

CAT® R2900 XE

HIGH-EFFICIENCY ELECTRIC DRIVE SYSTEM



Built on the platform of the most popular Caterpillar load haul dump (LHD) models, the Cat® R2900 XE is the first diesel-electric underground LHD for Caterpillar. The R2900 XE is highly productive with smooth and quick machine responses, improved digging, and impressive tramming performance. The R2900 XE features a proven Switched Reluctance (SR) electric drive system that is Caterpillar designed, integrated, validated and supported.

The Benefits of Electric Drive

The R2900 XE employs a high-efficiency Switched Reluctance (SR) technology electric drive system. Cat Switched Reluctance Electric Drive System benefits include:

- Improved power and cycle times.
- Continuous variable speed control.
- Programmable virtual gear speed limits.
- Torque on demand and seamless hydraulic performance.
- Automatic retarding controls for maintaining speed on grade.
- Anti-roll back features for operating on grade.
- Neutral creep and coasting inhibitor.
- Reduced service brake application.
- Smoother directional changing, no driveline or power train shock loads.
- Speed management can be programmed, allowing improved operator efficiency and reduced fatigue.

How Electric Drive Works

The electric drive system starts with a Cat® C15 engine. The efficient Cat C15 engine is available in EU Stage V, Tier 3, or Tier 2 configurations. Instead of powering a torque converter, the engine drives a generator, which turns the mechanical engine power into electricity. And instead of a transmission, the electric motor powers the final drives through a mechanical drop-box and drive shafts. The power inverter connects the generator and the motor by heavy-duty power cables and connectors, and this inverter controls the flow of electricity between the two components.

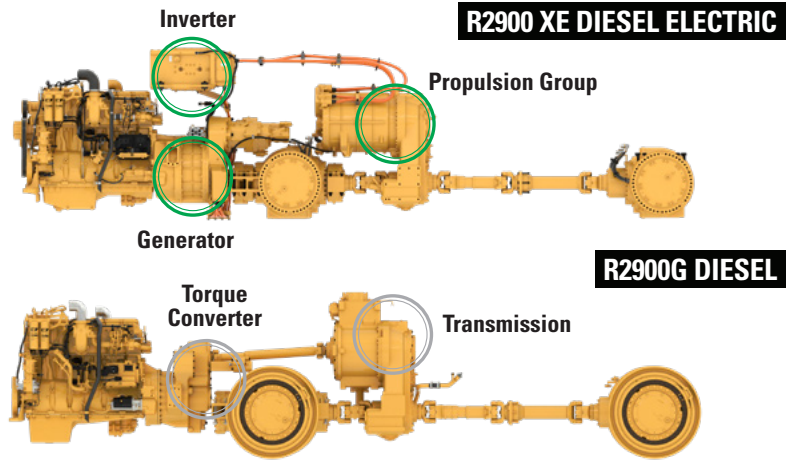
The electric motor can operate at all ground speeds, ensuring the loader is always operating at the most efficient point possible. The electric drive components are sealed against the environment and liquid cooled, resulting in efficient and reliable operation in the most demanding underground applications. Like a traditional powershift transmission in Cat underground loaders, the R2900 XE Electric Drive power train leverages vertically integrated, proven, and durable components. Each component is completely modular, so internal components can be accessed quickly and efficiently to reduce downtime.

R2900 XE Powertrain Advantages: Comparison: R2900 XE vs R2900G

Leveraging the Cat SR Electric Drive, the R2900 XE is designed to achieve high productivity without burning more fuel.

- 18.5 metric ton (40,785 lb) payload capability enables 3–4 pass match with Cat AD63 truck.
- 52% quicker acceleration, improved machine response.*
- Greater than 31% reduced fuel consumption.*
- 35% increased breakout force.*

*Compared to R2900G



Operational

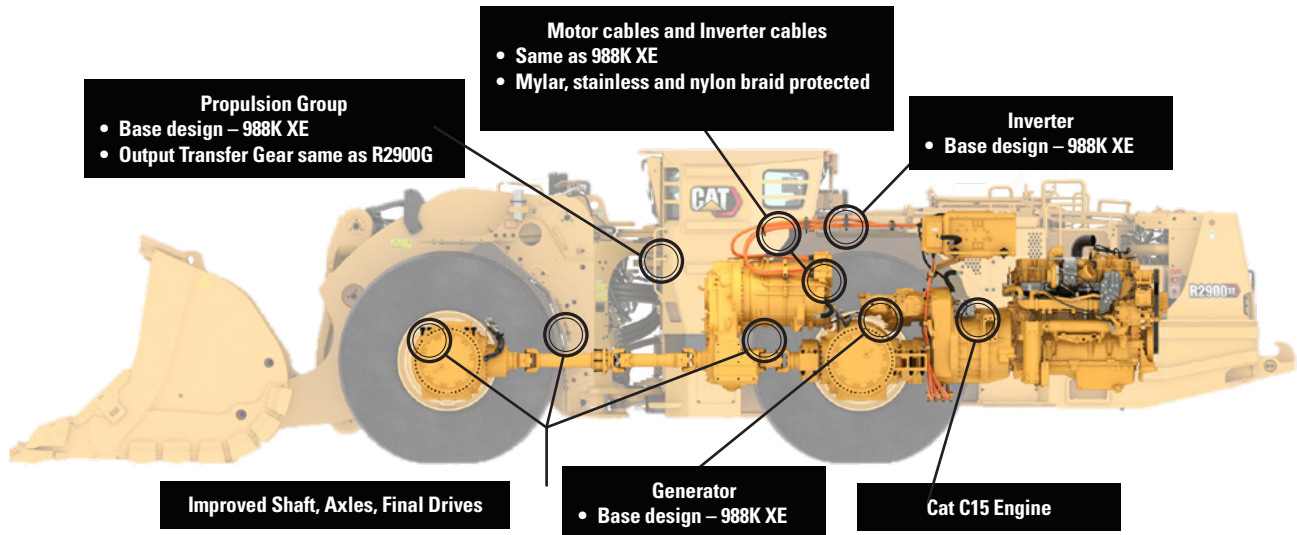
- Smooth shifting without mechanical transmission
- No lock-up clutch engagement “bump”
- Traction control and electric drive retarding

Mechanical

- No high-speed shaft
- Improved final drives
- Smoother driveline torque loading
- Less service brake use
- Lower powertrain oil temperatures

Serviceability

- Fewer moving parts than the traditional torque converter and mechanical transmission systems
- Improved transmission filter in service bay
- Reduction of service intervals and increased service life



An Evolution in Validation

The R2900 XE leverages the successful design base of the Cat 988 XE electric drive wheel loader. Continued Electric Drive research and development has resulted in a broader application experience, as well as innovations in testing. Field testing in a variety of applications is ongoing which strengthens the Caterpillar expertise and knowledge.

Caterpillar engineers have also developed advanced endurance testing that can put a lifetime of stress on a single component in a short amount of time. The result is the next generation of robust, durable Electric Drive systems.

For more complete information on Cat products, dealer services, and industry solutions, visit us on the web at www.cat.com

© 2025 Caterpillar

All rights reserved

Materials and specifications are subject to change without notice. Featured machines in photos may include additional equipment. See your Cat dealer for available options.

CAT, CATERPILLAR, LET'S DO THE WORK, VisionLink, their respective logos, “Caterpillar Corporate Yellow,” the “Power Edge” and Cat “Modern Hex” trade dress as well as corporate and product identity used herein, are trademarks of Caterpillar and may not be used without permission.

AEXQ4227-00
July 2025

