L10 Series

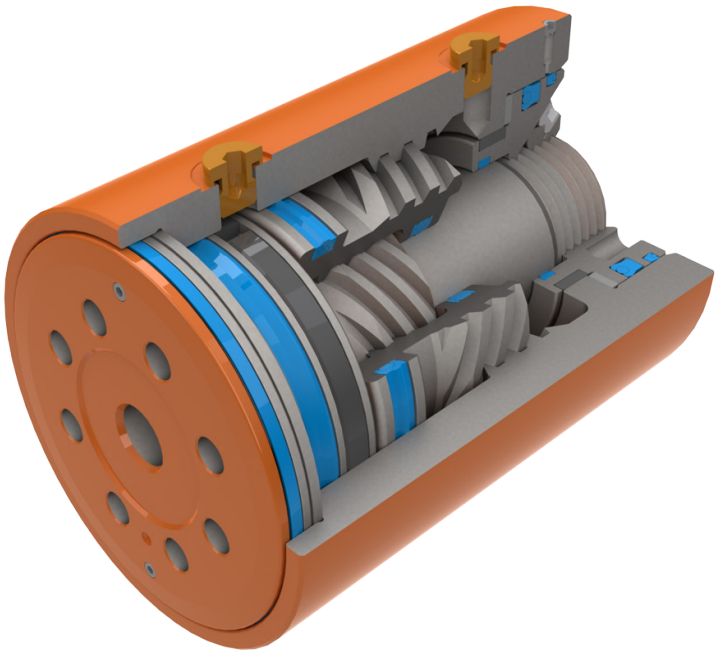
Helical Hydraulic Rotary Actuators

Exceptional Torque in an Ultra-Compact Design:

The L10 Series is our smallest and most compact helical hydraulic actuator, ideal for applications where space is a premium. This ultra-compact series features extremely high thrust bearing capacity in a sleek cylindrical design, with end-flange mounting and a drilled-and-tapped output flange for direct attachment of heavy loads.

Parker's helical hydraulic sliding spline technology is non-self-locking, while providing high shock resistance and holding torque for demanding applications. Simultaneously functioning as a rotating device, mounting bracket, and load bearing structure, the L10 Series eliminates the need for external bearing systems, brakes or locking devices.

The L10 Series is available in 5 standard sizes with torque output up to 25,000 in-lb.



Product Features:

- **Powerful**
  - High Torque
  - High Bearing Capacity
- **Drift-Free Positioning**
  - Zero Internal Leakage
  - Smooth Operation
  - No External Brake Required
- **Backdrives in Overload Conditions**
  - Acts like a Hydraulic Fuse
  - Prevents Mechanical Damage
- **Available in 180° and 360° Rotation**
- **Ultra-Compact**
  - High Power Density
  - Fits in Tight Spaces
- **Streamlined Design**
  - Eliminates Linkages and Bearings
  - Reduced Bill of Materials
- **Durable**
  - Suitable for Harsh Environments
  - Moving Parts Protected
- **Counterbalance Valve Option Available**

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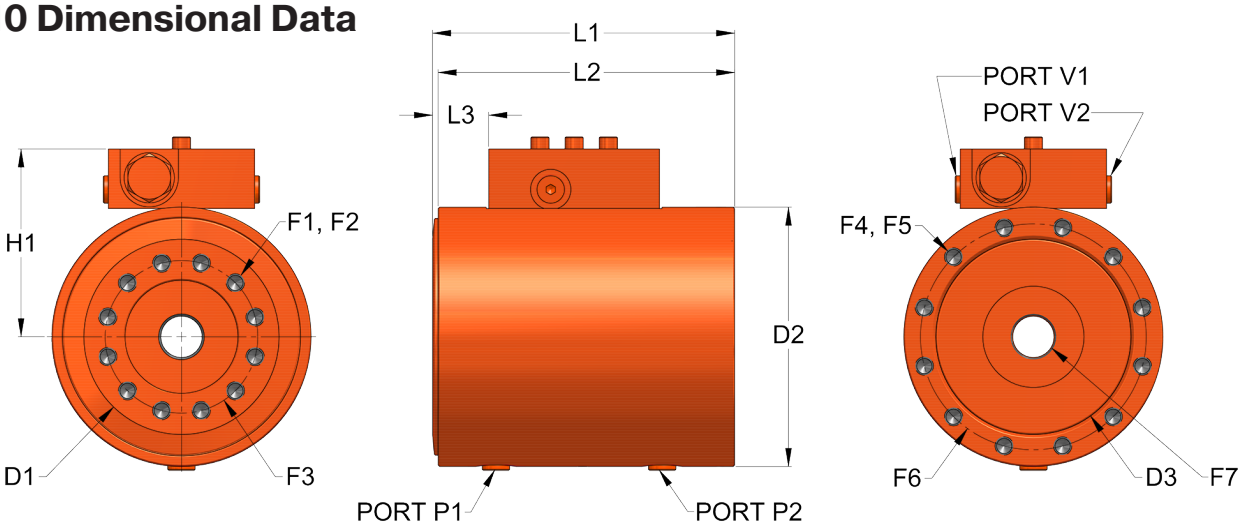
Parker HELAC®

ENGINEERING YOUR SUCCESS.

L10 Dimensional Data



Shaft Flange **Housing Flange**

Model	Drive Torque in-lb @ 3,000 psi (Nm @ 207 bar)	Holding Torque in-lb @ 3,000 psi (Nm @ 207 bar)	Moment Capacity Cantilever Mount in-lb (Nm)	Radial Capacity lb (kg)	Axial Capacity lb (kg)	Displacement 180° in^3 (cm^3)	Displacement 360° in^3 (cm^3)	Approximate Weight 180° lb (kg)	Approximate Weight 360° lb (kg)
3.0	3,000 (339)	11,000 (1 243)	9,000 (1 017)	3,000 (1 361)	3,000 (1 361)	7.40 (121.3)	14.80 (242.5)	22.0 (10.0)	28.0 (12.7)
5.5	5,500 (622)	17,000 (1 921)	20,000 (2 260)	4,000 (1 814)	4,000 (1 814)	11.7(191.7)	23.40 (383.5)	31.0 (14.1)	42.0 (19.1)
9.5	9,500 (1 074)	34,000 (3 842)	50,000 (5 650)	8,000 (3 629)	8,000 (3 629)	22.3 (365.4)*	44.70 (732.5)	57.0 (25.9)*	77.0 (34.9)
15	15,000 (1 695)	50,000 (5 650)	80,000 (9 040)	11,000 (4 990)	11,000 (4 990)	33.7 (552.2)	67.40 (1 104.5)	95.0 (43.1)	120 (54.4)
25	25,000 (2 825)	83,000 (9 379)	100,000 (11 300)	15,000 (6 804)	15,000 (6 804)	55.8 (914.4)	111.60 (1 828.8)	125 (56.7)	183 (83.0)

Model	D1 Shaft mounting surface diameter in (mm)	D2 Housing diameter in (mm)	D3 Mounting flange inside diameter in (mm)	F1 Threaded mounting hole, shaft flange in, deep (metric, deep)	F2 Quantity of mounting hole, shaft flange	F3 Bolt circle diameter, shaft flange in (mm)	F4 Threaded mounting hole, housing flange in, deep (metric, deep)	F5 Quantity of mounting holes, housing flange	F6 Bolt circle diameter, housing flange in (mm)	F7 Shaft through-hole diameter in (mm)
3.0	3.50 (89)	4.70 (119)	3.66 (93)	5/16-18 ⇩0.50 (M8 x 1.25 ⇩12)	8	2.875 (73.0)	5/16-18 ⇩0.50 (M8 x 1.25 ⇩12)	8	4.063 (103)	0.66 (17)
5.5	4.00 (102)	5.30 (135)	4.12 (105)	3/8-16 ⇩0.63 (M10 x 1.5 ⇩15.2)	12	3.125 (80.0)	3/8-16 ⇩0.63 (M10 x 1.5 ⇩18)	12	4.625 (117)	.84 (21.4)
9.5	5.00 (127)	6.70 (170)	5.28 (134)	1/2-13 ⇩0.75 (M12 x 1.75 ⇩19.1)	12	4.000 (102)	1/2-13 ⇩0.75 (M12 x 1.75 ⇩19.1)	12	5.938 (151)	1.41 (35.7)
15	5.81 (148)	7.80 (198)	6.16 (157)	1/2-13 ⇩0.75 (M12 x 1.75 ⇩19.1)	12	5.000 (127)	1/2-13 ⇩0.75 (M12 x 1.75 ⇩19.1)	12	6.875 (175)	1.80 (45.7)
25	7.27 (185)	8.90 (226)	7.32 (186)	5/8-11 ⇩1.00 (M16 x 2 ⇩25.4)	12	5.500 (140)	1/2-13 ⇩0.75 (M12 x 1.75 ⇩19.1)	12	8.000 (203)	2.63 (66.7)

Model	H1 Centerline to valve top in (mm)	L1 Overall Length 180° in (mm)	L1 Overall Length 360° in (mm)	L2 Overall Length, non-rotating 180° in (mm)	L2 Overall Length, non-rotating 360° in (mm)	L3 Shaft flange to counterbalance valve 180° in (mm)	L3 Shaft flange to counterbalance valve 360° in (mm)
3.0	3.53 (89.7)	5.63 (143)	7.45 (189)	5.58 (142)	7.40 (188)	1.06 (26.9)	0.89 (22.6)
5.5	3.85 (97.8)	6.13 (156)	8.35 (212)	6.08 (154)	8.30 (211)	1.09 (27.7)	0.97 (24.6)
9.5	4.53 (115)	7.25 (184)*	10.15 (258)	7.17 (182)*	10.07 (256)	1.10 (27.9)*	1.68 (42.7)
15	5.07 (129)	8.83 (224)	12.25 (311)	8.72 (221)	12.14 (308)	1.52 (38.6)	2.37 (60.2)
25	5.63 (143)	9.50 (241)	13.64 (346)	9.40 (239)	13.54 (344)	1.73 (43.9)	2.77 (70.4)

*L10-9.5 185° Rotation

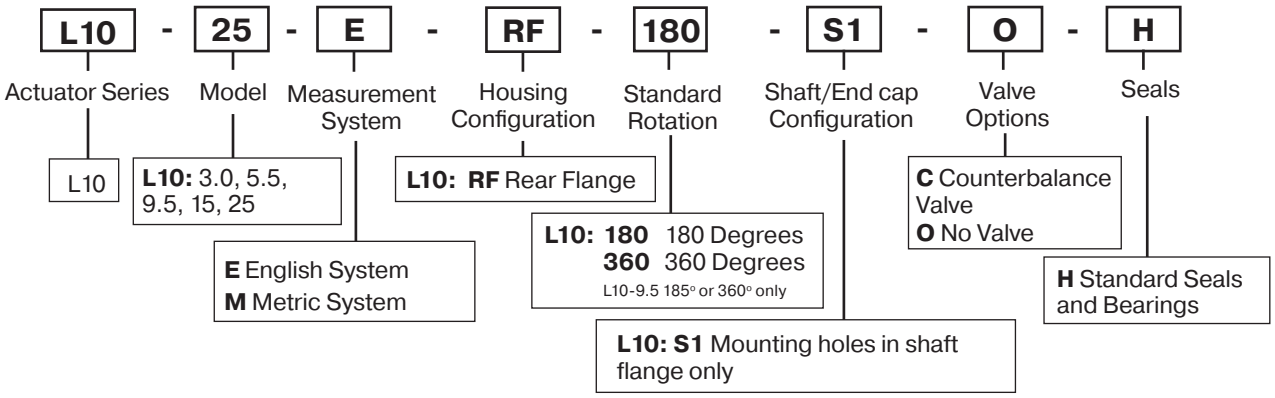
Specification charts are for general reference only. Consult drawings for actual values and tolerances.

L10 Dimensional Data

Model	P1, P2 - Ports, housing inch (metric)	V1, V2 - Ports, valve inch (metric)
3.0	ISO-11926/SAE Series of ports. Sizes are SAE #4 (7/16"). (ISO-1179-1/BSPP 'G' Series of ports. Sizes are 1/8".) See drawings for details.	ISO-11926/SAE Series of ports. Sizes are SAE #4 (7/16"). (ISO-1179-1/BSPP 'G' Series of ports. Sizes are 1/8".) See drawings for details
5.5		
9.5		
15		
25		

*L10-9.5 185° Rotation - Specification charts are for general reference only. Consult drawings for actual values and tolerances.

Model Code and Part Numbers

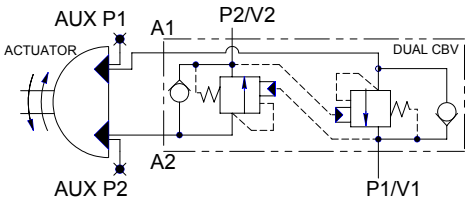


English 180° Rotation		Metric 180° Rotation		English 360° Rotation		Metric 360° Rotation	
Model	Part Number	Model	Part Number	Model	Part Number	Model	Part Number
L10-3.0-E-RF-180-S1-O-H	53905-P041-D	L10-3.0-M-RF-180-S1-O-H	53909-P041-D	L10-3.0-E-RF-360-S1-O-H	53908-P041-D	L10-3.0-M-RF-360-S1-O-H	53910-P041-D
L10-3.0-E-RF-180-S1-O-H	53905-P065-D	L10-3.0-M-RF-180-S1-O-H	53909-P065-D	L10-3.0-E-RF-360-S1-O-H	53908-P065-D	L10-3.0-M-RF-360-S1-O-H	53910-P065-D
L10-3.0-E-RF-180-S1-C-H	53977-P041-D	L10-3.0-M-RF-180-S1-C-H	53968-P041-D	L10-3.0-E-RF-360-S1-C-H	53887-P041-D	L10-3.0-M-RF-360-S1-C-H	53940-P041-D
L10-3.0-E-RF-180-S1-C-H	53977-P065-D	L10-3.0-M-RF-180-S1-C-H	53968-P065-D	L10-3.0-E-RF-360-S1-C-H	53887-P065-D	L10-3.0-M-RF-360-S1-C-H	53940-P065-D
L10-5.5-E-RF-180-S1-O-H	53715-P041-D	L10-5.5-M-RF-180-S1-O-H	53917-P041-D	L10-5.5-E-RF-360-S1-O-H	53721-P041-D	L10-5.5-M-RF-360-S1-O-H	53755-P041-D
L10-5.5-E-RF-180-S1-O-H	53715-P065-D	L10-5.5-M-RF-180-S1-O-H	53917-P065-D	L10-5.5-E-RF-360-S1-O-H	53721-P065-D	L10-5.5-M-RF-360-S1-O-H	53755-P065-D
L10-5.5-E-RF-180-S1-C-H	53666-P041-D	L10-5.5-M-RF-180-S1-C-H	53825-P041-D	L10-5.5-E-RF-360-S1-C-H	53667-P041-D	L10-5.5-M-RF-360-S1-C-H	53674-P041-D
L10-5.5-E-RF-180-S1-C-H	53666-P065-D	L10-5.5-M-RF-180-S1-C-H	53825-P065-D	L10-5.5-E-RF-360-S1-C-H	53667-P065-D	L10-5.5-M-RF-360-S1-C-H	53674-P065-D
L10-9.5-E-RF-185-S1-O-H	53689-P041-D	L10-9.5-M-RF-185-S1-O-H	53691-P041-D	L10-9.5-E-RF-360-S1-O-H	53685-P041-D	L10-9.5-M-RF-360-S1-O-H	54001-P041-D
L10-9.5-E-RF-185-S1-O-H	53689-P065-D	L10-9.5-M-RF-185-S1-O-H	53691-P065-D	L10-9.5-E-RF-360-S1-O-H	53685-P065-D	L10-9.5-M-RF-360-S1-O-H	54001-P065-D
L10-9.5-E-RF-185-S1-C-H	53698-P041-D	L10-9.5-M-RF-185-S1-C-H	53699-P041-D	L10-9.5-E-RF-360-S1-C-H	53687-P041-D	L10-9.5-M-RF-360-S1-C-H	53700-P041-D
L10-9.5-E-RF-185-S1-C-H	53698-P065-D	L10-9.5-M-RF-185-S1-C-H	53699-P065-D	L10-9.5-E-RF-360-S1-C-H	53687-P065-D	L10-9.5-M-RF-360-S1-C-H	53700-P065-D
L10-15-E-RF-180-S1-O-H	53224-P041-D	L10-15-M-RF-180-S1-O-H	53845-P041-D	L10-15-E-RF-360-S1-O-H	53724-P041-D	L10-15-M-RF-360-S1-O-H	54026-P041-D
L10-15-E-RF-180-S1-O-H	53224-P065-D	L10-15-M-RF-180-S1-O-H	53845-P065-D	L10-15-E-RF-360-S1-O-H	53724-P065-D	L10-15-M-RF-360-S1-O-H	54026-P065-D
L10-15-E-RF-180-S1-C-H	53702-P041-D	L10-15-M-RF-180-S1-C-H	53491-P041-D	L10-15-E-RF-360-S1-C-H	53791-P041-D	L10-15-M-RF-360-S1-C-H	53920-P041-D
L10-15-E-RF-180-S1-C-H	53702-P065-D	L10-15-M-RF-180-S1-C-H	53491-P065-D	L10-15-E-RF-360-S1-C-H	53791-P065-D	L10-15-M-RF-360-S1-C-H	53920-P065-D
L10-25-E-RF-180-S1-O-H	53514-P041-D	L10-25-M-RF-180-S1-O-H	53964-P041-D	L10-25-E-RF-360-S1-O-H	53450-P041-D	L10-25-M-RF-360-S1-O-H	53965-P041-D
L10-25-E-RF-180-S1-O-H	53514-P065-D	L10-25-M-RF-180-S1-O-H	53964-P065-D	L10-25-E-RF-360-S1-O-H	53450-P065-D	L10-25-M-RF-360-S1-O-H	53965-P065-D
L10-25-E-RF-180-S1-C-H	53470-P041-D	L10-25-M-RF-180-S1-C-H	53982-P041-D	L10-25-E-RF-360-S1-C-H	53453-P041-D	L10-25-M-RF-360-S1-C-H	54029-P041-D
L10-25-E-RF-180-S1-C-H	53470-P065-D	L10-25-M-RF-180-S1-C-H	53982-P065-D	L10-25-E-RF-360-S1-C-H	53453-P065-D	L10-25-M-RF-360-S1-C-H	54029-P065-D

P041 - Black Primer
P065 - Semi Gloss Black Paint
Reference the L10 Series Service and Repair Manual for service parts

Valve Configuration

Optional factory mounted counterbalance valves prevent rotation in the event of a hydraulic line failure, control rotation when loads go over center, and protect the actuator against excessive torque loads.



Hydraulic Schematic of Optional Counterbalance Valve

L10 with counterbalance valve

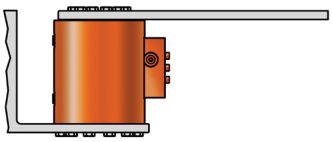
L10 Series

Manufactured from aluminum, the valve blocks are bolted to a flat mounting pad on the actuator housing. Three bolts secure the valve block to the actuator. See page 2 for valve location.

The pilot ratio is 3:1. The valves are set to relieve at 3300 psi ±300 psi (228 bar ±21 bar).

Cantilever Mount

The load is mounted to the shaft flange and is supported at only one end of the shaft. Cantilever mounting is not recommended for aerial work platforms or other critical and safety-related applications.

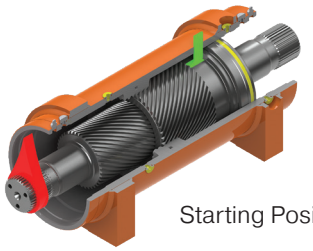


Helical Hydraulic Rotary Actuator Technology

Helac's innovative sliding-spline technology converts linear piston motion into powerful shaft rotation. Each actuator is comprised of a housing and two moving parts — the central shaft and piston. Helical spline teeth on the shaft engage matching teeth on the piston's inside diameter. A second set of helical splines on the piston's outside diameter mesh with the gear in the housing.

Starting Position

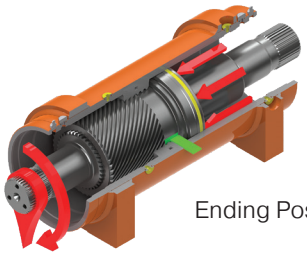
The piston is at end of stroke. Bars indicate starting positions of piston and shaft. The housing with integral gear remains stationary.



Starting Position

Ending Position

When hydraulic pressure is applied to the piston, it moves axially; while the helical gearing causes the piston and shaft to rotate simultaneously. Applying pressure to the opposite port will return the piston and shaft to their original starting positions.



Ending Position