Key Size	Shaft Locations		Drive End Cutout Width	Drive End Cutout Height	Mounting Hardware
	DEL	DEW	DEH	SHFTL	SHFTD	SHFTK	SHFTH1	SHFTH2	DE1	DE2	MHDWR
1	76.2mm 2.999in	50.0mm 1.969in	38.0mm 1.496in	29.6mm 1.166in	9.0mm .354in	3mm	20.0mm .787in	3.0mm .118in	30.0mm 1.181in	16.0mm .630in	M3x22mm MIN
2S	95.2mm 3.748in	72.0mm 2.835in	60.0mm 2.362in	36.7mm 1.445in	12.0mm .472in	4mm	24.0mm .945in	2.0mm .079in	40.0mm 1.575in	28.0mm 1.102in	M5x30mm MIN
2L	141.2mm 5.558in	80.0mm 3.150in	100.0mm 3.937in	50.1mm 1.973in	20.0mm .787in	6mm	46.0mm 1.811in	18.0mm .709in	40.0mm 1.575in	68.0mm 2.677in	M5x35mm MIN
3	173.2mm 6.818in	102.0mm 4.016in	120.0mm 4.724in	50.1mm 1.973in	20.0mm .787in	6mm	56.0mm 2.205in	18.1mm .713in	52.0mm 2.047in	78.1mm 3.075in	M6x45mm MIN
4	183.2mm 7.212in	140.0mm 5.512in	128.0mm 5.039in	50.1mm 1.973in	20.0mm .787in	6mm	59.0mm 2.323in	11.0mm .434in	54.0mm 2.126in	75.0mm 2.953in	M8x55mm MIN

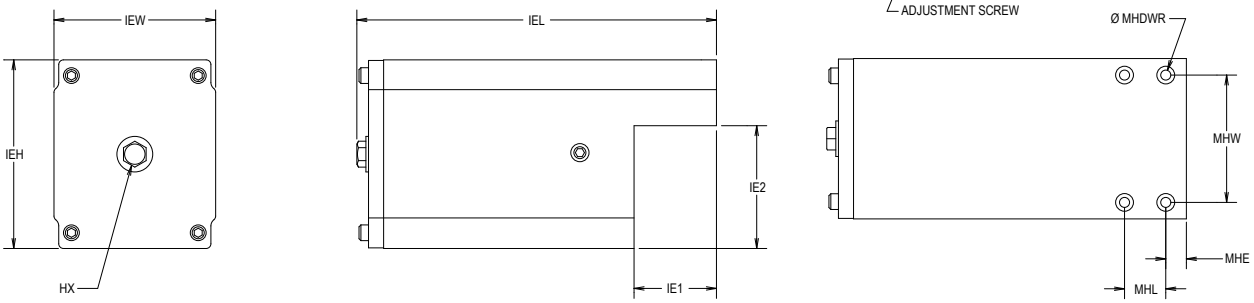
Size	Mounting Holes (Typical)			Motor Mount			
	Width	Edge Spacing	Length	Pilot Diameter	Pilot Bearing Height	Bolt Circle Diameter	Mounting Hole Thread
	MHW	MHE	MHL	PD	PB	MHBC	MHTHD
1	40.0mm 1.575in	6.0mm .236in	18.0mm .709in	24.0mm .945in	1.7mm .067in	42.4mm 1.670in	M4x0.7
2S	59.0mm 2.323in	10.0mm .394in	20.0mm .787in	28.0mm 1.102in	1.7mm .067in	50.9mm 2.004in	M5x0.8
2L	59.0mm 2.323in	10.0mm .394in	20.0mm .787in	52.0mm 2.047in	2.7mm .106in	67.9mm 2.673in	M6x1.0
3	81.0mm 3.189in	13.0mm .512in	26.0mm 1.024in	52.0mm 2.047in	2.7mm .106in	87.7mm 3.452in	M8x1.25
4	111.0mm 4.370in	13.5mm .532in	27.0mm 1.063in	52.0mm 2.047in	2.7mm .106in	90.5mm 3.564in	M8x1.25

Right hand version shown. Dual shaft, left hand, and corrosion resistant versions are also available. Contact Bishop-Wisecarver for details.

Idler Ends for Belt Driven Systems

- Belt adjustment is easily accomplished via rotation of a single, easy-to-access adjustment screw
- High quality radial bearings and high strength aluminum housing provides smooth, accurate linear motion
- Idler ends are available with optional relief holes for extremely aggressive environments with high particulate matter. Contact Bishop-Wisecarver for details.





Size	Idler End Length	Bottom View		Idler End Cutout Width	Idler End Cutout Height	Mounting Hardware
		Idler End Width	Idler End Height			
	IEL	IEW	IEH	IE1	IE2	MHDWR
1	97.4mm 3.834in	50.0mm 1.969in	38.0mm 1.496in	30.0mm 1.181in	16.0mm .630in	M3x22mm MIN
2S	132.4mm 5.212in	72.0mm 2.835in	60.0mm 2.362in	40.0mm 1.575in	28.0mm 1.102in	M5x30mm MIN
2L	176.9mm 6.964in	80.0mm 3.150in	100.0mm 3.937in	40.0mm 1.575in	68.0mm 2.677in	M5x35mm MIN
3	226.9mm 8.933in	102.0mm 4.016in	120.0mm 4.724in	52.0mm 2.047in	78.1mm 3.075in	M6x45mm MIN
4	257.7mm 10.146in	140.0mm 5.512in	128.0mm 5.039in	54.0mm 2.126in	75.0mm 2.953in	M8x55mm MIN

Size	Mounting Holes (Typical)			Hex Head Adj. Screw
	Width	Edge Spacing	Length	
	MHW	MHE	MHL	HX
1	40.0mm 1.575in	6.0mm .236in	18.0mm .709in	7/16in
2S	59.0mm 2.323in	10.0mm .394in	20.0mm .787in	7/16in
2L	59.0mm 2.323in	10.0mm .394in	20.0mm .787in	1/2in
3	81.0mm 3.189in	13.0mm .512in	26.0mm 1.024in	1/2in
4	111.0mm 4.370in	13.5mm .532in	27.0mm 1.063in	9/16in

Corrosion resistant versions are also available. Contact Bishop-Wisecarver for details.

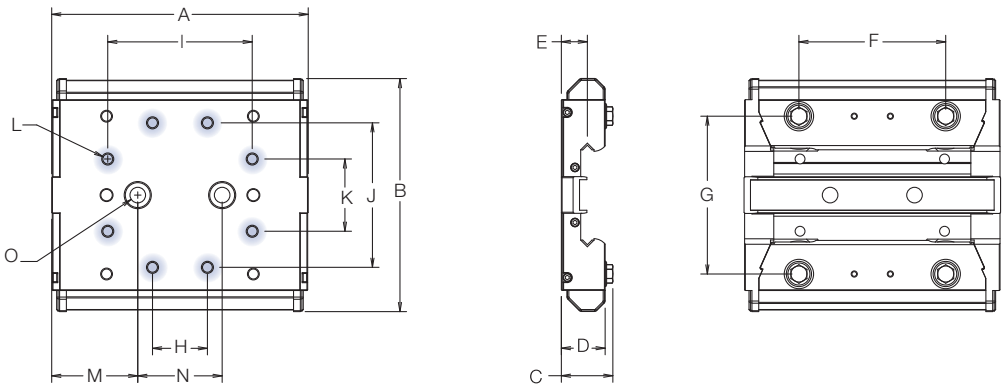
Wheel Plate Options for Belt Driven Systems

Wiper Wheel Plate

Size	Part Number	Overall Length	Overall Width	Assembly Height	Wheel Plate Height	Wheel Vee Height	Wheel Spacing Length	Wheel Spacing Width
		A	B	C	D	E	F	G
1	LP1WPADG	94.0mm 3.700in	78.0mm 3.070in	18.5mm .730in	16.5mm .650in	9.5mm .375in	50.8mm 2.00in	53.29mm 2.098in
2	LP2WPADG	129.9mm 5.114in	115.3mm 4.540in	26.4mm 1.041in	23.3mm .916in	14.0mm .551in	76.2mm 3.00in	80.01mm 3.150in
3	LP3WPADG	177.6mm 6.990in	161.3mm 6.350in	35.6mm 1.403in	30.3mm 1.193in	18.0mm .709in	101.6mm 4.00in	109.22mm 4.300in
4	LP4WPADG	243.8mm 9.600in	213.2mm 8.394in	45.7mm 1.798in	39.5mm 1.553in	24.0mm .945in	152.4mm 6.00in	146.66mm 5.774in

For secondary wheel plate assembly, consult factory.

Size	Mounting Hole Length 1	Mounting Hole Length 2	Mounting Hole Width 1	Mounting Hole Width 2	Mounting Hole Thread	Coupler Mounting Hole to Edge	Coupler Mounting Hole Length	Coupler Fastener	Weight in Grams
	H	I	J	K	L	M	N	O	
1	N/A	50.0mm 1.969in	50.0mm 1.969in	25.0mm .984in	M4x0.7	33.7mm 1.325in	26.7mm 1.05in	M5	194
2	30.0mm 1.181in	76.0mm 2.992in	76.0mm 2.992in	38.0mm 1.496in	M6x1.0	42.1mm 1.657in	45.7mm 1.80in	M8	628
3	38.0mm 1.496in	100.0mm 3.937in	100.0mm 3.937in	50.0mm 1.969in	M8x1.25	59.6mm 2.345in	58.4mm 2.30in	M10	1629
4	66.0mm 2.598in	152.0mm 5.984in	152.0mm 5.984in	66.0mm 2.598in	M10x1.5	71.1mm 2.800in	101.6mm 4.00in	M12	3816



Highlighted holes indicate customer mounting holes

Wheel plate assemblies included with complete systems. *See system ordering information, page 14.*

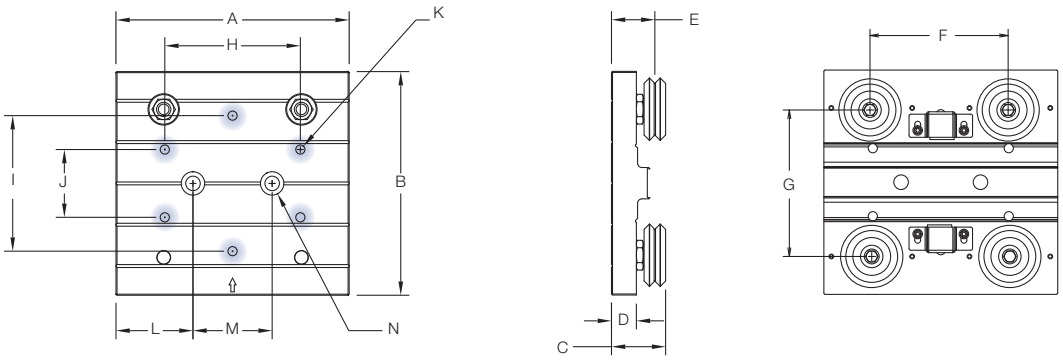
Wheel Plate Options for Belt Driven Systems

Basic Wheel Plate

Size	Part Number		Overall Length	Overall Width	Assembly Height	Wheel Plate Height	Wheel Vee Height	Wheel Spacing Length	Wheel Spacing Width
	Track Lubricators	Wheel Covers	A	B	C	D	E	F	G
1	BWP1XSWTLBC	BWP1XSWWCBC	90.0mm 3.54in	80.0mm 3.15in	23.09mm .909in	11.33mm .446in	18.62mm .733in	50.8mm 2.00in	53.29mm 2.098in
2	BWP2XSWSTLBC	BWP2XSWSWCBC	127.0mm 5.00in	116.0mm 4.57in	25.59mm 1.165in	14.40mm .567in	24.03mm .946in	76.2mm 3.00in	80.01mm 3.150in
3	BWP3XSWSTLBC	BWP3XSWSWCBC	172.0mm 6.77in	165.0mm 6.50in	39.93mm 1.572in	18.36mm .723in	32.00mm 1.260in	101.6mm 4.00in	109.22mm 4.300in
4	BWP4XSWSTLBC	BWP4XSWSWCBC	242.0mm 9.53in	222.0mm 8.74in	47.52mm 1.871in	21.64mm .852in	38.00mm 1.496in	152.4mm 6.00in	146.66mm 5.774in

Part numbers above are for wheel plate assemblies with carbon steel linear guide wheels with SWS swaged studs. Other swaged guide wheel materials and versions are available including: stainless steel (SSX), stainless steel high temperature (SS227), stainless steel low temperature (SS300).

Size	Mounting Hole Length	Mounting Hole Width 1	Mounting Hole Width 2	Mounting Hole Thread	Coupler Mounting Hole to Edge	Coupler Mounting Hole Length	Coupler Fastener	Weight in Grams[1]
	H	I	J	K	L	M	N	
1	50.0mm 1.969in	50.0mm 1.969in	25.0mm .984in	M4x0.7	31.67mm 1.247in	26.7mm 1.05in	M5	307
2	76.0mm 2.992in	76.0mm 2.992in	38.0mm 1.496in	M6x1.0	40.64mm 1.600in	45.7mm 1.80in	M8	835
3	100.0mm 3.937in	100.0mm 3.937in	50.0mm 1.969in	M8x1.25	56.79mm 2.236in	58.4mm 2.30in	M10	2153
4	152.0mm 5.984in	152.0mm 5.984in	66.0mm 2.598in	M10x1.5	70.21mm 2.764in	101.6mm 4.00in	M12	4765



Highlighted holes indicate customer mounting holes. Wheel plate assembly shown with track lubricators.

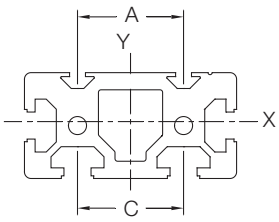
Wheel plate assemblies included with complete systems. See system ordering information, page 14.

1. Weights shown are for wheel plates with wheel covers and without coupling kits. Basic wheel plates with track lubricators weigh slightly less.

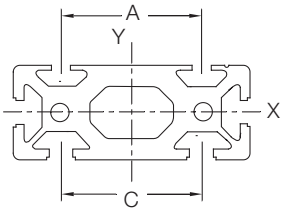
Support Beams for Belt Driven Systems

Aluminum Support Beams

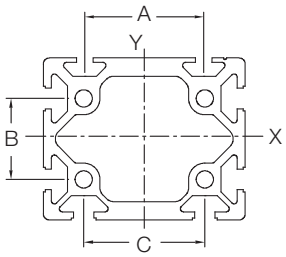
- Designed with industry standard cross section and T-slot (10mm) geometry
- Compatible with HepcoMotion®'s MCS aluminum frame and machine construction system from Bishop-Wisecarver, as well as other industry profile extrusions



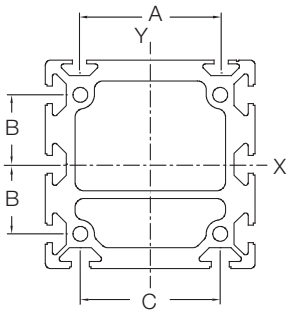
Size 1
LP1SBEXT



Size 2S
LP2SSBEXT



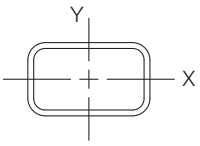
Size 2L
LP2LSBEXT



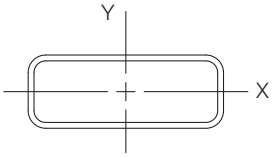
Size 3
LP3SBEXT

Size	Width	Height	Cross Sectional Area	Moment of Inertia X-Axis	Moment of Inertia Y-Axis	LoPro T-Slot A	LoPro T-Slot B	LoPro T-Slot C	Max Length
1	80.0mm 3.150in	40.0mm 1.575in	1679.9mm^2 2.60in^2	2.772x10^{5}mm^4 .66in^4	1.007x10^{6}mm^4 2.42in^4	40.0mm 1.575in	N/A	40.0mm 1.575in	5.6m 18.37ft
2S	100.0mm 3.937in	40.0mm 1.575in	2130.1mm^2 3.30in^2	3.512x10^{5}mm^4 .84in^4	1.773x10^{6}mm^4 4.26in^4	59.0mm 2.322in	N/A	60.0mm 2.362in	5.6m 18.37ft
2L	100.0mm 3.937in	80.0mm 3.150in	2698.3mm^2 4.18in^2	2.142x10^{6}mm^4 5.15in^4	2.974x10^{6}mm^4 7.14in^4	59.0mm 2.322in	40.0mm 1.575in	60.0mm 2.362in	5.6m 18.37ft
3	120.0mm 4.724in	120.0mm 4.724in	5146.6mm^2 7.98in^2	8.537x10^{6}mm^4 20.51in^4	8.490x10^{6}mm^4 20.40in^4	81.0mm 3.189in	40.0mm 1.575in	80.0mm 3.150in	5.6m 18.37ft

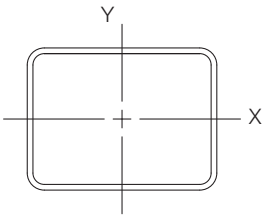
Steel Support Beams



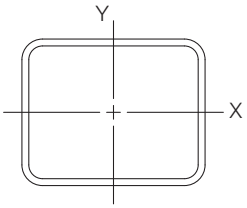
Size 1
LP1BSB



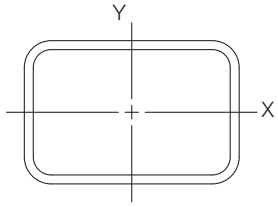
Size 2S
LP2SBSB



Size 2L
LP2LBSB



Size 3
LP3BSB



Size 4
LP4BSB

Size	Width	Height	Thickness	Cross Sectional Area	Moment of Inertia X-Axis	Moment of Inertia Y-Axis	Max Length[1]
1	63.5mm 2.50in	38.1mm 1.50in	3.1mm .12in	541.0mm^2 .84in^2	1.215x10^{5}mm^4 .29in^4	2.679x10^{5}mm^4 .64in^4	7.3m 24ft
2S	101.6mm 4.00in	38.1mm 1.50in	3.1mm .12in	774.6mm^2 1.20in^2	1.933x10^{5}mm^4 .46in^4	9.045x10^{5}mm^4 2.17in^4	12.2m 40ft
2L	101.6mm 4.00in	76.2mm 3.00in	3.1mm .12in	1006.8mm^2 1.56in^2	9.468x10^{5}mm^4 2.27in^4	1.469x10^{6}mm^4 3.53in^4	7.3m 24ft
3	127.0mm 5.00in	101.6mm 4.00in	4.8mm .19in	1994.1mm^2 3.09in^2	3.216x10^{6}mm^4 7.73in^4	4.524x10^{6}mm^4 10.87in^4	14.6m 48ft
4	152.4mm 6.00in	101.6mm 4.00in	6.4mm .25in	2891.4mm^2 4.48in^2	4.702x10^{6}mm^4 11.30in^4	8.777x10^{6}mm^4 21.09in^4	14.6m 48ft

Aluminum beams are 6061-T6 aluminum alloy. Steel beams are structural steel tubing ASTM A500 Grade A. Note: drawings are not to scale.

1. Sizes 3 & 4 - up to 48ft lengths stock. Longer lengths available upon request. Contact factory for availability.

System Ordering Information: Belt Driven Systems

LP	B	1Z	C	W	C	Z	R	A	B	1250.0

System:
LP: LoPro

Drive System:
B: Belt

Size:
1Z: Size 1
2Z: Size 2 (LS and BS only)
2S: Size 2S (Belt, Chain, Un-driven)
2L: Size 2L (Belt, Chain, Un-driven)
3Z: Size 3
4Z: Size 4

System Material:
C: Carbon Steel (Standard)
S: Stainless Steel (Corrosion Resistant)

Carriage Type[2]:
W: Wiper Wheel Plate
L: Basic Wheel Plate w/ Track Lubricators
C: Basic Wheel Plate w/ Wheel Covers

Wheel Type:
C: Carbon Steel
S: Stainless Steel
H: Stainless Steel 227 High Temp.
L: Stainless Steel 300 Low Temp.
W: Stainless Steel Washdown
V: Stainless Steel Vacuum

Travel Length:
Enter value in 0.1mm increments

Version:
B: Version B

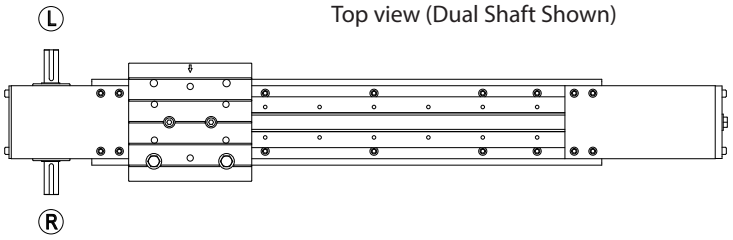
Support Beam:
U: Un-mounted
A: Aluminum Beam[1]
S: Steel Beam
D: Stainless Steel Beam[2]

Drive Configuration:
L: Belt/Chain Left Hand Output Shaft
R: Belt/Chain Right Hand Output Shaft
D: Belt/Chain Dual L/R Output Shaft
E: Belt/Chain Left Hand Output Shaft with Open Bottom
F: Belt/Chain Right Hand Output Shaft with Open Bottom
G: Belt/Chain Dual L/R Output Shaft with Open Bottom

Additional Wheel Plate Options:
R: Sensor Flag Right Side
L: Sensor Flag Left Side
Y: Sensor Flags Right & Left Sides
Z: None, Without Sensor Flag

Drive Shaft Position

Top view (Dual Shaft Shown)



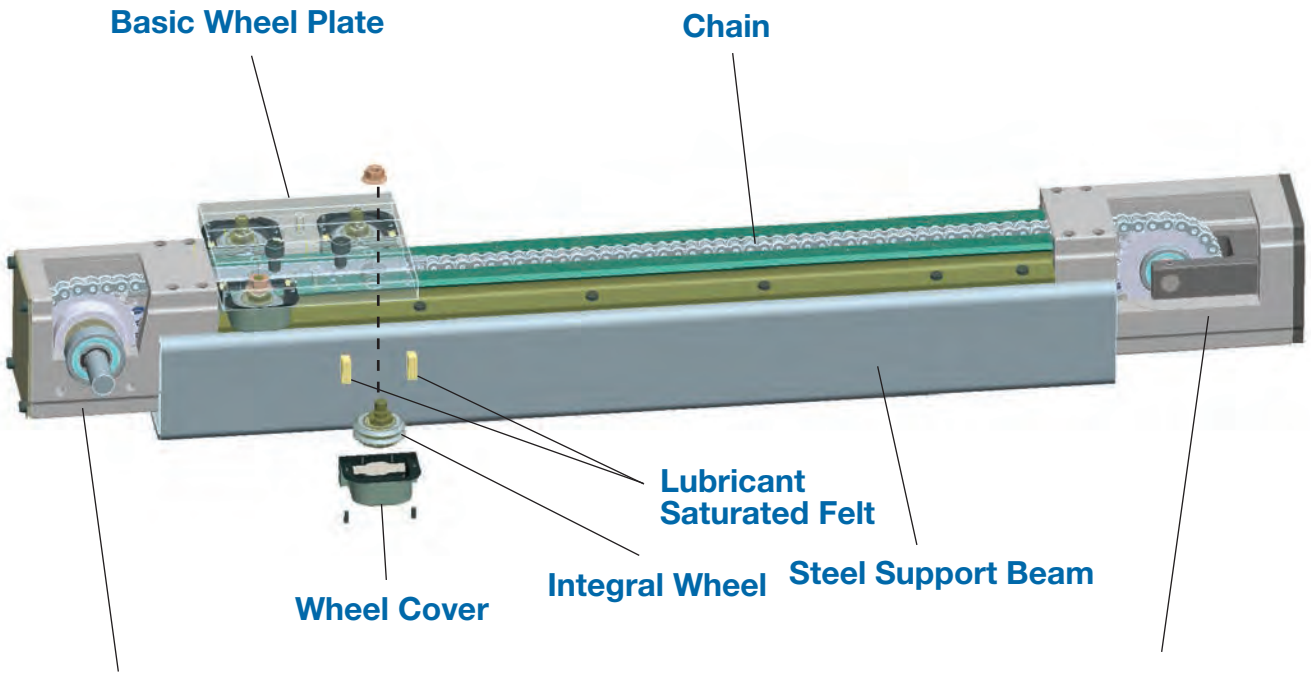
Ordering Example

LP B 1Z C W C Z R A B 1250.0 = LPB1ZCWCZRAB 1250.0

LoPro, Belt, Size 1, Carbon Steel, Wiper Wheel Plate, Carbon Steel Wheels, No Sensor Flags, Right Hand Output Shaft, Aluminum Beam Mounted, Version B, 1250.0mm Travel Stroke

1. Aluminum beam not available on size 4.
2. Corrosion resistant systems are available with basic wheel plate or wiper wheel plate. Corrosion resistant systems on stainless steel beams are custom. Contact Bishop-Wisecarver for details.

Chain Driven Systems

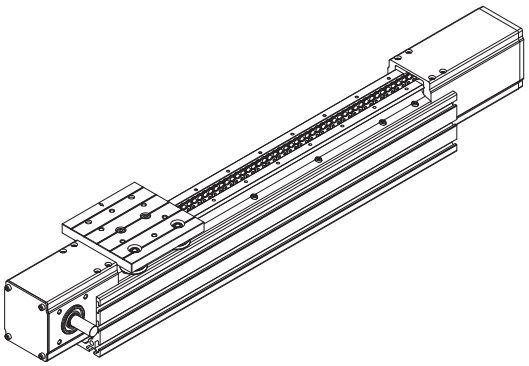


Drive End

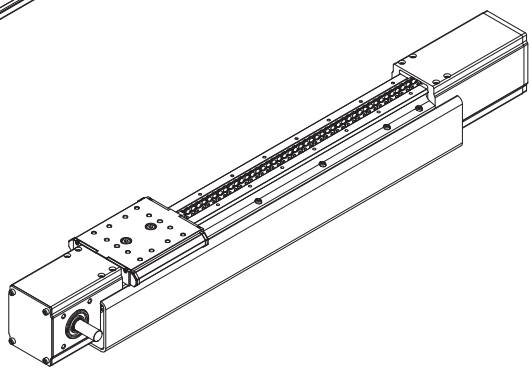
Constructed with anodized aluminum housing and stainless steel input drive shaft. Sprocket and shaft are supported by two single row ball bearings.

Idler End with Tensioning Adjustment

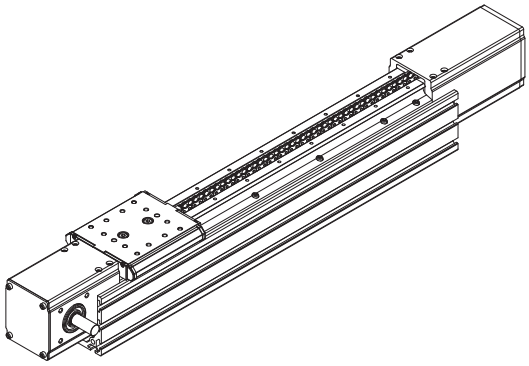
Rugged anodized aluminum housing; sprocket is supported by two single row ball bearings. Chain tension adjustment screw is easily accessed on the back plate of the idler end assembly.



- Basic Wheel Plate
- Aluminum Support Beam



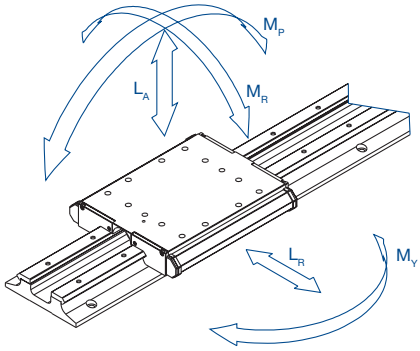
- Wiper Wheel Plate
- Steel Support Beam



- Wiper Wheel Plate
- Aluminum Support Beam

Chain Driven Systems

- Complete chain actuated system, ready for installation
- Ideal for vertical hoisting and large load actuation over long lengths
- Standard or corrosion resistant ANSI roller chain
- Accurate to .015 in/ft (0.4mm/300mm)
- Repeatable within .008 in (0.2mm)
- Small and large drive options available on size 2
- Aluminum support beams, steel beams or un-mounted (without beams)
- Basic wheel plate or wiper wheel plate
- Optional NEMA and IEC motor mounts
- Steel or stainless steel drive end sprockets



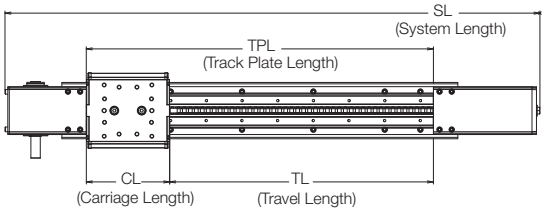
Carriage Assembly Load Capacities										
System Size	Axial Load Capacity L_A		Radial Load Capacity L_R		Pitch Moment Capacity M_p		Yaw Moment Capacity M_Y		Roll Moment Capacity M_R	
	N	lbs	N	lbs	N·m	ft·lbf	N·m	ft·lbf	N·m	ft·lbf
1	988	222	2391	538	26	18.9	62	45.7	27	19.8
2S/2L	2450	551	5194	1168	95	70.3	202	148.9	100	73.8
3	6668	1499	11564	2600	346	254.9	599	442.1	372	274.1
4	15684	3526	19012	4274	1220	899.5	1478	1090.3	1174	865.6

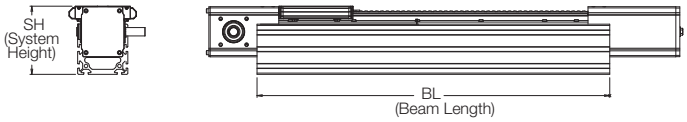
LoPro System Chain Load Capacities										Drive End Sprockets	
System Size	Chain Size Single Strand	Static/Slow Speed Working Load				Working Load at 0.5 m/s				Pitch Diameter	No. of Teeth
		Steel		Stainless Steel		Steel		Stainless Steel			
		N	lbs	N	lbs	N	lbs	N	lbs		
1	25	431	97	347	78	267	60	214	48	24.5mm (.966in)	12
2S	35	1036	233	841	189	618	139	494	111	36.8mm (1.449in)	12
2L	35	1036	233	841	189	645	145	516	116	79.0mm (3.111in)	26
3	40	1975	444	1481	333	1152	259	863	194	93.3mm (3.672in)	23
4	50	3261	733	2322	522	1788	402	1272	286	91.4mm (3.599in)	18

Working load varies with speed. Contact Bishop-Wisecarver for specific application information.

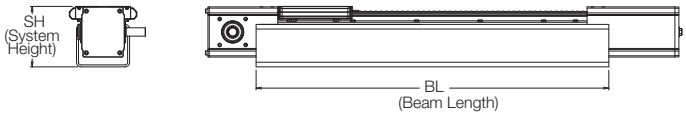
Chain Driven Systems - Wiper Wheel Plate

Beam Mounted



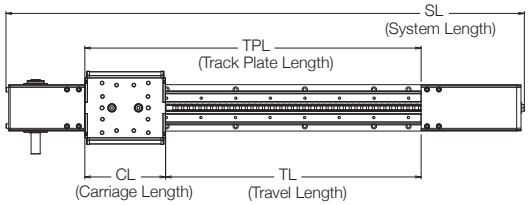


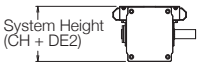
Aluminum Beam

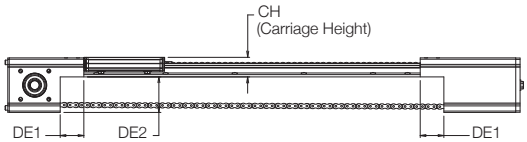


Steel Beam

Un-mounted*







Size	Track Plate Length TPL (=TL+CL)	System Length SL	System Height SH			Beam Length BL	Carriage Height CH
			Aluminum	Steel	Un-mounted	Beam Mounted	Un-mounted
1	TL+94.0mm TL+3.701in	TPL+173.6mm TPL+6.833in	63.0mm 2.482in	61.1mm 2.407in	39.0mm 1.537in	TL+154.0mm TL+6.063in	23.0mm .907in
2S	TL+129.9mm TL+5.114in	TPL+227.6mm TPL+8.960in	73.0mm 2.874in	71.1mm 2.799in	61.0mm 2.401in	TL+209.9mm TL+8.264in	33.0mm 1.299in
2L	TL+129.9mm TL+5.114in	TPL+318.1mm TPL+12.522in	113.0mm 4.449in	109.2mm 4.299in	101.0mm 3.976in	TL+209.9mm TL+8.264in	33.0mm 1.299in
3	TL+177.6mm TL+6.990in	TPL+400.1mm TPL+15.751in	163.0mm 6.417in	144.6mm 5.693in	121.1mm 4.768in	TL+281.6mm TL+11.084in	43.0mm 1.693in
4	TL+243.8mm TL+9.600in	TPL+440.9mm TPL+17.358in	N/A	156.6mm 6.167in	130.0mm 5.120in	TL+351.8mm TL+13.852in	55.0mm 2.167in

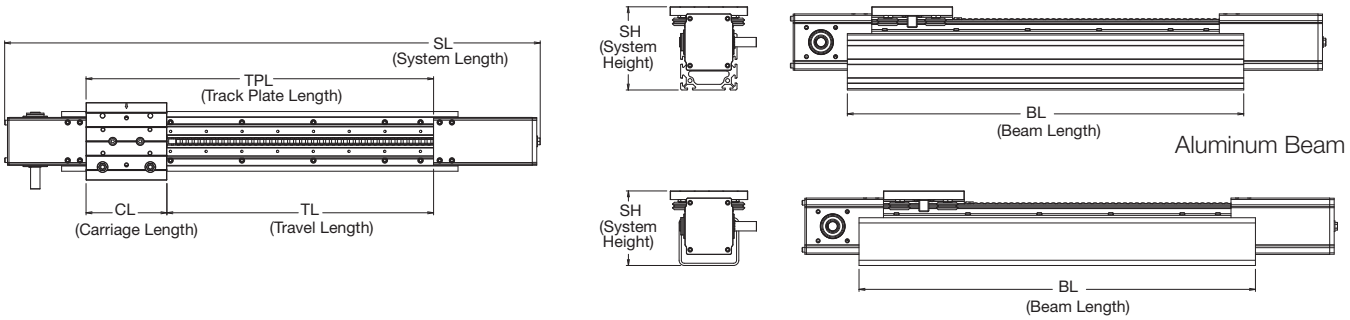
Size	Drive End Cutout Width DE1	Drive End Cutout Height DE2	System Inertia J (A + B + C)		
	Un-mounted	Un-mounted	A	B[1]	C[2]
1	30.0mm 1.181in	16.0mm .630in	57.6kg•mm² .197lb•in²	.0421kg•mm x TL .00366lb•in x TL	151mm² x M .234in² x M
2S	40.0mm 1.575in	28.0mm 1.102in	402kg•mm² 1.37lb•in²	.23kg•mm x TL .020lb•in x TL	339mm² x M .525in² x M
2L	40.0mm 1.575in	68.0mm 2.677in	2530kg•mm² 8.65lb•in²	1.06kg•mm x TL .092lb•in x TL	1560mm² x M 2.42in² x M
3	52.0mm 2.047in	78.1mm 3.075in	8090kg•mm² 27.7lb•in²	2.78kg•mm x TL .241lb•in x TL	2170mm² x M 3.36in² x M
4	54.0mm 2.126in	75.0mm 2.953in	15600kg•mm² 53.4lb•in²	4.47kg•mm x TL .388lb•in x TL	2090mm² x M 3.24in² x M

*Un-mounted systems are designed for mounting to a customer-supplied mounting surface. System straightness and flatness are determined by mounting surface accuracy. Continuous support along the entire track plate length and under drive end mounting surfaces is required.

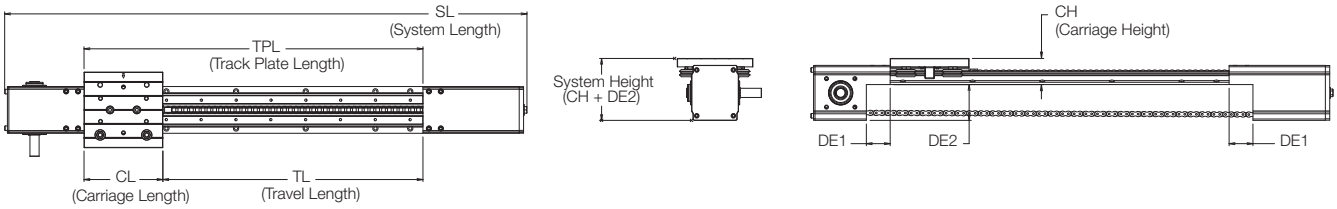
1. TL (Travel Length) must be in mm for metric calculation, inches for English calculation.
2. M (Mass of payload on the carriage) must be in kg for metric calculation, lbm for English calculation.

Chain Driven Systems - Basic Wheel Plate

Beam Mounted



Un-mounted*



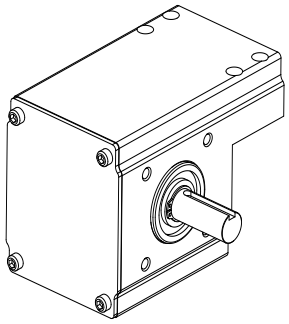
Size	Track Plate Length TPL (=TL+CL)	System Length SL	System Height SH			Beam Length BL	Carriage Height CH
			Aluminum	Steel	Un-mounted	Beam Mounted	Un-mounted
1	TL+90.0mm TL+3.543in	TPL+173.6mm TPL+6.833in	72.1mm 2.840in	70.2mm 2.765in	48.1mm 1.895in	TL+150.0mm TL+5.906in	32.1mm 1.265in
2S	TL+127.0mm TL+5.000in	TPL+227.6mm TPL+8.960in	83.0mm 3.269in	81.1mm 3.194in	71.0mm 2.796in	TL+207.0mm TL+8.150in	43.0mm 1.694in
2L	TL+127.0mm TL+5.000in	TPL+318.1mm TPL+12.522in	123.0mm 4.844in	119.2mm 4.694in	111.0mm 4.371in	TL+207.0mm TL+8.150in	43.0mm 1.694in
3	TL+172.0mm TL+6.772in	TPL+400.1mm TPL+15.751in	177.0mm 6.969in	158.6mm 6.245in	135.1mm 5.320in	TL+276.0mm TL+10.866in	57.0mm 2.244in
4	TL+242.0mm TL+9.528in	TPL+440.9mm TPL+17.358in	N/A	170.6mm 6.718in	144.0mm 5.671in	TL+350.0mm TL+13.780in	69.0mm 2.718in

Size	Drive End Cutout Width DE1	Drive End Cutout Height DE2	System Inertia J (A + B + C)		
	Un-mounted	Un-mounted	A	B[1]	C[2]
1	30.0mm 1.181in	16.0mm .630in	74.8kg•mm² .256lb•in²	.0421kg•mm x TL .0037lb•in x TL	151mm² x M .234in² x M
2S	40.0mm 1.575in	28.0mm 1.102in	474kg•mm² 1.62lb•in²	.230kg•mm x TL .020lb•in x TL	339mm² x M .525in² x M
2L	40.0mm 1.575in	68.0mm 2.677in	2860kg•mm² 9.78lb•in²	1.06kg•mm x TL .092lb•in x TL	1560mm² x M 2.42in² x M
3	52.0mm 2.047in	78.1mm 3.075in	9260kg•mm² 31.7lb•in²	2.78kg•mm x TL .241lb•in x TL	2170mm² x M 3.36in² x M
4	54.0mm 2.126in	75.0mm 2.953in	17600kg•mm² 60.2lb•in²	4.47kg•mm x TL .388lb•in x TL	2090mm² x M 3.24in² x M

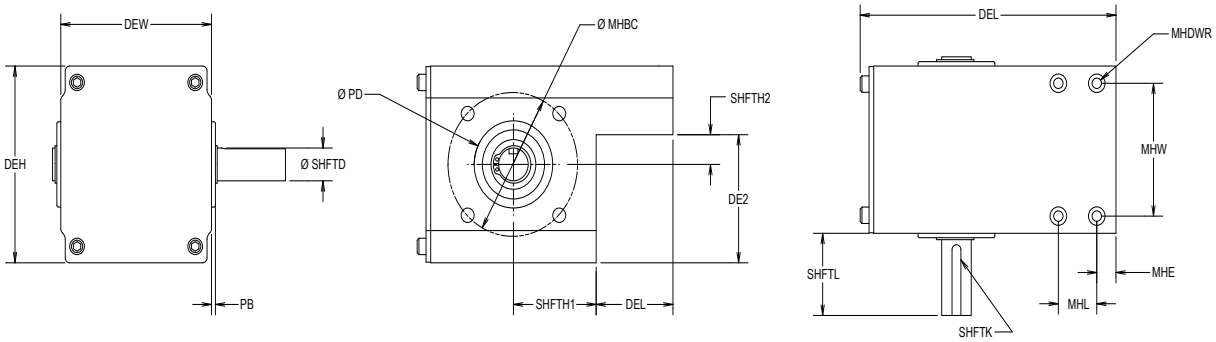
*Un-mounted systems are designed for mounting to a customer-supplied mounting surface. System straightness and flatness are determined by mounting surface accuracy. Continuous support along the entire track plate length and under drive end mounting surfaces is required.

1. TL (Travel Length) must be in mm for metric calculation, inches for English calculation.
2. M (Mass of payload on the carriage) must be in kg for metric calculation, lbm for English calculation.

Drive Ends for Chain Driven Systems



- Designed for high performance, high cycling linear motion
- Incorporates high quality radial bearings with a high strength aircraft grade aluminum housing
- Drive ends are available with optional relief holes for extremely aggressive environments with high particulate matter. Contact Bishop-Wisecarver for details.



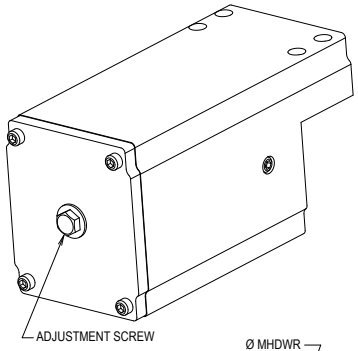
Size	Drive End Length	Drive End Width	Drive End Height	Shaft Length	Shaft Diameter	Shaft Square Key Size	Shaft Locations		Drive End Cutout Width	Drive End Cutout Height	Mounting Hardware
	DEL	DEW	DEH	SHFTL	SHFTD	SHFTK	SHFTH1	SHFTH2	DE1	DE2	MHDWR
1	76.2mm 2.999in	50.0mm 1.969in	38.0mm 1.496in	29.6mm 1.166in	9.0mm .354in	3mm	20.0mm .787in	3.0mm .118in	30.0mm 1.181in	16.0mm .630in	M3x22mm MIN
2S	95.2mm 3.748in	72.0mm 2.835in	60.0mm 2.362in	36.7mm 1.445in	12.0mm .472in	4mm	24.0mm .945in	2.0mm .079in	40.0mm 1.575in	28.0mm 1.102in	M5x30mm MIN
2L	141.2mm 5.558in	80.0mm 3.150in	100.0mm 3.937in	50.1mm 1.973in	20.0mm .787in	6mm	46.0mm 1.811in	18.0mm .709in	40.0mm 1.575in	68.0mm 2.677in	M5x35mm MIN
3	173.2mm 6.818in	102.0mm 4.016in	120.0mm 4.724in	50.1mm 1.973in	20.0mm .787in	6mm	56.0mm 2.205in	18.1mm .713in	52.0mm 2.047in	78.1mm 3.075in	M6x45mm MIN
4	183.2mm 7.212in	140.0mm 5.512in	128.0mm 5.039in	50.1mm 1.973in	20.0mm .787in	6mm	59.0mm 2.323in	11.0mm .434in	54.0mm 2.126in	75.0mm 2.953in	M8x55mm MIN

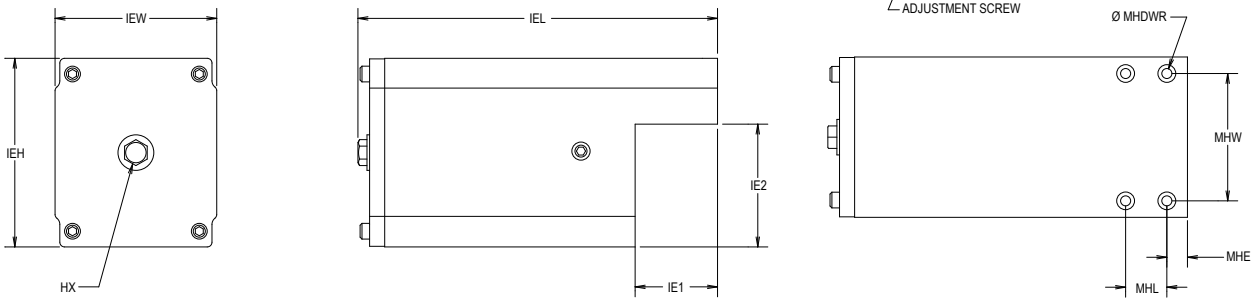
Size	Mounting Holes (Typical)			Motor Mount			
	Width	Edge Spacing	Length	Pilot Diameter	Pilot Bearing Height	Bolt Circle Diameter	Mounting Hole Thread
	MHW	MHE	MHL	PD	PB	MHBC	MHTHD
1	40.0mm 1.575in	6.0mm .236in	18.0mm .709in	24.0mm .945in	1.7mm .067in	42.4mm 1.670in	M4x0.7
2S	59.0mm 2.323in	10.0mm .394in	20.0mm .787in	28.0mm 1.102in	1.7mm .067in	50.9mm 2.004in	M5x0.8
2L	59.0mm 2.323in	10.0mm .394in	20.0mm .787in	52.0mm 2.047in	2.7mm .106in	67.9mm 2.673in	M6x1.0
3	81.0mm 3.189in	13.0mm .512in	26.0mm 1.024in	52.0mm 2.047in	2.7mm .106in	87.7mm 3.452in	M8x1.25
4	111.0mm 4.370in	13.5mm .532in	27.0mm 1.063in	52.0mm 2.047in	2.7mm .106in	90.5mm 3.564in	M8x1.25

Right hand version shown. Dual shaft, left hand, and corrosion resistant versions are also available. Contact Bishop-Wisecarver for details.

Idler Ends for Chain Driven Systems

- Chain adjustment is easily accomplished via rotation of a single, easy-to-access adjustment screw
- High quality radial bearings and high strength aluminum housing provides smooth, accurate linear motion
- Idler ends are available with optional relief holes for extremely aggressive environments with high particulate matter. Contact Bishop-Wisecarver for details.





Size	Idler End Length	Bottom View		Idler End Cutout Width	Idler End Cutout Height	Mounting Hardware
		Idler End Width	Idler End Height			
	IEL	IEW	IEH	IE1	IE2	MHDWR
1	97.4mm 3.834in	50.0mm 1.969in	38.0mm 1.496in	30.0mm 1.181in	16.0mm .630in	M3x22mm MIN
2S	132.4mm 5.212in	72.0mm 2.835in	60.0mm 2.362in	40.0mm 1.575in	28.0mm 1.102in	M5x30mm MIN
2L	176.9mm 6.964in	80.0mm 3.150in	100.0mm 3.937in	40.0mm 1.575in	68.0mm 2.677in	M5x35mm MIN
3	226.9mm 8.933in	102.0mm 4.016in	120.0mm 4.724in	52.0mm 2.047in	78.1mm 3.075in	M6x45mm MIN
4	257.7mm 10.146in	140.0mm 5.512in	128.0mm 5.039in	54.0mm 2.126in	75.0mm 2.953in	M8x55mm MIN

Size	Mounting Holes (Typical)			Hex Head Adj. Screw
	Width	Edge Spacing	Length	
	MHW	MHE	MHL	HX
1	40.0mm 1.575in	6.0mm .236in	18.0mm .709in	7/16in
2S	59.0mm 2.323in	10.0mm .394in	20.0mm .787in	7/16in
2L	59.0mm 2.323in	10.0mm .394in	20.0mm .787in	1/2in
3	81.0mm 3.189in	13.0mm .512in	26.0mm 1.024in	1/2in
4	111.0mm 4.370in	13.5mm .532in	27.0mm 1.063in	9/16in

Corrosion resistant versions are also available. Contact Bishop-Wisecarver for details.

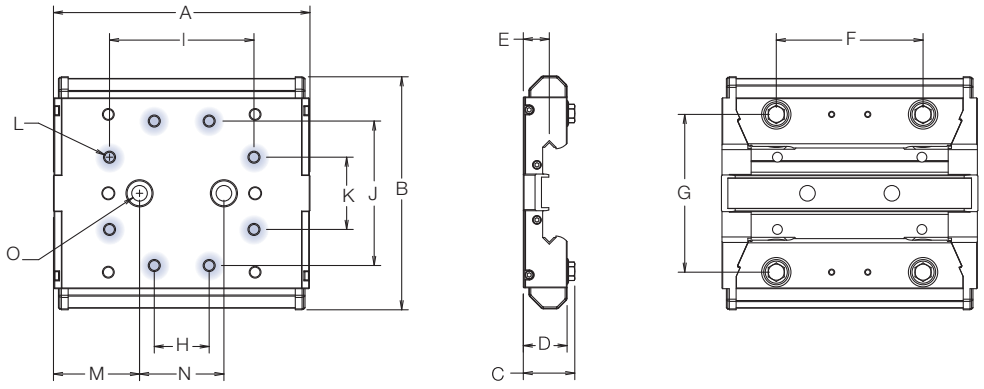
Wheel Plate Options for Chain Driven Systems

Wiper Wheel Plate

Size	Part Number	Overall Length	Overall Width	Assembly Height	Wheel Plate Height	Wheel Vee Height	Wheel Spacing Length	Wheel Spacing Width
		A	B	C	D	E	F	G
1	LP1WPADG	94.0mm 3.700in	78.0mm 3.070in	18.5mm .730in	16.5mm .650in	9.5mm .375in	50.8mm 2.00in	53.29mm 2.098in
2	LP2WPADG	129.9mm 5.114in	115.3mm 4.540in	26.4mm 1.041in	23.3mm .916in	14.0mm .551in	76.2mm 3.00in	80.01mm 3.150in
3	LP3WPADG	177.6mm 6.990in	161.3mm 6.350in	35.6mm 1.403in	30.3mm 1.193in	18.0mm .709in	101.6mm 4.00in	109.22mm 4.300in
4	LP4WPADG	243.8mm 9.600in	213.2mm 8.394in	45.7mm 1.798in	39.5mm 1.553in	24.0mm .945in	152.4mm 6.00in	146.66mm 5.774in

For secondary wheel plate assembly, consult factory.

Size	Mounting Hole Length 1	Mounting Hole Length 2	Mounting Hole Width 1	Mounting Hole Width 2	Mounting Hole Thread	Coupler Mounting Hole to Edge	Coupler Mounting Hole Length	Coupler Fastener	Weight in Grams
	H	I	J	K	L	M	N	O	
1	N/A	50.0mm 1.969in	50.0mm 1.969in	25.0mm .984in	M4x0.7	33.7mm 1.325in	26.7mm 1.05in	M5	194
2	30.0mm 1.181in	76.0mm 2.992in	76.0mm 2.992in	38.0mm 1.496in	M6x1.0	42.1mm 1.657in	45.7mm 1.80in	M8	628
3	38.0mm 1.496in	100.0mm 3.937in	100.0mm 3.937in	50.0mm 1.969in	M8x1.25	59.6mm 2.345in	58.4mm 2.30in	M10	1629
4	66.0mm 2.598in	152.0mm 5.984in	152.0mm 5.984in	66.0mm 2.598in	M10x1.5	71.1mm 2.800in	101.6mm 4.00in	M12	3816



Highlighted holes indicate customer mounting holes

Wheel plate assemblies included with complete systems. *See system ordering information, page 24.*

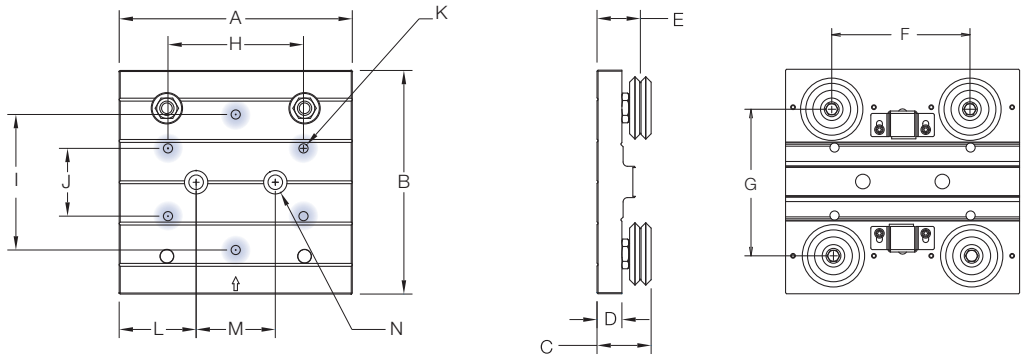
Wheel Plate Options for Chain Driven Systems

Basic Wheel Plate

Size	Part Number		Overall Length	Overall Width	Assembly Height	Wheel Plate Height	Wheel Vee Height	Wheel Spacing Length	Wheel Spacing Width
	Track Lubricators	Wheel Covers	A	B	C	D	E	F	G
1	BWP1XSWTLBC	BWP1XSWWCBC	90.0mm 3.54in	80.0mm 3.15in	23.09mm .909in	11.33mm .446in	18.62mm .733in	50.8mm 2.00in	53.29mm 2.098in
2	BWP2XSWSTLBC	BWP2XSWSWCBC	127.0mm 5.00in	116.0mm 4.57in	25.59mm 1.165in	14.40mm .567in	24.03mm .946in	76.2mm 3.00in	80.01mm 3.150in
3	BWP3XSWSTLBC	BWP3XSWSWCBC	172.0mm 6.77in	165.0mm 6.50in	39.93mm 1.572in	18.36mm .723in	32.00mm 1.260in	101.6mm 4.00in	109.22mm 4.300in
4	BWP4XSWSTLBC	BWP4XSWSWCBC	242.0mm 9.53in	222.0mm 8.74in	47.52mm 1.871in	21.64mm .852in	38.00mm 1.496in	152.4mm 6.00in	146.66mm 5.774in

Part numbers above are for wheel plate assemblies with carbon steel linear guide wheels with SWS swaged studs. Other swaged guide wheel materials and versions are available including: stainless steel (SSX), stainless steel high temperature (SS227), stainless steel low temperature (SS300).

Size	Mounting Hole Length	Mounting Hole Width 1	Mounting Hole Width 2	Mounting Hole Thread	Coupler Mounting Hole to Edge	Coupler Mounting Hole Length	Coupler Fastener	Weight in Grams[1]
	H	I	J	K	L	M	N	
1	50.0mm 1.969in	50.0mm 1.969in	25.0mm .984in	M4x0.7	31.67mm 1.247in	26.7mm 1.05in	M5	307
2	76.0mm 2.992in	76.0mm 2.992in	38.0mm 1.496in	M6x1.0	40.64mm 1.600in	45.7mm 1.80in	M8	835
3	100.0mm 3.937in	100.0mm 3.937in	50.0mm 1.969in	M8x1.25	56.79mm 2.236in	58.4mm 2.30in	M10	2153
4	152.0mm 5.984in	152.0mm 5.984in	66.0mm 2.598in	M10x1.5	70.21mm 2.764in	101.6mm 4.00in	M12	4765



Highlighted holes indicate customer mounting holes. Wheel plate assembly shown with track lubricators.

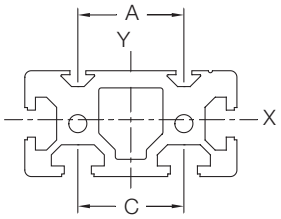
Wheel plate assemblies included with complete systems. *See system ordering information, page 24.*

1. Weights shown are for wheel plates with wheel covers and without coupling kits. Basic wheel plates with track lubricators weigh slightly less.

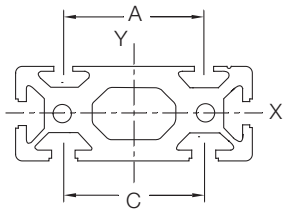
Support Beams for Chain Driven Systems

Aluminum Support Beams

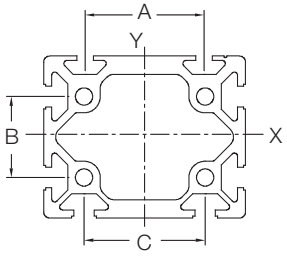
- Designed with industry standard cross section and T-slot (10mm) geometry
- Compatible with HepcoMotion®'s MCS aluminum frame and machine construction system from Bishop-Wisecarver, as well as other industry profile extrusions



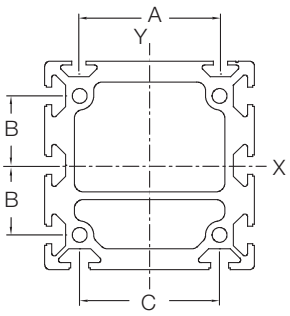
Size 1
LP1SBEXT



Size 2S
LP2SSBEXT



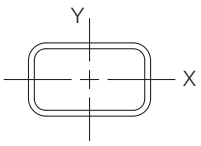
Size 2L
LP2LSBEXT



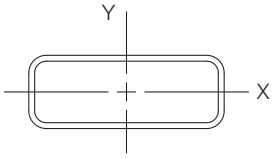
Size 3
LP3SBEXT

Size	Width	Height	Cross Sectional Area	Moment of Inertia X-Axis	Moment of Inertia Y-Axis	LoPro T-Slot A	LoPro T-Slot B	LoPro T-Slot C	Max Length
1	80.0mm 3.150in	40.0mm 1.575in	1679.9mm^2 2.60in^2	2.772x10^{5}mm^4 .66in^4	1.007x10^{6}mm^4 2.42in^4	40.0mm 1.575in	N/A	40.0mm 1.575in	5.6m 18.37ft
2S	100.0mm 3.937in	40.0mm 1.575in	2130.1mm^2 3.30in^2	3.512x10^{5}mm^4 .84in^4	1.773x10^{6}mm^4 4.26in^4	59.0mm 2.322in	N/A	60.0mm 2.362in	5.6m 18.37ft
2L	100.0mm 3.937in	80.0mm 3.150in	2698.3mm^2 4.18in^2	2.142x10^{6}mm^4 5.15in^4	2.974x10^{6}mm^4 7.14in^4	59.0mm 2.322in	40.0mm 1.575in	60.0mm 2.362in	5.6m 18.37ft
3	120.0mm 4.724in	120.0mm 4.724in	5146.6mm^2 7.98in^2	8.537x10^{6}mm^4 20.51in^4	8.490x10^{6}mm^4 20.40in^4	81.0mm 3.189in	40.0mm 1.575in	80.0mm 3.150in	5.6m 18.37ft

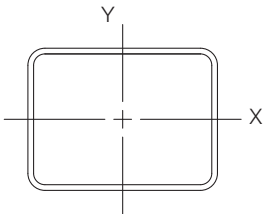
Steel Support Beams



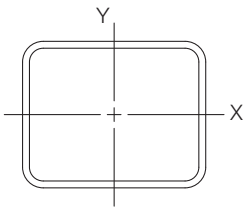
Size 1
LP1BSB



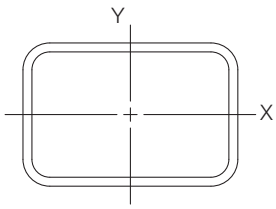
Size 2S
LP2SBSB



Size 2L
LP2LBSB



Size 3
LP3BSB



Size 4
LP4BSB

Size	Width	Height	Thickness	Cross Sectional Area	Moment of Inertia X-Axis	Moment of Inertia Y-Axis	Max Length[1]
1	63.5mm 2.50in	38.1mm 1.50in	3.1mm .12in	541.0mm^2 .84in^2	1.215x10^{5}mm^4 .29in^4	2.679x10^{5}mm^4 .64in^4	7.3m 24ft
2S	101.6mm 4.00in	38.1mm 1.50in	3.1mm .12in	774.6mm^2 1.20in^2	1.933x10^{5}mm^4 .46in^4	9.045x10^{5}mm^4 2.17in^4	12.2m 40ft
2L	101.6mm 4.00in	76.2mm 3.00in	3.1mm .12in	1006.8mm^2 1.56in^2	9.468x10^{5}mm^4 2.27in^4	1.469x10^{6}mm^4 3.53in^4	7.3m 24ft
3	127.0mm 5.00in	101.6mm 4.00in	4.8mm .19in	1994.1mm^2 3.09in^2	3.216x10^{6}mm^4 7.73in^4	4.524x10^{6}mm^4 10.87in^4	14.6m 48ft
4	152.4mm 6.00in	101.6mm 4.00in	6.4mm .25in	2891.4mm^2 4.48in^2	4.702x10^{6}mm^4 11.30in^4	8.777x10^{6}mm^4 21.09in^4	14.6m 48ft

Aluminum beams are 6061-T6 aluminum alloy. Steel beams are structural steel tubing ASTM A500 Grade A. Note: drawings are not to scale.

1. Sizes 3 & 4 - up to 48ft lengths stock. Longer lengths available upon request. Contact factory for availability.

System Ordering Information: Chain Driven Systems

LP	C	1Z	C	W	C	Z	R	A	B	1475.5

System:
LP: LoPro

Drive System:
C: Chain

Size:
1Z: Size 1
2Z: Size 2 (LS and BS only)
2S: Size 2S (Belt, Chain, Un-driven)
2L: Size 2L (Belt, Chain, Un-driven)
3Z: Size 3
4Z: Size 4

System Material:
C: Carbon Steel (Standard)
S: Stainless Steel (Corrosion Resistant)

Carriage Type[2]:
W: Wiper Wheel Plate
L: Basic Wheel Plate w/ Track Lubricators
C: Basic Wheel Plate w/ Wheel Covers

Wheel Type:
C: Carbon Steel
S: Stainless Steel
H: Stainless Steel 227 High Temp.
L: Stainless Steel 300 Low Temp.
W: Stainless Steel Washdown
V: Stainless Steel Vacuum

Travel Length:
Enter value in 0.1mm increments

Version:
B: Version B

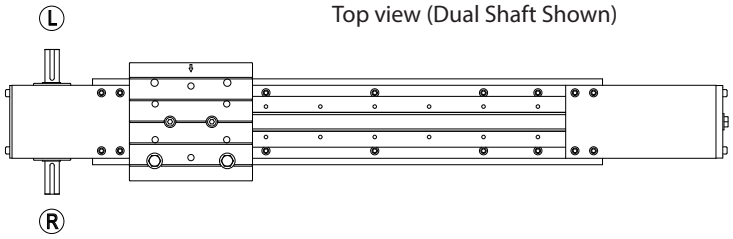
Support Beam:
U: Un-mounted
A: Aluminum Beam[1]
S: Steel Beam
D: Stainless Steel Beam[2]

Drive Configuration:
L: Belt/Chain Left Hand Output Shaft
R: Belt/Chain Right Hand Output Shaft
D: Belt/Chain Dual L/R Output Shaft
E: Belt/Chain Left Hand Output Shaft with Open Bottom
F: Belt/Chain Right Hand Output Shaft with Open Bottom
G: Belt/Chain Dual L/R Output Shaft with Open Bottom

Additional Wheel Plate Options:
R: Sensor Flag Right Side
L: Sensor Flag Left Side
Y: Sensor Flags Right & Left Sides
Z: None, Without Sensor Flag

Drive Shaft Position

Top view (Dual Shaft Shown)



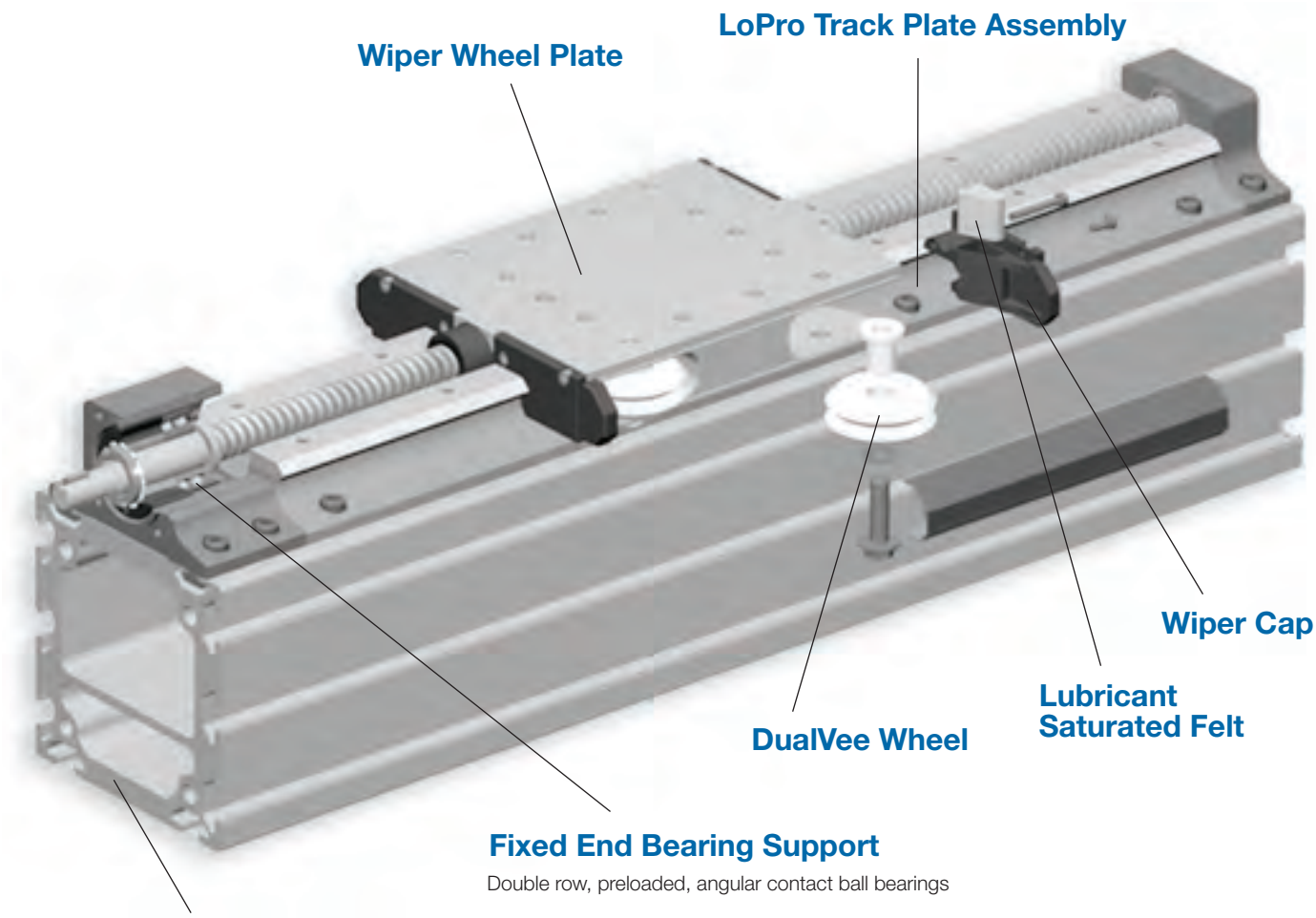
Ordering Example

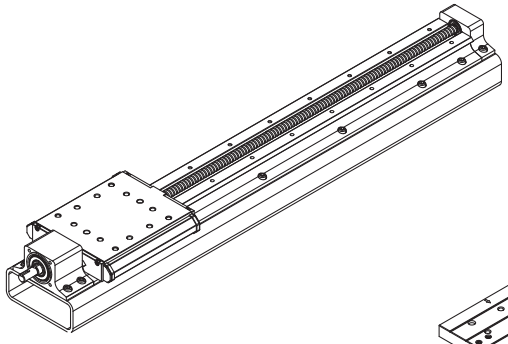
LP C 2L C W C L R A B 1475.5 = LPC2LCWCLRAB 1475.5

LoPro, Chain, Size 2 Large, Carbon Steel, Wiper Wheel Plate, Carbon Steel Wheels, Sensor Flag Left, Right Hand Output Shaft, Aluminum Beam Mounted, Version B, 1475.5mm Travel Stroke

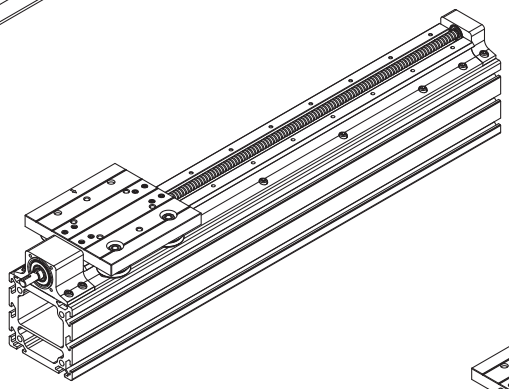
1. Aluminum beam not available on size 4.
2. Corrosion resistant systems are available with basic wheel plate or wiper wheel plate. Corrosion resistant systems on stainless steel beams are custom. Contact Bishop-Wisecarver for details.

Lead Screw Driven Systems

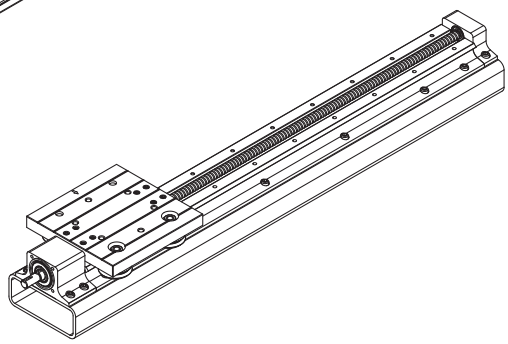




- Wiper Wheel Plate
- Steel Support Beam



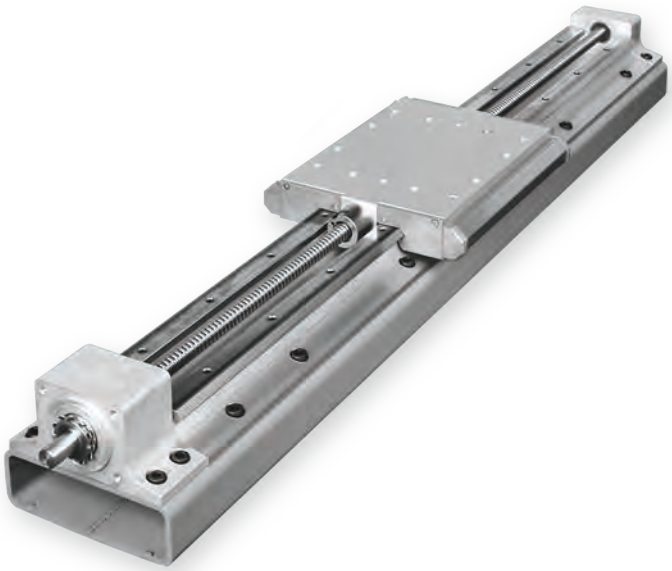
- Basic Wheel Plate
- Aluminum Support Beam



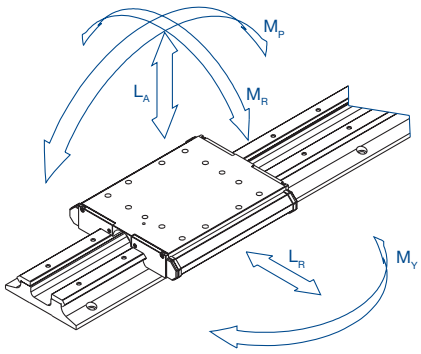
- Basic Wheel Plate
- Steel Support Beam

Lead Screw Driven Systems

- Complete lead screw actuated system, ready for installation
- Standard (BY) or anti-backlash (NTBY & VHDY) nuts
- Lead accuracies to .0006 in/in (mm/mm)
- Repeatable within .0005 in (0.01mm)
- Aluminum support beams, steel beams or un-mounted (without beams)
- Basic wheel plate or wiper wheel plate
- Optional NEMA and IEC motor mounts
- Standard and corrosion resistant versions available



Carriage Assembly Load Capacities										
System Size	Axial Load Capacity L_A		Radial Load Capacity L_R		Pitch Moment Capacity M_p		Yaw Moment Capacity M_Y		Roll Moment Capacity M_R	
	N	lbs	N	lbs	N·m	ft·lbf	N·m	ft·lbf	N·m	ft·lbf
1	988	222	2391	538	26	18.9	62	45.7	27	19.8
2	2450	551	5194	1168	95	70.3	202	148.9	100	73.8
3	6668	1499	11564	2600	346	254.9	599	442.1	372	274.1
4	15684	3526	19012	4274	1220	899.5	1478	1090.3	1174	865.6

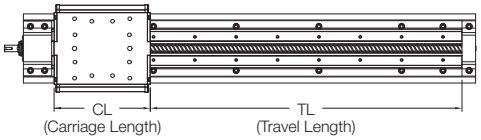


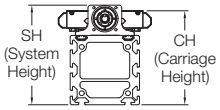
Lead Screw Thrust Capacities				
System Size	Screw Diameter	Nut Type	Dynamic Load Capacity	
	in		N	lbs
1	1/4	BY	222	50.0
		NTBY	44	9.9
2	3/8	BY	334	75.0
		NTBY	89	20.0
3	1/2	NTBY	444	100.0
	5/8	BY	1000	225.0
4	3/4	BY	1556	350.0
		VHDY	1556	350.0

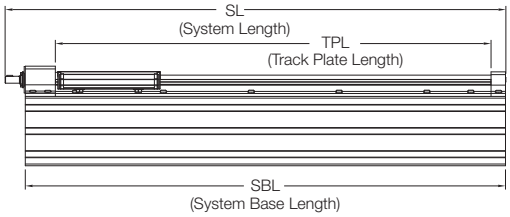
System mass and inertia calculations are available in the Technical Reference on pages 56 and 57.

Lead Screw Driven Systems - Wiper Wheel Plate

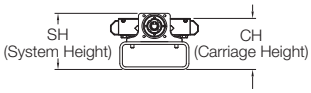
Beam Mounted

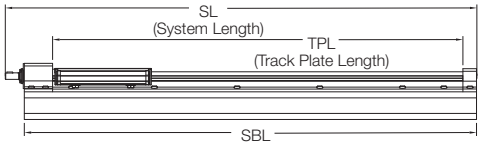






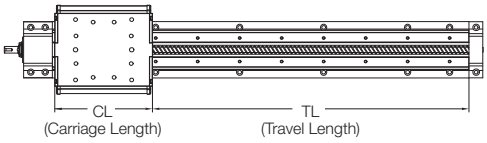
Aluminum Beam

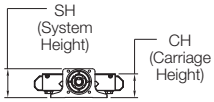


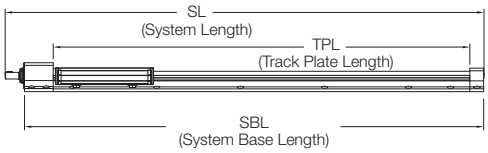


Steel Beam

Un-mounted*







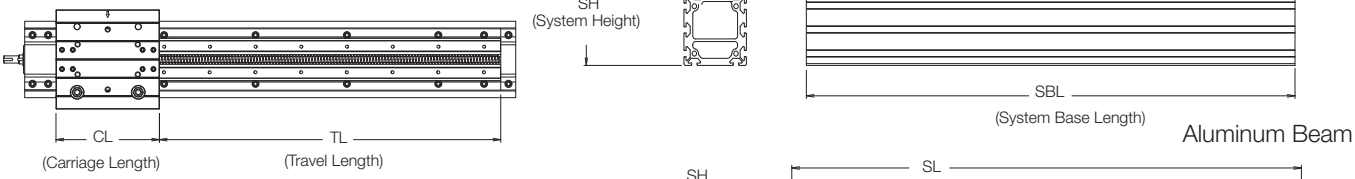
Size	Screw Diameter	Track Plate Length TPL (=TL+CL)			System Length SL	System Base Length SBL
		BY	NTBY	VHDY		
1	1/4	TL+95.8mm TL+3.770in	TL+96.7mm TL+3.807in	N/A	TPL+65.7mm TPL+2.588in	TPL+43.0mm TPL+1.691in
2	3/8	TL+129.9mm TL+5.114in	TL+146.9mm TL+5.783in	N/A	TPL+91.9mm TPL+3.617in	TPL+59.1mm TPL+2.325in
3	1/2	N/A	TL+195.4mm TL+7.694in	N/A	TPL+112.6mm TPL+4.434in	TPL+76.9mm TPL+3.027in
	5/8	TL+180.3mm TL+7.099in	N/A	N/A	TPL+112.6mm TPL+4.434in	TPL+76.9mm TPL+3.027in
4	3/4	TL+270.0mm TL+10.630in	N/A	TL+298.5mm TL+11.750in	TPL+121.7mm TPL+4.792in	TPL+86.0mm TPL+3.385in

Size	Carriage Height CH			System Height SH		
	Aluminum	Steel	Un-mounted	Aluminum	Steel	Un-mounted
1	63.0mm 2.481in	61.1mm 2.406in	23.0mm .906in	70.5mm 2.775in	68.6mm 2.700in	30.5mm 1.200in
2	73.0mm 2.874in	71.1mm 2.799in	33.0mm 1.299in	83.2mm 3.275in	81.3mm 3.200in	43.2mm 1.700in
3	163.0mm 6.417in	93.8mm 3.693in	43.0mm 1.693in	172.3mm 6.784in	103.1mm 4.060in	52.3mm 2.060in
4	N/A	105.8mm 4.167in	55.0mm 2.167in	N/A	119.4mm 4.700in	68.6mm 2.700in

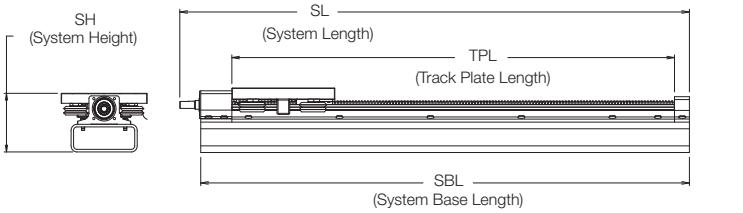
*Un-mounted systems are designed for mounting to a customer-supplied mounting surface, and are shipped with temporary mounting plates affixing the fixed and simple ends to the track plate. System straightness and flatness are determined by mounting surface accuracy. Continuous support along the entire system base length is required.

Lead Screw Driven Systems - Basic Wheel Plate

Beam Mounted

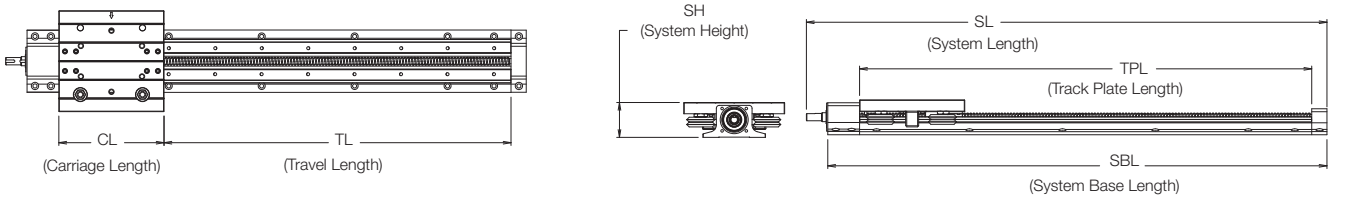


Aluminum Beam



Steel Beam

Un-mounted*



Size	Screw Diameter	Track Plate Length TPL (=TL+CL)			System Length SL	System Base Length SBL
		BY	NTBY	VHDY		
1	1/4	TL+90.0mm TL+3.543in	TL+90.0mm TL+3.543in	N/A	TPL+65.7mm TPL+2.588in	TPL+43.0mm TPL+1.691in
2	3/8	TL+136.9mm TL+5.391in	TL+154.0mm TL+6.061in	N/A	TPL+91.9mm TPL+3.617in	TPL+59.1mm TPL+2.325in
3	1/2	N/A	TL+172.0mm TL+6.772in	N/A	TPL+112.6mm TPL+4.434in	TPL+76.9mm TPL+3.027in
	5/8	TL+172.0mm TL+6.772in	N/A	N/A	TPL+112.6mm TPL+4.434in	TPL+76.9mm TPL+3.027in
4	3/4	TL+268.2mm TL+10.558in	N/A	TL+296.6mm TL+11.678in	TPL+121.7mm TPL+4.792in	TPL+86.0mm TPL+3.385in

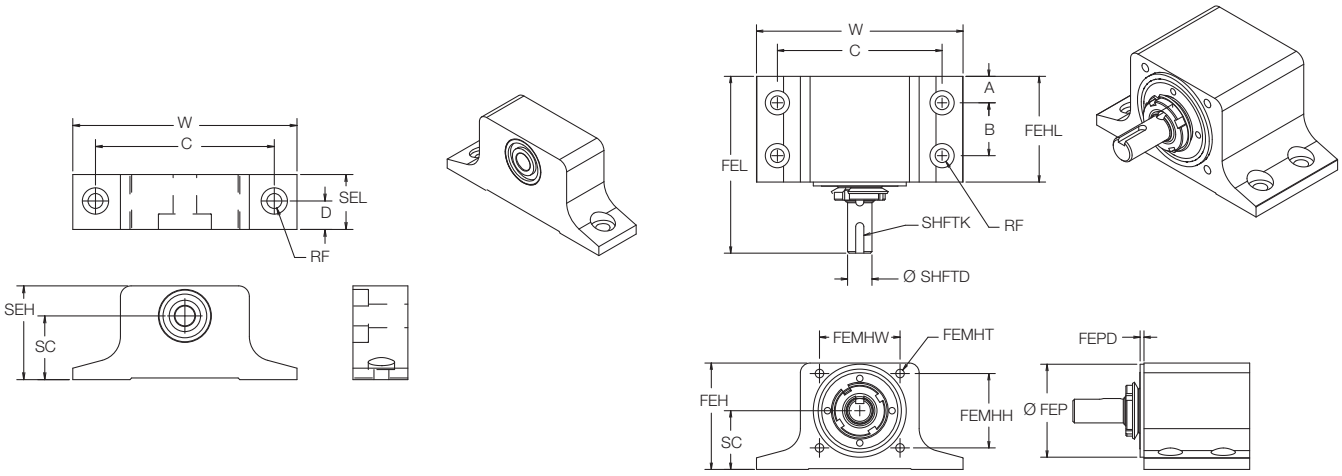
Size	System Height SH		
	Aluminum	Steel	Un-mounted
1	72.1mm 2.840in	70.2mm 2.765in	32.1mm 1.265in
2	83.0mm 3.269in	81.1mm 3.194in	43.0mm 1.694in
3	177.0mm 6.969in	107.8mm 4.245in	57.0mm 2.244in
4	N/A	119.8mm 4.718in	69.0mm 2.718in

*Un-mounted systems are designed for mounting to a customer-supplied mounting surface, and are shipped with temporary mounting plates affixing the fixed and simple ends to the track plate. System straightness and flatness are determined by mounting surface accuracy. Continuous support along the entire system base length is required.

Fixed End & Simple End for Lead Screw Driven Systems

Fixed End

- Designed for high performance, high cycling linear motion
- Fixed and simple end assemblies incorporate radial ball bearings and high strength aluminum housings



Size	C	W	SC	Mounting Hardware	Simple End			Fixed End	
					Length	Height	D	A	B
				RF	SEL	SEH			
1	40.0mm 1.574in	50.8mm 2.00in	15.88mm .625in	M3	13.0mm .510in	22.8mm .896in	5.9mm .234in	6.0mm .236in	18.0mm .709in
2	59.0mm 2.324in	72.4mm 2.850in	22.28mm .877in	M5	19.1mm .750in	32.5mm 1.280in	10.1mm .396in	10.0mm .394in	20.0mm .787in
3	81.0mm 3.189in	101.6mm 4.000in	28.88mm 1.137in	M6	24.9mm .980in	42.5mm 1.673in	12.9mm .508in	13.0mm .512in	26.0mm 1.024in
4	111.0mm 4.370in	139.7mm 5.500in	35.74mm 1.407in	M8	32.0mm 1.260in	54.5mm 2.146in	13.5mm .532in	13.5mm .532in	27.0mm 1.063in

Size	Fixed End									
	Length	Height	Housing Length	Shaft Diameter	Shaft Key Size[2]	Mounting Hole Width	Mounting Hole Height	Mounting Hole Thread	Pilot Diameter[1]	Pilot Depth
	FEL	FEH	FEHL	SHFTD	SHFTK	FEMHW	FEMHH	FEMHT	FEP	FEPD
1	52.0mm 2.048in	30.5mm 1.200in	30.0mm 1.181in	5.0mm .197in	N/A	24.89mm .980in	21.34mm .840in	M3 ↧ 13	26.95mm 1.061in	1.91mm .075in
2	72.1mm 2.837in	43.2mm 1.700in	40.0mm 1.575in	6.0mm .236in	N/A	37.08mm 1.460in	30.48mm 1.200in	M5 ↧ 13	36.17mm 1.424in	1.91mm .075in
3	87.0mm 3.424in	52.3mm 2.060in	52.0mm 2.047in	12.0mm .472in	4mmx10mm	39.62mm 1.560in	36.58mm 1.440in	M5 ↧ 13	45.72mm 1.800in	1.91mm .075in
4	89.0mm 3.502in	68.6mm 2.700in	54.0mm 2.125in	15.0mm .591in	5mmx10mm	63.50mm 2.500in	50.80mm 2.000in	M6 ↧ 17	56.79mm 2.236in	1.91mm .075in

1. Pilot diameter tolerance is +.001/-.005in (+.00/-0.12mm)
2. Square keys

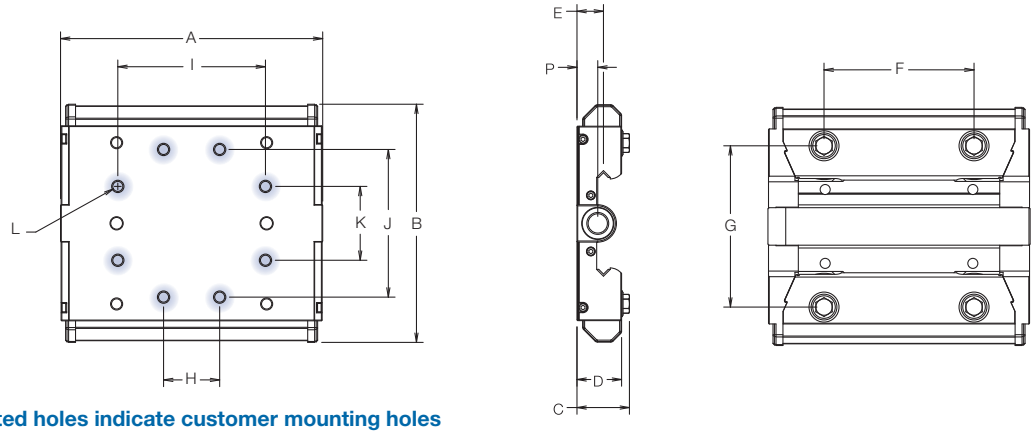
Wheel Plate Options for Lead Screw Driven Systems

Wiper Wheel Plate

Size	Part Number[1]	Overall Length	Overall Width	Assembly Height	Wheel Plate Height	Wheel Vee Height	Wheel Spacing Length	Wheel Spacing Width
		A	B	C	D	E	F	G
1	LP1WPALS_	94.0mm 3.700in	78.0mm 3.070in	18.5mm .730in	16.5mm .650in	9.5mm .375in	50.8mm 2.00in	53.29mm 2.098in
2	LP2WPALS_	129.9mm 5.114in	115.3mm 4.540in	26.4mm 1.041in	23.3mm .916in	14.0mm .551in	76.2mm 3.00in	80.01mm 3.150in
3	LP3WPALS_	177.6mm 6.990in	161.3mm 6.350in	35.6mm 1.403in	30.3mm 1.193in	18.0mm .709in	101.6mm 4.00in	109.22mm 4.300in
4	LP4WPALS_	243.8mm 9.600in	213.2mm 8.394in	45.7mm 1.798in	39.5mm 1.553in	24.0mm .945in	152.4mm 6.00in	146.66mm 5.774in

For secondary wheel plate assembly, consult factory.

Size	Mounting Hole Length 1	Mounting Hole Length 2	Mounting Hole Width 1	Mounting Hole Width 2	Mounting Hole Thread	Coupler Mounting Height	Weight in Grams
	H	I	J	K	L	P	
1	N/A	50.0mm 1.969in	50.0mm 1.969in	25.0mm .984in	M4x0.7	7.1mm .281in	201
2	30.0mm 1.181in	76.0mm 2.992in	76.0mm 2.992in	38.0mm 1.496in	M6x1.0	10.7mm .422in	651
3	38.0mm 1.496in	100.0mm 3.937in	100.0mm 3.937in	50.0mm 1.969in	M8x1.25	14.1mm .556in	1651
4	66.0mm 2.598in	152.0mm 5.984in	152.0mm 5.984in	66.0mm 2.598in	M10x1.5	19.3mm .758in	4034



Highlighted holes indicate customer mounting holes

Wheel plate assemblies included with complete systems. See system ordering information, page 33.

1. Part numbers vary according to system configuration. Contact Bishop-Wisecarver for details.

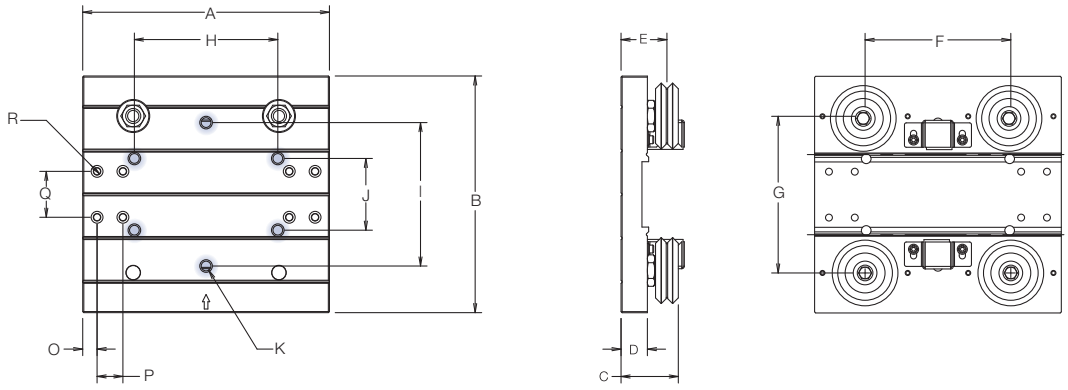
Wheel Plate Options for Lead Screw Driven Systems

Basic Wheel Plate

Size	Part Number		Overall Length	Overall Width	Assembly Height	Wheel Plate Height	Wheel Vee Height	Wheel Spacing Length	Wheel Spacing Width
	Track Lubricators	Wheel Covers	A	B	C	D	E	F	G
1	BWP1XSWTLLS	BWP1XSWWCLS	90.0mm 3.54in	80.0mm 3.15in	23.09mm .909in	11.33mm .446in	18.62mm .733in	50.8mm 2.00in	53.29mm 2.098in
2	BWP2XSWSTLLS	BWP2XSWSWCLS	127.0mm 5.00in	116.0mm 4.57in	25.59mm 1.165in	14.40mm .567in	24.03mm .946in	76.2mm 3.00in	80.01mm 3.150in
3	BWP3XSWSTLLS	BWP3XSWSWCLS	172.0mm 6.77in	165.0mm 6.50in	39.93mm 1.572in	18.36mm .723in	32.00mm 1.260in	101.6mm 4.00in	109.22mm 4.300in
4	BWP4XSWSTLLS	BWP4XSWSWCLS	242.0mm 9.53in	222.0mm 8.74in	47.52mm 1.871in	21.64mm .852in	38.00mm 1.496in	152.4mm 6.00in	146.66mm 5.774in

Part numbers above are for wheel plate assemblies with carbon steel linear guide wheels with SWS swaged studs. Other swaged guide wheel materials and versions are available including: stainless steel (SSX), stainless steel high temperature (SS227), stainless steel low temperature (SS300).

Size	Mounting Hole Length	Mounting Hole Width 1	Mounting Hole Width 2	Mounting Hole Thread	Coupler Mounting Hole to Edge	Coupler Mounting Hole to Hole Length	Coupler Mounting Hole Width	Coupler Fastener	Weight in Grams[1]
	H	I	J	K	O	P	Q	R	
1	50.0mm 1.969in	50.0mm 1.969in	25.0mm .984in	M4x0.7	6.0mm .236in	10.0mm .394in	14.0mm .551in	M3	280
2	76.0mm 2.992in	76.0mm 2.992in	38.0mm 1.496in	M6x1.0	10.0mm .394in	18.0mm .709in	24.0mm .944in	M4	762
3	100.0mm 3.937in	100.0mm 3.937in	50.0mm 1.969in	M8x1.25	10.0mm .394in	18.0mm .709in	32.0mm 1.260in	M4	1984
4	152.0mm 5.984in	152.0mm 5.984in	66.0mm 2.598in	M10x1.5	12.0mm .472in	22.0mm .866in	52.0mm 2.047in	M6	4269



Highlighted holes indicate customer mounting holes. Wheel plate assembly shown with track lubricators.

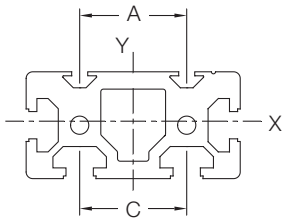
Wheel plate assemblies included with complete systems. See system ordering information, page 33.

1. Weights shown are for wheel plates with wheel covers and without coupling kits. Basic wheel plates with track lubricators weigh slightly less.

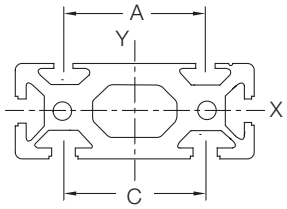
Support Beams for Lead Screw Driven Systems

Aluminum Support Beams

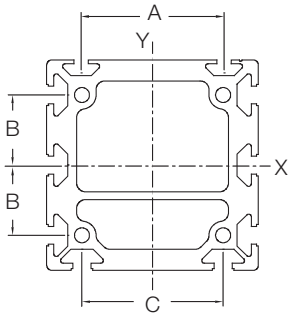
- Designed with industry standard cross section and T-slot (10mm) geometry
- Compatible with HepcoMotion®'s MCS aluminum frame and machine construction system from Bishop-Wisecarver, as well as other industry profile extrusions



Size 1
LP1SBEXT



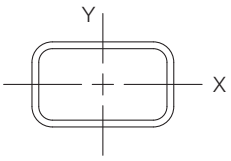
Size 2
LP2SSBEXT



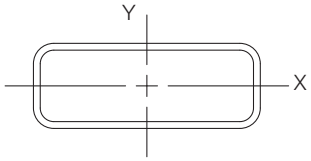
Size 3
LP3SBEXT

Size	Width	Height	Cross Sectional Area	Moment of Inertia X-Axis	Moment of Inertia Y-Axis	LoPro T-Slot A	LoPro T-Slot B	LoPro T-Slot C	Max Length
1	80.0mm 3.150in	40.0mm 1.575in	1679.9mm^2 2.60in^2	2.772x10^{5}mm^4 .66in^4	1.007x10^{6}mm^4 2.42in^4	40.0mm 1.575in	N/A	40.0mm 1.575in	5.6m 18.37ft
2	100.0mm 3.937in	40.0mm 1.575in	2130.1mm^2 3.30in^2	3.512x10^{5}mm^4 .84in^4	1.773x10^{6}mm^4 4.26in^4	59.0mm 2.322in	N/A	60.0mm 2.362in	5.6m 18.37ft
3	120.0mm 4.724in	120.0mm 4.724in	5146.6mm^2 7.98in^2	8.537x10^{6}mm^4 20.51in^4	8.490x10^{6}mm^4 20.40in^4	81.0mm 3.189in	40.0mm 1.575in	80.0mm 3.150in	5.6m 18.37ft

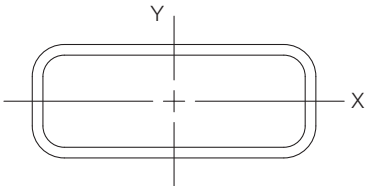
Steel Support Beams



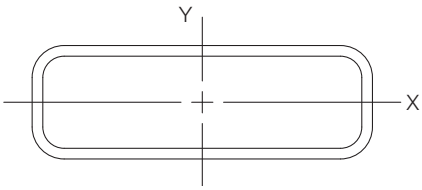
Size 1
LP1LSBS



Size 2
LP2SLSBS



Size 3
LP3LSBS



Size 4
LP4LSBS

Size	Width	Height	Thickness	Cross Sectional Area	Moment of Inertia X-Axis	Moment of Inertia Y-Axis	Max Length
1	63.5mm 2.50in	38.1mm 1.50in	3.1mm .12in	542.3mm^2 .84in^2	1.218x10^{5}mm^4 .29in^4	2.688x10^{5}mm^4 .65in^4	7.3m 24ft
2	101.6mm 4.00in	38.1mm 1.50in	3.1mm .12in	774.6mm^2 1.20in^2	1.933x10^{5}mm^4 .46in^4	9.045x10^{5}mm^4 2.17in^4	12.2m 40ft
3	127.0mm 5.00in	50.8mm 2.00in	4.8mm .19in	1509.0mm^2 2.34in^2	6.394x10^{5}mm^4 1.54in^4	2.711x10^{6}mm^4 6.51in^4	14.6m 48ft
4	152.4mm 6.00in	50.8mm 2.00in	4.8mm .19in	1751.6mm^2 2.71in^2	7.683x10^{5}mm^4 1.85in^4	4.400x10^{6}mm^4 10.57in^4	14.6m 48ft

Aluminum beams are 6061-T6 aluminum alloy. Steel beams are structural steel tubing ASTM A500 Grade A. Note: drawings are not to scale.

System Ordering Information: Lead Screw Driven Systems

LP	L	3Z	C	L	C	Y	D	S	A	500.0

System:
LP: LoPro

Drive System:
L: Lead screw

Size:
1Z: Size 1
2Z: Size 2
3Z: Size 3
4Z: Size 4

System Material:
C: Carbon Steel (Standard)
S: Stainless Steel (Corrosion Resistant)

Carriage Type[2]:
W: Wiper Wheel Plate
L: Basic Wheel Plate w/ Track Lubricators
C: Basic Wheel Plate w/ Wheel Covers

Wheel Type:
C: Carbon Steel
S: Stainless Steel
H: Stainless Steel 227 High Temp.
L: Stainless Steel 300 Low Temp.
W: Stainless Steel Washdown
V: Stainless Steel Vacuum

Additional Wheel Plate Options:
R: Sensor Flag Right Side
L: Sensor Flag Left Side
Y: Snesor Flags Right & Left Sides
Z: None, Without Sensor Flag

Travel Length:
Enter value in 0.1mm increments

Version:
A: Version A

Support Beam:
U: Un-mounted
A: Aluminum Beam[1]
S: Steel Beam
D: Stainless Steel Beam[2]

Drive Configuration:
Size 1 Systems
A: 1/4" x 2mm, BY Nut
B: 1/4" x 2mm, NTBY Nut
C: 1/4" x 10mm, BY Nut
D: 1/4" x 10mm, NTBY Nut
Size 2 Systems
A: 3/8" x 5mm, BY Nut
B: 3/8" x 5mm, NTBY Nut
C: 3/8" x 12mm, BY Nut
D: 3/8" x 12mm, NTBY Nut
E: 3/8" x 25mm, BY Nut
F: 3/8" x 25mm, NTBY Nut
Size 3 Systems
A: 1/2" x 5mm, NTBY Nut
B: 1/2" x 10mm, NTBY Nut
C: 1/2" x 25mm, NTBY Nut
D: 5/8" x 8mm, BY Nut
E: 5/8" x 16mm, BY Nut
Size 4 Systems
A: 3/4" x 5mm, BY Nut
B: 3/4" x 5mm, VHDY Nut
C: 3/4" x 10mm, BY Nut
D: 3/4" x 10mm, VHDY Nut
E: 3/4" x 24mm, BY Nut
F: 3/4" x 24mm, VHDY Nut
G: 3/4" x 50mm, BY Nut
H: 3/4" x 50mm, VHDY Nut

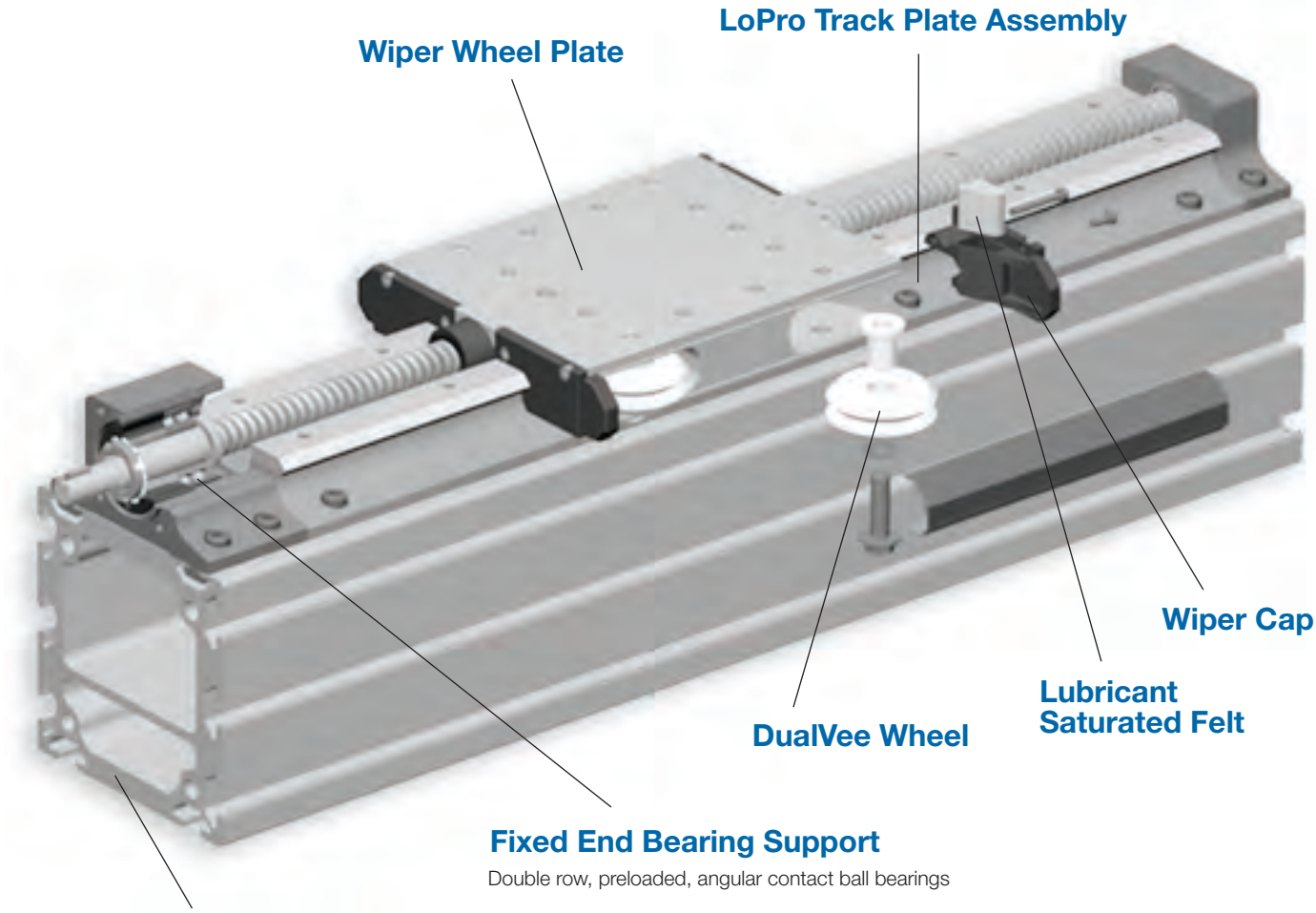
Ordering Example

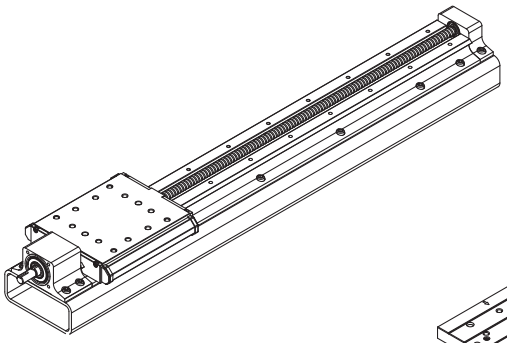
LP L 3Z C L C Y D S A 500.0 = LPL3ZCLCYDSA 500.0

LoPro, Lead Screw, Size 3, Carbon Steel, Basic Wheel Plate, Carbon Steel Wheels, Sensor Flag Right & Left, 5/8" x 8mm BY Nut, Steel Beam Mounted, Version A, 500.0mm Travel.

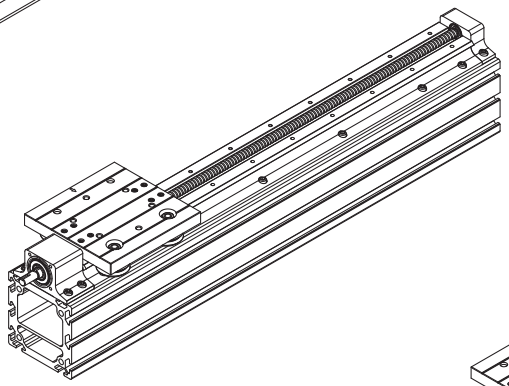
1. Aluminum beam not available on size 4.
2. Corrosion resistant systems are available with basic wheel plate or wiper wheel plate. Corrosion resistant systems on stainless steel beams are custom. Contact Bishop-Wisecarver for details.

Ball Screw Driven Systems

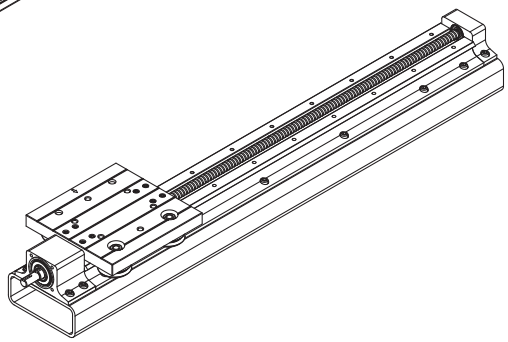




- Wiper Wheel Plate
- Steel Support Beam



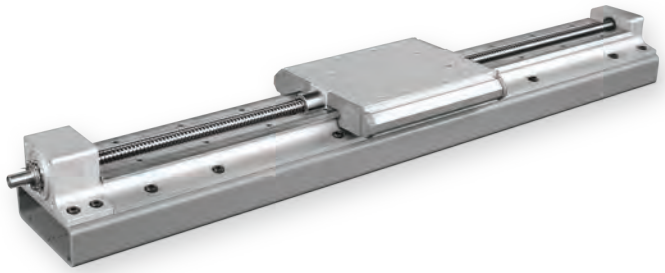
- Basic Wheel Plate
- Aluminum Support Beam



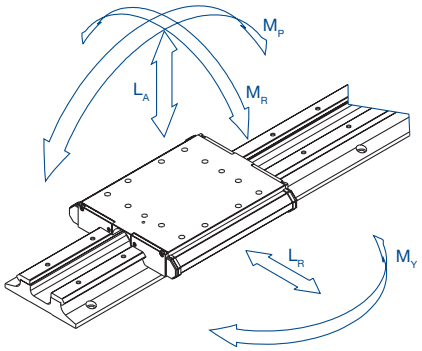
- Basic Wheel Plate
- Steel Support Beam

Ball Screw Driven Systems

- Complete ball screw actuated system, ready for installation
- Accurate to .004 in/ft (100µm/300mm)
- Repeatable within .003 in (0.07mm) or better, depending on size of lead
- Aluminum support beams, steel beams or un-mounted (without beams)
- Basic wheel plate or wiper wheel plate
- Optional NEMA and IEC motor mounts



Carriage Assembly Load Capacities										
System Size	Axial Load Capacity L_A		Radial Load Capacity L_R		Pitch Moment Capacity M_p		Yaw Moment Capacity M_Y		Roll Moment Capacity M_R	
	N	lbs	N	lbs	N·m	ft·lbf	N·m	ft·lbf	N·m	ft·lbf
2	2450	551	5194	1168	95	70.3	202	148.9	100	73.8
3	6668	1499	11564	2600	346	254.9	599	442.1	372	274.1
4	15684	3526	19012	4274	1220	899.5	1478	1090.3	1174	865.6

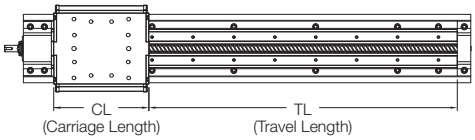


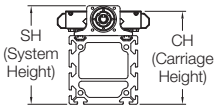
Ball Screw Thrust Capacities					
System Size	Screw Diameter	Maximum Length	Lead	Dynamic Load Capacity	
	mm	mm	mm	N	lbs
2	10	3000	2	1250	281.0
			3	2800	629.4
3	12	1500	5	2300	517.0
			10	1500	337.2
4	16	1500	5	5600	1258.9
			10	5800	1303.8
	20	1800	5	8600	1933.3

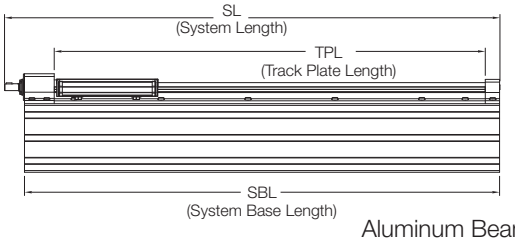
System mass and inertia calculations are available in the Technical Reference on pages 58 and 59.

Ball Screw Driven Systems - Wiper Wheel Plate

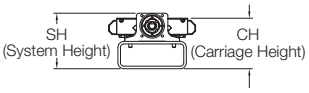
Beam Mounted

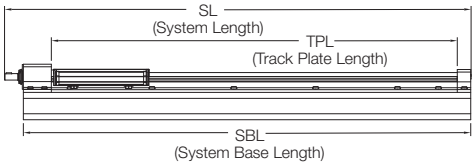






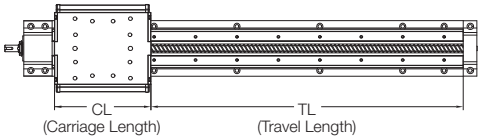
Aluminum Beam

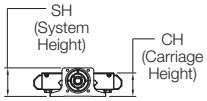


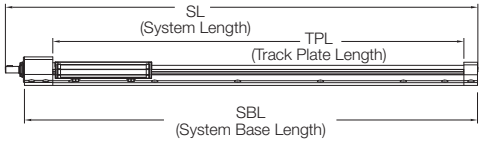


Steel Beam

Un-mounted*







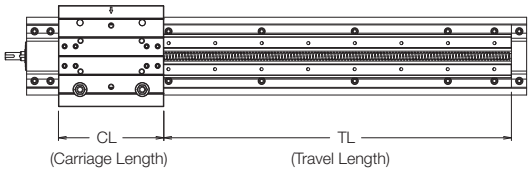
Size	Screw Diameter	Track Plate Length TPL (=TL+CL)				System Length SL	System Base Length SBL
		2mm Lead	3mm Lead	5mm Lead	10mm Lead		
2	10	TL+129.9mm TL+5.114in	TL+129.9mm TL+5.114in	N/A	N/A	TPL+91.9mm TPL+3.617in	TPL+59.1mm TPL+2.325in
3	12	N/A	N/A	TL+180.3mm TL+7.098in	TL+184.3mm TL+7.256in	TPL+112.6mm TPL+4.434in	TPL+76.9mm TPL+3.027in
4	16	N/A	N/A	TL+259.9mm TL+10.233in	TL+273.9mm TL+10.784in	TPL+121.7mm TPL+4.792in	TPL+86.0mm TPL+3.385in
	20	N/A	N/A	TL+267.9mm TL+10.547in	N/A	TPL+121.7mm TPL+4.792in	TPL+86.0mm TPL+3.385in

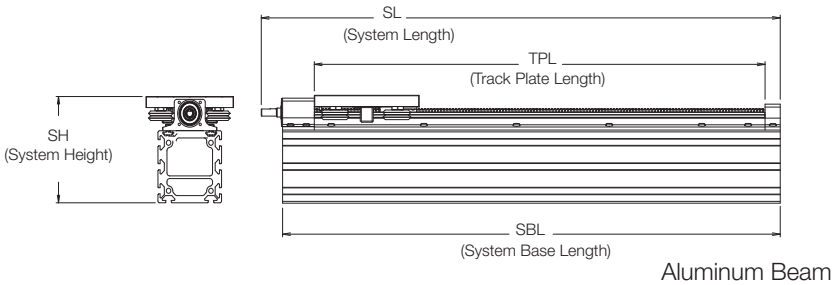
Size	Carriage Height CH			System Height SH		
	Aluminum	Steel	Un-mounted	Aluminum	Steel	Un-mounted
2	73.0mm 2.874in	71.1mm 2.799in	33.0mm 1.299in	83.2mm 3.275in	81.3mm 3.200in	43.2mm 1.700in
3	163.0mm 6.417in	93.8mm 3.693in	43.0mm 1.693in	172.3mm 6.784in	103.1mm 4.060in	52.3mm 2.060in
4	N/A	105.8mm 4.167in	55.0mm 2.167in	N/A	119.4mm 4.700in	68.6mm 2.700in

*Un-mounted systems are designed for mounting to a customer-supplied mounting surface, and are shipped with temporary mounting plates affixing the fixed and simple ends to the track plate. System straightness and flatness are determined by mounting surface accuracy. Continuous support along the entire system base length is required.

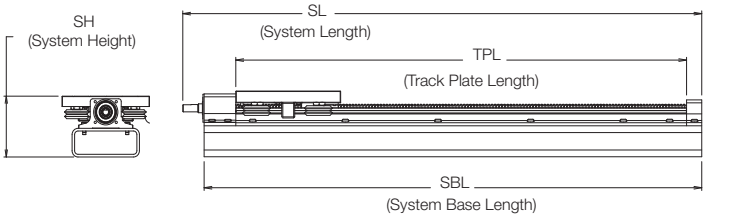
Ball Screw Driven Systems - Basic Wheel Plate

Beam Mounted



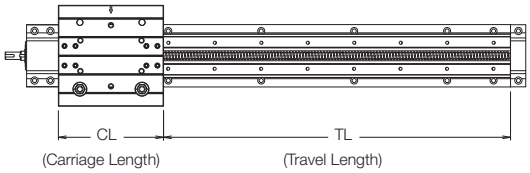


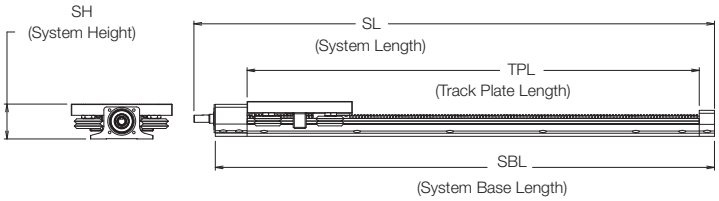
Aluminum Beam



Steel Beam

Un-mounted*





Size	Screw Diameter	Track Plate Length TPL (=TL+CL)				System Length SL	System Base Length SBL
		2mm Lead	3mm Lead	5mm Lead	10mm Lead		
2	10	TL+131.9mm TL+5.192in	TL+152.0mm TL+5.984in	N/A	N/A	TPL+91.9mm TPL+3.617in	TPL+59.1mm TPL+2.325in
3	12	N/A	N/A	TL+172.0mm TL+6.772in	TL+172.0mm TL+6.772in	TPL+112.6mm TPL+4.434in	TPL+76.9mm TPL+3.027in
4	16	N/A	N/A	TL+258.1mm TL+10.161in	TL+272.1mm TL+10.712in	TPL+121.7mm TPL+4.792in	TPL+86.0mm TPL+3.385in
	20	N/A	N/A	TL+260.7mm TL+10.264in	N/A	TPL+121.7mm TPL+4.792in	TPL+86.0mm TPL+3.385in

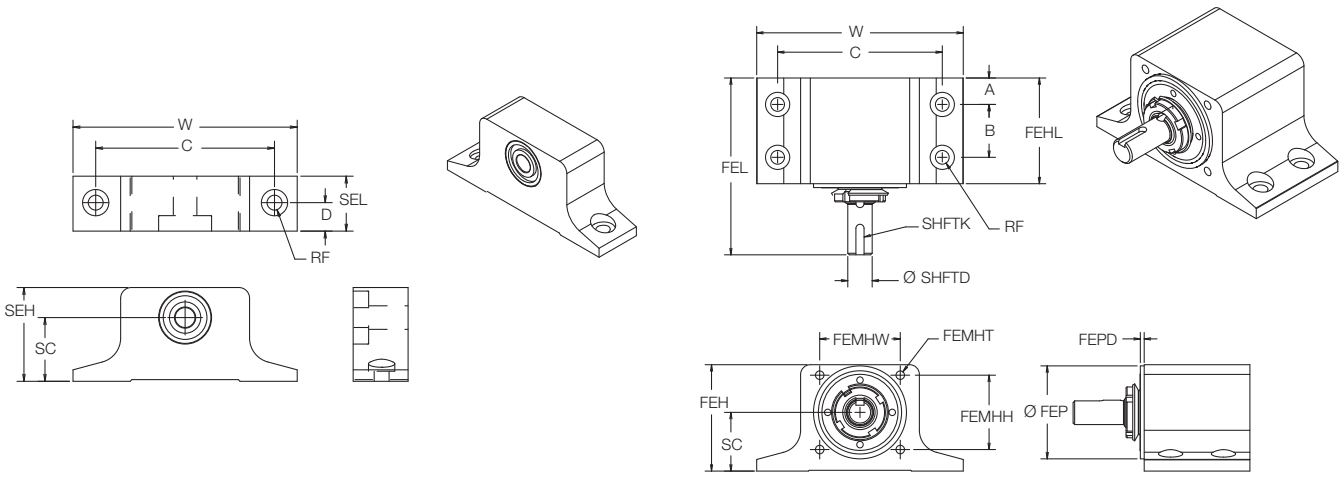
Size	System Height SH		
	Aluminum	Steel	Un-mounted
2	83.0mm 3.269in	81.1mm 3.194in	43.0mm 1.694in
3	177.0mm 6.969in	107.8mm 4.244in	57.0mm 2.244in
4	N/A	119.8mm 4.718in	69.0mm 2.718in

*Un-mounted systems are designed for mounting to a customer-supplied mounting surface, and are shipped with temporary mounting plates affixing the fixed and simple ends to the track plate. System straightness and flatness are determined by mounting surface accuracy. Continuous support along the entire system base length is required.

Fixed End & Simple End for Ball Screw Driven Systems

Fixed End

- Designed for high performance, high cycling linear motion
- Fixed and simple end assemblies incorporate radial ball bearings and high strength aluminum housings



Size	C	W	SC	Mounting Hardware	Simple End			Fixed End	
					Length	Height	D	A	B
				RF	SEL	SEH			
2	59.0mm 2.324in	72.4mm 2.850in	22.28mm .877in	M5	19.1mm .750in	32.5mm 1.280in	10.1mm .396in	10.0mm .394in	20.0mm .787in
3	81.0mm 3.189in	101.6mm 4.000in	28.88mm 1.137in	M6	24.9mm .980in	42.5mm 1.673in	12.9mm .508in	13.0mm .512in	26.0mm 1.024in
4	111.0mm 4.370in	139.7mm 5.500in	35.74mm 1.407in	M8	32.0mm 1.260in	54.5mm 2.146in	13.5mm .532in	13.5mm .532in	27.0mm 1.063in

Size	Fixed End									
	Length	Height	Housing Length	Shaft Diameter	Shaft Key Size[2]	Mounting Hole Width	Mounting Hole Height	Mounting Hole Thread	Pilot Diameter[1]	Pilot Depth
	FEL	FEH	FEHL	SHFTD	SHFTK	FEMHW	FEMHH	FEMHT	FEP	FEPD
2	72.1mm 2.837in	43.2mm 1.700in	40.0mm 1.575in	6.0mm .236in	N/A	37.08mm 1.460in	30.48mm 1.200in	M5 ↧ 13	36.17mm 1.424in	1.91mm .075in
3	87.0mm 3.424in	52.3mm 2.060in	52.0mm 2.047in	12.0mm .472in	4mmx10mm	39.62mm 1.560in	36.58mm 1.440in	M5 ↧ 13	45.72mm 1.800in	1.91mm .075in
4	89.0mm 3.502in	68.6mm 2.700in	54.0mm 2.125in	15.0mm .591in	5mmx10mm	63.50mm 2.500in	50.80mm 2.000in	M6 ↧ 17	56.79mm 2.236in	1.91mm .075in

1. Pilot diameter tolerance is +.001/-.005in (+.00/-0.12mm)
2. Square keys

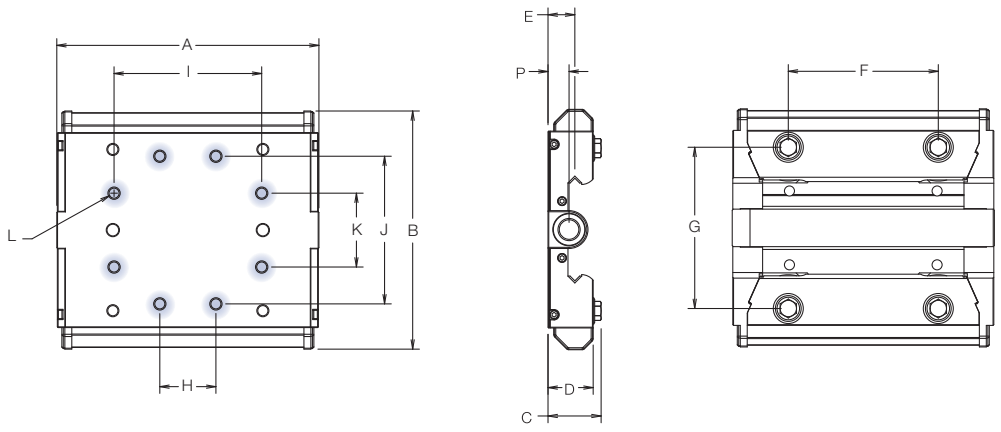
Wheel Plate Options for Ball Screw Driven Systems

Wiper Wheel Plate

Size	Part Number[1]	Overall Length	Overall Width	Assembly Height	Wheel Plate Height	Wheel Vee Height	Wheel Spacing Length	Wheel Spacing Width
		A	B	C	D	E	F	G
2	LP2WPABS_	129.9mm 5.114in	115.3mm 4.540in	26.4mm 1.041in	23.3mm .916in	14.0mm .551in	76.2mm 3.00in	80.01mm 3.150in
3	LP3WPABS_	177.6mm 6.990in	161.3mm 6.350in	35.6mm 1.403in	30.3mm 1.193in	18.0mm .709in	101.6mm 4.00in	109.22mm 4.300in
4	LP4WPABS_	243.8mm 9.600in	213.2mm 8.394in	45.7mm 1.798in	39.5mm 1.553in	24.0mm .945in	152.4mm 6.00in	146.66mm 5.774in

For secondary wheel plate assembly, consult factory.

Size	Mounting Hole Length 1	Mounting Hole Length 2	Mounting Hole Width 1	Mounting Hole Width 2	Mounting Hole Thread	Coupler Mounting Height	Weight in Grams
	H	I	J	K	L	P	
2	30.0mm 1.181in	76.0mm 2.992in	76.0mm 2.992in	38.0mm 1.496in	M6x1.0	10.7mm .422in	651
3	38.0mm 1.496in	100.0mm 3.937in	100.0mm 3.937in	50.0mm 1.969in	M8x1.25	14.1mm .556in	1651
4	66.0mm 2.598in	152.0mm 5.984in	152.0mm 5.984in	66.0mm 2.598in	M10x1.5	19.3mm .758in	4034



Highlighted holes indicate customer mounting holes

Wheel plate assemblies included with complete systems. *See system ordering information, page 42.*

1. Part numbers vary according to system configuration. Contact Bishop-Wisecarver for details.

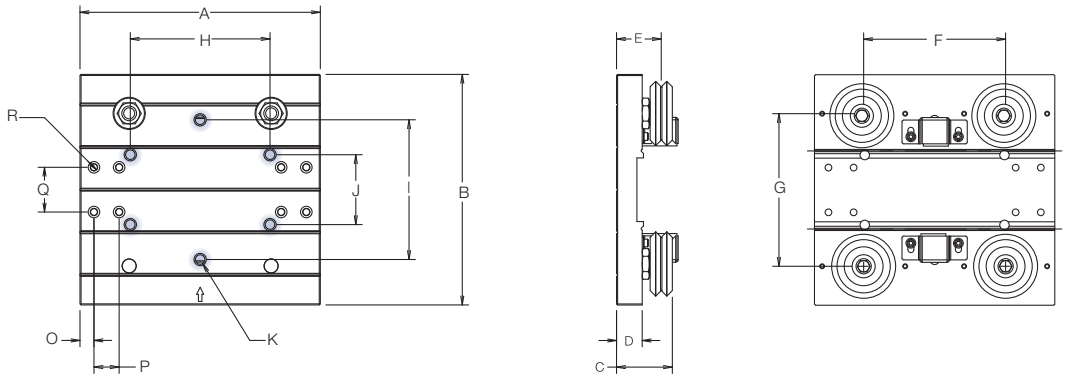
Wheel Plate Options for Ball Screw Driven Systems

Basic Wheel Plate

Size	Part Number		Overall Length	Overall Width	Assembly Height	Wheel Plate Height	Wheel Vee Height	Wheel Spacing Length	Wheel Spacing Width
	Track Lubricators	Wheel Covers	A	B	C	D	E	F	G
2	BWP2XSWSTLLS	BWP2XSWSWCLS	127.0mm 5.00in	116.0mm 4.57in	25.59mm 1.165in	14.40mm .567in	24.03mm .946in	76.2mm 3.00in	80.01mm 3.150in
3	BWP3XSWSTLLS	BWP3XSWSWCLS	172.0mm 6.77in	165.0mm 6.50in	39.93mm 1.572in	18.36mm .723in	32.00mm 1.260in	101.6mm 4.00in	109.22mm 4.300in
4	BWP4XSWSTLLS	BWP4XSWSWCLS	242.0mm 9.53in	222.0mm 8.74in	47.52mm 1.871in	21.64mm .852in	38.00mm 1.496in	152.4mm 6.00in	146.66mm 5.774in

Part numbers above are for wheel plate assemblies with carbon steel linear guide wheels with SWS swaged studs. Other swaged guide wheel materials and versions are available including: stainless steel (SSX), stainless steel high temperature (SS227), stainless steel low temperature (SS300).

Size	Mounting Hole Length	Mounting Hole Width 1	Mounting Hole Width 2	Mounting Hole Thread	Coupler Mounting Hole to Edge	Coupler Mounting Hole to Hole Length	Coupler Mounting Hole Width	Coupler Fastener	Weight in Grams[1]
	H	I	J	K	O	P	Q	R	
2	76.0mm 2.992in	76.0mm 2.992in	38.0mm 1.496in	M6x1.0	10.0mm .394in	18.0mm .709in	24.0mm .944in	M4	762
3	100.0mm 3.937in	100.0mm 3.937in	50.0mm 1.969in	M8x1.25	10.0mm .394in	18.0mm .709in	32.0mm 1.260in	M4	1984
4	152.0mm 5.984in	152.0mm 5.984in	66.0mm 2.598in	M10x1.5	12.0mm .472in	22.0mm .866in	52.0mm 2.047in	M6	4269



Highlighted holes indicate customer mounting holes. Wheel plate assembly shown with track lubricators.

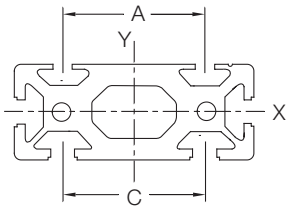
Wheel plate assemblies included with complete systems. See system ordering information, page 42.

1. Weights shown are for wheel plates with wheel covers and without coupling kits. Basic wheel plates with track lubricators weigh slightly less.

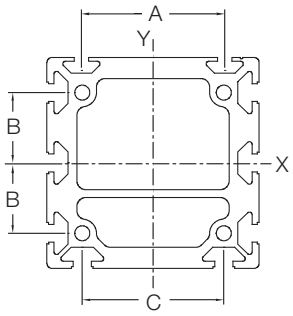
Support Beams for Ball Screw Driven Systems

Aluminum Support Beams

- Designed with industry standard cross section and T-slot (10mm) geometry
- Compatible with HepcoMotion®'s MCS aluminum frame and machine construction system from Bishop-Wisecarver, as well as other industry profile extrusions



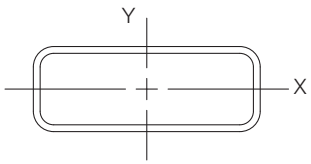
Size 2
LP2SSBEXT



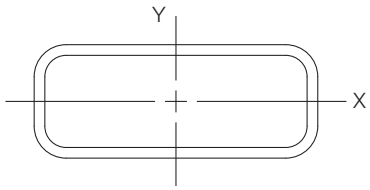
Size 3
LP3SBEXT

Size	Width	Height	Cross Sectional Area	Moment of Inertia X-Axis	Moment of Inertia Y-Axis	LoPro T-Slot A	LoPro T-Slot B	LoPro T-Slot C	Max Length
2	100.0mm 3.937in	40.0mm 1.575in	2130.1mm^2 3.30in^2	3.512x10^{5}mm^4 .84in^4	1.773x10^{6}mm^4 4.26in^4	59.0mm 2.322in	N/A	60.0mm 2.362in	5.6m 18.37ft
3	120.0mm 4.724in	120.0mm 4.724in	5146.6mm^2 7.98in^2	8.537x10^{6}mm^4 20.51in^4	8.490x10^{6}mm^4 20.40in^4	81.0mm 3.189in	40.0mm 1.575in	80.0mm 3.150in	5.6m 18.37ft

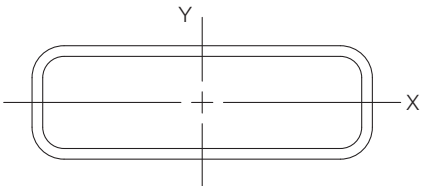
Steel Support Beams



Size 2
LP2SLSBS



Size 3
LP3LSBS

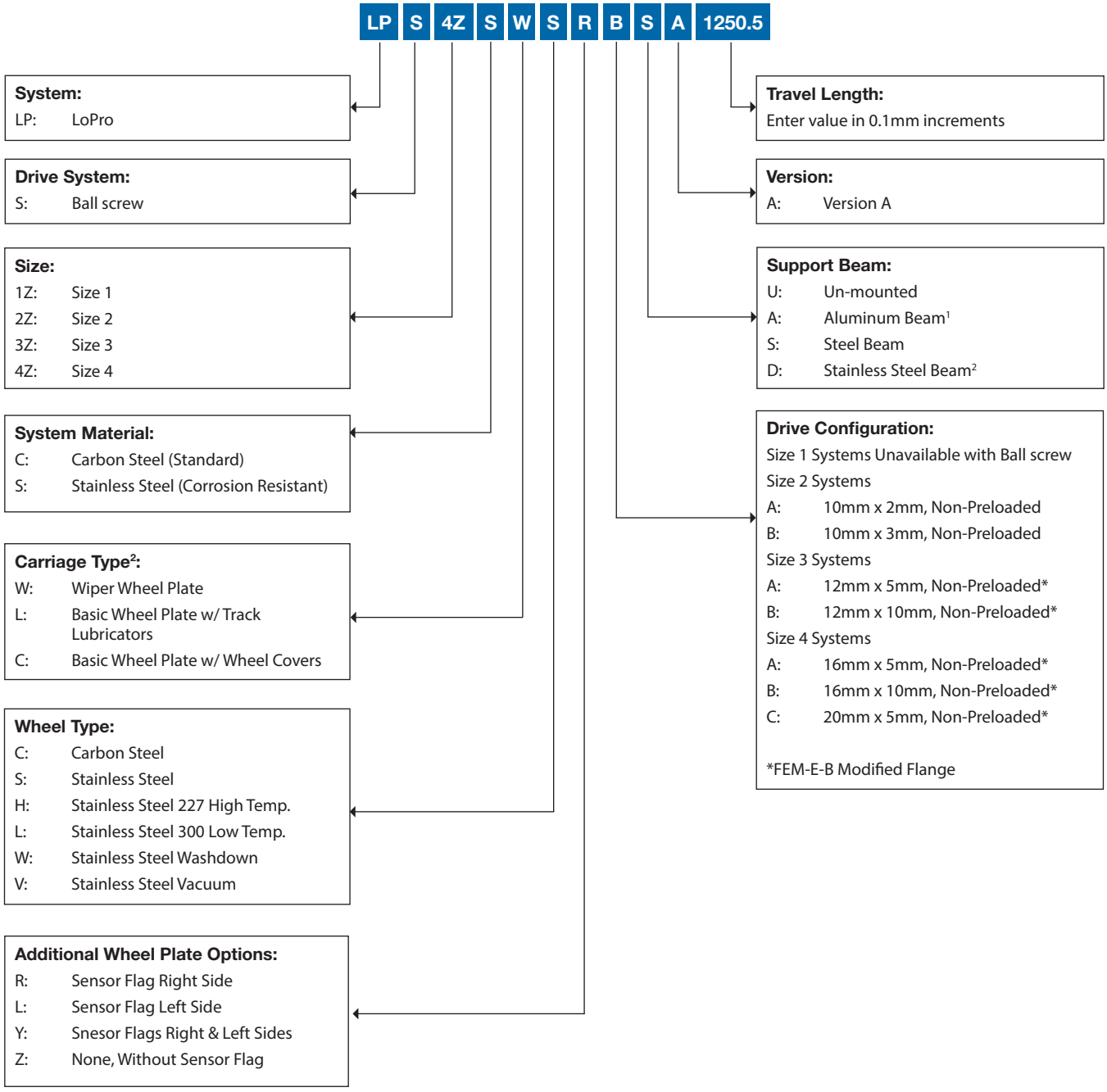


Size 4
LP4LSBS

Size	Width	Height	Thickness	Cross Sectional Area	Moment of Inertia X-Axis	Moment of Inertia Y-Axis	Max Length
2	101.6mm 4.00in	38.1mm 1.50in	3.1mm .12in	774.6mm^2 1.20in^2	1.933x10^{5}mm^4 .46in^4	9.045x10^{5}mm^4 2.17in^4	12.2m 40ft
3	127.0mm 5.00in	50.8mm 2.00in	4.8mm .19in	1509.0mm^2 2.34in^2	6.394x10^{5}mm^4 1.54in^4	2.711x10^{6}mm^4 6.51in^4	14.6m 48ft
4	152.4mm 6.00in	50.8mm 2.00in	4.8mm .19in	1751.6mm^2 2.71in^2	7.683x10^{5}mm^4 1.85in^4	4.400x10^{6}mm^4 10.57in^4	14.6m 48ft

Aluminum beams are 6061-T6 aluminum alloy. Steel beams are structural steel tubing ASTM A500 Grade A. Note: drawings are not to scale.

System Ordering Information: Ball Screw Driven Systems



Ordering Example

LP S 4Z S W S R B S A 1250.5 = LPS4ZSWSRBSA 1250.5

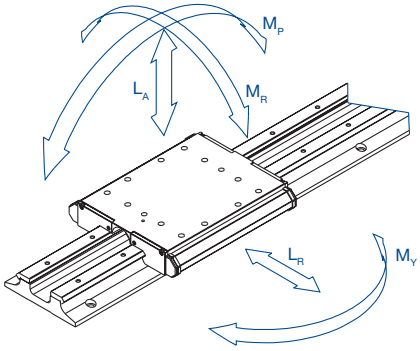
LoPro, Ball Screw, Size 4, Stainless Steel, Wiper Wheel Plate, Stainless Steel Wheels, Sensor Flag Right, 16mm x 10mm Ball Screw, Steel Beam Mounted, Version A, 1250.5mm Travel.

1. Aluminum beam is not available on size 4.
2. Corrosion resistant systems are available with basic wheel plate or wiper wheel plate. Corrosion resistant systems on stainless steel beams are custom. Contact Bishop-Wisecarver for details.
3. Ball screws are carbon steel. Stainless steel ball screws are custom.

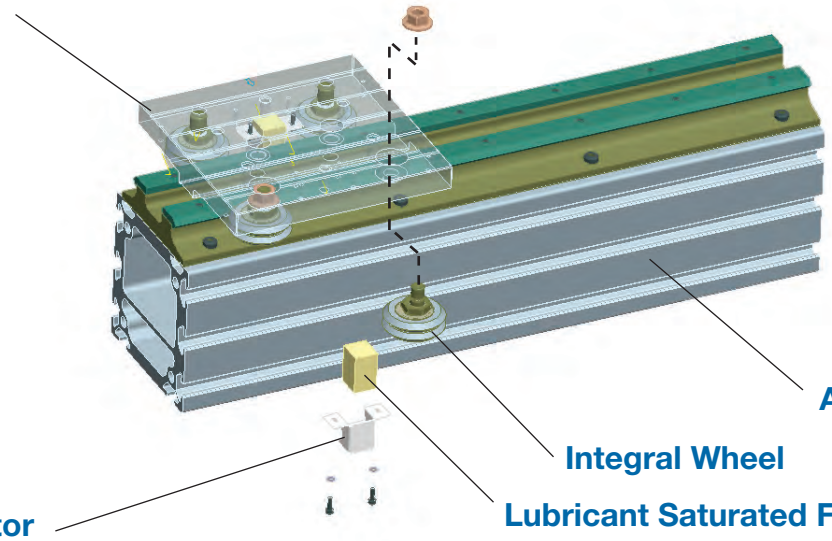
Un-driven Systems

- Complete non-actuated linear system, ready for immediate installation
- Standard aluminum and steel support beam options available
- Two standard available wheel plate options
- Available in standard and corrosion resistant versions
- High speed and acceleration capacity
- Long stroke length capability (virtually unlimited)

Carriage Assembly Load Capacities										
System Size	Axial Load Capacity L_A		Radial Load Capacity L_R		Pitch Moment Capacity M_p		Yaw Moment Capacity M_Y		Roll Moment Capacity M_R	
	N	lbs	N	lbs	N·m	ft·lbf	N·m	ft·lbf	N·m	ft·lbf
1	988	222	2391	538	26	18.9	62	45.7	27	19.8
2S/2L	2450	551	5194	1168	95	70.3	202	148.9	100	73.8
3	6668	1499	11564	2600	346	254.9	599	442.1	372	274.1
4	15684	3526	19012	4274	1220	899.5	1478	1090.3	1174	865.6

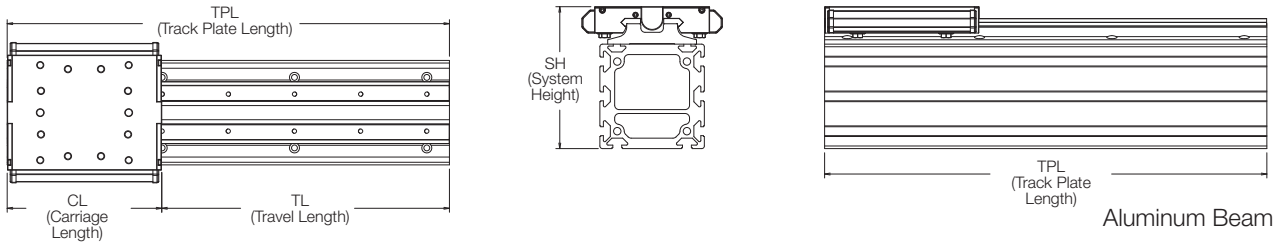


Basic Wheel Plate

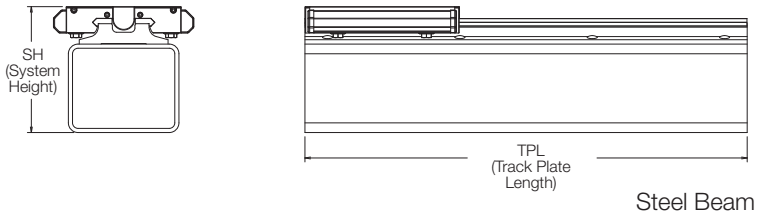


Un-driven systems - Wiper Wheel Plate

Beam Mounted

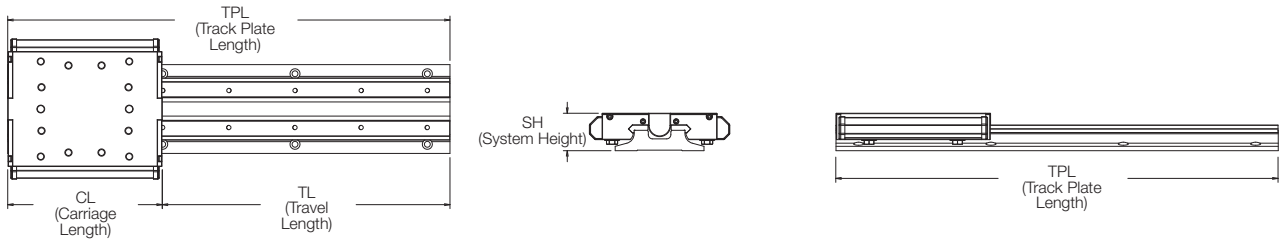


Aluminum Beam



Steel Beam

Un-mounted*

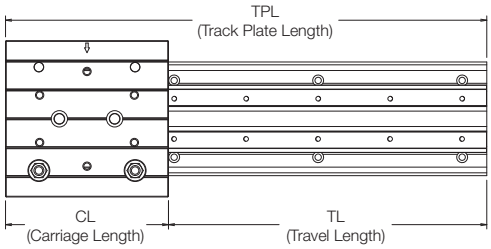


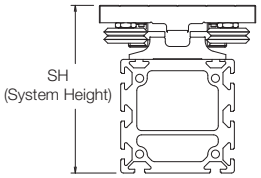
Size	Track Plate Length **TPL** (=TL+CL)	System Height SH		
		Aluminum	Steel	Un-mounted
1	TL+94.0mm TL+3.700in	63.0mm 2.482in	61.1mm 2.407in	23.0mm .907in
2S	TL+129.9mm TL+5.114in	73.0mm 2.874in	71.1mm 2.799in	33.0mm 1.299in
2L	TL+129.9mm TL+5.114in	113.0mm 4.449in	109.2mm 4.299in	33.0mm 1.299in
3	TL+177.6mm TL+6.990in	163.0mm 6.417in	93.8mm 3.693in	43.0mm 1.693in
4	TL+243.8mm TL+9.600in	N/A	105.8mm 4.167in	55.0mm 2.167in

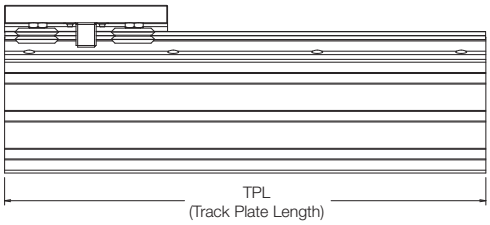
*Un-mounted systems are designed for mounting to a customer-supplied mounting surface. System straightness and flatness are determined by mounting surface accuracy. Continuous support along the entire track plate length is recommended.

Un-driven Systems - Basic Wheel Plate

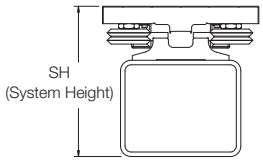
Beam Mounted

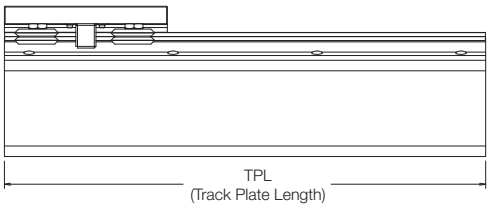






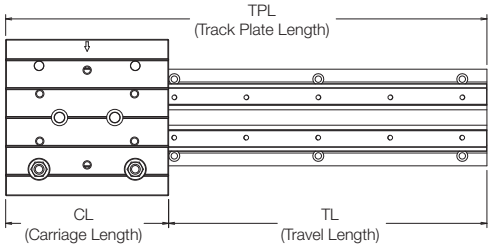
Aluminum Beam

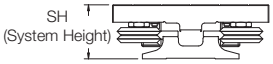


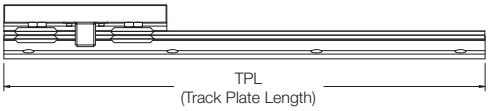


Steel Beam

Un-mounted*







Size	Track Plate Length **TPL** (=TL+CL)	System Height SH		
		Aluminum	Steel	Un-mounted
1	TL+90.0mm TL+3.543in	72.1mm 2.840in	70.2mm 2.765in	32.1mm 1.265in
2S	TL+127.0mm TL+5.000in	83.0mm 3.269in	81.1mm 3.194in	43.0mm 1.694in
2L	TL+127.0mm TL+5.000in	123.0mm 4.844in	119.2mm 4.694in	43.0mm 1.694in
3	TL+172.0mm TL+6.772in	177.0mm 6.969in	107.8mm 4.245in	57.0mm 2.244in
4	TL+242.0mm TL+9.528in	N/A	119.8mm 4.718in	69.0mm 2.718in

*Un-mounted systems are designed for mounting to a customer-supplied mounting surface. System straightness and flatness are determined by mounting surface accuracy. Continuous support along the entire track plate length is recommended.

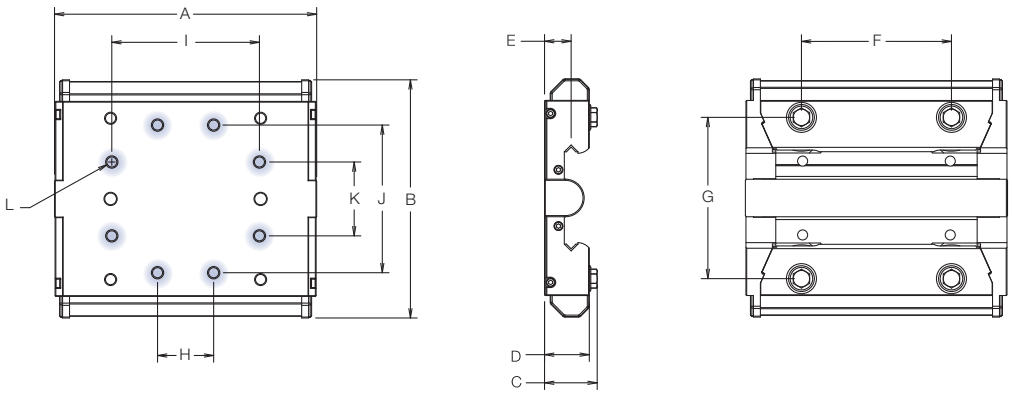
Wheel Plate Options for Un-driven Systems

Wiper Wheel Plate

Size	Part Number	Overall Length	Overall Width	Assembly Height	Wheel Plate Height	Wheel Vee Height	Wheel Spacing Length	Wheel Spacing Width
		A	B	C	D	E	F	G
1	M1AWPW	94.0mm 3.700in	78.0mm 3.070in	18.5mm .730in	16.5mm .650in	9.5mm .375in	50.8mm 2.00in	53.29mm 2.098in
2	M2AWPW	129.9mm 5.114in	115.3mm 4.540in	26.4mm 1.041in	23.3mm .916in	14.0mm .551in	76.2mm 3.00in	80.01mm 3.150in
3	M3AWPW	177.6mm 6.990in	161.3mm 6.350in	35.6mm 1.403in	30.3mm 1.193in	18.0mm .709in	101.6mm 4.00in	109.22mm 4.300in
4	M4AWPW	243.8mm 9.600in	213.2mm 8.394in	45.7mm 1.798in	39.5mm 1.553in	24.0mm .945in	152.4mm 6.00in	146.66mm 5.774in

For secondary wheel plate assembly, consult factory.

Size	Mounting Hole Length 1	Mounting Hole Length 2	Mounting Hole Width 1	Mounting Hole Width 2	Mounting Hole Thread	Weight in Grams
	H	I	J	K	L	
1	N/A	50.0mm 1.969in	50.0mm 1.969in	25.0mm .984in	M4x0.7	216
2	30.0mm 1.181in	76.0mm 2.992in	76.0mm 2.992in	38.0mm 1.496in	M6x1.0	692
3	38.0mm 1.496in	100.0mm 3.937in	100.0mm 3.937in	50.0mm 1.969in	M8x1.25	1768
4	66.0mm 2.598in	152.0mm 5.984in	152.0mm 5.984in	66.0mm 2.598in	M10x1.5	4231



Highlighted holes indicate customer mounting holes

Wheel plate assemblies included with complete systems. *See system ordering information, page 49.*

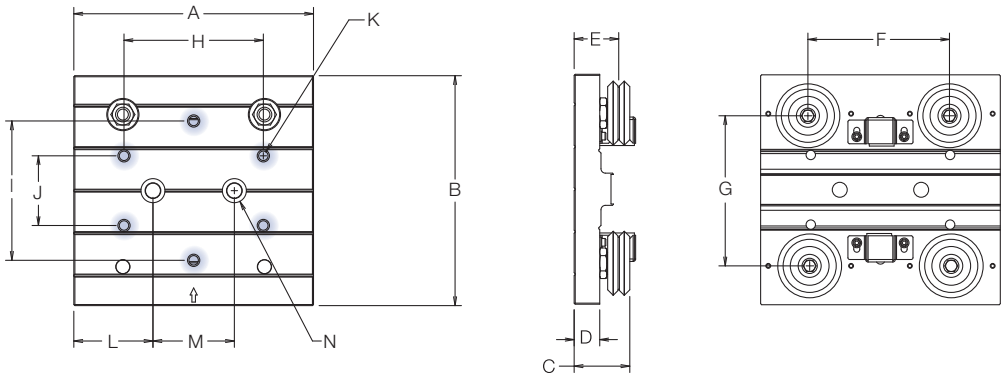
Wheel Plate Options for Un-driven Systems

Basic Wheel Plate

Size	Part Number		Overall Length	Overall Width	Assembly Height	Wheel Plate Height	Wheel Vee Height	Wheel Spacing Length	Wheel Spacing Width
	Track Lubricators	Wheel Covers	A	B	C	D	E	F	G
1	BWP1XSWTLBC	BWP1XSWWCBC	90.0mm 3.54in	80.0mm 3.15in	23.09mm .909in	11.33mm .446in	18.62mm .733in	50.8mm 2.00in	53.29mm 2.098in
2	BWP2XSWSTLBC	BWP2XSWSWCBC	127.0mm 5.00in	116.0mm 4.57in	25.59mm 1.165in	14.40mm .567in	24.03mm .946in	76.2mm 3.00in	80.01mm 3.150in
3	BWP3XSWSTLBC	BWP3XSWSWCBC	172.0mm 6.77in	165.0mm 6.50in	39.93mm 1.572in	18.36mm .723in	32.00mm 1.260in	101.6mm 4.00in	109.22mm 4.300in
4	BWP4XSWSTLBC	BWP4XSWSWCBC	242.0mm 9.53in	222.0mm 8.74in	47.52mm 1.871in	21.64mm .852in	38.00mm 1.496in	152.4mm 6.00in	146.66mm 5.774in

Part numbers above are for wheel plate assemblies with carbon steel linear guide wheels with SWS swaged studs. Other swaged guide wheel materials and versions are available including: stainless steel (SSX), stainless steel high temperature (SS227), stainless steel low temperature (SS300).

Size	Mounting Hole Length	Mounting Hole Width 1	Mounting Hole Width 2	Mounting Hole Thread	Coupler Mounting Hole to Edge	Coupler Mounting Hole Length	Coupler Fastener	Weight in Grams[1]
	H	I	J	K	L	M	N	
1	50.0mm 1.969in	50.0mm 1.969in	25.0mm .984in	M4x0.7	31.67mm 1.247in	26.7mm 1.05in	M5	307
2	76.0mm 2.992in	76.0mm 2.992in	38.0mm 1.496in	M6x1.0	40.64mm 1.600in	45.7mm 1.80in	M8	835
3	100.0mm 3.937in	100.0mm 3.937in	50.0mm 1.969in	M8x1.25	56.79mm 2.236in	58.4mm 2.30in	M10	2153
4	152.0mm 5.984in	152.0mm 5.984in	66.0mm 2.598in	M10x1.5	70.21mm 2.764in	101.6mm 4.00in	M12	4765



Highlighted holes indicate customer mounting holes. Wheel plate assembly shown with track lubricators.

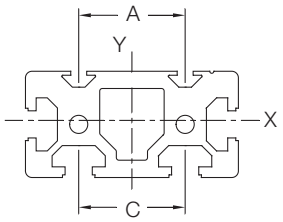
Wheel plate assemblies included with complete systems. See system ordering information, page 49.

1. Weights shown are for wheel plates with wheel covers and without coupling kits. Basic wheel plates with track lubricators weigh slightly less.

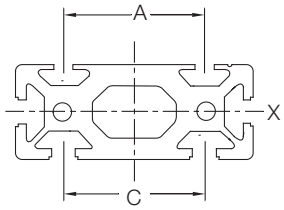
Support Beams for Un-driven Systems

Aluminum Support Beams

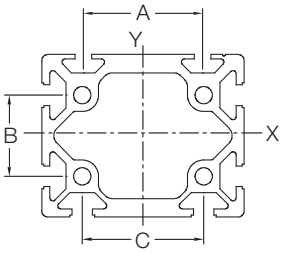
- Designed with industry standard cross section and T-slot (10mm) geometry
- Compatible with HepcoMotion®'s MCS aluminum frame and machine construction system from Bishop-Wisecarver, as well as other industry standard profile extrusions



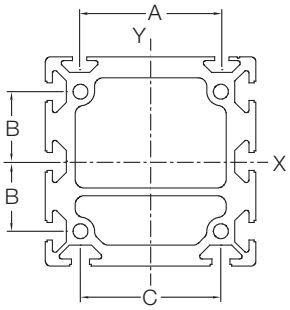
Size 1
LP1SBEXT



Size 2S
LP2SSBEXT



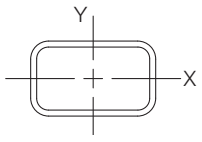
Size 2L
LP2LSBEXT



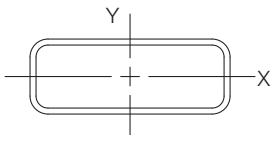
Size 3
LP3SBEXT

Size	Width	Height	Cross Sectional Area	Moment of Inertia X-Axis	Moment of Inertia Y-Axis	LoPro T-Slot A	LoPro T-Slot B	LoPro T-Slot C	Max Length
1	80.0mm 3.150in	40.0mm 1.575in	1679.9mm^2 2.60in^2	2.772x10^{5}mm^4 .66in^4	1.007x10^{6}mm^4 2.42in^4	40.0mm 1.575in	N/A	40.0mm 1.575in	5.6m 18.37ft
2S	100.0mm 3.937in	40.0mm 1.575in	2130.1mm^2 3.30in^2	3.512x10^{5}mm^4 .84in^4	1.773x10^{6}mm^4 4.26in^4	59.0mm 2.322in	N/A	60.0mm 2.362in	5.6m 18.37ft
2L	100.0mm 3.937in	80.0mm 3.150in	2698.3mm^2 4.18in^2	2.142x10^{6}mm^4 5.15in^4	2.974x10^{6}mm^4 7.14in^4	59.0mm 2.322in	40.0mm 1.575in	60.0mm 2.362in	5.6m 18.37ft
3	120.0mm 4.724in	120.0mm 4.724in	5146.6mm^2 7.98in^2	8.537x10^{6}mm^4 20.51in^4	8.490x10^{6}mm^4 20.40in^4	81.0mm 3.189in	40.0mm 1.575in	80.0mm 3.150in	5.6m 18.37ft

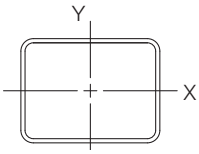
Steel Support Beams



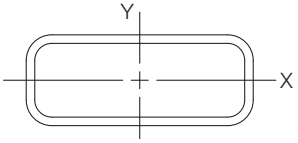
Size 1
LP1SSB



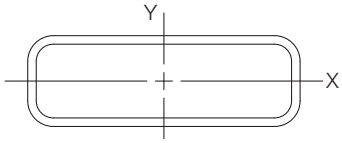
Size 2S
LP2SSSB



Size 2L
LP2LSSB



Size 3
LP3SSB



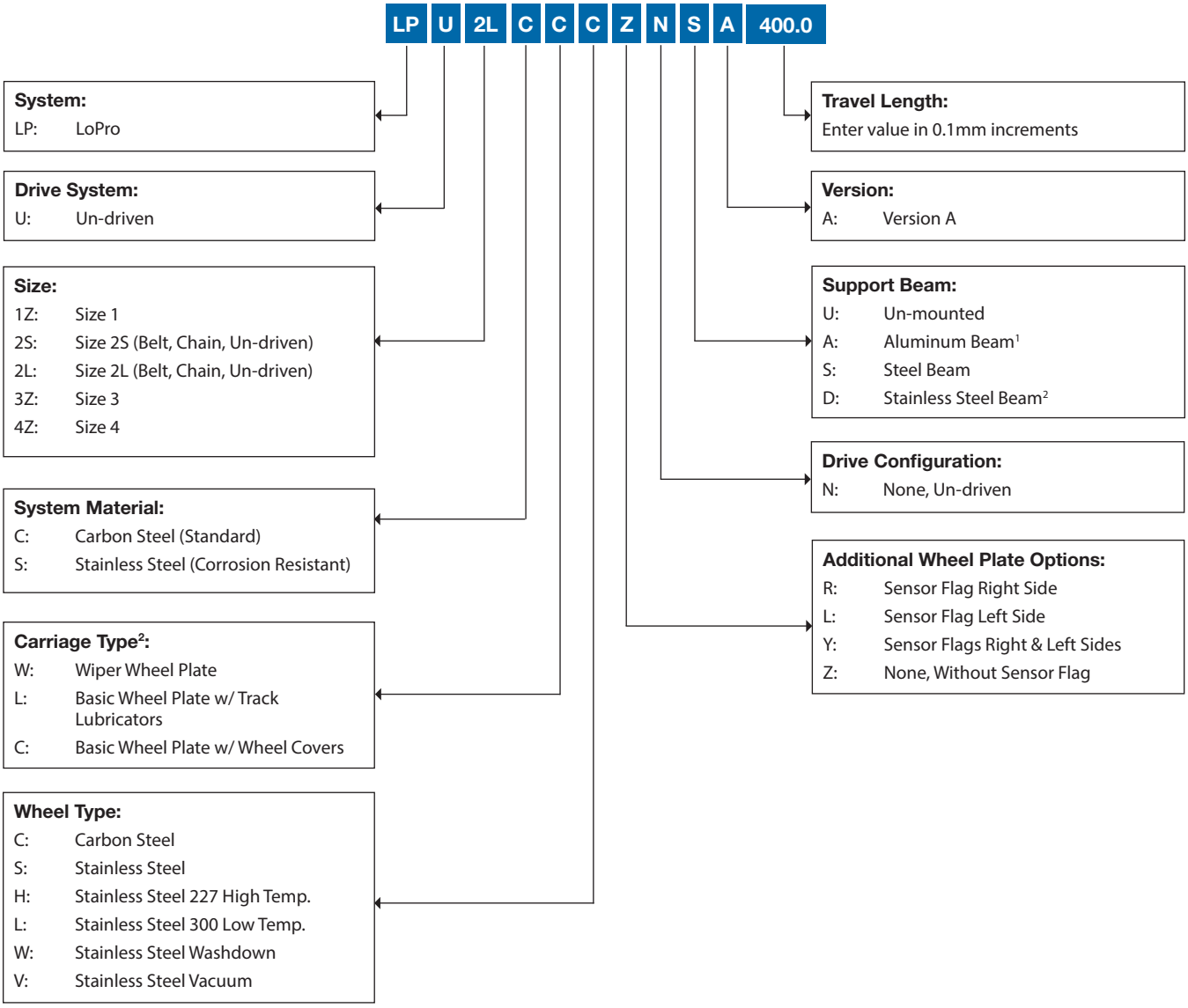
Size 4
LP4SSB

Size	Width	Height	Thickness	Cross Sectional Area	Moment of Inertia X-Axis	Moment of Inertia Y-Axis	Max Length[1]
1	63.5mm 2.50in	38.1mm 1.50in	3.1mm .12in	542.3mm^2 .84in^2	1.218x10^{5}mm^4 .29in^4	2.688x10^{5}mm^4 .65in^4	7.3m 24ft
2S	101.6mm 4.00in	38.1mm 1.50in	3.1mm .12in	774.6mm^2 1.20in^2	1.933x10^{5}mm^4 .46in^4	9.045x10^{5}mm^4 2.17in^4	12.2m 40ft
2L	101.6mm 4.00in	76.2mm 3.00in	3.1mm .12in	1006.8mm^2 1.56in^2	9.468x10^{5}mm^4 2.27in^4	1.469x10^{6}mm^4 3.53in^4	7.3m 24ft
3	127.0mm 5.00in	50.8mm 2.00in	4.8mm .19in	1509.0mm^2 2.34in^2	6.394x10^{5}mm^4 1.54in^4	2.711x10^{6}mm^4 6.51in^4	14.6m 48ft
4	152.4mm 6.00in	50.8mm 2.00in	4.8mm .19in	1751.6mm^2 2.71in^2	7.683x10^{5}mm^4 1.85in^4	4.400x10^{6}mm^4 10.57in^4	14.6m 48ft

Aluminum beams are 6061-T6 aluminum alloy. Steel beams are structural steel tubing ASTM A500 Grade A. Note: drawings are not to scale.

1. Sizes 3 & 4 - up to 48ft lengths stock. Longer lengths available upon request. Contact factory for availability.

System Ordering Information: Un-driven Systems



Ordering Example

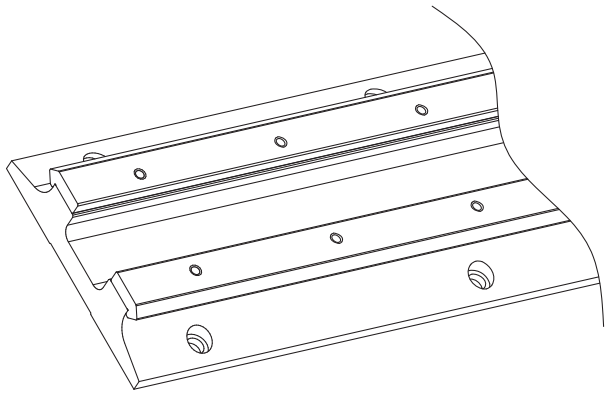
LP U 2L C C C Z N S A 400.0 = LPU2LCCCZNSA 400.0

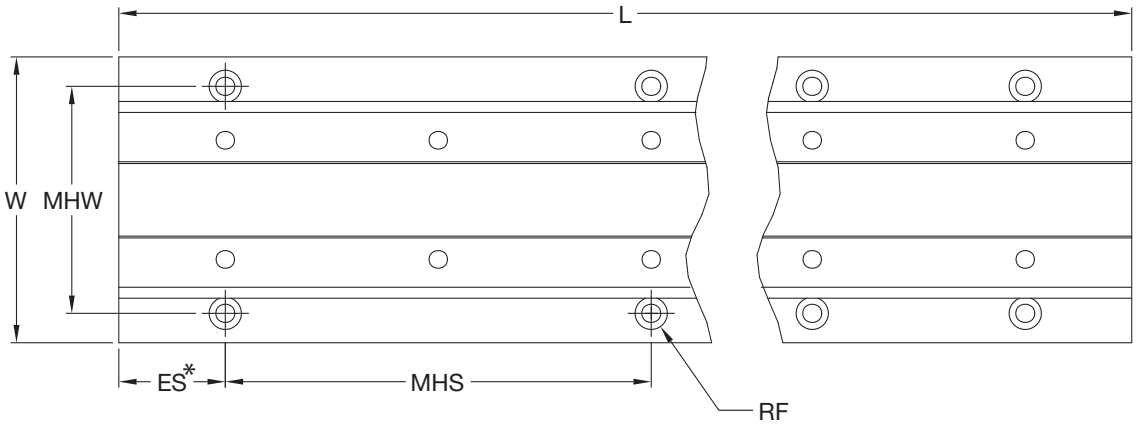
LoPro, Un-driven, Size 2 Large, Carbon Steel, Basic Wheel Plate with Wheel Covers, Carbon Steel Wheels, No Sensor Flags, No Drive Configuration, Steel Beam Mounted, Version A, 400.0mm Travel.

1. Aluminum beam is not available on size 4.
2. Corrosion resistant systems are available with basic wheel plate or wiper wheel plate. Corrosion resistant systems on stainless steel beams are custom. Contact Bishop-Wisecarver for details.
3. Ball screws are carbon steel. Stainless steel ball screws are custom.

Track Plate Assemblies

- Provides the lowest profile linear guidance
- Induction hardened, single edge track is available in either carbon steel or stainless steel
- Track plate assemblies are butt-joinable for long stroke requirements
- Lightweight anodized aluminum substrate

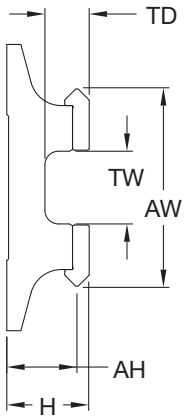




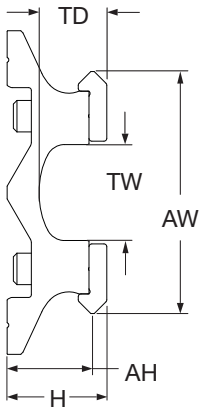
Size	Part Number	Width	Overall Height	Vee Height	Vee Width	Inner Width	Inner Depth	Mounting Hole Width	Mounting Hole Length Space	Mounting Hardware (Low Head Cap Screws)
		W	H	AH	AW	TW	TD	MHW	MHS	RF
1	M1ATP	50.0mm 1.969in	15.9mm .625in	13.5mm .532in	37.4mm 1.473in	12.7mm .500in	9.3mm .365in	40.0mm 1.575in	76.0mm 2.992in	M3
2	M2ATP	72.0mm 2.835in	22.2mm .873in	19.0mm .748in	54.6mm 2.150in	21.3mm .840in	15.1mm .593in	59.0mm 2.323in	126.0mm 4.961in	M5
3	M3ATP	102.0mm 4.016in	29.4mm 1.156in	25.0mm .985in	71.1mm 2.799in	25.9mm 1.020in	15.8mm .622in	81.0mm 3.189in	152.0mm 5.984in	M6
4	M4ATP	140.0mm 5.512in	36.6mm 1.440in	31.0mm 1.222in	95.8mm 3.773in	39.4mm 1.550in	22.9mm .900in	111.0mm 4.370in	178.0mm 7.008in	M8

*ES = End spacing dimension is contingent upon Track Plate Length.
Add SS to the end of the part number for stainless steel track and hardware.

Track Sizes 1, 3 and 4

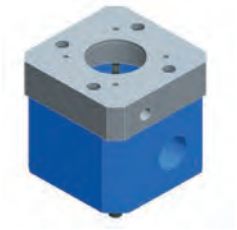


Track Size 2



Tools and Accessories

Motor Mounts



- Available to fit ANY manufacturer's motor or gearbox
- Supplied as a kit, complete with shaft coupling and mounting hardware
- Two-piece design
- Dual access holes

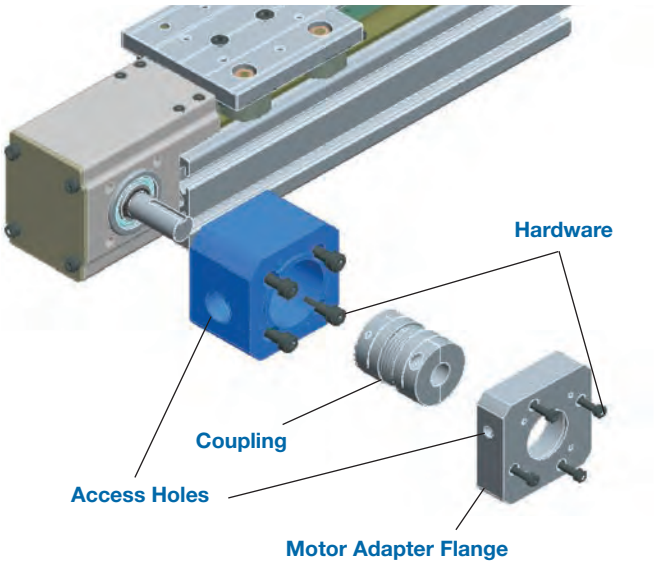
Coupling Options:

Elastomer

- Zero backlash
- Vibration dampening
- Three-piece pluggable design
- Ideal choice where high stiffness is not critical

Bellows

- Zero backlash
- High stiffness (7 to 10 times stiffer than an elastomer coupling)
- High speeds (up to 25,000 rpm)
- Can withstand harsh environments, where glue connections cannot



Ordering Information:

LP3BC	E	1	K		L	

System Size/Drive Type

LP1BC: Size 1 Belt or Chain
LP2SBC: Size 2S Belt or Chain
LP2LBC: Size 2L Belt or Chain
LB3BC: Size 3 Belt or Chain
LB4BC: Size 4 Belt or Chain
LP1LS: Size 1 Lead Screw
LP2BL: Size 2 Ball or Lead Screw
LP3BL: Size 3 Ball or Lead Screw
LP4BL: Size 4 Ball or Lead Screw

Coupling

E: Elastomer
B: Bellows

Motor of Gearhead

Enter Manufacturer Name and Model Number

Shaft Configuration (size 1 belt/chain only; for all other systems, leave blank)

L: Left Hand
R: Right Hand

Corrosion Resistance

blank: Standard Hardware
CR: Corrosion Resistant Hardware

Keyways

N: No Keyways
K: Keyways

Torque Rating N•m / (Bore Range)

LP1BC:	Elastomer	Bellows
1:	8 / (8-16mm)	4 / (3-14mm)

LP2SBC:	Elastomer	Bellows
1:	8 / (8-16mm)	10 / (8-16mm)

LP2LBC:	Elastomer	Bellows
1:	30 / (.500"-26mm)	25 / (10-28mm)
2:	45 / (18-26mm)	--

LP3BC:	Elastomer	Bellows
1:	60 / (14-29mm)	50 / (15-34mm)
2:	90 / (.750"-29mm)	--

LP4BC:	Elastomer	Bellows
1:	150 / (22-38mm)	100 / (22-38mm)

LP1LS:	Elastomer	Bellows
1:	5 / (5-8mm)	2 / (3-10mm)
2:	--	5 / (3-10mm)

LP2BL:	Elastomer	Bellows
1:	5 / (5-8mm)	5 / (6-11mm)

LP3BL:	Elastomer	Bellows
1:	15 / (.375"-.750")	10 / (8-16mm)
2:	20 / (12mm-.750")	20 / (10-20mm)

LP4BL:	Elastomer	Bellows
1:	30 / (.500"-26mm)	40 / (12-28mm)
2:	45 / (18-26mm)	--

For complete details and dimensions, visit www.bwc.com/products/lopro.html.

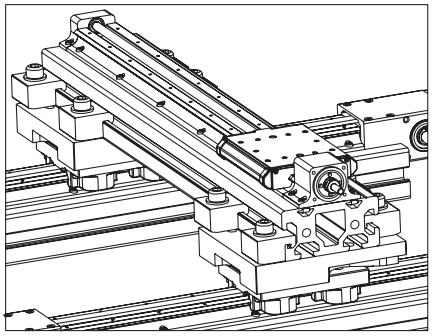
Tools and Accessories

Gantry Brackets

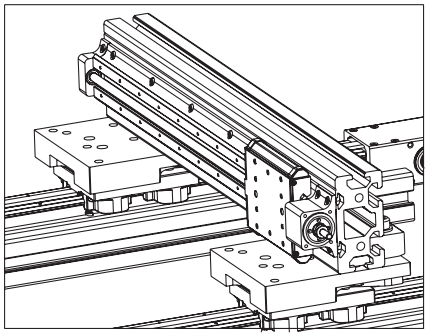
A wide variety of gantry brackets are available to form complete LoPro gantry systems. The following compatibility matrix shows which LoPro system sizes can be mated together, and in which orientations.

Additional parts may be required for complete assembly, including mounting plates, carriage screws, and clamp, T-nut or gusset fastening system parts. Please consult Bishop-Wisecarver's applications engineers for additional assistance. In addition, the LoPro gantry system assembly manual is available at www.bwc.com.

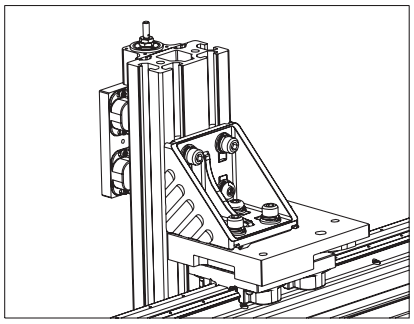
Primary Stage System Size	Secondary System Size				
	1	2[1]/2S	2L	3	4
1	A, B, C, D	N/A	N/A	N/A	N/A
2	A, B, C, D	A, B, C, D	A, B, C, D	N/A	N/A
3	A, B, C, D	A, B, C, D	A, B, C, D	A, B, C, D	D[3]
4	A, B[2], C, D	B[2]	B	A, B, C, D	D[3]



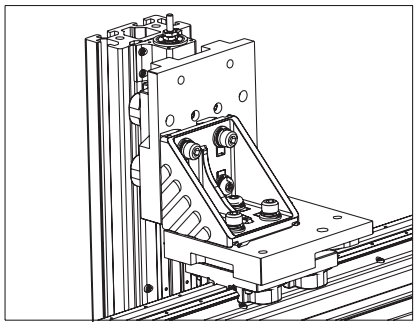
A. X-Y (Horizontal Y Stage)



B. X-Y (Perpendicular Y Stage)



C. X-Z (Z Stage Connected by Support Beam)



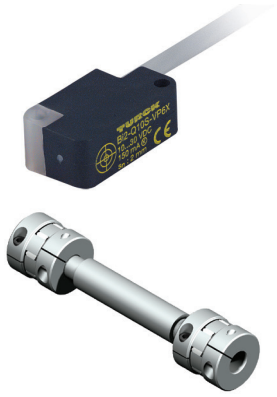
D. X-Z (Z Stage Connected by Carriage)

1. Size 2 lead screw or ball screw system.
2. Size 1 and 2/2S secondary stages can be mounted with T-nuts in the perpendicular orientation on size 4 mounting plates, but cannot have side clamps as reinforcement.
3. Though it is physically possible to connect size 4 systems as secondary stages, this arrangement is not recommended.

Tools and Accessories

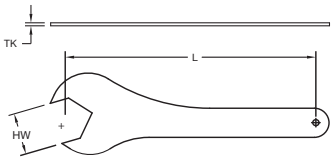
Other Accessories

- Various inductive proximity sensors, sensor mounting kits, and sensor flags
- Elastomer line shafts in a variety of lengths and diameters
- Additional custom accessories are available to fit your application needs. Contact our applications engineers for assistance.

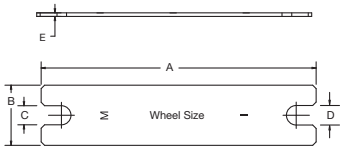


Fit-up Wrenches

- Eccentric adjustment mounting tools
- Order bushing wrench and wheel bolt wrench for each wiper wheel plate size (1, 2, 3, and 4)
- For basic wheel plate, use wheel stud wrench and socket wrench to adjust eccentric wheels (socket wrench not supplied)
- Allows for fit-up adjustment between opposing wheels by rotating eccentric bushing



Wiper Wheel Plate



Basic Wheel Plate

Wiper Wheel Plate

Wrench Type	Size	Part Number	Wrench Size	Length	Thickness
			HW	L	TK
Wheel Bolt	1	1PWRB	5.6mm .220in	101.3mm 3.990in	2.3mm .091in
	2	2PWRB	8.7mm .344in	114.3mm 4.50in	3.0mm .121in
	3	3PWRB	11.2mm .440in	127.0mm 5.00in	3.4mm .140in
	4	4PWRB	12.8mm .503in	138.9mm 5.50in	3.4mm .140in
Eccentric Bushing	1	1PWRX	11.2mm .439in	101.6mm 4.00in	1.8mm .070in
	2	2PWRX	14.3mm .564in	114.3mm 4.50in	2.3mm .090in
	3	3PWRX	19.1mm .752in	129.5mm 5.10in	2.7mm .110in
	4	4PWRX	22.3mm .877in	147.3mm 5.80in	2.7mm .110in

Wheel Stud Wrench

Part #'s	Wheel Size	A	B	C	D	E
BAW1	1	7.00	1.50	.474-.479	.439-.444	.0747 +.0143/-.0050
BAW2	2	8.00	1.75	.553-.558	.565-.570	.1046 +.0244/-.0136
BAW3	3	9.00	2.00	.750-.755	.752-.757	.1345 +.0055/-.0165
BAW4	4	9.00	2.00	.868-.873	.877-.882	.1345 +.1275/-.0165

Values are in inches. Wrenches are universal for metric and inch.

Technical Reference

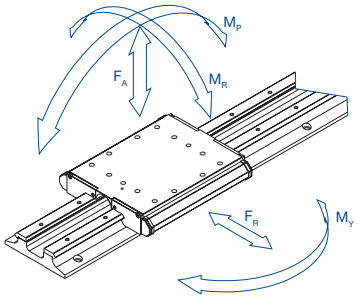
Load/Life Relationship

Several factors influence the service life of a LoPro linear motion system. Through research and development spanning over thirty years, Bishop-Wisecarver has devised a simple method to estimate the load/life relationship for a specific DualVee guide mechanism under defined loading conditions. The methodology accounts for the size of the DualVee bearing elements, their relative spacing, and the orientation, location, and magnitude of the load. The formula is based upon clean and well lubricated track conditions; so for applications where lubrication is prohibitive, a derating factor must be applied.

It is important to note that other factors such as maximum velocity, acceleration rates, duty cycle, stroke length, environmental conditions, the presence of shock and vibration, and extreme temperature ranges can all impact service life to varying degrees. As such, the sizing method should be considered only as a guideline for the sizing of DualVee components and assemblies.

Load/Life Equation – Sizing and Selection

The load/life estimation requires a basic understanding of the principles of statics, and the ability to work with free body diagrams. The following life equation is for the purpose of estimating the expected life of the wheel plate and track plate only. System drive components are not accounted for but should also be considered. Drive element load ratings are shown throughout the catalog for each type of system.



Step 1: Calculate all forces applied to the wheel plate

Any forces applied on the wheel plate need to be considered, including inertial forces, gravitational forces, external forces such as tool pressure, impact loading, and payload. If assistance is required in resolving specific loads into the resultant reaction forces, please contact our Applications Engineering staff for support. It is recommended that the Application Data Sheet on page 57 be submitted beforehand, with as much application information detailed as possible.

Step 2: Calculate the load factor for the wheel plate

$$L_F = \frac{F_R}{F_{R(max)}} + \frac{F_A}{F_{A(max)}} + \frac{T_P}{M_{P(max)}} + \frac{T_Y}{M_{Y(max)}} + \frac{T_R}{M_{R(max)}}$$

Where:

L_F = Load Factor
F_R = Applied Radial Load
F_A = Applied Axial Load
T_P = Applied Pitch Moment Load
T_Y = Applied Yaw Moment Load
T_R = Applied Roll Moment Load

$L_F \leq 1$

Carriage Assembly Load Capacities					
System Size	Radial Load Capacity $F_{R(max)}$	Axial Load Capacity $F_{A(max)}$	Pitch Moment Capacity $M_{P(max)}$	Yaw Moment Capacity $M_{Y(max)}$	Roll Moment Capacity $M_{R(max)}$
	N	N	N•m	N•m	N•m
1	2391	988	26	62	27
2/2S/2L	5194	2450	95	202	100
3	11564	6668	346	599	372
4	19012	15684	1220	1478	1174

Step 3: Calculate estimated life with adjustment factor

Due to varying application load and speed parameters and environmental conditions, the appropriate adjustment factor must be applied to the equation on the following page.

Adjustment Factor (A_F)	Application Conditions
1.0 – 0.7	Clean, low speed, low shock, low duty
0.7 – 0.4	Moderate contaminants, medium duty, medium shock, low to medium vibration, moderate speed
0.4 – 0.1	Heavy contamination, high acceleration, high speed, medium to high shock, high vibration, high duty cycle

Oscillating motion resulting in less than one full revolution of the wheel under load can cause accelerated wear on the internal bearing elements. Testing of such systems is recommended to verify compatibility of the design with load/life requirements.

Technical Reference

System Size	Life Constant L_C	
	Inches of Travel Life	Kilometers of Travel Life
1	2.19×10^6	55
2/2S/2L	3.47×10^6	87
3	5.19×10^6	130
4	6.84×10^6	171

$$\text{Life} = \left(\frac{L_C}{(L_F)^3} \right) A_F$$

Where: L_F = Load Factor
L_C = Life Constant
A_F = Adjustment Factor

Accuracy/Repeatability

The accuracy of a LoPro linear system is dependent upon the mounting surface preparation and the technique used to align the track. LoPro systems can achieve straightness and flatness characteristics to within .004in/foot (0.1mm/300mm) when mounting surfaces are adequately prepared. Straight line accuracy of beam mounted LoPro systems are subject to the industry standard straightness and twist tolerances associated with extruded or hot formed sections. As such, the highest straight line precision can be achieved by bolting an unsupported LoPro system to a carefully prepared flat mounting surface. Use of a machined reference edge will help maximize system straightness.

Fit-up Adjustment

The concentric bushings/wheels determine the alignment of the system. They should carry as much of the load as possible. The system should be such that the load is predominantly supported by the wheels radially whenever possible.

Normal adjustment is obtained by rotating the eccentric bushings until all free play is removed from the carriage assembly. When the eccentrics are adjusted and the carriage plate is held firmly in place, one should be able to rotate, by hand, any of the four guide wheels in the system against its mating track. If rotation is not possible, preload on the wheels should be reduced accordingly. Over-tightening of the eccentric adjustment could result in premature bearing failure. Such a condition can exert a force greater than the load rating of the wheel.

Lubrication

Lubrication is the key to maximizing service life in any rolling contact linear bearing design. Internally, DualVee guide wheels are lubricated for life with an extreme pressure, corrosion resistant grease. As such, the main consideration with regards to lubrication is the wheel/track interface. Typically, a light machine oil or an extreme pressure grease does well to minimize wear, stick slip, and corrosion.

LoPro systems are available with two standard wheel plate designs. The wiper wheel plate comes complete with lubricating wiper caps (lubricators consist of an oil saturated felt). The basic wheel plate is available with either wheel covers or track lubricators. Both options include lubrication via oil saturated felt.

Lubrication will maximize the load capacity of an individual bearing element. As such, for any specific loading condition, the presence of lubrication on the guide ways will significantly increase the service life over a non-lubricated configuration under the same loads.

Lubrication will also increase the maximum linear velocity that a guide wheel-based bearing arrangement can travel. In high cycling applications where high speed or acceleration rates are present, lubrication of the wheel/track interface is strongly recommended.

LoPro System Mass Calculation

The following calculations are approximate, and depict the maximum mass (kg) for each size. Exact calculations will vary depending on system configuration.

Beam Mounted

Size	Actuator Type			
	Belt	Chain	Lead Screw	Ball Screw
1	6.3xL + 1.7	6.5xL + 1.8	6.4xL + 1.2	N/A
2	N/A	N/A	9.2xL + 3	9.3xL + 2.8
2S	8.8xL + 4	9.3xL + 4.3	N/A	N/A
2L	10.7xL + 6.9	11.1xL + 7.4	N/A	N/A
3	21.9xL + 14.6	22.8xL + 15.7	23.1xL + 7.7	22.4xL + 7.7
4	32.6xL + 26.3	34.3xL + 27.4	25.7xL + 15	25.9xL + 13.6

Un-Mounted

Size	Actuator Type			
	Belt	Chain	Lead Screw	Ball Screw
1	1.7xL + 1.0	1.9xL + 1.1	1.9xL + 0.6	N/A
2	N/A	N/A	3.2xL + 1.7	3.2xL + 1.6
2S	2.7xL + 2.8	3.3xL + 3	N/A	N/A
2L	2.8xL + 5.2	3.3xL + 5.7	N/A	N/A
3	6.4xL + 10.3	7.3xL + 11.4	7.6xL + 4.1	6.9xL + 4.1
4	10.1xL + 18.3	11.7xL + 19.4	12.0xL + 9.7	12.2xL + 9.1

L = Carriage Travel Length (m)

Technical Reference

LoPro System Mass & System Inertia Calculations

Lead Screw Driven Systems, Basic Wheel Plate

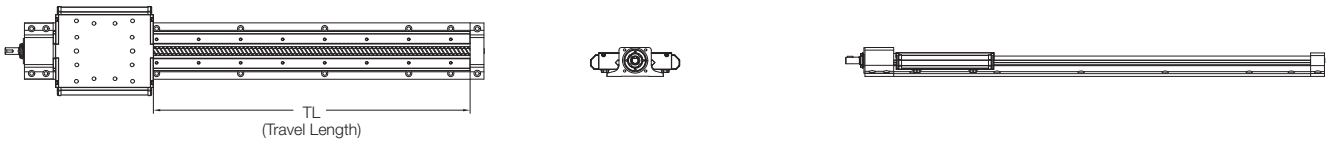
Size	Drive Element	System Inertia Formulas J (A + B + C)			System Mass Formulas (kg)		
		Inertia Constant A	Payload Mass Multiplier C^2	Length Dependent Intertia B[1]	Un-mounted	Aluminum Beam Mounted	Steel Beam Mounted
1	1/4" x 2mm	1.21 kg•mm² .00414 lb•in²	.101 mm² x M .000157 in² x M	.00127 kg•mm x TL .00011 lb•in x TL	.6 + 1.9 x L	1.2 + 6.4 x L	1.2 + 6.1 x L
	1/4" x 10mm	2 kg•mm² .00684 lb•in²	2.53 mm² x M .00392 in² x M		.5 + 1.9 x L	1.2 + 6.4 x L	1.1 + 6.1 x L
2	3/8" x 5mm	9.5 kg•mm² .03249 lb•in²	0.633 mm² x M .000981in² x M	.00645 kg•mm x TL .00056 lb•in x TL	1.7 + 3.2 x L	2.9 + 9 x L	3 + 9.2 x L
	3/8" x 12mm	12.3 kg•mm² .0421 lb•in²	3.65 mm² x M .00566 in² x M				
	3/8" x 25mm	23.4 kg•mm² .08 lb•in²	15.8 mm² x M .0245 in² x M				
3	1/2" x 5mm	24.3 kg•mm² .0831 lb•in²	.633 mm² x M .000981in² x M	.0205 kg•mm x TL .00178 lb•in x TL	4 + 7 x L	7.6 + 21 x L	7.6 + 22.5 x L
	1/2" x 10mm	28.8 kg•mm² .0985 lb•in²	2.53 mm² x M .00392 in² x M				
	1/2" x 25mm	60 kg•mm² .205 lb•in²	15.8 mm² x M .0245 in² x M				
	5/8" x 8mm	31.9 kg•mm² .109 lb•in²	1.62 mm² x M .00251 in² x M	.05 kg•mm x TL .00434 lb•in x TL	4.1 + 7.6 x L	7.7 + 21.6 x L	7.7 + 23.1 x L
	5/8" x 16mm	43.3 kg•mm² .148 lb•in²	6.48 mm² x M .01 in² x M				
4	3/4" x 5mm	95.5 kg•mm² .327 lb•in²	.633 mm² x M .000981 in² x M	.104 kg•mm x TL .00903 lb•in x TL	9.7 + 12 x L	N/A	15 + 25.7 x L
	3/4" x 10mm	106 kg•mm² .363 lb•in²	2.53 mm² x M .00392 in² x M				
	3/4" x 24mm	170 kg•mm² .581 lb•in²	14.6 mm² x M .0226 in² x M				
	3/4" x 50mm	430 kg•mm² 1.47 lb•in²	63.3 mm² x M .0981in² x M				

1. TL (Travel Length) must be in mm for metric calculation, inches for English calculation.
2. M (Mass of payload on the carriage) must be in kg for metric calculation, lbm for English calculation.

Technical Reference

LoPro System Mass & System Inertia Calculations

Lead Screw Driven Systems, Wiper Wheel Plate



Size	Drive Element	System Inertia Formulas J (A + B + C)			System Mass Formulas (kg)		
		Inertia Constant A	Payload Mass Multiplier C^2	Length Dependent Intertia B[1]	Un-mounted	Aluminum Beam Mounted	Steel Beam Mounted
1	1/4” x 2mm	1.2 kg•mm² .0041 lb•in²	.101 mm² x M .000157 in² x M	.00127 kg•mm x TL .00011 lb•in x TL	.5 + 1.9 x L	1.2 + 6.4 x L	1.1 + 6.1 x L
	1/4” x 10mm	1.78 kg•mm² .00609 lb•in²	2.53 mm² x M .00392 in² x M		.5 + 1.9 x L	1.2 + 6.4 x L	1.1 + 6.1 x L
2	3/8” x 5mm	9.42 kg•mm² .0322 lb•in²	0.633 mm² x M .000981in² x M	.00645 kg•mm x TL .00056 lb•in x TL	1.5 + 3.2 x L	2.7 + 9 x L	2.7 + 9.2 x L
	3/8” x 12mm	11.7 kg•mm² .04 lb•in²	3.65 mm² x M .00566 in² x M				
	3/8” x 25mm	21 kg•mm² .0718 lb•in²	15.8 mm² x M .0245 in² x M				
3	1/2” x 5mm	24.2 kg•mm² .0828 lb•in²	.633 mm² x M .000981in² x M	.0205 kg•mm x TL .00178 lb•in x TL	3.8 + 7 x L	7.7 + 21 x L	7.8 + 22.5 x L
	1/2” x 10mm	27.9 kg•mm² .0954 lb•in²	2.53 mm² x M .00392 in² x M				
	1/2” x 25mm	53.8 kg•mm² .184 lb•in²	15.8 mm² x M .0245 in² x M				
	5/8” x 8mm	31.5 kg•mm² .108 lb•in²	1.62 mm² x M .00251 in² x M	.05 kg•mm x TL .00434 lb•in x TL	3.8 + 7.6 x L	7.4 + 21.6 x L	7.5 + 23.1 x L
	5/8” x 16mm	41 kg•mm² .14 lb•in²	6.48 mm² x M .01 in² x M				
4	3/4” x 5mm	95.4 kg•mm² .326 lb•in²	.633 mm² x M .000981 in² x M	.104 kg•mm x TL .00903 lb•in x TL	9.3 + 12 x L	N/A	14.7+25.7 x L
	3/4” x 10mm	105 kg•mm² .359 lb•in²	2.53 mm² x M .00392 in² x M				
	3/4” x 24mm	164 kg•mm² .561 lb•in²	14.6 mm² x M .0226 in² x M				
	3/4” x 50mm	405 kg•mm² 1.39 lb•in²	63.3 mm² x M .0981in² x M				

1. TL (Travel Length) must be in mm for metric calculation, inches for English calculation.
2. M (Mass of payload on the carriage) must be in kg for metric calculation, lbm for English calculation.

Technical Reference

LoPro System Mass & System Inertia Calculations

Ball Screw Driven Systems, Basic Wheel Plate

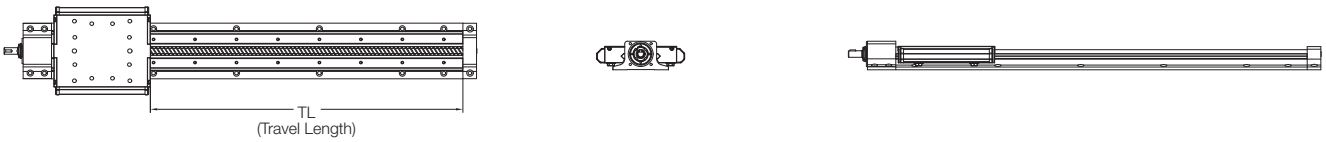
Size	Drive Element	System Inertia J (A + B + C)			System Mass Formulas (kg)		
		Inertia Constant A	Payload Mass Multiplier C^2	Length Dependent Intertia B[1]	Un-mounted	Aluminum Beam Mounted	Steel Beam Mounted
2	10mm x 2mm	9.2 kg·mm² .0315 lb·in²	0.101 mm² x M .000157 in² x M	.00783 kg·mm x TL .00068 lb·in x TL	1.6 + 3.2 x L	2.7 + 9.1 x L	2.8 + 9.3 x L
	10mm x 3mm	9.33 kg·mm² .0319 lb·in²	.228 mm² x M .000353 in² x M				
3	12mm x 5mm	23.6 kg·mm² .0807 lb·in²	.633 mm² x M .000981 in² x M	.0164 kg·mm x TL .00142 lb·in x TL	4.1 + 6.9 x L	7.6 + 20.9 x L	7.7 + 22.4 x L
	12mm x 10mm	28.2 kg·mm² .0964 lb·in²	2.53 mm² x M .00392 in² x M				
4	16mm x 5mm	82.4 kg·mm² .282 lb·in²	.633 mm² x M .000981 in² x M	.0516 kg·mm x TL .00448 lb·in x TL	8.9 + 11.3 x L	N/A	13.4 + 25 x L
	16mm x 10mm	92.5 kg·mm² .316 lb·in²	2.53 mm² x M .00392 in² x M				
	20mm x 5mm	101 kg·mm² .345 lb·in²	.633 mm² x M .000981 in² x M	.126 kg·mm x TL .0109 lb·in x TL	9.1 + 12.2 x L	N/A	13.6 + 25.9 x L

1. TL (Travel Length) must be in mm for metric calculation, inches for English calculation.
2. M (Mass of payload on the carriage) must be in kg for metric calculation, lbm for English calculation.

Technical Reference

LoPro System Mass & System Inertia Calculations

Ball Screw Driven Systems, Wiper Wheel Plate



Size	Drive Element	System Inertia J (A + B + C)			System Mass Formulas (kg)		
		Inertia Constant A	Payload Mass Multiplier C^2	Length Dependent Intertia B[1]	Un-mounted	Aluminum Beam Mounted	Steel Beam Mounted
2	10mm x 2mm	9.21 kg•mm² .0315 lb•in²	0.101 mm² x M .000157 in² x M	.00783 kg•mm x TL .00068 lb•in x TL	1.5 + 3.2 x L	2.6 + 9.1 x L	2.6 + 9.3 x L
	10mm x 3mm	9.31 kg•mm² .0319 lb•in²	.228 mm² x M .000353 in² x M				
3	12mm x 5mm	23.4 kg•mm² .08 lb•in²	.633 mm² x M .000981 in² x M	.0164 kg•mm x TL .00142 lb•in x TL	3.7 + 6.9 x L	7.3 + 20.9 x L	7.4 + 22.4 x L
	12mm x 10mm	27.3 kg•mm² .0934 lb•in²	2.53 mm² x M .00392 in² x M				
4	16mm x 5mm	82.2 kg•mm² .281 lb•in²	.633 mm² x M .000981 in² x M	.0516 kg•mm x TL .00448 lb•in x TL	8.5 + 11.3 x L	N/A	13.1 + 25 x L
	16mm x 10mm	91.6 kg•mm² .313 lb•in²	2.53 mm² x M .00392 in² x M				
	20mm x 5mm	101 kg•mm² .345 lb•in²	.633 mm² x M .000981 in² x M	.126 kg•mm x TL .0109 lb•in x TL	8.7 + 12.2 x L	N/A	13.3 + 25.9 x L

1. TL (Travel Length) must be in mm for metric calculation, inches for English calculation.
2. M (Mass of payload on the carriage) must be in kg for metric calculation, lbm for English calculation.

Custom Engineered Linear Motion Systems

In addition to the standard line of LoPro linear system products, Bishop-Wisecarver's capabilities extend beyond these standard systems and into the realm of custom engineered products. Custom engineered solutions from Bishop-Wisecarver range from slight modifications made to standard systems to complete ground-up system designs using DualVee components and/or linear guides.

Value added modifications and capabilities include but are not limited to:

- Multi-axis/Gantry Bracketry
- Limit Switches
- Gearboxes
- Elastomer or Bellows Couplings
- Connecting Shafts
- Bellows
- Foot Mounts for Steel Support Beams
- Special Machining
- Track Plating Options
- Custom Wheel Plate Designs
- Custom Design Assistance
- Assembly Services (prior to shipping)

Custom engineered products are typically designed in collaboration with the customer's design team, taking into account the major design parameters including envelope restrictions, material considerations, accuracy, repeatability, thrust requirements, duty cycle, and service life objectives. Non-recurring engineering fees may apply depending on the level of customization involved. Typical projects entail varying levels of prototype sketching, detailing, and prototype design modification as the system specifications are refined. Prior to fabrication, prototype designs are formally detailed and documented for "sign-off" approval by the customer. JIT and Kanban-type arrangements can be accommodated for custom engineered OEM requirements.

This custom LoPro linear guidance system's X-axis uses custom carriage assemblies consisting of eight size 4XL (extra large) DualVee wheels and steel wheel plates rather than the standard size 4, four-wheel aluminum wheel plate assemblies. Each assembly is capable of loads in excess of 7,500 lbs. The Z-axis, with lift capacities of more than 5,000 lbs., features special chain couplers with a leaf chain drive mechanism and solid steel idler sheave with high capacity roller bearings mounted on a steel housing structure.

APPLICATION DATA SHEET

Company: _____
Contact: _____
Address: _____

City: _____ State: _____ Zip Code: _____
Phone: _____ Fax: _____ e-mail: _____

System Orientation: _____	horizontal		vertical		
Load: _____	lbs		N		
Mass Size (LxWxH): _____	in		m		
Stroke Length: _____	in		m		
Velocity: _____	in/s		m/s		
Accel/Decel: _____	in/s^2		m/s^2		
Linear Accuracy: _____	in/ft		mm/m		
Repeatability: _____	in		mm		
Duty Cycle: _____	in/day		m/day		
Environment: _____	factory	food grade		clean room	other
Temperature: _____	˚F		˚C		
Additional Forces: _____	lbs		N		

Product/Machine Description: _____

Additional Requirements: _____

Expected Volume: _____ Date Needed: _____

System Sketch

BISHOPWISECARVER®

2104 Martin Way, Pittsburg, CA 94565
phone: 925.439.8272 fax: 925.439.5931
info@bwc.com www.bwc.com

Bishop-Wisecarver Corporation: Manufacturer of the original DualVee® guide wheel and the industry leader in guided motion technology, and exclusive North American partner and distributor for HepcoMotion products since 1984.

DualVee® Guide Wheels
LoPro® Linear Motion System
MadeWell® Crown Rollers
MinVee® Linear Slide System
UtiliTrak® Linear Motion Guide

Signature Motion Linear Actuators™

ECO60™ Linear Actuators
SimpleSlide™ Linear Tables
SlickStick™ Linear Actuators
SteadyRail™ Linear Stages
XLA™ Linear Actuators

3D CAD DRAWINGS

Download 3D CAD files for our complete product lines at www.bwc.com/3dcad.php

BLOG

Read about industry trends, product applications and so much more: www.bwc.com/blog

PRODUCT ORDERS

Please call Bishop-Wisecarver with your specific application requirements or fill out this form on-line www.bwc.com/how-can-we-help Our technical staff is available to assist with your custom solution.

AMERICAN MANUFACTURING

Our products are proudly designed and manufactured in the United States at our California based headquarters with a majority of domestically sourced raw materials.

HepcoMotion®

DTS Driven Track System
GV3 Linear Guidance and Transmission System
HDRT Heavy Duty Ring Slides and Track System
HDS2 Heavy Duty Slide System
MHD Heavy Duty Track Roller Guidance System
MCS Machine Construction System
PDU2 Profile Driven Unit
PRT2 Precision Ring and Track System
PSD Profile Screw Driven Unit
SBD Sealed Belt Drive
Simple Select®
SL2 Stainless Steel Based Slide System

888.580.8272 925.439.8272 www.bwc.com

19.1121-1

Revised April 2020