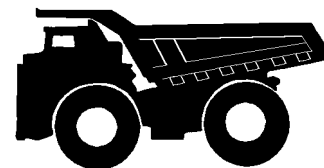


Shop Manual

DG728

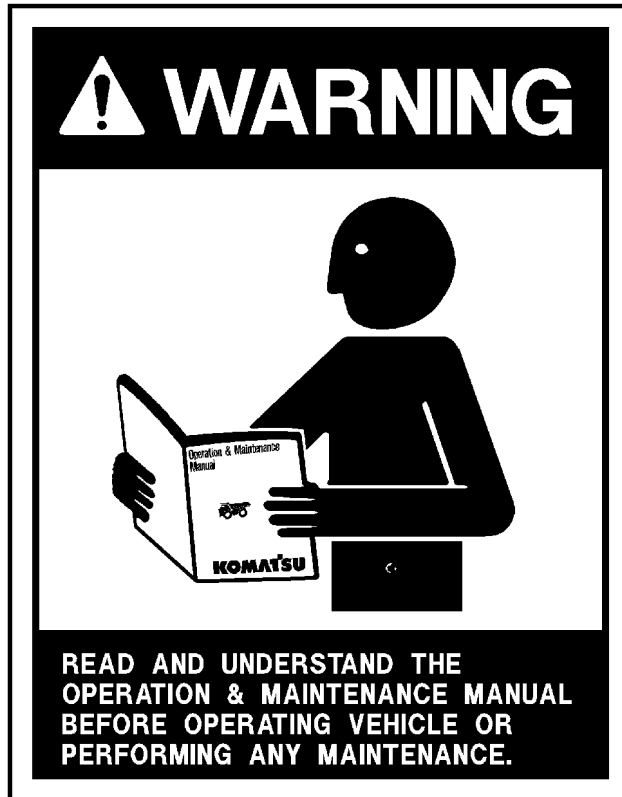


330M

DUMP TRUCK

**SERIAL SUFFIX 330M A10190 Thru
330M A10211**

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.

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It is the policy of the Company to improve products whenever it is possible and practical to do so. The Company reserves the right to make changes or add improvements at any time without incurring any obligation to install such changes on products sold previously.

Because of continuous research and development, periodic revisions may be made to this publication. Customers should contact their local distributor for information on the latest revision.

CALIFORNI Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects and other reproductive harm.

FOREWORD

This 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 U.S. standard and metric (SI) 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 **100 ft.lbs. (135 N.m)** torque. All torque specifications have $\pm 10\%$ tolerance unless otherwise specified.

A Product Identification plate is normally located on the truck frame upright in front of the left 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 HAULPAK[®] Model designation consists of three numbers and one letter (i.e. 330M). The three numbers represent the basic truck model. The letter "M" designates a Mechanical drive and 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, “CAUTION”, “DANGER”, and “WARNING” in this manual to alert the reader to hazards arising from improper operating and maintenance practices.



*“DANGER” identifies a specific potential hazard
WHICH WILL RESULT
in either INJURY OR DEATH
if proper precautions are not taken.*



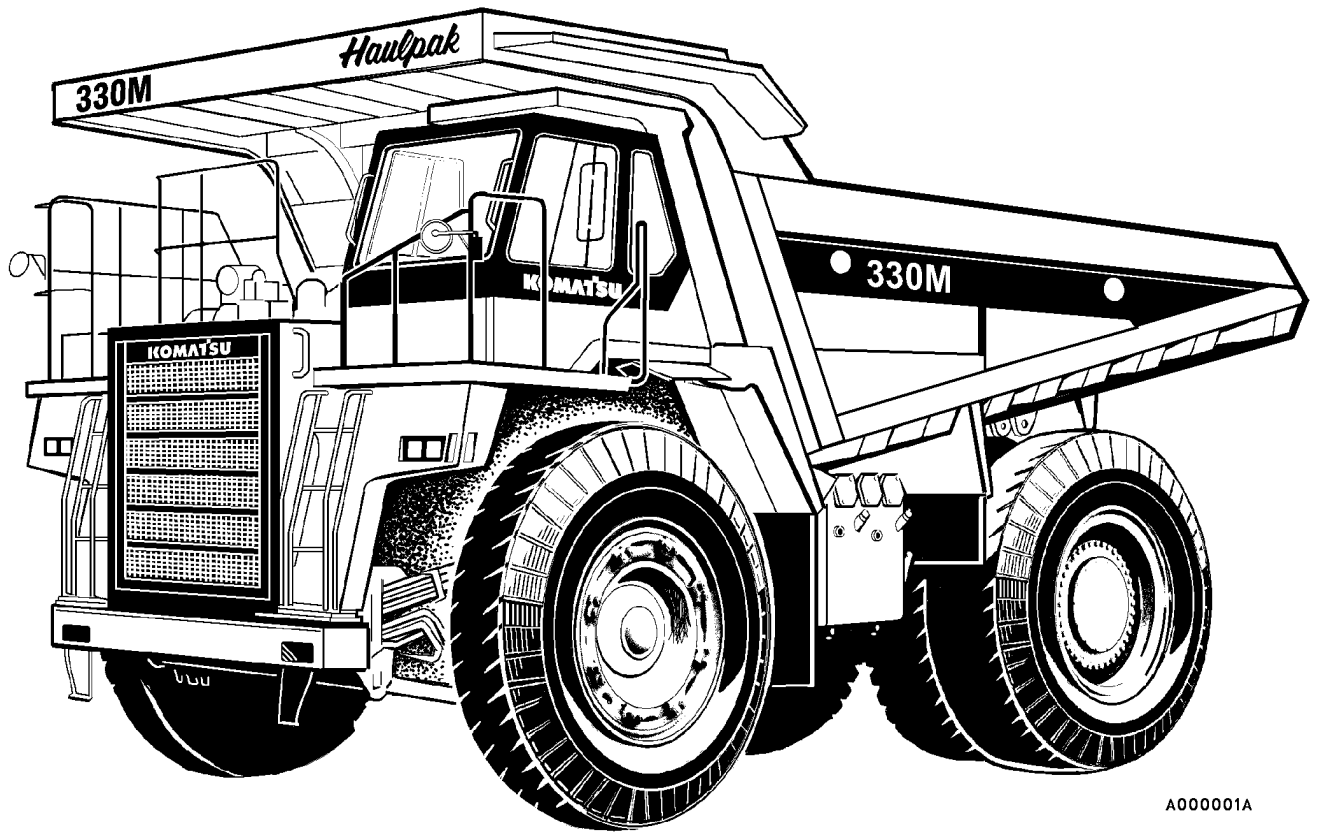
*“WARNING” identifies a specific potential hazard
WHICH MAY RESULT
in either INJURY OR DEATH
if proper precautions are not taken.*



*“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.*

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KOMATSU 330M HAULPAK TRUCK

SECTION A

GENERAL INFORMATION

INDEX

TRUCK COMPONENT DESCRIPTION & SPECIFICATIONS	A2-1
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NOTES

MAJOR COMPONENTS AND SPECIFICATIONS

ENGINE

The 330M Truck is powered by a Komatsu diesel engine.

TRANSMISSION

The TORQFLOW transmission consists of a 3-element, single-stage, two-phase torque converter and a planetary gear, multiple disc clutch transmission which is hydraulically actuated and force-lubricated for optimum heat dissipation.

The TORQFLOW transmission is capable of seven (7) forward speeds and one (1) reverse gear. Automatic shifting is controlled by electronic shift control with automatic clutch modulation in all gears. A lockup system consisting of a wet, double-disc clutch, is activated in F1–F7 gears for increased fuel savings.

FINAL DRIVE ASSEMBLY

The final drive consists of a plug-in differential with planetary wheel drive.

OPERATOR'S CAB

The Operator's Cab is spacious and comfortable and includes wide windows all around for excellent visibility. All pedals, controls and instruments are arranged for maximum efficiency and ease of operation. The electronic display/monitoring panel keeps the operator informed of the truck's operating systems. Audible alarms and lights warn the operator of system malfunctions.

POWER STEERING

The 330M is equipped with full hydraulic power steering. The system includes an electric motor driven pump which automatically provides emergency power if the steering pump hydraulic flow is reduced below an established minimum.

BRAKE SYSTEM

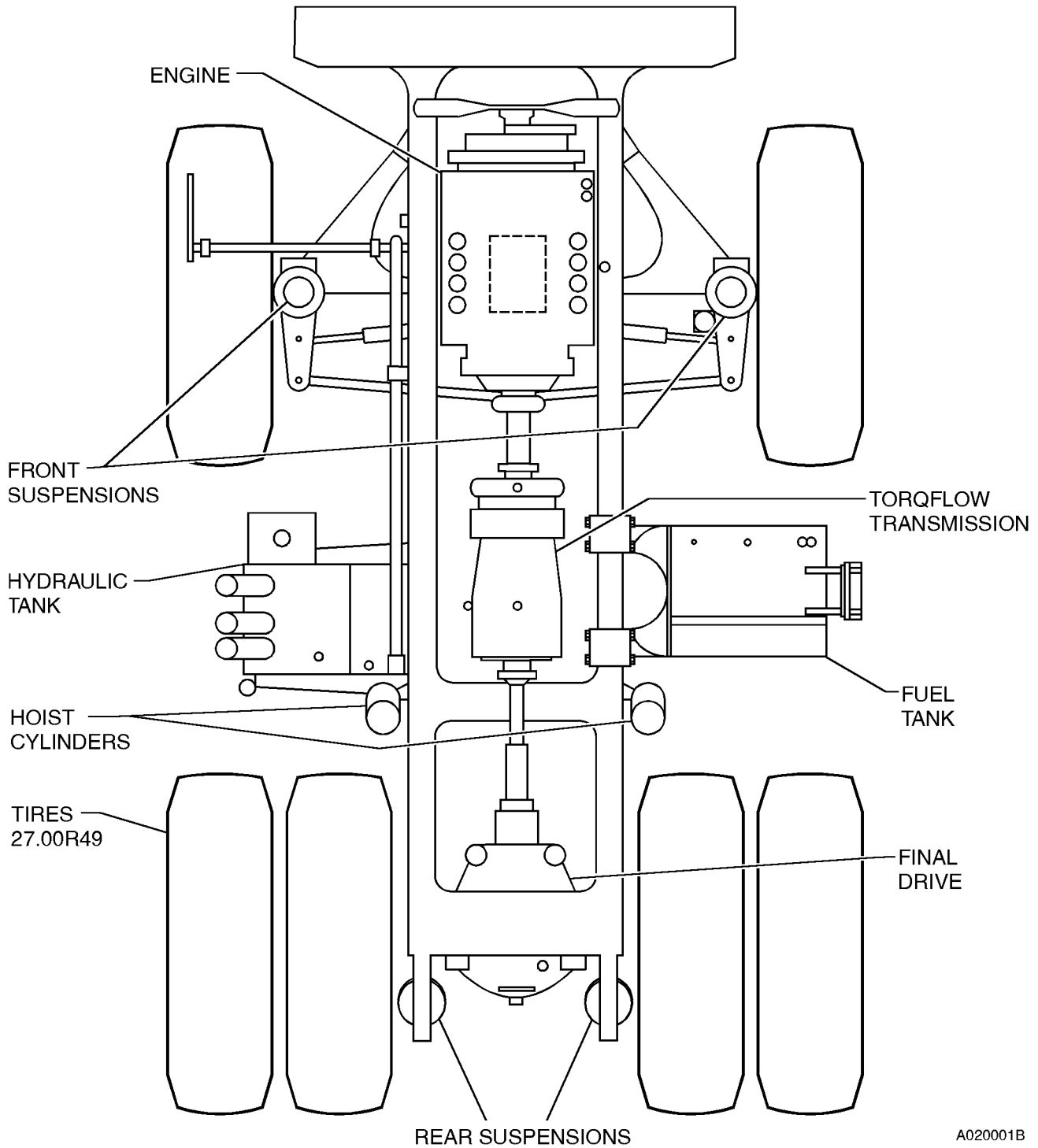
Depressing the brake pedal actuates front and rear air-over-hydraulic service brakes. The front service brakes are caliper disc type. The rear service brakes are oil-cooled, multiple-disc brakes (acts also as retarder).

RETARDER

The operator can manually apply the rear oil-cooled, multiple-disc retarder brakes by moving the retarder control lever which is mounted on the steering column. These brakes are automatically activated when the engine speed exceeds the rated revolutions of the shift position.

SUSPENSION

Hydro-pneumatic suspension cylinders are used at each wheel to reduce shock and provide riding comfort for the operator and machine stability.



330M MAJOR COMPONENTS

SPECIFICATIONS

ENGINE

Komatsu	SA12V140Z-1
Number of Cylinders	12
Operating Cycle	4-Stroke
Rated 783 kW (1050 SAE Brake HP) @ 2000 RPM	
Flywheel	753 kW (1010 SAE HP) @ 2000 RPM
Maximum torque 4631 N.m (3415 lb-ft) @ 1400 RPM	

TORQFLOW TRANSMISSION

Automatic Electronic Shift Control . . . with Automatic Clutch Modulation In All Gears.	
Lockup Clutch	Wet, Double-disc, Activated in F1–F7 gears.
Torque Converter	3-Element, Single-stage, Two-phase
Transmission	Planetary Gear, Multiple Disc Clutch, Hydraulically Actuated, Force-lubricated Speeds 7 Forward, 1 Reverse
Max Travel Speed	61.9 Km/h (38.5 MPH)

FINAL DRIVE ASSEMBLY

Final Drive	Plug-in Differential with Planetary Wheel Drive
Reduction Ratios:	
Bevel Set	3.47:1
Planetary Final Drive	6.50:1
Total Reduction	22.54:1

ELECTRIC SYSTEM

Batteries	4 x 12V / 200 Amp Hr. 1450 Cold Cranking Amps
Alternator	24 Volt, 75 Ampere Output
Lighting	24 Volt
Starter	One 24-Volt

AIR SYSTEM

Compressor	0.85 m ³ /min (30 cfm)
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SERVICE CAPACITIES

	Liters	U.S. Gallons
Engine (Includes Lube Oil Filters)	147	(39)
Cooling System	256	(66)
Fuel Tank	1250	(330)
Transmission And Torque Converter	125	(33)
Steering & Hoist System	248	(65.5)
Tank Only	145	(38.3)
Brake Cooling System	366	(96.6)
Tank Only	248	(65.5)
Final Drive Case	250	(66)
Differential & both planetaries		

HYDRAULIC SYSTEM

The steering/hoisting and retarder cooling circuits are independent circuits. Load sensing steering system controls the flow to the steering circuit in accordance with demand.

Hydraulic Pumps	2-Separate Gear Pumps
Steering/Hoist Functions	
Flow rated at	636 l/min. (168 U.S. gal/min.)
Retarder Cooling	
Flow rated at	1001 l/min. (264 U.S. gal/min.)
Hoist Control Valve	Spool Type
Positions	Raise, Hold, Float, and Lower
Hydraulic Cylinders	
Hoisting	2-Stage Telescoping Piston
Steering	Double Acting Piston
Relief Valve Setting	210 kg/cm ² (3,000 psi)

SERVICE BRAKES

Actuation:	Air-Over-Hydraulic
Front	Caliper Disc Brakes
Rear	Oil-Cooled, Multiple-Disc Act as both Service and Retarder Brakes
Retarder Brakes:	
Normally Applied	Manually By Operator.
Automatically Actuated	when engine speed exceeds the rated revolutions of the shift position for the transmission.
Parking Brake:	Spring-loaded, Caliper Disc Actuates On Drive Shaft
Emergency Brakes:	
An emergency relay valve actuates the brakes automatically should air pressure in the air tank drop below a pre-set value.	
Manual operation is also possible.	

STEERING

Min Turning Radius 9.9 m (32' 6")
 Automatic Emergency Steering Standard

TIRES

Rock Service (E-3) Tubeless
 Standard 27.00R49XRBT
 Rim Size 50 cm X 124.4 cm (19.5 in. X 49 in.)
 Separable Tire Rims

DUMP BODY CAPACITY (Standard)

Struck 38.6 m³ (50.5 yds³)
 Heaped @ 2:1 (SAE) 60.1 m³ (78.7 yds³)

WEIGHT DISTRIBUTION

Based on SAE 2:1 Heaped 60 m³ (78 yds³)
 (w/Komatsu Engine; and 27.00R49 Tires)

EMPTY	Kilograms	Pounds
Front Axle	33 145	73,080
Rear Axle	35 905	79,170
Total	69 050	152,250

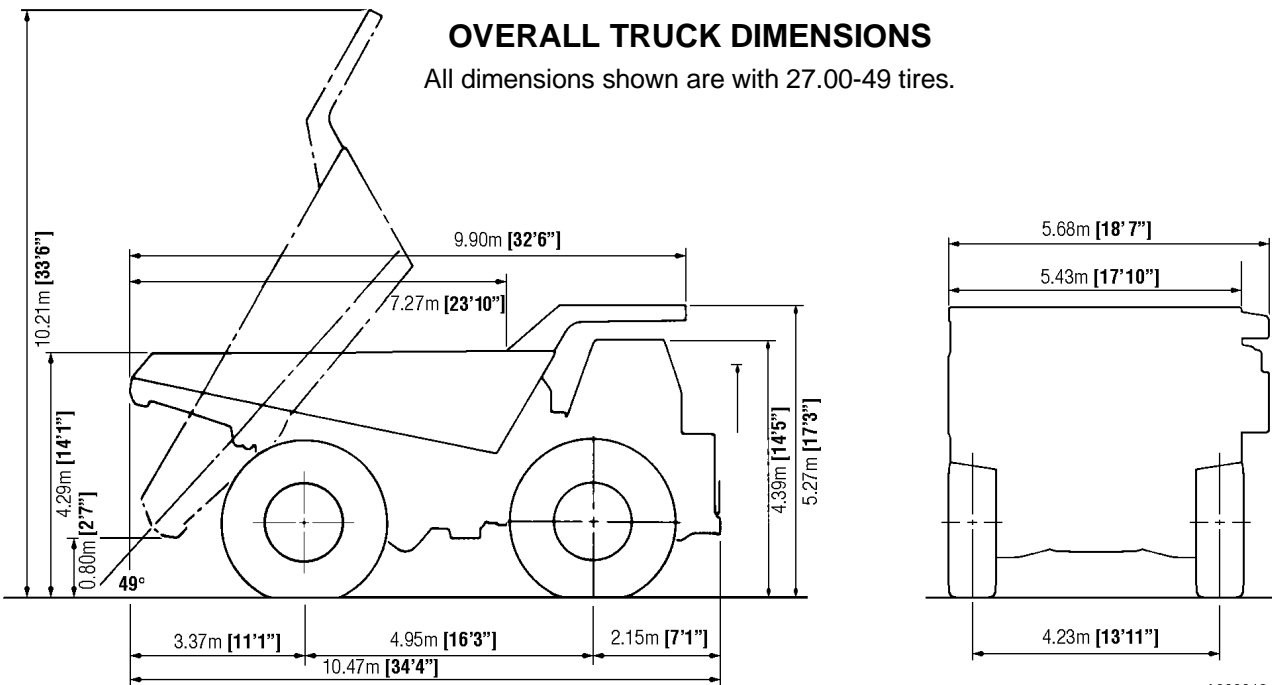
LOADED (100 Ton PAYLOAD)

Kilograms	Pounds	
Front Axle	54 080	119,280
Rear Axle	112 320	247,720
Total *	166 400	367,000

* **Not to Exceed** 166 400 kg (367,000 lbs.).
Including Options, Fuel & Payload

OVERALL TRUCK DIMENSIONS

Loading Height 4.29 m (14' 1")
 Minimum Clearance Height (Empty) 5.27 m (17' 3")
 Overall Length 10.47 m (34' 4")
 Maximum Width 5.68 m (18' 7")



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GENERAL SAFETY

This safety section also contains precautions for optional equipment and attachments.



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

SAFETY RULES

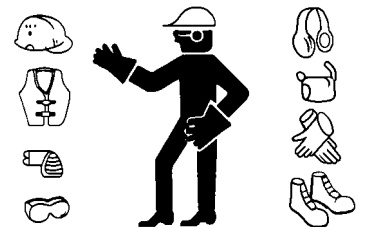
- ONLY trained and authorized personnel can operate and maintain the machine.
- Follow all safety rules, precautions and instructions when operating or performing maintenance on the machine.
- When working with another operator or a person on worksite traffic duty, be sure all personnel understand all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

SAFETY FEATURES

- Be sure all guards and covers are in their proper position. Have guards and covers repaired if damaged. (See Walk-Around Check, Page 3-17)
- Learn the proper use of safety features such as safety locks, safety pins, and seat belts, and use these safety features properly.
- NEVER remove any safety features. ALWAYS keep them in good operating condition.
- Improper use of safety features could result in serious bodily injury or death.

CLOTHING AND PERSONAL PROTECTIVE ITEMS

- Avoid loose clothing, jewelry, and loose long hair. They can catch on controls or in moving parts and cause serious injury or death. Also, do not wear oily clothes because they are flammable.
- Wear a hard hat, safety glasses, safety shoes, mask or gloves when operating or maintaining the machine. Always wear safety goggles, hard hat and heavy gloves if your job involves scattering metal chips or minute materials--this is so particularly when driving pins with a hammer and when cleaning the air cleaner element with compressed air. Check also that there is no one near the machine.



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UNAUTHORIZED MODIFICATION

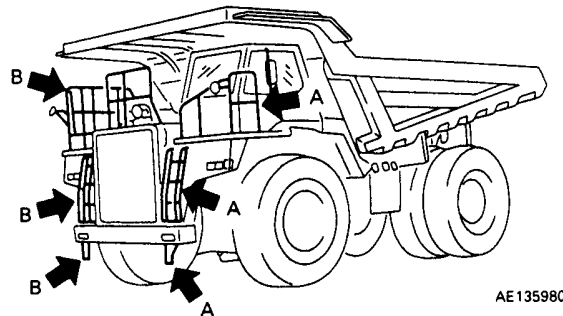
- Any modification made without authorization from Komatsu can create hazards.
- Before making a modification, consult your Komatsu distributor. Komatsu will not be responsible for any injury or damage caused by any unauthorized modification.

STANDING UP FROM THE SEAT

- To prevent any accident occurring if you should touch any control lever that is not locked, always carry out the following before standing up from the operator's seat.
- Place the gear shift lever at neutral and set the parking lever to the PARKING position.
- Lower the dump body, set the dump lever to the HOLD position, then apply the lock.
- Stop the engine. When leaving the machine, always lock everything. Always remember to take the key with you. If the machine should suddenly move or move in an unexpected way, this may result in serious bodily injury or death.

MOUNTING AND DISMOUNTING

- NEVER jump on or off the machine. NEVER get on or off a moving machine.
- When getting on or off the machine, face the machine and use the handhold and steps.
- Never hold any control levers when getting on or off the machine.
- Always maintain three-point contact with the handholds and steps to ensure that you support yourself.
- When bringing tools to the operator's compartment, always pass them by hand or pull them up by rope.
- If there is any oil, grease, or mud on the handholds or steps, wipe it off immediately. Always keep these parts 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.
 - A: For use when getting on or off the machine from the left door.
 - B: For use when getting on or off the machine from the engine hood or right door.



FIRE PREVENTION FOR FUEL AND OIL

Fuel, oil, and antifreeze can be ignited by a flame. Fuel is particularly **FLAMMABLE** and can be **HAZARDOUS**.

- Keep flame away from flammable fluids.
- Stop the engine and do not smoke when refueling.
- Tighten all fuel and oil tank caps securely.
- Refueling and oiling should be made in well ventilated areas.
- Keep oil and fuel in the determined place and do not allow unauthorized persons to enter.



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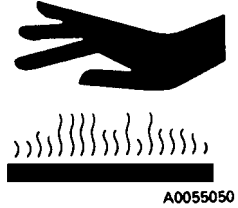
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PRECAUTIONS WHEN HANDLING AT HIGH TEMPERATURES

- Immediately after operations, the engine cooling water, engine oil, differential and final drive case oil, and hydraulic oil are at high temperature and are under pressure. If the cap is removed or the oil or water is drained or the filters are replaced, there is danger of serious burns. Always wait for the temperature to go down, and carry out the operation according to the specified procedure.
- To prevent hot water from spurting out:
 - 1) Stop the engine.
 - 2) Wait for the water temperature to go down.
 - 3) Turn the cap slowly to release the pressure before removing the cap.
- To prevent hot oil from spurting out:
 - 1) Stop the engine.
 - 2) Wait for the oil temperature to go down.
 - 3) Turn the cap slowly to release the pressure before removing the cap.

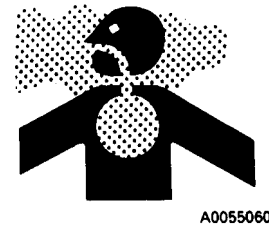


ASBESTOS DUST HAZARD PREVENTION

Asbestos dust can be HAZARDOUS to your health if it is inhaled.

If you handle materials containing asbestos fibers, follow these guidelines as given below:

- NEVER use compressed air for cleaning.
- Use water for cleaning to keep down the dust.
- Operate the machine with the wind to your back, whenever possible.
- Use an approved respirator if necessary.

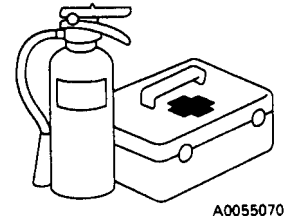


PREVENTION OF INJURY BY WORK EQUIPMENT

- Never enter or put your hand or arm or any other part of your body between movable parts such as the dump body and chassis or cylinders. If the work equipment is operated, the clearance will change and this may lead to serious bodily injury or death.

FIRE EXTINGUISHER AND FIRST AID KIT

- Be sure fire extinguishers have been provided and know how to use them.
- Provide a first aid kit at the storage point.
- Know what to do in the event of a fire.
- Be sure you know the phone numbers of persons you should contact in case of an emergency.



PRECAUTIONS WHEN USING ROPS

- If ROPS is installed, the ROPS must never be removed when operating the machine.
- The ROPS is installed to protect the operator if the machine should roll over. It is designed not only to support the load if the machine should roll over, but also to absorb the impact energy.
- The Komatsu ROPS fulfills all of the regulations and standards for all countries, but if it is rebuilt without authorization or is damaged when the machine rolls over, the strength will drop and it will not be able to fulfill its function properly. It can only display its performance if it is repaired or modified in the specified way.
- When modifying or repairing the ROPS, always contact your Komatsu distributor.
- Even if the ROPS is installed, it cannot show its full effect if the operator does not fasten the seat belt properly. Always fasten the seat belt when operating.

PRECAUTIONS FOR ATTACHMENTS

- When installing and using an optional attachment, 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 your 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.

PRECAUTIONS DURING OPERATION

BEFORE STARTING ENGINE

SAFETY AT WORKSITE

- Before starting the engine, thoroughly check the area for any unusual conditions that could be dangerous.
- Examine the road surface in the jobsite and determine the best and safest method of operation.
- Choose an area where the ground is as horizontal and firm as possible before carrying out the operation.
- If you need to operate on a road, protect pedestrians and cars by designating a person for worksite traffic duty or by installing fences around the worksite.
- Check the river bed condition, and depth and flow of water before crossing shallow parts of river. NEVER be in water which is in excess of the permissible water depth.
- The operator must check personally the work position, roads to be used, and existence of obstacles before starting operations.
- Always determine the travel roads in the worksite and maintain them so that it is always safe for the machines to travel.

FIRE PREVENTION

- Thoroughly remove wood chips, leaves, paper and other flammable things accumulated in the engine compartment. They could cause a fire.
- Check fuel, lubrication, and hydraulic systems for leaks. Have any leaks repaired. Wipe up any excess oil, fuel or other flammable fluids.
- Be sure a fire extinguisher is present and working.
- Do not operate the machine near any flame.



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IN OPERATOR'S CAB

- Do not leave tools or spare parts lying around in the operator's compartment. They may damage or break the control levers or switches. Always put them in the tool box on the right side of the machine.
- Keep the cab floor, controls, steps and handrails free of oil, grease, snow, and excess dirt.
- Check the seat belt, buckle and hardware for damage or wear. Replace any worn or damaged parts. Always use seat belts when operating your machine.

VENTILATION FOR ENCLOSED AREAS

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



A0055060

KEEP MIRRORS, WINDOWS, AND LIGHTS CLEAN

- Remove any dirt from the surface of the windows or lights to ensure good visibility.
- Adjust the rear view mirror to a position where the operator can see best from the operator's seat, and keep the surface of the mirror clean. If any glass should break, replace it with a new part.
- Check that the machine is equipped with the head lamps and working lamps needed for the operating conditions. Check that all the lamps light up properly.

OPERATING MACHINE

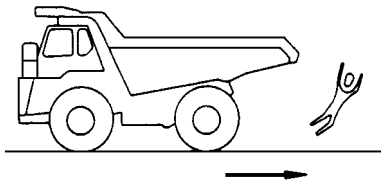
WHEN STARTING ENGINE

- Walk around your machine again just before mounting it, checking for people and objects that might be in the way.
- NEVER start the engine if a warning tag has been attached to the control.
- When starting the engine, sound the horn as an alert.
- Start and operate the machine only while seated.
- Do not allow any person other than the operator in the operator's compartment or any other place on the machine.
- For machines equipped with a back-up alarm buzzer, check that the alarm buzzer works properly.

CHECK WHEN TRAVELING IN REVERSE

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

- Sound the horn to warn people in the area.
- Check that there is no one near the machine. Be particularly careful to check behind the machine.
- If necessary, designate a person to check the safety. This is particularly necessary when traveling in reverse.
- When operating in areas that may be hazardous or have poor visibility, designate a person to direct worksite traffic.
- Do not allow any one to enter the line of travel of the machine. This rule must be strictly observed even on machines equipped with a back-up alarm or rear view mirror.



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TRAVELING

- When traveling on rough ground, travel at low speed. When changing direction, avoid turning suddenly.
- Lower the dump body and set the dump lever to the FLOAT position when traveling.
- If the engine should stop when the machine is traveling, the steering wheel will not work, and it will be dangerous to drive the machine. Apply the brakes immediately and stop the machine.

TRAVELING ON SLOPES

- Traveling on slopes could result in the machine tipping over or slipping.
- Do not change direction on slopes. To ensure safety, go down 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. Take all possible steps to avoid traveling sideways, and always keep the travel speed low.
- When traveling downhill, use the retarder brake to reduce speed. Do not turn the steering wheel suddenly. Do not use the foot brake except in an emergency.
- If the engine should stop on a slope, apply the brakes fully and apply the parking brake, also, to stop the machine.

ENSURE GOOD VISIBILITY

- When working in dark places, install working lamps and head lamps, and set up lighting in the work area if necessary.
- Stop operations if the visibility is poor, such as in mist, snow, or rain, and wait for the weather to improve to a condition that allows the operation to be carried out safely.

OPERATE CAREFULLY 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, so always travel slowly and avoid sudden starting, turning, or stopping.
- Be extremely careful when carrying out snow-clearing operations. 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 DUMP BODY

- When working in tunnels, on bridges, under electric cables, or when entering a parking place or any other place where there are height limits, always drive extremely carefully and lower the dump body completely before driving the machine.

DO NOT GO CLOSE TO HIGH-VOLTAGE CABLES

- Going close to high-voltage cables can cause electric shock. Always maintain the safe distance given below between the machine and the electric cable.

Voltage	Min. Safety Distance	
	m	ft
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:
 - 1) Wear shoes with rubber or leather soles.
 - 2) Use a signalman to give warning if the machine approaches too close to the electric cable.
- If the work equipment should touch the electric cable, the operator should not leave the operator's compartment.
- When carrying out operations near high voltage cables, do not let anyone come close to the machine.
- Check with the electricity company about the voltage of the cables before starting operations.