



# Cat<sup>®</sup> 988 XE

## Wheel Loader

**Move more material in less time at a lower cost per ton with the Cat<sup>®</sup> 988 XE wheel loader. The electric-drive 988 XE is faster and more efficient than the powershift 988 in applications that demand high performance and production. Get a faster return on your investment with up to 25% better overall fuel efficiency and designed-in durability for multiple life cycles.**

### Proven Reliability

- With 15+ years of electric-drive experience, the 988 XE combines the simple and robust switched reluctance technology with existing 988 proven machine design.
- More than 90 percent identical to the market leader, the 988.
- Fewer moving parts than traditional torque converter and mechanical transmission systems.
- Solid-state, fully sealed, and liquid-cooled powered electronics maximize durability in extreme conditions.
- Moves more material more efficiently with improved power and control.
- Cat C18 engine is built and tested to meet your most demanding applications.
- Advanced filtration system for extended performance and reliability of the hydraulic system.

### Durability

- Achieves longer engine life and improved fuel efficiency with reduced high idle speed.
- Automatic retarder controls maintain speed on grade.
- One-piece castings provide enhanced front linkage strength in key pin areas.
- Full box section rear frame resists torsional shock and twisting forces.
- Durable construction withstands the toughest loading conditions and multiple life cycles.
- Achieves longer brake life while operating in single pedal with dynamic braking mode.

### Achieve Greater Productivity

- Electric-drive system eliminates shifting and simplifies operator control, accelerating the learning curve of new operators.
- Superior acceleration, smoother directional shifts, and reduced travel times.
- Maximum responsiveness with Steering and Integrated Control (STIC<sup>™</sup>).
- Convenient, responsive electro-hydraulic controls increase operator productivity.
- Superior digging, higher bucket fill factors, and reduced dig times.
- Up to 10 percent more payload per pass, higher efficiency, and improved pass match.
- Improved visibility over the top of the linkage.

### Superior Fuel Efficiency

- Up to 25 percent better fuel efficiency overall.
- Up to 49 percent more fuel efficiency in truck loading applications.
- Greenhouse gas reductions up to the equivalent of 1 year of electricity use for nearly 10 homes.
- Continuously variable speed control up to maximum ground speed.
- Positive Flow Control (PFC) hydraulic system increases efficiency, bucket feel, and responsiveness with consistent performance.
- Economy mode provides 100% ECM managed engine speed to provide the most fuel efficient required RPM during machine operation.
- Fully integrated electronic engine controls make your fuel go farther.
- Engine idle shutdown for less fuel used while idling.
- Flow sharing hydraulics for full-flow at reduced engine rpm.
- Increased hydraulic speed and faster cycle times for decreased idle, decreased fuel burn, and increased efficiency.



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## Increase Productivity and Efficiency with Integrated Technologies

- Cat Technologies developed to monitor, manage, and enhance your jobsite operations.
- Cat Payload provides accurate weighing\* of the materials you are loading and hauling. Payload data is displayed in real-time to improve productivity and reduce overloading.
- Cat Detect enhances awareness of the environment around working equipment and provides alerts to help keep people and assets safe on the jobsite.
- Product Link™ wirelessly connects you to your equipment, giving you access to essential information you need to know to run your business.
- Gain valuable insight into how your machine or fleet is performing.
- Optional Advanced Productivity subscription provides comprehensive actionable information to help you manage and improve the productivity and profitability of your operations.
- Improved cycle times and bucket fill factors with optional Operator Coaching.
- Up to 10% dig segment cycle optimization with optional Operator Assist features.
- Easier to operate in single pedal with dynamic braking and operator assist features that allow faster training of new operators.
- Increase operator efficiency with Operator Coaching through on-board tips for truck loading operations.

*\*Not legal for trade.*

## Safety Features

- Operator presence sensing automatically engages the parking brake if the machine detects movement without an operator on the seat.
- External operator seat belt beacon indicates when the seat belt is not being used by the operator.
- Standard LED lights provide a safer work environment while operating in dark conditions.
- Hazardous voltage lamp assures electric drive system is de-energized and machine is safe to work on.
- Achieve precise positioning for easy loading in tight areas with 43 degrees of steering articulation.
- Precise machine control by load-sensing hydraulic steering system.
- Reduced stairway angles and standard stairway lighting provide reduced risk of slips, trips, and falls due to better visibility of the steps and stairway.
- Left- and right-hand stairs with 45-degree angle.
- Computerized monitoring system with warning indicators.
- Standard Cat Vision enhances visibility behind the machine, helping you work safely and confidently.
- Pressurized cabin with filtered air and reduced sound levels.

## Reduced Maintenance Time and Costs

- Electric-drive system maximizes consumable life, reducing oil and filter waste. Enables two times the life for power train oil and four times the life for filters.
- Three levels of dynamic braking when operating in single pedal mode reduces break wear.
- Operator Assist features help reduce component and tire wear by automating critical dig segments while working in the material pile.
- Reduce the potential for wheel slippage without reducing hydraulic efficiency with RCS (Rimpull Control System) and modulating the left pedal from 100 to 25 percent.
- Longer life, rebuildability, and high resale value with 10 percent lower maintenance costs.
- Grouped service points and swing-out engine compartment service doors provide easy access to critical daily service checks.
- Ecology drains to prevent spilled contaminants.
- Electro-hydraulic controls.
- Reduced waste with maintenance-free batteries.
- Vehicle Information Management System (VIMS™) notifications to resolve problems before failure.
- Operators can now check tire pressure during operation with any change sending a fault code to VisionLink®, preventing premature tire failure.

## Easy, Comfortable Operator Environment

- Best-in-class operator comfort and ergonomics.
- Cat Premium Plus seat with standard features including leather finish, forced air heating and cooling, two-way thigh adjustment, power lumbar and back bolster adjustment, and dynamic end dampening to provide total comfort throughout the workday.
- Easy-to-reach levers and seat-mounted implement pod to reduce fatigue.
- Ergonomic switch placement and displays with large, backlit switches and LED indicators.
- Two-position rocker switch activates the electro-hydraulic parking brake.
- Reduced vibrations from isolated cab mounts and seat air suspension.
- Automatic cab temperature controls.

## Purpose-Built Specialty Arrangements Millyard

- Unload a typical full-length log truck in a single pass with the larger lift and tilt cylinders and a unique tilt lever to maximize linkage force. Up to 20% more lift capacity and 26% more tilt capacity over the standard 988.
- Swing out fan radiator design for easier service in high-debris millyard applications reducing maintenance and service down time. Auto reversing fan system to help dislodge debris and keep air flowing across the radiator cores.
- Additional counterweight to increase stability for improved confidence while maneuvering with full loads.
- Purpose-built lift arm with lowered cross member to increase visibility to the tips of the forks helping to increase the speed when lining up the load and reduce operator movements to see the forks.

## Standard and Optional Equipment

Standard and optional equipment may vary. Consult your Cat dealer for details.

	Standard	Optional		Standard	Optional
<b>ELECTRICAL</b>			<b>POWERTRAIN (CONTINUED)</b>		
Alarm, back-up	✓		Crankcase guard		✓
Alternator, single 150 amp	✓		Electro hydraulic parking brake	✓	
Converter, 10/15 amp, 24V to 12V	✓		Engine block heater 120V or 240V		✓
Lighting system (LED work lights, access and service platform lighting)	✓		Engine brake, SEA		✓
Starting and charging system, 24V	✓		Engine, C18 diesel, turbocharged/aftercooled	✓	
Starter emergency start receptacle	✓		Engine oil change system, high speed, Wiggins		✓
Starter lockout in bumper	✓		Ground level engine shutoff	✓	
Transmission lockout in bumper	✓		High ambient cooling – software		✓
<b>OPERATOR ENVIRONMENT</b>			Turbine precleaner, engine air intake	✓	
Air conditioner	✓		Radiator, Aluminum Modular Radiator (AMR)	✓	
Automatic parking brake activation when operator is not detected and machine is moving	✓		Starting aid, ether, automatic	✓	
Cat® Detect, object detection system		✓	Throttle lock, electronic	✓	
Cat Vision, rear vision camera system	✓		Manual switch and automatic fuel priming	✓	
Cab precleaner		✓	<b>ADDITIONAL EQUIPMENT</b>		
Cab, sound suppressed and pressurized, integrated rollover protective structure (ROPS/ FOPS) radio ready for entertainment, includes antenna, speakers, and converter (12-volt 5-amp) and power port	✓		Operator Assist feature, Tire Slip Prevention	✓	
External operator seat belt beacon indicator		✓	Operator Assist features, Auto Set Tires and Lift Stall Prevention		✓
Handrail mounted mirrors for increased operator visibility to the rear tires		✓	Autolube with Auto shutoff		✓
LED warning strobe		✓	Automatic bucket lift & return to dig memory	✓	
Lights, directional	✓		Base machine price includes a rim allowance	✓	
Mirrors, rearview (externally mounted)	✓		Cat Clean Emission Module (CEM) (Tier 4 Only)	✓	
Payload Overload Prevention	✓		Cold weather package: additional starter and 2 batteries, engine block heater 120V or 240V, heated fuel lines		✓
Radio, AM/FM/CD/MP3 Bluetooth® with Satellite Sirius XM		✓	Doors, service access (locking)	✓	
Radio, CB ready	✓		Ecology drains for engine, radiator, hydraulic tank	✓	
Seat, cab - heated and ventilated		✓	Engine compartment lights		✓
Seat, Deluxe	✓		Fast fill fuel system (Shaw-Aero)		✓
Seat belt minder	✓		Front and rear roading fenders		✓
Seat belt, retractable, 76 mm (3 in) wide	✓		High Performance LED lighting		✓
Single pedal operation with three levels of dynamic braking	✓		Hitch, drawbar with pin	✓	
Slope indicator within cab information display	✓		Hydraulic, steering and brake filtration/screening system	✓	
STIC System	✓		Hydraulically driven demand fan	✓	
Virtual gear indicator	✓		Load and carry counterweight		✓
Wet-arm wipers/washers (front and rear) – intermittent front and rear wipers	✓		Operator Coaching system		✓
<b>POWERTRAIN</b>			Premixed 50% concentration of extended life coolant with freeze protection to -34°C (-29°F)	✓	
Antifreeze -50°C (-58°F)		✓	Steering, load sensing	✓	
Automatic retarder controls	✓		Tire Pressure Monitoring System		✓
Axle Oil Cooler		✓	Vandalism protection caplocks	✓	
Brakes, oil-cooled, multi-disc, service/secondary	✓		Wheel chocks		✓
Cat Integrated Powered Electronics	✓		<b>OTHER OPTIONAL CONFIGURATIONS</b>		
Cat Production Measurement		✓	Aggregate Handler		✓
Cat Production Measurement ready	✓		Load and Carry		✓
Cat SR drive motor	✓		Millyard		✓
Cat SR generator/pump drive	✓				

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## Technical Specifications

### Engine

Engine Model	C18	
Rated Speed	1,700 rpm	
Peak Power Speed	1,500 rpm	
Engine – ISO 14396:2002	432 kW	580 hp
Gross – SAE J1995:2014	439 kW	588 hp
Net Power – SAE J1349:2011	401 kW	538 hp
Bore	145 mm	5.7 in
Stroke	183 mm	7.2 in
Displacement	18.1 L	1,105 in <sup>3</sup>
Peak Torque @ 1,200 rpm – SAE J1995:2014	3023 N·m	2,230 lb-ft
Torque Rise	58%	

- Two engine emissions options are available:
  - Meets U.S. EPA Tier 4 Final, EU Stage V and Japan 2014 emission standards.
  - Meets Brazil MAR-1 emission standards, equivalent to U.S. EPA Tier 3 and EU Stage IIIA.
- Net power advertised is the power available at the flywheel when the engine is equipped with fan at minimum speed, air intake system, exhaust system, and alternator.

### Operating Specifications

Operating Weight	52 781 kg	116,362 lb
Rated Payload – Quarry Face	11.3 tonnes	12.5 tons
Rated Payload – Loose Material	14.5 tonnes	16.0 tons
Bucket Capacity Range	4.7-13.0 m <sup>3</sup>	6.2-17.0 yd <sup>3</sup>

### Transmission

Transmission Type	Cat switched reluctance electric drive					
Speed	km/h	mph	Speed	km/h	mph	
Forward 1 (virtual)	7.0	4.3	Reverse 1 (virtual)	7.0	4.3	
Forward 2 (virtual)	11.3	7.0	Reverse 2 (virtual)	11.3	7.0	
Forward 3 (virtual)	22.2	13.8	Reverse 3 (virtual)	28.2	17.5	
Forward 4 (virtual)	32.1	20.0				

### Hydraulic System – Lift/Tilt

Lift/Tilt System – Circuit	EH – Positive Flow Control, Flow Sharing	
Lift/Tilt System Pumps	Variable displacement piston	
Relief Valve Setting – Lift/Tilt	32 800 kPa	4,757 psi

### Hydraulic Cycle Time

Rackback	4.5 seconds
Raise	8.0 seconds
Dump	2.2 seconds
Lower Float Down	3.5 seconds
Total Hydraulic Cycle Time (empty bucket)	18.2 seconds

### Hydraulic System – Steering

Steering System – Circuit	Pilot, load sensing	
Steering System – Pump	Piston, variable displacement	
Steering Cut Off Pressure	30 000 kPa	4,351 psi
Total Steering Angle	86°	
Steering Cycle Time (high idle)	3.4 seconds	
Steering Cycle Time (low idle)	5.6 seconds	

### Service Refill Capacities

Fuel Tank	555 L	147.0 gal
Diesel Exhaust Fluid Tank	33 L	8.7 gal

- All nonroad Tier 4 Final/Stage V diesel engines only are required to use:
  - The machine has the flexibility to run on either ultra-low-sulfur diesel fuel (ULSD with 15 ppm of sulfur or less).
  - Cat engines are compatible with the following renewable, alternative, and biodiesel\* fuels that reduce greenhouse gases:
    - Up to B20 biodiesel (FAME) \*\*
    - Up to 100% HVO and GTL renewable fuels
- \* Refer to guidelines for successful application. Please consult your Cat dealer or “Caterpillar Machine Fluids Recommendations” (SEBU6250) for details.
- Cat DEO-ULS™ or oils that meet the Cat ECF-3, API CJ-4, and ACEA E9 specifications are required.
- Only use DEF that meets ISO 22241-1 standards.

### Air Conditioning System

The air conditioning system on this machine contains the fluorinated greenhouse gas refrigerant R134a (Global Warming Potential = 1430). The system contains 1.8 kg of refrigerant which has a CO<sub>2</sub> equivalent of 2.574 metric tonnes.

### Sound Performance – Tier 4 Final/Stage V

Operator Sound Level (ISO 6396:2008)	Standard
	72 dB(A)
Machine Sound Level (ISO 6395:2008)	109 dB(A)

- The operator sound pressure level was measured according to the test procedures and conditions specified in ISO 6396:2008. The measurement was conducted at 70 percent of the maximum engine cooling fan speed.
- Hearing protection may be needed when the machine is operated with a cab that is not properly maintained or when the doors or windows are open for extended periods or in a noisy environment.
- The machine sound power level was measured according to the test procedures and conditions specified in ISO 6395:2008. The measurement was conducted at 70 percent of the maximum engine cooling fan speed.
- European Union Directive “2000/14/EC” as amended by “2005/88/EC” and UK Noise Regulation 2001 No. 1701.



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