GROSS HORSEPOWER 2610 kW 3,500 HP

NOMINAL GVW 576072 kg 1,270,000 lb

KOMATSU[®] 960E-2



ELECTRIC DRIVE TRUCK

WALK-AROUND

Productivity Features

- High performance Komatsu SSDA18V170 engine Gross horsepower 2610 kW **3,500 HP**
- GE dual IGBT AC electric drive system
- 4476 kW 6,000 HP continuous retarding capability
- Automatic retard speed control
- Traction (spin-slide) control
- Customer specific body
- Tight turning radius 16 m 52'6"
- Payload Meter III®

Environmentally Friendly

- Optional Tier 4 compliant Komatsu SSDA18V170 engine
- Fuel efficient engine

Reliability Features

- Frame structurally enhanced for 327 tonne **360 short ton** payload
- Proven wheelmotor design
- Simple and reliable hydraulic system
- Steering and brake accumulators
- Hydraulically actuated multiple-disc wet brakes



960E-2

ELECTRIC DRIVE TRUCK

GROSS HORSEPOWER 2610 kW 3,500 HP @ 1900 rpm

> **NOMINAL GVW** 576072 kg **1,270,000 lb**

Operator Environment

- Ergonomically designed spacious cab with improved visibility
- Fully adjustable driving position settings
- Four post ROPS/FOPS Level 2 Cab
- Advanced dash panel with payload display
- AM/FM/CD/MP3/USB radio



Easy Maintenance

- KOMTRAX Plus allows immediate diagnostics of key engine, chassis, and drive system components
- Oil-cooled wet disc braking system reduces wear and extends component replacement intervals
- Extended oil change intervals based on the Centinel[®] and Reserve systems
- Automatic lubrication system
- Eliminator[®] oil filtration system
- In-tank fast fuel fill system

960E-2 ELECTRIC DRIVE TRUCK

PRODUCTIVITY FEATURES

Komatsu SSDA18V170 High Horsepower Engine

Komatsu's SSDA18V170 engine was designed and developed by Industrial Power Alliance (IPA) technical joint venture between Komatsu and Cummins®. This 2610 kW **3,500 HP** engine will operate in most of today's mining applications without experiencing power derate. Fuel efficiency is maximized due to optimized air handling with two-stage turbocharging. A standard pre-lube system is designed to eliminate start-up wear and increase overhaul life. Standard features include:

- CENSE® on board monitoring of engine performance for each cylinder
- CENTINEL® Advanced Engine Oil Management System with Reserve oil
- ELIMINATOR[®] filtration system reduces oil and filter changes by one-third



Electric Dynamic Retarder

The 4476 kW **6,000 HP** retarding system provides state of the art braking capacity for navigating today's mining applications which contain steep continuous descents and sharp switchbacks.

Continuous retarding capacity enhances the productivity of the vehicle operator, while eliminating the need for excessive mechanical braking effort.



GE Dual IGBT AC Electric Drive System

Invertex[®] AC control system offers independent control of the rear wheelmotors, which in turn provides outstanding traction-ability during wet and slippery conditions, thus improving tire wear and operator confidence.

The air cooled Insulated Gate Bipolar Transistor (IGBT) inverter system technology provides the highest available reliability. The IGBT inverter is more compact and much simpler than the design of its predecessor, the Gate Turn Off (GTO) inverter, which improves serviceability and routine maintenance.



Traction (Spin-Slide) Control

During slippery events caused by inclement weather conditions and/or application severity, the 960E wheel Spin-Slide prevention technology will detect and correct any wheel spin control events. Spin-Slide Control operates automatically and independently of the service brakes. During propulsion, "wheel slip control" reduces nonproductive wheel spin in low traction conditions. During retarding, "wheel slide control" prevents wheel lockup and subsequent sliding.

Automatic Retard Speed Control

While in continuous descent, the operator has the capability to select a comfortable downhill travel speed. Automatic Retard Speed Control simultaneously manages the speed of each wheel independently to allow for any immediate adjustments needed during slippery underfoot conditions.

Customer Specific Body

For all trucks, Komatsu goes through the Body Worksheet (BW) process to ensure that each body is designed to meet the requirements for each specific application while carrying its rated payload. Komatsu works with each customer to understand all of the material properties at a mine site and to identify the appropriate liner package.

Komatsu offers a standard all-welded steel, flat floor body with a full canopy and horizontal bolsters. This body includes a driver side eyebrow, body up sling, and rubber mounts on the frame.

- Standard Body Struck Capacity: 149 m³ 195 yd³
- Standard Body SAE Heaped 2:1: 214 m³ 280 yd³
- Standard Komatsu Body Weight: 40823 kg 90,000 lbs



Tight Turning Radius

By using double acting hydraulic steering cylinders with a sixpoint articulation linkage, the 960E-2 power steering system provides steering control with minimal operator effort. The turning radius of the 960E-2 is 16 m **52' 6"**, which provides excellent maneuverability for



tight loading and dumping conditions. The steering accumulators comply with ISO-5010 standards.



Payload Meter III® (PLM III)

PLM III is an electronic system that monitors and records payload information for Komatsu's off-highway mining trucks. The accurate and reliable payload measurement system is designed to help optimize payload, maximize productivity and reduce the life cycle cost of the machine. PLM III tracks and records the following key production parameters:

- Payload
- · Empty Carry-Back
- · Operator Identification
- · Haul Cycle, Loading, Dumping Time and Date
- · Distance Traveled (Loaded and Empty)
- Cycle Time Information
- Maximum Speeds (Loaded and Empty)
- · TMPH Estimate for Front and Rear Tires
- · Average Speed (Loaded and Empty)

Example of Payload Summary



Hydropneumatic Suspension

Hydrair II[®] is a suspension system that utilizes four nitrogen-over-oil cylinders. This suspension system is designed to maximize machine productivity by providing the operator with a smooth and comfortable ride. By absorbing



shocks to the chassis during operation,

Hydrair II[®] contributes to the durability of the machine's frame and components.



ELECTRIC DRIVE TRUCK

OPERATOR ENVIRONMENT

Ergonomically Designed Cab

The Komatsu 960E-2 cab design provides a comfortable and productive environment to meet today's mining demands. The cab includes tinted windows, heating and air conditioning, acoustical insulation, double sealed doors, and provides filtered and pressurized air.

Operator Seat

Komatsu recognizes that operator comfort is a key to productivity in today's mining environment. The five-way adjustable operator seat and the tilt-telescopic steering column provide an optimum driving posture for increased operator comfort and control over the machine. The air suspension seat absorbs vibrations transmitted from the machine, reducing operator fatigue. A 51 mm **2**" wide three-point seat belt is provided as standard equipment.

Built-in ROPS and FOPS Structure

Integral ROPS/FOPS Level 2 cab. These structures conform to ISO standards 3471 and 3449.





960E-2 ELECTRIC DRIVE TRUCK

RELIABILITY FEATURES

Structurally Enhanced Frame Design

By using advanced computer-aided design, finite element analysis, and full-scale dynamic and static testing, the frame design has been structurally enhanced to carry 327 tonne **360 short tons** and provides the highest reliability in the industry.



Simple and Reliable Hydraulic System

The hydraulic system is a proven and reliable design with fewer parts than other OEMs. The system utilizes a common tank, and therefore, common fluid for steering, braking, and hoisting. In-line, replaceable filtration elements provide additional hydraulic system protection from contamination.

To keep downtime to a minimum, Komatsu developed a sub-frame pump module that can be removed and replaced as a single unit. This reduces change-out time and allows easy access to the hydraulic pump module.



Castings Used in High Stress Areas

To increase frame reliability, steel castings have been incorporated at key frame pivot points and key load bearing critical portions of the frame. This includes the rear body pivot and horsecollar sections.

Steering and Brake Accumulators

In the event that the hydraulic pressure in the steering or braking system drops below an acceptable minimum, nitrogen-charged accumulators will automatically apply the brakes so that the truck may be stopped. There are separate accumulators for the braking and steering systems.



Proven Wheelmotor Design

The GDY108 has a redundant brake and transmission fluid sealing arrangement for better reliability and an improved oil drain system for easier maintenance.



Fully Hydraulic Controlled Multiple-Disc Wet Brakes

Although the dynamic retarding system is the primary braking force, the 960E-2 comes standard with four-wheel, hydraulically actuated, oil cooled service brakes. In the event that the truck's hydraulic system pressure drops below an acceptable level, accumulator tanks will automatically apply all wheel brakes to bring the truck to a complete stop.

- Max. service apply pressure: 18960 kPa 2,750 psi
- Total friction area per brake: 103729 cm² 16,078 in²

The oil cooled brake system provides lower maintenance costs and higher reliability versus dry disc brakes. This system is fully sealed to help keep contaminants out and reduce brake wear and maintenance. The brakes are hydraulically actuated, removing all air from the design. By eliminating an air system, air bleeding is not required and water condensation that can lead to contamination, freezing, and corrosion is no longer present. There are three independent hydraulic circuits that provide hydraulic back-up.





EASY MAINTENANCE

Advanced Monitoring System – On-board Diagnostics

The Komatsu advanced monitoring system identifies maintenance items to the operator, reduces diagnostic times, indicates oil and filter replacement hours, and displays fault codes. This monitoring system is designed to maximize machine availability.

Automatic Lubrication System

The automatic lubrication system is designed to reduce downtime for lubrication by having a centralized location that automatically distributes grease to all lubrication points.



Flange Type Tire Rims

The flange type rims allow quicker removal and installation of the tires which minimizes the overall impact on downtime.

KOMTRAX Plus

As part of a complete service and support program, Komatsu equips every mining and quarry sized machine with KOMTRAX Plus. By using a satellite-based communication system, KOMTRAX Plus offers a new vision of monitoring your valuable assets by providing insight to critical operating metrics and information that can be used to increase availability, lower owning and operating costs and maximize fuel efficiency.

The KOMTRAX Plus information available on MyKomatsu.com allows service personnel and asset owners to review cautions, operational data, fuel consumption, payloads and key component measurements provided in forms of trends. With KOMTRAX Plus, knowledge becomes the power to fuel your productivity.



Extended Oil Change System

Cummins CENTINEL® oil management system and ELIMINATOR® filtration system reduce oil and filter changes by one-third. Oil drain is extended to 4,000 hours, and there are no spin-on oil filters. Centrifuge paper is replaced every 1,500 hours.



ADDITIONAL FEATURES

Environmentally Friendly

Komatsu SSDA18V170 Engine

Payload Policy

haul profiles only.

10-10-20 Load Policy Criteria

Recognizing that variation occurs naturally in material

America Corp. deems it necessary to establish a consistent

payload policy. This payload policy is intended to identify

the guidelines and limitations for the loading of Komatsu

mining trucks, and is valid for approved applications and

density, fill factors, and loading equipment, Komatsu

Optional Tier 4 compliant Komatsu SSDA18V170 engine.

Less Fluids Than Mechanical Drives

Komatsu electric drive trucks contain 57% less fluid compared to similar class mechanical drive trucks, creating a lower environmental impact and makes fluid replacement simpler, quicker and more economical.

Selectable Stairway Direction



Komatsu's 960E-2 offers stairway access with entry from either the right or left side of the truck depending on the customer's preference.

- 1) The average
 - 1) The average monthly payload must not exceed the rated payload of the truck
 - 2) 90% of all loads must be below 110% of the rated payload of the truck
 - 3) 10% of all loads may be between 110% and 120% of the rated payload of the truck
 - 4) No single payload may exceed 120% of the rated payload of the truck



Percent of Rated Payload

SPECIFICATIONS



	. 2610 kW 3,500 HP @ 1900 rpm
Net flywheel power***	. 2495 kW 3,346 HP @ 1900 rpm
Weight (wet)	11750 kg 25,897 lb
(dry)	11250 kg 24,795 lb

- Optional Tier 4 emission compliant engine for North American market. Non-emissionized engine for markets outside of North America.
- Gross horsepower is the output of the engine as installed in this machine, at governed rpm and with engine manufacturer's approved fuel setting. Accessory losses included
- are water pump, fuel pump and oil pump. ***Net flywheel power is the rated power at the engine flywheel minus the average accessory losses. Accessories include fan and charging alternator. Rating(s) represent net engine performance in accordance with SAE J1349 conditions.

ELECTRIC DRIVE

AC/DC CURRENT

Alternator
Dual impeller in-line blower
Control
Motorized wheels*
Ratio
Speed (maximum)

Wheel motor application depends upon gross vehicle weight, haul road grade, haul road length, rolling resistance and other parameters. Komatsu and G.E. must analyze each job condition to assure proper application.

TIRES AND RIMS

Rock service, tubeless, radial tires

- Standard tire*. Flange mount rim
- 1041 mm x 1600 mm x 140 mm 41" x 63" x 5.5" rim assembly. Rims rated at 758 kPa 110 psi cold inflation pressure.
- Tires should meet application requirements for tkph/tmph, tread, compound, inflation pressure, ply rating or equivalent, etc.



All-welded steel flat floor body with horizontal bolsters and full canopy. Eyebrow, rear wheel rock ejectors, body up sling and rubber mounts on frame are standard. Pivot exhaust heating optional.

Floor sheet
19 mm 0.75" Center
1379 MPa 200,000 psi tensile strength steel
Front sheet
12 mm 0.47" Center
1379 MPa 200,000 psi tensile strength steel
Side sheet
1379 MPa 200,000 psi tensile strength steel
Canopy sheet
690 MPa 100,000 psi tensile strength steel
Capacity struck
SAE heaped 2:1
Standard Komatsu body weight



Advanced Operator Environment with integral 4-post ROPS/FOPS Level 2 cab, adjustable air suspension seat w/lumbar support and arm rests, full-size passenger seat, maximum R-value insulation, tilt and telescoping steering wheel, electric windshield wipers w/washer, tinted safety glass, power windows, Komatsu Payload Weighing System, 61,000 Btu/hr heater and defroster, 19,900 Btu/hr air conditioning (HFC - 134A refrigerant).



Advanced technology, full butt-welded box sectional ladder-type frame with integral ROPS supports, integral front bumper, rear tubular cross members, steel castings at all critical stress transition zones, rugged continuous horsecollar.

Plate material
tensile strength steel
Casting material
tensile strength steel
Rail width
Rail depth (minimum)
Top and bottom plate thickness
Side plate thickness
32 mm 1.26" Front
Drive axle mounting Pin.and spherical bushing
Drive axle alignment



Service brakes: oil-cooled, hydraulic-actuated, multiple disc brakes at
each wheel. Traction system wheel spin-slide control.
Max. service apply pressure
Total friction area per brake
Secondary brakes Automatically applied prior
to hydraulic system pressure dropping below level
required to meet secondary stopping requirements.
Wheel brake locks
Parking brakes Multiple.disc, spring-applied,
hydraulically-released, dry brakes on inboard end
of each wheel motor rotor shaft. Rated to hold on
±15% grade at maximum gross vehicle weight.
Electric dynamic retarder Continuous 4476 kW 6000 hp
Continuously rated high-density blown grids w/retard capacity at low

Continuously rated high-density blown grids w/retard capacity at low speeds and retard in reverse propulsion.

SUSPENSION

Variable rate hydro-pneumatic with integral rebound control
Max. front stroke
Max. rear stroke
Max. rear axle oscillation

COOLING SYSTEM

L&M radiator assembly, split-flow, with deaerator-type top tank. R

Radiator frontal area	2.m ² 75.5 ft ²
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SERVICE CAPACITIES

Cooling System	.7.19 L . 190.U.S. gal
Crankcase*	. 34.1 L 90. U.S. gal
Hydraulic system	1325.L. 350 U.S. gal
Motor gear box (each)	95.L . 25 U.S. gal
Fuel	5300.L.1.400 U.S. gal
* Includes lube oil filters	

AHO: DIMENSIONS



All dimensions are with standard body.

	Cap	Loading	
Body	Struck	2:1 Heap	Height*
Standard	149 m³ 195 yd³	214 m³ 280 yd³	7.14 m 23'5''

*Exact load height may vary due to tire make, type, and inflation pressure.



Steering Accumulator assisted with twin double acting cylinders provide constant rate steering. Secondary steering automatically supplied by accumulator.
Turning circle diameter (SAE)
Suction
with diagnostic test connections HoistTwo 3-stage dual-acting outboard cylinders, 4 x 8
internal cushion valve, over-center dampening batte
Hoist times AI
Power-up loaded 24 sec. Li Power-down 14 sec. Ci Float-down empty 24 sec
Pumps
Hoist and brake cooling
Steering and brake Pressure-compensating piston pump with output of 246 lpm 65 gpm at 1900 rpm and 20685 kPa 3,000 psi
System relief pressures Hoist and brake cooling



960E-2





4 x 8D 1450 CCA, 12 volt, in series/parallel, 220-ampere-hour batteries, bumper-mounted with disconnect switch.

Alternator	 .24 volt, 250.amp
· · Lighting	
· Cranking motors	

PERFORMANCE CHART



Short Time Retarding - While thermal conditions permit, short time retarding performance will be utilized.

KOMATSU PRODUCT LINE LOADER/TRUCK MATCHING

	Komatsu Trucks									
			HD785 100 ton	HD1500 159 ton	730E 203 ton	830E-AC 244 ton	860E-1K 280 ton	930E-4 320 ton	930E-4SE 320 ton	960E 360 ton
	PC2000	15.7 yd ³	4	7						
ATORS	PC3000	19.5 yd ³	4	6	7					
KOMATSU EXCAVATORS	PC4000	29 yd ³	3	4	5	6	6			
KOMAT	PC5500	37 yd³		3	4	5	5	6	6	7
	PC8000	55 yd ³				3	3	4	4	5

Typical Number of Passes to Load

Nominal truck payload rating (short tons)

Bucket ratings are based on 1780 kg/lcm 3,000 lbs/lcy material density.

	ehicle Weight Front Axle Distribution	123490 kg	272,250 lbs	49.5%
		C C	,	
	Rear Axle Distribution	125985 kg	277,750 lbs	50.5%
	Total EVW	249475 kg	550,000 lbs	
Gross Ve	hicle Weight			
	Front Axle Distribution	190104 kg	419,100 lbs	33.0%
	Rear Axle Distribution	385968 kg	850,900 lbs	67.0%
	Nominal GVW	576072 kg	1,270,000 lbs	
Payload				
	Nominal Payload	326585 kg	720,000 lbs	
	-	327 metric tons	360 short tons	

Nominal payload is defined by Komatsu America Corp's payload policy documentation. In general, the nominal payload must be adjusted for the specific vehicle configuration and site application. The figures above are provided for basic product description purposes. Please contact your Komatsu distributor for specific application requirements.



STANDARD EQUIPMENT

- Air cleaners, Donaldson® w/evacuators
- Alternator (24 volt/250A)
- Auto lubrication system w/ground level fill & level indicator
- Back up alarm Batteries-4 x 8D (1450 CCA's)
- Battery charging cable and socket
- Body over center device
- Body impact plate
- Brakes: oil-cooled, multiple disc front & rear
- Deck guard rails
- Electric start
- Eliminator[®], Centinel[®], Cense[®]
- Fast-fill fuel system (in tank and left side remote)
- Filters, high pressure hydraulic
- Fuel tank sight gauge (3)
- Ground level radiator fill
- L&M Radiator
- Mud flaps
- Muffled exhaust-deck-mounted
- Power supply, 24 volt and 12 volt DC
- Quick disconnects (hoist and diagnostics)
- Radiator sight gauge
- Removable power module unit (radiator. engine, alternator, blower)
- Retard speed control
- Reverse retarding
- Service center-LH
- Thermostatic fan clutch

OPERATOR ENVIRONMENT & CONTROL

- All hydraulic service brakes w/auto apply
- Battery disconnect switch
- Body up sling
- Brake lock and drive system interlock
- Circuit breakers, 24 volt
- Dedicated auxiliary circuits in operator cab (ladder lights, 2-way radios, fire
- Suppression power) Diagonal ladder tread cap plates Dynamic retarding with continuous ٠
- rated element grids

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- Engine access guard rail
- Engine shutdown at ground level

Accumulators (cold weather)

Bumper mounted headlights

Engine access platform

• Fire extinguisher 9 kg 20 lb

KOMATSU®

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Eliminator®, Centinel®, Cense®

Antifreeze (-40°C)

Extended canopy

Body Liners*

Eyebrow

· Heated body

AESS832-00

- Hoist propulsion interlock
- Horns (electric-front and back-up)

OPTIONAL EQUIPMENT Note: Optional equipment may change operating weight.

- Hydraulic tank ladder
- Integral ROPS/FOPS Level 2 cab
- Maintenance and power lockout
- Parking brakes with warning light & speed application protection
- Power steering w/auto secondary steering
- Protective deck handrails
- Pre-shift brake test
- Pump driveline protector
- Radiator fan guard
- RH & LH multi-cambered convex mirrors Seat belts
- Operator 3-point 51 mm 2" retractable
- Passenger lap 51 mm 2" retractable
- Slip-resistant / dimpled surface on walkways
- Stairway-selectable direction (L to R)

STANDARD HIGH VISIBILITY DELUXE CAB

- AC drive interface display
- Actia Dash & Status Panel
 - Body up
 - Parking brake
 - Propulsion system not ready
 - No DC link voltage
 - High engine oil temp
 - No propel
 - Service brake applied
 - Wheel brake lock applied
 - Maintenance monitor
- Air cleaner vacuum gauges
- Air conditioner HFC-134A
- AM/FM radio with CD. USB & MP3
- Column-mounted retarder control
- Digital tachometer and speedometer
- Dome light
- Engine hourmeter, oil pressure gauge, coolant temperature gauge, hydraulic oil temperature gauge
- Engine shutdown w/ "Smart Timer" delay
- Floor mat (double barrier)
- Fuel gauge in cab
- Fuel low level light and buzzer
- Gauges (w/backlight)
- Headlight switch

HID headlights

Hot start hydraulic oil

ISRI 3 point seat

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*Available factory installed or non-installed. All other options and accessories listed are available factory installed only.

Heater and defroster (heavy-duty)

Hot start engine coolant (220V 2-2500W)

Hot start engine oil (220V 2-500W)

Mudflaps on hydraulic tank & fuel tank

Mudflaps on hydraulic tank & fuel tank

Printed in USA

Hydraulic folding access ladder

without ladder on hydraulic tank

Heater switch

- High beam selector and indicator
- Horn (center of steering wheel)
- Indicator lights (blue)
 - Engine service - KOMTRAX Plus snapshot (IM)
- Insulation (Max R-Value)
- Komatsu Payload Meter III[®] KOMTRAX Plus with ORBCOMM
- Operator seat, adjustable w/air
- suspension, lumbar support and arm rests
- Panel lighting (adjustable)
- Passenger seat, mechanical suspension
- Power windows

LIGHTING

halogen

- Pressurized cab air system w/fan on
- Single brake/retarder pedal Starter key switch
- Sunvisor (adjustable) Tilt & telescoping steering column
- Voltmeter (battery output)
- Windshield (tinted safety plate)

Clearance lights (LED)

Fog lights (2) halogen

HID-style backup/ berm light

Payload lights R and L (LED)

Stop & tail lights (2) (LED)

Under-hood service lights

Reversed access ladder (R to L)

Scoreboard PLM III Display

Special language decals

Suspensions, cold weather

Wiggins Quick Fluid Fill & Engine Oil

10/11 (EV-1)

Service center-RH

Shutters (radiator)

Evacuation System

AD10(1.5M)OSP

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Work/ deck lights on control cabinet

Platform lights R, L and Center Recessed corner marker/ signal lighting

positions (10)

Stairway lights

Turn signals (LED)

(LED)

Windshield wiper (dual) and washer (electric)

Back-up lights-rear mount (2) halogen

Brake and retard lights on top of cab

Control cabinet service light (LED)

Engine compartment service lights

Halogen headlights- all high & low beam

Manual back-up light, switch and indicator

Dynamic retarding, rear (2) (LED)

Back-up lights-R and L - deck mount (2)