CEBM021902

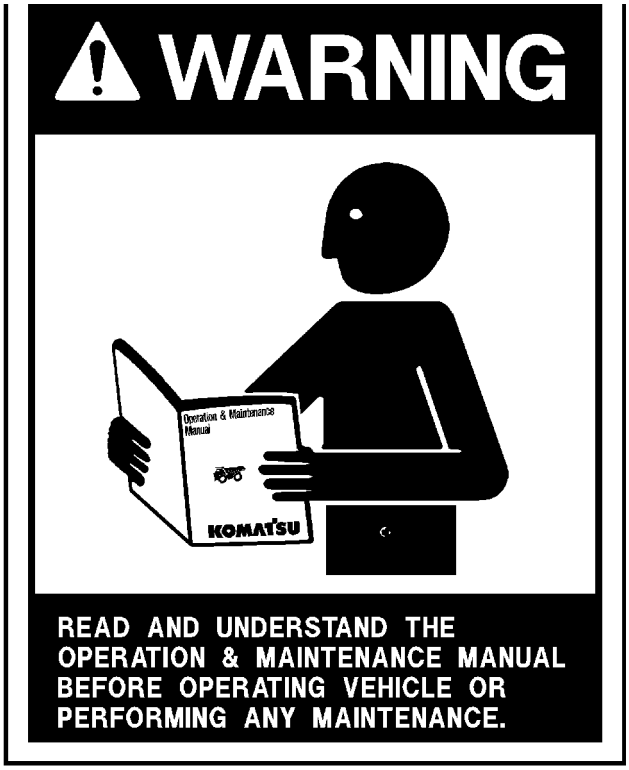
Shop Manual

830E-1AC

DUMP TRUCK

SERIAL NUMBERS **A30240 - A30560**

KOMATSU®



Unsafe use of this machine may cause serious injury or death. Operators and maintenance personnel must read and understand this manual before operating or maintaining this machine.

This manual should be kept in or near the machine for reference, and periodically reviewed by all personnel who will come into contact with it.

CALIFORNIA
Proposition 65 Warning

Diesel engine exhaust, some of its constituents, and certain vehicle components contain or emit chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

CALIFORNIA
Proposition 65 Warning

Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.

⚠WARNING

NON-OEM PARTS IN CRITICAL SYSTEMS

For safety reasons, Komatsu America Corp. strongly recommends against the use of non-OEM replacement parts in critical systems of all Komatsu equipment. Critical systems include but are not limited to steering, braking and operator safety systems.

Replacement parts manufactured and supplied by unauthorized sources may not be designed, manufactured or assembled to Komatsu's design specifications; accordingly, use of such parts may compromise the safe operation of Komatsu products and place the operator and others in danger should the part fail.

Komatsu is also aware of repair companies that will rework or modify an OEM part for reuse in critical systems. Komatsu does not generally authorize such repairs or modifications for the same reasons as noted above.

Use of non-OEM parts places full responsibility for the safe performance of the Komatsu product on the supplier and user. Komatsu will not in any case accept responsibility for the failure or performance of non-OEM parts in its products, including any damages or personal injury resulting from such use.

FOREWORD

This Shop Manual is written for use by the service technician and is designed to help the technician become fully knowledgeable of the truck and all its systems in order to keep it running and in production. All maintenance personnel should read and understand the materials in this manual before performing maintenance and/or operational checks on the truck. All safety notices, warnings and cautions should be understood and followed when accomplishing repairs on the truck.

The first section covers component descriptions, truck specifications and safe work practices, as well as other general information. The major portion of the manual pertains to disassembly, service and reassembly. Each major serviceable area is dealt with individually. For example: The disassembly, service and reassembly of the radiator group is discussed as a unit. The same is true of the engine and engine accessories, and so on through the entire mechanical detail of the truck. Disassembly should be carried only as far as necessary to accomplish needed repairs.

The illustrations used in this manual are, at times, typical of the component shown and may not necessarily depict a specific model.

This manual shows dimensioning of metric (SI) and U.S. standard units throughout and all references to “Right”, “Left”, “Front”, or “Rear” are made with respect to the operator's normal seated position, unless specifically stated otherwise.

Standard torque requirements are shown in torque charts in the general information section and individual torques are provided in the text in bold face type, such as **135 N·m (100 ft lbs)** torque. All torque specifications have ±10% tolerance unless otherwise specified.

A Product Identification plate is normally located on the truck frame in front of the right side front wheel and designates the Truck Model Number, Product Identification Number (vehicle serial number), and Maximum G.V.W. (Gross Vehicle Weight) rating.

The KOMATSU Truck Model designation consists of three numbers and one letter (i.e. 830E). The three numbers represent the basic truck model. The letter “E” designates an Electrical propulsion system.

The Product Identification Number (vehicle serial number) contains information which will identify the original manufacturing bill of material for this unit. This complete number will be necessary for proper ordering of many service parts and/or warranty consideration.

The Gross Vehicle Weight (GVW) is what determines the load on the drive train, frame, tires, and other components. The vehicle design and application guidelines are sensitive to the **total maximum Gross Vehicle Weight (GVW)** and this means **the total weight:** the Empty Vehicle Weight + the fuel & lubricants + the payload.

To determine allowable payload: Service all lubricants for proper level and fill fuel tank of empty truck (which includes all accessories, body liners, tailgates, etc.) and then weigh truck. Record this value and subtract from the GVW rating. The result is the allowable payload.

NOTE: Accumulations of mud, frozen material, etc. become a part of the GVW and reduces allowable payload. To maximize payload and to keep from exceeding the GVW rating, these accumulations should be removed as often as practical.

Exceeding the allowable payload will reduce expected life of truck components.

This "ALERT" symbol is used with the signal words, "DANGER", "WARNING", and "CAUTION" in this manual to alert the reader to hazards arising from improper operating and maintenance practices.

DANGER

"DANGER" identifies a specific potential hazard WHICH WILL RESULT IN EITHER INJURY OR DEATH if proper precautions are not taken.

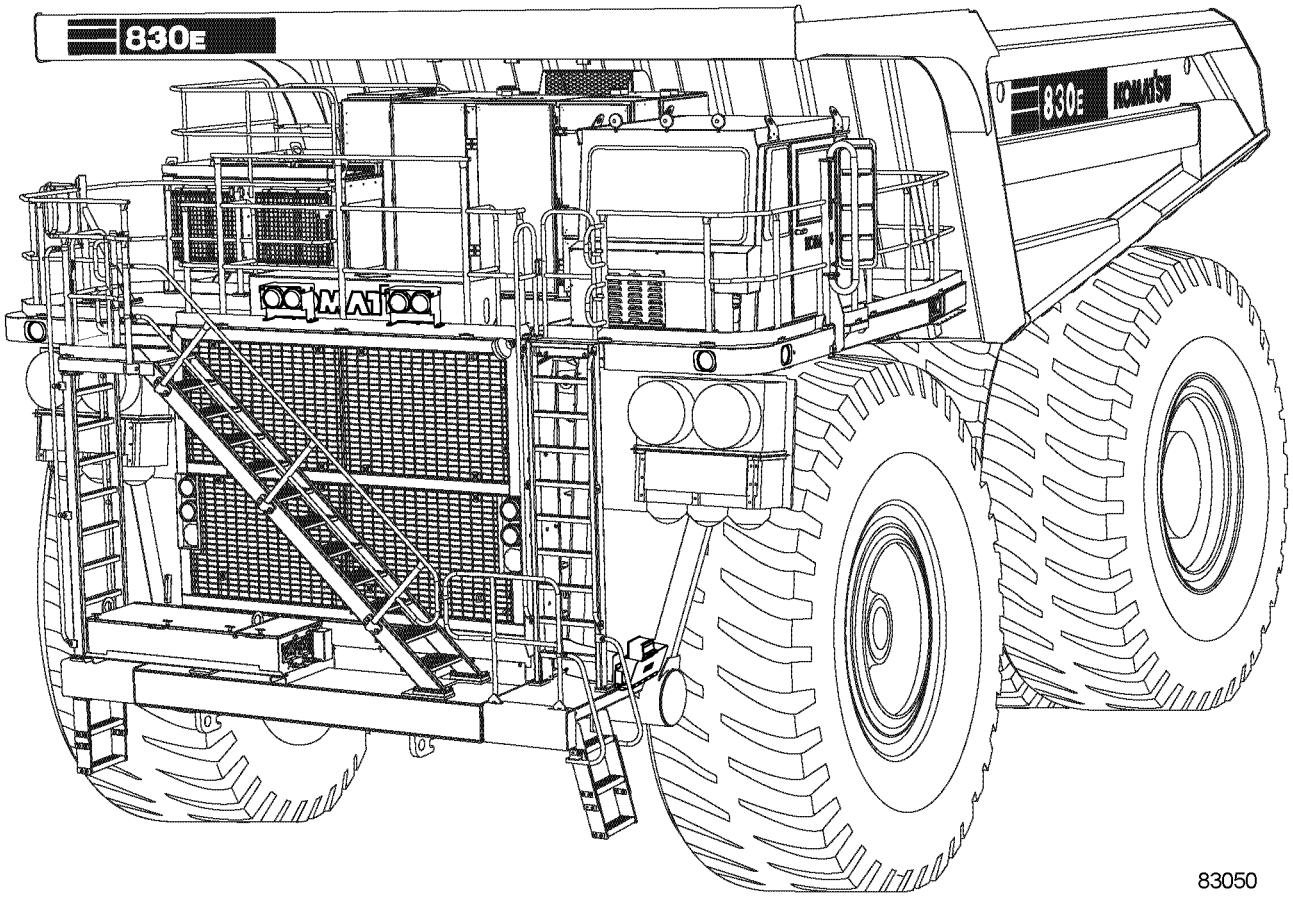
WARNING

"WARNING" identifies a specific potential hazard WHICH MAY RESULT IN EITHER INJURY OR DEATH if proper precautions are not taken.

CAUTION

"CAUTION" is used for general reminders of proper safety practices OR to direct the reader's attention to avoid unsafe or improper practices which may result in damage to the equipment.

TABLE OF CONTENTS



KOMATSU MODEL 830E-AC TRUCK

SECTION A
GENERAL INFORMATION
INDEX

NOTES

MAJOR COMPONENT DESCRIPTION

Truck And Engine

The 830E-AC Dump Truck is an off-highway, rear dump truck with AC Electric Drive. The gross vehicle weight is 385 852 kg (850,650 lbs.). The engine is a Komatsu SDA16V160 rated @ 1865 kW (2500 HP).

Alternator (G.E. GTA-41)

The diesel engine drives an in-line alternator at engine speed. The alternator produces AC current which is rectified to DC within the main control cabinet. The rectified DC power is converted back to AC by groups of devices called "inverters", also within the main control cabinet. Each inverter consists of six "phase modules" under the control of a "gate drive unit" (GDU). The GDU controls the operation of each phase module.

Cooling air for the control / power group and wheel motors, as well as the alternator itself, is provided by dual fans mounted on the alternator shaft.

AC Induction Traction Motorized Wheels

The alternator output supplies electrical energy to the two wheel motors attached to the rear axle housing. The motorized wheels use three-phase AC induction motors with full-wave AC power.

The two wheel motors convert electrical energy back to mechanical energy through built-in gear trains within the wheel motor assembly. The direction of the wheel motors is controlled by the directional control lever located on the center console.

Suspension

HYDRAIR®II suspension cylinders located at each wheel provide a smooth and comfortable ride for the operator and dampens shock loads to the chassis during loading and operation.

Operator's Cab

The operator cab has been engineered for operator comfort and to allow for efficient and safe operation of the truck. The cab provides wide visibility, with an integral 4-post ROPS/FOPS structure, and an advanced analog operator environment. It includes a tinted safety-glass windshield and power-operated side windows, a deluxe interior with a fully adjustable seat with lumbar support, a fully adjustable tilt/telescope steering wheel, controls mounted within easy reach of the operator, and an analog instrument panel which provides the operator with all instruments and gauges which are necessary to control and/or monitor the truck's operating systems.

Power Steering

The truck is equipped with a full time power steering system which provides positive steering control with minimum operator effort. The system includes nitrogen-charged accumulators which automatically provide emergency power if the steering hydraulic pressure is reduced below an established minimum.

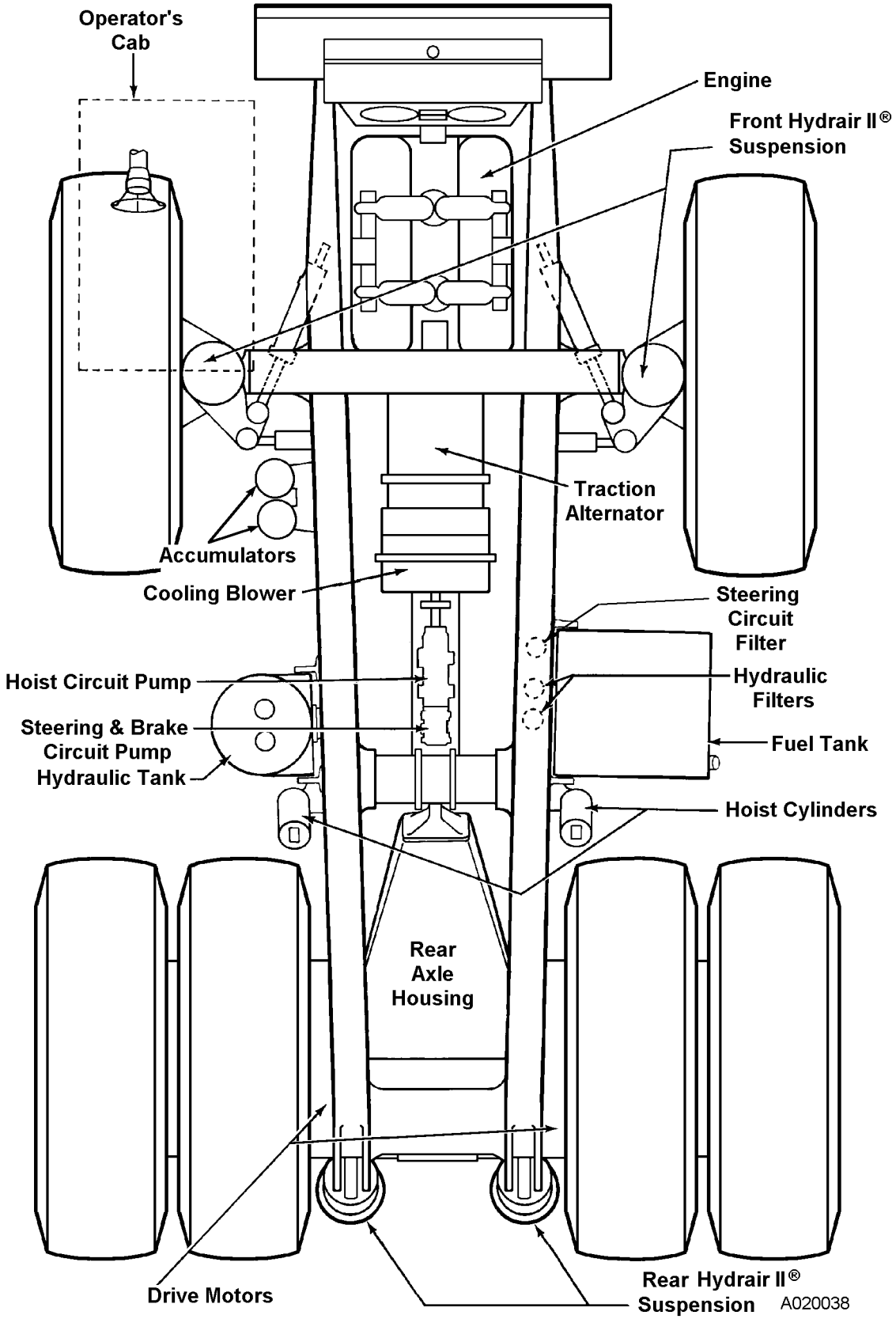
Dynamic Retarding

The dynamic retarding is used to slow the truck during normal operation or control speed coming down a grade. The dynamic retarding ability of the electric system is controlled by the operator through the activation of the retarder pedal in the operators cab and by setting the RSC (Retarder Speed Control). Dynamic Retarding is automatically activated, if the truck speed goes to a preset overspeed setting.

Brake System

The braking system consists of an all hydraulic actuation system. Depressing the brake pedal actuates wheel-speed single disc front brakes and armature-speed dual disc rear brakes. The brakes can also be activated by operating a switch on the instrument panel. The brakes will be applied automatically if system pressure decreases below a preset minimum.

The parking brake is integral with the service brake caliper, and is spring-applied and hydraulically-released. The park brake is applied by moving the directional control lever to the PARK position.


Operator's Cab
Engine
Front Hydrair II®
Suspension
Traction Alternator
Accumulators
Cooling Blower
Steering Circuit Filter
Hoist Circuit Pump
Hydraulic Filters
Steering & Brake Circuit Pump
Hydraulic Tank
Fuel Tank
Hoist Cylinders
Rear Axle Housing
Drive Motors
Rear Hydrair II®
Suspension
A020038

SPECIFICATIONS

These specifications are for the standard Komatsu 830E-AC Truck. Customer Options may change this listing.

ENGINE

Komatsu SDA16V160
(Optional SSDA16V160)

No. of Cylinders 16
Operating Cycle 4-Stroke
Rated Brake HP . . . . 1865 kW (2500 hp)@ 1900 rpm
Flywheel HP . . . . . 1761 kW (2360 hp) @ 1900 rpm
Weight* (Wet) 9 608 kg (21,182 lbs)

* Weight does not include Radiator, Sub-frame, or Alternator

AC ELECTRIC DRIVE SYSTEM

(AC/DC Current)

Alternator . . . . . General Electric GTA - 41
Dual Impeller, In-Line Blower 255 m^3/min (9000 cfm)
Motorized Wheels . . . . GEB25 AC Induction Traction Motors
Ratio 31.875:1
Maximum Speed* . . . . . 64.5 km/h (40 mph)
(*w/40.00-57 Tires and 31.875:1 gear train)

**NOTE: Wheel motor application depends upon GVW, haul road grade and length, rolling resistance, and other parameters. Komatsu & G.E. must analyze each job condition to assure proper application.*

DYNAMIC RETARDING

Electric Dynamic Retarding . . . . . Standard
Maximum Rating . . . . . 2983 kW (4000 hp)

24 VDC ELECTRIC SYSTEM

Batteries . . . . 4 x 8D 1450 CCA, 12 volt batteries in Series/Parallel w/Disconnect Switch
Alternator . . . . . 24 Volt, 140 Ampere Output
Lighting . . . . . 24 Volt
Cranking Motors (2) . . . . . 24 Volt

SERVICE CAPACITIES

	Liters. (U.S. Gal.)
Crankcase *	280.0. . . . . (74.0)
* Includes Lube Oil Filters	
Cooling System	568. . . . . (150)
Fuel	4542. . . . (1200)
Hydraulic System	946. . . . . (250)
Hydraulic Tank	901. . . . . (238)
Wheel Motor Gear Box (each)	38. . . . . (10)

HYDRAULIC SYSTEMS*

Pumps

Hoist . . . . . Tandem Gear Pump
Rated @ . . . . . 851 lpm (225 gpm) @ 1900 rpm and 17 240 kPa (2,500 psi)
Steering/Brake . . . . . Pressure Compensating Piston
Rated @ . . . . . 246 lpm (65 gpm) @ 1900 rpm and 18 961 kPa (2,750 psi)

System Relief Pressures

Hoist . . . . . 17 240 kPa (2,500 psi)
Steering/Brakes . . . . . 27 580 kPa (4,000 psi)
Hoist Cylinders (2) 3-Stage
Tank (Vertical/Cylindrical) . . . . . Non-Pressurized
Filtration . . . . . in-line replaceable elements
Suction . . . . . Single, Full Flow, 100 Mesh
Hoist & Steering . . . . . Full Flow, Dual In-Line, High Pressure Beta 12 Rating =200

*With Quick Disconnects for powering disabled truck and system diagnostics.

SERVICE BRAKES

Actuation . . . . . All Hydraulic
Front . . . . . Wheel Speed, Single Disc
Inboard Mounted . . . . . 3 Calipers
Disc Diameter, O.D. . . . . 1213 mm (47.75 in.)
Rear . . . . . Armature Speed, Dual Disc
Disc Diameter, O.D. . . . . 635 mm (25.00 in.)
Emergency Brake- Automatically Applied (Standard)
Wheel Brake Lock . . . . . Manual Switch on Panel (Loading and Dumping)

DISC PARKING BRAKE

Each Rear Wheel . . . . . Integral with Service Caliper Spring Applied, Hydraulically Released

STEERING

Turning Circle - Front Wheel Track. . . 28.4 m (93 ft.)
Twin hydraulic cylinders with accumulator assist to provide constant rate steering. Emergency power steering automatically provided by accumulators.

DUMP BODY CAPACITIES AND DIMENSIONS

Standard, Heaped @ 2:1 (SAE) . . 147 m^3 (193 yd^3)
Struck . . . . . 117 m^3 (153 yd^3)
Loading Height Empty . . . . . 6.61 m (21 ft. 8 in.)
Dumping Angle 45
Non-heated body w/exhaust mufflers . . . . . Standard

TIRES

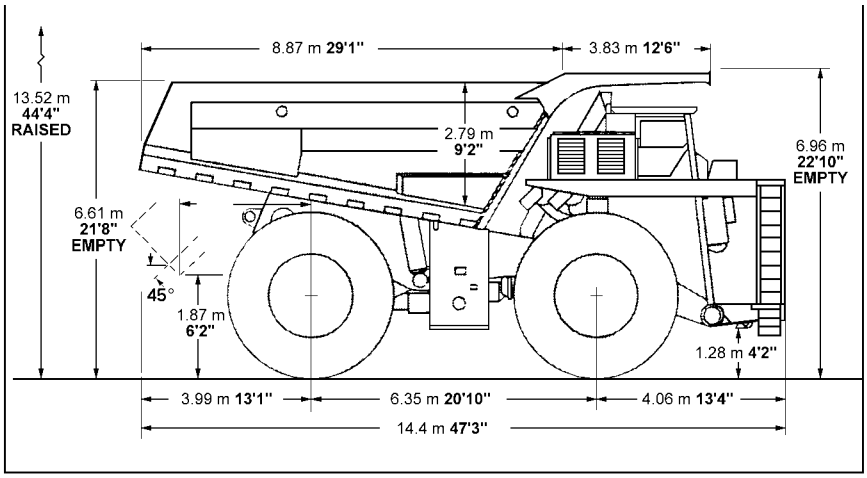
Radial Tires (standard) 40.00 R57
Optional Tires 46/90 R57
Rock Service, Deep Tread . . . . . Tubeless
Rims, standard 5 piece . . Rated to 827 kPa (120 psi)

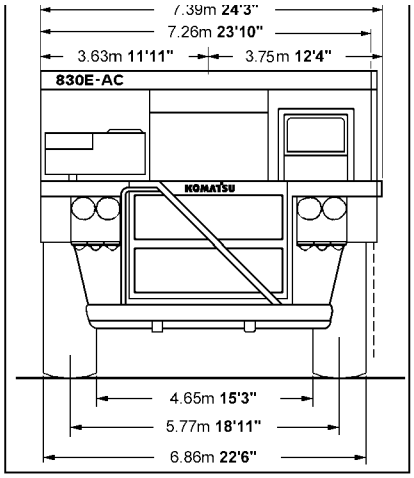
WEIGHT DISTRIBUTION

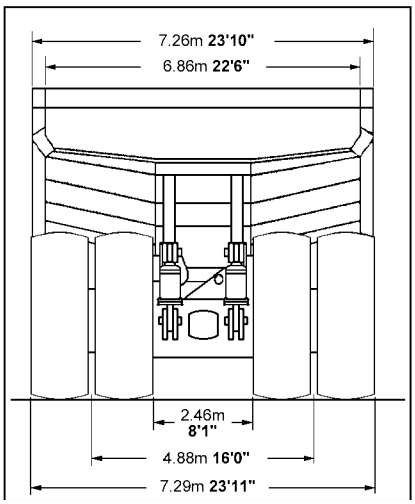
Empty Vehicle . . . . Kilograms. . . . . (Pounds)		
Front Axle	82 747.	(182,426)
Rear Axle.	82 902.	(182,768)
Total (100% fuel)	165 649.	(365,194)
Standard Komatsu body	27 669.	(61,000)
Standard tire weight. . . .	21 081.	(46,476)

Loaded Vehicle . . . Kilograms. . . . . (Pounds)		
Front Axle	127 330.	(280,715)
Rear Axle.	258 522.	(569,935)
Total *	385 852.	(850,650)
Nominal Payload *. . . .	220 199.	(485,456)
. . . . .	(242 U.S. Ton)	

*Nominal payload is defined by Komatsu America Corporation'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.







OVERALL TRUCK DIMENSIONS
(Empty with Standard Body)

Length . . . . . 14.4 m (47 ft. 3 in.)
Width . . . . . 7.32 m (24 ft. 0 in.)
Height with Canopy . . . . . 6.96 m (22 ft. 10 in.)
Height with Dump Body Up . . . . . 13.52 m (44 ft. 4 in.)
Turning Circle (on front track) . . . . . 28.4 m (93 ft. 0 in.)

SECTION A3
GENERAL SAFETY AND OPERATING INSTRUCTIONS
INDEX

GENERAL SAFETY

Safety records of most organizations will show that the greatest percentage of accidents are caused by unsafe acts of persons. The remainder are caused by unsafe mechanical or physical conditions. Report all unsafe conditions to the proper authority.

The following safety rules are provided as a guide for the operator. However, local conditions and regulations may add many more to this list.

⚠WARNING

Read and follow all safety precautions. Failure to do so may result in serious injury or death.

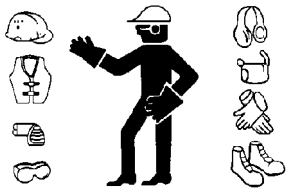
Safety Rules

- Only trained and authorized personnel can operate and maintain the machine.
- Follow all safety rules, precautions and instructions when operating or performing maintenance on the machine.
- When working with another operator or a person on work site traffic duty, ensure all personnel understand all hand signals that are to be used.

Truck Safety Features

- Ensure all guards and covers are in their proper position. Repair any damaged guards and covers. (Refer to Walk-Around Inspection, later in this section.)
- Learn the proper use of safety features such as safety locks, safety pins, and seat belts. Always use these safety features, properly.
- Never remove any safety features. Always keep safety features in good operating condition.
- Improper use of safety features may result in serious bodily injury or death.

Clothing And Personal Items



- Avoid wearing loose clothing, jewelry, and loose long hair. They can catch on controls or in moving parts and cause serious injury or death. Additionally, never wear oily clothes as they are flammable.
- Wear a hard hat, safety glasses, safety shoes, a mask and gloves when operating or maintaining a machine. Always wear safety goggles, a hard hat and heavy gloves if your job involves scattering metal chips or minute materials. This is particularly important when driving pins with a hammer or when cleaning air cleaner elements with compressed air. Also, ensure that the work area is free of other personnel during such tasks.

Unauthorized Modification

- Any modification made to this vehicle without authorization from Komatsu America Corp. can possibly create hazards.
- Before making any modification, consult your authorized regional Komatsu America Corp. distributor. Komatsu will not be responsible for any injury or damage caused by any unauthorized modification.

Leaving The Operator's Seat

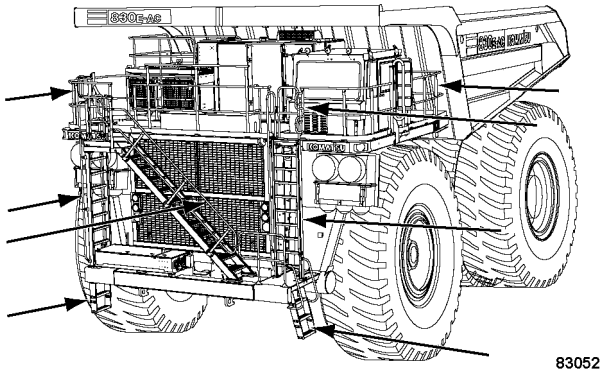
While leaving the operator's seat, DO NOT touch any controls. To prevent accidental operations from occurring, always perform the following:

- Move the directional control lever to the PARK position (this will apply the parking brake). DO NOT apply the wheel brake lock.
- Lower the dump body, and move the hoist control lever to the FLOAT position.
- Turn the key switch to the OFF position and wait for the engine to stop.
- After the engine has stopped, wait two minutes before exiting the cab. If any warning lights are illuminated or warning horns are sounding, DO NOT leave the cab and notify maintenance personnel immediately. When exiting the machine, always lock compartments, and take the keys with you to prevent entry from unauthorized persons.

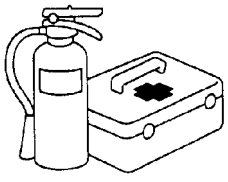
Mounting And Dismounting

- Never jump on or off the machine. Never climb on or off a machine while it is moving.
- When climbing on or off a machine, face the machine and use the hand-hold and steps.
- Never hold any control levers when getting on or off a machine.
- Always maintain three-point contact with the hand-holds and steps to ensure that you support yourself.
- When bringing tools up to the operating deck, always pass them by hand or pull them up by rope.
- If there is any oil, grease, or mud on the hand-holds or steps, wipe them clean immediately. Always keep these components clean. Repair any damage and tighten any loose bolts.
- Use the handrails and steps marked by arrows in the diagram below when getting on or off the machine.

NOTE: Some trucks may be equipped with different boarding equipment than shown in the figure below. Refer to Options Section for additional information.



Fire Extinguishers And First Aid Kits



- Ensure fire extinguishers are accessible and proper usage techniques are known.
- Provide a first aid kit at the storage point.
- Know what to do in the event of a fire.
- Keep the phone numbers of persons you must contact in case of an emergency on hand.

Precautions For High Temperature Fluids

- Immediately after machine operation, engine coolant, engine oil, and hydraulic oil are at high temperatures and are pressurized. If the cap is removed, the fluids drained, the filters are replaced, etc., there is danger of serious burns. Allow heat and pressure to dissipate before performing such tasks and follow proper procedures as outlined in the service manual.
- To prevent hot coolant from spraying:
  1. Stop the engine and wait for the coolant temperature to decrease.
  2. Depress the pressure relief button on the radiator cap.
  3. Turn the radiator cap slowly to allow pressure to dissipate.
- To prevent hot engine oil spray:
  1. Stop the engine.
  2. Wait for the oil temperature to cool down.
  3. Turn the cap slowly to allow pressure to dissipate.

Asbestos Dust Hazard Prevention

Asbestos dust is hazardous to your health when inhaled. If you handle materials containing asbestos fibers, follow the guidelines below:

- Never use compressed air for cleaning.
- Use water for cleaning and to control dust.
- Operate the machine or perform tasks with the wind to your back, whenever possible.
- Use an approved respirator, when necessary.

Fire Prevention For Fuel And Oil

- Fuel, oil, and antifreeze can be ignited by a flame. These fluids are extremely flammable and hazardous.
- Keep flames away from flammable fluids.
- Stop the engine while refueling.
- Never smoke while refueling
- Tighten all fuel and oil tank caps securely.
- Refuel and maintain oil in well ventilated areas.
- Keep oil and fuel in a designated location. DO NOT allow unauthorized persons to enter.

ROPS Precautions

- The Rollover Protection Structure (ROPS) must be properly installed for machine operation.
- The ROPS is intended to protect the operator if the machine rolls over. It is designed not only to support the load of the machine, but also to absorb the energy of the impact.
- ROPS structures installed on equipment manufactured and designed by Komatsu fulfills all of the regulations and standards for all countries. If it is modified or repaired without authorization from Komatsu, or is damaged when the machine rolls over, the strength of the structure will be compromised and will not be able to fulfill its intended purpose. Optimum strength of the structure can only be achieved if it is repaired or modified as specified by Komatsu.
- When modifying or repairing the ROPS, always consult your nearest Komatsu distributor.
- Even with the ROPS installed, the operator must always use the seat belt when operating the machine.

Preventing Injury From Work Equipment

- Never position any part of your body between movable parts such as the dump body, chassis or cylinders. If the work equipment is operated, clearances will change and may cause serious bodily injury or death.

Precautions For Optional Attachments

- When installing and using optional equipment, read the instruction manual for the attachment and the information related to attachments in this manual.
- DO NOT use attachments that are not authorized by Komatsu, or the authorized regional Komatsu distributor. Use of unauthorized attachments could create a safety problem and adversely affect the proper operation and useful life of the machine.
- Any injuries, accidents, and product failures resulting from the use of unauthorized attachments will not be the responsibility of Komatsu America Corp., or the authorized regional Komatsu distributor.

Precautions When Starting The Machine

- Start the engine from the operator's seat, only.
- Never attempt to start the engine by shorting across the starter terminals. This may cause fire, or serious injury or death to anyone in the machine's path.

PRECAUTIONS FOR TRUCK OPERATION

Safety Is Thinking Ahead

Prevention is the best safety program. Prevent a potential accident by knowing the employer's safety requirements and all necessary job site regulations. In addition, know the proper use and care of all the safety equipment on the truck. Only qualified operators or technicians may attempt to operate or maintain a Komatsu machine.

Safe practices start before the operator gets to the equipment!

Safety At The Worksite

- When walking to and from a truck, maintain a safe distance from all machines even when the operator is visible.
- Before starting the engine, thoroughly check the area for any unusual conditions that could be dangerous.
- Examine the road surface at the job site and determine the best and safest method of operation.
- Choose an area where the ground is as horizontal and firm as possible before performing the operation.
- If you need to operate on or near a public road, protect pedestrians and cars by designating a person for work site traffic duty or by installing fences around the work site.
- The operator must personally check the work position, the roads to be used, and existence of obstacles before starting operations.
- Always determine the travel roads to be used at the work site. Travel roads must be maintained in order to ensure safe machine travel.
- If travel through wet areas is necessary, check the depth and flow of water before crossing the shallow parts. Never drive through water which exceeds the permissible water depth.

Fire Prevention

- Remove all wood chips, leaves, paper and other flammable items accumulated in the engine compartment, as they could cause a fire.

- Check fuel, lubrication, and hydraulic systems for leaks. Repair any leaks. Clean any excess oil, fuel or other flammable fluids, and dispose of properly.
- Ensure a fire extinguisher is present and in proper working condition.
- DO NOT operate the machine near open flames.

Preparing For Operation

- Always mount and dismount while facing the truck. Never attempt to mount or dismount the truck while it is in motion. Always use handrails and ladders when mounting or dismounting the truck.
- Check the deck areas for debris, loose hardware, and tools. Check for people and objects that remain on or around the truck.
- Become familiar with and use all protective equipment devices on the truck and ensure that these items (anti-skid material, grab bars, seat belts, etc.) are securely in place.

Ventilation For Enclosed Areas

- If it is necessary to start the engine in an enclosed area, provide adequate ventilation. Exhaust fumes from the engine can kill.

Mirrors, Windows, And Lights

- Remove any dirt from the surface of the windshield, cab windows, mirrors and lights. Good visibility may prevent an accident.
- Adjust the mirrors to a position where the operator can see best from the operator's seat.
- Ensure headlights, work lights and taillights are in proper working order. Ensure that the machine is equipped with the proper work lamps needed for the operating conditions.
- Replace any broken mirrors, windows or lights.

In The Operator's Cab - Before Starting The Engine

- DO NOT leave tools or spare parts lying around or allow trash to accumulate in the cab of the truck. Keep all unauthorized reading material out of the truck cab.
- Keep the cab floor, controls, steps, and handrails free of oil, grease, snow, and excess dirt.
- Read and understand the contents of the Operation & Maintenance manual. Read safety and operating instructions with special attention. Become thoroughly acquainted with all gauges, instruments and controls before attempting operation of the truck.
- Read and understand the **WARNING** and **CAUTION** decals in the operator's cab.
- Ensure the steering wheel, horn, controls and pedals are free of any oil, grease or mud.
- Check operation of the windshield wiper, condition of wiper blades, and check the washer fluid reservoir level.
- Be familiar with all steering and brake system controls, warning devices, road speeds and loading capabilities, before operating the truck.
- If equipped, ensure the Retractable Ladder System (RLS) is raised.

Seat Belts

- On both driver and passenger seats, check the seat belt fabric, buckle, all belt retractors and hardware for damage or wear. Replace any worn or damaged parts immediately.
- Even if there are no signs of damage, replace both driver and passenger seat belts 5 years after seat belt manufacture, or every 3 years after start of use, whichever comes first. The passenger seat belt date of manufacture label is sewn into the seat belt near the buckle. The driver seat belt date of manufacture label is sewn into the shoulder harness belt, near the retractor end.

OPERATING THE MACHINE

Starting The Engine

- NEVER ATTEMPT TO START THE MACHINE BY SHORTING ACROSS THE STARTER TERMINALS. This may cause fire, or serious injury or death to anyone in machine's path.
- NEVER start the engine if a warning tag has been attached to the controls.
- When starting the engine, sound the horn as an alert.
- Start and operate the machine only while seated in the operator's seat.
- DO NOT allow any unauthorized persons in the operator's compartment or any other place on the machine.

Truck Operation - General

- WEAR SEAT BELTS AT ALL TIMES.
- Only authorized persons are allowed to ride in the truck. Passengers must be in the cab and belted in the passenger seat.
- DO NOT allow anyone to ride on the decks or on the steps of the truck.
- DO NOT allow anyone to get on or off the truck while it is in motion.
- DO NOT move the truck in or out of a building without a signal person present.
- Know and obey hand signal communications between the operator and spotter. When other machines and personnel are present, the operator must move in and out of buildings, loading areas and through traffic, under the direction of a signal person. **Courtesy at all times is a safety precaution!**
- Immediately report any adverse conditions on haul road, pit or dump area that may cause an operating hazard.

- Check for flat tires periodically during a shift. If the truck has been operating on a “flat”, the truck must not be parked indoors until the tire cools. If the tire must be changed, DO NOT stand in front of the rim and locking ring when inflating a tire mounted on the machine. Observers must not be permitted in the area and must be kept away from the side of such tires.

⚠DANGER

A tire and rim assembly may explode if subjected to excessive heat. Personnel must move to a remote or protected location if there is a fire near the tire and wheel area or if the smell of burning rubber or excessively hot brakes is evident.

If the truck must be approached, such as to fight a fire, those personnel must do so only while facing the tread area of the tire (front or back), unless protected by use of large heavy equipment as a shield. Stay at least 15 m (50 ft) from the tread of the tire.

In the event of fire in the tire and wheel area (including brake fires), stay away from the truck for at least eight hours or until the tire and wheel are cool.

- Keep serviceable fire fighting equipment on hand. Report used extinguishers for replacement or refilling.
- Always move the directional control lever to PARK (this will apply the parking brake) when the truck is parked and unattended. DO NOT leave the truck unattended while the engine is running.

NOTE: DO NOT use wheel brake lock when parking the truck.

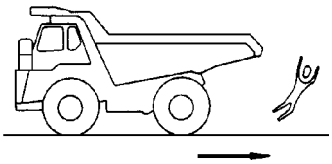
- Park the truck a safe distance away from other vehicles as determined by the supervisor.
- Stay alert at all times! In the event of an emergency, be prepared to react quickly and avoid accidents. If an emergency arises, know where to get prompt assistance.

Traveling In The Truck

- When traveling on rough ground, travel at low speeds. When changing direction, avoid turning suddenly.
- Lower the dump body and move the dump lever to the FLOAT position before traveling.
- If the engine stops when the machine is in motion, the emergency steering system will be activated. Apply the brakes immediately and stop the machine as quickly and safely as possible (off of the haul road, if possible). Apply the parking brake.

Precautions When Traveling In Reverse

Before operating the machine or work equipment, do as follows:



- Ensure the backup alarm works properly.
- Sound the horn to warn people in the area.
- Check for personnel near the machine. Do a thorough check behind the machine.
- When necessary, designate a person to watch the area for the truck operator. This is particularly necessary when traveling in reverse.
- When operating in hazardous areas and areas with poor visibility, designate a person to direct work site traffic.
- DO NOT allow any one to enter the line of travel of the machine. This rule must be strictly obeyed even with machines equipped with a back-up alarm or rear view mirror.

Traveling On Slopes

- Traveling on slopes could result in the machine tipping over or slipping.
- DO NOT change direction on slopes. To ensure safety, drive to level ground before turning.
- DO NOT travel up and down on grass, fallen leaves, or wet steel plates. These materials may make the machine slip on even the slightest slope. Avoid traveling sideways, and always keep travel speed low.
- When traveling downhill, use the retarder to reduce speed. DO NOT turn the steering wheel suddenly. DO NOT use the foot brake except in an emergency.
- If the engine stops on a slope, apply the service brakes to fully stop the machine. Move the directional control lever to the PARK position (this will apply the parking brake).

Ensuring Good Visibility

- When working in dark places, install work lamps and head lamps.
- Discontinue operations if visibility is poor, such as in mist, snow, or rain. Wait for the weather to improve to allow the operation to be performed safely.

Operating On Snow

- When working on snowy or icy roads, there is danger that the machine may slip to the side on even the slightest slope. Always travel slowly and avoid sudden starting, turning, or stopping in these conditions.
- Be extremely careful when clearing snow. The road shoulder and other objects are buried in the snow and cannot be seen. When traveling on snow-covered roads, always install tire chains.

Avoid Damage To The Dump Body

- When working in tunnels, on bridges, under electric cables, or when entering an enclosed area where there are height limits, always use extreme caution. The dump body must be completely lowered before driving.

⚠WARNING

Driving with a raised dump body or raising the dump body in an enclosed area, may result in serious damage and bodily injury or death. Always drive with the dump body resting on the frame.

Driving Near High Voltage Cables

- Driving near high-voltage cables can cause electric shock. Always maintain the safe distances between the machine and the electric cable as listed below.

Voltage	Minimum Safe Distance	
6.6 kV	3 m	10 ft.
33.0 kV	4 m	14 ft.
66.0 kV	5 m	17 ft.
154.0 kV	8 m	27 ft.
275.0 kV	10 m	33 ft.

The following actions are effective in preventing accidents while working near high voltages:

- Wear shoes with rubber or leather soles.
- Use a signalman to give warning if the machine approaches an electric cable.
- If the work equipment touches an electric cable, the operator must not leave the cab.
- When performing operations near high voltage cables, DO NOT allow anyone to approach the machine.
- Check with the electrical maintenance department about the voltage of the cables before starting operations.

When Loading The Truck

- Ensure the surrounding area is safe. If so, stop the machine in the correct loading position and evenly load the body.
- DO NOT leave the operator's seat during the loading operation.

When Dumping

- Before dumping, check that there is no person or objects behind the machine.
- Stop the machine in the desired location. Check again for persons or objects behind the machine. Give the determined signal, then slowly operate the dump body. If necessary, use blocks for the wheels or position a flagman.
- When dumping on slopes, machine stability is poor and there is danger of tip over. Always perform such operations using extreme care.
- Never travel with the dump body raised.

Working On Loose Ground

- Avoid operating the machine near cliffs, overhangs, and deep ditches. If these areas collapse, the machine could fall or tip over and result in serious injury or death. Remember that ground surfaces in these areas may be weakened after heavy rain or blasting.
- Freshly laid soil and the soil near ditches is loose. It can collapse under the weight or vibration of the machine. Avoid these areas whenever possible.

Parking The Machine

- Ensure the truck body is empty. Completely lower the dump body by placing the hoist control lever in the FLOAT position.
- Choose a horizontal road surface to park the machine. If the machine must be parked on a slope, follow local regulations to secure the truck to prevent the machine from moving.
- Move the directional control lever to PARK (this will apply the parking brake).

NOTE: DO NOT apply the wheel brake lock.

- Turn the key switch to the OFF position and wait for the engine to stop. This could take up to three minutes for a hot engine to cool down. After the engine has stopped, wait two minutes before exiting the cab. If any warning lights are illuminated or warning horns are sounding, DO NOT leave the cab and notify maintenance personnel immediately.
- When exiting the machine, always lock compartments, and take the keys with you to prevent entry from unauthorized persons.
- Place wheel chocks around the wheels to prevent the truck from rolling.

TOWING

Improper towing methods may lead to serious personal injury and/or damage.

- Tow with a solid tow bar. DO NOT tow with a cable.
- Use a towing device with ample strength for the weight of this machine.
- Never tow a machine on a slope.
- When connecting a machine to be towed, DO NOT allow anyone to go between the tow machine and the disabled machine.
- Set the coupling of the disabled machine in a straight line with the towing portion of the tow machine, and secure it in position.
- DO NOT stand next to the towing device while the truck is moving.

(For towing method, see the Operation and Maintenance Manual, Section 30, Operating Instructions - Towing.)

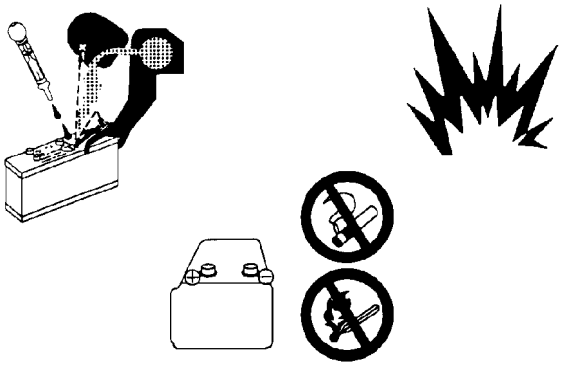
WORKING NEAR BATTERIES

Battery Hazard Prevention

Battery electrolyte contains sulfuric acid and can quickly burn the skin and eat holes in clothing. If electrolyte comes in contact with skin, immediately flush the area with water.

Battery acid can cause blindness if splashed into the eyes. If acid gets into the eyes, flush them immediately with large quantities of water and see a doctor immediately.

- If acid is accidentally ingested, drink a large quantity of water, milk, beaten eggs or vegetable oil. Call a doctor or poison prevention center immediately.
- Always wear safety glasses or goggles when working with batteries.



- Batteries generate hydrogen gas. Hydrogen gas is very EXPLOSIVE, and is easily ignited with a small spark or flame.
- Before working with batteries, stop the engine and turn the key switch to the OFF position. Wait two minutes after the engine has stopped, and if no warning lights illuminate, then turn the battery disconnect switches to the OFF position.
- Avoid short-circuiting the battery terminals through accidental contact with metallic objects, such as tools, across the terminals.
- When removing or installing a battery, positively identify the positive (+) terminal and negative (-) terminal and use precautions not to short circuit between the terminals.
- This truck is equipped with a master disconnect switch (3, Figure 20-2) on the battery ground circuit. When disconnecting battery cables, always move the master disconnect switch to the OFF position (1, Figure 20-1). First, disconnect the positive (+) battery cables, then the negative (-) battery cables last.

NOTE: If the master disconnect switch is OFF, and a wrench on the negative (-) terminal touches the battery box frame, a spark will occur if any electrical component on the truck was left in the ON position.

- When connecting battery cables, always move the master disconnect switch (3, Figure 20-2) to the OFF position. Then connect the negative (-) cables first, then the positive cables (+) last.
- Tighten battery terminals securely. Loose terminals can generate sparks and could lead to an explosion.
- Tighten battery caps securely.

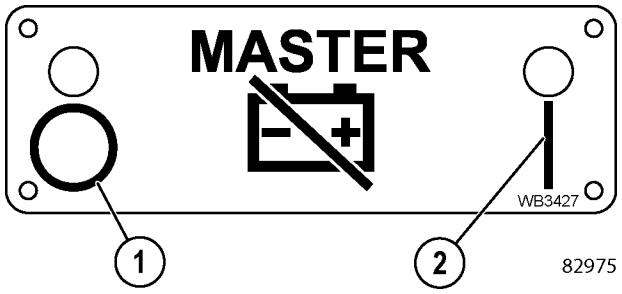
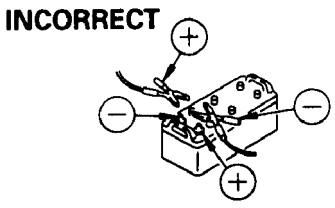


FIGURE 3-1. MASTER DISCONNECT SWITCH

1. Off 2. On

Jump Starting With Booster Cables

- Always wear safety glasses or goggles when starting the machine with booster cables.
- While jump starting with another machine, DO NOT allow the two machines to touch.
- Ensure the parking brake is applied on both machines. The engine on the good machine is to be operating.
- Ensure the size of the booster cables and clips are suitable for the battery size. Inspect the cables and clips for any damage or corrosion.
- Ensure the key switch and master battery disconnect switch (3, Figure 3-2) on the disabled machine is in the OFF position.
- Connect the batteries in parallel: positive to positive and negative to negative.
- Connect the positive (24VDC +) cable from the good machine to the (24VDC +) on the disabled machine first.
- Then connect the ground cable from the negative (-) battery terminal on the good machine to the frame of the disabled machine, as far away as possible from the batteries. This will prevent a spark from possibly starting a battery fire.
- Move the master battery disconnect switch (3, Figure 3-2) to the ON position. Allow time for the batteries to charge.
- If starting with a booster cable, perform the operation with two people. One person in the cab of the disabled machine, the other person working with the jumper cables.
- If the batteries are low, DO NOT attempt starting the machine with only one set of jumper cables installed. Install the second set of jumper cables in the same way as already described.
- Attempt starting the disabled machine.
- For booster cable removal, disconnect the ground or negative (-) cable first, then the (24VDC +) cable last.



- If any tool touches between the positive (+) terminal and the chassis, it will cause sparks. Always use caution when using tools near the batteries.

Jump Starting With Receptacles

- Always wear safety glasses or goggles when starting the machine with booster cables.
- While jump starting with another machine, DO NOT allow the two machines to touch.
- Ensure the parking brake is applied on both machines. The engine on the good machine is to be operating.
- Inspect the cables and connectors for any damage or corrosion.
- Ensure the key switch and master battery disconnect switch (3, Figure 3-2) on the disabled machine is in the OFF position.
- Connect the jumper cable to the receptacle on the good machine to the receptacle on the disabled machine.
- Allow time for the batteries to charge.

NOTE: The batteries will charge even with the master battery disconnect switch is in the OFF position.

- If starting with a booster cable, perform the operation with two people. One person in the cab of the disabled machine, the other person working with the jumper cables.
- If the batteries are low, DO NOT attempt starting the machine with only one set of jumper cables installed. Install the second set of jumper cables in the same way as already described.
- Turn the master battery disconnect switch (3, Figure 3-2) to the ON position and attempt starting.
- For booster cable removal, disconnect the cables from each machine.
- If any tool touches between the positive (+) terminal and the chassis, it will cause sparks. Always use caution when using tools near the batteries.

PRECAUTIONS FOR MAINTENANCE

BEFORE PERFORMING MAINTENANCE

Stopping The Engine Before Service

- Before performing inspections or maintenance, stop the machine on firm, flat ground. Lower the dump body, place the directional control lever to the PARK position (this will apply the parking brake), and turn the key switch to the OFF position and wait for the engine to stop.
- Wait two minutes after the engine has stopped, and if no warning lights illuminate, then turn the battery disconnect switches to the OFF position. Verify that the disconnects are functioning.
- Place wheel chocks around the wheels to prevent the truck from rolling.
- If the engine must be operated during maintenance, always move the directional control lever to the PARK position (this will apply the parking brake). Always perform this work with two people. One person must be in the operator's seat to stop the engine if necessary. Never move any controls not related to the task at hand during these situations. Apply the propel lockout lever (5, Figure 3-2) to prevent the truck from moving if the engine must operate during maintenance. When the propel lockout lever is in the OFF position and LED light (8) is illuminated, the drive system is locked out and the truck will not propel. When the propel lockout lever is in the ON position and LED light (7) is illuminated, the drive system is active and the truck can be driven.
- When servicing the machine, use care not to touch any moving parts. Never wear loose clothing.
- When performing service with the dump body raised, always place the dump lever in the HOLD position, and apply the lock (if equipped). Install the body-up safety cable securely.

Electrical Systems Isolation

- Isolation box (6, Figure 3-2) contains master disconnect switch (3), starter disconnect switch (4) and propel lockout lever (5). The isolation box is located on top of the front bumper, on the left hand side. Move both disconnect switches and the propel lockout lever to the OFF position to disable the 24VDC electrical system, starters and the AC electric drive system. When the switches and propel lockout lever are in the OFF position, LED lights (8) will be illuminated. The battery disconnect switches and propel lockout lever can be padlocked in the OFF position to prevent unauthorized truck operation. When the switches and the propel lockout lever are in the ON position, LED lights (7) will be illuminated. Refer to the following table to ensure the correct disconnect is used to isolate a desired circuit or system.

NOTE: This is the recommended usage of the battery disconnect and propel lockout switches. Local regulations may be different.

Action	Recommended Isolation
24V Electrical Troubleshooting	Starter Lockout
24V Electrical Maintenance/Repair	Master Lockout
High Voltage/Propulsion Troubleshooting	None
High Voltage Maintenance/Repair	Master Lockout
Hydraulic Troubleshooting	Propel Lockout
Hydraulic Maintenance/Repair	Starter Lockout
Engine Troubleshooting	Propel Lockout
Engine Repair	Master Lockout
Mechanical Repair	Starter Lockout
Weld Repair	Master Lockout & Alternator Isolation
Fueling	Starter Lockout
Lube/General Maintenance	Starter Lockout
Shift Change Walk Around	Starter Lockout
Oil Sample Collection	Propel Lockout

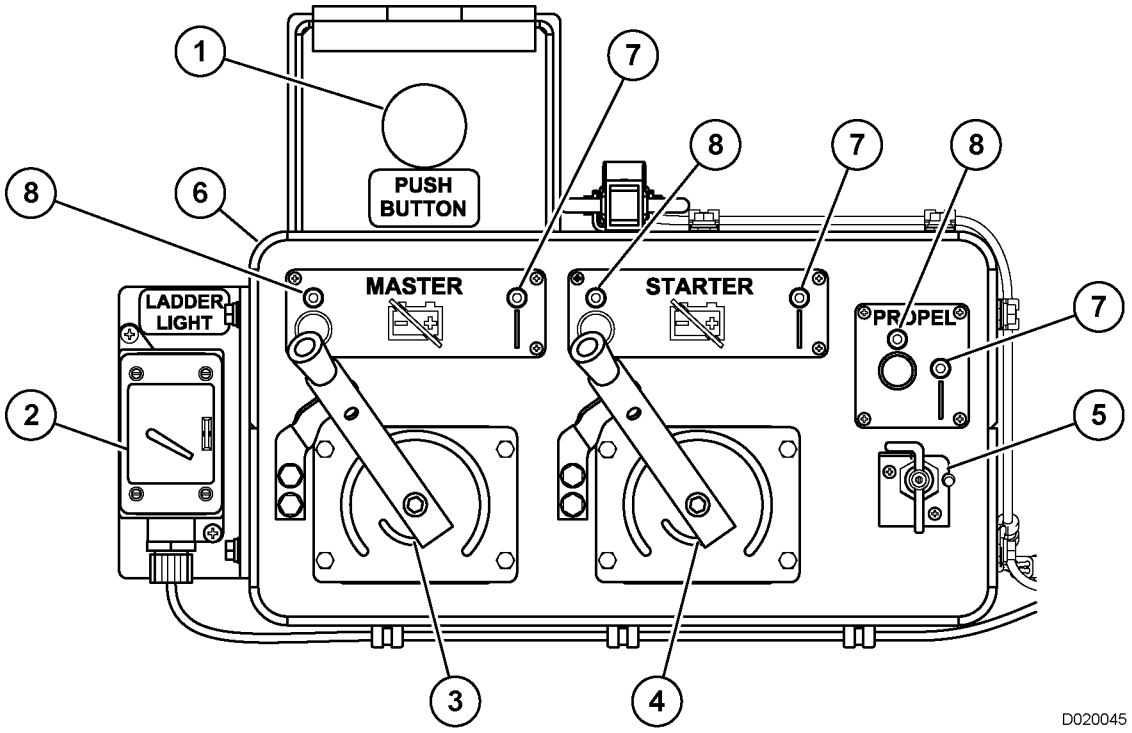


FIGURE 3-2. ISOLATION BOX ASSEMBLY (COVERS REMOVED)

1. Engine Shutdown Switch
2. Access Ladder Light Switch
3. Master Disconnect Switch
4. Starter Disconnect Switch
5. Propel Lockout Lever
6. Isolation Box
7. LED Lights (on)
8. LED Lights (off)