

# EcoDigger 850E - Environmentally Friendly Digger - Official Technical Overview & Datasheet

## EXECUTIVE SUMMARY

The global construction, mining, and agricultural sectors face unprecedented pressure to decarbonize operations without sacrificing productivity. The EcoDigger 850E is the industry's first mass-produced, fully electric 12.5-tonne excavator engineered to deliver diesel-equivalent digging forces while producing zero local emissions. Targeting urban construction sites subject to strict low-emission zones, underground mining operations, and enclosed agricultural facilities like greenhouses and livestock barns, the 850E achieves a total cost of ownership reduction of up to 42% compared to conventional hydraulic excavators over a five-year horizon.

Powered by a liquid-cooled 85 kWh lithium-iron-phosphate (LFP) battery and a dual-path permanent magnet synchronous motor (PMSM) driving two independent variable-displacement piston pumps, the EcoDigger 850E maintains 135 kN of bucket digging force and 105 kN of arm crowd force. Regenerative hydraulic circuitry recovers gravitational energy during boom lowering and swing braking, extending effective runtime by 18% on typical load-cycle applications. The machine supports both CCS2 AC (22 kW) and DC fast charging (up to 150 kW), enabling a 20% to 80% recharge in 38 minutes.



## STRUCTURAL INTEGRITY & POWERTRAIN

The upper frame and track chassis are fabricated from Swedish-made HARDOX 450 wear-resistant steel (450 HBW hardness) with a minimum yield strength of 1,300 MPa. All welded seams undergo magnetic particle inspection (MPI) and stress-relief annealing per ISO 15614-1. The sealed and lubricated track chain (SALT) features induction-hardened pins and bushings achieving 8,500 hours of estimated wear life under heavy clay and abrasive granite conditions. Reinforced X-frame cross-members prevent torsional flex during offset digging, preserving electric motor and battery alignment.

Propulsion comes from a dual-sourced motor assembly (Yaskawa custom PMSM, IP67 ingress protection) mated to a two-stage planetary reduction

gearbox with a parking brake interlock. The 85 kWh LFP battery pack (314 V nominal, 270 Ah) is IP69K-rated and housed behind a 6 mm thick bolted steel shield with integrated fire suppression (aerosol-based). Thermal management is active liquid cooling via a radiator-free loop that rejects heat into the hydraulic oil cooler. No diesel engine, DPF, DEF tank, or exhaust aftertreatment system is present, reducing maintenance points by 73% relative to a Stage V / Tier 4 Final diesel excavator.

#### KEY FEATURES & OPERATOR COMFORT

- Load-Sensing Electric-Hydraulic Architecture: Two independent 80 cc/rev axial piston pumps deliver flow on demand (max 2 x 160 L/min at 2,200 motor RPM) with zero flow when controls are neutral. Combined with electric motor torque control, parasitic losses drop by 62% compared to conventional load-sensing systems powered by fixed-speed diesel engines.
- ROPS/FOPS Level II Cab: Certified to ISO 3471 (ROPS) and ISO 3449 (FOPS Level II). The cab includes a 7.1 kWh/h integrated HVAC heat pump (no resistive heater), dual-pane acoustic laminated glass, and a full-color 10-inch touchscreen displaying SOC, remaining runtime (min), motor temperatures, and hydraulic oil contamination status. Interior sound pressure level is 69 dB(A) – quieter than typical office environments.
- Smart Eco-Modes: Three selectable power profiles – ECO (85% power, 7.2 hours runtime), STANDARD (100% power, 6.5 hours), and BOOST (120% power

for 30 seconds, 5.8 hours). Auto idle engages after 5 seconds of control inactivity (programmable), and auto shutdown after 10 minutes, preventing auxiliary battery drain.

- 360-Degree Camera & Collision Mitigation: Four wide-dynamic-range cameras feed an AI-based object detection system (ISO 19233 compliant). Audible and visual alerts trigger within 1.5 meters of personnel, and the system can apply the service brakes and interrupt swing power if an imminent collision is detected at < 3 km/h.

- Regenerative Boom & Swing: During boom lowering, the electric motor inverts to generator mode, recovering up to 28% of potential energy. Swing braking regeneration captures 18% of kinetic energy. Both flows recharge the LFP battery directly without additional resistor grids, extending daily total runtime by 1.2 hours under urban pick-and-place cycles.

## COMPLIANCE & SAFETY STANDARDS

The EcoDigger 850E meets or exceeds all relevant global regulatory frameworks for low-emission and mobile machinery. The machine holds CE marking (2006/42/EC Machinery Directive, 2014/30/EU EMC), EPA Future Efficient Truck (FET) exemption (zero on-road emissions), and CARB Large Spark-Ignition (LSI) zero-emission certification. It is ISO 9001:2015 certified for manufacturing quality, ISO 14001:2015 for environmental management, and ISO 50001:2018

for energy management systems. Safety compliance includes ISO 12100 risk assessment, ISO 13849-1 PL d (Category 2) for safety-related control functions, and UN ECE R100 for battery electric vehicle safety (including post-crash electrolyte leakage and high-voltage isolation tests). The high-voltage interlock loop (HVIL) and automatic discharge of DC link capacitors (to < 60 V within 3 seconds of key-off) meet IEC 61851-23 requirements for electric vehicle charging safety.

## TECHNICAL SPECIFICATIONS

All parameters measured at sea level, 25 °C ambient temperature, standard rubber track configuration, and 80% state of charge (unless otherwise noted). Hydraulic pressures conform to ISO 10987-2:2023.

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>115 kW / 85 kW	
Battery Type / Capacity	LFP (Lithium Iron Phosphate) / 85 kWh (314 V nominal)
Operating Weight (including 400 mm rubber tracks)	12,500 kg (27,557 lbs)
Bucket Digging Force (ISO)	135 kN (30,350 lbf)
Arm Crowd Force (ISO)	105 kN (23,604 lbf)
Max Digging Depth	5,520 mm (18 ft 1 in)
Max Reach at Ground Level	8,630 mm (28 ft 4 in)
Swing Speed	9.8 rpm
Travel Speed (low / high)	2.8 / 5.1 km/h (1.7 / 3.2 mph)
Hydraulic System Pressure (implement / travel)	34.3 / 34.3 MPa (4,975

psi)	
Hydraulic Pump Flow (total, at 2,200 motor RPM)	320 L/min (84.5 gal/min)
Noise Level (cab interior / exterior LpA)	69 dB(A) / 96 dB(A)
Charging: AC (onboard, 3-phase)	22 kW (0-100% in 4.5 hours)
Charging: DC fast (CCS2, offboard)	150 kW (20-80% in 38 minutes)
Expected Battery Cycle Life (to 80% SOH)	5,000 cycles
Track Width (standard rubber / optional steel)	400 mm / 450 mm
Ground Pressure (rubber tracks)	34.2 kPa (4.96 psi)
ROPS/FOPS Certification	ISO 3471 / ISO 3449 Level II
Main Hydraulic Steel Grade	

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style='padding: 8px; border: 1px solid #ddd; > HARDOX  
450</td> </tr> </table>
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