

# 310L EP (IT4) Backhoe Loader

54 kW (72 gross hp) / 51 kW (69 net hp)



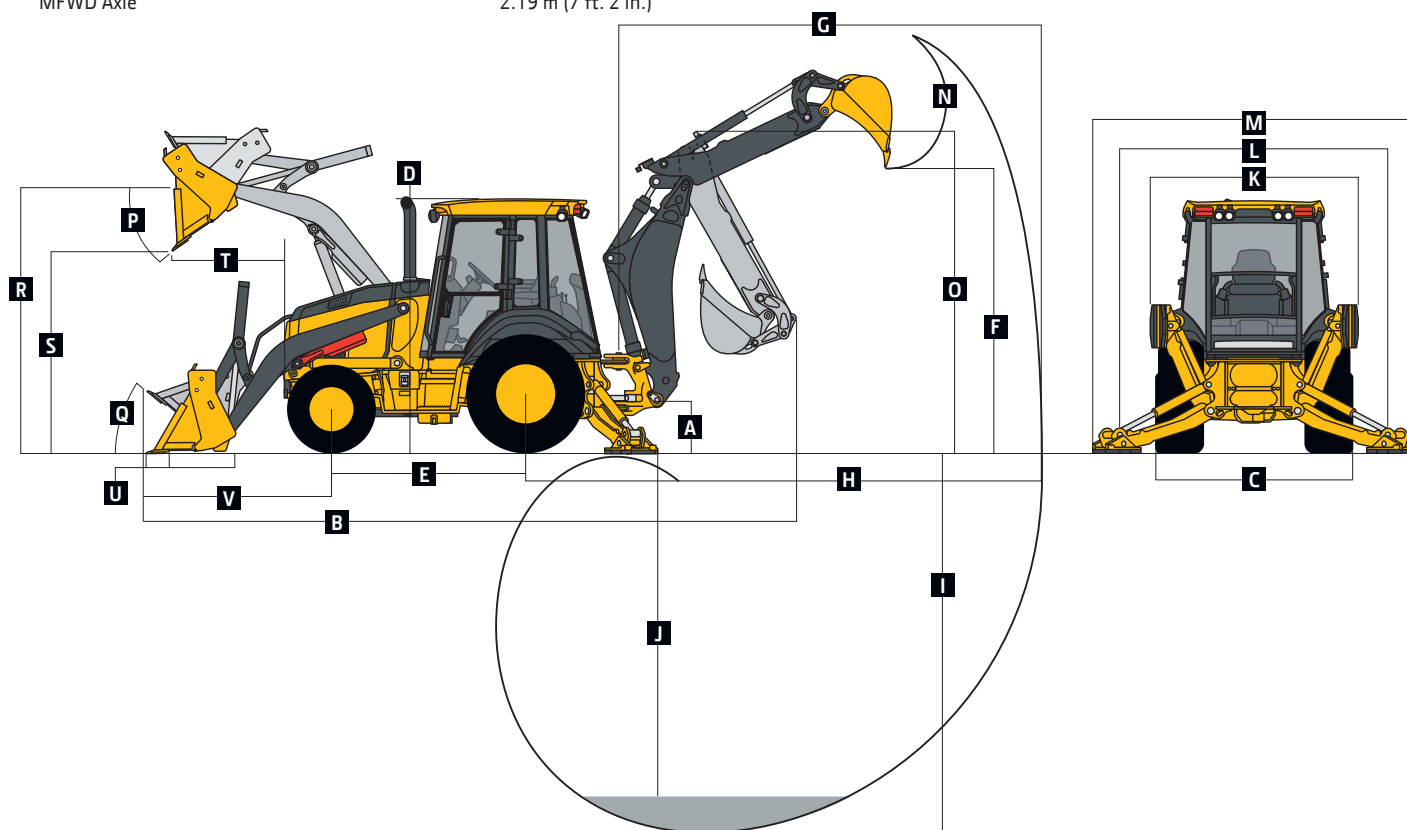
JOHN DEERE



Engine		310L EP	
Manufacturer and Model		Yanmar 4TNV98CT turbocharged	
Non-Road Emission Standard		EPA Interim Tier 4/EU Stage IIIB	
Displacement		3.3 L (203 cu. in.)	
Gross Peak Power		54 kW (72 hp) at 2,330 rpm	
Power Ratings			
Net Peak Power* (ISO 9249)		51 kW (69 hp) at 2,010 rpm	
Net Peak Torque (ISO 9249)		271 Nm (200 lb.-ft.) at 1,800 rpm	
Net Torque Rise		27%	
Lubrication		Pressure system with spin-on filter and cooler	
Air Cleaner		Dual-stage dry type with safety element and evacuator valve	
*Net power advertised is the power available at the flywheel when the engine is equipped with cooling fan, air cleaner, muffler, and alternator at standard conditions. An engine power derate will occur with an elevation increase that may be perceivable beginning at ~3,000 ft., depending on application and conditions.			
Cooling			
Fan Type		Viscous variable-rate (temperature-controlled) cooling fan standard	
Engine Coolant Rating		-40 deg. C (-40 deg. F)	
Engine Oil Cooler		Oil to water	
Powertrain			
Transmission		4-speed, helical-cut gears, full PowerShift™ transmission with hydraulic reverser standard; electric clutch cutoff on loader lever	
Torque Converter		Single stage, dual phase with 2.63:1 stall ratio, 280 mm (11 in.)	
Maximum Travel Speeds with Standard Engine, Measured with 19.5L-24 Rear Tires		Forward	Reverse
Gear 1		5.3 km/h (3.3 mph)	6.7 km/h (4.2 mph)
Gear 2		9.7 km/h (6.0 mph)	12.3 km/h (7.6 mph)
Gear 3		20.1 km/h (12.5 mph)	—
Gear 4		36.4 km/h (22.6 mph)	—
Axles			
Axle Oscillation, Stop to Stop, Front Axle		22 deg.	
Axle Ratings		Front	Rear
SAE J43		5000 kg (11,000 lb.)	6000 kg (13,200 lb.)
Dynamic		9000 kg (19,800 lb.)	10 000 kg (22,000 lb.)
Static		23 500 kg (51,800 lb.)	26 500 kg (58,400 lb.)
Ultimate		37 000 kg (81,600 lb.)	39 500 kg (87,100 lb.)

Powertrain <i>(continued)</i>		310L EP	
Differentials			
Mechanical-Front-Wheel-Drive (MFWD) Axle		Open – standard; automatic, limited-slip traction control – custom or optional	
Rear Axle		Foot actuated, hydraulically engaged 100% mechanical lock	
Steering (ISO 5010)		Hydrostatic power steering and emergency steering	
Axle		MFWD	Non-Powered Front
Curb-Turning Radius			
With Brakes		3.57 m (11 ft. 9 in.)	3.55 m (11 ft. 8 in.)
Without Brakes		4.15 m (13 ft. 7 in.)	4.12 m (13 ft. 6 in.)
Bucket-Clearance Circle			
With Brakes		9.99 m (32 ft. 9 in.)	9.98 m (32 ft. 9 in.)
Without Brakes		10.86 m (35 ft. 8 in.)	10.84 m (35 ft. 7 in.)
Steering Wheel Turns (lock to lock)		2.7	3.2
MFWD and Rear Axle		Heavy duty, outboard planetary final drives distribute shock loads over 3 gears	
Brakes (ISO 3450)			
Service		Power assisted, hydraulic wet disc, mounted inboard, self-adjusting and self-equalizing	
Parking		Spring applied, hydraulically released, wet, multi-disc, independent of service brakes with electric switch control	
Hydraulics			
Main Pump		Open-center system; axial-piston pump	
Pump Flow at 2,200 rpm			
Backhoe		128 L/m (33.7 gpm)	
Loader		104 L/m (27.5 gpm)	
System Relief Pressure			
Backhoe		24 993 kPa (3,625 psi)	
Loader		22 063 kPa (3,200 psi)	
Controls			
Backhoe		2-lever mechanical standard; pilot controls with pattern select and manual and/or electric auxiliary functions optional; field kits available for additional mechanical-control options	
Loader		Single-lever control with electric clutch cutoff switch and MFWD (momentary) standard; single-lever control with electric clutch cutoff switch, electrohydraulic (EH) proportional auxiliary roller, MFWD (momentary), and transmission quick-shift optional	
Cylinders			
Heat-treated, chrome-plated, polished rods; hardened steel (replaceable bushings) pivot pins			
	Bore	Rod Diameter	Stroke
Loader Boom (2)	80 mm (3.15 in.)	50 mm (1.97 in.)	790 mm (31.10 in.)
Loader Bucket (1)	90 mm (3.54 in.)	50 mm (1.97 in.)	744 mm (29.29 in.)
Backhoe Boom (1)	110 mm (4.33 in.)	56 mm (2.20 in.)	821 mm (32.32 in.)
Backhoe Crowd (1)	110 mm (4.33 in.)	63 mm (2.48 in.)	553 mm (21.77 in.)
Backhoe Bucket (1)	80 mm (3.15 in.)	50 mm (1.97 in.)	892 mm (35.12 in.)
Backhoe Swing (2)	80 mm (3.15 in.)	45 mm (1.77 in.)	310 mm (12.20 in.)
Backhoe Extendable Dipperstick (1)	63 mm (2.48 in.)	32 mm (1.26 in.)	1062 mm (41.81 in.)
Backhoe Stabilizer (2)	80 mm (3.15 in.)	50 mm (1.97 in.)	500 mm (19.69 in.)
Non-Powered Axle (1)	70 mm (2.76 in.)	42 mm (1.65 in.)	210 mm (8.27 in.)
MFWD (1)	65 mm (2.56 in.)	40 mm (1.57 in.)	210 mm (8.27 in.)
Electrical			
Voltage		12 volt	
Alternator Rating		120 amp with canopy and quarter cab / 130 amp with cab	
Lights		10 halogen: 4 front, 4 rear, and 2 side docking (32,500 candlepower each); turn signals and flashers: 2 front and 2 rear; stop and taillights; and 2 rear reflectors; factory-installed option for 2 LED spotlights and 8 LED floodlights in lieu of standard halogen light package	
Operator Station			
Type (ISO 3471)		Canopy, isolation mounted, ROPS/FOPS, left/right access, with molded roof; optional quarter cab (front glass only) and fully enclosed cab	
Tires/Wheels			
	Front	Rear	
Non-Powered Front Axle	12.5/80-18 F3 (12)	19.5L-24 R4 (12)	
	14.5/75-16.1 F3 (16)	19.5L-24 R4 (12)	
With MFWD	12-16.5 NHS (12)	19.5L-24 R4 (12)	
Serviceability			
Refill Capacities			
Cooling System			
Cab		19.3 L (20.4 qt.)	
Canopy		17.4 L (18.4 qt.)	
Rear Axle		18 L (19 qt.)	
Engine Oil (including vertical spin-on filter)		10.5 L (11.1 qt.)	
Torque Converter and Transmission		15.1 L (16 qt.)	
Fuel Tank (with ground-level fueling)		128.7 L (34 gal.)	
Hydraulic System		126.8 L (33.5 gal.)	
Hydraulic Reservoir		45 L (11.9 gal.)	
MFWD Housing			
Axle		6.5 L (6.9 qt.)	
Planetary (each)		0.9 L (1 qt.)	

Operating Weights		310L EP
With Full Fuel Tank, 79-kg (175 lb.) Operator, Standard Equipment, and Bumper		6270 kg (13,822 lb.)
Typical with Cab, Extendable Dipperstick, MFWD, and 204-kg (450 lb.) Counterweight		7095 kg (15,642 lb.)
Optional Components (weight difference between base equipment and option)		
Cab		263 kg (580 lb.)
MFWD with Tires		168 kg (370 lb.)
Extendable Dipperstick		191 kg (420 lb.)
Front Loader Coupler		257 kg (566 lb.)
Backhoe Bucket Coupler		59 kg (130 lb.)
Overall Dimensions		
A Ground Clearance, Minimum		318 mm (13 in.)
B Overall Length, Transport		7.24 m (23 ft. 9 in.)
C Width Over Tires		2.20 m (7 ft. 3 in.)
D Height to Top of ROPS/Cab		2.81 m (9 ft. 3 in.)
E Length from Axle to Axle		
Non-Powered Front Axle		2.16 m (7 ft. 1 in.)
MFWD Axle		2.19 m (7 ft. 2 in.)

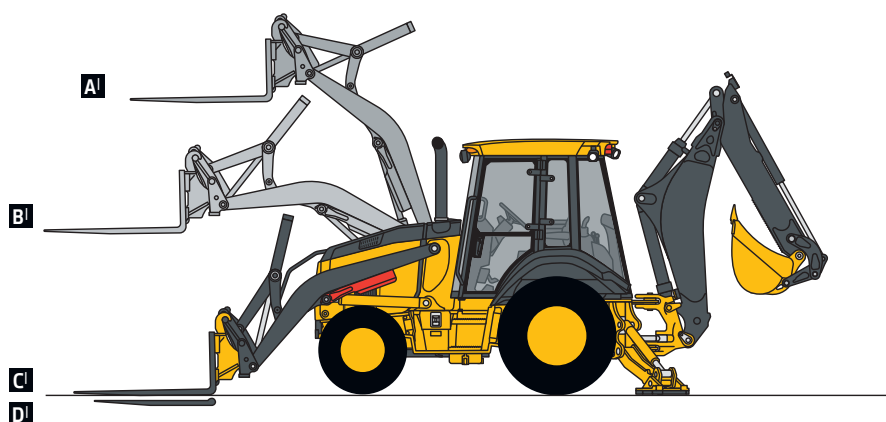


Backhoe Dimensions and Performance		310L EP		
Backhoe specifications are with 610-mm x 0.18-m <sup>3</sup> (24 in. x 6.5 cu. ft.) bucket; dipper lift specs are with a boom angle of 65 deg.				
Bucket Range		305–762 mm (12–30 in.)		
Digging Force				
Bucket Cylinder		48.2 kN (10,844 lb.)		
Crowd Cylinder		31.1 kN (6,992 lb.)		
Swing Arc		180 deg.		
Operator Control		2 levers		
Leveling Angle		14 deg.		
Stabilizer Angle Rearward		18 deg.		
		With Optional Extendable Dipperstick		
		With Standard Backhoe	Retracted	Extended
F	Loading Height, Truck Loading Position	3.38 m (11 ft. 1 in.)	3.46 m (11 ft. 4 in.)	4.12 m (13 ft. 6 in.)
G	Reach from Center of Swing Pivot	5.42 m (17 ft. 9 in.)	5.49 m (18 ft. 0 in.)	6.51 m (21 ft. 4 in.)
H	Reach from Center of Rear Axle	6.49 m (21 ft. 3 in.)	6.55 m (21 ft. 6 in.)	7.57 m (24 ft. 10 in.)
I	Digging Depth (SAE maximum)	4.30 m (14 ft. 1 in.)	4.38 m (14 ft. 4 in.)	5.43 m (17 ft. 10 in.)
J	Digging Depth (SAE)			
	610-mm (2 ft.) Flat Bottom	4.27 m (14 ft. 0 in.)	4.34 m (14 ft. 3 in.)	5.40 m (17 ft. 9 in.)
	2440-mm (8 ft.) Flat Bottom	3.93 m (12 ft. 11 in.)	4.01 m (13 ft. 2 in.)	5.15 m (16 ft. 11 in.)
K	Stabilizer Width, Transport	2.18 m (7 ft. 2 in.)	2.18 m (7 ft. 2 in.)	2.18 m (7 ft. 2 in.)
L	Stabilizer Spread, Operating	3.10 m (10 ft. 2 in.)	3.10 m (10 ft. 2 in.)	3.10 m (10 ft. 2 in.)
M	Stabilizer Overall Width, Operating	3.53 m (11 ft. 7 in.)	3.53 m (11 ft. 7 in.)	3.53 m (11 ft. 7 in.)
N	Bucket Rotation	190 deg.	190 deg.	190 deg.
O	Transport Height	3.38 m (11 ft. 1 in.)	3.39 m (11 ft. 1 in.)	3.39 m (11 ft. 1 in.)

Loader Dimensions and Performance		310L EP			
<b>P</b>	Bucket Dump Angle, Maximum	45 deg.			
<b>Q</b>	Rollback Angle at Ground Level	40 deg.			
		<i>Heavy-duty</i>	<i>Heavy-duty</i>	<i>Heavy-duty long lip</i>	<i>Multipurpose</i>
	Bucket Capacity	0.77 m <sup>3</sup> (1.00 cu. yd.)	0.86 m <sup>3</sup> (1.12 cu. yd.)	0.96 m <sup>3</sup> (1.25 cu. yd.)	0.96 m <sup>3</sup> (1.25 cu. yd.)
	Width	2184 mm (86 in.)	2184 mm (86 in.)	2184 mm (86 in.)	2184 mm (86 in.)
	Weight	363 kg (800 lb.)	390 kg (860 lb.)	405 kg (892 lb.)	794 kg (1,750 lb.)
	Breakout Force	41.6 kN (9,361 lb.)	42.3 kN (9,512 lb.)	40.0 kN (8,983 lb.)	37.0 kN (8,321 lb.)
	Lift Capacity, Full Height	2919 kg (6,435 lb.)	2995 kg (6,602 lb.)	2760 kg (6,085 lb.)	2427 kg (5,352 lb.)
<b>R</b>	Height to Bucket Hinge Pin, Maximum	3.48 m (11 ft. 5 in.)	3.48 m (11 ft. 5 in.)	3.48 m (11 ft. 5 in.)	3.48 m (11 ft. 5 in.)
<b>S</b>	Dump Clearance, Bucket at 45 deg.	2.74 m (9 ft. 0 in.)	2.78 m (9 ft. 1 in.)	2.68 m (8 ft. 9 in.)	2.68 m (8 ft. 9 in.)
<b>T</b>	Reach at Full Height, Bucket at 45 deg.	702 mm (27.7 in.)	667 mm (26.3 in.)	793 mm (31.2 in.)	705 mm (27.8 in.)
<b>U</b>	Digging Depth Below Ground, Bucket Level	70 mm (2.8 in.)	71 mm (2.8 in.)	51 mm (2.0 in.)	111 mm (4.4 in.)
<b>V</b>	Length from Front Axle Centerline to Bucket Cutting Edge	2.02 m (6 ft. 8 in.)	1.97 m (6 ft. 6 in.)	2.12 m (6 ft. 11 in.)	2.10 m (6 ft. 10 in.)

#### Lift Capacity with Quick-Coupler Forks

Hydraulic Capacity	1219-mm (48 in.) Tines	1524-mm (60 in.) Tines
<b>A<sup>1</sup></b> Maximum Height	1711 kg (3,772 lb.)	1592 kg (3,510 lb.)
<b>B<sup>1</sup></b> Maximum Reach	2690 kg (5,931 lb.)	2530 kg (5,578 lb.)
<b>C<sup>1</sup></b> At Ground Line	3393 kg (7,480 lb.)	3203 kg (7,061 lb.)
<b>D<sup>1</sup></b> Below Ground Line	185 mm (7.3 in.)	185 mm (7.3 in.)

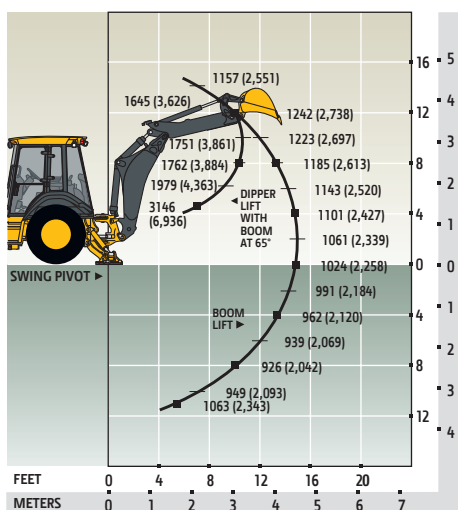


#### Lift Capacity with Bucket

Lift capacities are over-end values in kg (lb.) according to SAE J31. Figures listed are 87% of the maximum lift force available. Calculated with 610-mm x 0.18-m<sup>3</sup> (24 in. x 6.5 cu. ft.) bucket. Bucket impacts overall lift capacity.

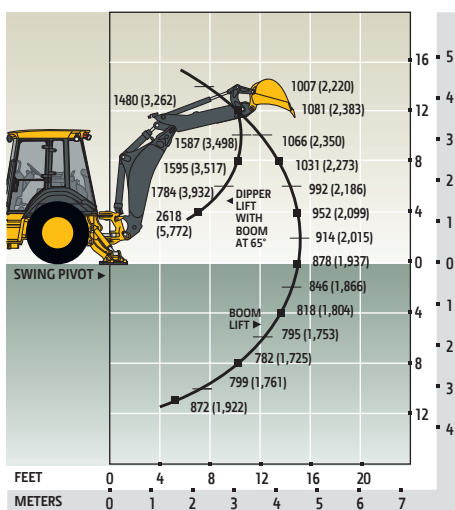
##### STANDARD LIFT

##### With Standard Dipperstick



##### STANDARD LIFT

##### With 1.06-m (3 ft. 6 in.) Extendable Dipperstick, Retracted



##### STANDARD LIFT

##### With 1.06-m (3 ft. 6 in.) Extendable Dipperstick, Extended

