

# E-SERIES SKID STEER LOADERS

320E/324E



JOHN DEERE





# Your words carry a lot of weight, too.

When our customers express their opinions, we listen. And you'll discover plenty of bright ideas in our E-Series Skid Steers that are the result of your input. Such as a connect-under-pressure auxiliary coupler system that makes it easier to switch attachments. Larger-displacement slower-running diesels for easier cold-weather starting and improved fuel efficiency. Best-in-class visibility and bucket breakout forces plus increased operating capacities in both models. You have more control choices, too, including industry-exclusive switchable electrohydraulic (EH) H-ISO-foot controls. And quieter, more spacious operator stations. Other customer-inspired enhancements include a redesigned rear hood and easier-to-remove/replace heavier-duty engine side shields that simplify servicing. You won't find a more owner- and operator-friendly skid steer on the market. You have our word on it.

Specifications	320E	324E
<b>Power</b>	51.7 kW (69 gross hp) / 49.4 kW (66 net hp)	54.8 kW (74 gross hp) / 52.5 kW (70 net hp)
<b>Rated Operating Capacity</b>	994 kg (2,190 lb.)	1221 kg (2,690 lb.)
<b>Breakout Force</b>		
<b>Boom</b>	1589 kg (3,500 lb.)	2497 kg (5,500 lb.)
<b>Bucket</b>	2724 kg (6,000 lb.)	3973 kg (8,750 lb.)
<b>Tipping Load</b>	1989 kg (4,380 lb.)	2443 kg (5,380 lb.)





DEERE 320E





1. Although not exactly a sunroof, the bolt-on top window on cab-equipped models removes quickly for increased ventilation and/or easy cleaning.

2. Standard courtesy lighting stays on up to 90 sec. after the engine is shut down, illuminating the way for easier exits out of dark barns or off after-hour jobsites.





# Open the door to a more productive day.

When was the first time that “compact” and “comfortable” were accurately used together to describe a skid steer? But with the many refinements found in our E-Series, we can make the claim with a straight face. Wide-open entryways in both models and a flat floor in the 324E allow easier entrances and exits. Operators will also like what they see from the sculpted air-ride or mechanical-suspension seat. All-around visibility is expansive and second-to-none. The highly efficient HVAC system employs eight automotive-style vents to keep the glass clear and cab comfortable. Plus plenty of other cab amenities including an optional AM/FM weather-band radio with dual speakers help tune-in more productivity.

Triple-interlock operator-presence system automatically applies the brakes when the lap bar is raised, the operator leaves the seat, or the engine is shut down.

Expansive curved front glass, large top window, and low side windows make it easy to see the surrounding jobsite. Even with an expanded engine compartment, best-in-class sightlines provide a clear view of the action behind you, as well.

Flat floor in the 324E provides 33-percent-more comfort-lending foot room. Makes getting in and out of the cab easier, too.

Fully adjustable pull-down padded lap bar provides comfortable arm support.

HVAC system employs eight automotive-style louvers to direct warm or cold airflow where it's appreciated most — on the operator. For production-boosting year-round comfort.

Cabs and floors are tightly sealed and pressurized to keep out dust and noise.

We've got your back with a sculpted air-ride or mechanical-suspension seat to help smooth the ride. Choose either a cloth or vinyl air-suspension seat in cab-equipped models.

Storage box, cup holder, and iPod™/cell-phone holder (with nearby 12-volt power port) provide plenty of room to stow your stuff.



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# Set your sites on getting more done.

Want a skid steer that's more productive? Get an E-Series. Optimal weight distribution, low centers of gravity, high ground clearances, and long wheelbases deliver superior stability. But getting there is only half the battle. These skid steers also excel at putting material in its place. Their patented vertical-lift booms rise to the occasion, delivering exceptional lift height and reach. So you can do more, with less effort.



1. Superior axle torque and impressive bucket breakout forces deliver the leverage and traction to dig in where others just spin. For best-in-class pushing, prying, and digging power.
2. Optional ride control's shock-absorbing boom cylinders cushion bumps, helping retain full bucket loads all the way to your destination. Help speed navigation over rough terrain, too.

3. Impressive tipping load and rated operating capacities empower our E-Series Skid Steers to master an ever-changing variety of material-handling tasks.
4. Fast ground speeds and large bucket capacities enable these nimble material movers to make the most of every cycle. Need even more speed? Opt for a two-speed transmission.

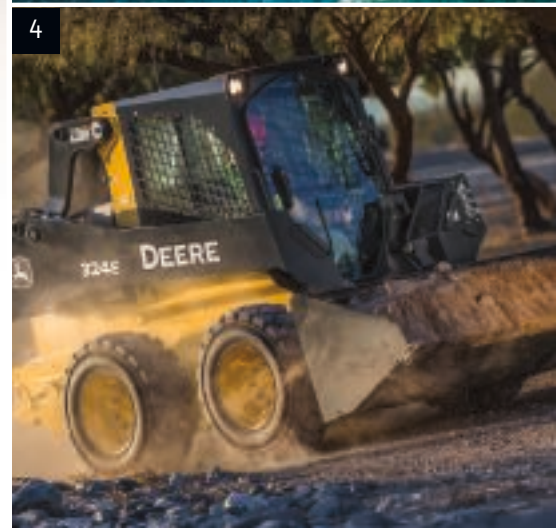


These are our most powerful skid steers ever. Larger field-proven ultra-reliable diesels deliver more displacement and significantly more torque rise and usable power, meeting EPA Final Tier 4 (FT4)/EU Stage IV regulations.

The unequalled ability of the 320E and 324E comes from a design that optimizes hydraulics, lift capabilities, and pushing forces.

Fully electronic injection systems aid cold-weather starting and enable E-Series engines to run at lower rpm without sacrificing power. For longer life and better fuel efficiency.

Some jobs can be a real stretch. Our patented boom design clears high sideboards and even dumps to the center of tandem-axle trucks.



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# Become a “controls freak.”

We'll excuse you for becoming a bit of a “controls freak” after running one of our skid steers. Offering one-of-a-kind options, only the E-Series lets an operator decide how the work gets done. ISO, H-pattern, or foot/joystick electrohydraulic (EH) controls are all available. Or, choose our industry-exclusive switchable EH option that lets you select any of the above, at any time, at the push of a button. That's just for starters. Add the EH Joystick Performance Package, and you can customize vehicle and attachment response. The ultimate people pleasers, our E-Series truly is all things to all operators.



1. Joystick buttons, rotary switch, and triggers actuate and control the auxiliary hydraulics/flow rates, boom float, and optional two-speed transmission.
2. Optional keyless-start sealed-switch module (SSM) includes an anti-theft system with one owner and five individual codes, and simple fingertip control of numerous options.

3. Overhead panel conveniently places machine info on the left, control switches to the right. Easy-to-read LCD monitor accesses a wealth of machine info and control — including vital operating conditions and advanced diagnostics.







Optional EH joysticks are our smoothest and most responsive yet, providing enhanced control and operating ease.

Now you can have your joysticks and foot pedals, too. Industry-exclusive switchable EH controls allow the operator to choose ISO, H-pattern, or EH joystick and foot controls. Simply press a button on the keyless SSM.

Want to make the most of our vertical-lift boom design? Add the self-level option and simplify your material-handling tasks.

**EH Joystick Performance Package** lets an operator customize operation and response to personal preferences through the SSM:

- **Attachment control** operates hydraulic-powered additions such as augers or hammers.
- **Creeper control** allows slow incremental travel speeds while maintaining full engine and hydraulic power. It's ideal for work with cold planers or trenchers.
- **Boom and bucket speed settings** enable precision (slow), utility (normal), and productivity (fast) responses.
- **Switchable controls** let you choose ISO or H-pattern.
- **Propel aggressiveness** modes set travel/steering response rates. **Precision** is ideal for work in tight spaces. **Utility** is for normal operation. **Production** delivers faster response for stockpiling and truck loading.





# Work our connections, as you expand yours.

If you're looking to broaden your business, your John Deere dealership is the place to start. Their equipment offering includes more than 100 Worksite Pro™ attachments that will help expand your efforts. E-Series Skid Steers are designed with these additions in mind. The universal Quik-Tatch™ makes attachment switchover quick and easy. Standard-flow auxiliary hydraulics with connect-under-pressure couplers is also standard. And if your equipment yard includes our compact track loaders (CTLs), compact excavators, or compact loaders, many of these attachments are interchangeable between machines. Talk to your dealer to learn more.

Numerous rock, multi-purpose, construction, utility, and tooth buckets are available in varying widths and capacities.

Clear heavy brush and saplings with our rotary cutters. Or put a mulching head to work shredding trees and stumps.

High- or standard-flow trenchers and removable backhoes work well for irrigation and underground utility tasks.

Cleanup is quicker with tools such as our brush, scrap, and utility grapples. Two hydraulic-actuated dual-action tongs provide superior material retention.

#### Worksite Pro attachments:

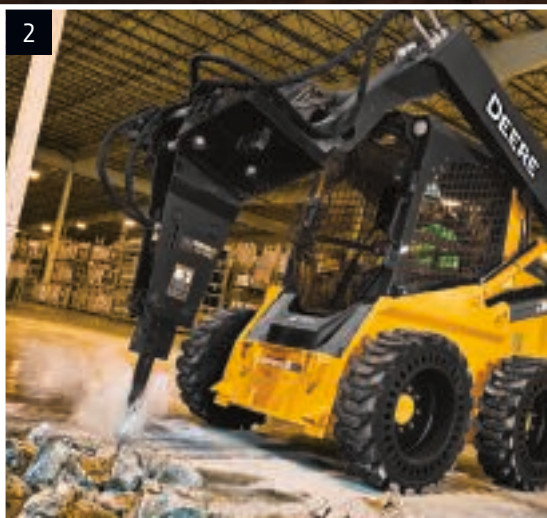
- Ag forks
- Augers
- Backhoes
- Bale spears (round, square)
- Blades (snow, utility)
- Breakers/hammers
- Brooms (angle, pickup)
- Cold planers
- Dozer blades
- Grapples (ag utility, brush-tined, scrap)
- Landplanes
- Mulching heads
- Multi-purpose buckets
- Pallet forks
- Power rakes
- Rock buckets
- Roller levels
- Rotary cutters
- Rotary tillers
- Scrapers (material, manure)
- Side-discharge buckets
- Snow blowers
- Snow pushers
- Trenchers
- Vibratory rollers







1. Our E-Series Skid Steers are also your foul-weather friends. Equipped with snow blower, snow pusher, blade, or angle broom, they make quick work of cleaning up whatever drops your way.
2. Bust through with any of our four hammers. Their low-pressure nitrogen-charged design cushions both machine and operator.
3. Perfect for concrete or asphalt flatwork — our angle brooms, rollers, cold planers, and wide variety of buckets let you hit the road running.
4. Our offering of landscape and nursery tools continues to grow and includes rotary tillers, augers, pallet forks, power rakes, landplanes, multi-purpose buckets, dozer blades, and roller levels, to list just a few.
5. For handling feed, cleaning out pens, re-bedding stalls, or numerous other chores — we've got the utility grapples, manure scrapers, forks, bale spears, and buckets to get it done.





# Nothing runs like a Deere, because nothing is built like one.

Downtime and deadlines don't mix — which is why we build our skid steers the way we do. Large-displacement electronic-injection diesels headline the list of uptime-boosting enhancements. Other job-proven durability difference-makers include our exclusive V-plenum cooling system with hydraulically driven variable-speed fans. Heavy-duty axles. Beefy booms and upper links. And integrated rear bumpers. When you know how they're built, you'll run a Deere.

Large cross-section boom arms and heavy-duty upper links deliver the strength to endure tough tasks for long-term durability.

The E-Series employs the same job-proven FT4/Stage IV technologies as our larger equipment. Simple, fully integrated, and fully supported, our emission solution delivers industry-leading fuel efficiency and uptime.

Diesel particulate filter (DPF) cleaning doesn't impact or interrupt machine performance under normal operating conditions.

Switches and electrical connectors are sealed from moisture and dirt to help prevent corrosion.

Spring-applied, hydraulic-released wet-disc park brakes are fully enclosed and never require adjustment.

O-ring face-seal hydraulic fittings virtually eliminate aggravating and costly oil leaks.

Auto-idle helps preserve engine life and conserve fuel, reducing engine speed after the operator has vacated the seat. Full auto-idle (available with EH controls) slows the engine after five seconds of inactivity and resumes preset engine speed with any joystick movement.

Auto-shutdown system monitors engine and hydraulic vitals, and issues an audible warning when limits are exceeded. If necessary, it shuts down the machine to help prevent damage.

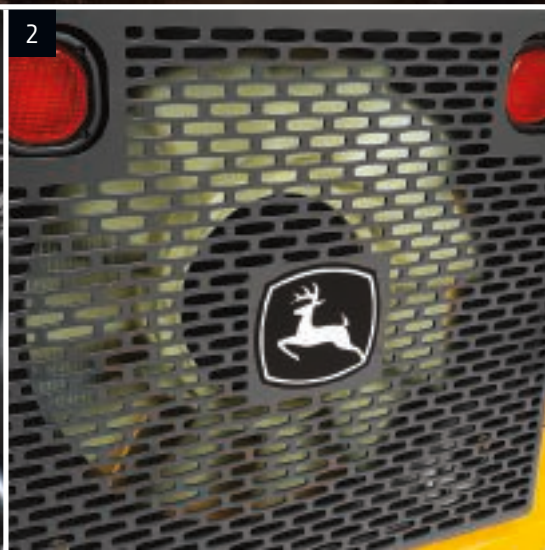
320E's auxiliary hydraulic lines are routed through the boom arms for an extra degree of protection. Couplers connect under pressure for quick and easy powered-attachment hookup.







1. Industry-exclusive design separates coolers in an innovative V-shape configuration that's 10-percent-more efficient. Large aluminum hydraulic cooler and radiator provide the necessary capacity for high-ambient-temperature operation.
2. Hydraulic-driven variable-speed fan runs only as fast or frequently as needed — for improved power and fuel efficiency, and decreased noise and debris flow through the coolers. Exclusive fan option can be set to automatically reverse as often as the application dictates to clear core-clogging buildup.
3. Rear bumper with integral tie-downs protects cooling components from run-ins with obstacles. Add the optional heavy-duty rear grille for even more durability.





# Maintenance made “E”asy.

Servicing an E-Series Skid Steer is quick and easy. So easy, in fact, that you won't even have to raise its boom for daily service or most periodic maintenance. Checkpoints are conveniently grouped and easily reached beneath the hinged hood. And removable side panels give way to the coolers, maintenance-free battery, and fluid and air filters. If necessary, the operator station tilts in minutes for best-in-class drivetrain access. And industry-leading parts and service are just as accessible at more than 1,300 John Deere dealer locations from coast to coast.





Daily servicing is quick and convenient. Simply lift the gas-shock-supported hood for ground-level access to check fluids and refuel.

Removable rear side panels allow wide-open service access and are easier to remove and replace. Stronger, too.

Through-the-monitor onboard diagnostics help speed troubleshooting.

These skid steers share components such as engines with our CTLs and compact excavators, making it easier to ensure you always have the right filters and fluids on hand.

Fluid-fill and service checkpoints are grouped and color-coded. And a conveniently displayed maintenance chart helps ensure that nothing gets overlooked.

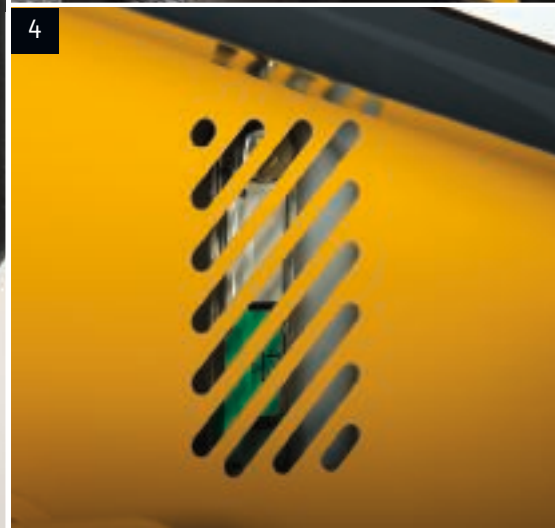
Ash-service intervals for the diesel particulate filter (DPF) are not required until 8,000 engine hours depending on machine application, regular maintenance practices, and type of lubricating oil. DPF service can be performed by your John Deere dealer.

V-plenum cooling system resists debris buildup and makes radiator and cooler cores easier to clean.

Because no maintenance beats low maintenance, engine serpentine belts never need adjustment.

Compare the cost of parts and labor for recommended maintenance with other makes. The E-Series will save you significant money.

1. Getting to the heart of a Deere is easy. There's no need to raise the boom — just pivot the cab and remove the floor. Takes only minutes.
2. Need extra elbowroom? Raise the boom and remove the side shields for wide-open engine-compartment access. Unique lock lever secures the boom from inside the cab.
3. Spin-on filters and environmental drains allow quick fluid changes.
4. Hydraulic sight gauge and see-through coolant and windshield washer fluid reservoirs let you check levels at a glance.





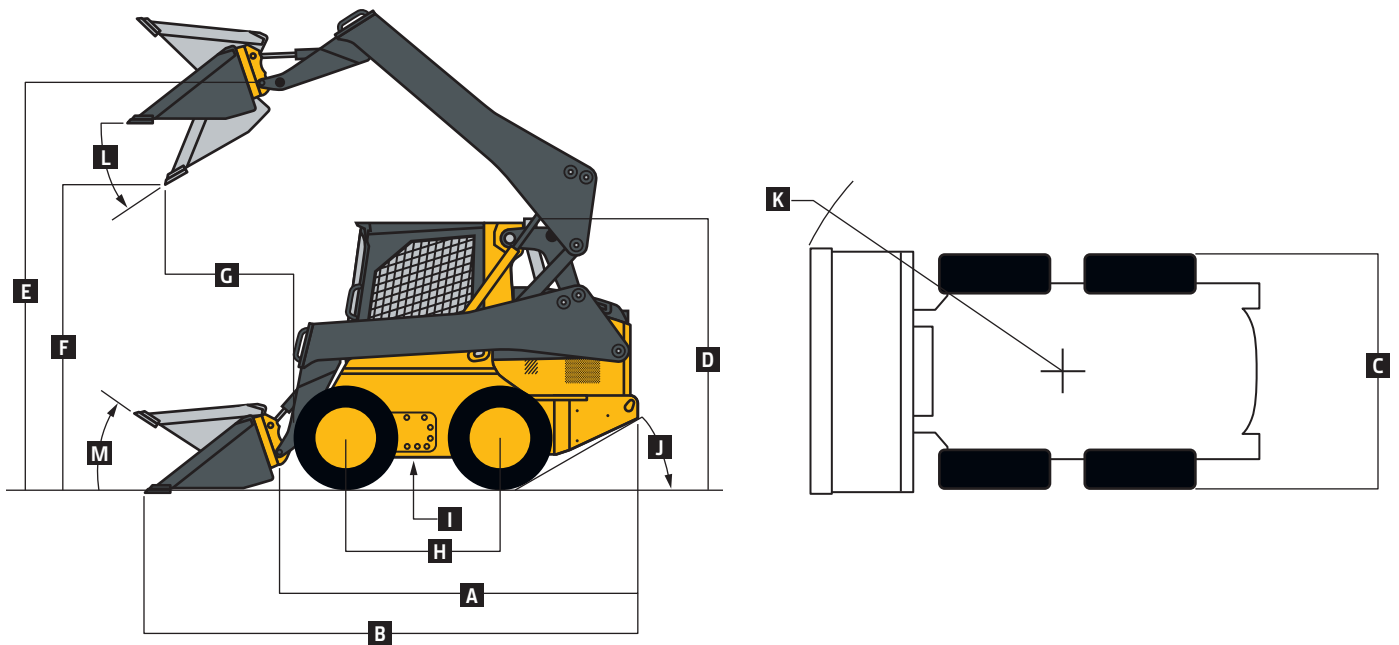
# 320E / 324E

Engine	320E	324E
Manufacturer and Model	Yanmar 4TNV98C (optional 4TNV98CT)	Yanmar 4TNV98CT
Non-Road Emission Standards	EPA Final Tier 4/EU Stage IV	EPA Final Tier 4/EU Stage IV
Cylinders	4	4
Net Peak Power (SAE J1349 / ISO 9249)	49.4 kW (66 hp) at 2,500 rpm	52.5 kW (70 hp) at 2,500 rpm
Gross Rated Power (ISO 14396)	51.7 kW (69 hp) at 2,500 rpm	54.8 kW (74 hp) at 2,500 rpm
Peak Torque	241 Nm (178 ft.-lb.) at 1,625 rpm	280 Nm (207 ft.-lb.) at 1,800 rpm
Displacement	3.3 L (203 cu. in.)	3.3 L (203 cu. in.)
Rated Engine Speed	2,500 rpm	2,500 rpm
Torque Rise	22% at 1,625 rpm	34% at 1,800 rpm
Aspiration	Naturally aspirated (optional turbocharger)	Turbocharged
Air Cleaner	Dry dual element	Dry dual element
<b>Cooling</b>	<b>320E / 324E</b>	
Fan Type	Variable-speed hydraulic drive standard / reversing fan drive optional	
<b>Powertrain</b>	<b>320E</b>	<b>324E</b>
Type	Hydrostatic-manual or electrohydraulic (EH) controls; 4 – 80 heavy-duty, continuous-loop chains	
Speeds		
Single Speed	11.1 km/h (6.9 mph)	11.1 km/h (6.9 mph)
2 Speed, High	17.9 km/h (11.1 mph)	17.9 km/h (11.1 mph)
<b>Axles</b>	Induction-hardened, one-piece forged axle shafts with maintenance-free oil-bath lubrication of inner and outer axle bearings	
Maximum Axle Torque, Single Speed	6771 Nm (4,994 lb.-ft.)	6771 Nm (4,994 lb.-ft.)
Tractive Effort	3220 kgf (7,491 lbf)	3220 kgf (7,491 lbf)
<b>Final Drive</b>	High-strength, adjustment-free chains	High-strength, adjustment-free chains
<b>Brakes</b>	Integral, automatic, spring-applied, hydraulically released, wet-disc park brake	
<b>Hydraulics</b>		
Pump Flow		
Standard	76 L/m (20 gpm)	79 L/m (21 gpm)
Total with High-Flow Option	106 L/m (28 gpm)	110 L/m (29 gpm)
System Pressure at Couplers	22 408 kPa (3,250 psi)	23 787 kPa (3,450 psi)
Hydraulic Horsepower Flow (calculated)		
Standard	28 kW (38 hp)	32 kW (42 hp)
High	40 kW (53 hp)	44 kW (58 hp)
Auxiliary Hydraulics	Connect-under-pressure with flat-faced couplers	Connect-under-pressure with flat-faced couplers
<b>Cylinders</b>	<b>320E / 324E</b>	
Type	John Deere heat-treated, chrome-plated, polished cylinder rods, hardened steel (replaceable bushings) pivot pins	
<b>Electrical</b>		
Voltage	12 volt	
Battery Capacity	750 CCA standard / 925 CCA optional	
Alternator Rating	70 amp	
<b>Lights</b>	Halogen, 2 front and 1 rear	
<b>Operator's Station</b>		
	ROPS (ISO 3471) / FOPS (ISO 3449) structure with quick-pivot standard	
<b>Serviceability</b>		
<b>Refill Capacity</b>		
Fuel Tank	76 L (20 gal.)	





Operating Weight		320E	324E
Base Machine		3246 kg (7,150 lb.)	3405 kg (7,500 lb.)
Machine Dimensions			
A	Length without Bucket	2.85 m (112.0 in.) (9 ft. 4 in.)	2.85 m (112 in.) (9 ft. 4 in.)
B	Length with Foundry Bucket	3.47 m (136.8 in.) (11 ft. 5 in.)	3.47 m (136.8 in.) (11 ft. 5 in.)
C	Width without Bucket	1.76 m (69.2 in.) (5 ft. 9 in.)	1.78 m (70.1 in.) (5 ft. 10 in.)
D	Height to Top of ROPS	2.02 m (79.4 in.) (6 ft. 7 in.)	2.02 m (79.4 in.) (6 ft. 7 in.)
E	Height to Hinge Pin	3.09 m (121.5 in.) (10 ft. 2 in.)	3.19 m (125.5 in.) (10 ft. 6 in.)
F	Dump Height with Foundry Bucket	2.46 m (96.9 in.) (8 ft. 1 in.)	2.56 m (100.9 in.) (8 ft. 5 in.)
G	Dump Reach		
	With Foundry Bucket	0.74 m (29.0 in.)	0.74 m (29.0 in.)
	With Construction Bucket	0.92 m (36.3 in.) (3 ft. 0 in.)	0.92 m (36.3 in.) (3 ft. 0 in.)
H	Wheelbase	1.13 m (44.3 in.) (3 ft. 8 in.)	1.13 m (44.3 in.) (3 ft. 8 in.)
I	Ground Clearance	0.22 m (8.5 in.)	0.22 m (8.5 in.)
J	Angle of Departure	28 deg.	25 deg.
K	Front Turn Radius with Foundry Bucket	2.03 m (79.8 in.) (6 ft. 8 in.)	2.03 m (79.8 in.) (6 ft. 8 in.)
L	Dump Angle (full lift height)	43 deg.	43 deg.
M	Bucket Rollback (ground level)	33 deg.	33 deg.



Loader Performance		320E	324E
Tipping Load		1989 kg (4,380 lb.)	2443 kg (5,380 lb.)
SAE Rated Operating Capacity		994 kg (2,190 lb.)	1221 kg (2,690 lb.)
	With Counterweight	1067 kg (2,350 lb.)	1294 kg (2,850 lb.)
Boom Breakout with Construction Bucket		1453 kg (3,200 lb.)	2361 kg (5,200 lb.)
Bucket Breakout Force with Construction Bucket		1907 kg (4,200 lb.)	2724 kg (6,000 lb.)



# Additional equipment

Key: ● Standard ▲ Optional or special

See your John Deere dealer for further information.

320E	324E	Engine
●	●	Meets EPA Final Tier 4/EU Stage IV emissions
●		Yanmar 4TNV98C
▲	●	Yanmar 4TNV98CT
●	●	Auto-idle
▲	▲	Automatic fan tensioner
●	●	Automatic preheat
●	●	Electronic injection system
●	●	John Deere COOL-GARD™ II Extended-Life Engine Coolant
●	●	John Deere Plus-50™ 10w30 initial engine oil fill*
●	●	5-micron primary fuel filter and water separator
▲	▲	Cold-weather starting package
<b>Cooling System</b>		
●	●	Coolant recovery tank
●	●	Variable-speed hydraulically driven fan cooling system
▲	▲	Reversing fan drive
<b>Powertrain</b>		
●	●	High-strength adjustment-free final-drive chains
●	●	Spring-applied hydraulically released wet-disc park brake
●	●	Wet-disc brakes
▲	▲	Transmission, 2-speed
<b>Hydraulic System</b>		
●	●	John Deere hydraulic cylinders with cushioned boom cylinders
●	●	Connect-under-pressure auxiliary couplers
●	●	Quick-check hydraulic fluid-level sight glass
●	●	5-micron hydraulic filter
▲	▲	High-flow hydraulics
<b>Electrical</b>		
●	●	Automatic shutdown with alarm
●	●	Auxiliary hydraulics operator-presence system
●	●	Courtesy lighting

320E	324E	Electrical (continued)
●	●	Deluxe instrumentation EMU with: Operator-selectable monitoring – Hour meter, engine rpm, battery voltage, diagnostics, EMU configuration, engine coolant temperature, hydraulic oil temperature / LED warning indicators – Glow plug, seat switch, seat belt, door open, auxiliary hydraulics, park brake engaged, 2-speed engaged, stop, low engine oil pressure, engine coolant over-temperature, battery not charging, air filter restriction, hydraulic filter restriction
●	●	Front and rear halogen work lights
●	●	Triple interlock operator-presence control system
▲	▲	Backup alarm
●	●	Battery, 750 CCA
▲	▲	Battery, 925 CCA
▲	▲	Hazard warning lights
▲	▲	Strobe light, amber
▲	▲	Horn
<b>Operator's Station</b>		
●	●	Deluxe cab headliner
▲	▲	Electrohydraulic (EH) ISO-pattern joystick controls
▲	▲	EH H-pattern joystick controls
▲	▲	EH foot and joystick controls
▲	▲	EH switchable foot-ISO-H-pattern controls
▲	▲	Keyless-start sealed-switch module with integrated anti-theft system
●	●	Electronic push-button auxiliary controls
●	●	Pull-down lap bar
●	●	Quick-pivot ROPS
●	●	Rear window
●	●	Top window
▲	▲	Removable top window
▲	▲	Sliding/locking glass side windows
●	●	ROPS/FOPS operator structure
●	●	Seat belt, 51-mm (2-in.), retractable
▲	▲	Seat belt, 76-mm (3-in.), retractable
▲	▲	Shoulder belt
●	●	Water-shedding deluxe vinyl seat
▲	▲	Deluxe vinyl suspension seat
▲	▲	Air-ride (cloth) seat

320E	324E	Operator's Station (continued)
▲	▲	Air-ride (vinyl) seat
●	●	12-volt power port / Dome light / Cargo storage / Beverage holder
▲	▲	Air conditioning with heater/defroster
▲	▲	Heater with defroster
▲	▲	AM/FM/weatherband radio with auxiliary input
▲	▲	Cab enclosure
▲	▲	Electrohydraulic joystick controls
▲	▲	EH joystick performance package: Switchable ISO-H pattern / Creeper mode / Boom/bucket speed settings / Adjustable propel settings / Attachment controls
▲	▲	Floor mat
▲	▲	Floor mat with left footrest
▲	▲	Hand controls with foot throttle
▲	▲	Rearview mirror
▲	▲	Severe-duty cab door
▲	▲	Heavy-duty rear grille
<b>Loader</b>		
●	●	Integral cab boom lock
●	●	Patented John Deere Quik-Tatch™ (no grease required)
▲	▲	Power Quik-Tatch
●	●	Patented John Deere vertical-lift boom with superior visibility
▲	▲	Hydraulic self-leveling on/off
▲	▲	Ride control
<b>Other</b>		
●	●	Convenient front and rear tie-downs
●	●	Environmental drains for all fluid reservoirs
▲		10 x 16.5 8 PR SKS Extra Wall Heavy Duty
▲	▲	12 x 16.5 8 PR SKS Extra Wall
▲	▲	12 x 16.5 10 PR Extra Wall
	▲	14 x 17.5 12 PR Extra Wall
	▲	14 x 17.5 14 PR Hauler
▲	▲	Chrome exhaust stack
▲	▲	Modular rear-weight packages
▲	▲	Single-point lift kit
▲	▲	SMV sign kit
▲	▲	Spare tire and wheel
▲	▲	Tire options: Flotation / Solid / Heavy duty

\*500-hour engine oil-change intervals when John Deere Plus-50 oil and John Deere oil filter are used.



Net engine power is with standard equipment including air cleaner, exhaust system, alternator, and cooling fan, at standard conditions per SAE J1349 and DIN 6270B, using No. 2-D fuel at 35 API gravity. Gross power is without cooling fan. Specifications and design subject to change without notice. Wherever applicable, specifications are in accordance with SAE standards. Except where otherwise noted, these specifications are based on units with standard equipment, full fuel tanks, and 79-kg (175-lb.) operator.