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

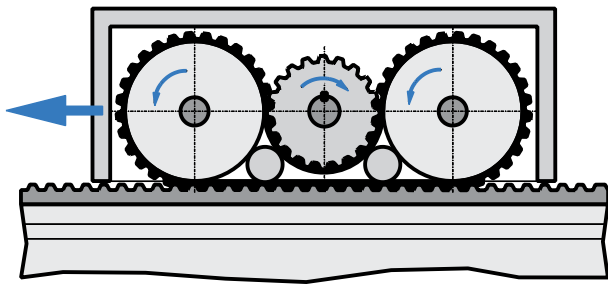
The “endless” linear unit is designed for guiding, transporting or positioning payloads over long travel distances with high rigidity and accuracy. This is accomplished by incorporating Parker’s uniquely designed rack-and-pinion based drive system with an HLE150 linear module housing. The exceptional 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

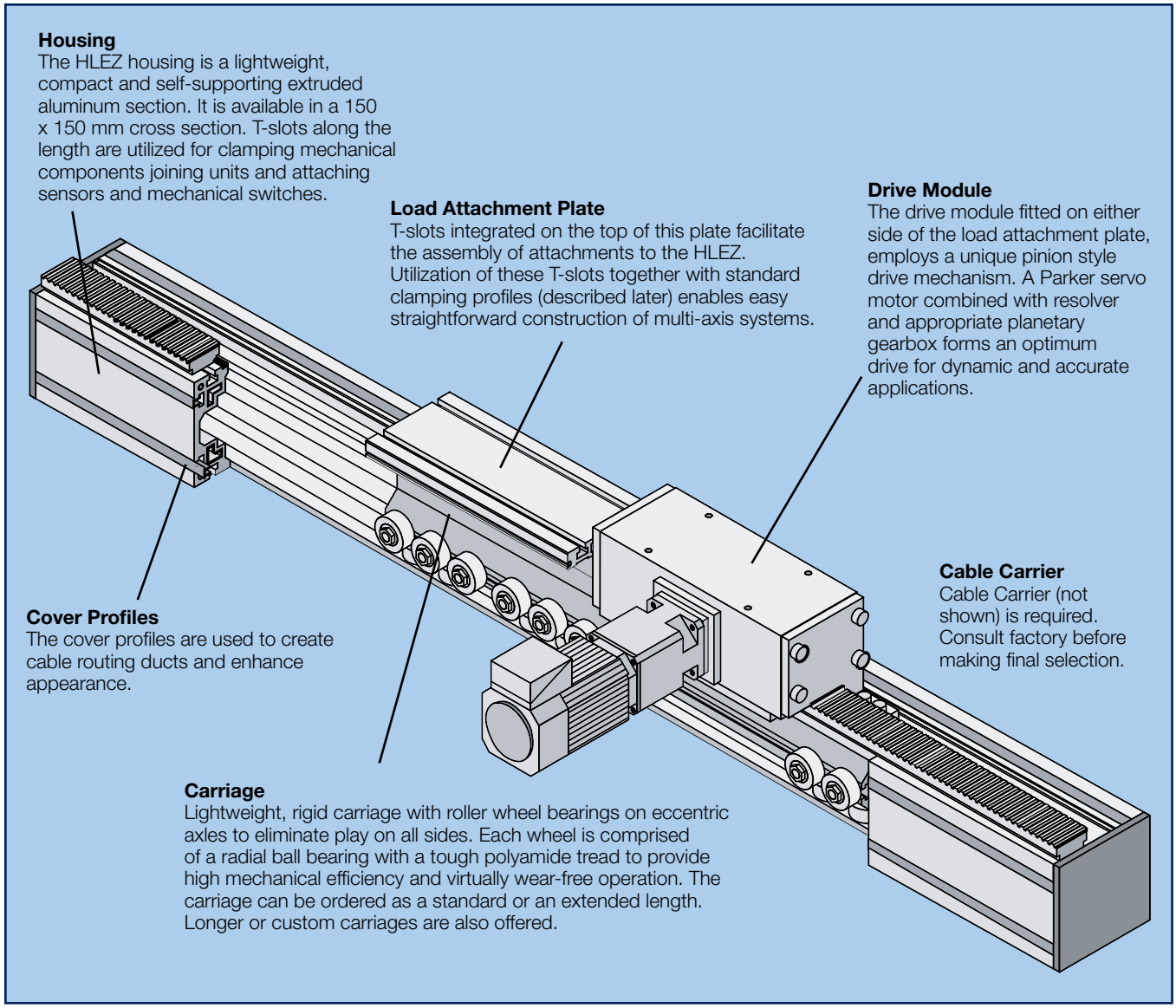
Linear actuator and rack offers the following advantages:

- 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



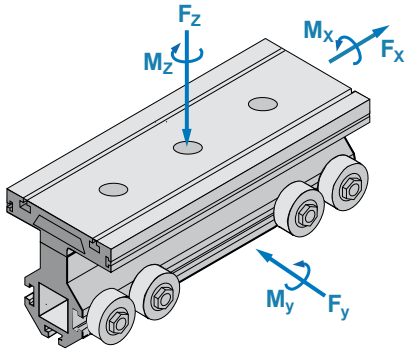
HLE-Z Series Specifications

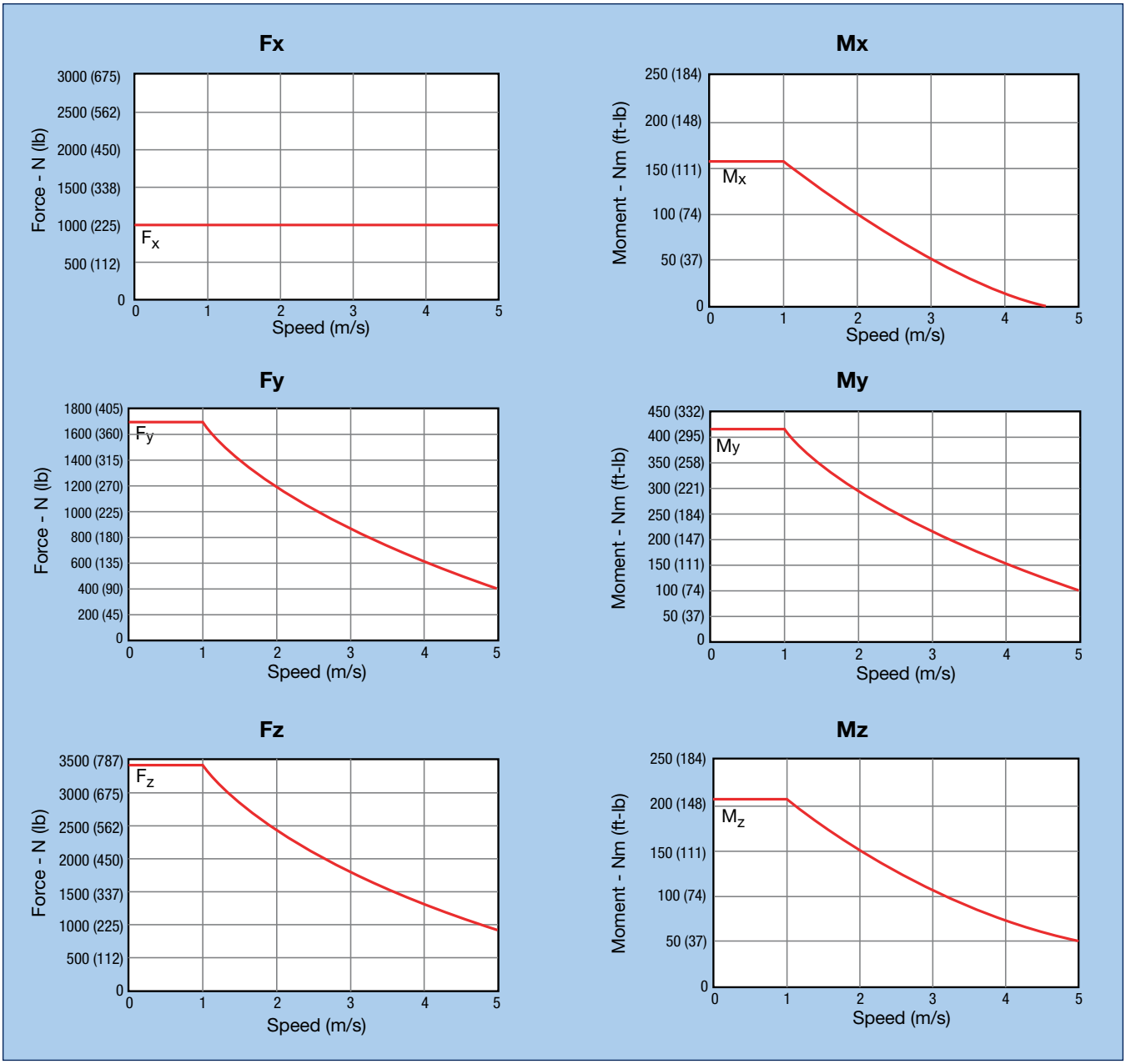
Characteristic	Units	HLEZ150	
Unit Weight (basic unit without stroke)			
Standard Carriage, S	kg (lb)	53.0	(116.9)
Extended Carriage, E	kg (lb)	61.0	(134.5)
Carriage Weight			
Standard Carriage, S	kg (lb)	25.7	(56.7)
Extended Carriage, E	kg (lb)	29.7	(65.5)
Weight (per meter) of additional travel length	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

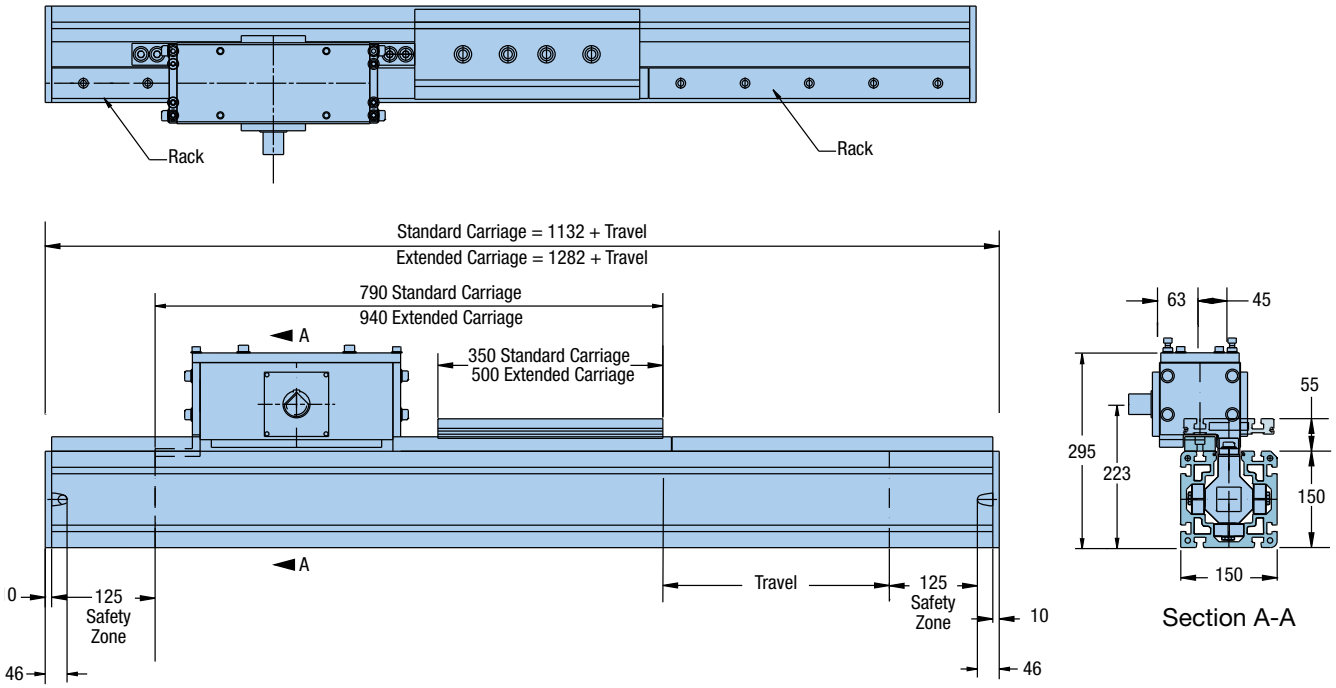
The forces and torque ratings of the carriage are speed dependent. The curves shown in the graphs apply to a standard carriage (S). With the extended carriage (E), all the values except for Fx (load-bearing capacity of timing belt) can be doubled if the load is applied equally to both halves of the carriage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





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

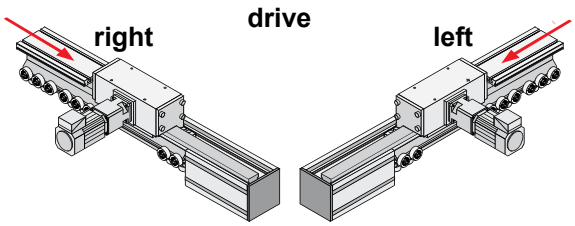
⑥ Travel Length
nnnn Specified travel in mm (nnnn = mm)

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
G1-nn Customer Supplied
G2-nn PEN-115*
G3-nn PER-115*
G4-nn GTN-115*
G5-nn GTR-115*
*Single stage ratios: 3, 4, 5, 8, 10; Dual stage ratios: 12, 15, 16, 20, 25

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
K06 J034*, N034*, BE34*, TS3* to GT, PE-115
K07 J090*, N090* to GT, PE-115
K08 M105* to GT, PE-115
K09 ES3*, OEM83-*, ZETA83-*, S83-*, RS3* to GT, PE-115
K10 RS42, RE42, S106-205 to GT, PE-115
K11 S106-178, S106-250 to GT, PE-115
K12 M145 to GT, PE-115
K13 M145 to GT, PE-142
*Single stage ratios: 3, 4, 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