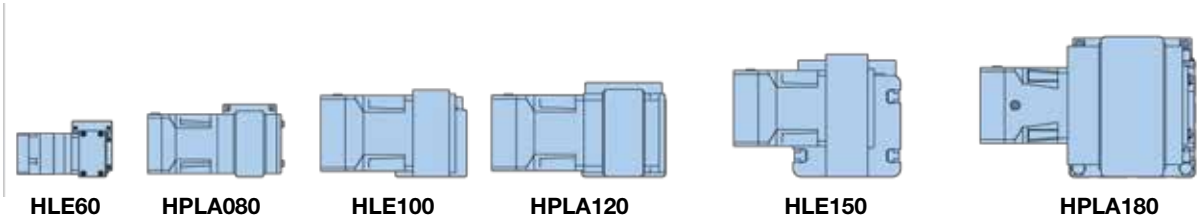
HPLA Series
Belt Driven Linear Modules

Belt-Drive Actuators for High Thrust, Long Stroke Applications

- **Strong – steel roller bearing option for highest load capacity – 1530 kg**
- **Rugged construction for heavy duty applications**
- **Thrust force capacity to 5455 N**
- **Standard travel up to 9 meters**
- **Velocity up to 5 meters/sec.**
- **Positional repeatability of ±0.2 mm**
- **Timing belt and pulley drive mechanism for fast, accurate positioning**

Proven Technology

- **Direct mounting for planetary gear reducers – eliminating complexity of additional machined parts or couplings**
- **Adjustable "end of travel" limit switches and "Home" position sensor**
- **Cable carrier systems**
- **Performance matched Parker servo systems**
- **Structural components for vertical and multi-axis mounting**
- **Toe clamps and hardware for fast/easy mounting**
- **External bumper option**
- **Link shafts and support bearing for dual unit axes**
- **Splice plates for extending travels beyond length available in a single profile**



HLE60 HPLA080 HLE100 HPLA120 HLE150 HPLA180

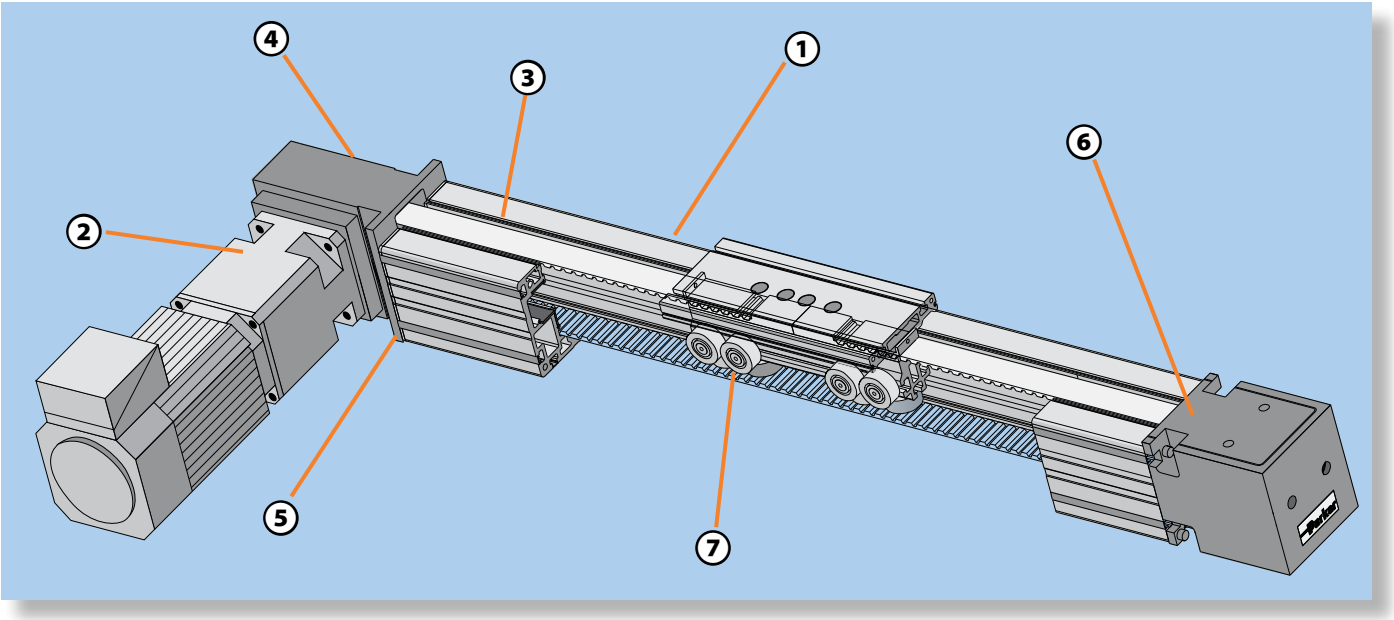
	HLE60	HPLA80	HLE100	HPLA120	HLE150	HPLA180
Maximum Travel (mm)	4,000	5,540	6,200	9,470	7,900	9,240
Maximum Payload (N)	353	1,304	1,549	2,598	3,402	4,501
Maximum Acceleration (m/s²)	10	10	10	10	10	10

***Do not exceed allowable axial and moment loading.**

The HPLA is a rugged "next generation" linear module that offers high speed, high acceleration, and long travel, combined with stiff, rigid construction characteristics. It is ideally suited as a single axis product or as a component for high speed multi-axis gantries.

The HPLA carriage is rigidly supported on three sides by heavy duty roller bearings, housed in a rugged aluminum housing. The bearing wheels are pre-loaded via eccentric bushings to eliminate play in the system, and are strategically located to evenly distribute the load across the length of the carriage.

A high strength steel reinforced drive belt and pulley system provides fast and highly repeatable positioning of the carriage. This high thrust drive belt is securely connected to the carriage by a unique clamping system. This system provides a secure connection and enables easy belt replacement without the need to remove the payload. Having a low coefficient of friction, the carriage design provides a high mechanical efficiency and long service life. Special carriage lengths and linear units with multiple carriages are available for custom applications.



1 Carriage

Roller bearing wheels on three sides of the carriage provide smooth linear motion and support and evenly distribute the load across the length of the carriage. Eccentric bearing wheel bushings eliminate play on all sides of the carriage.

2 Gearhead

Parker Stealth series gearheads integrated as direct drive options.

3 Drive Belt

A zero backlash, steel reinforced timing belt provides high speed, high force, and high acceleration. A serrated clamp mechanism between belt and carriage guarantees a safe, strong connection and allows belt replacement without removing the load.

4 Drive Station

The drive stations are designed to accept planetary gear reducers or provide different shaft outputs for driving the HPLA.

5 Housing

An extruded aluminum profile provides maximum rigidity (torsion and deflection) at minimum weight. It accommodates steel wheels that ride on integral hardened steel bearing ways, or polyamide wheels that ride in the extruded guideway.

6 Tensioning Station

An easily accessible tensioning station is used to set the drive belt tension.

7 Roller Bearing

Three rows of preloaded heavy duty steel roller bearings provide the highest load carrying capacity available.

Modular drive system

Increased system stiffness due to larger belt width. Low maintenance. High performance due to hollow shaft input.

Modular guide system

Provides an alternative to composite wheel material, with low maintenance and quiet operations. Steel wheel option on an integrated steel rolling surface for increased load capacity, plus high load-bearing capacity and high levels of rigidity.

Various options for adaptation to wide ranging applications

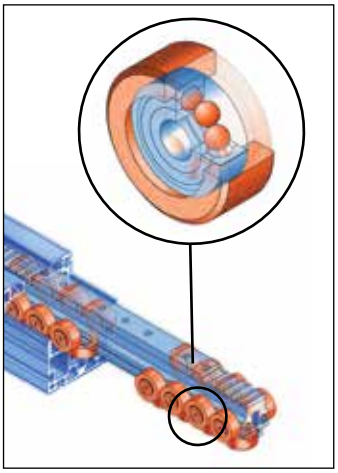
Steel cover strip, corrosion-resistant stainless steel version for application in clean rooms or in the food industry, and integrated position feedback system for maximum precision.

Optional IP30 Strip Seal

Magnetically attached stainless steel seal strip (not shown) provides environmental protection to interior components.

Roller Bearing Design

Each roller bearing incorporates a low friction, lubricated and sealed radial ball bearing enclosed in a hardened steel outer ring (or raceway). A polyamide tread can be substituted for the steel ring whenever whisper quiet motion is desired.



SPECIFICATIONS

As part of the advanced, cost-effective construction of machines and handling systems, the HPLA is a good choice for applications such as materials handling (palletizing, depalletizing, feeding, and part removal), warehouse technology (parts picking, storage and retrieval), and machine tool automation (workpiece loading and unloading, tool changing). Additional examples include textile machinery building (cross-cutting, slitting and stacking, quilting, seam stitching) and construction (formwork and placing reinforcing steel bars in concrete).

Other typical applications are process engineering (painting, coating, bonding), testing technology (guiding ultrasonic sensors, laboratory equipment), and cleanroom technology (wafer transport, wafer coating).

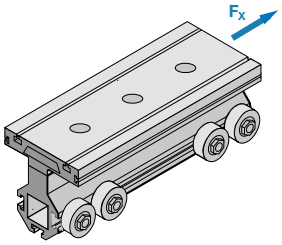
Characteristic	Units	HPLA80 Polyamide Wheel	HPLA80 Steel Wheel	HPLA120 Polyamide Wheel	HPLA120 Steel Wheel	HPLA180 Polyamide Wheel	HPLA180 Steel Wheel	HPLA180 (Rack Drive) Polyamide Wheel
Unit Weight (basic unit without stroke)								
Standard Carriage, NL	kg (lb)	6.8 (15.0)	7.5 (16.5)	20.2 (44.4)	21.6 (47.5)	57.2 (125.8)	61.6 (135.3)	78.4 (172.5)
Extended Carriage, VL	kg (lb)	8.6 (18.9)	9.5 (20.9)	25.2 (55.4)	27.1 (59.6)	74.8 (164.6)	80.9 (178.0)	95.2 (209.4)
Carriage Weight								
Standard Carriage, NL	kg (lb)	1.7 (3.7)	1.8 (4.0)	5.8 (12.8)	6.0 (13.2)	12.3 (27.1)	12.6 (27.7)	32.5 (71.5) (1)
Extended Carriage, VL	kg (lb)	2.6 (5.7)	2.8 (6.2)	8.8 (19.4)	9.2 (20.2)	21.1 (46.4)	21.8 (48.0)	39.8 (87.6) (1)
Weight/Meter of Additional Travel	kg/m (lb/ft)	6.1 (4.1)	7.3 (4.9)	13.7 (9.2)	15.5 (10.4)	29.4 (19.8)	33.6 (22.6)	31.5 (21.2)
Moment of Inertia (related to the drive shaft)								
Standard Carriage, NL	kg-cm² (lb-in²)	17.8 (6.1)	18.4 (6.3)	142 (48)	146 (50)	725 (247)	743 (253)	698 (238)
Extended Carriage, VL	kg-cm² (lb-in²)	25.4 (8.7)	26.5 (9.0)	197 (67)	204 (70)	1121 (382)	1154 (393)	845 (288)
Travel and Speed								
Maximum Speed(2)	m/s (in/s)	5 (200)		5 (200)		5 (200)		5 (200)
Maximum Acceleration(2)	m/s² (in/s²)	10 (393)		10 (393)		10 (393)		10 (393)
Max. Travel, Standard Carriage NL(3)	mm (in)	5540 (218)	5520 (217)	9470 (372)	9440 (371)	9240 (363)	9200 (362)	8680 (341)
Max. Travel, Extended Carriage VL(3)	mm (in)	5390 (212)	5370 (211)	9270 (365)	9240 (363)	8940 (352)	8900 (350)	8380 (330)
Geometric Data								
Cross Section, Square	mm (in)	80 (3.15)		120 (4.72)		180 (7.09)		180 (7.09)
Moment of Inertia Ix	cm⁴ (in⁴)	139 (3.34)		724 (17.39)		3610 (86.73)		3610 (86.73)
Moment of Inertia Iy	cm⁴ (in⁴)	165 (3.96)		830 (19.94)		4077 (97.95)		4077 (97.95)
Moment of Elasticity	N/mm² (lb/in²)	0.72 x 10⁵ (0.1044 x 10⁸)		0.72 x 10⁵ (0.1044 x 10⁸)		0.72 x 10⁵ (0.1044 x 10⁸)		0.72 x 10⁵ (0.1044 x 10⁸)
Pulley Data, Torques, Forces								
Travel Distance per Revolution	mm/rev (in/rev)	180 (7.09)		270 (10.63)		420 (16.54)		280 (11.02)
Response Radius of Drive Pulley	mm (in)	28.7 (1.13)		43.0 (1.69)		66.8 (2.63)		44.6 (1.75)
Maximum Drive Torque	Nm (lb-in)	47.4 (420)		131.4 (1165)		368 (3264)		58 (514)
Maximum Belt Traction (effective load)		Refer to Load-Bearing Capacity and Maximum Permissable Moment Load Charts						
Repeatability(3)(4)	mm (in)	± 0.2 (± 0.008)		± 0.2 (± 0.008)		± 0.2 (± 0.008)		± 0.05 (± 0.002)

(1) Includes weight of drive module.
(2) Greater speeds and accelerations may be achieved.
(3) Bumper to bumper maximum stroke - splicing possible for longer travel distances including safety zone.
(4) Nominal value - component dependent. For improved repeatability consult factory.

HPLA080 Series – Load-Bearing Capacity of Carriage and Timing Belt

Load-Bearing Capacity of HPLA080 Timing Belt (Fx)

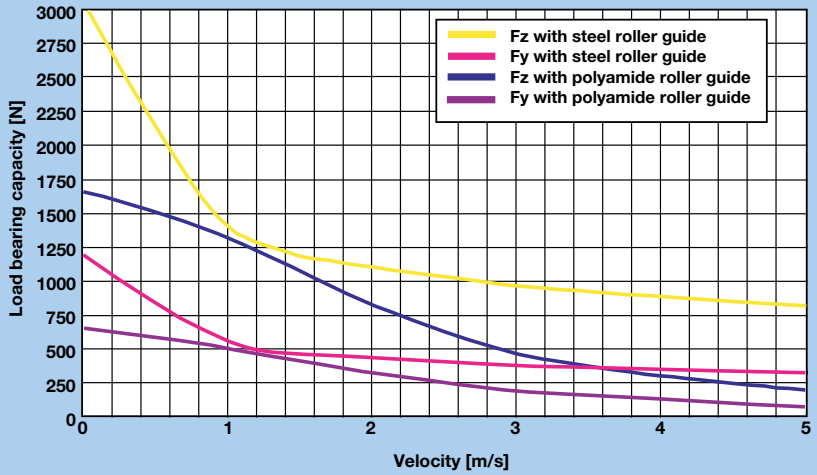
			Transferable Thrust Force (n)	
			Nominal Belt Tension	Maximum Belt Tension
Description	Gearhead	Drive Option	(81,000 km life)	(46,000 km life)
Supported Pulley	PX90/PX115 PV90/PV115 PS90	S03/S04/ S08/S09	925	1115



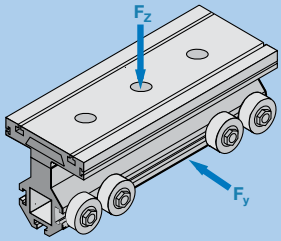
The forces and moments that the carriage is capable of transferring are speed-dependent. The curves shown in the graphs apply to a standard carriage (S). With the extended carriage (E), all the values apart from Fx (load-bearing capacity of timing belt) can be doubled if the load is applied equally to both halves of the carriage or distributed uniformly along its entire length.

HPLA080 Load-Bearing Capacity (Fy and Fz)

(Values double for extended carriage)

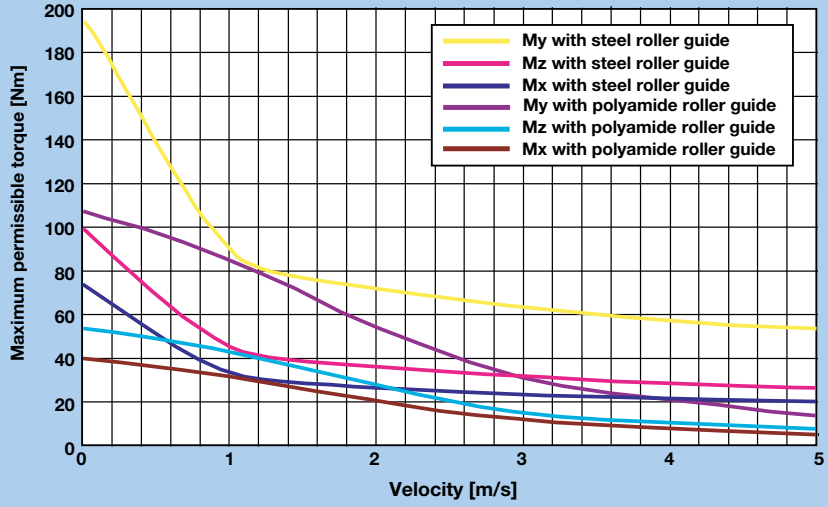


The curves show the maximum load-bearing capacity of a carriage in one direction of force or torque. If several loads are applied in different directions, the values given by the curves must be derated, i.e. the load or speed should be reduced if necessary.



HPLA080 Maximum Permissable Moment Load (Mx, My and Mz)

(Values double for extended carriage)



Virtual Engineer software is available for determination of precise carriage loading.

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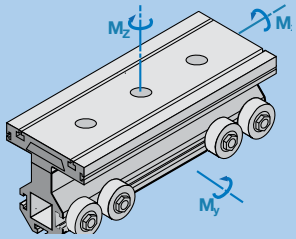
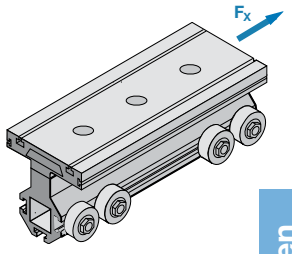


HPLA120 Series – Load-Bearing Capacity of Carriage and Timing Belt

Load-Bearing Capacity of HPLA120 Timing Belt (Fx)

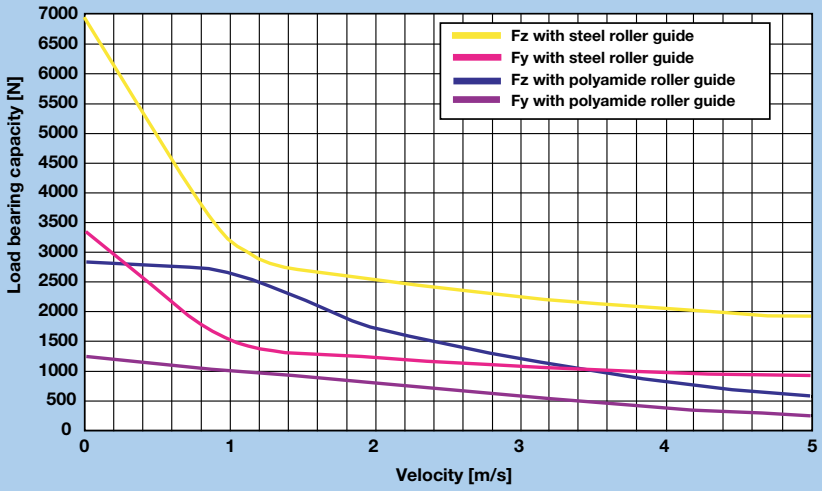


The forces and moments that the carriage is capable of transferring are speed-dependent. The curves shown in the graphs apply to a standard carriage (S). With the extended carriage (E), all the values apart from Fx (load-bearing capacity of timing belt) can be doubled if the load is applied equally to both halves of the carriage or distributed uniformly along its entire length.

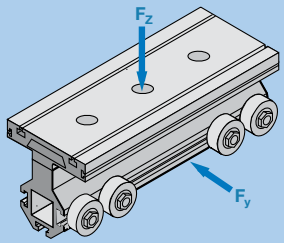
			Transferable Thrust Force (n)	
			Nominal Belt Tension	Maximum Belt Tension
Description	Gearhead	Drive Option	(81,000 km life)	(46,000 km life)
Supported Pulley	PV115 PX115 PS90/PS115	S03/S04/ S08/ S09	1700	2235

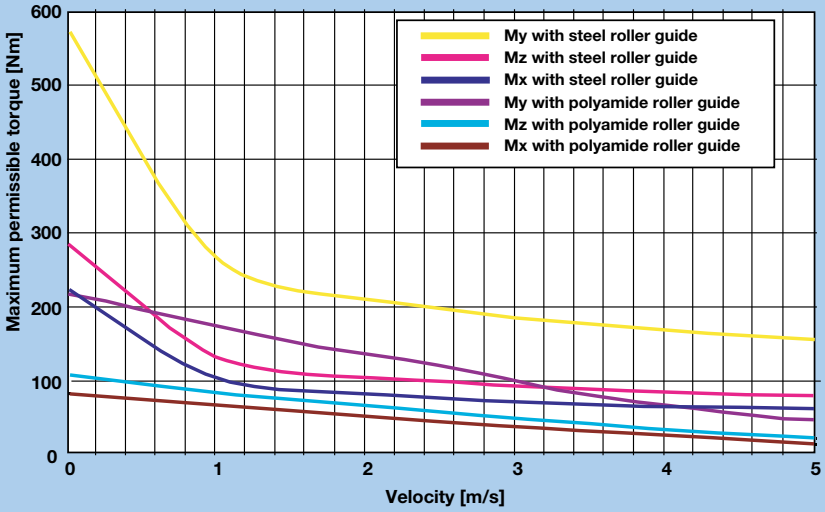
HPLA120 Load-Bearing Capacity (Fy and Fz)

(Values double for extended carriage)



The curves show the maximum load-bearing capacity of a carriage in one direction of force or torque. If several loads are applied in different directions, the values given by the curves must be derated, i.e. the load or speed should be reduced if necessary.





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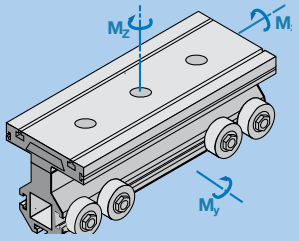
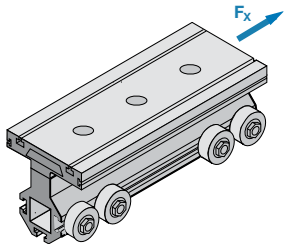


HPLA180 Series – Load-Bearing Capacity of Carriage and Timing Belt

Load-Bearing Capacity of HPLA180 Timing Belt (Fx)

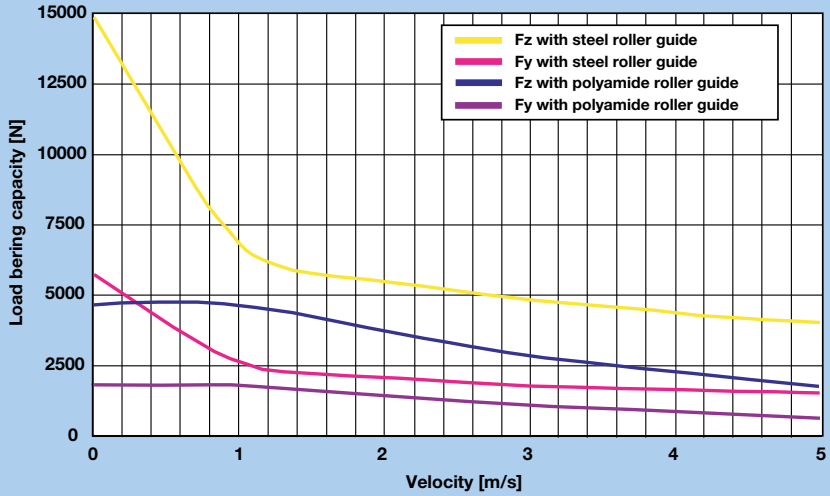


The forces and moments that the carriage is capable of transferring are speed-dependent. The curves shown in the graphs apply to a standard carriage (S). With the extended carriage (E), all the values apart from Fx (load-bearing capacity of timing belt) can be doubled if the load is applied equally to both halves of the carriage or distributed uniformly along its entire length.

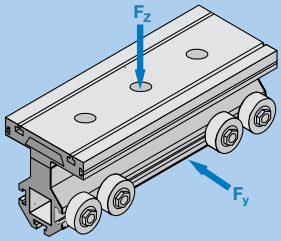
			Transferable Thrust Force (n)	
			Nominal Belt Tension	Maximum Belt Tension
Description	Gearhead	Drive Option	(81,000 km life)	(46,000 km life)
Supported Pulley	PS115 PS142	S03/S04/ S08/S09	4170	5455

HPLA180 Load-Bearing Capacity (Fy and Fz)

(Values double for extended carriage)

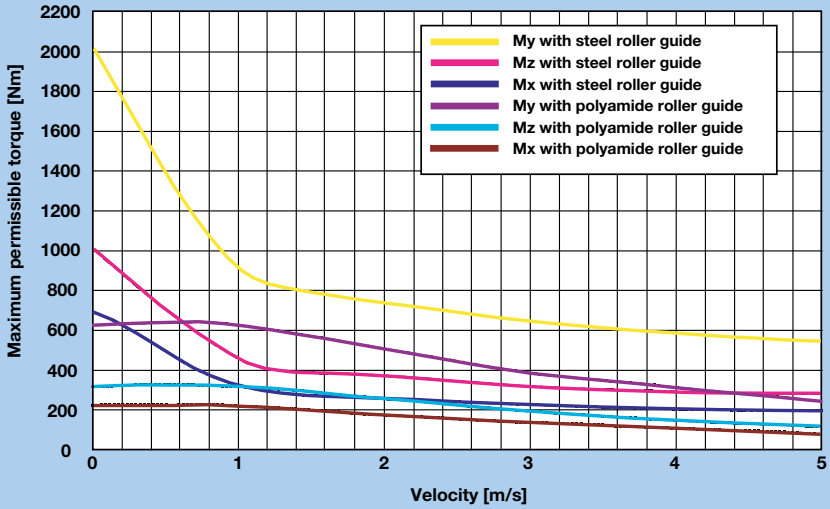


The curves show the maximum load-bearing capacity of a carriage in one direction of force or torque. If several loads are applied in different directions, the values given by the curves must be derated, i.e. the load or speed should be reduced if necessary.



HPLA180 Maximum Permissable Moment Load (Mx, My and Mz)

(Values double for extended carriage)



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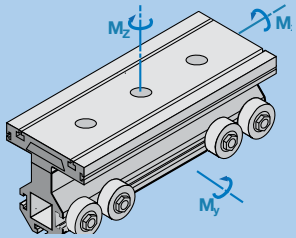
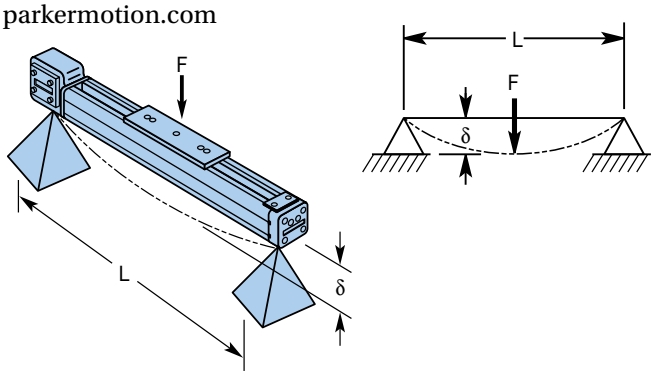


HPLA Characteristics

The HPLA deflection curves can be used for determining the deflection based on the profile length and the application load weight. Applications requiring high acceleration forces can place a severe strain on the system stability. In these cases, a solid substructure may be required with the HPLA product being supported at frequent intervals.

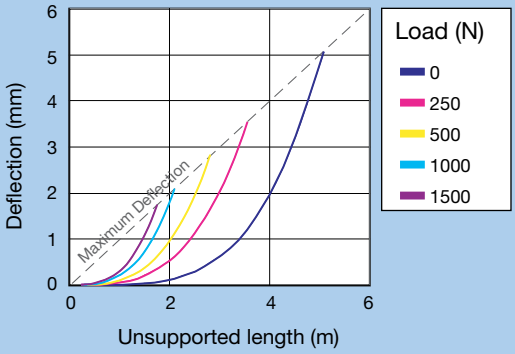
These deflection curves illustrate the deflection d, based on the HPLA profile being simply supported at both ends. The graphs take into consideration the self deflection due to the weight of the profile, along with the load to be transported. The maximum deflection cannot be exceeded. If the maximum deflection is exceeded based on your application parameters, then additional supports are required. Alternatively, the next larger profile size may be considered. For deflection formulas and calculations, please refer to the Technical Information Library found on our web site: www.parkermotion.com



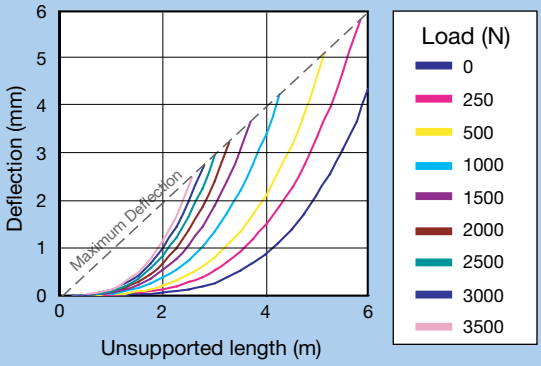
F = Force N
L = Unsupported length mm
δ = Deflection mm

Deflection Curves

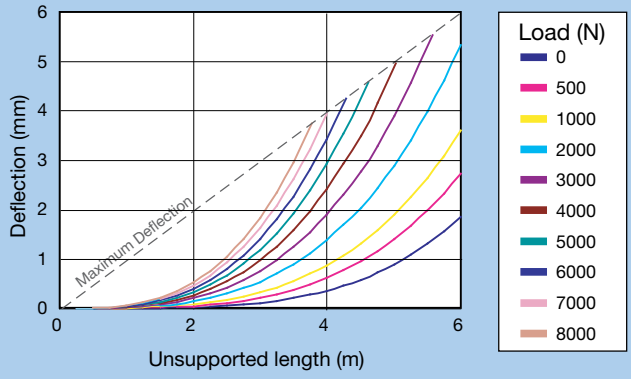
HPLA080



HPLA120



HPLA180

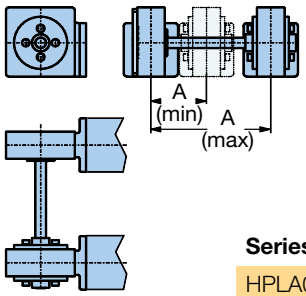


Dual Axis Considerations

When two parallel linear modules are required to form a single axis, the span or distance between each unit determines which type of shaft connection is required. In some cases, a link shaft support bearing might also be required.

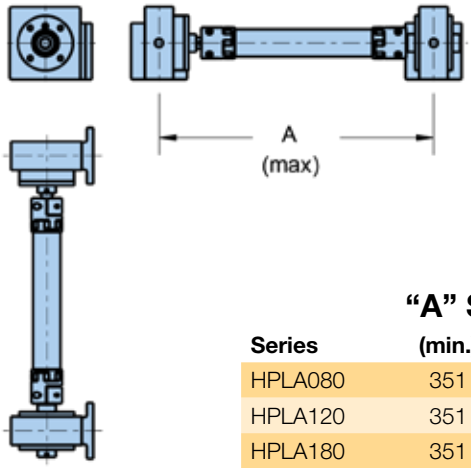
The link shaft bearing is used to support the linking shaft of an HPLA dual axis when there is a large center to center distance. This bearing must be used if the critical speed is exceeded with the dual-axis link shaft.

Figure A



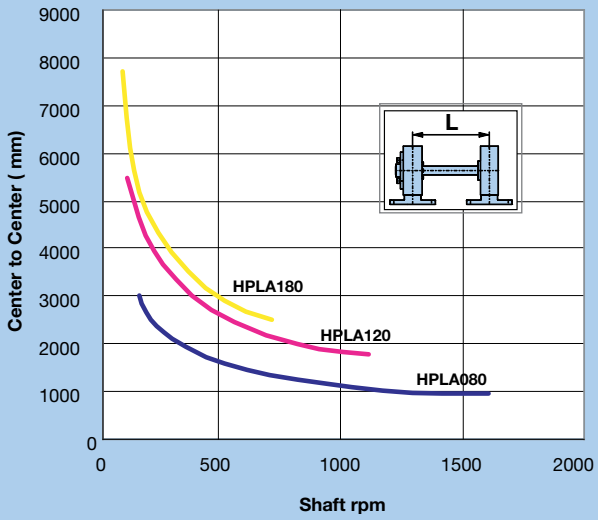
Series	"A" Span (mm) (min.)	(max.)
HPLA080	120	350
HPLA120	150	350
HPLA180	185	350

Figure B

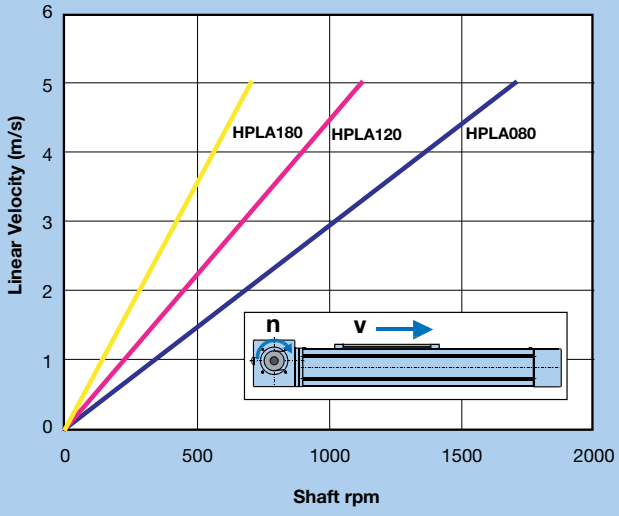


Series	"A" Span (mm) (min.)	(max.)
HPLA080	351	3000
HPLA120	351	3000
HPLA180	351	3000

Critical Speed



Linear Velocity

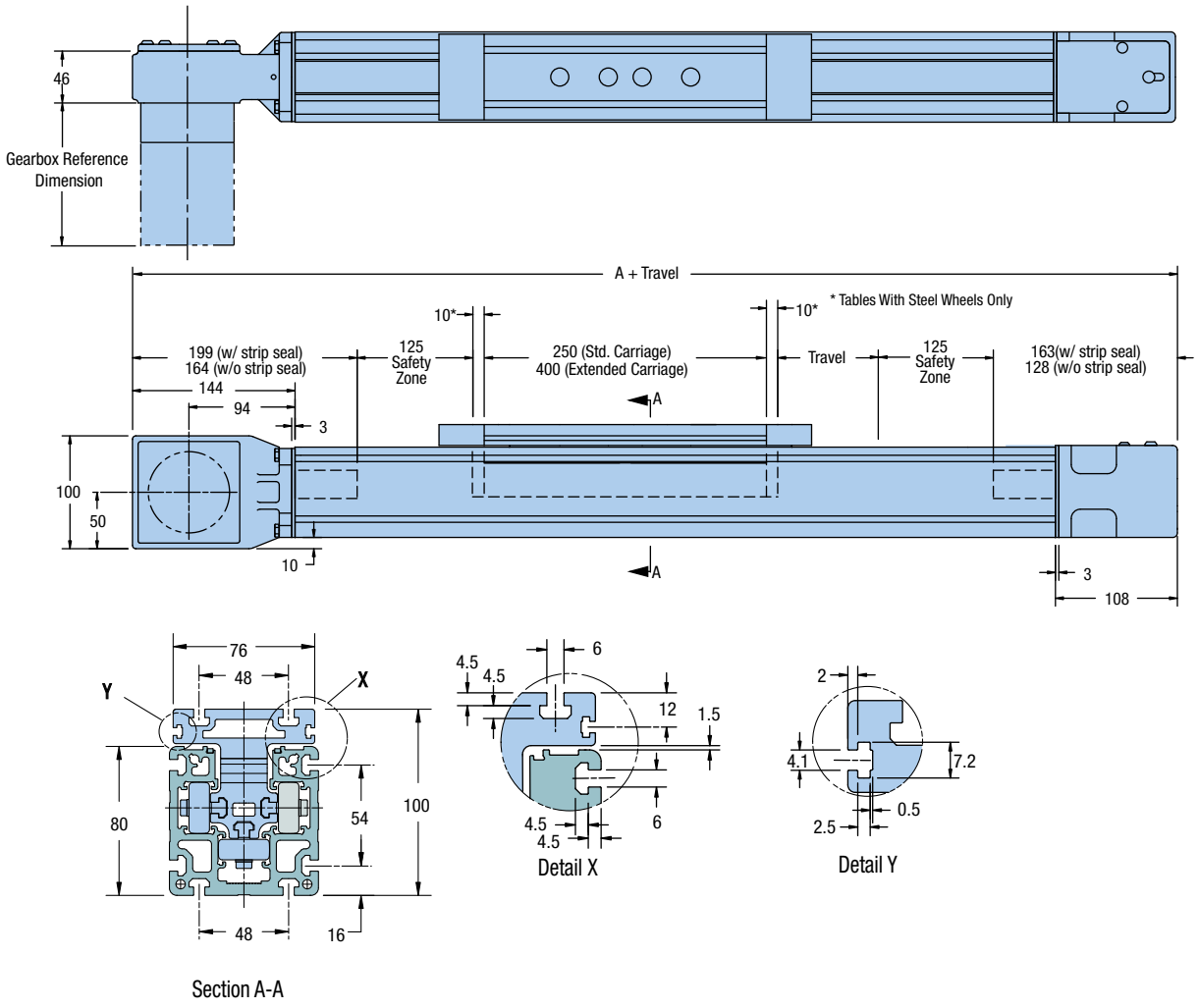


DIMENSIONS

Download 2D & 3D files from www.parker.com/emn/HPLA080

HPLA080 Drive Unit

Dimensions (mm)



Dimension A (mm)

Description	With Strip Seal	Without Strip Seal
Standard Carriage - Polyamide Wheels	862	792
Standard Carriage - Steel Wheels	882	812
Extended Carriage - Polyamide Wheels	1012	942
Extended Carriage - Steel Wheels	1032	962

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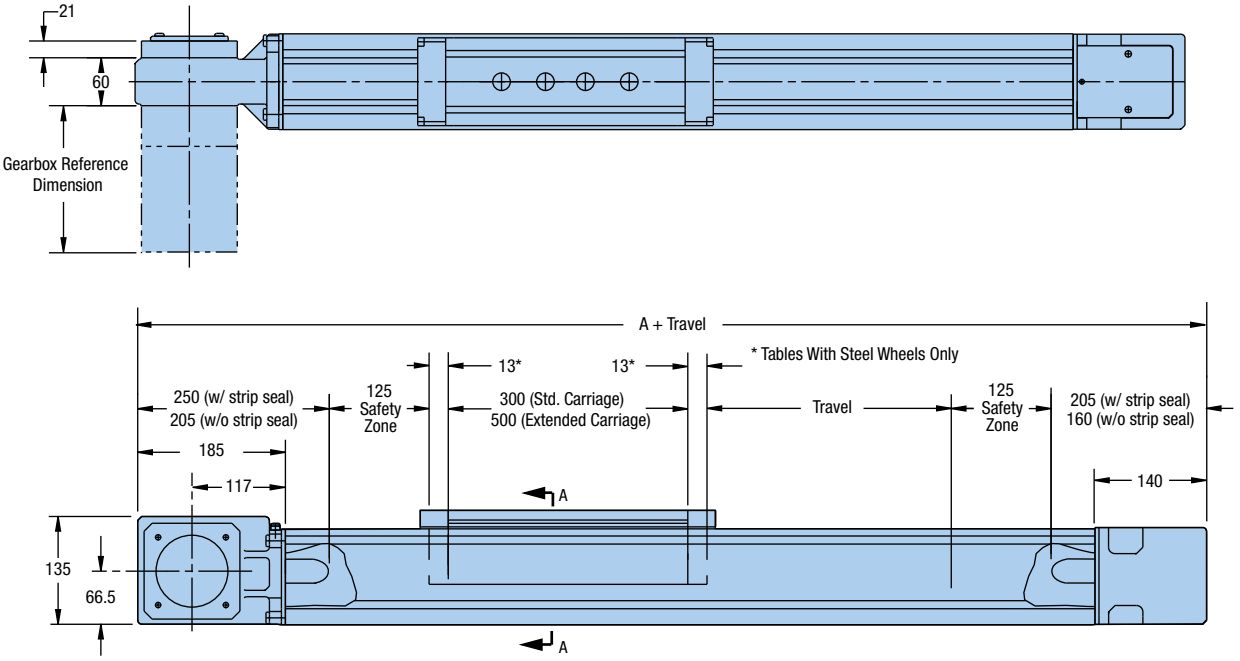
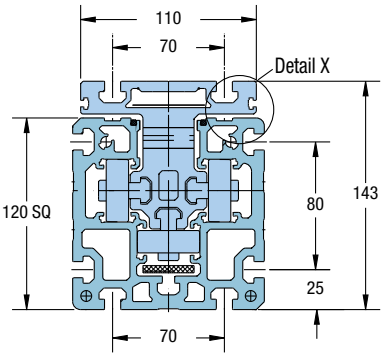
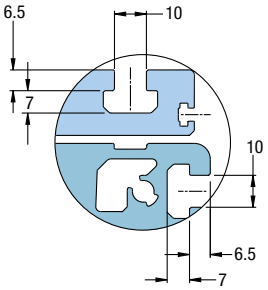
HPLA120 Drive Unit

Dimensions (mm)





Section A-A



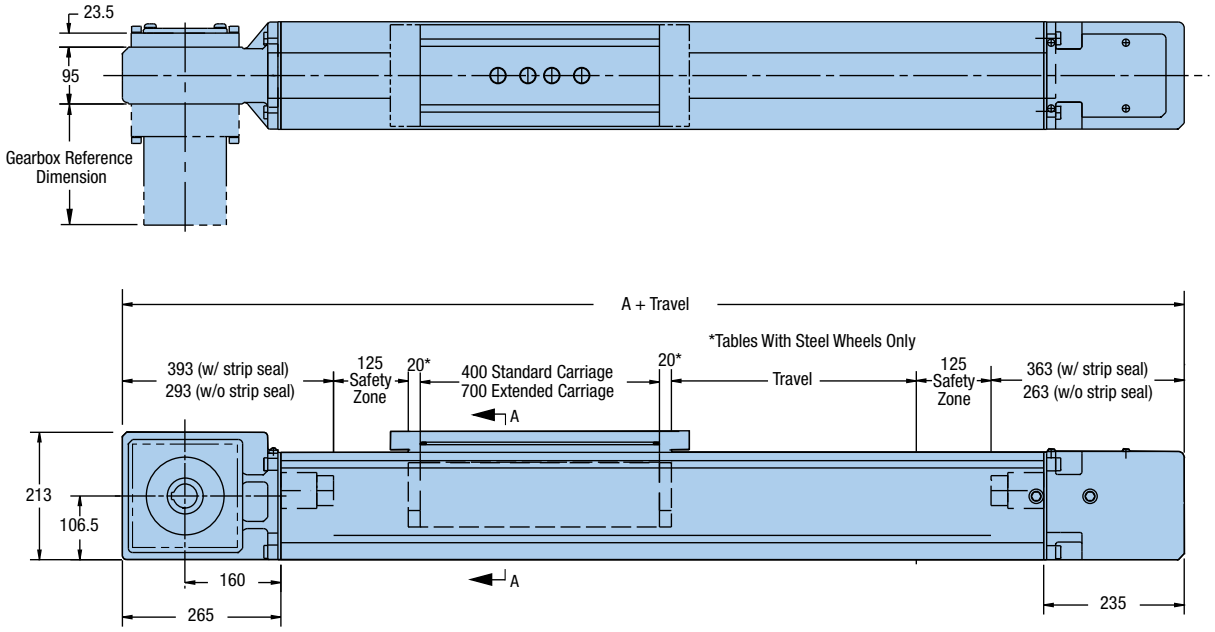
Detail X

Dimension A (mm)

Description	With Strip Seal	Without Strip Seal
Standard Carriage - Polyamide Wheels	1005	915
Standard Carriage - Steel Wheels	1031	941
Extended Carriage - Polyamide Wheels	1205	1115
Extended Carriage - Steel Wheels	1231	1141

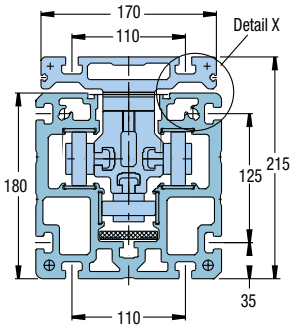
HPLA180 Drive Unit

Dimensions (mm)

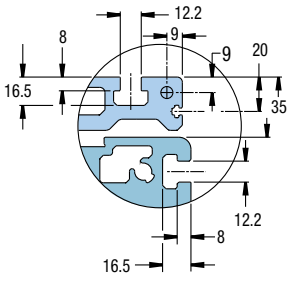


Dimension A (mm)

Description	With Strip Seal	Without Strip Seal
Standard Carriage - Polyamide Wheels	1408	1206
Standard Carriage - Steel Wheels	1446	1246
Extended Carriage - Polyamide Wheels	1706	1506
Extended Carriage - Steel Wheels	1746	1546



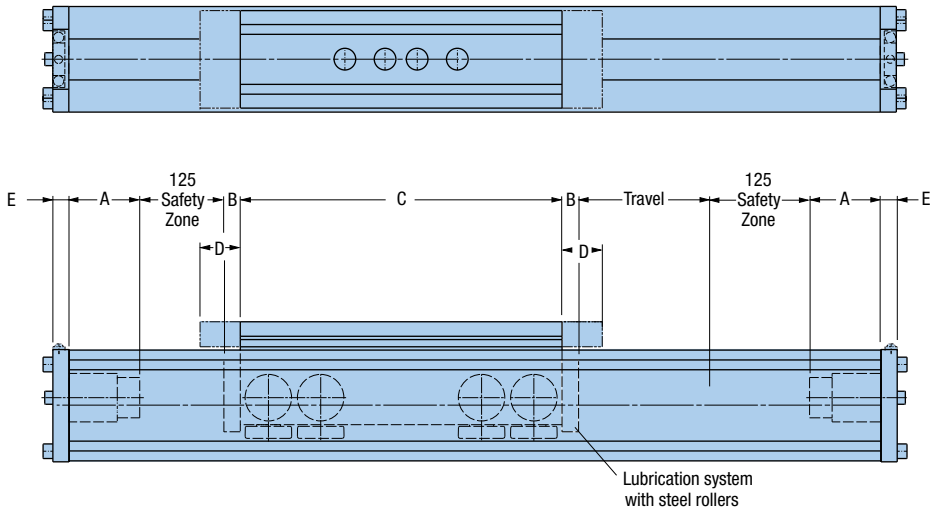
Section A-A



Detail X

Idler Unit Dimensions

Dimensions (mm)



Dimensions (mm)

Series	Carriage Length	Wheel Type	With Strip Seal					Without Strip Seal				
			A	B	C	D	E	A	B	C	D	E
HPLA080	Standard	Polyamide	55	-	250	40	10	20	-	250	-	10
HPLA080	Extended	Polyamide	55	-	400	40	10	20	-	400	-	10
HPLA080	Standard	Steel	55	10	250	40	10	20	10	250	-	10
HPLA080	Extended	Steel	55	10	400	40	10	20	10	400	-	10
HPLA120	Standard	Polyamide	65	-	300	50	15	20	-	300	-	15
HPLA120	Extended	Polyamide	65	-	500	50	15	20	-	500	-	15
HPLA120	Standard	Steel	65	13	300	50	15	20	13	300	-	15
HPLA120	Extended	Steel	65	13	500	50	15	20	13	500	-	15
HPLA180	Standard	Polyamide	128	-	400	100	20	28	-	400	-	20
HPLA180	Extended	Polyamide	128	-	700	100	20	28	-	700	-	20
HPLA180	Standard	Steel	128	20	400	100	20	28	20	400	-	20
HPLA180	Extended	Steel	128	20	700	100	20	28	20	700	-	20

HPLA/HLE OPTIONS & ACCESSORIES

Limit and home sensors, switches, cable carriers, splice plates, and more.

See Options & Accessories at the end of the belt-driven section.

ORDERING INFORMATION
HPLA

Fill in an order code from each of the numbered fields to create a complete model order code.

	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭
Order Example:	HPLA080	D1	B1	T2000	C1	DA1000	S08	F02	G2-05	K24	R1	H1	LH1	E1

① Series
- **HPLA080**
- **HPLA120**
- **HPLA180**

② Drive System
- **D0** Idler Unit
- **D1** Timing Belt Drive, Nominal Thrust, Maximum Life
- **D2** Timing Belt Drive, Maximum Thrust, Nominal Life

③ Bearing Option
- **B1** Polyamide Rollers
- ***B2** Steel Rollers

* For steel roller option in vertical and inverted orientations, please consult factory for special instructions.

④ Travel
- **Tnnnn** Specified travel in mm (nnnn = mm)

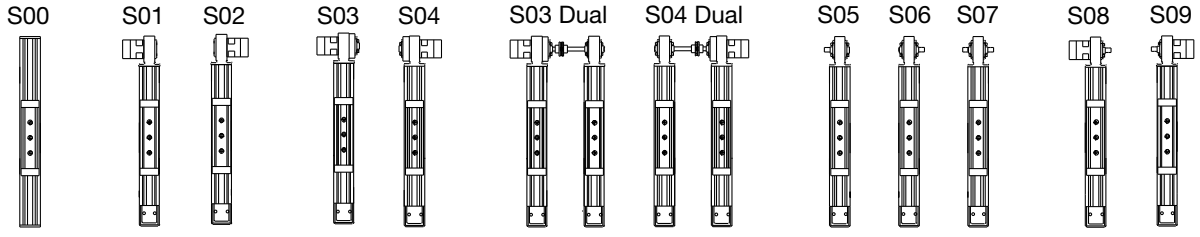
⑤ Carriage
- **C1** Standard Length Carriage with Load Plate*
- **C2** Extended Length Carriage with Load Plate*
- **C3** Standard Length Carriage with Clamping Bar*
- **C4** Extended Length Carriage with Clamping Bar*

* See photos below.

⑥ Link Shaft Option
- **DA0000** No Link Shaft - Single Axis or Idler Unit
- **DAnnnn** Double Unit, Specify Center to Center Distance (mm)

⑦ Drive Shaft Configuration
- **S00** No Shaft, Idler Unit
- **S03** Supported Pulley, Flange Left
- **S04** Supported Pulley, Flange Right
- **S05** Supported Pulley, Shaft Option, Left
- **S06** Supported Pulley, Shaft Option, Right
- **S07** Supported Pulley, Shaft Option, Both
- **S08** Supported Pulley, Flange Left, Shaft Right
- **S09** Supported Pulley, Flange Right, Shaft Left

⑧ Drive Housing Flange
- **F00** No Flange
- **F08** PV90/PX90 Flange (HPLA80 ONLY)
- **F09** PX115/PV115 Flange (HPLA080 and HPLA120 only)
- **F10** PS90 Flange (HPLA080 and HPLA120 only)
- **F11** PS115 Flange (HPLA120 & HPLA180 only)
- **F12** PS142 Flange (HPLA180 only)



Free sizing and selection support from Virtual Engineer at parker.com/VirtualEngineer

Virtual Engineer

Fill in an order code from each of the numbered fields to create a complete model order code.

	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭
Order Example:	HPLA080	D1	B1	T2000	C1	DA1000	S08	F02	G2-05	K24	R1	H1	LH1	E1

⑨ Gearbox Option

G0-00 No Gearbox
G08-nn PX90 Gearbox included
G09-nn PX115 Gearbox included
G10-nn PS90 Gearbox included
G11-nn PS115 Gearbox included
G12-nn PS142 Gearbox included
G14-nn PV90 Gearbox included
G15-nn PV115 Gearbox included

nn = ratio
Single stage ratios 3:1, 5:1, 10:1 Dual stage ratios 15:1, 25:1

⑩ Motor Kit Option

K00 No Flange
K20 NEMA23 stepper, 1/4" shaft
K21 BE23
K23 SMN60, MPM72 (metric), N070, J070
K24 SMN82, MPM89 (metric), N092, J092
K26 BE34
K34 MPP092x motor kit
K36 Parker MPP100/MPJ100
K39 Parker MPP115/MPJ115
K41 Parker MPP142/MPJ142
K50 Parker HDY55; MPL15XX (Allen Bradley)
K51 AKM3X-AN (Kollmorgen)
K52 SGMAH-04 (Yaskawa)
K53 SGMAH-08 (Yaskawa)
K54 MKD041 (Indramat)
K55 AKM4X-AN (Kollmorgen)
K56 MKD070 (Indramat)
K57 MKD090 (Indramat)

⑪ Environmental Option

R1 Standard preparation with strip seal [1]
R2 Standard preparation with no strip seal
R3 Corrosion resistant preparation with strip seal [1, 2]
R4 Corrosion resistant preparation with no strip seal [2]

[1] C1, C2 Carriage Load Plate Only
[2] B1 Bearing Option Polyamide Rollers Only)

⑫ Mounting Orientation

H1 Carriage Up
H2 Carriage Down
H3 Carriage on Side, Drive Station Up
H4 Carriage on Side, Drive Station Down

⑬ Limit/Home Switch Option*

LH0 No Limit Switch Assembly
LH3 Three NPN Prox Switches,10-30 VDC
LH4 Three PNP Prox Switches, 10-30 VDC

*C1, C2 Carriage Load Plate Only

⑭ Linear Encoder

E1 Without Linear Encoder
E5* 5.0 Micron Resolution, Magnetic Type
E7* Sine Cosine Output, Magnetic Type

*C1, C2 Carriage Load Plate Only
*Consult factory for linear encoder options and quotation.

HLE-RB Series
Belt Driven Linear Modules

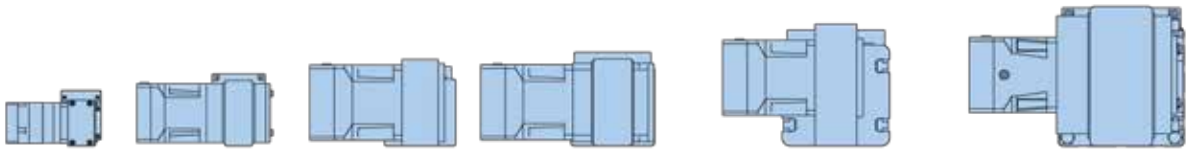
Belt-Drive Actuators for High Thrust, Long Stroke Applications

- **Standard travel up to 7.9 meters***
- **Load Capacities up to 600 kg**
- **±0.2 mm positional repeatability**
- **Timing belt and pulley drive mechanism for fast, accurate positioning**
- **Roller wheel bearings for smooth high speed linear motion**
- **IP30 strip seal**

*Longer travels available with splice kits.

Design Advantages

- **Low running friction**
- **Low particle generation (clean room suitability to class 100)**
- **Low wear and low maintenance**
- **Quiet operation**
- **High efficiency and long service life**
- **High dynamic performance due to low-mass, play-free wheels**
- **Minimal preventative maintenance required**
- **T-slots integrated on all sides of the profile for mounting attachments or for use as a cable duct**
- **Timing belts can be replaced without removing load attachment plate**
- **Multiple configuration options due to T-slots available on both the profile and load plate**



HLE60 HPLA080 HLE100 HPLA120 HLE150 HPLA180

	HLE60	HPLA80	HLE100	HPLA120	HLE150	HPLA180
Maximum Travel (mm)	4,000	5,540	6,200	9,470	7,900	9,240
Maximum Payload (N)	353	1,304	1,549	2,598	3,402	4,501
Maximum Acceleration (m/s²)	10	10	10	10	10	10

***Do not exceed allowable axial and moment loading.**

The HLE-RB linear modules are ideal as single axis products or as components for high speed multi-axis gantries. With thousands of units in operation worldwide the HLEs are proven performers offering long life and trouble-free operation.

The HLE Linear Module consists of a lightweight carriage which can be precisely positioned within an extruded aluminum housing by a timing belt and pulley drive system. The housing, constructed from extruded aluminum with a square cross sectional geometry, demonstrates excellent deflection characteristics.

The protective anolite coating provides durability as well as an attractive silver appearance. It includes T-slots along its entire length for flexible mounting. The drive mechanism is a zero backlash steel reinforced timing belt. The tension station, conveniently located at the end of the unit provides for quick and easy belt adjustment. The drive station is designed to accept planetary gear reducers as well as a wide variety of servo and stepper motors. The bearing system for the RB models is comprised of three rows of roller wheels integral to the carriage which are guided by extruded tracks within the housing.