

# Operation & Maintenance Manual

Dump Truck

**930E-4**

Serial Numbers A31693 & UP

**⚠ WARNING**

Unsafe use of this machine may cause serious injury or death. Operators and maintenance personnel must read this manual before operating or maintaining this machine. This manual should be kept near the machine for reference and periodically reviewed by all personnel who will come into contact with it.

**NOTICE**

Komatsu has Operation & Maintenance Manuals written in some other languages. If a foreign language manual is necessary, contact your local distributor for availability.

**KOMATSU**

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# STANDARD CHARTS AND TABLES



## **WARNING**

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

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

## CONVERSION MULTIPLIERS F.3-0000051232

### METRIC TO ENGLISH

Table 2-11

Common Conversion Multipliers Metric To English		
To Convert From	To	Multiply By
millimeter (mm)	inch (in.)	0.0394
centimeter (cm)	inch (in.)	0.3937
meter (m)	foot (ft)	3.2808
meter (m)	yard (yd)	1.0936
kilometer (km)	mile (mi)	0.6210
square centimeters (cm <sup>2</sup> )	square inch (in. <sup>2</sup> )	0.1550
square centimeters (cm <sup>2</sup> )	square feet (ft <sup>2</sup> )	0.001
cubic centimeters (cm <sup>3</sup> )	cubic inch (in. <sup>3</sup> )	0.061
liters (L)	cubic inch (in. <sup>3</sup> )	61.02
cubic meters (m <sup>3</sup> )	cubic feet (ft <sup>3</sup> )	35.314
liters (L)	cubic feet (ft <sup>3</sup> )	0.0353
grams (g)	ounce (oz)	0.0353
milliliter (mL)	fluid ounce (fl oz)	0.0338
kilogram (kg)	pound (mass)	2.2046
Newton (N)	pounds (lb)	0.2248
Newton meters (N·m)	kilogram force meters (kgf·m)	0.102
Newton meters (N·m)	foot pounds (ft lb)	0.7376
kilogram force meters (kgf·m)	foot pounds (ft lb)	7.2329
kilogram force meters (kgf·m)	Newton meters (N·m)	9.807
kilopascals (kPa)	pounds/square inch (psi)	0.1450
megapascals (MPa)	pounds/square inch (psi)	145.038
kilograms/cm <sup>2</sup> (kg/cm <sup>2</sup> )	pounds/square inch (psi)	14.2231
kilograms/cm <sup>2</sup> (kg/cm <sup>2</sup> )	kilopascals (kPa)	98.068
kilogram (kg)	short ton (tn)	0.0011
metric ton	short ton (tn)	1.1023
liters (L)	quart (qt)	1.0567
liters (L)	gallon (gal)	0.2642
Watts (W)	horsepower (hp)	0.00134
kilowatts (kW)	horsepower (hp)	1.3410

## OPERATING THE MACHINE

F.8-0000051287

### General Information

While operating the truck obey the following guidelines:

- 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.
- 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.
- Know and obey hand signal communications between the operator and spotter. Use a signal person when other machines and personnel are present, the operator must move in and out of buildings, and traveling through traffic.
- 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. 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 8 hours or until the tire and wheel are cool.

### Starting The Engine

- DO NOT 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.
- DO NOT start the engine if a warning tag has been attached to the controls.

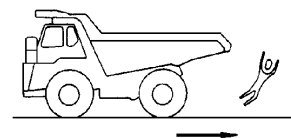
When starting the engine, sound the horn as an alert. Start and operate the machine only while seated in the operator's seat. DO NOT allow any unauthorized persons in the operator's compartment or any other place on the machine.

### Traveling In The Machine

When traveling on rough ground, travel at low speeds. When changing direction, avoid turning suddenly. Lower the dump body 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.

### 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.

## Jump Starting With Booster Cables

### ⚠ CAUTION

- Always wear safety glasses or goggles when starting the machine with booster cables. DO NOT allow the two machines to touch while jump starting with another machine.

When jump starting the machine with booster cables, obey the following guidelines:

1. Ensure the parking brake is applied on both machines. The engine on the good machine must be operating.
2. 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.
3. Ensure the key switch and the master battery disconnect switch on the disabled machine are in the OFF position.
4. Connect the batteries in parallel: positive to positive and negative to negative.
5. Connect the positive (24VDC +) cable from the good machine to the (24VDC +) on the disabled machine first.
6. 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.
7. Move the master battery disconnect switch to the ON position. Allow time for the batteries to charge.
8. If starting with a booster cable, perform the operation with two people. One person must be in the cab of the disabled machine, the other person must be working with the jumper cables.
9. If the batteries are low, DO NOT attempt to start the machine with only one set of jumper cables installed. Install the second set of jumper cables in the same way as already described.
10. Attempt to start the disabled machine.
11. For booster cable removal, disconnect the ground or negative (-) cable first, then the (24VDC +) cable last.

**NOTE:** 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

### ⚠ CAUTION

- Always wear safety glasses or goggles when starting the machine with booster cables. DO NOT allow the two machines to touch while jump starting with another machine.

When jump starting the machine with receptacles, obey the following guidelines:

1. Ensure the parking brake is applied on both machines. The engine on the good machine must be operating.
2. Inspect the cables and connectors for any damage or corrosion.
3. Ensure the key switch and master battery disconnect switch on the disabled machine are in the OFF position.
4. Connect the jumper cable to the receptacle on the good machine to the receptacle on the disabled machine.
5. Allow time for the batteries to charge.

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

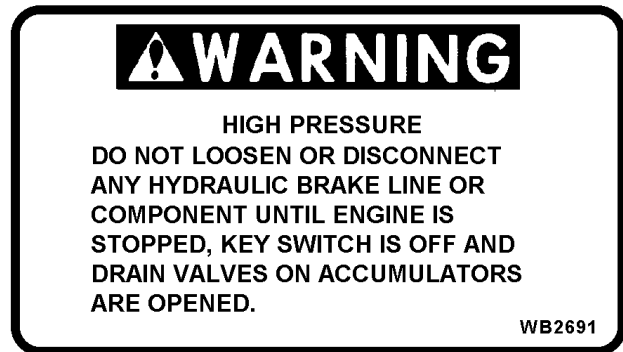
6. If starting with a booster cable, perform the operation with two people. One person must be in the cab of the disabled machine, the other person must be working with the jumper cables.
7. If the batteries are low, DO NOT attempt to start the machine with only one set of jumper cables installed. Install the second set of jumper cables in the same way as already described.
8. Turn the master battery disconnect switch to the ON position and attempt to start the disabled machine.
9. For booster cable removal, disconnect the cables from each machine.

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

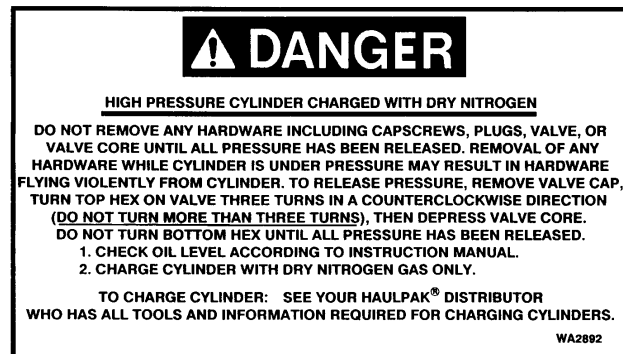
Warning decals are applied to the inside of the brake system cabinet behind the operator cab. These decals remind servicing technicians to close the accumulator drain valves after they have been opened to bleed brake pressure. It further warns not to over-tighten the drain valves to prevent damage to the valve seat(s).



This warning plate is located on the inside and outside of the brake system cabinet doors. This warning plate alerts the technician to stop the engine, turn the key switch OFF, and open the drain valves on all three accumulators to bleed the hydraulic system pressure before disconnecting a brake line.



This danger plate is attached to all four suspensions. The plate contains instructions for releasing internal pressure before disconnecting any hardware. Serious injury can occur if these directions are not followed.



# OPERATING INSTRUCTIONS

## **WARNING**

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

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

**PRE-SHIFT BRAKE TEST** B.5-0000051681

**NOTE:** *Komatsu recommends that operators perform static brake tests to verify that the braking systems are adequate at the beginning of each shift before operating the truck.*

The static brake test allows the operator to check the service brake, parking brake and the dynamic retarder. The purpose of these tests is to verify the functionality of the service brake, parking brake and retarder systems at the time they are tested.

After performing each test, it is the operator's responsibility to determine if the truck passed each test and if the truck is safe for operation.

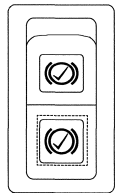
The order of performing the brake tests, (service brake, parking brake or retard system) does not matter. Each brake test is a separate test, where one brake system or all three can be tested at any time.

**⚠ WARNING**

- **If the truck fails any brake test, notify maintenance personnel immediately. Do not resume operation unless the truck passes all brake tests.**

**OPERATION**

The static brake test utilizes a momentary switch and a check light located on the dash panel.



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.

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

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

**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

**NOTE:** *The drive system will not enter any brake test if the truck is loaded.*

Before performing any brake test, the following conditions must be met:

- Dump body is empty.
- Truck located outside on a flat area, where truck movement is allowed.

**⚠ WARNING**

- **Ensure the area around the truck is free of personnel and objects. Some truck movement could occur during brake testing.**
- **The drive system is unable to determine if the truck is on a hill or in a parking ditch. Testing during these conditions will affect test results.**

## Pre-Operation Testing

**NOTE:** *Komatsu recommends that operators perform this test to verify that the steering accumulator precharge pressure is adequate at the beginning of each shift before operating the truck.*

### **WARNING**

- **Ensure no one is near the front tires during this test. All personnel are warned that clearances change when the steering wheel is turned and this could cause serious injury.**

This test can only be performed with an empty truck.

1. Park the empty truck on flat, level ground. Lower the dump body onto the frame and stop the engine. Ensure the key switch is in the OFF position.
2. Wait at least 90 seconds to verify that all hydraulic pressure has been relieved from the steering accumulators. Turn the steering wheel from stop to stop. If the front wheels do not move, there is no hydraulic pressure.
3. Check the hydraulic tank oil level. The oil level must be visible in the center of the upper sight glass and must not cover the entire upper sight glass. Add oil if necessary. DO NOT overfill.
4. Turn the key switch to the ON position, but DO NOT start the engine.
  - If any warning messages are displayed immediately notify maintenance personnel. DO NOT operate the truck until the problem is corrected.
5. Start the engine and allow the steering accumulators to fully charge. Turn the steering wheel so that the front wheels are straight.
6. Check the hydraulic tank oil level while the engine is on.
  - If the oil level is visible in center of the lower sight glass and does not cover the entire lower sight glass, the steering accumulators are adequately charged. Proceed to Step 7.
  - If the oil level is below the lower sight glass, the steering accumulators are not adequately charged. Stop the engine and turn the key switch to the OFF position. Immediately notify maintenance personnel. DO NOT operate the truck until the problem is corrected.
7. Shut the engine off by using the engine stop button located on the center console. Leave

the key switch in the ON position. This allows the steering accumulators to retain their hydraulic charge.

- If the warning light and buzzer do activate, turn the key switch OFF and notify maintenance personnel. DO NOT operate the truck until the problem is corrected.
  - If the steering accumulators are adequately charged, the warning light and buzzer will not activate. Continue to the next step.
8. If the front wheels cannot be turned fully to the left and right, or if the warning light and buzzer do not activate, immediately notify maintenance personnel. DO NOT operate the truck until the problem is corrected.

If the truck passes this test, the emergency steering system is functioning properly.

### Additional Guidelines

- When the truck body is raised, DO NOT allow anyone below it unless the body-up retaining cable is in place.
- DO NOT use the fire extinguisher for any purpose other than putting out a fire! If an extinguisher is discharged, report the occurrence so the used unit can be refilled or replaced.
- DO NOT allow unauthorized personnel to ride in the truck. DO NOT allow anyone to ride on the ladder or outside of the truck cab. Passengers must be belted into the passenger seat during travel.
- DO NOT leave the truck unattended while the engine is running. Move the directional control lever to PARK, then shut the engine off before getting out of the cab.

### FUEL DEPLETION D.3-0000051426

#### **CAUTION**

- **Operating the truck to fuel depletion forces the injector train into a no-follow condition. No fuel flow between the plungers may cause damage to the injectors and the overhead due to adhesive wear, resulting in costly repairs and unnecessary downtime.**

#### **WARNING**

- **Allowing the Komatsu truck to operate until fuel depletion can lead to unsafe operating conditions possibly resulting in an uncontrollable vehicle and/or personal injury.**

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<b>Table 1: HAUL CYCLE DATA</b>		
<b>Data</b>	<b>Unit</b>	<b>Remark</b>
Loaded Max Speed Time	seconds	Number of seconds from the start of the haul cycle to the time when the max speed occurred
Empty Max Speed	km/h	Maximum speed recorded while the truck is empty
Empty Max Speed Time	seconds	Number of seconds from the start of the haul cycle to the time when the max speed occurred
Peak Positive Frame Torque	ton-meter	Positive frame torque is measured as the frame twists in the clockwise direction as viewed from the operator's seat.
Peak Frame Torque Time	seconds	Number of seconds from the start of the haul cycle to the peak torque, download program converts to time for display
Peak Negative Frame Torque	ton-meter	Negative frame torque is measured as the frame twists in the counter-clockwise direction as viewed from the operator's seat.
Peak Frame Torque Time	seconds	Number of seconds from the start of the haul cycle to the peak torque, download program converts to time for display
Peak Sprung Load	tons	Peak dynamic load calculation
Peak Sprung Load Time	seconds	Number of seconds from the start of the haul cycle to the peak instantaneous load calculation
Front left tire ton km/h	t-km/h	Tire ton-km/h for haul cycle
Front right tire ton km/h	t-km/h	Tire ton-km/h for haul cycle
Average rear tire ton km/h	t-km/h	Tire ton-km/h for haul cycle
Truck Frame Serial Number	alpha	The truck serial number from the nameplate on the truck frame
Reserved 1–10	number	These values are internal calculations used in the continued development of the PLMIII system and should be ignored

### Haul Cycle Warning Flags

The payload meter expects haul cycles to progress in a particular way. When something unexpected takes place, the system records a warning flag. Several events within the haul cycle can cause a warning flag to be generated. Each one indicates an unusual occurrence during the haul cycle. They do not necessarily indicate a problem with the payload meter or payload calculation.

#### Continuous Loading

This message indicates the truck is loaded over 50% full without the payload meter sensing swingloads. This indicates that a continuous loading operation was used to load the truck. It may also indicate that the payload meter did not receive the brake lock input while the truck was being loaded. There

may be a problem with the wiring or the brake lock was not used. The payload meter will not measure swingloads unless the brake lock is used during the loading process.

#### Loading to Dumping Transition

This message indicates the payload meter senses a body up input during the loading process. This message is usually accompanied by a "no\_final\_load" flag.

#### No Final Load

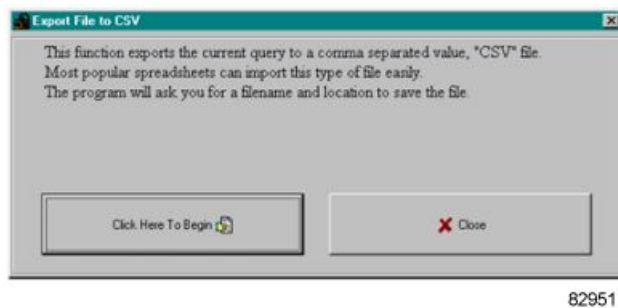
This message indicates the payload meter is unable to determine the final payload in the truck. Typically, this means that the payload meter switched from a loaded state to the dumping state before the load could be accurately measured.

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 "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

### 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.



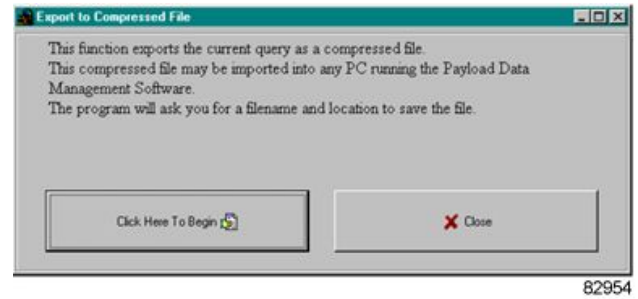
To export data in CSV format:

1. Confirm that the data displayed is the query data that needs to be exported.
2. From the payload summary screen, press the "Export" button and select "To CSV".
3. The program will ask for a filename and location.

### ZIP Export

This export function allows the data from one laptop to be transferred to another computer. This can be useful when a service laptop is used to download multiple machines and transfer the data to a central computer for analysis. This can also be used to copy haul data from a particular truck onto a diskette for analysis.

The file format is a compressed binary form of the displayed query. The file can only be imported by another computer running the PDM software.



To export data in ZIP format:

1. Confirm that the data displayed is the query data that needs to be exported.
2. From the payload summary screen, press the "Export" button and select "To ZIP".
3. The program will ask for a filename and location.

## Importing Data

This import function allows the data from one laptop to be transferred to another computer. This can be useful when a service laptop is used to download multiple machines and transfer the data to a central computer for analysis. This can also be used to copy haul data from a particular truck from a diskette into a database for analysis.

To import data, press the "Import" button at the bottom of the payload summary screen. The program will ask for a zip file to import, locate the file and press open. The program will only import zip files created by another computer running the PDM Software.

## Deleting Haul Cycle Records

To delete haul cycle records from the main database, press the "Delete" button at the bottom of the payload summary screen. The program will display a summary of the records from the displayed query. To delete a record, select one at a time and press the "Delete" button. It is recommended that records be exported to a zip file for archival purposes before deletion. Multiple records may be selected by holding down the Shift key. Pressing the "Delete All" button will select all the records from the current query and delete them.

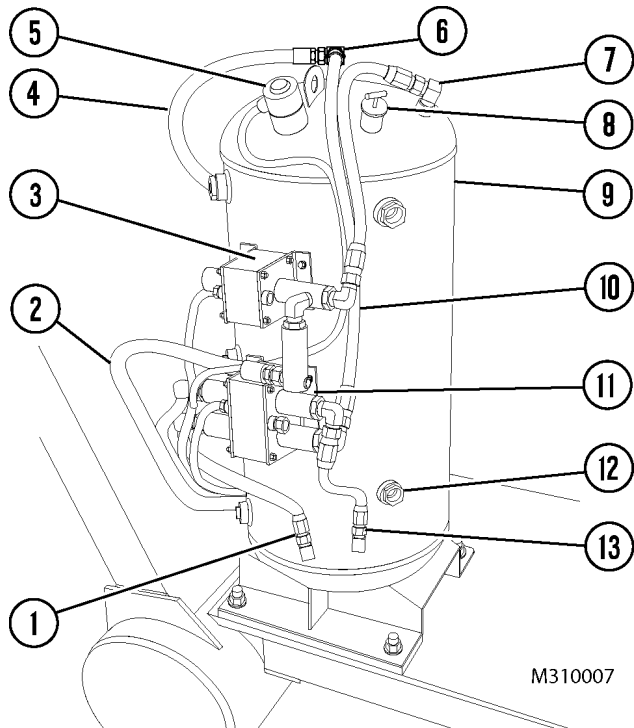
**NOTE:** *There is no recovery for records that have been deleted from the main database. It is highly recommended that all records be exported and archived in a compressed file format for future reference before being deleted.*

## RESERVE ENGINE OIL SYSTEM

F.2-0000051462

The reserve oil tank for the engine is designed to add more oil capacity to the engine and to make less frequent servicing of the engine oil. The circulation of oil between the engine sump and reserve tank increases the total volume of working oil. This dilutes the effects of contamination and loss of additives and maintains the oil quality over longer periods.

### Operation



- |                     |                      |
|---------------------|----------------------|
| 1. Oil Suction      | 8. Fill Cap          |
| 2. Oil Tank Fill    | 9. Reserve Oil Tank  |
| 3. Fill Valve       | 10. Engine Fill Line |
| 4. Engine Fill Line | 11. Pump Unit        |
| 5. Oil Level Sensor | 12. Sight Gauge      |
| 6. Air Valve        | 13. Tank Return Line |
| 7. Tank Fill Line   |                      |

### Figure 5-21 RESERVE ENGINE OIL SYSTEM

Engine oil is circulated between the engine sump and the reserve tank by two electrically driven pumps within a single pumping unit (11, [5-21 RESERVE ENGINE OIL SYSTEM, page 5-51](#)). The pump unit is mounted on the side of the reserve tank, and is equipped with an LED monitor light on one side.

Pump 1 (in the pump unit) draws oil from the engine sump at a preset control point determined by the height of the suction tube. Oil above this point is withdrawn and transferred to reserve tank (9). This lowers the level in the engine sump until air is drawn.

Air reaching the pumping unit activates pump 2 (in the pump unit) which returns oil from the reserve tank and raises the engine sump level until air is no longer drawn by pump 1. Pump 2 then turns off. The running level is continuously adjusted at the control point by alternation between withdrawal and return of oil at the sump.

### LED Monitor Light

The following light indications should be used to understand pump operation.

- Steady - Pump 1 is withdrawing oil from the engine sump and bringing down the oil level.
- Regular Pulsing - Pump 2 is returning oil to the engine sump and raising the oil level.
- Irregular Pulsing - Oil is on the correct operating level.

### Changing Oil

Obey the following guidelines when changing the oil.

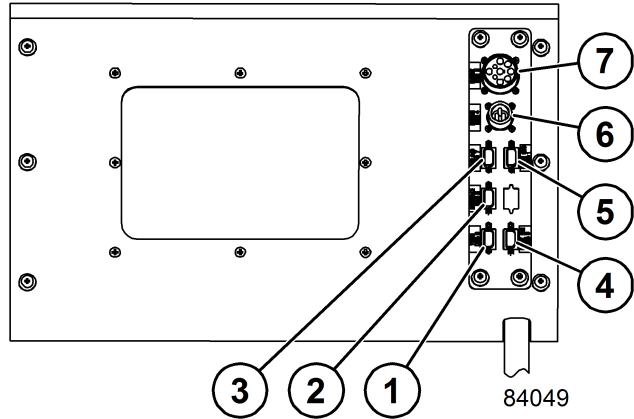
1. Drain both the engine sump and the reserve tank. Refill both the engine and reserve tank with new oil to proper levels.
2. Change engine and reserve tank filters as required.
3. Start the engine and check for proper operation.

**NOTE:** DO NOT use the oil in the reserve tank to fill the engine sump. Both must be at proper level before starting the engine.

4. The engine oil level must be checked with the engine dipstick at every shift change. If the oil level in the engine is incorrect, check for proper operation of the reserve engine oil system.
5. The oil level in the reserve tank must also be checked at every shift change. Use dipstick on fill cap (8) to check oil level. If necessary, add oil to the reserve tank by using the quick fill system utilizing tank fill valve (3). For filling instructions, refer to [Lubrication and Service-RESERVE ENGINE OIL SERVICE, page 7-4](#) in this manual.

Oil must always be visible in lower sight gauge (12). If the tank is equipped with three sight gauges, oil must always be visible in the middle sight gauge.

**DIAGNOSTIC PORTS** B.4-0000051438



- |                                      |                                     |
|--------------------------------------|-------------------------------------|
| 1. KOMTRAX Plus Diagnostic Port      | 5. DSC Diagnostic Port              |
| 2. Interface Module Diagnostic Port  | 6. Engine Diagnostic Port (CENSE)   |
| 3. Payload Meter Diagnostic Port     | 7. Engine Diagnostic Port (QUANTUM) |
| 4. Drive System / MM Diagnostic Port |                                     |

**Figure 6-4 DIAGNOSTIC PORTS**

The diagnostic ports shown in Figure 6-4 [DIAGNOSTIC PORTS, page 6-9](#) are located on the back wall of the cab next to the D.I.D. Panel.

**KOMTRAX Plus**

KOMTRAX Plus diagnostic port (1) is used to download truck operation data from the KOMTRAX Plus controller.

**INTERFACE MODULE (IM)**

Interface module (IM) diagnostic port (2) is used to connect the interface module to a computer for installing software.

**PAYLOAD METER**

Payload Meter diagnostic port (3) is used to download data from the payload meter system. Refer to [PAYLOAD METER III SYSTEM, page 5-27](#) for a more complete description of the payload meter and its functions.

**DRIVE SYSTEM OR MODULAR MINING**

Drive system controller (DSC) or Modular Mining diagnostic port (4) is used to access diagnostic information for the Drive System Controller (DSC) or for Modular Mining controller.

**DRIVE SYSTEM CONTROLLER (DSC)**

Drive system controller (DSC) diagnostic port (5) is used to access diagnostic information for the Drive System Controller (DSC).

**ENGINE (CENSE)**

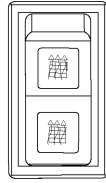
Engine diagnostic port (CENSE) (6) is a three pin connector used to access diagnostic information for the engine monitoring system.

**ENGINE (QUANTUM)**

Engine diagnostic port (QUANTUM) (7) is a nine pin connector used to access diagnostic information for the engine control system.

**Engine Warm Up**

Engine warm up switch (12) is a rocker switch. When in the ON position, this feature is used to keep the engine warm in cold conditions because it puts a small amount of load on the engine.



This energy is created by passing a load through one bank of the grid resistors in the retarding grid.

**Key Switch**



Key switch (16) is a four-position (ACC, OFF, RUN, START) switch. The ACC position is not currently used.

**Starting**

When the switch is rotated one position clockwise, it is in the RUN position and all electrical circuits except START are activated.

1. With the selector switch in PARK, rotate key switch fully clockwise to the START position, and hold this position until the engine starts. The START position is spring-loaded to return to RUN when the key is released. If the engine is equipped with a prelube system, a noticeable delay will occur before engine cranking begins.
2. After engine has started, place rest switch (4) in the OFF position, which will de-activate the rest mode of operation. Refer to the discussion of rest switch later in this chapter.

**NOTE:** The electric cranking motors have a 30 second time limit. If the 30 second limit is reached, cranking will be prohibited for two minutes. After two minutes, cranking will be allowed. If the 30 second limit is reached seven consecutive times, the key switch must be turned to the OFF position. This will allow the interface module to power down and reset, which requires seven minutes to complete.

**Warning Light**

Red warning light (17) will come on to indicate that a truck function requires immediate action by the operator. Safely stop the truck and notify maintenance personnel. A warning message will appear on the digital display.



**Digital Display Contrast Buttons**

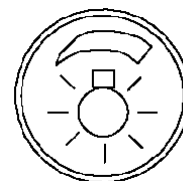
Cold ambient operating temperatures may affect the contrast of the digital display. If necessary, use buttons (18) to increase or decrease the contrast of the digital display to make it easier to read.

**Turn Signal Indicators**

Indicators (19) illuminate to indicate that the right or left turn signals are operating when the turn signal lever on the steering column is moved upward or downward. Moving the lever to its center position will turn the indicator off.

**Panel Light Dimmer**

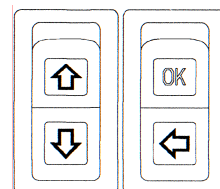
Panel illumination light dimmer switch (20) is a rheostat which allows the operator to vary the brightness of the instruments and panel lights.

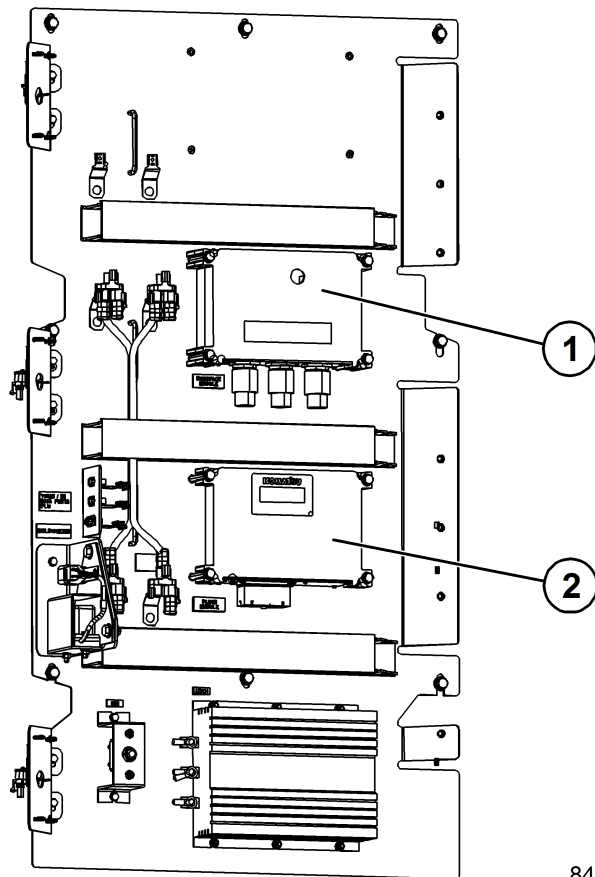


- Rotating the knob to the full clockwise position turns the panel lights on to the brightest condition.
- Rotating the knob counterclockwise continually dims the lights until OFF position is reached at full counterclockwise rotation.

**Mode Switches**

Mode switches (21) and (22) are two-way momentary rocker switches. The





1. Interface Module      2. PLMIII Controller

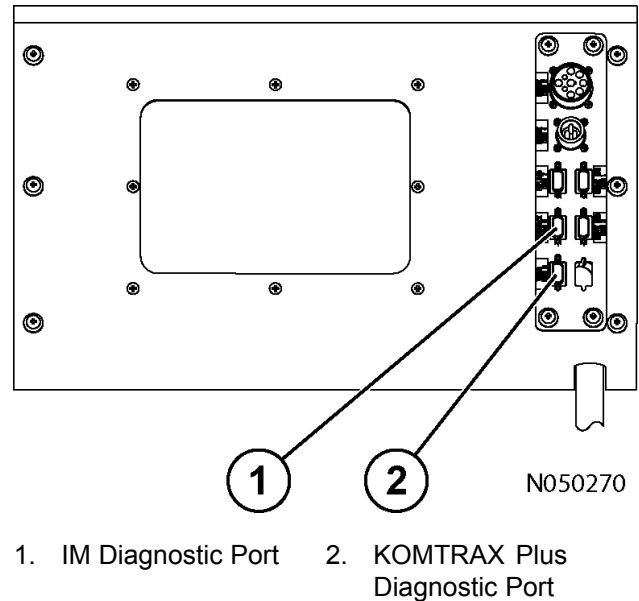
**Figure 6-14 KOMTRAX Plus COMPONENT LOCATION**

**DOWNLOADING KOMTRAX Plus DATA** D.10-0000051588

**GENERAL INFORMATION**

Downloading data requires a laptop PC running Windows 95/98/2000/ME/XP/Vista/7 operating systems, the *VHMS Technical Analysis Toolbox* software, and a serial cable to connect the PC to the KOMTRAX Plus controller. Refer to the *VHMS Technical Analysis Tool Box* instruction manual for additional information about using this software. When a download to a laptop PC is performed, certain files are generated to store data. KOMTRAX Plus diagnostic port (2, [Figure 6-15 DIAGNOSTIC PORTS \(D.I.D. PANEL AT REAR OF CAB\)](#), page 6-29), located on the D.I.D. panel at the rear of the operator cab, is used to download data from the controller.

**KOMTRAX Plus DOWNLOADING PROCEDURE**



1. IM Diagnostic Port      2. KOMTRAX Plus Diagnostic Port

**Figure 6-15 DIAGNOSTIC PORTS (D.I.D. PANEL AT REAR OF CAB)**

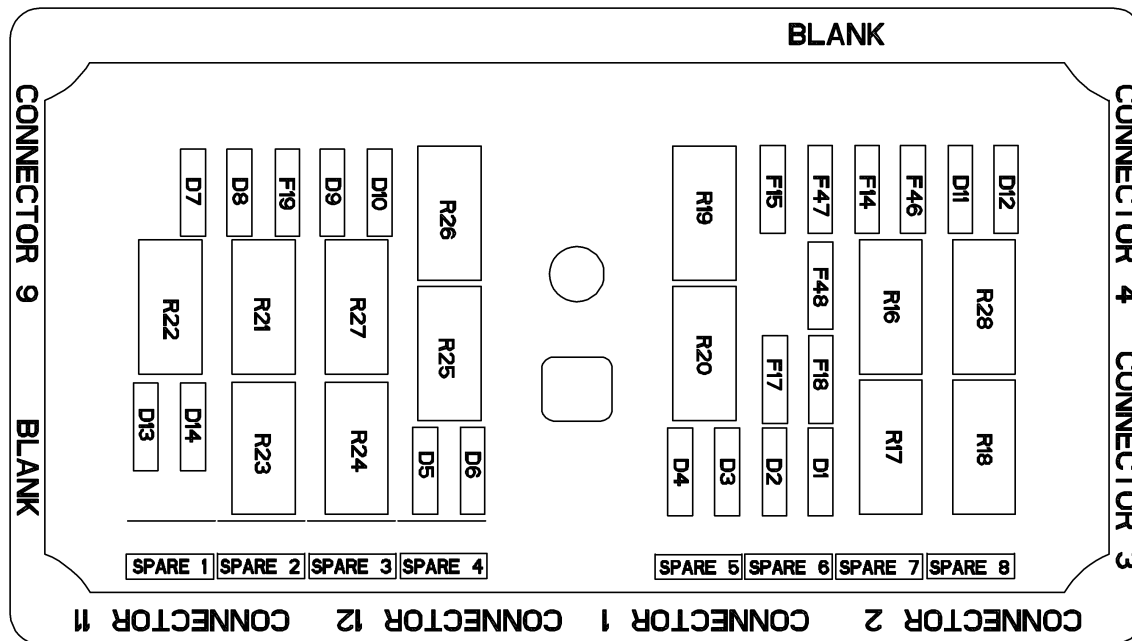
**NOTE:** Always verify the full download has completed before disconnecting the PC from the machine.

1. Turn the key switch to the OFF position to stop the engine.
2. Turn the key switch to the ON position, but DO NOT start the engine.
3. Allow the KOMTRAX Plus controller to start up. This will take about one minute. Verify the red LED display starts counting up.
4. Attach the KOMTRAX Plus serial cable to KOMTRAX Plus diagnostic port (2), and the other end to the PC's serial port.
5. Double-click on the *VHMS Technical Analysis Tool Box* icon on the PC's desktop.
6. Enter the appropriate User Name and Password and click the [OK] button.
7. Double-click on the [Download] icon.
8. Select the COM port in the Port No. drop-down box and click the [Connection] button.
9. Verify that the date and time is correct for current local date and time. Also verify that the displayed service meter hours are equal to the value entered previously.
10. If this is the first time this PC has connected to the machine, you will need to download its definition file by clicking the [OK] button.

**VEHICLE ELECTRICAL CENTER**

90 A.2-000070602

Vehicle Electrical Center 90 is located inside the auxiliary control cabinet.



84053

Figure 6-20 VEHICLE ELECTRICAL CENTER 90

VEHICLE ELECTRICAL CENTER 90		
LOCATION	AMPS	DEVICE(S) PROTECTED
F14	5	Payload Lamps
F15	5	Park Brake Status
F17	5	Payload Meter
F18	15	Ground Level Shutdown Switch
F19	10	Park Brake Control
F46	5	Payload Meter Key Switch Power
F47	5	KOMTRAX Plus Key Switch Power
F48	5	Modular Mining Conn Key Switch Power
SP1	1	Spare
SP2	1	Spare
SP3	1	Spare
SP4	5	Spare
SP5	10	Spare
SP6	15	Spare

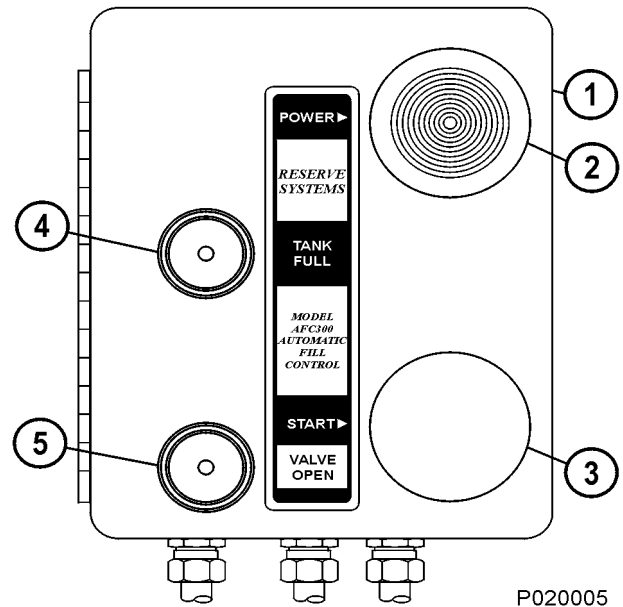
Oil should always be visible in the bottom sight gauge. If not, add oil to the reserve oil tank until oil is visible in the top sight gauge.

- Never add oil to the engine unless it has been completely drained.
- If the engine oil has been drained from the oil pan, new oil must be added to the oil pan. **Do not use the oil in the reserve oil tank to fill an empty engine oil pan.**

After an oil change, both the engine and reserve oil tank must be full of oil before starting the engine.

### Reserve Oil Tank Filling Procedure (Remote Fill)

1. Connect the pressure supply hose from the new oil supply to the quick coupler on the truck. Open the valve on the supply hose to apply pressure.
2. Pull out on switch (2, [7-5 CONTROL PANEL](#), [page 7-5](#)) to turn the system on.
3. Push start switch (3). The VALVE OPEN light (5) should illuminate and the filling process will begin.
4. When tank is full, the VALVE OPEN light will turn off and FULL light (4) will illuminate.
5. Close the oil supply valve in the fill hose.
6. Press and hold start switch (3) for a couple of seconds.
7. Disconnect the new oil supply hose.
8. Push switch (2) in to turn system power OFF.



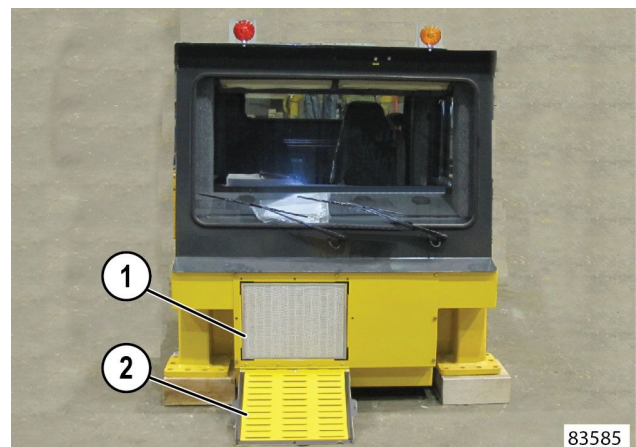
- |                       |                       |
|-----------------------|-----------------------|
| 1. Remote Control Box | 4. "FULL" Light       |
| 2. System Switch      | 5. "VALVE OPEN" Light |
| 3. Start Switch       |                       |

**Figure 7-5 CONTROL PANEL**

### Inline Screen

There is an inline screen located at the inlet of the fill valve. This screen does not require periodic maintenance, but it can be cleaned by removing the screen and back flushing.

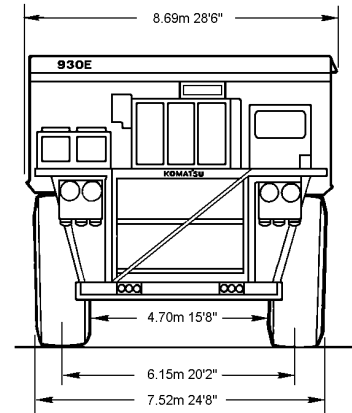
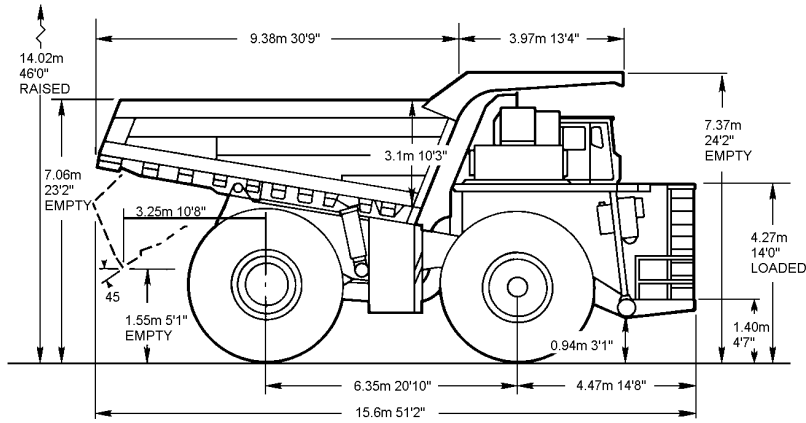
### CAB AIR FILTER SERVICE C.3-0000051602



- |                       |                 |
|-----------------------|-----------------|
| 1. Cab Filter Element | 2. Filter Cover |
|-----------------------|-----------------|

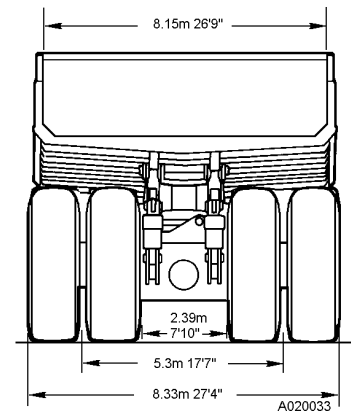
**Figure 7-6 CAB AIR FILTER LOCATION**

<b>EVERY 250 HOUR LUBRICATION AND MAINTENANCE</b>	
<b>Item</b>	<b>Task</b>
CAB AIR FILTER	Under normal operating conditions, clean every 250 hours. In extremely dusty conditions, service as frequently as required. Refer to <a href="#">CAB AIR FILTER SERVICE, page 7-5</a> for detailed instructions.
FRONT WHEEL HUB	Remove the magnetic plugs from the front wheel hub covers and check for debris. Clean the plugs and perform any necessary repairs.
WHEEL MOTOR OIL SAMPLING	Take an oil sample of the wheel motor oil. Refer to the shop manual for oil sampling instructions.
BATTERIES	Check the electrolyte level and add water if necessary.
BODY-UP & HOIST LIMIT SWITCHES	<ul style="list-style-type: none"> <li>• Check operation of the switches.</li> <li>• Clean the sensing areas of any dirt accumulation and inspect the wiring for any signs of damage.</li> </ul>
AC DRIVE BELT	Check the belt for wear or damage.
AUTOMATIC LUBE SYSTEM	<ul style="list-style-type: none"> <li>• Check all grease hoses from the injectors to the lubrication points.</li> <li>• Check all grease supply line hoses from the pump to the injectors.</li> <li>• Check the grease reservoir level.</li> <li>• Inspect all bearing points for a bead of lubricant around the bearing seal.</li> <li>• Perform system checkout. Refer to the Shop Manual for detailed instructions.</li> </ul>
RETRACTABLE LADDER SYSTEM (If Equipped)	<p>Check the ladder system for:</p> <ul style="list-style-type: none"> <li>• Loose or missing hardware.</li> <li>• Bent or misaligned structures.</li> <li>• Foreign materials such as dirt, mud, etc., that could affect proper operation of ladder.</li> <li>• Damaged wiring and harnesses.</li> <li>• Power pack box free of moisture and is properly sealed.</li> <li>• System voltage of 21VDC (off) to 30VDC max (operating).</li> <li>• Adverse noise conditions.</li> <li>• Proper movement in a vertical plane (viewed from front of ladder); the ladder must move up and down central to the actuator box.</li> <li>• Range of functions, including remote switches and park-brake interlock.</li> </ul>
DUMP BODY PADS	Check the pads, shims and mounting hardware for wear and proper tightening.



All Dimensions with 171/211 m<sup>3</sup> 224/276 yd<sup>3</sup> Body

BODIES	Struck		2:1 Heap		Loading Height	
	M <sup>3</sup>	Yd <sup>3</sup>	M <sup>3</sup>	Yd <sup>3</sup>	M	Feet
Standard	171	224	211	276	7.06	23'2"



A020033

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