CEAM019604

Operation & Maintenance Manual

930E-4

DUMP TRUCK

SERIAL NUMBERS **A30601 - A30692**

KOMATSU®

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STANDARD TIGHTENING TORQUES
For SAE Grade 5 and Grade 8 Cap screws

The following specifications apply to required assembly torques for all grade 5 and grade 8 cap screws.

- Cap screw threads and seats shall be lubricated when assembled.

  Unless instructions specifically recommend otherwise, these standard torque values are to be used with simple lithium base chassis grease (multi-purpose EP NLGI) or a rust- preventive grease (see list, previous page) on the threads.

- Torques are calculated to give a clamping force of approximately 75% of proof load.
- The maximum torque tolerance shall be ±10% of the torque value shown.
- In the following table under Cap Screw Size, the first number represents the shank diameter (in.). The second number represents threads per inch.

  Example: 7/16 - 20

  7/16 = shank diameter (7/16 inch (0.438 inch))

  20 = threads per inch

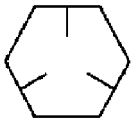


TABLE 2.
Standard Tightening Torque
for SAE Hex Head Cap Screw And Nut Assembly

Cap Screw Size	Torque - Grade 5			Torque - Grade 8			Cap Screw Size	Torque - Grade 5			Torque - Grade 8		
	N·m	ft lb	kg·m	N·m	ft lb	kg·m		N·m	ft lb	kg·m	N·m	ft lb	kg·m
1/4-20	9.5	7	0.97	13.6	10	1.38	**3/4-16**	319	235	32.5	454	335	46.3
1/4-28	10.8	8	1.11	14.9	11	1.52	**7/8-9**	475	350	48.4	678	500	69.2
5/16-18	20.3	15	2.07	28	21	2.90	**7/8-14**	508	375	51.9	719	530	73.3
5/16-24	22	16	2.21	30	22	3.04	**1.0-8**	712	525	72.6	1017	750	103.7
3/8-16	34	25	3.46	47	35	4.84	**1.0-12**	759	560	77.4	1071	790	109.3
3/8-24	41	30	4.15	54	40	5.5	**1.0-14**	773	570	78.8	1085	800	110.6
7/16-14	54	40	5.5	79	58	8.0	**1 1/8-7**	881	650	89.9	1424	1050	145
7/16-20	61	45	6.2	84	62	8.57	**1 1/8-12**	949	700	96.8	1546	1140	158
1/2-13	88	65	9	122	90	12.4	**1 1/4-7**	1234	910	125.9	2007	1480	205
1/2-20	95	70	9.7	129	95	13.1	**1 1/4-12**	1322	975	134.8	2142	1580	219
9/16-12	122	90	12.4	169	125	17.3	**1 3/8-6**	1627	1200	166	2630	1940	268
9/16-18	129	95	13.1	183	135	18.7	**1 3/8-12**	1776	1310	181	2874	2120	293
5/8-11	169	125	17.3	237	175	24.2	**1 1/2-6**	2142	1580	219	3471	2560	354
5/8-18	183	135	18.7	258	190	26.2	**1 1/2-12**	2305	1700	235	3756	2770	383
3/4-10	298	220	30.4	420	310	42.8							

1 ft. lb. = 0.138 kg·m = 1.356 N.m

Precautions With High Temperature Fluids

Immediately after truck operation, engine coolant, engine oil, and hydraulic oil are at high temperatures and are pressurized. If the cap is removed, the fluids are 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.


A0055050

To prevent hot coolant from spraying:

1. Stop the engine.
2. Wait for the coolant temperature to decrease.
3. Depress the pressure release button on the cap to vent cooling system pressure.
4. Turn the radiator cap slowly to release the pressure before removing.

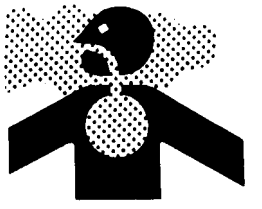
To prevent hot engine oil spray:

1. Stop the engine.
2. Wait for the oil temperature to cool down.
3. Turn the cap slowly to release the pressure before removing the cap.

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 to control dust.
- Operate the truck or perform tasks with the wind to your back whenever possible.
- Use an approved respirator when necessary.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Prevention Of Injury By Work Equipment

Never enter or put your hand, arm or any other 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 lead to serious bodily injury or death.

Unauthorized Modification

Any modification made to this vehicle without authorization from Komatsu America Corp. can possibly create hazards.

Before making any modification, consult the authorized regional Komatsu America Corp. distributor. Komatsu will not be responsible for any injury or damage caused by any unauthorized modification.

ROPS Precautions

The ROPS is intended to protect the operator if the truck should roll over. It is designed not only to support the load of the truck, but also to absorb the energy of the impact.

- The Rollover Protection Structure (ROPS) must be properly installed before the truck is operated.
- ROPS installed on equipment manufactured and designed by Komatsu America Corp. fulfills all of the regulations and standards for all countries. If it is modified or repaired without authorization from Komatsu, or if it is damaged when the truck 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 truck.

TIRES

Handling Tires

If tires are not used under the specified conditions, they may overheat and burst, or be cut and burst by sharp stones on rough road surfaces. This may lead to serious injury or damage.

To maintain tire safety, always use the specified tires. Inflate the tires to the specified pressure. An abnormal level of heat is generated when the inflation pressure is too low.

The tire inflation pressure and permissible speeds are general values. The actual values may differ depending on the type of tire and the condition under which they are used. For details, please consult the tire manufacturer.

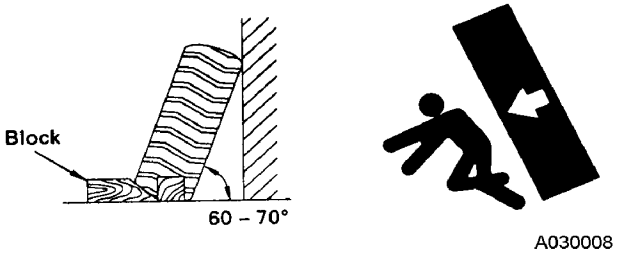
When tires become hot, a flammable gas is produced and may ignite. It is particularly dangerous if the tires become overheated while the tires are pressurized. If the gas generated inside the tire ignites, the internal pressure will suddenly rise and the tire will explode, resulting in danger to personnel in the area. Explosions differ from punctures or tire bursts because the destructive force is extremely large. Therefore, the following operations are strictly prohibited when the tire is pressurized:

- Welding the rim
- Welding near the wheel or tire
- Smoking or creating open flames

If the proper procedure for performing maintenance or replacement of the wheel or tire is not used, the wheel or tire may burst and cause serious injury or damage. When performing such maintenance, consult your authorized regional Komatsu distributor or the tire manufacturer.

Storing Tires After Removal

- As a basic rule, store the tires in a warehouse in which unauthorized persons cannot enter. If the tires are stored outside, always erect a fence around the tires and put up “No Entry” signs and other warning signs that even young children can understand.
- Stand the tire on level ground and block it securely so that it cannot roll or fall over.
- If the tire falls over, flee the area quickly. The tires for dump trucks are extremely heavy. Never attempt to hold or support the tire. Attempting to hold or support a tire may lead to serious injury.



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⚠WARNING

Voltages in excess of 1500 VDC may be present. Any measurement and/or protective equipment used must be rated at 2000 VDC minimum.

Verify functionality of the measurement equipment using site-approved procedures both before and after performing control group measurements.

Failure to observe these precautions may result in death or serious personal injury.

4. Measure voltage on all capacitors as described in Failure of the Discharge System on page 30-21. Discharge any capacitors that show voltage.
5. If all capacitors read discharged, verify that the meter is functioning correctly using site-approved procedures. If so, proceed to Short Isolated Capacitor Terminals on page 30-24.

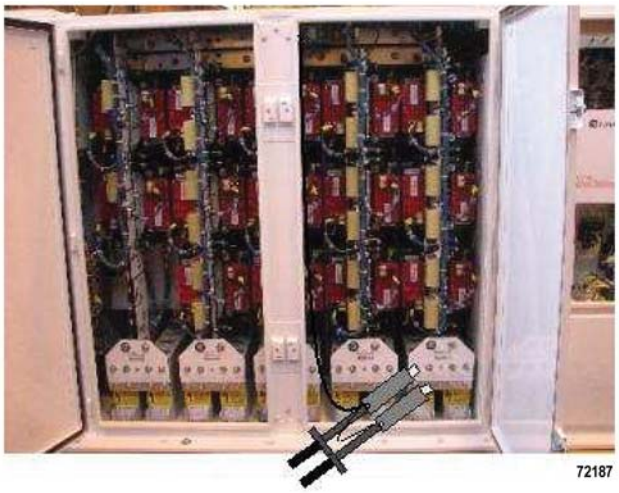
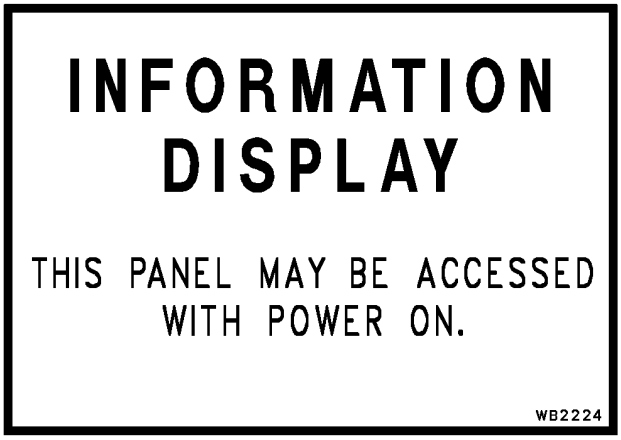


FIGURE 20-10. APPLICATION OF GROUNDING STICKS TO CAPACITOR TERMINALS

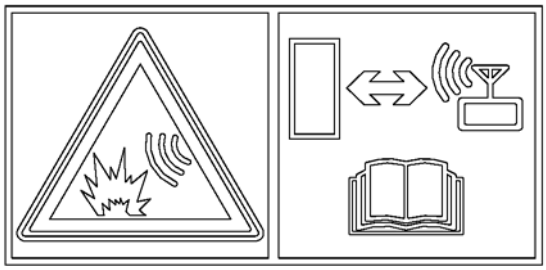
INFORMATION DISPLAY

This information decal is placed on the left door of the control cabinet.



WIRELESS SIGNALS

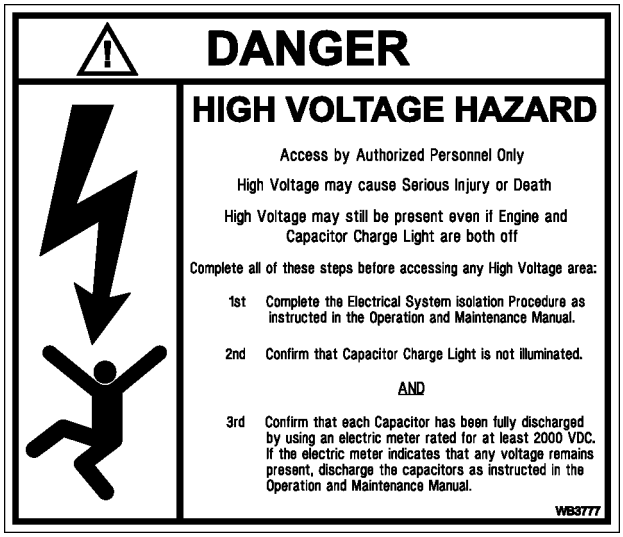
Wireless signals from the truck's KOMTRAX Plus system can interfere with other wireless signals in the area. This interference can cause a malfunction in a blast zone resulting in an unintended detonation. Know the locations of blast zones in the area and keep a safe distance to avoid unintentional blasts. Operating frequency of KOMTRAX Plus is 148 MHz to 150 MHz.

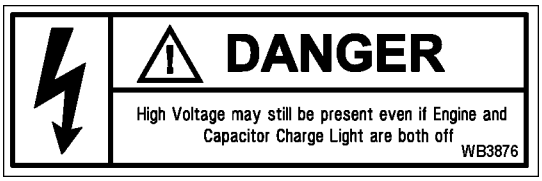


HIGH VOLTAGE

A high voltage danger decal is attached to the door of the rear hatch cover. **High voltage may be present!** Only authorized personnel should access this rear housing.

These danger decals are mounted on all the AC drive control housings and cabinets. **High voltage may be present!** Only authorized personnel should access this component.



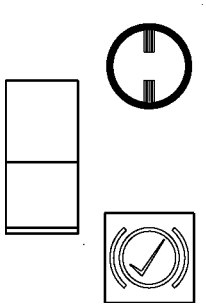


OPERATION

The static brake test utilizes a momentary switch and a check light located in the overhead display panel.

Brake Test Switch

The brake test switch is used to initiate a brake test. Press on the momentary switch to enter the brake test mode. If certain conditions are met, the operator can enter a brake test sequence.



Brake Check Light

The amber light is used to indicate when the truck is in the brake test mode. When illuminated, a brake test is ready. When flashing, the brake test is at the validation point, or the retard system test is finished.

Description

The operator can choose which brake test to perform, and will set the truck controls based on the settings in Table 1. The drive system will detect the position of the directional control lever, and will prepare for the appropriate test. The operator will then press the brake test switch.

If the brake check light is illuminated solid after pressing the brake test switch, the system is in brake test mode and is ready for the chosen test to be initiated by the operator. After testing, the operator will then determine if the truck passed the brake tests, and if it is safe for operation.

If the brake check light does not illuminate immediately after pressing the brake test switch, there is most likely a problem with the setup. Refer to the setup conditions and take action to prepare the truck for a brake test.

If there is a problem with the truck setup, the DID panel will display the problem.

For example if the engine is off:

ERROR Entering Brake Test
Engine not running

If the Truck is loaded:

ERROR Entering Brake Test
Truck is NOT Empty

If all of the conditions are correct, except the brakes are not set correctly, an error message will be displayed. For example, if the service brake and parking brake are both applied together:

ERROR Entering Brake Test
Set Brakes for Test

Brake Test Exit Criteria

Numerous conditions can occur which may interrupt a brake test, including the following:

- Any of the setup conditions becoming false
- Drive system fault which restricts the LINK or Propel mode
- Truck Speed greater than 3.2 kph (2.0 mph)
- Drive system at torque level for more than 30 seconds
- Brake test requested, but not initiated by the operator within 60 seconds after pressing the brake test switch

Table 1: BRAKE TEST SETTINGS

Test Type	Wheel Brake Lock	Service Brake Pedal	Directional Control Lever
Service Brake	OFF	FULLY APPLIED	NEUTRAL
Parking Brake	OFF	RELEASED	PARK
Retard Test	OFF	RELEASED	PARK

8. The parking brakes must be released before towing. To release the parking brake, follow the steps below to install a special wiring harness to release the parking brakes.
   a. Ensure switch (1) is in the OFF position.
   b. Connect one lead of the special wiring harness to the 24VDC bus bar terminal on the side wall in the auxiliary control cabinet for the 24V supply.
   c. Disconnect the truck wiring harness from parking brake solenoid (2, Figure 30-8). Connect special wiring harness (3, Figure 30-9) to the parking brake solenoid. Attach short lead (2) to ground.
   d. WIth the window lowered, place the end of the special wiring harness inside the cab so the operator can control switch (1).
9. When ready to tow the disabled truck, remove blocking from the wheels.
10. The operator in the disabled truck should now move switch (1) to the ON position. This will release the parking brakes.
11. Tow the disabled truck. Sudden movement may cause tow bar failure. Smooth, gradual truck movement is preferred. Do not tow the truck any faster than 8 kph (5 mph).

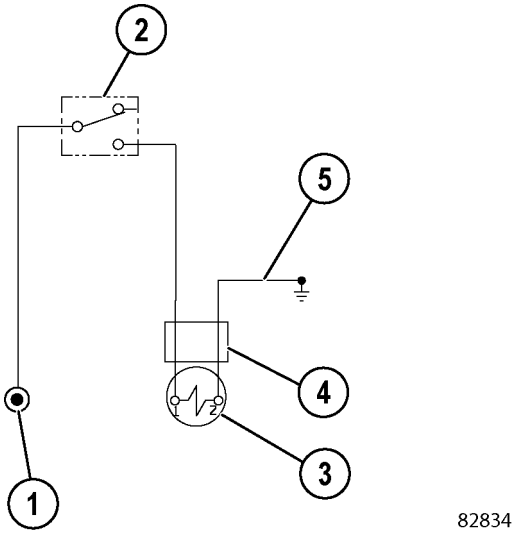


FIGURE 30-1. PARKING BRAKE HARNESS

1. 24VDC Bus Bar
2. Switch (ON/OFF)
3. Park Brake Solenoid
4. Connector
5. Ground Wire

12. Minimize the tow angle at all times. **Never exceed 30 degrees.** The towed truck must be steered in the direction of the tow bar.
13. When the desired location has been reached, the operator in the towed vehicle is to apply the service brakes, then turn switch (1) to the OFF position. This will apply the parking brakes.
14. Block the wheels to prevent roll-away.
15. Shut down the engine in the pulling vehicle. Disconnect the hydraulic hoses.
16. Disconnect special wiring harness (3) from the truck. Connect the truck wiring harness back to the parking brake solenoid.
17. Disconnect the tow bar.

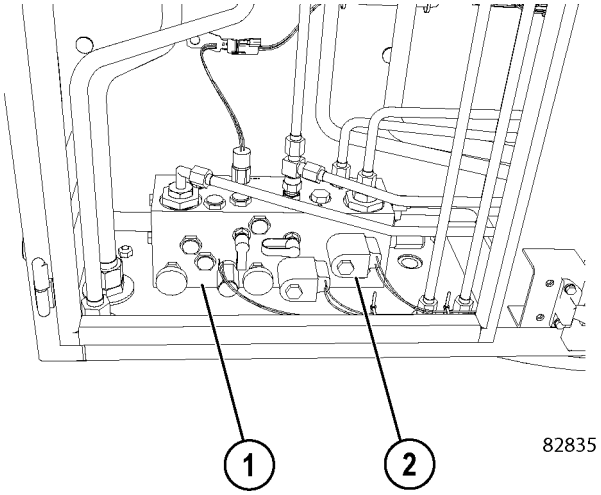


FIGURE 30-2. BRAKE CABINET

1. Brake Manifold
2. Parking Brake Solenoid

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OVERHEAD PANEL AND DISPLAYS

The components described below are located on the overhead panel. Refer to Figure 32-1.

Speakers

Speakers (9, Figure 32-1) for the radio/CD player are located at the far left and right of the overhead panel.

Warning Alarm Buzzer

A warning alarm buzzer (10) will sound when activated by any one of several truck functions. Refer to Instrument Panel and Indicator Lights in this section for a detailed description of functions and indicators that will activate this alarm.

Radio/CD Player

This panel will normally contain a radio/CD player (11). Refer to Section 70 for a complete description of the radio/CD player and its functions. Individual customers may use this area for other purposes, such as a two-way communications radio.

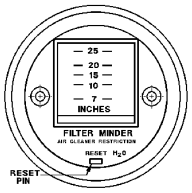
Warning Indicator Light Dimmer Control

Dimmer control (12) below the radio/CD player permits the operator to adjust the brightness of the warning indicator lights.

Status/Warning Indicator Light Panel

Status/ warning indicator panel (13) contains an array of indicator lights to provide the operator with important status messages concerning selected truck functions. Refer to Instrument Panel and Indicator Lights in this section for a detailed description of these indicators.

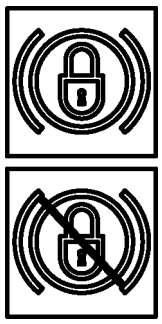
Air Cleaner Restriction Gauges



Air cleaner restriction gauges (14) provide a continuous reading of the maximum air cleaner restriction reached during operation. The air cleaner(s) should be serviced when the gauge(s) shows the maximum recommended restriction of 25 inches of H_2O vacuum.

NOTE: After service, push the reset button on the face of the gauge to return the gauge to zero.

Wheel Brake Lock Switch



Wheel brake lock switch (6, Figure 32-7) should be used with engine running for dumping and loading operations only. The brake lock switch actuates the hydraulic brake system which locks the **rear wheel service brakes only**. When pulling into shovel or dump area, stop the truck using the foot-operated service brake pedal. When truck is completely stopped and in loading position, apply the brake lock by pressing the top of the rocker switch. To release the brake, press the bottom of the rocker switch.

NOTE: Use at the shovel and dump only to hold the truck in position.

⚠WARNING

Do not use the wheel brake lock switch to stop the truck unless foot-operated treadle valve is inoperative. Use of this switch applies rear service brakes at a reduced, unmodulated pressure. Do not use brake lock for parking. With engine stopped, hydraulic pressure will bleed down, allowing brakes to release.

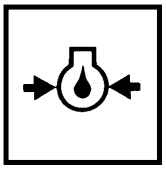
Hazard Warning Light Switch

Hazard warning light switch (7, Figure 32-7) flashes all the turn signal lights. Pressing the bottom of the rocker switch activates these lights. Pressing the top of the rocker switch turns these lights off.

Heater/Air Conditioner Vents

Heater/air conditioner vents (8, Figure 32-7) may be directed by the operator to provide the most comfortable cabin air flow.

Engine Oil Pressure Gauge



Engine oil pressure gauge (9, Figure 32-7) indicates pressure in the engine lubrication system.

Normal operating pressure after engine warm-up should be:

Idle: 138 kPa (20 psi) minimum

Rated Speed: 310 - 483 kPa (45 - 70 psi)

Right Turn Signal Indicator

Indicator (10, Figure 32-7) illuminates to indicate that the right turn signals are operating when the turn signal lever on the steering column is moved upward. Moving the lever to its center position will turn the indicator off.

Digital Tachometer

Digital tachometer (11, Figure 32-7) registers engine crankshaft speed in hundreds of revolutions per minute (rpm).

Governed Speed	
Low Idle	750 rpm
High Idle	1910 rpm
Full Load	1900 rpm

High Beam Indicator

When lit, high beam indicator (12, Figure 32-7) indicates that the headlights are on high beam. To switch the headlights to high beam, push the turn indicator lever away from the steering wheel. For low beam, pull the lever toward the steering wheel.

Speedometer/Payload Meter Display

Speedometer/payload meter display (13, Figure 32-7) indicates the truck speed in kilometers per hour (kph) or in miles per hour (mph). The display also shows payload meter information. For more information, see Section 60, Payload Meter III.

KOMTRAX PLUS

Operation

This system uses KOMTRAX Plus controller (formerly known as VHMS) (6, Figure 32-11) to gather data about the operation of the truck from sensors and other controllers installed on the truck. The data stored in KOMTRAX Plus is collected by a laptop personal computer (PC) or transmitted directly by communications satellite (utilizing the ORBCOMM controller). This data is then compiled at the Komatsu computer server. Based on this information, the servicing Komatsu distributor will suggest improvements and provide information aimed at reducing machine repair costs and downtime.

NOTE: A contract is necessary before KOMTRAX Plus can be used. Contact your Komatsu distributor for more information.

⚠CAUTION

DO NOT disassemble, repair, or modify the KOMTRAX Plus system without proper authorization. Changes to the system may cause machine failures and fire.

DO NOT touch the KOMTRAX Plus system components during machine operation.

DO NOT pull on KOMTRAX Plus system wiring harnesses, connectors, or sensors. This may cause short circuits or open circuits and lead to machine failure or fire.

DO NOT allow water, dirt, or oil onto system components.

The ORBCOMM satellite requires the installation of a pole and antenna, adding to the overall height of the machine. The height increase is 410 mm (16.2 in.). With the guard installed, the overall height increases another 260 mm (10.2 in.). Use caution when operating in areas with height restrictions.

⚠DANGER

Anyone with a pacemaker must remain a minimum of 22 cm (9 in.) from the communications antenna. Radio waves from the antenna can interfere with pacemaker operation.

⚠IMPORTANT⚠

The KOMTRAX Plus system uses wireless components that transmit via radio waves. It is necessary to conform to local laws when using this system.

Proper operation of the system is dependent on good reception. Operating in tunnels, mountain ranges and covered areas may prevent communication of the system.

Contact your Komatsu distributor before selling or exporting a truck equipped with KOMTRAX Plus. It may be necessary to remove the system before transfer of ownership.

Contact your Komatsu distributor before installing equipment that may interfere with the KOMTRAX Plus system.

Komatsu is not responsible for any failures that result from neglecting KOMTRAX Plus system precautions and instructions.

⚠DANGER

ORBCOMM is a two-way radio communication device. Wireless signals from the system can interfere with other wireless signals in the area. This interference can cause a malfunction in a blast zone resulting in an unintended detonation. Know the locations of blast zones in the area and keep a safe distance to avoid unintentional blasts. If the machine is operating within a distance of 12m (40 ft) of a blast zone, disconnect the ORBCOMM harness. Failure to do so could result in serious injury or death.

This warning does not supersede requirements or regulations of the area or country where this machine is in operation. The following specifications are provided to ensure compliance with all of the applicable requirements or regulations:

Transmit power: 5-10 Watts
Operating Frequency Range: 148 - 150 MHz

LUBRICATION AND SERVICE

GENERAL

Recommended preventive maintenance will contribute to the long life and dependability of the truck and its components. The use of proper lubricants and the performance of checks and adjustments at the recommended intervals is most important.

Lubrication requirements are referenced to the lube key found in the Lubrication Chart (page 2-5). For detailed service requirements for specific components, refer to the shop manual section for that component (for example, Section H for suspensions, Section L for hydraulic system, etc).

Refer to the manufacturer's service manual when servicing any components of the General Electric propulsion system.

Refer to engine manufacturer's service manual when servicing the engine or any of its components.

The service intervals presented here are in hours of operation. **These intervals are recommended in place of an oil analysis program which may determine different intervals.** However, if the truck is being operated under extreme conditions, some or all of the intervals may need to be shortened and the service should be performed more frequently.

The 930E truck is equipped with a Lincoln Automatic Lubrication System. The initial setup for this system provides for nominal amounts of lubricant to be delivered to each serviced point. The lubrication injectors can be adjusted to vary the amount of lubricant delivered. In addition, the timer for lubrication intervals is normally adjustable. For adjustments to these devices, refer to Section 42, Automatic Lubrication System.

SERVICE CAPACITIES

Component/System	Liters	U.S. Gallons
Crankcase (including 4 oil filters) Komatsu SSDA16V160 Engine	280	74
Cooling System Komatsu SSDA16V160 Engine	594	157
Hydraulic System Refer to “Hydraulic Tank Service”	1325	350
Wheel Motors (each side)	95	25
Fuel Tank (Diesel fuel only)	4542	1200

HYDRAULIC TANK SERVICE

There are two sight gauges (1, Figure 40-1) on the side of the hydraulic tank. With the engine stopped, key switch OFF, hydraulic system depressurized, and body down, the oil level should be visible in the center of the top sight gauge. If the oil level is not visible in the center of the top sight gauge, follow the instructions below for adding oil.

Adding Oil

NOTE: Keep the system open to the atmosphere only as long as absolutely necessary to lessen chances of system contamination.

Service the tank with clean Type C-4 hydraulic oil only. All oil being put into the hydraulic tank should be filtered through 3 micron filters.

1. Make sure that the engine is stopped, key switch is OFF, hydraulic system is depressurized, and body is down
2. Remove fill cap (2) and add hydraulic oil until the oil level is visible in the center of the top sight gauge.
3. Install the fill cap.
4. Start the engine. Raise and lower the dump body three times.
5. Check the hydraulic oil level again with the engine stopped, key switch OFF, hydraulic system depressurized, and body down.
6. Repeat Steps 1 - 5 until the oil level is maintained in the center of the top sight gauge.

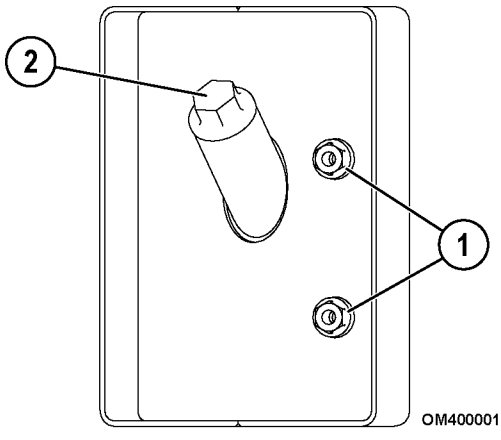


FIGURE 40-1. HYDRAULIC TANK SERVICE

1. Sight Gauges 2. Fill Cap

250 HOUR LUBRICATION AND MAINTENANCE CHECKS (Cont.)

	TASK	COMMENTS	CHECKED	INITIALS
17.	CAB RECIRCULATION AIR FILTER - Clean the filter element with mild soap and water. Rinse completely and allow to air dry before reinstalling the filter.			
18.	CAB AIR FILTER - Clean the filter element with mild soap and water. Rinse completely and dry with pressure air of 275 kPa (40 psi) maximum. Reinstall the filter.			

500 HOUR LUBRICATION AND MAINTENANCE CHECKS

All *10 Hour (Daily) Inspections* and *250 Hour Lubrication and Maintenance Checks* should also be performed at this time.

NOTE: "Lube Key" references are to the ***Lubrication Chart*** *on page 40-5.*

Truck Serial Number_____ **Site Unit Number**_____ **Date**_____

Hourmeter_____ **Name of Service Technician**_____

	TASK	COMMENTS	CHECKED	INITIALS
1.	FINAL DRIVE CASE BREATHERS - Remove the breather elements for the motorized wheels. Clean or replace the elements.			
2.	HYDRAULIC SYSTEM FILTERS - Replace the hydraulic tank breathers and high pressure filter elements. Check the oil level. Add oil as necessary. (Lube Key "B")			
3.	HYDRAIR® SUSPENSION - Check for proper piston extension (front and rear).			
4.	THROTTLE AND BRAKE PEDAL - Lubricate the treadle roller and hinge pins with lubricating oil. Lift the boot from the mounting plate and apply a few drops of lubricating oil between the mounting plate and the plunger.			
5.	HOIST LEVER LINKAGE - Check the lever operation. Clean, lubricate and adjust the linkage as necessary.			
6.	PARKING BRAKE - Refer to Section J7, Parking Brake, in the shop manual for the recommended inspections.			

INJECTORS (SL-1 Series “H”)

Injector Specifications

- Each lube injector services only one grease point. In case of pump malfunction, each injector is equipped with a covered grease fitting to allow the use of external lubricating equipment.
- Injector output volume:

  Maximum output = ... 1.31 cc (0.08 in^3).

  Minimum output = ... 0.13 cc (0.008 in^3).
- Operating Pressure:

  Minimum - . . . . . 12 755 kPa (1,850 psi)

  Maximum - . . . . . 24 133 kPa (3,500 psi)

  Recommended - . . . . 17 238 kPa (2,500 psi)
- Maximum Vent Pressure - (Recharge)

  . . . . . 4 137 kPa (600 psi)

Injector Adjustment

The injectors may be adjusted to supply from 0.13 - 1.31 cc (0.008 - 0.08 in^3) of lubricant per injection cycle. The injector piston travel distance determines the amount of lubricant supplied. This travel is in turn controlled by an adjusting screw in the top of the injector housing.

Turn adjusting screw (1, Figure 42-6) counterclockwise to increase lubricant amount delivered and clockwise to decrease the lubricant amount.

When the injector is not pressurized, maximum injector delivery volume is attained by turning the adjusting screw (1) fully counterclockwise until the indicating pin just touches the adjusting screw. At the maximum delivery point, about 9.7 mm (0.38 in. adjusting screw threads should be showing. Decrease the delivered lubricant amount by turning the adjusting screw clockwise to limit injector piston travel. If only half the lubricant is needed, turn the adjusting screw to the point where about 4.8 mm (0.19 in.) threads are showing. The injector will be set at minimum delivery point with about 0.22 mm (0.009 in.) thread showing.

NOTE: The above information concerns adjustment of injector delivery volume. The timer adjustment should also be changed, if overall lubricant delivery is too little or too much. Injector output should NOT be adjusted to less than 1/4 capacity.

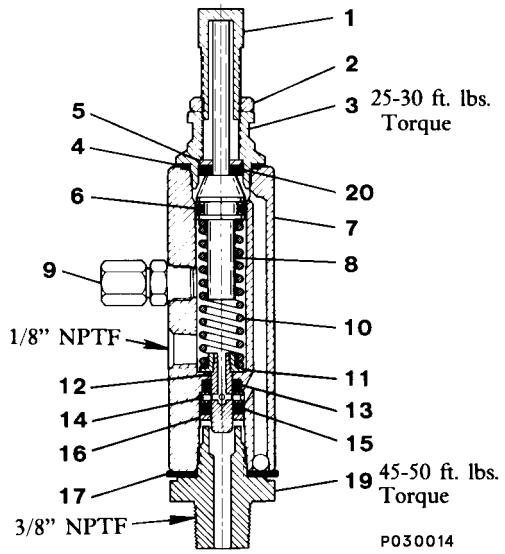


FIGURE 42-6. TYPE SL-1 INJECTOR

1. Adjusting Screw
2. Locknut
3. Piston Stop Plug
4. Gasket
5. Washer
6. Viton O-Ring
7. Injector Body Assy.
8. Piston Assembly
9. Fitting Assembly
10. Plunger Spring
11. Spring Seat
12. Plunger
13. Viton Packing
14. Inlet Disc
15. Viton Packing
16. Washer
17. Gasket
18. Adapter Bolt
19. Adapter
20. Viton Packing

NOTE: The piston assembly (8) has a visible indicator pin at the top of the assembly to verify injector operation.

SPECIFICATIONS

These specifications are for the standard Komatsu 930E-4 Truck. Customer options may change this listing.

ENGINE

Komatsu SSDA16V160

No. of Cylinders 16
Operating Cycle 4-Stroke
Rated Brake HP . . . . . 2 014 kW (2,700 HP) @ 1900 RPM
Flywheel HP . . . . . 1 902 kW (2,550 HP) @ 1900 RPM
Weight (Wet)* . . . . . 9 608 kg (21,182 lb)

* 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 . . . . . 340 m³/ min (12,000 cfm)
Motorized Wheels . . . . . GDY106 AC Induction Traction Motors
  Standard Gear Ratio* 32.62:1
  Maximum Speed . . . . . 64.5 km/h (40 mph)

* Wheel motor application depends upon GVW, haul road grade and length, rolling resistance, and other parameters. Komatsu and GE must analyze each job condition to ensure proper application.

DYNAMIC RETARDING

Electric Dynamic Retarding . . . . . Standard
Maximum Rating . . . . . 4 026 kW (5,400 HP)
Continuous* . . . . . 2 460 kW (3,300 HP)

* Continuously rated high-density blown grids with retard at engine idle and retard in reverse propulsion.

BATTERY ELECTRIC SYSTEM

Batteries . . . . . Four 8D, 12 volt wet batteries with disconnect switch
  Cold Cranking Amps . . . . . 1450 CCA
Alternator . . . . . 24 Volt, 260 Amp Output
Lighting . . . . . 24 Volts
Starters (2) . . . . . 24 Volts

SERVICE CAPACITIES

Crankcase (including lube oil filters) . . . . . 280 liters (74 gallons)
Cooling System . . . . . 594 liters (157 gallons)
Fuel . . . . . 4 542 liters (1,200 gallons)
Hydraulic System . . . . . 1 325 liters (350 gallons)
Wheel Motor Gear Box . . . . . 95 liters (25 gallons) per wheel

Wiring and Termination

Most of the PLMIII truck connections use a heavy-duty cable. This yellow multi-conductor cable uses a 16awg, finely stranded wire designed for continuous motion operations. The conductors are protected by a foil and braided shield for electronic noise immunity and physical strength. This wire is typically terminated with a #10 ring terminal. Most connections for the PLMIII system are made in the payload meter junction box.

TCI Outputs

The GE drive system on the 930E/960E requires information from the payload meter regarding the loaded condition of the truck. There are three outputs from the payload meter to GE to indicate the relative load in the truck. 24 vdc on the 73MSL circuit indicates that the load is 70% of rated load. 24 vdc on the 73FSL circuit indicates the truck is 100% loaded. The 73OSL circuit is not currently used.

PC SOFTWARE OVERVIEW

PC Overview

The PC software has several basic functions:

- Configure the PLMIII system on the truck.
- Troubleshoot and check the PLMIII system.
- Download data from the PLMIII system.
- Analyze data from the payload systems.

Configuration, troubleshooting and downloading require a serial connection to the payload meter on the truck. Analysis can be done at any time without a connection to the payload meter.

Payload data is downloaded from several trucks into one database on the PC. The database can be queried to look at the entire fleet, one truck or truck model. The data can be graphed, reported, imported or exported. The export feature can take payload data and save it in a format that spreadsheet programs like Excel or word processing programs can easily import.

System Configuration

PLMIII needs to be configured for operation when it is first installed on the truck. This process requires several steps and uses the laptop computer to make the necessary settings. The setup procedure can be broken down into several steps:

- Connecting the laptop to the PLMIII system.
- Starting communications
- Setting the time & date
- Setting the truck type
- Setting the truck ID
- Setting the speedometer/display gauge units

Installing the PLMIII Software

The CD-ROM containing the Payload Data Management (PDM) software will automatically begin installation when it is inserted into the drive on the PC. If this does not happen, the software can be installed by running the Setup.exe program on the CD-ROM.

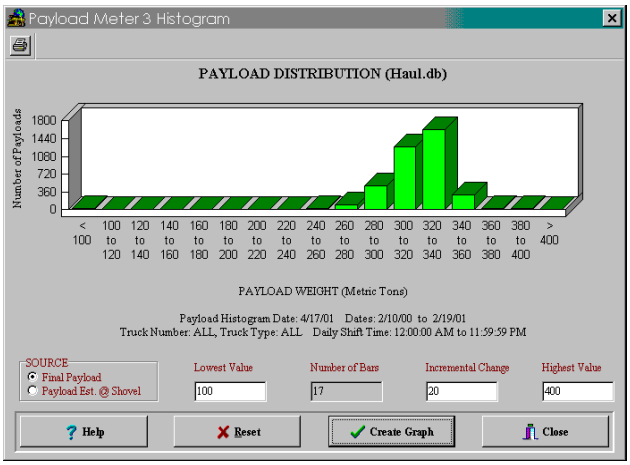
The minimum PC requirements for running the software is a Pentium 133Mhz with 64 MB of ram and at least 300 MB of free hard drive space available. For improved performance, the recommended PC would have a Celeron, AMD K6-2 or better processor with 128 MB of ram running at 400 Mhz. The PDM software uses a powerful database to manipulate the large amounts of data gathered from the PLMIII system. Using a more powerful computer and added memory to run the software can result in a significant improvement in performance. The software is written to use a minimum 800x600 screen resolution.

Creating Graphs

The PLMIII software can generate graphs that quickly summarize payload data. These graphs can be customized for printing. Just like the reports, the graphs are generated from the query displayed on the “Payload Summary” screen. From the "Sorting on Time Range" example, the graph that is printed would only contain data from truck 374 during the month of July 2000, from 8:00 AM to 5:00 PM.

It is important to carefully select the query data and press the "Query Database & Display" button before creating a graph.

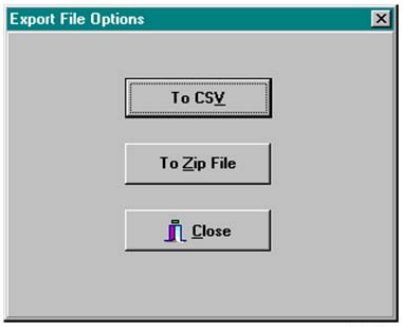
1. From the Payload Summary Screen select the “Graph” button at the bottom. The Histogram Setup screen will display



2. Enter the "Lowest Value". This will be the lowest payload on the graph. Any payloads less than this value will be summed in the first bar.
3. Enter the "Highest Value". This will be the highest value on the graph. Payloads over this value will be summed in the last bar.
4. Enter the "Incremental Change". This will determine the number of bars and the distance between them. The program limits the number of bars to 20. This allows graphs to fit on the screen and print onto 1 page.
5. Press the “Create Graph” button.

The graph will be displayed based on the query settings from the Payload Summary screen. The graph can be customized and printed.

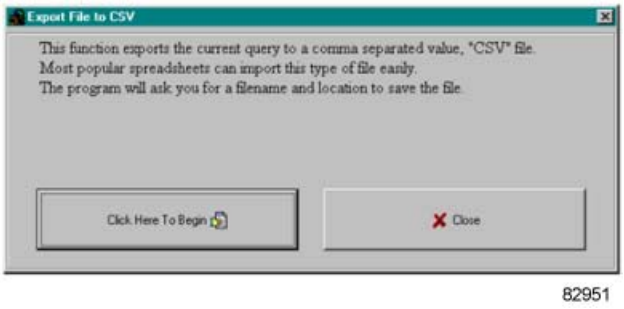
Exporting Data



The data from the database can be exported for use with other software applications. The data is selected from the currently displayed query. The exported data can be put into a ".CSV" file or a compressed ".zip" file.

- The “.CSV” format allows data to be easily imported into spreadsheet applications and word processing applications.
- The “.zip” format allows data to be transferred from one computer to the PDM Software database on another computer. This offers a compact way to transfer data from one computer to another.

CSV Export



CSV stands for Comma Separated Value. This is an ASCII text file format that allows spreadsheet applications like Excel and Lotus 123 to import data easily. To export the data into a ".csv" file, press the "Export" button at the bottom of the payload summary screen and select "To CSV". The program will request a filename and location for the file.

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