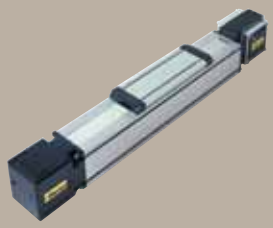
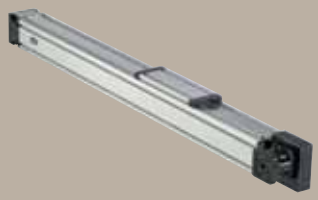
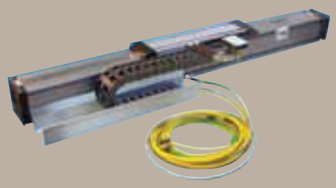






Belt Driven
high speed automation modules

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

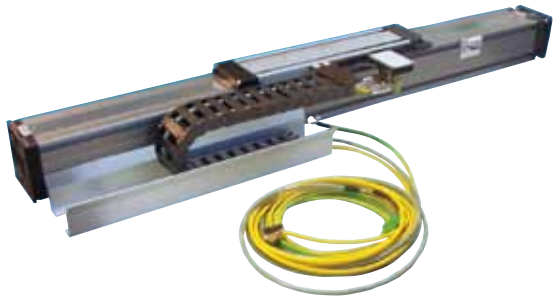
Page 246-251

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)

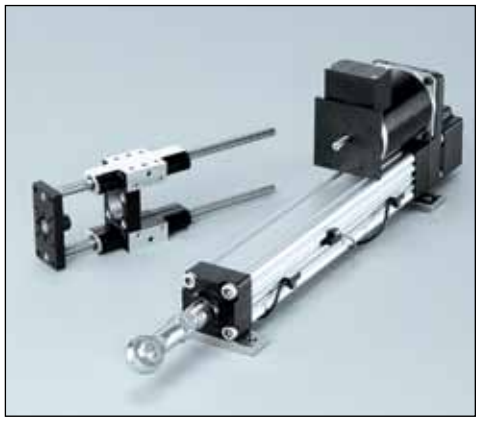
Page 271

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-Z Series

Features

- Long travels – selectable up to 50 meters
- Load capacities up to 600 kg
- Up to 5 meters/sec. velocity
- ±0.05 mm positional repeatability
- Rack-and-pinion drive mechanism
- Independent multiple carriages on single rail
- Roller wheel bearings for smooth high speed linear motion

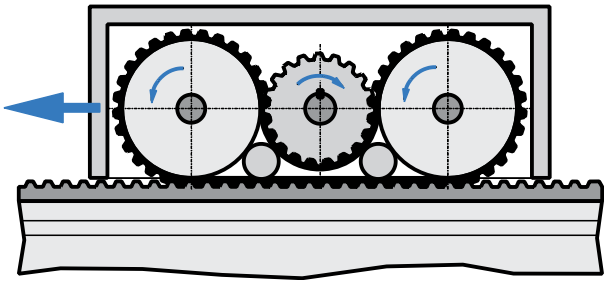
The “endless” linear unit is designed for guiding, transporting or positioning payloads over long travel distances with high rigidity and accuracy. This is accomplished by incorporating Parker’s uniquely designed rack-and-pinion based drive system with an HLE150 linear module housing. The exceptional dynamic characteristics inherent to these units make them well suited for applications requiring high speed linear translation and positioning over long travel distances.

The carriage drive mechanism is independent of the housing mechanics. As a result, multiple carriage applications, where several carriages can be positioned on a single unit independently of each other, are easily accommodated. Mechanical compatibility with the HLE series and other Parker components permit efficient, cost- effective construction of gantry robots and automated systems.

See pages 272-276 for available options and accessories.

HLE-Z Drive Principle

The HLEZ drive offers all the advantages of a rack drive, but without the usual drawbacks. The short timing belt (which is independent of travel length) reduces belt stretching to an absolute minimum. The lateral deflection roller pretensions the system and thereby removes backlash. “Hold down” rollers ensure that sufficient teeth always remain in mesh. The combination of a steel reinforced polyurethane timing belt and an aluminum rack-and-pinion is a safe and clean drive which requires no lubrication.



Combined Technology

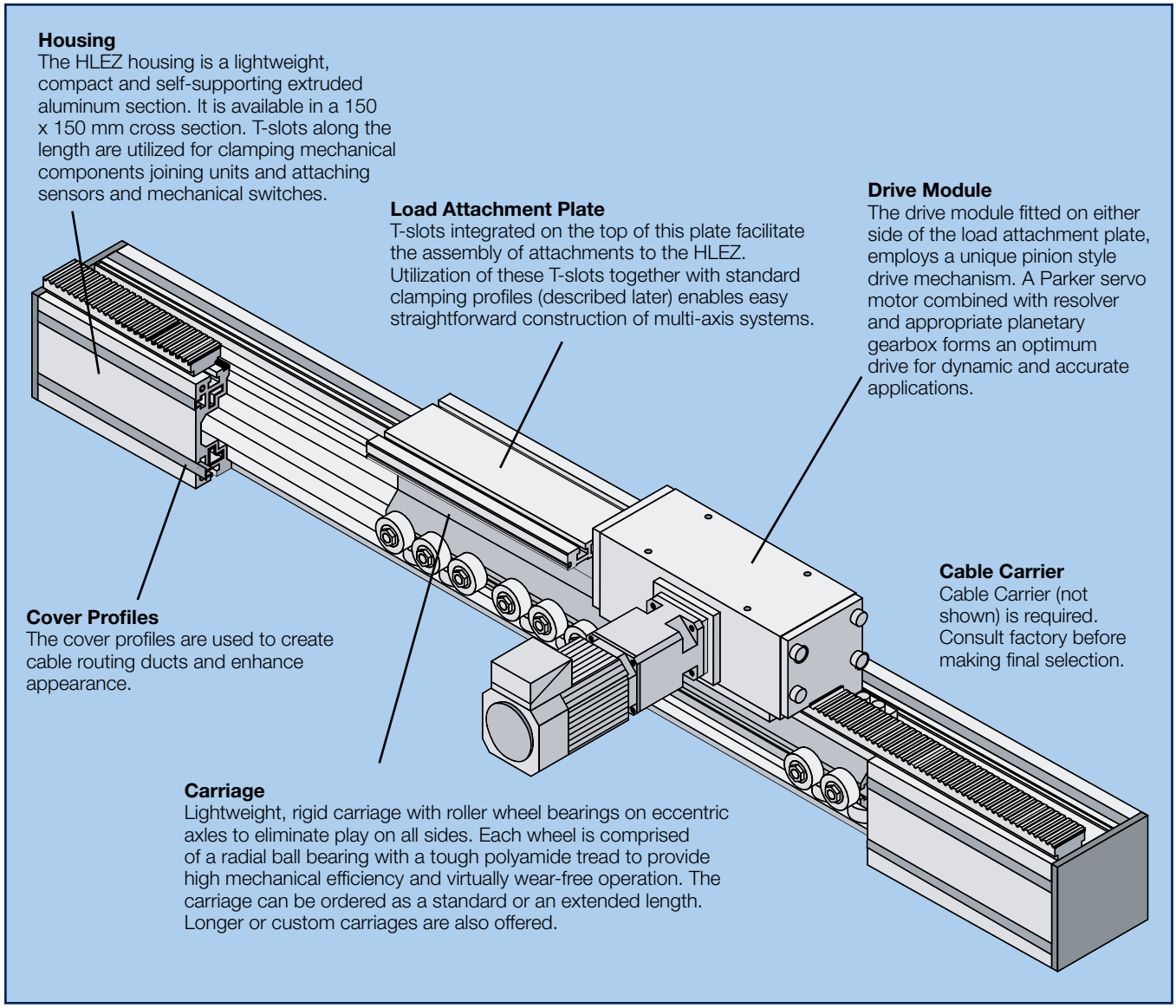
Linear actuator and rack offers the following advantages:

- High dynamic response, even over long travel distances, due to:
  – the short timing belt, regardless of travel length
  – the lightweight carriage
  – the backlash-free drive
- High positional repeatability, regardless of stroke length
- Option of several carriages per linear unit, making overlapping strokes along a single axis possible
- Longer maintenance free life

Typical Applications

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

- Materials handling: palletization, 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



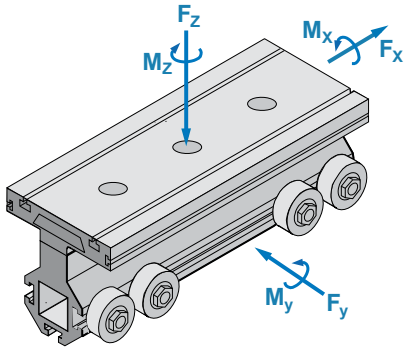
HLE-Z Series Specifications

Characteristic	Units	HLEZ150	
Unit Weight (basic unit without stroke)			
Standard Carriage, S	kg (lb)	53.0	(116.9)
Extended Carriage, E	kg (lb)	61.0	(134.5)
Carriage Weight			
Standard Carriage, S	kg (lb)	25.7	(56.7)
Extended Carriage, E	kg (lb)	29.7	(65.5)
Weight (per meter) of additional travel length	kg/m (lb/ft)	23.9	(16.6)
Moment of Inertia (related to the drive shaft)			
Standard Carriage, S	kg-cm^2 (lb-in^2)	325.0	(111.1)
Extended Carriage, E	kg-cm^2 (lb-in^2)	363.4	(124.3)
Travel and Speed			
Maximum Speed	m/s (in/s)	5	(197)
Maximum Acceleration	m/s^2 (in/s^2)	10	(393)
Maximum Travel [1], NL carriage	m (in)	8.8	(350)
Maximum Travel [1], VL carriage	m (in)	8.7	(344)
Maximum Travel - (with splices)	m (in)	50	(1969)
Geometric Data			
Cross Section, Square	mm (in)	150.0	(5.91)
Moment of Inertia Ix	cm^4 (in^4)	1940.0	(46.61)
Moment of Inertia Iy	cm^4 (in^4)	2147.0	(51.58)
Moment of Elasticity	N/mm^2 (lb/in^2)	0.72 x 10^5	(0.1044 x 10^8)
Pulley Data, Torques, Forces			
Travel Distance per Revolution	mm/rev (in/rev)	200.0	(7.87)
Pulley Diameter	mm (in)	63.6	(2.51)
Maximum Drive Torque [2]	Nm (lb-in)	64.0	(566)
Maximum Belt Traction [2] (effective load)	N (lb)	refer to force (Fx) chart on next page	
Repeatability [3]	mm (in)	±0.05	(±0.002)

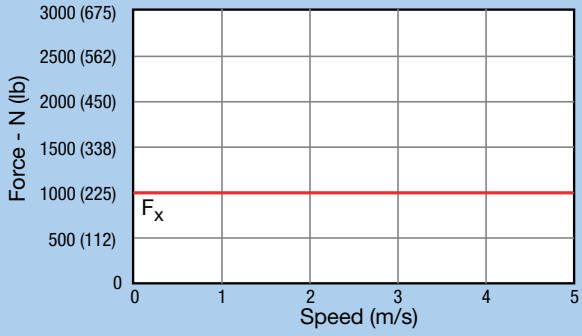
For deviations from the above standards, please contact Parker engineering.
Safety factor taken into consideration S=1. Data applies to a temperature range of between -10°C and +40°C.
(1) Splicing possible for longer travel distances.
(2) Longer life available with wider belt.
(3) Applies to the linear actuator with drive module, without drive.

HLE-Z Performance Curves

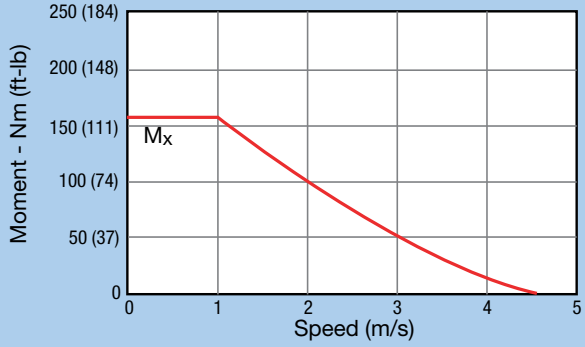
The forces and torque ratings of the carriage are speed dependent. The curves shown in the graphs apply to a standard carriage (S). With the extended carriage (E), all the values except for Fx (load-bearing capacity of timing belt) can be doubled if the load is applied equally to both halves of the carriage 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, or the load or speed should be reduced if necessary.



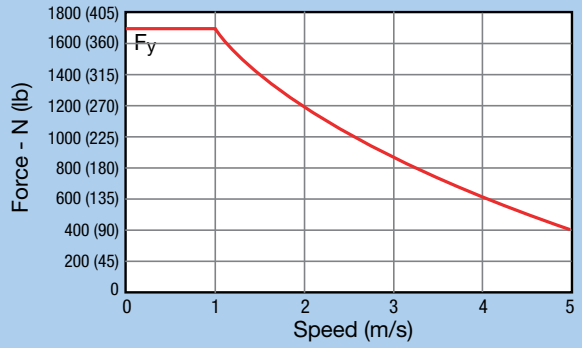
Fx



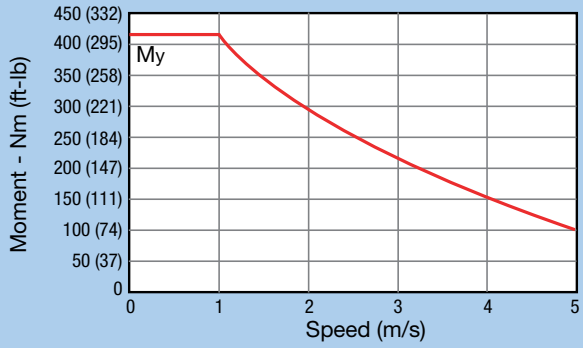
Mx



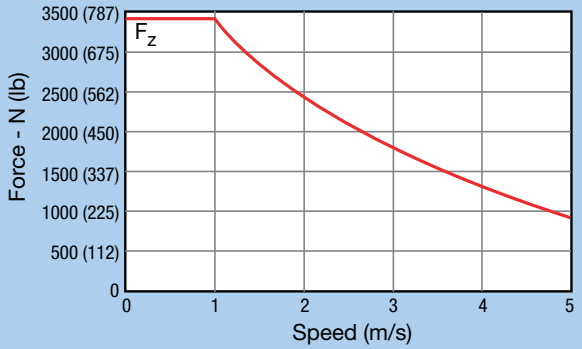
Fy



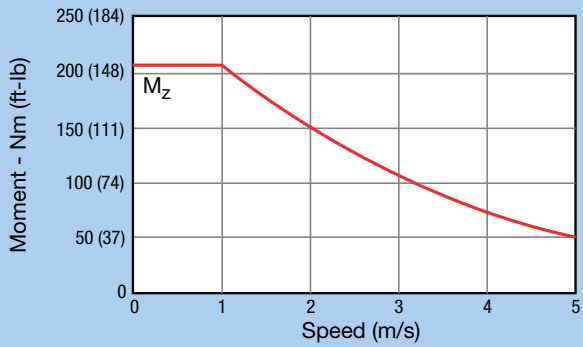
My



Fz



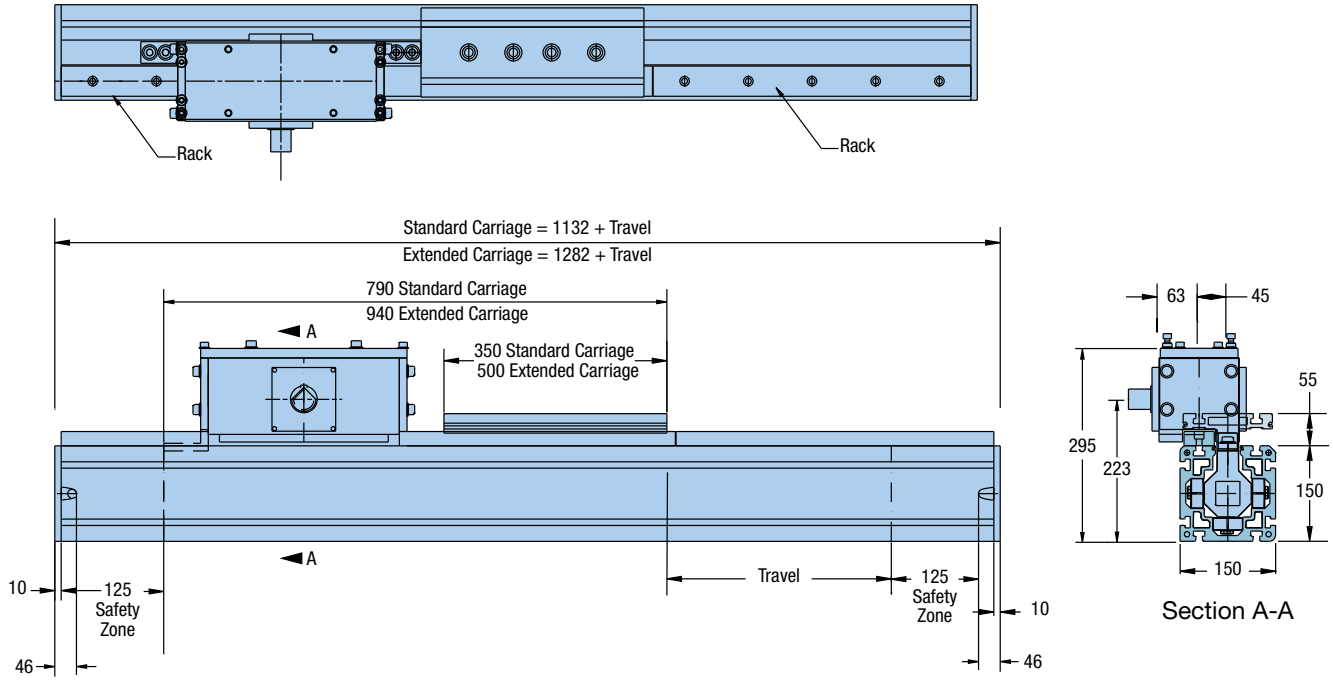
Mz



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

HLE-Z150 Dimensions

Dimensions (mm)



Note: Cable Carrier required (not shown) – consult factory before making final selection.

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:	HLE	Z	150	E	P	1000	DL	K	G4-05	N	N	N	K08	LH0

① Series
HLE

② Model Size
150

③ Drive System
Z Rack-and-pinion
N Idler Unit

④ Carriage Type
S Standard Carriage with Load Attachment Plate
E Extended Carriage with Load Attachment Plate

⑤ Guide System
P Polyamide Wheels

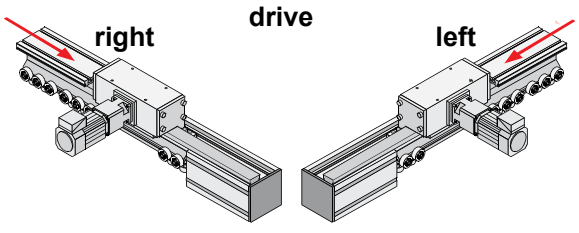
⑥ Travel Length
nnnn Specified travel in mm (nnnn = mm)

⑦ Drive Shaft Option*
ND No Drive Shaft – Idler Unit
SL Shaft on Left
SR Shaft on Right
DL Gearbox on Left
DR Gearbox on Right
*See illustration below.

⑧ Drive Shaft Interface
I No Flange – Idler Unit
K Flange Suitable for 115 mm Gearbox

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

Indication on left / right: looking from the load plate to the drive module



⑩ Linear Encoder
N Without Linear Encoder (Standard)
L With Linear Encoder (Consult Factory)

⑪ Material
N Standard Version
V Corrosion Resistant Version

⑫ Strip Seal Cover
N Without Cover (Standard)

⑬ Motor Kit Option
K00 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

⑭ Limit/Home Switch Option
LH0 No Limit Switch Assembly
LH1 Three Mechanical Switches
LH2 Two Mechanical Switches, 1 Prox
LH3 Three NPN Prox Switches, 10-30 VDC
LH4 Three PNP Prox Switches, 10-30 VDC