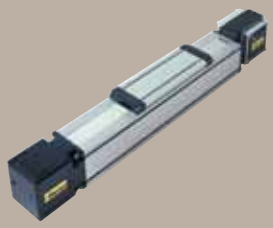
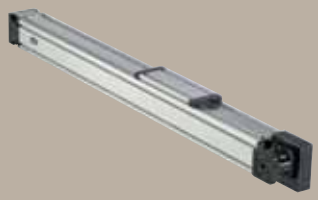
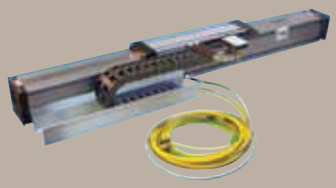






Belt Driven
high speed automation modules

For high speed automation, both gantry and articulated arm robots are widely used throughout industry. Because of the many inherent advantages of the gantry robot, it is a solid choice for: palletizing, storage and retrieval, machine loading, parts transfer, material handling, automated assembly. Parker offers numerous standard gantry configurations as well thousands of configured product options to develop a customer specific system solution to solve these and other automation applications. Utilization of these pre-engineered systems enables the user to redirect scarce engineering resources from motion system design to machine or process functionality.

Contents

High Speed Automation Systems Overview

Parker's family of linear modules provides the most comprehensive line of high throughput linear positioning devices in the industry. These electromechanical positioners are designed to shuttle a payload at high speeds to multiple locations along a linear travel path. They serve as the primary building blocks for Parker pre-engineered gantry systems or customer designed automation systems. Parker linear modules are offered in several unique product families which can address a broad range of travel, speed, load, accuracy, and environmental requirements. There are three bearing systems (polyamide roller, steel roller, or square rail), three drive types (belt-and-pulley or rack-and-pinion, or linear servo motor), and up to six different cross sectional sizes (60, 80, 100, 120, 150 and 180 mm) from which to choose. Systems designed around these elements have effectively, efficiently, and economically satisfied the widest range of application requirements for high speed automation.

HPLA Series

Page 200-213

The next generation of belt driven modules, the HPLA expands on the roller wheel bearing design with the addition of high-load capacity steel wheels. The steel wheels significantly increase normal and moment load capacities of this belt driven actuator.

- Travel Range: 9.0 meters
- Load Capacity: 1530 kg
- Maximum Speed: 5 meters/sec.
- Duty Cycle: 100%
- Repeatability: ±0.2 mm

HLE-RB Series

Page 214-227

These are the most popular electromechanical modules in the Parker line. They utilize a unique composite roller wheel bearing design coupled with a timing belt and pulley drive mechanism to provide long travel with high speed and high acceleration.

- Travel Range: 7.9 meters
- Load Capacity: 600 kg
- Maximum Speed: 5 meters/sec.
- Duty Cycle: 100%
- Repeatability: ±0.2 mm

HLE-SR Series

Page 228-239

The "SR" series, having a square rail ball bearing system, complement the RB series by providing increased moment load capacities without an increase in profile size. The SR utilizes the same reliable timing belt and pulley drive system found in the RB.

- Travel Range: 6.0 meters
- Load Capacity: 600 kg
- Maximum Speed: 3 meters/sec.
- Duty Cycle: 100%
- Repeatability: ±0.2 mm

HLE-Z Series

Page 240-245

The “endless” linear unit is designed for positioning payloads over long travel distances with high rigidity and repeatability. This is accomplished by incorporating Parker’s uniquely designed rack-and-pinion based drive system with the RB series roller wheel bearing system.

- Travel Range: 50 meters
- Load Capacity: 600 kg
- Maximum Speed: 5 meters/sec.
- Duty Cycle: 100%
- Repeatability: ±0.05 mm

HZR Series

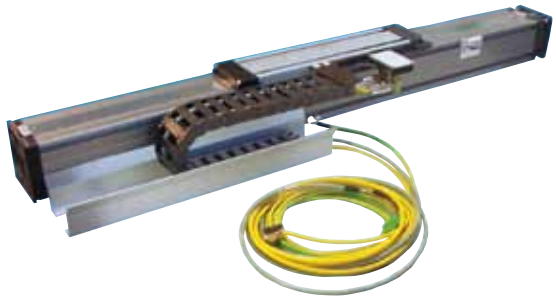
Page 246-251

The HZR is a vertical unit specifically designed to meet the high speed and force requirements of the automation industry. The fixed housing and movable aluminum extrusion permit the unit to retract out of the work area, thereby keeping the work area free of obstructions.

- Travel Range: 2.0 meters
- Load Capacity: 150 kg
- Maximum Speed: 5 meters/sec.
- Duty Cycle: 100%
- Repeatability: ±0.2 mm

BLMA Series

Page 252-253



The BLMA is a plug and play linear motor actuator which houses a powerful linear servo motor (386 pounds of peak thrust) in a high strength rigid aluminum body to enable high end performance with highly repeatable positioning over long unsupported spans.

- Travel Range: 6.0 meters
- Load Capacity: 700 kg
- Maximum Speed: 7 meters/sec.
- Duty Cycle: 100%
- Repeatability: ±0.01 mm

Gantry Systems

Page 254-269

Parker's gantry systems provide cost-effective, easy to integrate solutions that satisfy the vast majority of automation requirements. In addition to these standard gantry systems, Parker offers products with additional capabilities to fulfill the needs of special applications. Our engineering skill and manufacturing expertise have integrated these products into custom-tailored gantry solutions which have successfully addressed the most unique and exacting requirements of machine builders and integrators around the world.

Support Structures

Page 270

Parker can include the support structure and machine guarding as part of your complete system solution. Parker's ParFrame™ extruded aluminum structures are suited for light to medium duty requirements. High strength steel supports are offered for applications involving greater loads and forces.

Motors, Drives, and Controls (Electrical Subsystems)

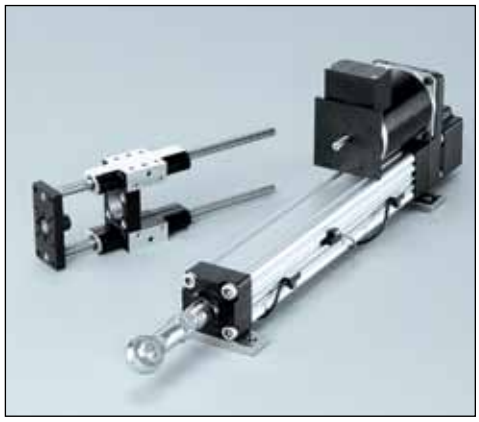
Page 271

A high speed multi-axis Gantry Robot requires a complete electromechanical solution where the machine Interface, Control and Motor/Drive functions are seamlessly integrated with the mechanical elements. Parker's wide range of electrical products and subsystems enable Gantry Robots to be supplied to the customer at the level of integration most suitable for his need. Whether you need a basic mechanical unit, a unit including drives and motors, or a full-blown electromechanical system ready to run or link to a PLC, Parker has the best solution.

Additional Capabilities

Page 277-280

HDM Series Rotary Motion Modules



ET Series Rod Style Electric Cylinders

HTR Telescopic Vertical Units

ER and ERV Series Rodless Actuators

LCB Series Compact Rodless Actuators

HLE-RB Series Belt Driven Linear Modules

Features

- 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.

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.

Construction

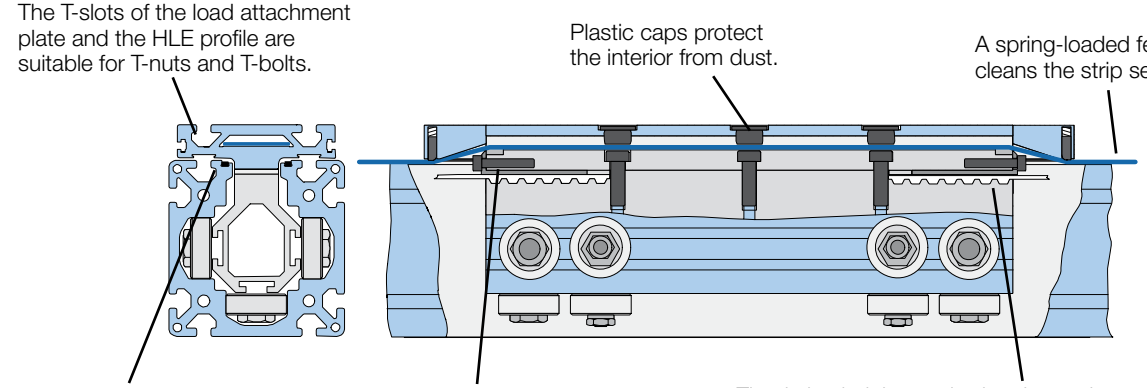
The HLE Linear Module consists of a lightweight carriage which can be precisely positioned within an extruded aluminum housing by a timing belt and pulley drive system. The housing, constructed from extruded aluminum with a square cross sectional geometry, demonstrates excellent deflection characteristics.

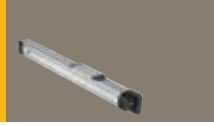
The protective anolite coating provides durability as well as an attractive silver appearance. It includes T-slots along its entire length for flexible mounting. The drive mechanism is a zero backlash steel reinforced timing belt. The tension station, conveniently located at the end of the unit provides 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.

Proven Technology

Proven in numerous applications, the HLE-RB series offers the following advantages:

- Low running friction
- Low particle generation (clean room suitability to class 100)
- Low wear
- Low maintenance
- Quiet operation
- High efficiency
- 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





Typical Fields of Application

As part of advanced, cost-effective construction of machines and handling systems:

- Materials handling: palletizing, depalletizing, feeding, part removal
- Cleanroom technology: wafer transport, wafer coating
- Warehouse technology: parts picking, storage and retrieval
- Machine tool automation: workpiece loading and unloading, tool changing
- Construction: formwork, placing reinforcing steel bars in concrete
- Process engineering: painting, coating, bonding
- Testing technology: guiding ultrasonic sensors, laboratory equipment
- Textile machinery: crosscutting, slitting and stacking, quilting, seam stitching

Optional Features

- Direct mounting for planetary gear reducers
- Adjustable “end of travel” limit switches and “home” position sensor
- Clean room preparation option
- Cable carrier systems
- Performance matched Parker servo systems
- Structural components for vertical and multi-axis mounting
- Toe clamps and hardware for fast and easy mounting
- External bumpers
- Link shafts and support bearings for dual axis units
- Splice plates for extending travels beyond length available in a single profile

See pages 272-276 for available options and accessories.

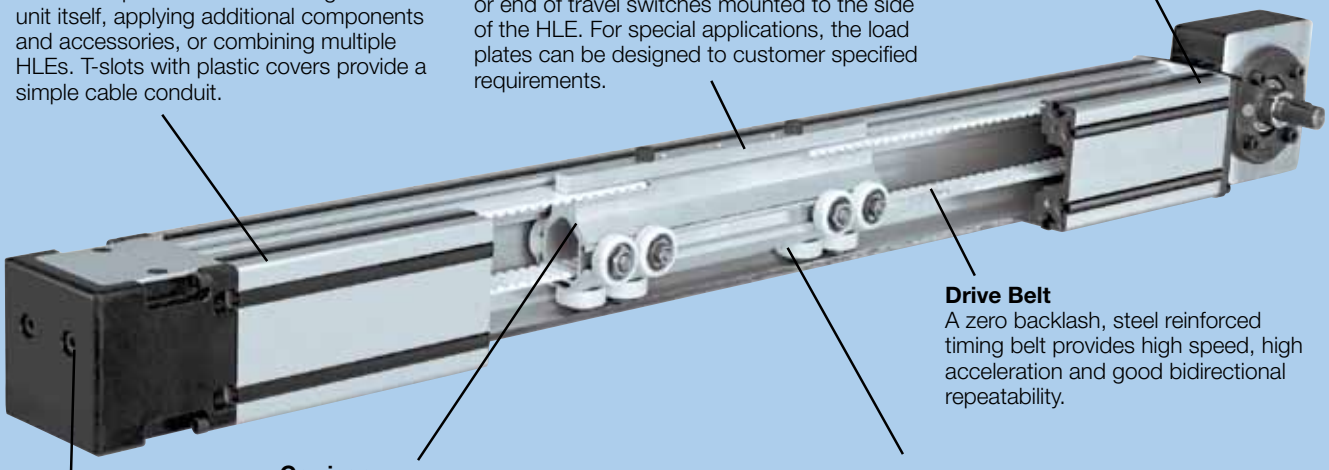
Housing
Lightweight and self-supporting aluminum profiles are offered in three sizes:

HLE60: 60 x 60 mm
HLE100: 100 x 100 mm
HLE150: 150 x 150 mm

T-slots are provided for mounting the linear unit itself, applying additional components and accessories, or combining multiple HLEs. T-slots with plastic covers provide a simple cable conduit.

Load Attachment Plate
Load attachment plates are available for every type of carriage. With integral T-slots or tapped with holes in a standard mounting pattern, they allow easy mounting of your load to the carriage of the HLE. Multiple HLEs can easily be mounted together by using standard clamping profiles. Tripping plates are mounted to the side of the load attachment plate to activate home or end of travel switches mounted to the side of the HLE. For special applications, the load plates can be designed to customer specified requirements.

Drive Station
Rigid cast housing with standard flanges for a variety of gearboxes. The drive stations are designed to accept planetary and worm gear reducers or provide different shaft outputs for driving the HLE.



Drive Belt
A zero backlash, steel reinforced timing belt provides high speed, high acceleration and good bidirectional repeatability.

Tensioning Station
“Easy access” tensioning bolts allow external adjustment of belt tension.

Carriage
Roller bearing wheels are installed on three sides of the carriage to provide smooth linear motion and support. The wheels are positioned to evenly distribute the load across the length of the carriage. Eccentric bearing wheel bushings are adjusted to eliminate play on all sides of the carriage. Due to a low coefficient of friction, the carriage design provides a high mechanical efficiency and long service life. The carriages are available in standard and extended lengths. Special carriage lengths and linear units with multiple carriages are available for custom applications.

Roller Bearing
Each wheel consists of a lubricated and sealed radial ball bearing to reduce friction and maintenance. The bearing is enclosed within a tough polyamide tread to reduce noise and provide long service life.

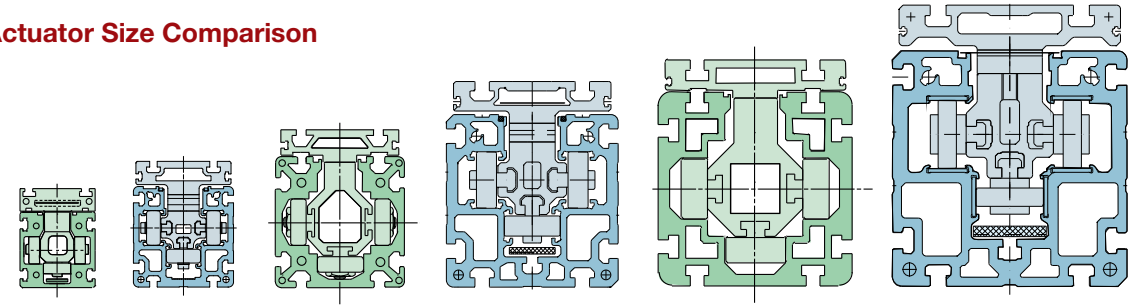
IP30 Strip Seal
Magnetically attached stainless steel seal strip (not shown) provides environmental protection to interior components.

HLE-RB Series Specifications

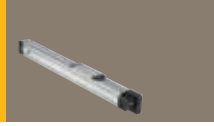
Characteristic	Units	HLE60-RB		HLE100-RB		HLE150-RB	
Unit Weight (basic unit without stroke)							
Standard Carriage, NL	kg (lb.)	2.28	(5.03)	12.70	(28.00)	31.20	(68.80)
Extended Carriage, VL	kg (lb.)	3.98	(8.77)	15.80	(34.84)	38.50	(84.89)
Carriage Weight							
Standard Carriage, NL	kg. (lb)	0.8	(1.76)	2.80	(6.17)	7.30	(16.10)
Extended Carriage, VL	kg. (lb)	1.3	(2.87)	4.40	(9.70)	11.50	(25.36)
Weight per meter of additional length	kg/m (lb/ft)	3.62	(2.43)	10.00	(6.72)	21.10	(14.18)
Moment of Inertia (related to the drive shaft)							
Standard Carriage, NL	kg-cm^2 (lb-in^2)	3.07	(1.05)	24.60	(8.41)	123.30	(42.17)
Extended Carriage, VL	kg-cm^2 (lb-in^2)	4.81	(1.64)	36.40	(12.45)	183.60	(62.79)
Travel and Speed							
Maximum Speed[1]	m/s (in/s)	5	(120)	5	(200)	5	(200)
Maximum Acceleration[1]	m/s^2 (in/s^2)	10	(393)	10	(393)	10	(393)
Maximum Travel[2]—standard carriage, NL	m (in)	4.0	(160)	6.2	(244)	7.9	(311)
Maximum Travel[2]—extended carriage, VL	m (in)	3.8	(149)	6.0	(238)	7.7	(305)
Geometric Data	mm (in)	57.1	(2.25)	100.0	(3.94)	150.0	(5.91)
Cross Section, Square	cm^4 (in^4)	55.8	(1.34)	383.0	(9.20)	1940.0	(46.61)
Moment of Inertia Ix	cm^4 (in^4)	56.2	(1.35)	431.0	(10.35)	2147.0	(51.58)
Moment of Inertia Iy	N/mm^2	0.72 x	(0.1044 x	0.72 x	(0.1044 x	0.72 x	(01044 x
Moment of Elasticity	(lb/in^2)	10^5	10^8)	10^5	10^8)	10^5	10^8)
Pulley Data, Torques, Forces							
Travel Distance per Revolution	mm/rev (in/rev)	125	(4.92)	170	(6.69)	240	(9.45)
Pulley Diameter	mm (in)	39.8	(1.57)	54.1	(2.13)	76.4	(3.01)
Maximum Drive Torque[3]	Nm (lb-in)	8.87	(78.5)	40.0	(354.0)	108.0	(955.9)
Maximum Belt Traction[3] (effective load)	N (lb)						
Repeatability[4]	mm (in)	±0.2	(±0.008)	±0.2	(±0.008)	±0.2	(±0.008)

For the following deviations from the above standards, please contact Parker engineering:
(1) Greater speeds and accelerations may be achieved.
(2) Splicing possible for longer travel distances. This may cause reductions in effective load, drive torque, speed, acceleration, and repeatability. Consult factory for strip seal availability on spliced units.
(3) Increased timing belt tension required.
(4) Nominal value - component dependent. For improved repeatability consult factory.

Linear Actuator Size Comparison



HLE60 HPLA080 HLE100 HPLA120 HLE150 HPLA180

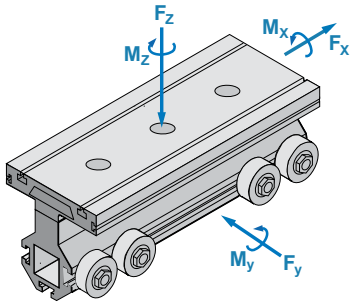


Load-Bearing Capacity of Carriage and Timing Belt

Forces and Moment Loads

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.

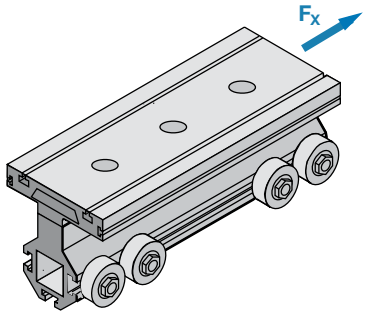
The curves show the maximum load-bearing capacity of a carriage in one direction of force or torque. If several loads are applied in different directions, the values given by the curves must be derated, i.e. the load or speed should be reduced if necessary.



"DimAxes" software is available for determination of precise carriage loading.

Visit www.parkermotion.com to request a Gantry Robot CD.

Load-Bearing Capacity Timing Belt (Fx)



HLE60-RB

Drive Option	Transferrable Thrust Force (n) Nominal Belt Tension (81,000 km life)	Maximum Belt Tension (46,000 km life)
Supported Pulley (SP19 - SP30)	500	–

HLE100-RB

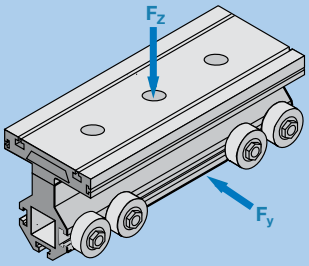
Drive Option	Gearhead	Drive Option	Transferrable Thrust Force (n) Nominal Belt Tension (81,000 km life)	Maximum Belt Tension (46,000 km life)
ARO/ALO	PS90	SP10	675	900
	PX115/PV115	SP11	675	900
	PS115	SP12	925	1115
ARW/ALW/DAR/DAL	PV90/PX90	SP9	500	675
	PS90	SP10	675	900
	PX115/PV115	SP11	675	900

HLE150-RB

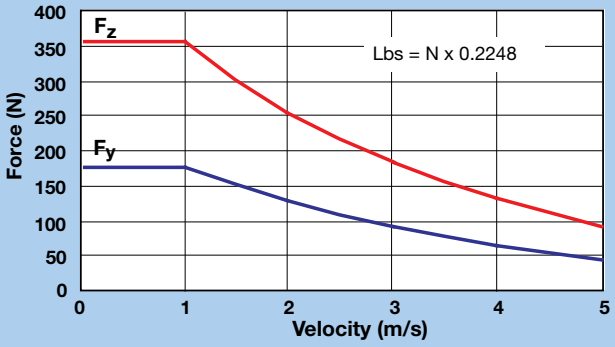
Drive Option	Gearhead	Drive Option	Transferrable Thrust Force (n) Nominal Belt Tension (85,000 km life)	Maximum Belt Tension (37,000 km life)
ARO/ALO	PX115/PV115	SP10	675	900
	PS115	SP11	1515	2015
	PS142	SP12	1700	2235
ARW/ALW/DAR/DAL	PX115/PV115	SP10	675	900
	PS115	SP11	1515	2015
	PS142	SP12	1700	2235

HLE-RB Series – Force and Moment Loads

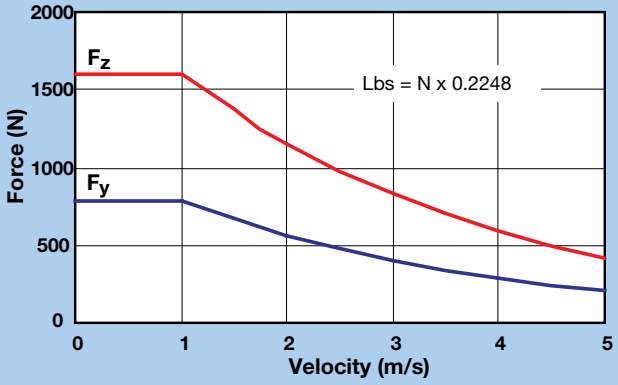
Load-Bearing Capacity



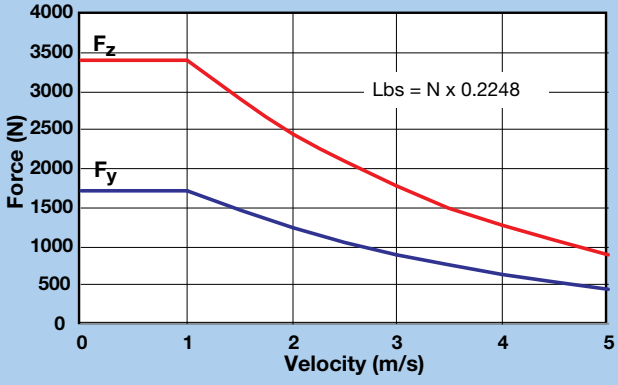
HLE60-RB



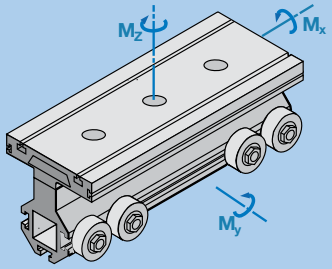
HLE100-RB



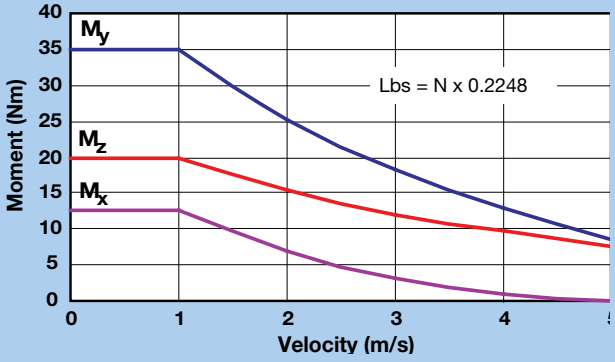
HLE150-RB



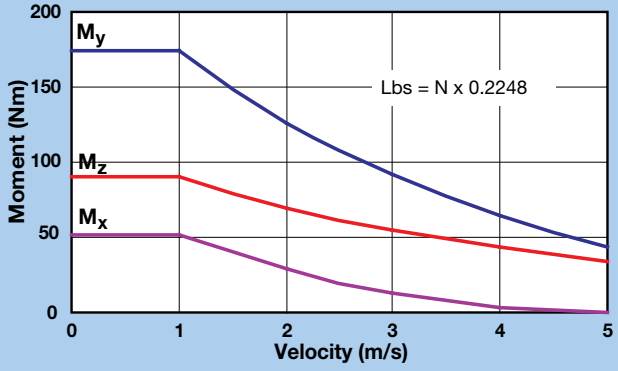
Maximum Permissible Moment Load



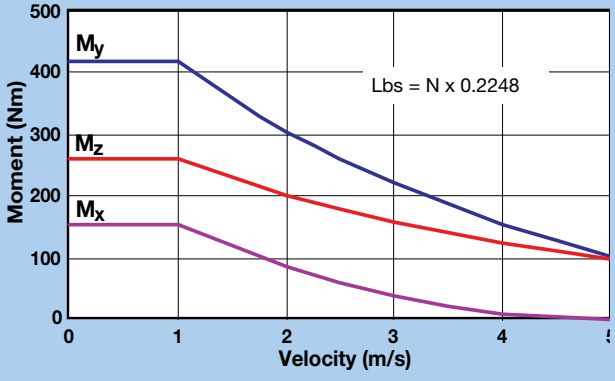
HLE60-RB

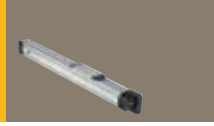


HLE100-RB



HLE150-RB

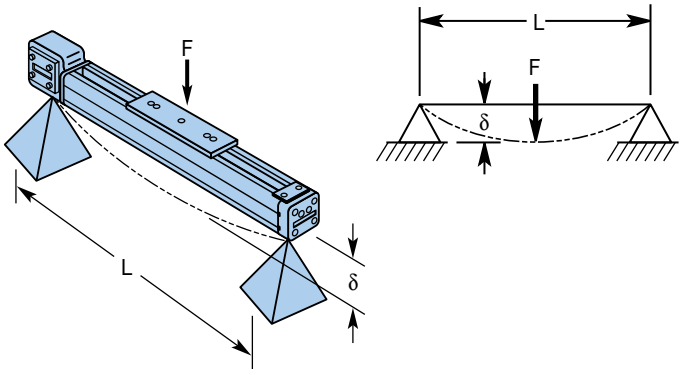




HLE-RB Deflection Characteristics

The HLE 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 HLE product being supported at frequent intervals.

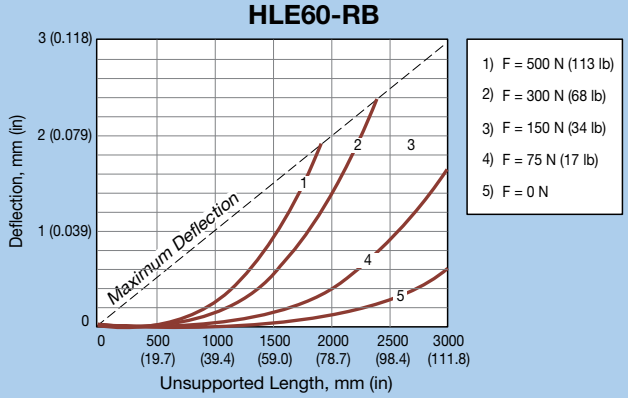
These deflection curves illustrate the deflection δ, based on the HLE profile being simply supported at both ends. The graphs take into consideration the self deflection due to the weight of the profile, along with the load to be transported. The maximum deflection cannot be exceeded. If the maximum 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



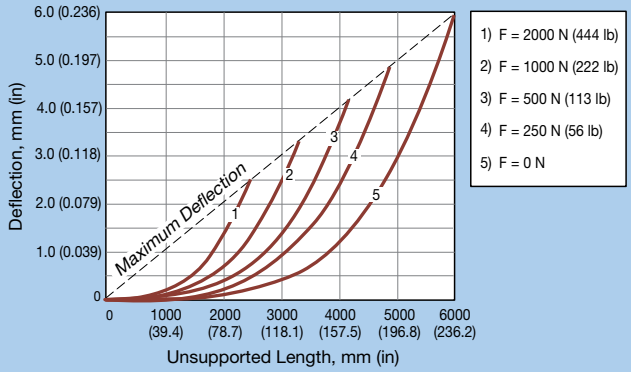
F = Force N
L = Unsupported length mm
δ = Deflection mm

Deflection Curves

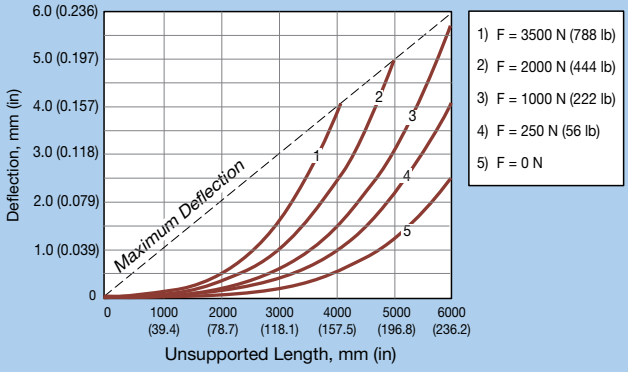
HLE60-RB



HLE100-RB



HLE150-RB

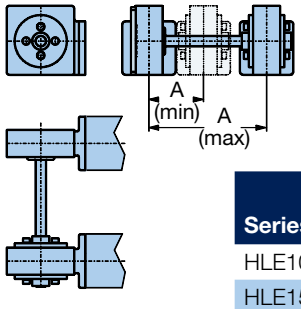


Dual Unit Axis Considerations

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.

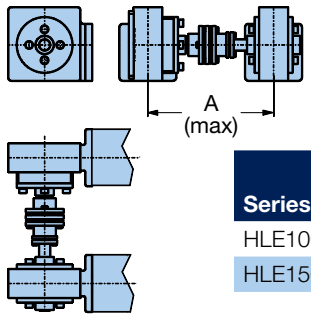
The link shaft bearing is used to support the linking shaft of an HLE dual axis when there is a large center to center distance. This bearing must be used if the critical speed is exceeded with the dual-axis link shaft.

Figure A



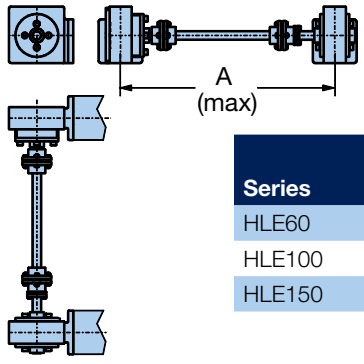
Series	"A" Span (mm) (min.)	(max.)
HLE100	105	225
HLE150	155	260

Figure B



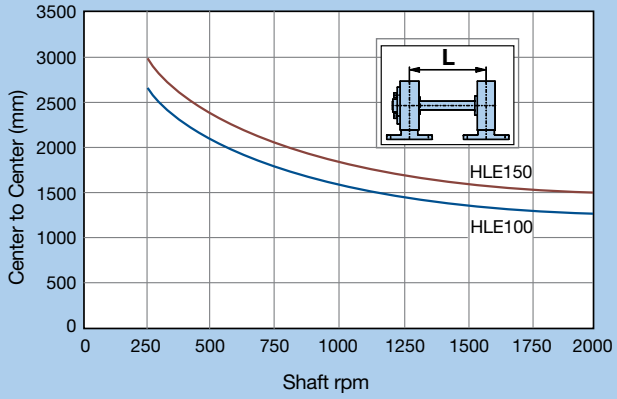
Series	"A" Span (mm) (min.)	(max.)
HLE100	226	500
HLE150	261	500

Figure C

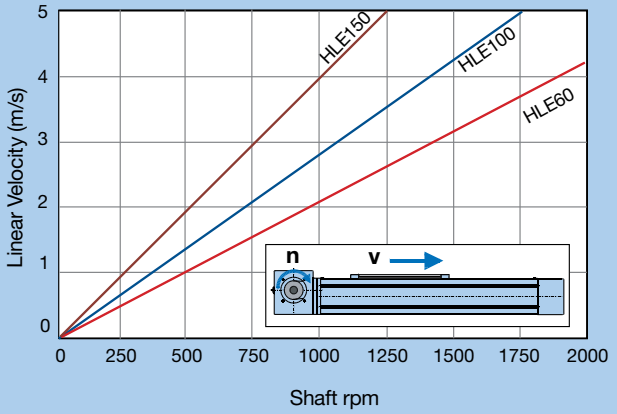


Series	"A" Span (mm) (min.)	(max.)
HLE60	300	1500
HLE100	501	—
HLE150	501	—

Critical Speed*

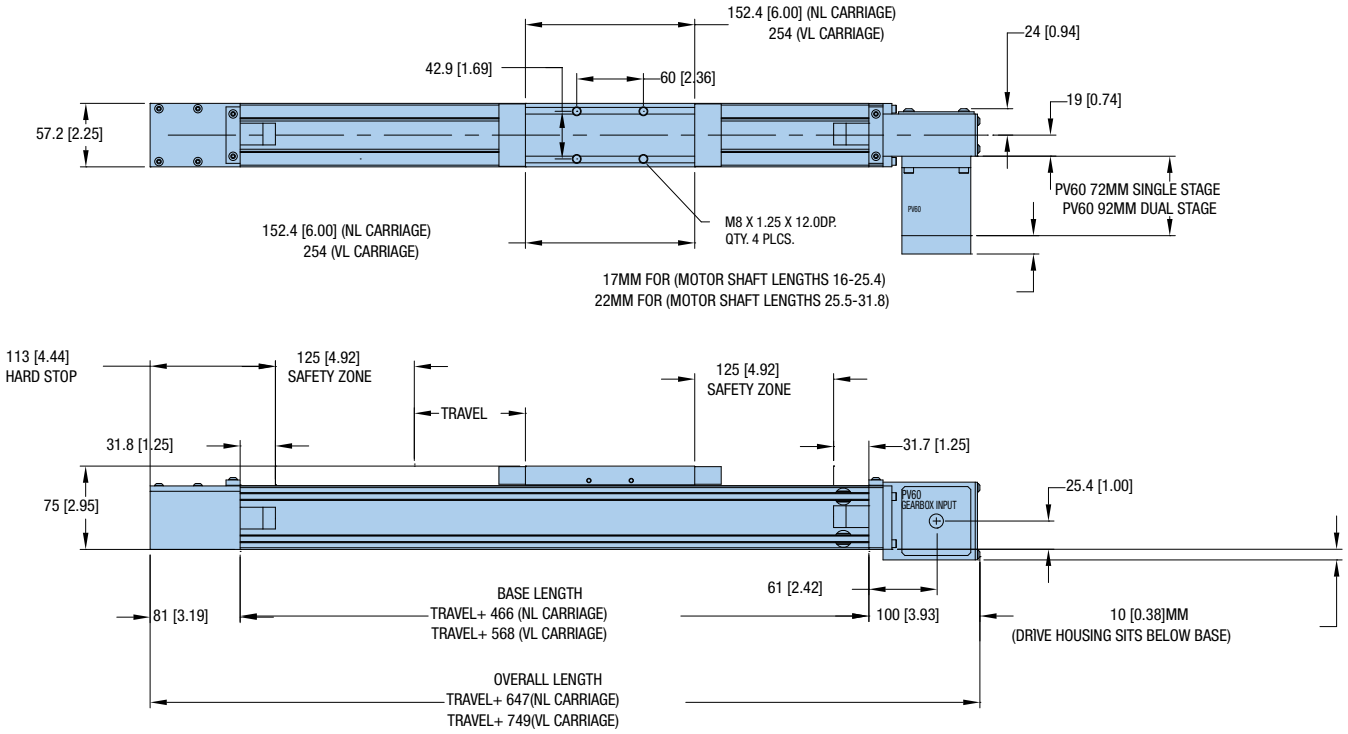


Linear Velocity

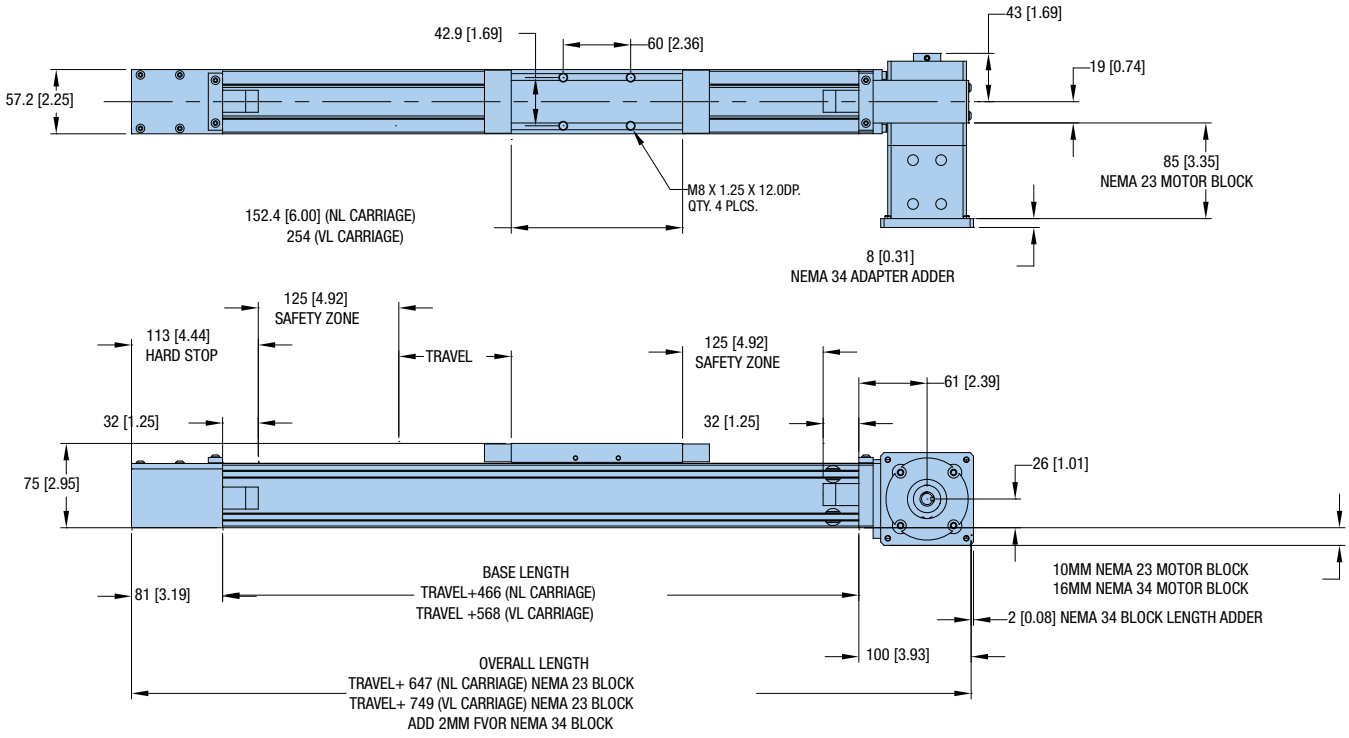


*HLE60 Critical speed is above charted 2000 RPM.

HLE60-RB with PV60 Direct Drive



HLE60-RB Drive with Motor Block

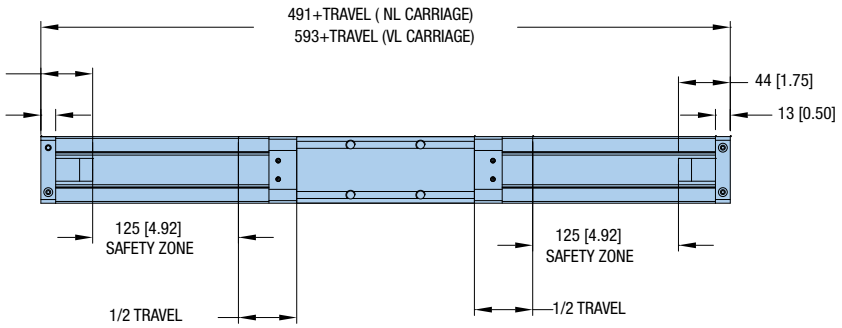


HLE60-RB Dimensions

2D & 3D CAD files Download from parkermotion.com

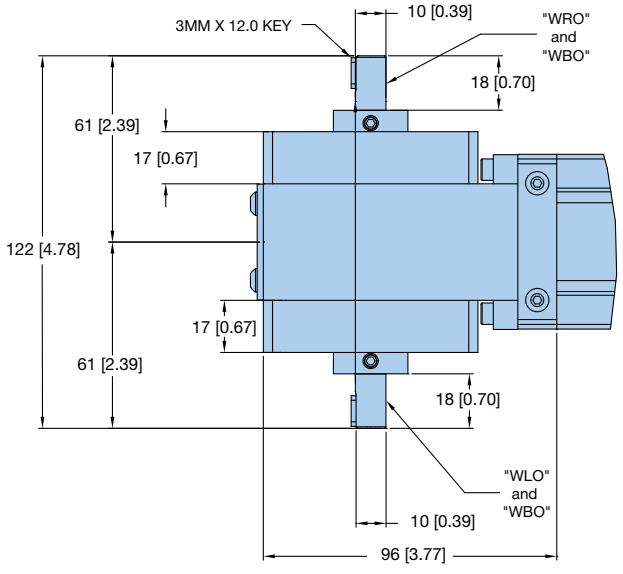
HLE60-RB Idler

Dimensions (mm)

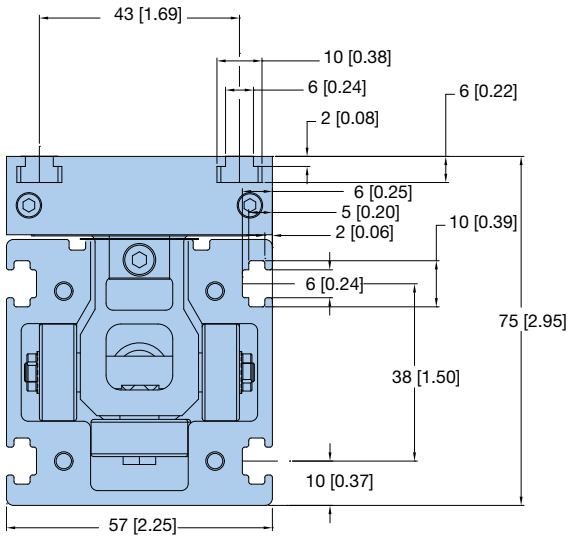


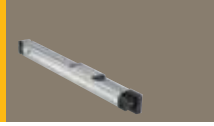
Drive Shaft Option

WRO Shaft on Right
WLO Shaft on Left
WBO Shaft on Both Sides



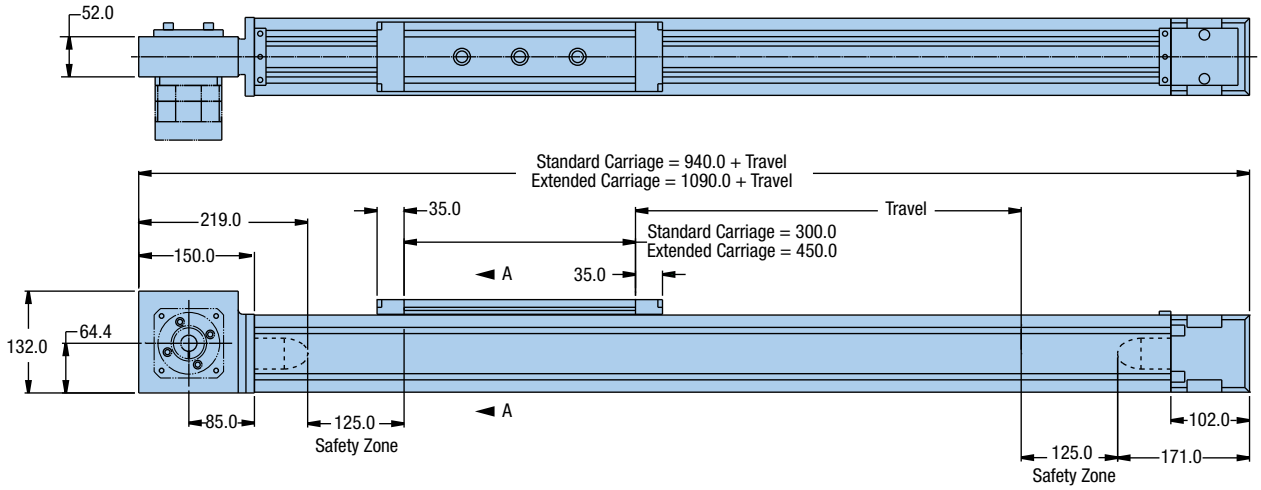
End View

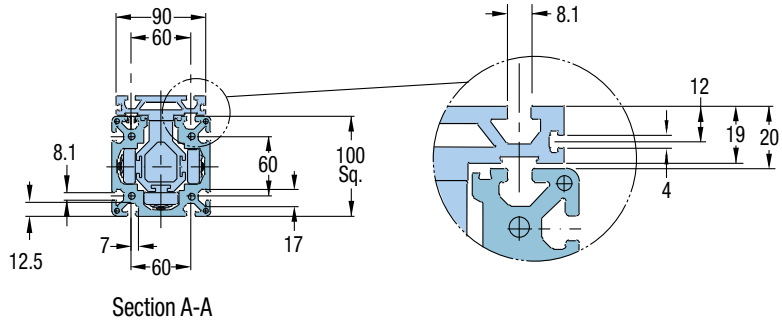




HLE100-RB Drive

Dimensions (mm)

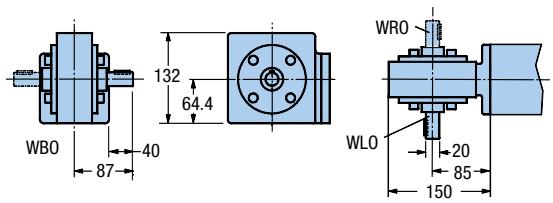




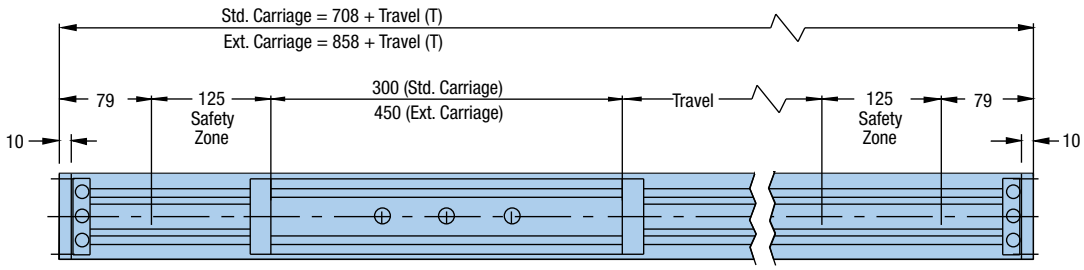
Section A-A

Drive Shaft Option

WRO Shaft on Right
WLO Shaft on Left
WBO Shaft on Both Sides



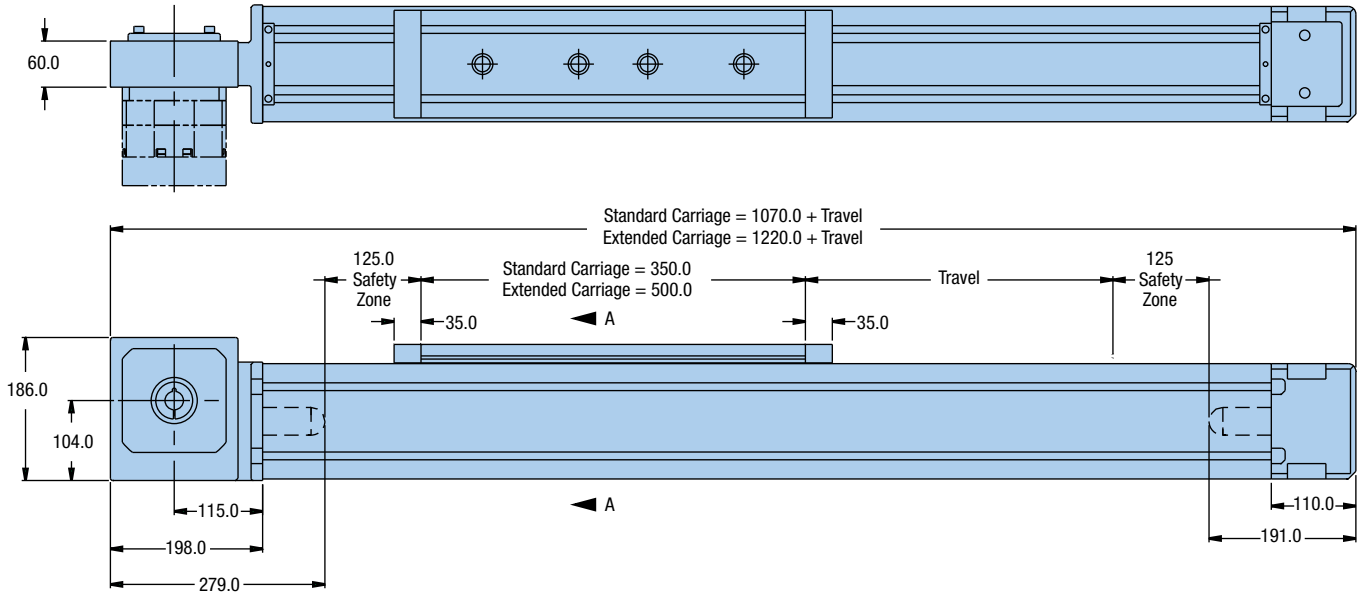
HLE100-RB Idler

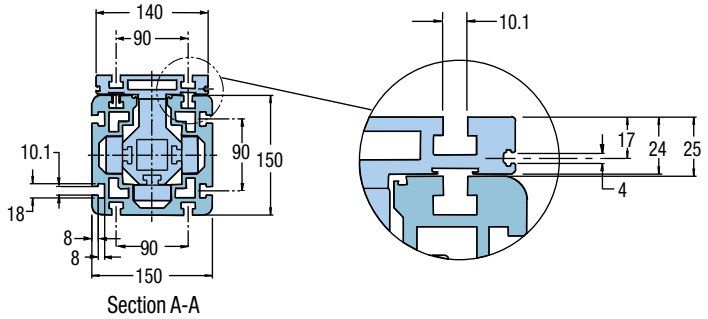


Belt Driven Tables

Dimensions (mm)

HLE150-RB Drive

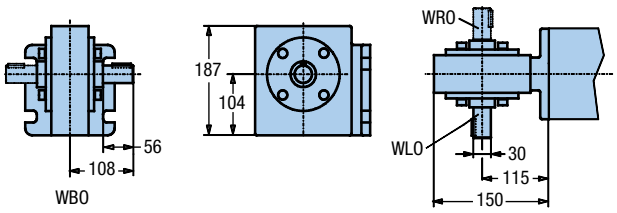




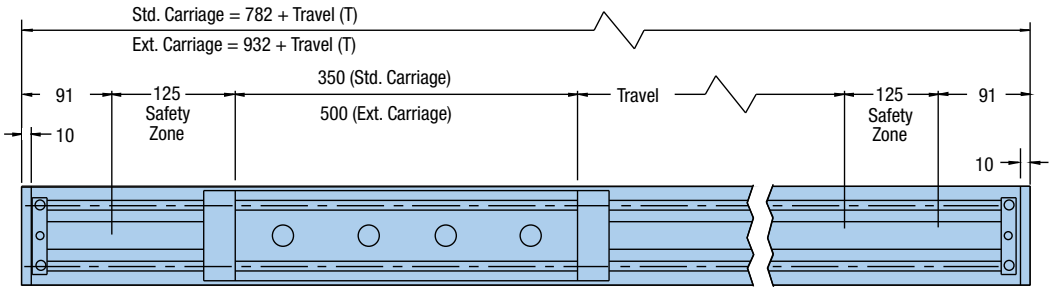
Section A-A

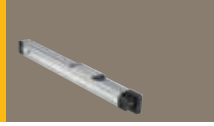
Drive Shaft Option

WRO Shaft on Right
WLO Shaft on Left
WBO Shaft on Both Sides



HLE150-RB Idler





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
Order Example:	HLE060	RB	NL	E	1000	DA0000	MBL	SP5	G1205	H1	K24	ZA	LH0

① Series
HLE060

② Bearing Type
RB

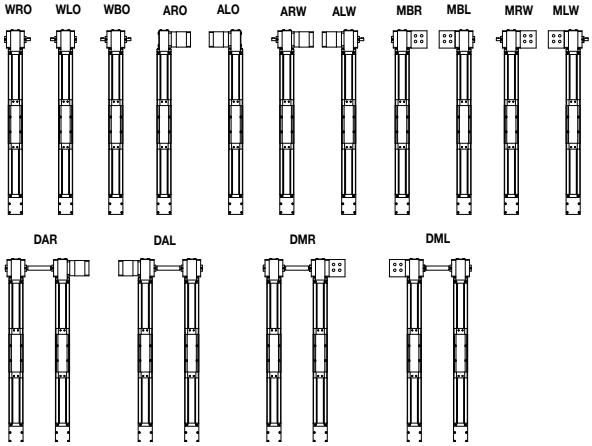
③ Carriage Type
NL Standard Carriage
VL Extended Carriage

④ Unit Type
M Idler
D Dual Axis Unit
E Single Axis Unit

⑤ Travel Length
nnnn nnnn=mm (3000 mm max for NLcarriage; 2900 mm max for VL carriage)

⑥ Drive Shaft Option - Center to Center
DA0000 No Drive Shaft - Single Axis or Idler Unit
DAnnnn (nnnn=mm) Dual Axis Center to Center (200 mm min; 1500 mm max)
DCnnnn (nnnn=mm) Dual Axis with Covered Link Shaft Center to Center (200 mm min; 1500 mm max)

⑦ Shaft Configuration Options
WOO No Shaft, Idler Unit
ARO Gearhead Right
ALO Gearhead Left
ARW Gearhead Right Shaft Left
ALW Gearhead Left Shaft Right
WLO Shaft Left
WRO Shaft Right
WBO Double Shaft
MBL Motor Block Left
MBR Motor Block Right
MLW Motor Block Left, Shaft Right
MRW Motor Block Right, Shaft Left
DAL Double Axis Gearhead, Drive Left
DAR Double Axis Gearhead, Drive Right
DML Double Axis, Motor Block Left
DMR Double Axis, Motor Block Right



⑧ Drive Station Interface
SP19 Drive Housing For PV60-FN
SP20 Idler Unit
SP21 No Motor Block
SP22 Motor Block NEMA 23 with 0.375” Bore Coupling
SP23 Motor Block NEMA 34 with 0.25” Bore Coupling
SP24 Motor Block NEMA 34 with 0.375” Bore Coupling
SP25 Motor Block NEMA 34 with 0.50” Bore Coupling
SP28 Motor Block NEMA 23 without Coupling
SP29 Motor Block NEMA 34 without Coupling
SP30 Motor Block Neo 70 with 11.0 mm Bore Coupling

⑨ Gearbox Option*
G0 No Gearbox (Requires MBR, MBL, MRW, MLW)
G1 Customer Supplied Gearhead*
G1203 PV60 Gearhead 3:1 Ratio
G1205 PV60 Gearhead 5:1 Ratio
G1210 PV60 Gearhead 10:1 Ratio
G1215 PV60 Gearhead 15:1 Ratio
G1225 PV60 Gearhead 25:1 Ratio
*Contact factory for approval of any alternative gearbox information.

⑩ Mounting Orientation
H1 Carriage Up
H2 Carriage Down
H3 Carriage on Side, Drive Station Up
H4 Carriage on Side, Drive Station Down

⑪ Motor Kit Option
K00 No Motor Kit
K21 Motor Kit LV23, HV23, OS23, ES23, VS23 to PV60
K22 Motor Kit BE23X to PV60
K23 Motor Kit SM23, SE23 to PV60
K24 Motor Kit LV34, HV34
K25 Motor Kit BE34, NO34X, JO34X, TS31, TS32 to PV60
K26 Motor Kit RS34, ES34 to PV60
K27 Motor Kit NO70, JO70 to PV60
K28 Motor Kit SMB60 to PV60

⑫ Strip Seal Option
ZA Unit with Strip Seal (IP30)
ZB Unit without Strip Seal

⑬ Limit/Home Switch Option
LH0 No Limit Switch Assembly
LH1 Three Mechanical Switches (1 NO & 1 NC Contact Per Switch)
LH2 Two Mechanical Switches (1 NO & 1 NC Contact Per Switch)
LH3 Three NPN Prox Switches, 10-30 VDC
LH4 Three PNP Prox Switches, 10-30 VDC

HLE100-RB Series Ordering Information

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
Order Example:	HLE100	RB	NL	E	1000	DA0000	ARO	SP7	G2-05	H2	ZB	K6	LH0

① Series
HLE100

② Bearing Type
RB

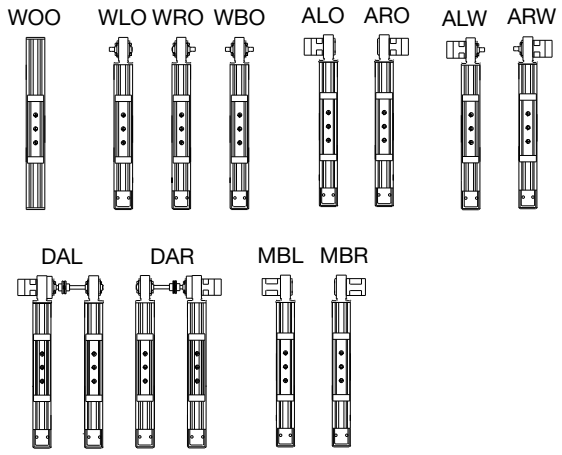
③ Carriage Type
NL Standard Carriage
VL Extended Carriage

④ Unit Type
M Idler
D Dual Axis Unit
E Timing Belt Drive, Nominal Thrust, Maximum Life

⑤ Travel Length
nnnn Specified travel in mm (nnnn = mm)

⑥ Drive Shaft Option - Center to Center
DA0000 No Drive Shaft - Single Axis or Idler Unit
DAnnnn (nnnn=mm)

⑦ Shaft Configuration Options
WOO No Shaft, Idler Unit
WLO Shaft Left
WRO Shaft Right
WBO Double Shaft
ALO Reducer Left
ARO Reducer Right
ALW Reducer Left, Shaft Right
ARW Reducer Right, Shaft Left
DAL Double Axis, Drive Left
DAR Double Axis, Drive Right
MBL Motor Block Left
MBR Motor Block Right



⑧ Drive Station Interface
SP0 Idler or Shaft Option
SP3 Motor Block - NEMA 34 with 0.500 in. coupling
SP4 Motor Block - NEMA 34 with 0.375 in. coupling
SP5 Motor Block - NEMA 34 without coupling
SP6 Motor Block - with coupling for JO923 direct drive
SP7 Motor Block - NEMA 42 with 0.625 in. coupling
SP8 Motor Block - NEMA 42 without coupling
SP9 Drive Housing for PX90/PV90/PEN/PER-090
SP10 Drive Housing for PS90
SP11 Drive Housing for PX115/PV115
SP12 Drive Housing for PS115

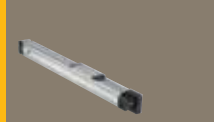
⑨ Gearbox Option
G0-00 No Gearbox
G10-nn PS90
G11-nn PX115
G12-nn PS115
G13-nn PX90
G14-nn PV90
G15-nn PV115
nn = ratio
Single stage ratios 3:1, 5:1, 10:1 Dual stage ratios 15:1, 25:1

⑩ Mounting Orientation
H1 Carriage Up
H2 Carriage Down
H3 Carriage on Side, Drive Station Up
H4 Carriage on Side, Drive Station Down

⑪ Strip Seal Option
ZA Unit with Strip Seal (IP30)
ZB Unit without Strip Seal

⑫ Motor Kit Option
K0 No motor kit
K1 J034*, N034*, BE34*, TS31, TS32 to GT-090, PE-090
K2 J070*, N070* to GT-090, PE-090
K3 J090*, N090* to GT-090, PE-090
K4 M105* to GT-090, PE-090
K5 ES3*, OEM83-*, ZETA83-*, S83-*, RS3* to GT-090, PE-090
K6 J034*, N034*, BE34*, TS3
K7 J090*, N090*
K8 M105*
K9 ES3*, OEM83-*, ZETA83-*, S83-*, RS3*
K10 RS42, RE42, S106-205
K11 S106-178, S106-250
K12 M145
K35 Parker MPP092/MPJ092
K37 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)

⑬ Limit/Home Switch Option
LH0 No Limit Switch Assembly
LH1 Three Mechanical Switches, 1 NO and 1 NC contact per switch
LH2 Two Mechanical Switches, 1 NPN Prox Switch
LH3 Three NPN Prox Switches, 10-30 VDC
LH4 Three PNP Prox Switches, 10-30 VDC



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
Order Example:	HLE150	RB	NL	E	1000	DA0000	ARO	SP1	G2-05	H2	ZA	K7	LH2

① Series
HLE150

② Bearing Type
RB

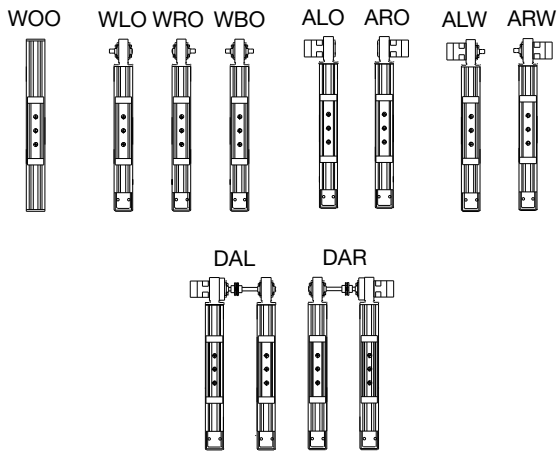
③ Carriage Type
NL Standard Carriage
VL Extended Carriage

④ Unit Type
M Idler
E Timing Belt Drive, Nominal Thrust, Maximum Life
F Timing Belt Drive, Maximum Thrust, Nominal Life

⑤ Travel Length
nnnn Specified travel in mm (nnnn = mm)

⑥ Drive Shaft Option - Center to Center
DA0000 No Drive Shaft - Single Axis or Idler Unit
DAnnnn (nnnn=mm)

⑦ Shaft Configuration Options
WOO No Shaft, Idler Unit
WLO Shaft Left
WRO Shaft Right
WBO Double Shaft
ALO Reducer Left
ARO Reducer Right
ALW Reducer Left, Shaft Right
ARW Reducer Right, Shaft Left
DAL Double Axis, Drive Left
DAR Double Axis, Drive Right



⑧ Drive Station Interface
SP0 Idler or Shaft Option
SP10 Drive Housing for PS90
SP11 Drive Housing for PX115/PV115
SP12 Drive Housing for PS115

⑨ Gearbox Option
G0-00 No Gearbox
G10-nn PS90
G11-nn PX115
G12-nn PS115
G13-nn PX90
nn = ratio
Single stage ratios 3:1, 5:1, 10:1 Dual stage ratios 15:1, 25:1

⑩ Mounting Orientation
H1 Carriage Up
H2 Carriage Down
H3 Carriage on Side, Drive Station Up
H4 Carriage on Side, Drive Station Down

⑪ Strip Seal Option
ZA Unit with Strip Seal (IP30)
ZB Unit without Strip Seal

⑫ Motor Kit Option
K0 No motor kit
K6 J034*, N034*, BE34*, TS31, TS32 to GT-115, PE-115
K7 J090*, N090* to GT-115, PE-115
K8 M105* to GT-115, PE-115
K9 ES3*, OEM83-*, ZETA83-*, S83-*, RS3* to GT-115, PE-115
K10 RS42, RE42, S106-205 to GT-115, PE-115
K11 S106-178, S106-250 to GT-115, PE-115
K12 M145 to GT-115, PE-115
K13 M145 to GT-142, PE-142
K35 Parker MPP092/MPJ092
K37 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)
*Single stage ratios: 3, 5, 8, 10; Dual stage ratios: 12, 15, 16, 20, 25

⑬ Limit/Home Switch Option
LH0 No Limit Switch Assembly
LH1 Three Mechanical Switches, 1 NO and 1 NC contact per switch
LH2 Two Mechanical Switches, 1 NPN Prox Switch
LH3 Three NPN Prox Switches, 10-30 VDC
LH4 Three PNP Prox Switches, 10-30 VDC

HLE-SR Series Belt Driven Linear Modules

Features

- Heavy duty steel square rail bearing system for greater load capacity
- Standard travel to 6 meters*
- Load capacities up to 600 kg
- Velocity up to 3 meters/sec.
- ±0.2 mm positional repeatability
- Timing belt and pulley drive mechanism
- IP30 strip seal

*Longer travels available with splice kits.

HLE-SR Bearing System

The bearing system is the principal distinction between the RB (Roller Bearing) type modules and the SR (Square Rail) type. The SR employs a square rail bearing system, which permits greater load carrying capability without increasing overall size. Square rail bearings are recirculating ball bearings designed to move heavy loads on a precise linear path. Linear guides, which house several rows of re-circulating ball bearings, ride on a high strength, steel square rail. The steel square rail cross section enables bearing ways to be ground into the sides of the rail. These bearing ways are shaped in an arch which approximates the same radius as the ball bearing. This increases the contact surface between the ball and the rail, thereby increasing the load capacity of the linear bearing.

HLE-SR Drive Principle

The HLE-SR employs the same high performance belt and pulley drive mechanism as the HLE-RB. It features a zero backlash steel reinforced timing belt drive, which provides high speeds, high acceleration, and good bidirectional repeatability. A belt 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.

Proven Technology

Proven in numerous applications, the HLE-SR series offers the following advantages:

- Low running friction
- Low wear
- Low maintenance
- Quiet operation
- High efficiency
- Long service life
- High dynamic performance due to high load capacity square rail systems
- Easily accessible lubrication points
- Minimal preventive maintenance required
- T-slots integrated on 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

Typical Fields of Application

As part of advanced, cost-effective construction of machines and handling systems:

- Materials handling: palletizing, depalletizing, feeding, part removal
- Clean room technology: water transport, water coating
- Warehouse technology: parts picking, storage and retrieval
- Machine tool automation: workpiece loading and unloading, tool changing
- Construction: formwork, placing reinforcing steel bars in concrete
- Process engineering: painting, coating, bonding
- Testing technology: guiding ultrasonic sensors, laboratory equipment
- Textile machinery building: cross-cutting, slitting and stacking, quilting, seam stitching

Optional Features

- Direct mounting for planetary gear reducers
- 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 bumpers
- Link shafts and support bearing for dual unit axes
- Splice plates for extending travels beyond length available in a single profile

See pages 272-276 for available options and accessories.

Housing

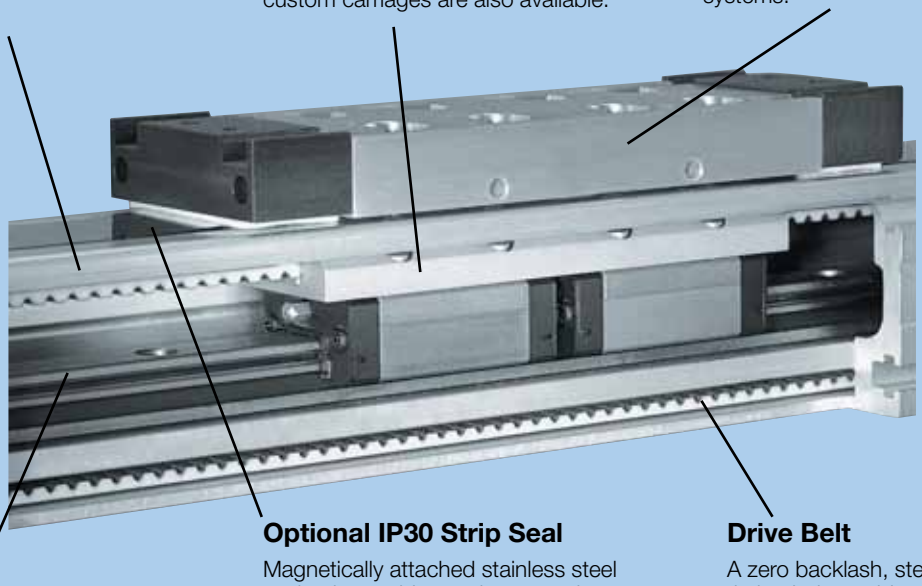
The HLE-SR housing is a light-weight, compact and self-supporting extruded aluminum section. It is available in two cross-sections: 60 x 60 mm (HLE60) and 100 x 100 mm (HLE100). T-slots along the length are utilized for clamping mechanical components, joining units, and attaching sensors or mechanical switches.

Carriage

A rigid carriage assembly is built upon two bearing housings which contain several rows of recirculating ball bearings designed to ride in grooves ground into a steel square rail linear raceway. Longer or custom carriages are also available.

Load Attachment Plate

Longitudinal T-Slots integrated on the top of this plate facilitate the assembly of attachments to the HLE-SR. Utilization of these T-Slots together with standard clamping profiles enables easy straight-forward construction of multi-axis systems.



Bearing Raceway

A high strength steel alloy bearing rail features precision ground “gothic arch” raceways to provide precise translation and high strength support of the recirculating ball bearings.

Optional IP30 Strip Seal

Magnetically attached stainless steel seal strip provides environmental protection to interior components.

Drive Belt

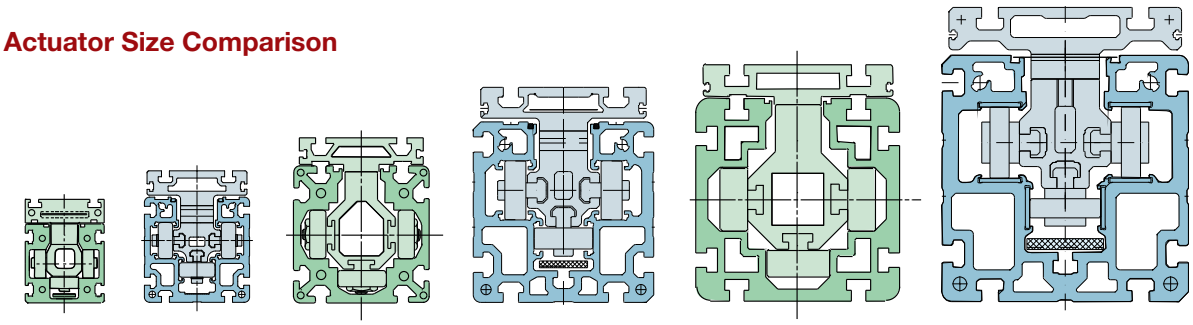
A zero backlash, steel reinforced timing belt provides high speed, high acceleration and high bidirectional repeatability. A serrated clamp mechanism between belt and carriage guarantees a safe and strong connection.

HLE-SR Series Specifications

Characteristic	Units	HLE60-SR		HLE100-SR	
Unit Weight (basic unit without stroke)					
Standard Carriage, NL	kg (lb.)	3.5	(7.7)	16.2	(35.7)
Extended Carriage, VL	kg (lb.)	5.91	(13)	20.0	(44.1)
Carriage Weight					
Standard Carriage, NL	kg. (lb)	1.8	(4.0)	2.2	(4.9)
Extended Carriage, VL	kg. (lb)	2.1	(4.6)	3.8	(8.4)
Weight per meter of additional length	kg/m (lb/ft)	5.5	(3.7)	13.3	(8.9)
Moment of Inertia (related to the drive shaft)					
Standard Carriage, NL	kg-cm^2 (lb-in^2)	3.52	(1.20)	34.8	(11.9)
Extended Carriage, VL	kg-cm^2 (lb-in^2)	5.20	(1.83)	52.2	(17.9)
Travel and Speed					
Maximum Speed[1]	m/s (in/s)	3	(120)	3	(120)
Maximum Acceleration[1]	m/s^2 (in/s^2)	10	(393)	10	(393)
Maximum Travel[2], NL	m (in)	3.05	(120)	6.15	(242)
Maximum Travel[2], VL	m (in)	2.8	(114)	6.0	(236)
Geometric Data					
Cross Section, Square	mm (in)	57.2	(2.25)	100	(3.94)
Moment of Inertia Ix	cm^4 (in^4)	48.3	(1.16)	377	(9.06)
Moment of Inertia Iy	cm^4 (in^4)	59.5	(1.43)	432	(10.38)
Moment of Elasticity	N/mm^2 (lb/in^2)	0.72 x 10^5	(0.1044 x 10^8)	0.72 x 10^5	(0.1044 x 10^8)
Pulley Data, Torques, Forces					
Travel Distance per Revolution	mm/rev (in/rev)	125	(4.92)	240.0	(9.45)
Pulley Diameter	mm (in)	39.8	(1.57)	74.5	(2.93)
Maximum Drive Torque[3]	Nm (lb-in)	8.87	(79)	61.5	(544)
Maximum Belt Traction[3] (effective load)	N (lb)	668	(150)	1650	(371)
Repeatability[4]	mm (in)	±0.2	(±0.008)	±0.2	(±0.008)

For the following deviations from the above standards, please contact Parker engineering: (1) Greater speeds and accelerations may be achieved.
(2) Splicing possible for longer travel distances. This may cause reductions in effective load, drive torque, speed, acceleration, and repeatability.
(3) Increased timing belt tension required. (4) Nominal value - component dependant. For improved repeatability consult factory.

Linear Actuator Size Comparison



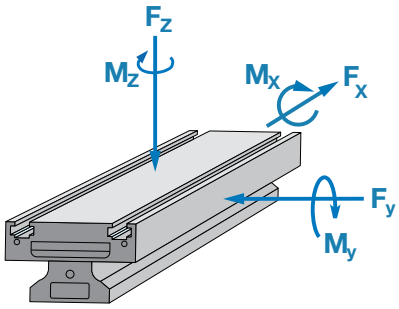
HLE60 **HPLA080** **HLE100** **HPLA120** **HLE150 (RB & Z only)** **HPLA180**

Load-Bearing Capacity of Carriage and Timing Belt

Forces and Moment Loads

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.

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.



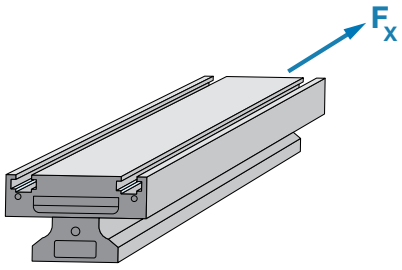
"DimAxes" software is available for determination of precise carriage loading.

Visit www.parkermotion.com to request a Gantry Robot CD.

Load-Bearing Capacity Timing Belt (Fx)

HLE60-SR

Drive Option	Transferrable Thrust Force (n) Nominal Belt Tension (81,000 km life)	Maximum Belt Tension (46,000 km life)
Supported Pulley (SP19 - SP30)	500	–

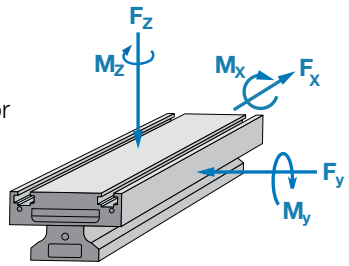


HLE100-SR

Drive Option	Gearhead	Drive Option	Transferrable Thrust Force (n) Nominal Belt Tension (81,000 km life)	Maximum Belt Tension (46,000 km life)
ARO/ALO	PS90	SP10	675	900
	PX115/PV115	SP11	675	900
	PS115	SP12	925	1115
ARW/ALW/DAR/DAL	PV90/PX90	SP9	500	675
	PS90	SP10	675	900
	PX115/PV115	SP11	675	900

HLE-SR Performance Curves

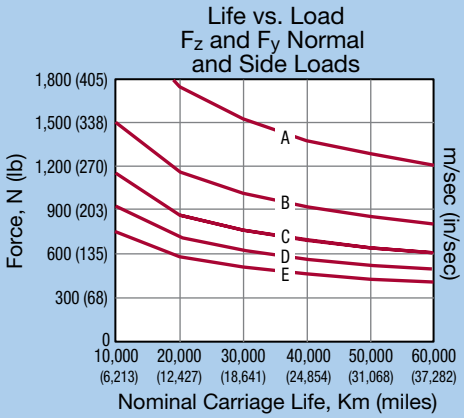
The force and moment capabilities of the carriage and the timing belt are speed dependent. The load curves shown in the graphs are valid for a standard (NL order code) carriage. These curves show the allowable force or moment versus the nominal carriage life.

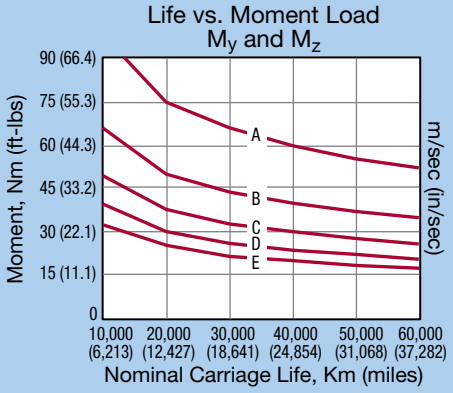


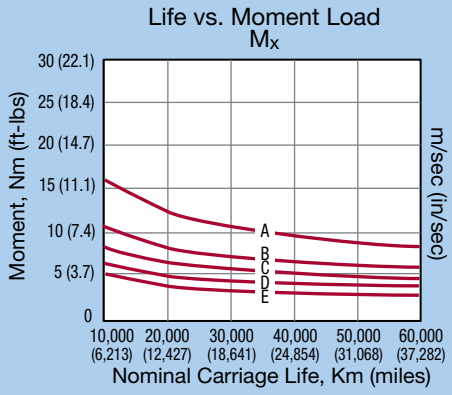
Legend

Curve	Velocity m/sec.	Velocity (in/sec.)
A	0.25	(10)
B	0.50	(20)
C	1.00	(40)
D	2.00	(80)
E	3.00	(120)

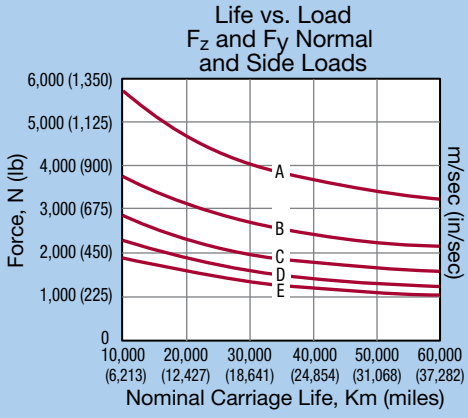
HLE-60SR

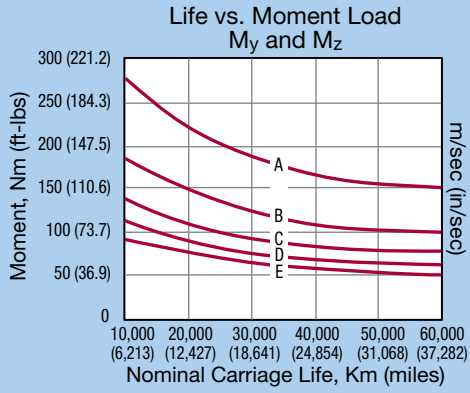


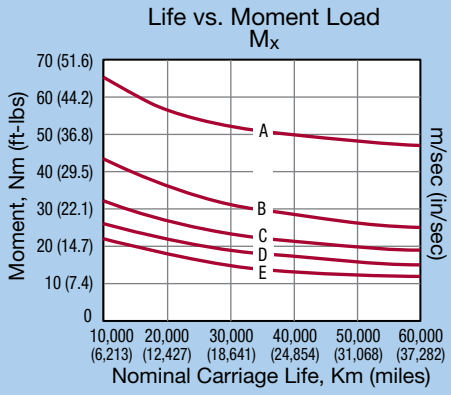




HLE-100SR



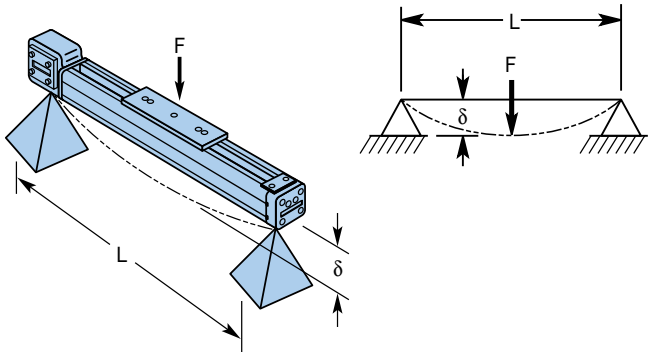




HLE-SR Deflection Characteristics

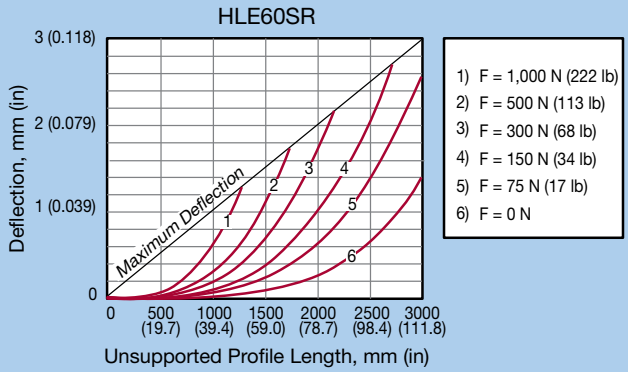
The HLE deflection curves can be used for determining the deflection based on the profile length and the application load weight. Applications requiring high acceleration forces can place a severe strain on the system stability. In these cases, a solid substructure may be required with the HLE product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

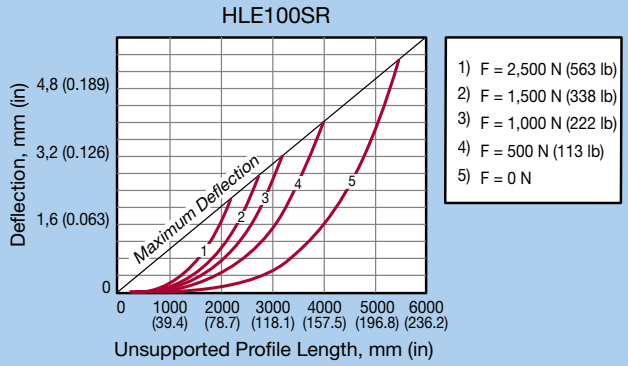
These deflection curves illustrate the deflection δ, based on the HLE profile being simply supported at both ends. The graphs take into consideration the self deflection due to the weight of the profile, along with the load to be transported. The maximum deflection cannot be exceeded unless additional supports are implemented. 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



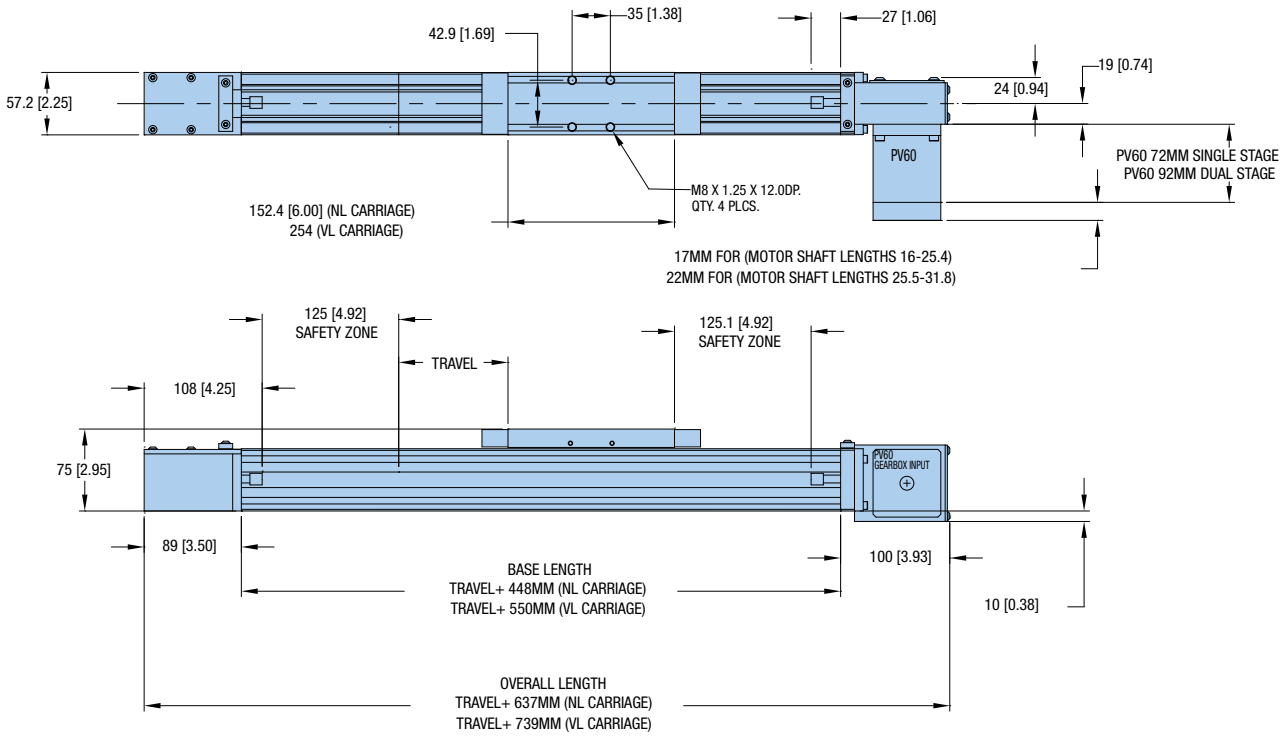


HLE60-SR Dimensions

2D & 3D CAD files
Download from parkermotion.com

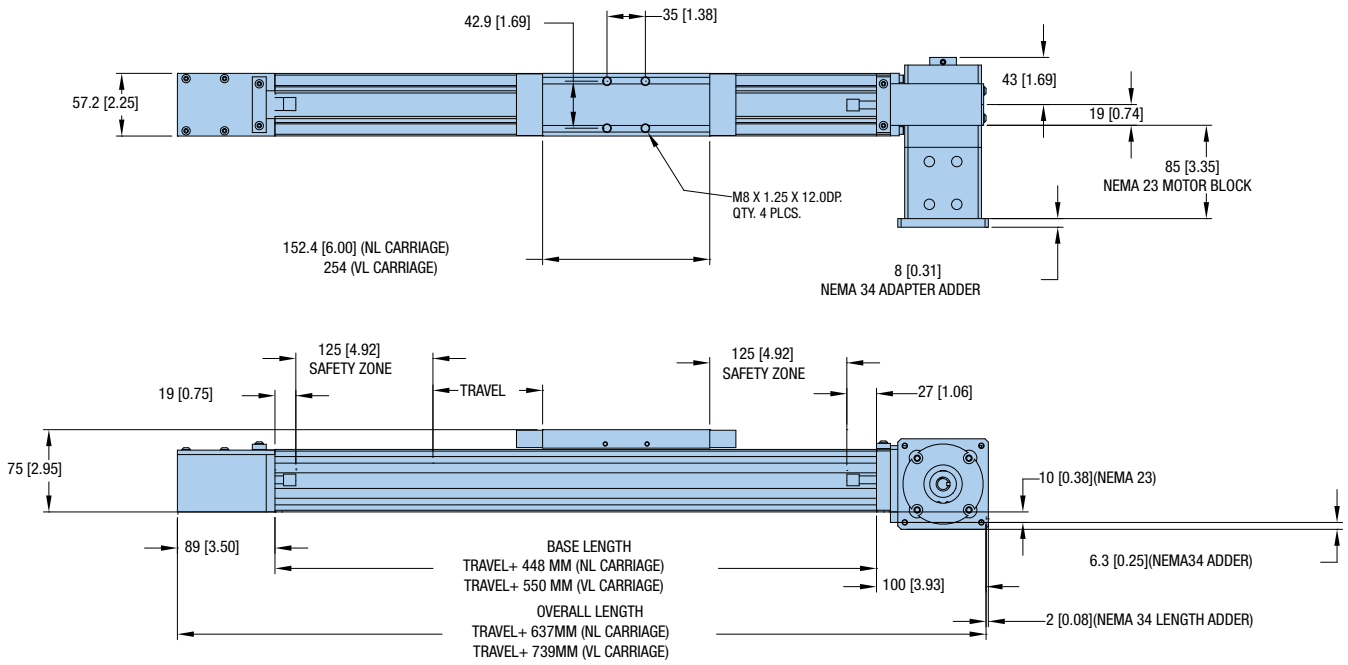
HLE60-SR with PV60 Direct Drive

Dimensions (mm)



HLE60-SR Drive with Motor Block

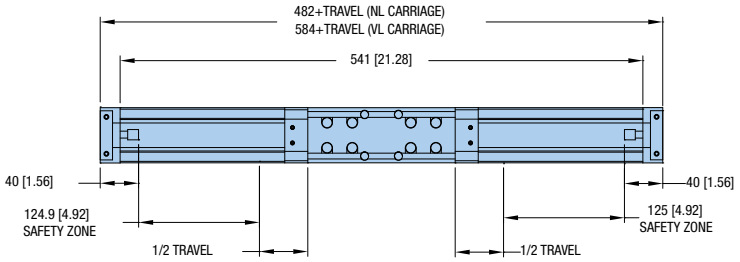
Dimensions (mm)



2D & 3D CAD files Download from parkermotion.com

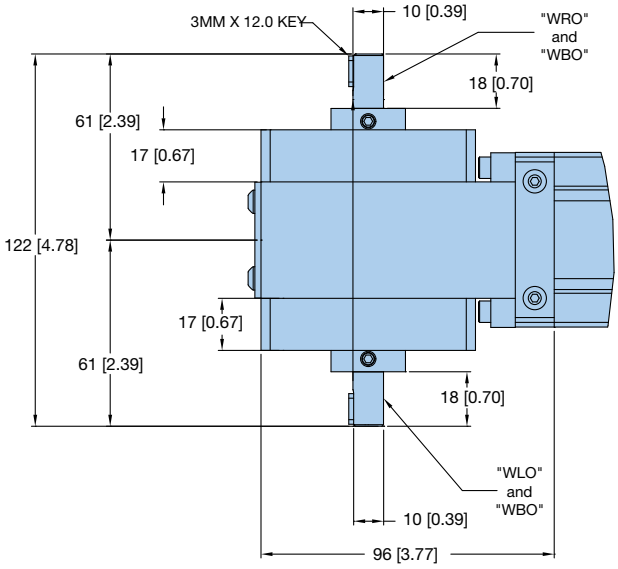
HLE60-SR Idler

Dimensions (mm)

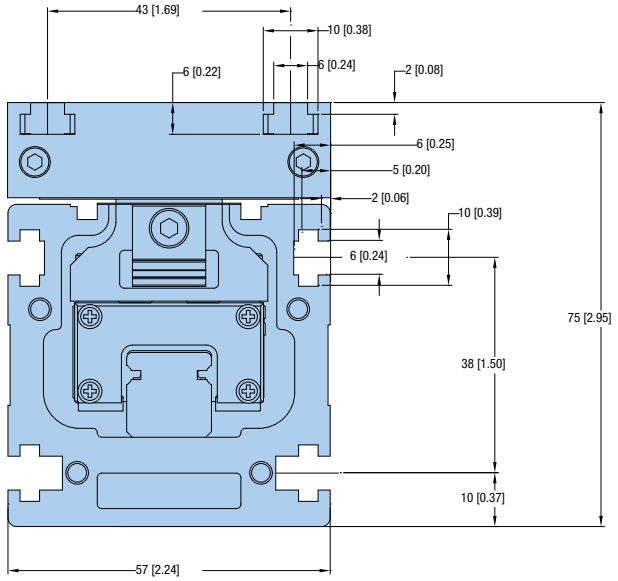


Drive Shaft Option

WRO Shaft on Right
WLO Shaft on Left
WBO Shaft on Both Sides

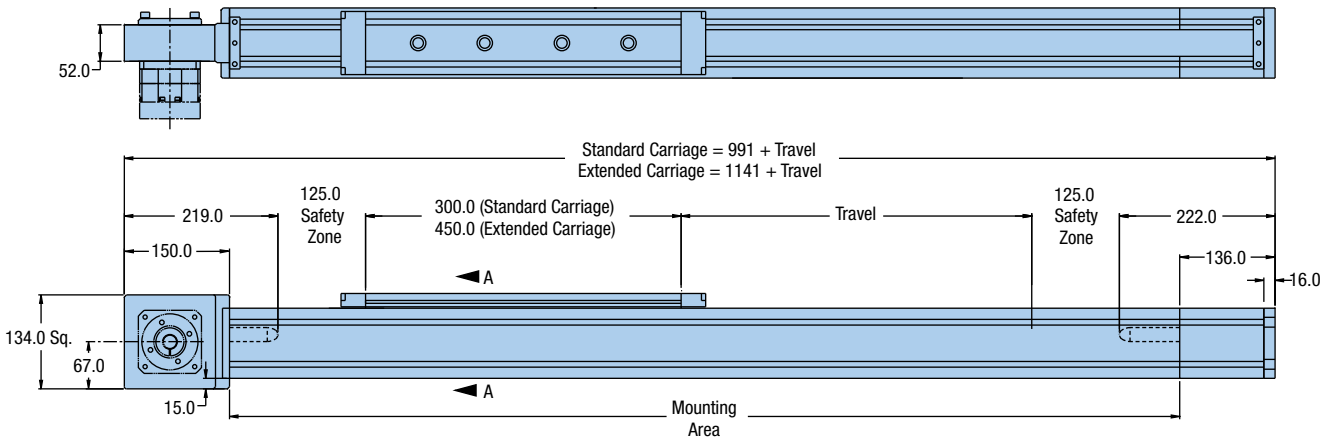


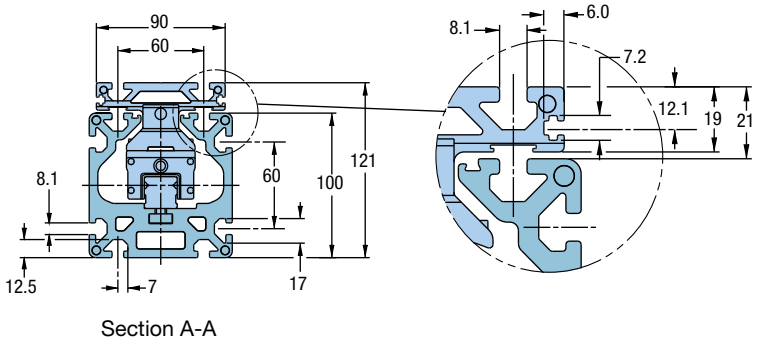
End View



HLE100-SR Drive

Dimensions (mm)

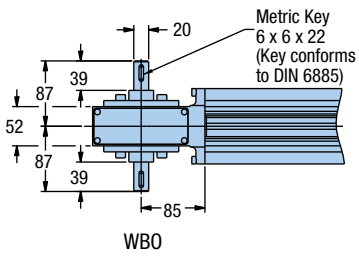




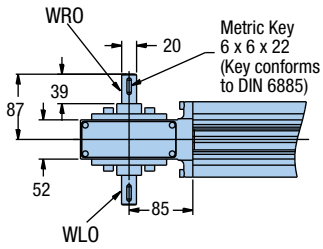
Section A-A

Drive Shaft Option

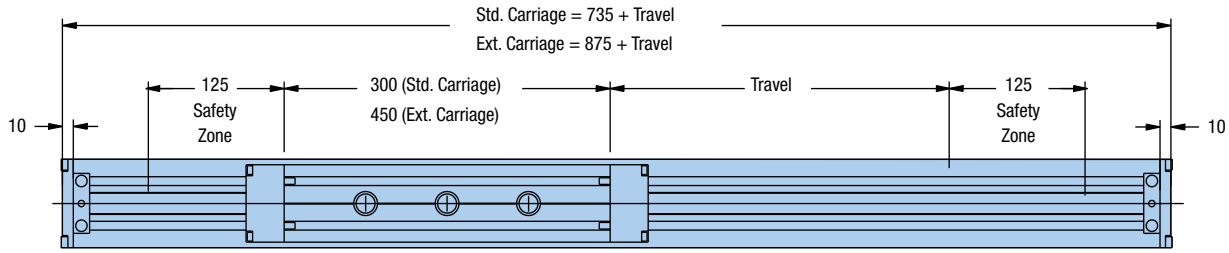
WRO Shaft on Right
WLO Shaft on Left
WBO Shaft on Both Sides



WBO



HLE100-SR Idler



HLE60-SR Series Ordering Information

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
Order Example:	HLE060	SR	NL	E	2000	DA000	MBR	SP5	G1205	H1	K24	ZA	LH0

① Series
HLE060

② Bearing Type
SR

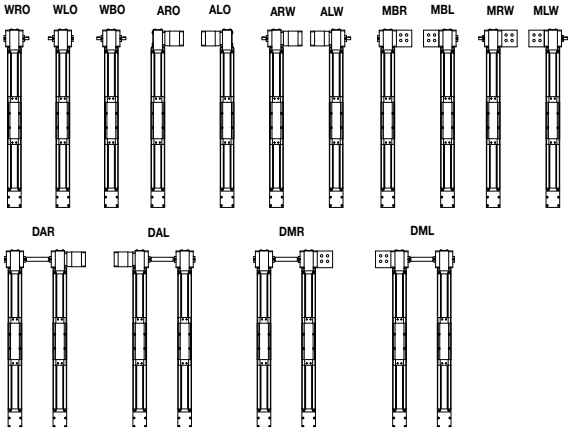
③ Carriage Type
NL Standard Carriage
VL Extended Carriage

④ Unit Type
M Idler
D Dual Axis Unit
E Single Axis Unit

⑤ Travel Length
nnnn nnnn=mm (3000 mm max for NL carriage; 2900 mm max for VL carriage)

⑥ Drive Shaft Option - Center to Center
DA0000 No Drive Shaft - Single Axis or Idler Unit
DAnnnn (nnnn=mm) Dual Axis Center to Center (200 mm min; 1500 mm max)
DCnnnn (nnnn=mm) Dual Axis with Covered Link Shaft Center to Center (200 mm min; 1500 mm max)

⑦ Shaft Configuration Options
WOO No Shaft, Idler Unit
ARO Gearhead Right
ALO Gearhead Left
ARW Gearhead Right Shaft Left
ALW Gearhead Left Shaft Right
WLO Shaft Left
WRO Shaft Right
WBO Double Shaft
MBL Motor Block Left
MBR Motor Block Right
MLW Motor Block Left, Shaft Right
MRW Motor Block Right, Shaft Left
DAL Double Axis Gearhead, Drive Left
DAR Double Axis Gearhead, Drive Right
DML Double Axis, Motor Block Left
DMR Double Axis, Motor Block Right



⑧ Drive Station Interface
SP19 Drive Housing For PV60-FN
SP20 Idler Unit
SP21 No Motor Block
SP22 Motor Block NEMA 23 with 0.375” Bore Coupling
SP23 Motor Block NEMA 34 with 0.25” Bore Coupling
SP24 Motor Block NEMA 34 with 0.375” Bore Coupling
SP25 Motor Block NEMA 34 with 0.50” Bore Coupling
SP28 Motor Block NEMA 23 without Coupling
SP29 Motor Block NEMA 34 without Coupling
SP30 Motor Block Neo 70 with 11.0 mm Bore Coupling

⑨ Gearbox Option*
G0 No Gearbox (Requires MBR, MBL, MRW, MLW)
G1 Customer Supplied Gearhead*
G1203 PV60 Gearhead 3:1 Ratio
G1205 PV60 Gearhead 5:1 Ratio
G1210 PV60 Gearhead 10:1 Ratio
G1215 PV60 Gearhead 15:1 Ratio
G1225 PV60 Gearhead 25:1 Ratio
*Contact factory for approval of any alternative gearbox information.

⑩ Mounting Orientation
H1 Carriage Up
H2 Carriage Down
H3 Carriage on Side, Drive Station Up
H4 Carriage on Side, Drive Station Down

⑪ Motor Kit Option
K00 No Motor Kit
K21 Motor Kit LV23, HV23, OS23, ES23, VS23 to PV60
K22 Motor Kit BE23X to PV60
K23 Motor Kit SM23, SE23 to PV60
K24 Motor Kit LV34, HV34 to PV60
K25 Motor Kit BE34, NO34X, JO34X, TS31, TS32 to PV60
K26 Motor Kit RS34, ES34 to PV60
K27 Motor Kit NO70, JO70 to PV60
K28 Motor Kit SMB60 to PV60

⑫ Strip Seal Option
ZA Unit with Strip Seal (IP30)
ZB Unit without Strip Seal

⑬ Limit/Home Switch Option
LH0 No Limit Switch Assembly
LH1 Three Mechanical Switches (1 NO & 1 NC Contact Per Switch)
LH2 Two Mechanical Switches (1 NO & 1 NC Contact Per Switch)
LH3 Three NPN Prox Switches, 10-30 VDC
LH4 Three PNP Prox Switches, 10-30 VDC

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
Order Example:	HLE100	SR	NL	E	2000	DA000	ARO	SP2	G2-03	H1	ZB	K2	LH0

① Series
HLE100

② Bearing Type
SR

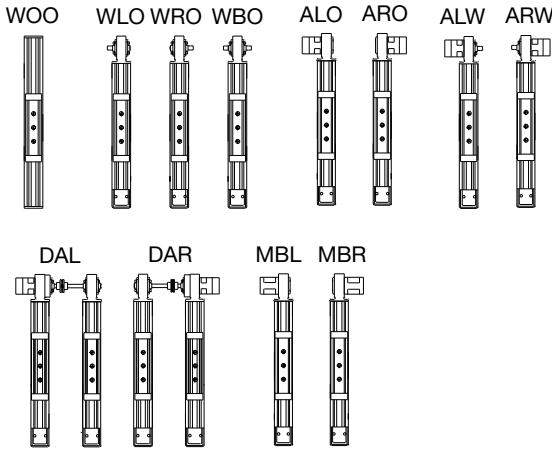
③ Carriage Type
NL Standard Carriage
VL Extended Carriage

④ Unit Type
M Idler
E Timing Belt Drive, Nominal Thrust, Maximum Life
F Timing Belt Drive, Nominal Thrust, Maximum Thrust

⑤ Travel Length
nnnn Specified travel in mm (nnnn = mm)

⑥ Drive Shaft Option - Center to Center
DA0000 No Drive Shaft - Single Axis or Idler Unit
DAnnnn (nnnn=mm)

⑦ Shaft Configuration Options
WOO No Shaft, Idler Unit
WLO Shaft Left
WRO Shaft Right
WBO Double Shaft
ALO Reducer Left
ARO Reducer Right
ALW Reducer Left, Shaft Right
ARW Reducer Right, Shaft Left
DAL Double Axis, Drive Left
DAR Double Axis, Drive Right
MBL Motor Block Left
MBR Motor Block Right



⑧ Drive Station Interface
SP0 Idler or Shaft Option
SP3 Motor Block - NEMA 34 with 0.500 in. coupling
SP4 Motor Block - NEMA 34 with 0.375 in. coupling
SP5 Motor Block - NEMA 34 without coupling
SP6 Motor Block - with coupling for JO923 direct drive
SP7 Motor Block - NEMA 42 with 0.625 in. coupling
SP8 Motor Block - NEMA 42 without coupling
SP9 Drive Housing for PX90/PV90/PEN/PER-090
SP10 Drive Housing for PS90
SP11 Drive Housing for PX115/PV115
SP12 Drive Housing for PS115

⑨ Gearbox Option
G0-00 No Gearbox
G10-nn PS90
G11-nn PX115
G12-nn PS115
G13-nn PX90
G14-nn PV90
G15-nn PV115
nn = ratio
Single stage ratios 3:1, 5:1, 10:1 Dual stage ratios 15:1, 25:1

⑩ Mounting Orientation
H1 Carriage Up
H2 Carriage Down
H3 Carriage on Side, Drive Station Up
H4 Carriage on Side, Drive Station Down

⑪ Strip Seal Option
ZA Unit with Strip Seal (IP30)
ZB Unit without Strip Seal

⑫ Motor Kit Option
K0 No Motor Kit
K1 J034*, N034*, BE34*, TS3*
K2 J070*, N070*
K3 J090*, N090*
K4 M105*
K5 ES3*, OEM83-*, ZETA83-*, S83-*, RS3*
K6 J034*, N034*, BE34*, TS3*
K7 J090*, N090* to PE-115
K8 M105* to PE-115
K9 ES3*, OEM83-*, ZETA83-*, S83-*, RS3*
K10 RS42, RE42, S106-205
K11 S106-178, S106-250
K12 M145
K35 MPP092
K37 MPP100
K39 MPP115
K35 Parker MPP092/MPJ092
K37 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)
*Single stage ratios: 3, 4, 5, 8, 10; Dual stage ratios: 12, 15, 16, 20, 25

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