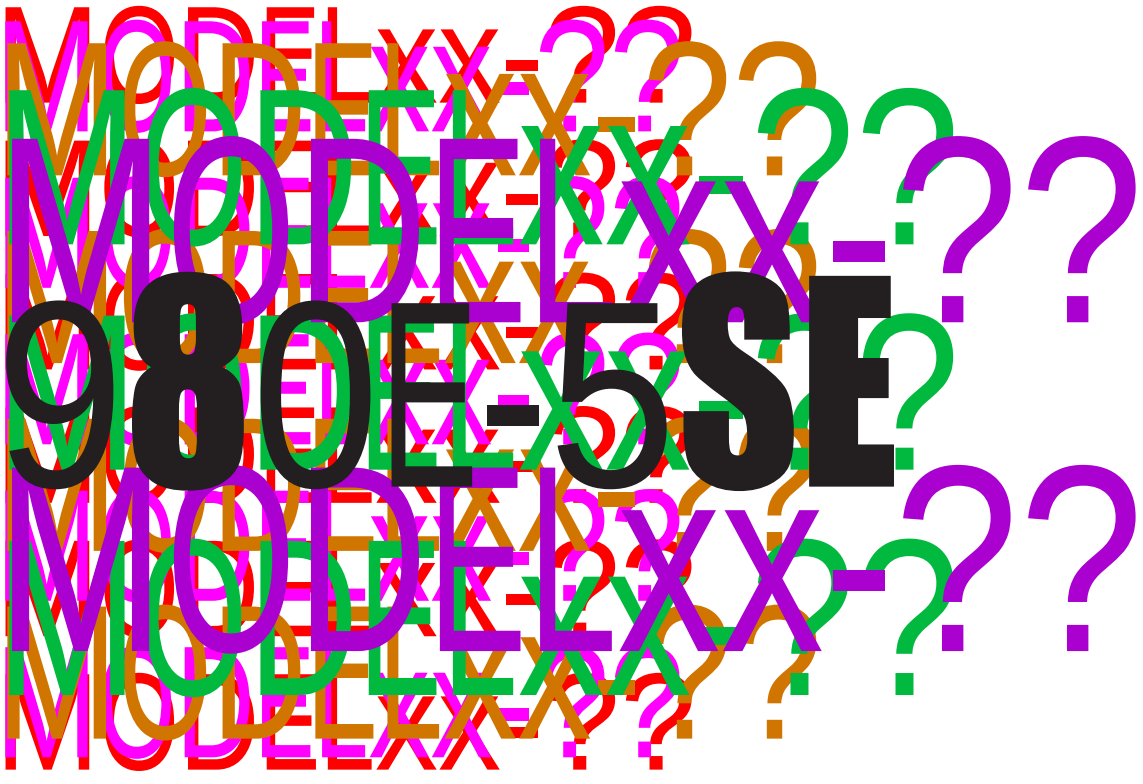
ORIGINAL INSTRUCTIONS
SEBM037602

Shop Manual Supplement



DUMP TRUCK

SERIAL NUMBERS	980E-5SE A60001 and up

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KOMATSU

⚠WARNING

NON-OEM PARTS IN CRITICAL SYSTEMS

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

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

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

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

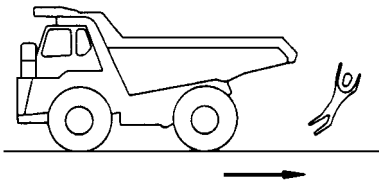
Traveling

- When traveling on rough ground, travel at low speeds. When changing direction, avoid turning suddenly.
- Lower the dump body and set the dump lever to the FLOAT position before traveling.
- If the engine stops while the truck is in motion, secondary steering and braking enable the truck to be steered and stopped. A fixed amount of reserve oil provides temporary steering and braking to briefly allow the truck to travel to a safe area. Apply the brakes immediately and stop the truck as quickly and safely as possible off of the haul road, if possible.

Traveling in reverse

Before operating the truck:

- Sound the horn to warn people in the area. Make sure that the back-up horn also works properly.
- Check for personnel near the truck. Be particularly careful to check behind the truck.
- When necessary, designate a person to watch the area near the truck and signal the operator. 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 work site traffic.
- Do not allow any one to enter the line of travel of the truck. This rule must be strictly observed even with machines equipped with a back-up horn or rear view mirror.



Traveling on slopes

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

Operating on snow or ice

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

Avoid damage to dump body

Always be extremely cautious when working in tunnels, on bridges, under electric cables, or when entering a parking place or any other place where there are height limits. The dump body must be completely lowered before driving the truck.

Tires

Inspection

The truck tires must be inspected and tire pressure must be checked with an accurate pressure gauge before each work shift and during tire rotations. Tire pressure will vary according to manufacturer and local working conditions. Consult the tire manufacturer for recommended tire pressure.

Ensure that the valve caps are securely applied to the valve stems. The caps protect the valves from dirt build up and damage. DO NOT bleed air from tires that are hot due to truck operation. Under such circumstances, it is normal for pressure to increase in the tire due to expansion.

A bent or damaged rim which does not support the bead properly may cause abnormal strain on the tire, resulting in tire damage. If a tire becomes deeply cut, it must be removed and repaired. Neglected cuts cause many tire problems. Water, sand, dirt and other foreign materials can get into the tire through a cut, eventually causing tread or ply separation.

Rim components that are deformed, bent, cracked, worn, corroded, or damaged must be clearly labeled to indicate their condition before they are discarded.

Maintenance

Rim and tire maintenance can be hazardous unless the correct procedures are followed by trained personnel. Tires that are improperly maintained or under/over-inflated can overheat and burst due to excessive pressure. Improper inflation can also result in cuts in the tire caused by sharp stones. Both of these conditions can lead to tire damage, serious personal injury, or even death. To safely maintain a tire:

- Before a tire is removed from a truck, the valve core must be partially removed to allow deflation. Then the tire/rim assembly can be removed.
- After the tire/rim assembly is installed on the truck, inflate the tires to their specified pressure. Abnormal heat is generated, particularly when the inflation pressure is too low.

NOTE: Any tire inflation pressures and permissible speeds given in this manual are general values. The actual values may differ, depending on the type of tire and the specific operating conditions. For details, consult the tire manufacturer.

Ensure that appropriate personal protective equipment is worn when servicing tires and rims.

⚠DANGER

When inflating and deflating tires, always use a safety cage. Never inflate a tire until the lock ring is securely in place. DO NOT stand in front of or over the lock ring during inflation procedures. Never over inflate a tire. Refer to tire manufacturer's recommendations.

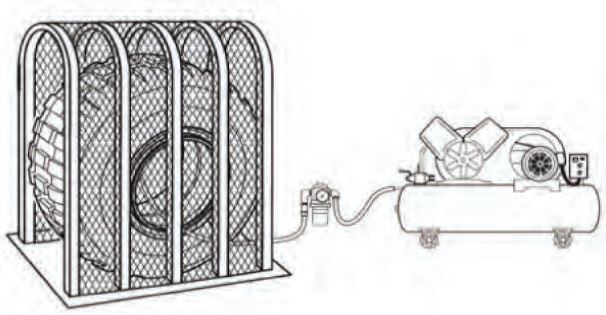
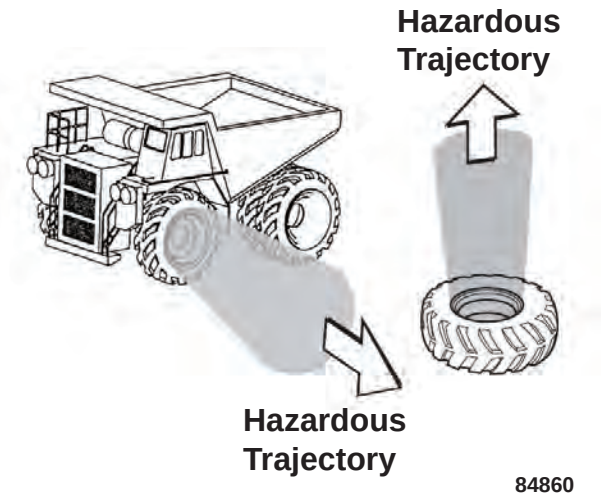


FIGURE 00-5. SAFETY CAGE 84825

⚠DANGER

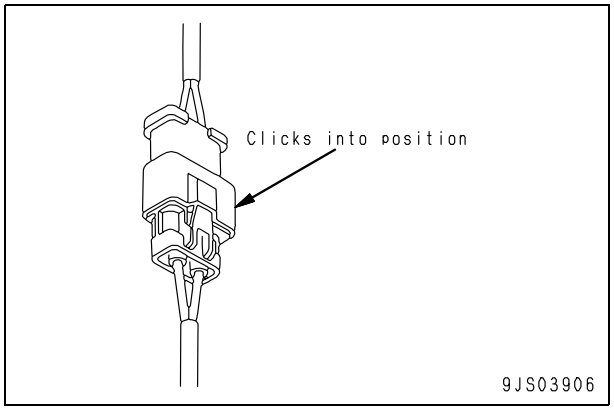
Always keep personnel away from a wheel and tire assembly when it is being removed, installed, deflated or inflated. Personnel must always be outside the range of the "hazardous trajectory". Exercise extreme caution as the trajectory may widen.

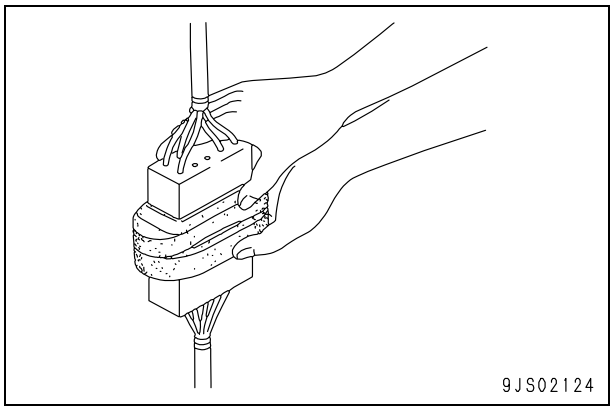


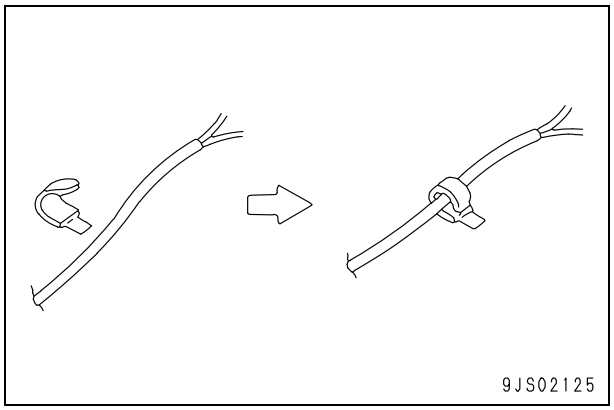
84860

FIGURE 00-6. HAZARDOUS TRAJECTORY

- Connecting connectors
  a. Check that there is no oil, dirt, or water stuck to the connector pins (mating portion). Check that there is no deformation, defective contact, corrosion, or damage to the connector pins. Check that there is no damage or breakage to the outside of the connector.
     - If there is any oil, water, or dirt stuck to the connector, wipe it off with a dry cloth. If any water has got inside the connector, warm the inside of the wiring with a dryer, but be careful not to make it too hot as this will cause short circuits.
     - If there is any damage or breakage, replace the connector.
  b. Fix the connector securely. Align the position of the connector correctly, and then insert it securely. For connectors with the lock stopper, push in the connector until the stopper clicks into position.
     - Correct any protrusion of the boot and any misalignment of the wiring harness.
     - For connectors fitted with boots, correct any protrusion of the boot. In addition, if the wiring harness is misaligned, or the clamp is out of position, adjust it to its correct position.
     - If the connector cannot be corrected easily, remove the clamp and adjust the position.
     - If the connector clamp has been removed, be sure to return it to its original position. Check also that there are no loose clamps.







Standard tightening torques for clamps

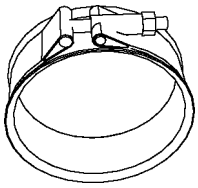


Table 11: Torque for T-bolt type hose clamp (SAE J1508 type TB)

Band Width	Thread Size	Torque N·m	Torque in. lb
19.05 mm (0.75 in.)	0.25–28 UNF	8.5 ± 0.6	75 ± 5

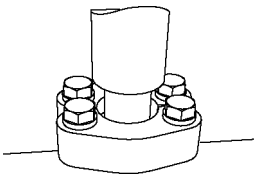


Table 12: Torques for split flange clamp bolts

Capscrew Thread Diameter (mm)	Width Across Flat (mm)	Torque N·m (± 10%)	Torque ft lb (± 10%)	Torque kg·m (± 10%)
10	14	66	48	6.7
12	17	112	83	11.5
16	22	279	206	28.5

Specification				Value
Steering System	Type			Fully hydraulic
Suspension	Suspension method		Front axle	Sliding pillar
			Rear axle	Hydro-pneumatic
Tires	Size			59/80 R63
	Min. tire pressure			600 kPa (87 psi)
	Tread (standard tire)		Front wheel	116 mm (4.6 in.)
			Rear wheel	116 mm (4.6 in.)
Brake System	Service brakes (front and rear)			Multiple wet disc
	Parking brake			Multiple dry disc
Hydraulic systems	Hydraulic pumps	Steering/brake pump	Type	Pressure compensated piston pump
			Delivery at 1900 rpm	246 liters/min (65 gpm)
		Hoist/brake cooling pump	Type	Tandem gear pump
			Delivery at 1900 rpm	931 liters/min (246 gpm)
	Cylinders	Hoist cylinder	Type	3-stage piston
			Bore x stroke	1st stage - 384.2 mm x 945.9 mm (15.13 in x 37.24 in)
				2nd stage - 320.7 mm x 945.9 mm (12.63 in x 37.24 in)
				3rd stage - 257.1 mm x 945.9 mm (10.12 in x 37.24 in)
		Steering cylinder	Type	Piston, double acting with accumulator assist
			Bore x stroke	190.5 mm x 665.7 mm (7.50 in x 26.21 in)

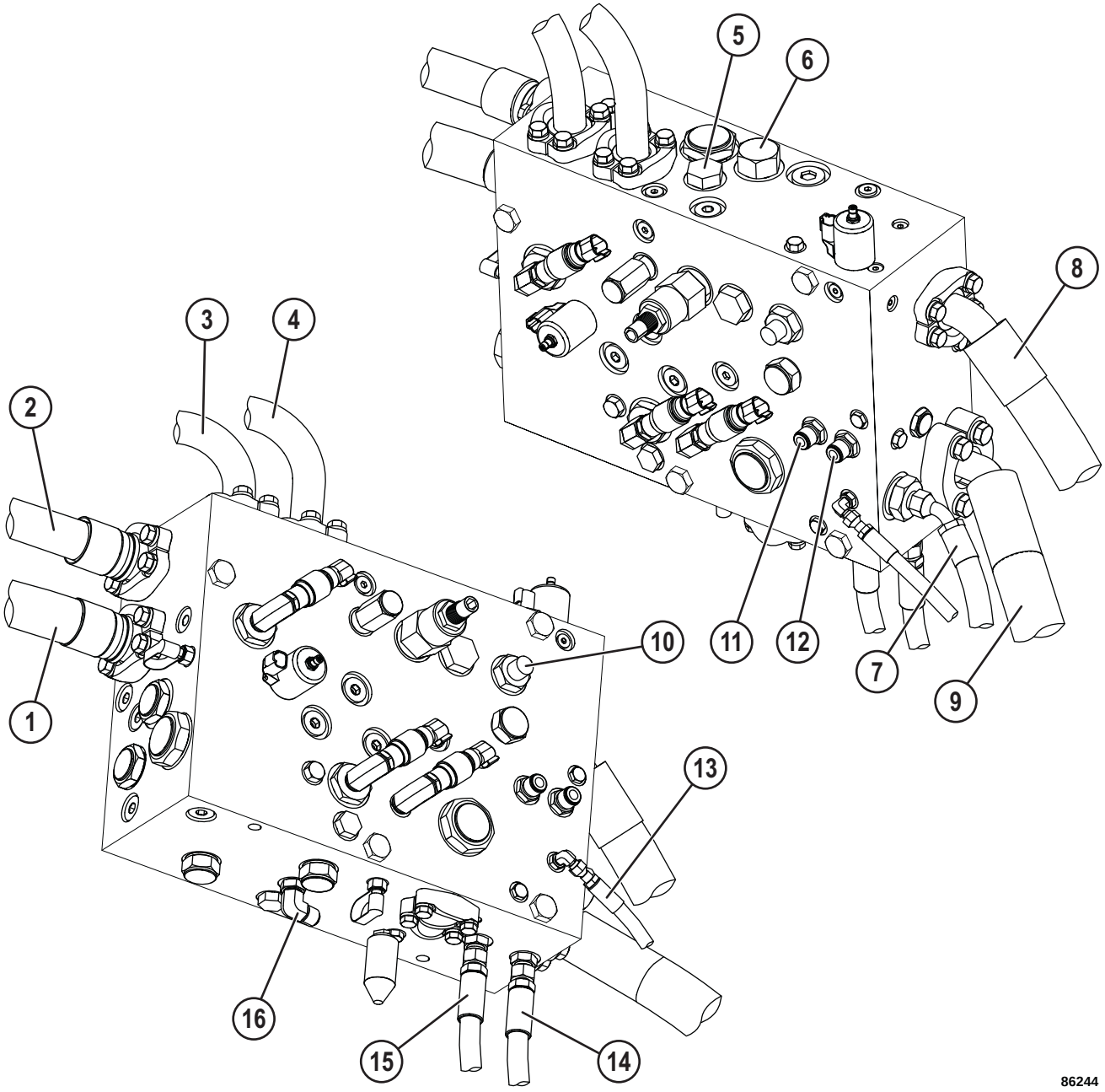


FIGURE 10-2. BLEEDDOWN MANIFOLD PIPING

1. Supply To Flow Amplifier
2. Return From Flow Amplifier
3. To Front Steering Accumulator
4. To Rear Steering Accumulator
5. Supply Port (Quick Disconnect)
6. Return Port (Quick Disconnect)
7. To Auxiliary Hydraulic System
8. Return to Tank
9. Supply From Pump
10. Return From Hoist Pilot Valve
11. Hoist Pilot Valve, Power Down
12. Hoist Pilot Valve, Power Up
13. Feedback Pressure to Unloader Valve
14. To Hoist Valve, Power Up
15. To Hoist Valve, Power Down
16. To Brake System

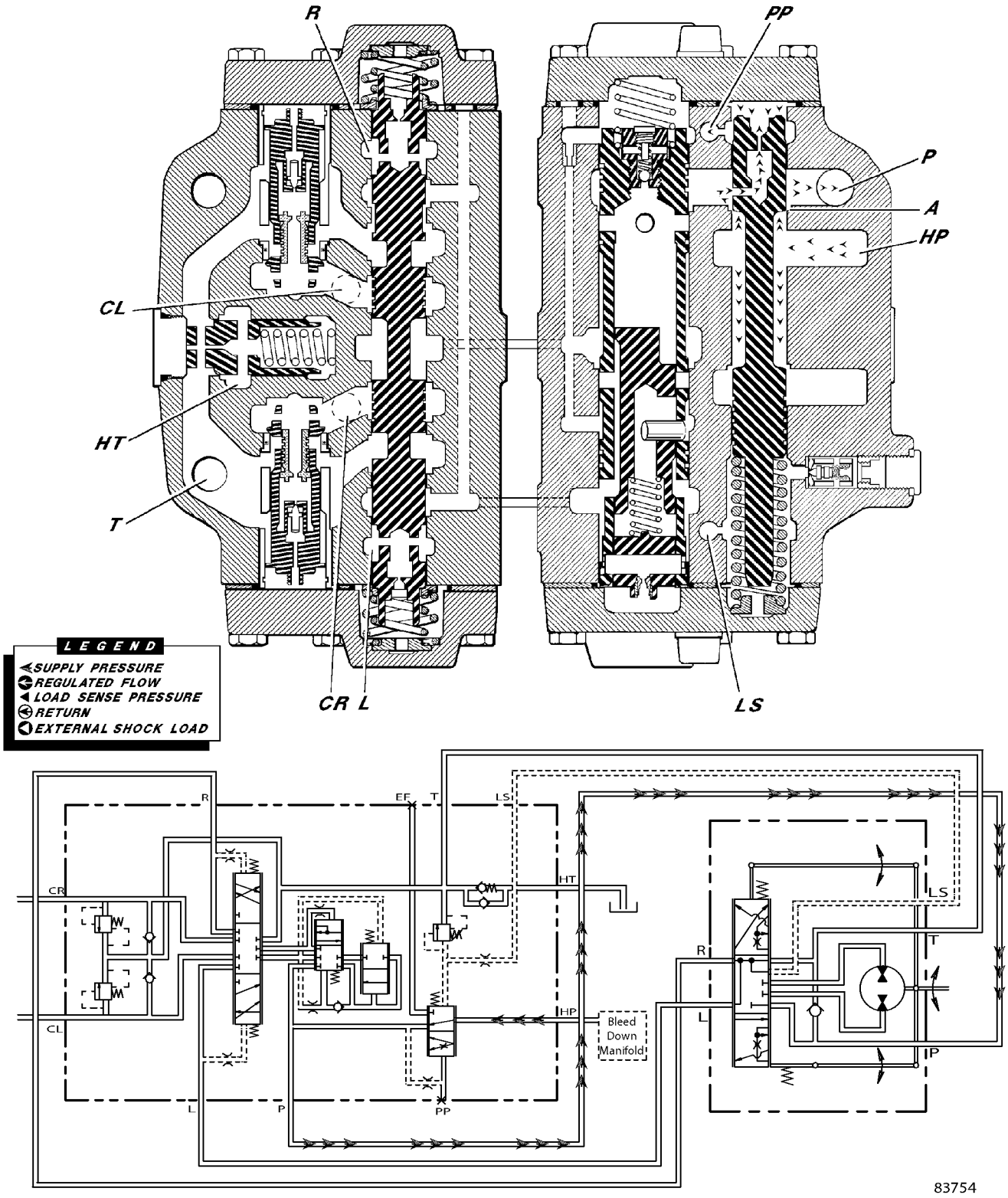


FIGURE 10-11. FLOW AMPLIFIER - NO STEER

Hoist circuit operation

Hydraulic oil is supplied by a hydraulic tank (1, Figure 10-1) located on the left frame rail. Hydraulic oil is routed to hoist pump (2). A second pump, coupled to the rear of the hoist pump, supplies oil for the steering and brake systems. The pumps are driven by an accessory drive at the end of the traction alternator.

Hoist pump output is directed to a pair of high pressure filters (3) mounted on the back of the fuel tank. Hydraulic oil from the hoist filters is directed to hoist valve (7), which is mounted above the pumps.

The hoist valve directs oil to hoist cylinders (10) for raising and lowering of the dump body. Hoist valve functions are controlled by the operator through the hoist control lever that is connected to hoist pilot valve (4) located in the hydraulic brake cabinet. Hoist limit solenoid (5), located in the bleeddown manifold, shifts the hoist valve out of POWER UP before the hoist cylinders extend to their maximum physical limit.

When the hoist valve is in the HOLD or FLOAT position, hoist circuit oil flows to the front and rear service brakes, cooling the wet disc brakes during truck operation.

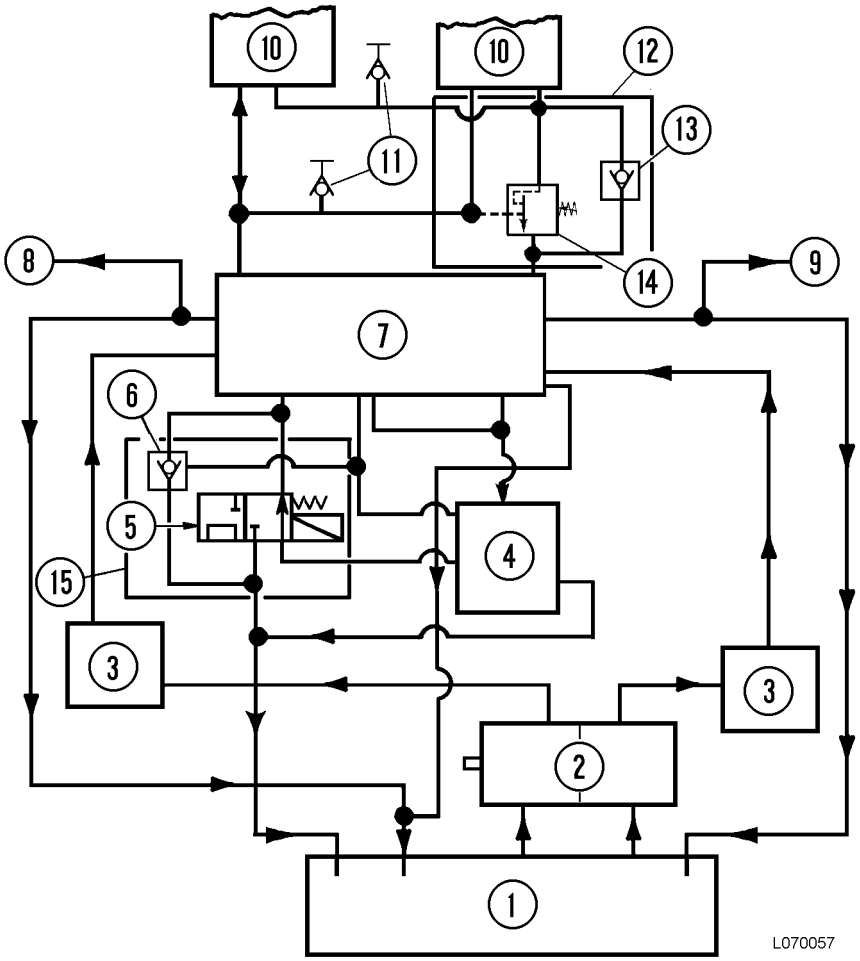


FIGURE 10-1. HOIST CIRCUIT SCHEMATIC

1. Hydraulic Tank
2. Hoist Pump
3. High Pressure Filter
4. Hoist Pilot Valve
5. Hoist Limit Solenoid
6. Pilot Operated Check Valve
7. Hoist Valve
8. Brake Cooling Oil Supply (Front)
9. Brake Cooling Oil Supply (Rear)
10. Hoist Cylinder
11. Quick Disconnect
12. Overcenter Manifold
13. Check Valve
14. Counterbalance Valve
15. Bleeddown Manifold

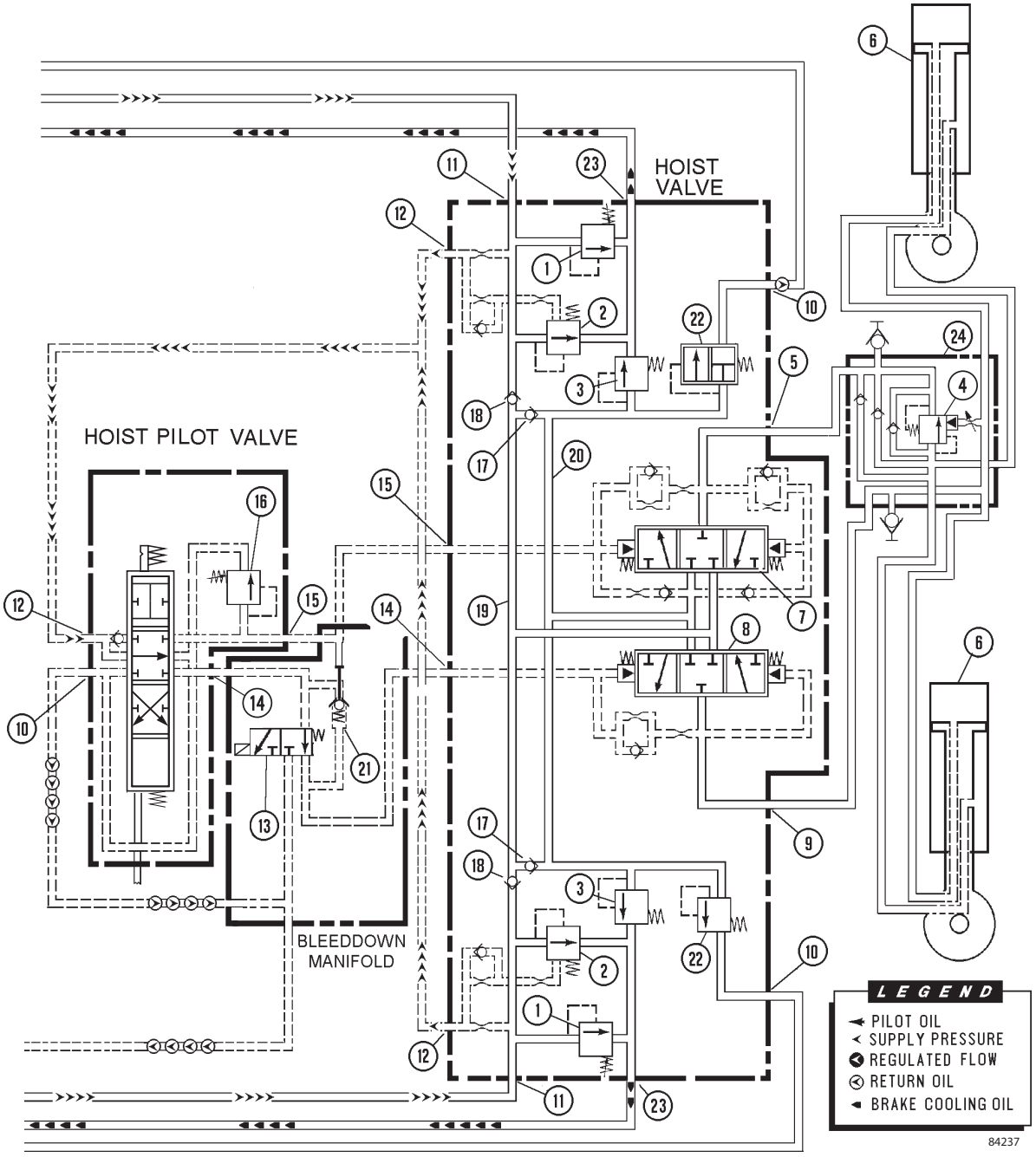


FIGURE 10-8. HOLD POSITION

1. Hoist Relief Valve (2,750 psi)
2. Flow Control Valve
3. Secondary Low Pressure Valve (250 psi)
4. Counterbalance Valve
5. Rod End Work Port
6. Hoist Cylinders
7. Rod End Spool
8. Head End Spool
9. Head End Work Port
10. Tank Return Port
11. Supply Port
12. Pilot Supply Port
13. Hoist Limit Solenoid
14. Raise Pilot Port
15. Down Pilot Port
16. Power Down Relief Valve (1,500 psi)
17. Anti-Void Check Valve
18. Load Check Valve
19. High Pressure Passage
20. Low Pressure Passage
21. Pilot Operated Check Valve
22. Primary Low Pressure Relief Valve (26 psi)
23. Brake Cooling Circuit Port
24. Overcenter Manifold

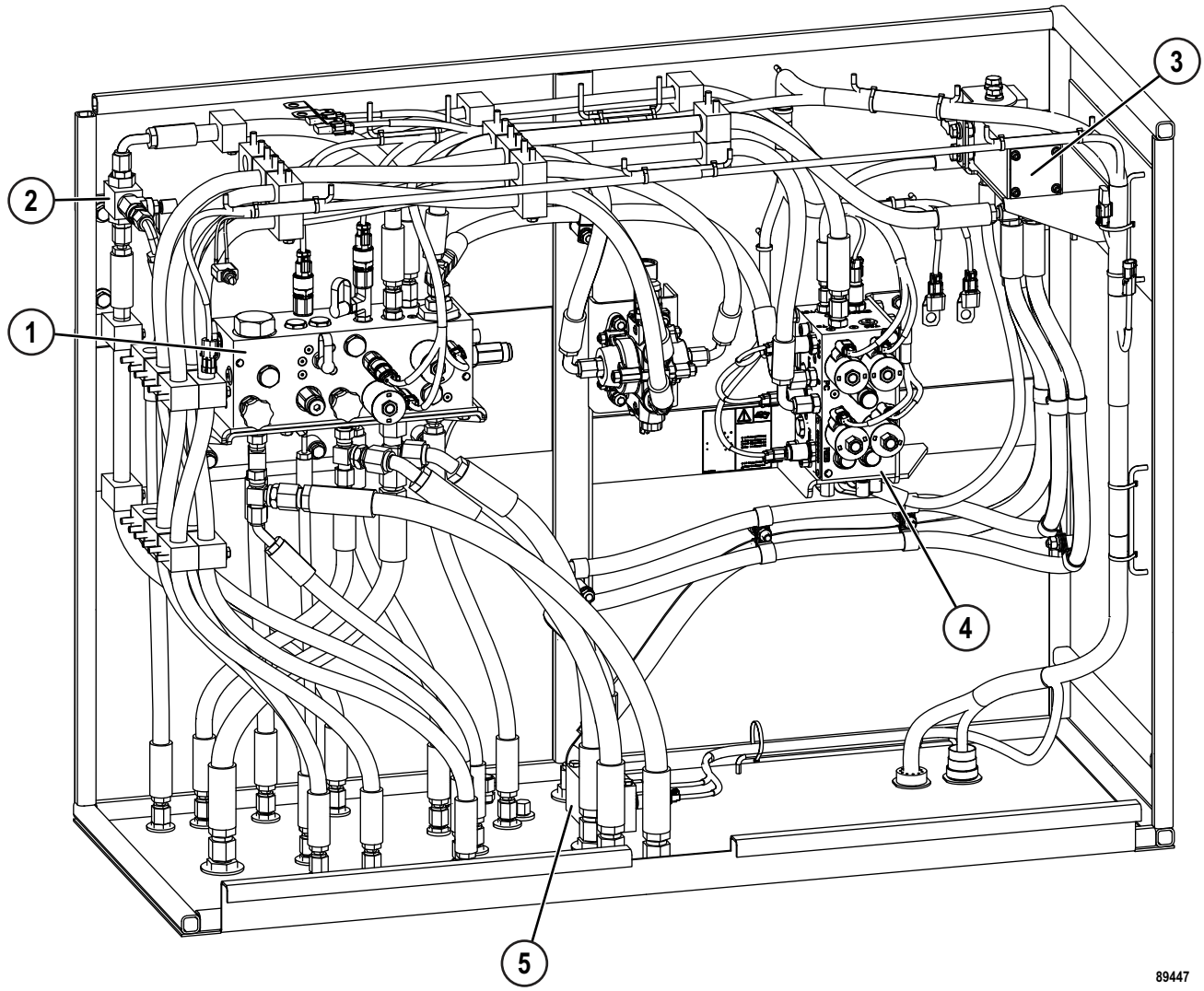


FIGURE 10-3. HYDRAULIC BRAKE CABINET - BRAKE CIRCUIT COMPONENTS

1. Brake Manifold
2. Brake Lock Shuttle Valve
3. Dual Relay Valve (Front Brakes)
4. Front ABS Manifold
5. Front Brake Junction Manifold

Battery supply system

Batteries

The truck uses a 24VDC electrical system to supply power for the engine starting circuits and most non-propulsion related electrical components. The 24VDC electrical circuit is supplied by six heavy duty, type 8D, 12-volt storage batteries (1, Figure 10-1) located in the battery box on the platform in front of the radiator. The batteries are of the lead-acid type, each containing six 2-volt cells.

While the engine is off, power is supplied by the batteries. During engine cranking, power is supplied by the batteries. When the engine is running, however, power is supplied by a high capacity alternator that is driven by the engine.

During operation, the batteries function as an electrochemical device that converts chemical energy into the electrical energy that is required for operating the accessories when the engine is off.

24VDC auxiliary battery receptacles

Two auxiliary battery receptacles (5) are provided to attach battery charger leads for charging the batteries. These receptacles can also be used for connecting external batteries to aid engine starting during cold weather.

When external batteries are used, they should be of the same type (8D) as the batteries that are installed on the truck. Two pairs of batteries should be used. Each pair should be connected in series to provide 24VDC, with one pair connected to each receptacle.

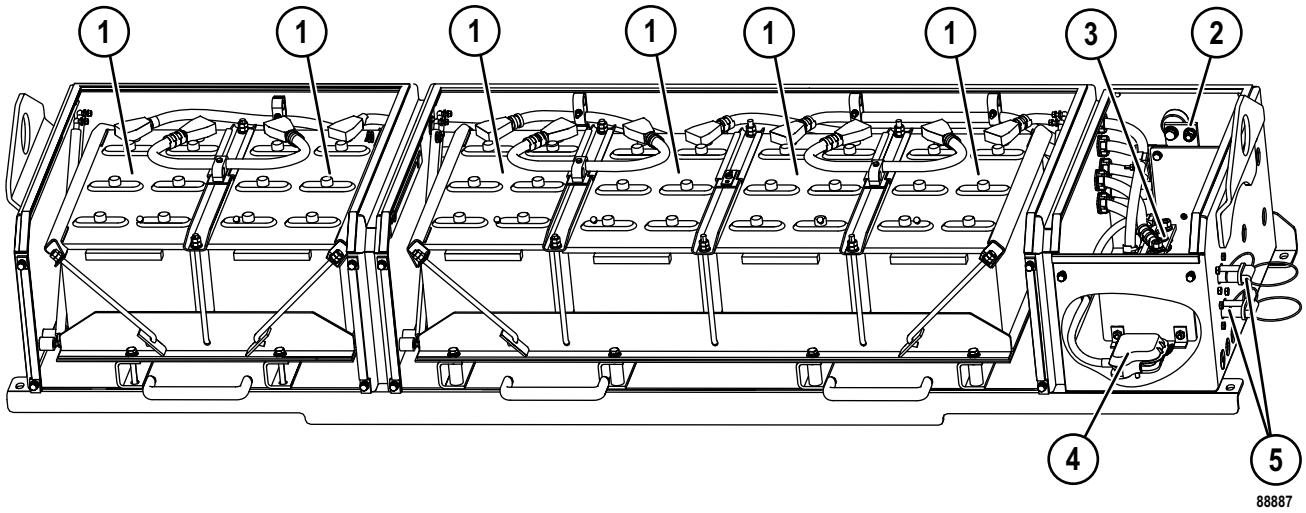


FIGURE 10-1. BATTERY BOX COMPONENTS

1. Batteries
2. 24VDC Bus Bar
3. Negative Bus Bar
4. Fuses (battery charging alternator and auxiliary control cabinet)
5. Auxiliary Battery Receptacles

General information

The automatic lubrication (auto lube) system is a pressurized lubricant delivery system which delivers a controlled amount of lubricant to designated lube points such as:

- steering cylinder pins
- tie rod pins
- body pivot pin
- hoist cylinder pins
- rear suspension pins
- sway bar pins

The system is controlled by logic in the interface module (IM), which signals a solenoid valve to operate a hydraulic motor powered grease pump. The solenoid valve is equipped with a manual override switch that, when actuated, activates the pump when power is not being supplied to the motor.

Hydraulic oil for pump operation is supplied through the auxiliary hydraulic system. Grease pump (5, Figure 10-1) is driven by the rotary motion of hydraulic motor (9), which is then converted to reciprocating motion through an eccentric crank mechanism. The pump is a positive displacement, double-acting type as grease output occurs on both the up and the down stroke.

Integrated pump control manifold (7) is incorporated with the motor to control input flow and pressure. Relief valve (3) in vent valve (4) protects the pump from high pressures. The relief valve is set at 27,580 kPa (4,000 psi).

A pressure gauge can be installed in the plugged port on top of the manifold to check the hydraulic oil pressure to the inlet of the hydraulic motor. Normal stall pressure is 1,900 +170 / -0 kPa (275 +25 / -0 psi).

When the grease supply is replenished through the service center, the grease passes through grease filter (10) to remove contaminants before it flows into reservoir (1). A bypass indicator on the filter alerts service personnel when the filter requires replacement.

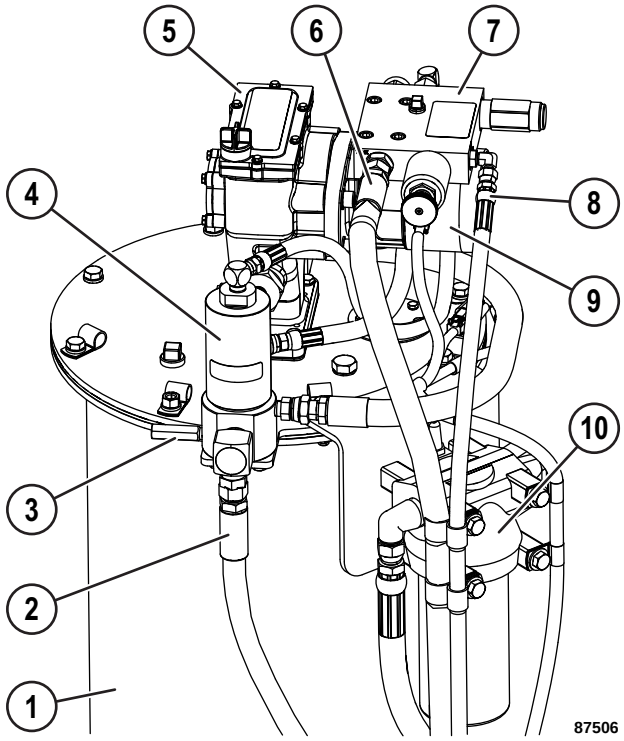


FIGURE 10-1. AUTO LUBE PUMP AND RESERVOIR COMPONENTS

1. Reservoir
2. Main Grease Supply Line
3. Relief Valve
4. Vent Valve
5. Grease Pump
6. Hydraulic Oil Supply
7. Pump Control Manifold
8. Hydraulic Oil Return
9. Hydraulic Motor
10. Grease Filter

NOTES

Hydraulic system checkout procedure

1. Refer to **"Accumulator charging and storage"** in Testing and adjusting accumulator and suspension section to set each accumulator precharge level.

**** Record on Data Sheet***

2. Install calibrated multiple range pressure gauges in the following locations:
   a. Pressure test port at each hoist filter. Gauges must read up to 24 000 kPa (3,500 psi).
   b. Steering pump test port GPA. Gauge must read up to 35 000 kPa (5,000 psi).
   c. Bleeddown manifold test port TP3. Gauge must read up to 35 000 kPa (5,000 psi).
3. Install calibrated pressure gauges in the following locations:
   a. Both test ports of steering cylinder manifold. Gauges must read up to 35 000 kPa (5,000 psi).
   b. Overcenter manifold test port TPD. Gauge must read up to 24 000 kPa (3,500 psi).
   c. Bleeddown manifold test port TP2. Gauge must read up to 35 000 kPa (5,000 psi).
   d. Test port for front brake cooling, located in block bolted on hoist valve outlet, and upper left test port on brake/hoist return manifold for rear brake cooling. Use low pressure gauges, preferably with 517 - 690 kPa (75 - 100 psi) range.

Initial startup and flushing

4. Connect ports marked "QD Supply" and "QD Return" in bleeddown manifold with a jumper hose. The jumper hose must withstand 24 000 kPa (3,500 psi) in the event it would become fully pressurized to steering system pressure (25.4 mm (1 in.) dia. SAE 100R12). However, the pressure in the hose during flushing should be below 3 450 kPa (500 psi).
5. Join piston end and rod end hoist cylinder hoses using the two supplied flushing blocks PC3074, if not already assembled.
6. An optional bleeddown hose assembly for manually bleeding down steering accumulators can be used. This hose/needle valve assembly is only for convenience and not required for the Checkout Procedure. It provides a way to manually bleeddown both steering accumulators at any time during the Checkout Procedure.

   The hose material can be 6.35 mm (1/4 in.) dia. SAE 100R2, which has 35 000 kPa (5,000 psi) rating. A needle valve will allow simple opening/closing, and must be rated for 27 500 kPa (4,000 psi) or above. The hose assembly can consist of two 6.35 mm (1/4 in.) dia. hoses connected to a needle valve. The opposite ends of the hoses can be connected as described below. The length of the hoses is not critical and can be selected to provide the best accessibility to the needle valve. Refer to Figure 30-6 and Figure 30-7 for port locations.
   a. Be sure both steering, both brake and the auxiliary accumulators are bled down.
   b. Remove plug located near bleeddown manifold port (1, Figure 30-6). This port does not have an identification stamping. Port TP3 (2) is shown for reference. Fittings WB0585 (SAE #10 O-ring boss to #8 JIC) and WB0692 (#8 JIC to #4 JIC) can be installed to connect to one end of hose. This port has the same pressure as bleeddown manifold ports Steering Supply and ACC2 (downstream steering accumulator), and will allow both steering accumulators to bleed down when the needle valve is opened.
   c. Connect one end of hose/needle valve assembly to fitting installed in step b.

j. Turn needle valve adjustment stem fully out and secure lock nut. **Needle valve must be fully open for normal operation.**

k. Remove gauge installed at test port TR (from step d).

**** Record on Data Sheet***

Auxiliary system(s) checkout and adjustment

39. Reconnect or enable auxiliary hydraulic systems disabled in step 8.

40. Perform associated auxiliary system checkouts, as detailed in their respective checkout manuals. These systems are optional equipment and may vary between individual trucks.

41. If optional steering accumulator bleed hose/ needle valve assembly was installed in step 6 or step 31 (method 2), bleed down all auxiliary, brake and steering accumulators and remove hose/needle valve assembly and associated fittings. Reinstall and properly torque the original plugs.

42. Remove gauges installed in steps 2, 3 and 27a.

Oil Cleanliness check

43. Before the truck can be put into service, the cleanliness of the hydraulic oil must be checked.

    Use the quick disconnect coupling at either hoist filter test port to attach a hose and obtain an oil sample. **Do not use the steering filter test port. No jumper hoses used for system flushing can be installed.**

    a. The hydraulic system checkout procedure must be completed before taking an oil sample.

    b. Start the engine and operate at high idle for at least ten minutes. Do not operate the steering, hoist, brakes or any other hydraulic function during the oil sampling procedure.

    c. Take particle count readings for at least 20 minutes without changing the engine speed.

    d. When the particle count level is at or below ISO 21/18/15 standard and is showing a trend of improving cleanliness or at least maintaining the ISO 21/18/15 or lower, the hydraulic system meets the acceptable criteria for cleanliness.

    e. If the particle count level of the ISO 21/18/15 standard is not achieved within 20 minutes, continue operating the engine at high idle until the conditions in step d are achieved.

**** Record on Data Sheet***

44. After completion of steps 1 through 43, all hydraulic filter elements must be changed before the truck is shipped from the factory or released for operation.

**** Record on Data Sheet***

NOTES

22. Remove connector R-EBCS2 from Rear Enhanced Brake Cut Sensor which is installed in port EBCS2 on the Rear Enhanced Brake Manifold.

Record the real time Rear Enhanced Brake Cut Sensor value (-990 – -1000 psi).

Record if faults SPN 8 (Yes) and FMI 8 (Yes) are active.

Reconnect connector R-EBCS2 to the Rear Enhanced Brake Cut Sensor. Cycle the engine start switch or toggle the “Enable Test Mode” button on the output control tab to clear the fault.

23. Remove connector R-LBS from Rear Left Brake Sensor which is installed in a port on the junction manifold inside the rear axle.

Record the real time Rear Left Brake Sensor value (-990 – -1000 psi).

Record if faults SPN 11 (Yes) and FMI 8 (Yes) are active.

Reconnect connector R-LBS to the Rear Left Brake Sensor. Cycle the engine start switch or toggle the “Enable Test Mode” button on the output control tab to clear the fault.

24. Remove connector R-RBS from Rear Right Brake Sensor which is installed in a port on the junction manifold inside the rear axle.

Record the real time Rear Right Brake Sensor value (-990 – -1000 psi).

Record if faults SPN 12 (Yes) and FMI 8 (Yes) are active.

Reconnect connector R-RBS to the Rear Right Brake Sensor. Cycle the engine start switch or toggle the “Enable Test Mode” button on the output control tab to clear the fault.

25. Remove connector R-PC from Rear Proportional Pressure Cut which is installed in port PC on the Rear Enhanced Brake Manifold.

Record if faults SPN 25 (Yes) and FMI 8 (Yes) are active.

Reconnect connector R-PC to the Rear Proportional Pressure Cut Valve. Cycle the engine start switch or toggle the “Enable Test Mode” button on the output control tab to clear the fault.

26. Remove connector R-EBC from Rear Enhanced Brake Cut Valve which is installed in port EBC on the Rear Enhanced Brake Manifold.

Record if faults SPN 28 (Yes) and FMI 8 (Yes) are active.

Reconnect the R-EBC to the Rear Enhanced Brake Cut Valve. Cycle the engine start switch or toggle the “Enable Test Mode” button on the output control tab to clear the fault.

27. Remove the connector R-LEB from the Rear Left Enhanced Brake Proportional Valve which is installed in port LEB on the Rear Enhanced Brake Manifold.

Record if faults SPN 26 (Yes) and FMI 8 (Yes) are active.

Reconnect connector R-LEB to the Rear Left Enhanced Brake Proportional Valve. Cycle the engine start switch or toggle the “Enable Test Mode” button on the output control tab to clear the fault.

28. Remove the connector R-REB from the Rear Right Enhanced Brake Proportional Valve which is installed in port REB on the Rear Enhanced Brake Manifold.

Record if faults SPN 27 (Yes) and FMI 8 (Yes) are active.

Reconnect connector R-REB to the Rear Right Enhanced Brake Proportional Valve. Cycle the engine start switch or toggle the “Enable Test Mode” button on the output control tab to clear the fault.

Brake piston leakage test

1. Remove the dust cap on test port (1, Figure 30-2) on the brake backplate.
2. Remove the capnut on bleed port (2). Attach a hydraulic pressure test device to the fitting.
3. Slowly apply pressure to bleed air from the piston cavity.
4. Cycle the piston to full stroke ten times by applying 2 070 kPa (300 psi) of hydraulic pressure at bleed port (2). Observe the piston for leakage.
5. Minor oil seepage (non-measurable) is permissible. If the leakage is greater, disassemble the piston assembly and determine the cause.

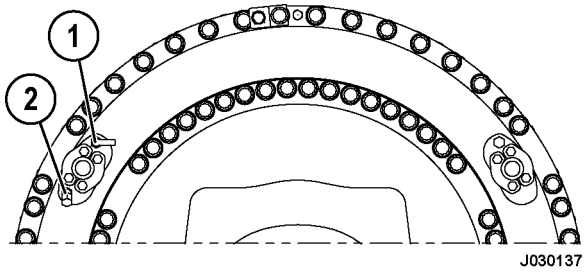


FIGURE 30-2. FRONT BRAKES

1. Test Port - "LFBP" and "RFBP"
2. Bleed Port

Brake seal pressure test

Check the integrity of the floating seal before installing the brakes on the truck.

1. Cap the cooling oil ports and pressurize the brake to a maximum of 103 kPa (15 psi).
2. Close off the air supply and monitor the interior brake pressure for 15 minutes.
3. If the air pressure decreases rapidly, a displaced or damaged brake seal is indicated. Disassemble the brake and reinstall or replace the floating seal.

Oil separator seal pressure test

Check the integrity of the floating seal after installing the wheel hub/brake assembly on the spindle. The wheel hub must be facing upward.

1. Remove fill plug (1, Figure 30-3). Fill the wheel hub cavity with approximately 11.5 L (3 gal) of TO-50 oil.

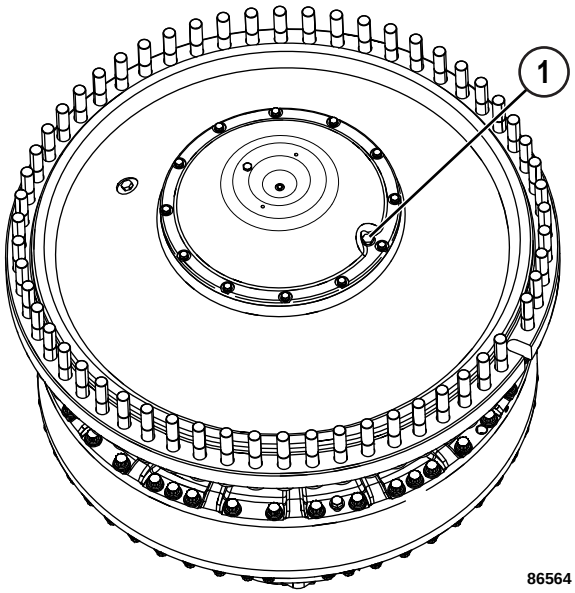


FIGURE 30-3. WHEEL HUB

1. Fill Plug

2. Connect a hose to the fill port in the hub cover plate. Ensure that all other ports are plugged.
3. Pressurize the hub cavity to a maximum of 103 kPa (15 psi).

⚠CAUTION

Do not overpressurize the cavity. Excessive pressure may cause damage to the seals.

4. Close off the air supply and monitor the hub cavity pressure for 15 minutes.
   a. If there is no pressure drop, the integrity of the seals is verified.
   b. If the pressure drops at all, a displaced or damaged seal is indicated. Disassemble the hub and reinstall or replace the floating seal.

NOTES

3. Remove valve cover (1, Figure 30-3) and spacer (2).

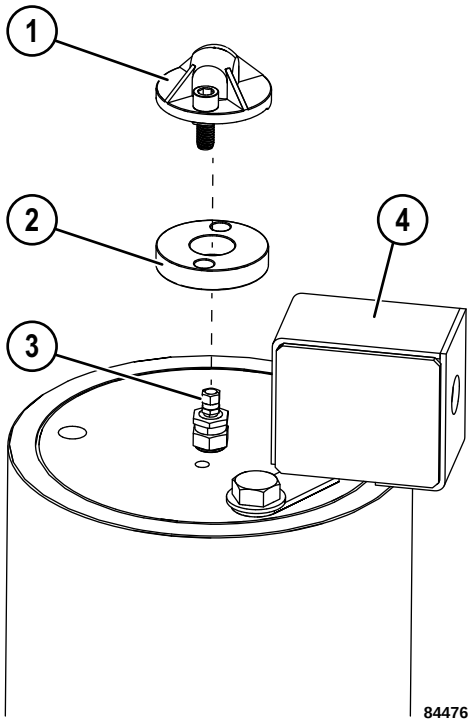


FIGURE 30-3. TOP OF PISTON ACCUMULATOR

1. Valve Cover
2. Spacer
3. Charging Valve
4. Switch Cover

⚠WARNING

Nitrogen pressure may be present in the accumulator. Only turn the swivel nut (small hex nut, 2, Figure 30-4) during the next step. Turning the entire valve body may result in the valve assembly being forced out of the accumulator by the nitrogen pressure inside. Wear a protective face mask when discharging nitrogen gas.

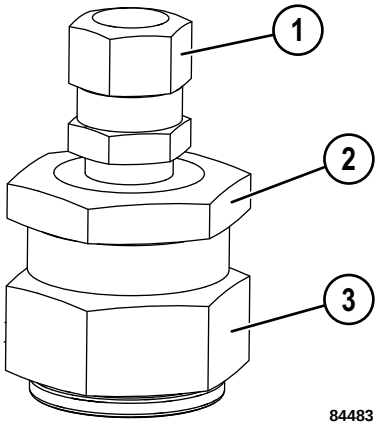


FIGURE 30-4. PISTON ACCUMULATOR CHARGING VALVE

1. Valve Cap
2. Swivel Nut (Small Hex Nut)
3. Valve Body (Large Hex Nut)

FIGURE 30-11. REAR SUSPENSION OILING BLOCK

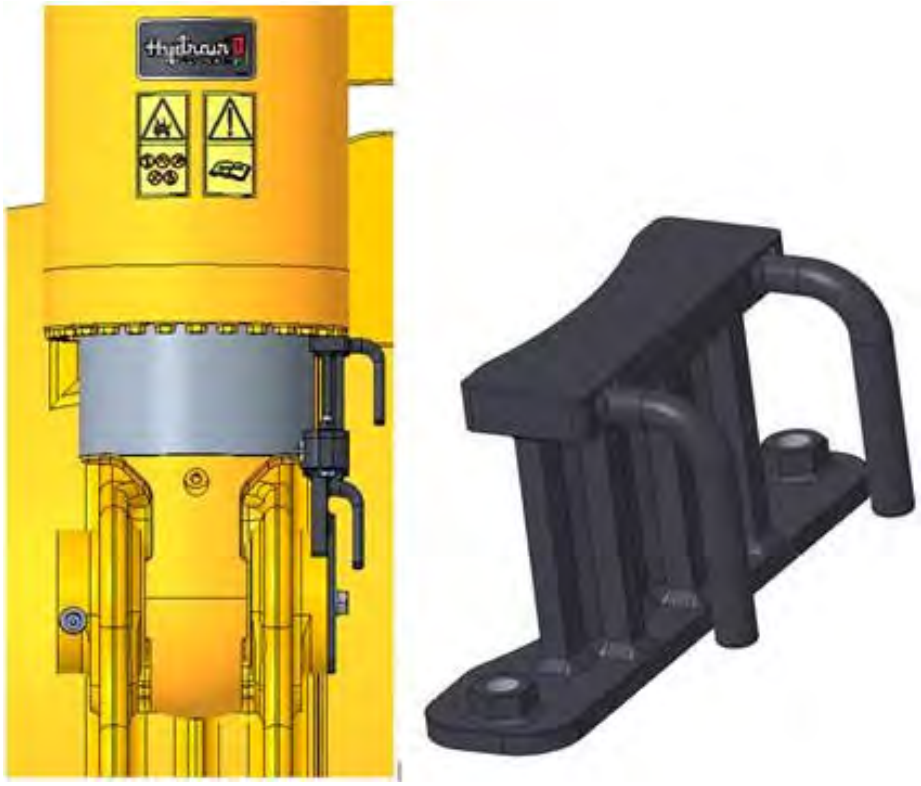


FIGURE 30-12. REAR SUSPENSION CHARGING BLOCK

DUMP TRUCK

930E
980E

Machine model	Serial number
930E-5SE	A60001 and up

30 Testing and adjusting
Electrical systems

3. Use the GE WebPTU software to check the following drive system analog inputs and outputs.

Function	Criteria
Power Supply	Operating value verified
Retard Pedal	Operating range verified and calibrated
Accelerator Pedal	Operating range verified and calibrated
10V Potentiometer Reference	Operating value verified

Engine delayed shutdown Smart Timer check

1. Install a multimeter to monitor the voltage on circuit 21NSL (TB27-E) to ground.
2. Start the engine and operate at an approximately 1700 rpm. After the engine coolant temperature rises to 82 °C (180 °F), circuit 21NSL voltage will rise from 0 to 24VDC.
3. Lower the engine speed to low idle for approximately one minute, then turn the engine start switch to the OFF position. The engine should continue to operate at low idle for approximately three minutes or less and then shut down.

Body hoist limit switch check

1. Turn the engine start switch ON.
2. Place a piece of metal in front of the body up switch located at the rear of the truck.
3. At the hoist limit solenoid (on the bleeddown manifold), measure the voltage circuit 53H to ground at TB35-N. There should be battery voltage at TB35-N.
4. Remove the piece of metal from the body up switch. There should be 0V measured when the piece of metal is removed.

Interface module checkout procedures

Checking for IM fault codes

NOTE: The interface module must be powered up to communicate with the service computer.

1. Turn the engine start switch to the ON position but do not start the engine.
2. Connect an ethernet cable from the service computer to ETH1 port (4, Figure 30-1) on the IM2. The service computer will automatically receive an IP address assignment from the IM2.
3. Open a web browser on the service computer.
4. Enter the IP address of the IM2 into the address bar.

   IM2 IP address: 192.168.3.120

   By default, the IM2 website will open to the Real-Time Data web page.
5. Confirm that there are no fault codes associated with the interface module. If any faults are found, these circuits must be analyzed to determine the cause of the fault. Repair the circuits or, if required, replace the interface module.

Checking digital inputs to the IM

Use the Real-Time Data web page to confirm the functionality of all IM inputs. The engine start switch must be ON for all checks.

1. **Hydraulic Tank Level (IM1-13)** - Disconnect connector P712 at hydraulic tank level sensor. Short pin C to ground momentarily and confirm state change (1 to 0). Reconnect P712.
2. **Low Steering Precharge (IM2-1)** - This step requires properly precharged steering accumulators. Disconnect one of the low accumulator precharge switches momentarily and confirm state change (0 to 1). Reconnect switch.
3. **Pump Filter Switches (IM3-44)** - Disconnect connector SFSW at steering filter pressure switch momentarily and confirm state change (0 to 1). Reconnect SFSW.
4. **Park Brake Released (IM1-39)** - Short wire 73S to ground at TB33-C momentarily and confirm state change (1 to 0).
5. **Park Brake Request (IM2-35)** - Short engine oil pressure switch wire circuit 36 on TB28-A to ground. Move lever from NEUTRAL to PARK and confirm state change (1 to 0). Remove ground from TB28-A.
6. **GE Batt + (IM2-36)** - Confirm that state is 1.
7. **Starter Motor 1 Energized (IM2-14)** - Disconnect wire 11SM1 from cranking motor to TB28-F at TB28-F. Momentarily short TB28-F to 24V and confirm state change (0 to 1). Reconnect wire.
8. **Starter Motor 2 Energized (IM2-25)** - Disconnect wire 11SM2 from cranking motor to TB28-G at TB28-G. Momentarily short TB28-G to 24V and confirm state change (0 to 1). Reconnect wire.
9. **Crank Sense (IM3-41)** - Open starter disconnect switch so that there is no battery voltage to the starters. Momentarily short TB28-J to 24V and confirm state change (0 to 1). After removing 24V short from TB28-J, close starter disconnect switch.

DUMP TRUCK

730E
830E
860E
930E
960E
980E

Machine model	Serial number
730E-10	A50005 - A50021, A50023, A50026 and up
830E-5	A50005 and up
830E-5AT	A50005 and up
860E-1K	A30031 - A30035, A30041, A30042, A30044 - A30046, A30101, A30107 - A30110, A30117 and up
860E-1KT	A30004 - A30030, A30036 - A30040, A30043, A30047 - A30100, A30102 - A30106, A30111 - A30116
930E-5	A40004 and up
930E-5AT	A40004 and up
930E-5SE	A50001 and up
960E-1	A30001, A30003 - A30026
960E-1K	A30002, A50003 - A50010
960E-2	A30027 and up
960E-2K	A50011 and up
960E-2KT	A50028 and up
980E-4	A40003 and up
980E-4AT	A40003 and up
980E-5	A50003 and up
980E-5AT	A50003 and up
980E-5SE	A60001 and up

30 Testing and adjusting
KOMTRAX Plus II

10. The **Datum and Time Zone** menu will appear. Make changes if needed, then click **Start**.

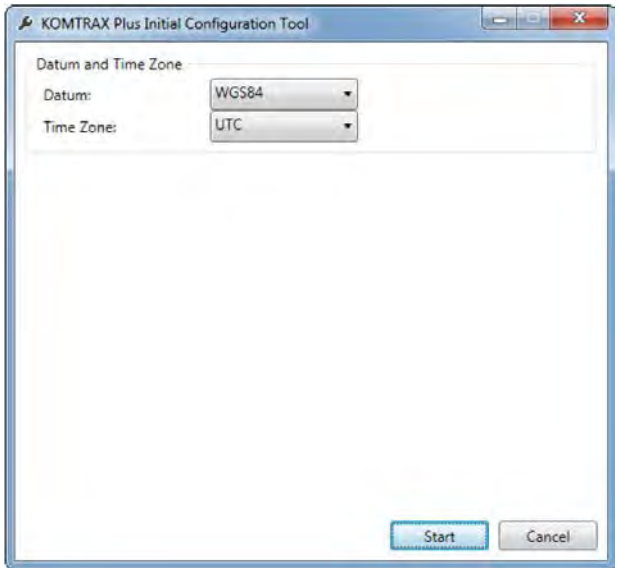


FIGURE 30-22. DATUM AND TIME ZONE MENU

11. A status window will appear. Click **OK** to complete the Iridium satellite system setup.

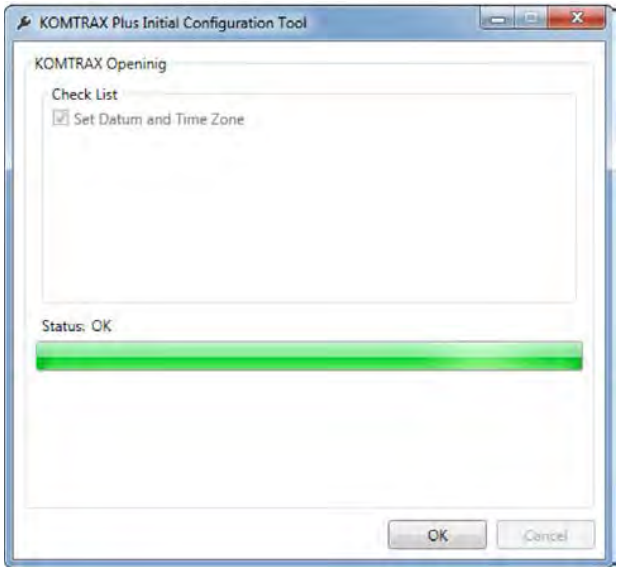


FIGURE 30-23. KOMTRAX OPENING STATUS WINDOW

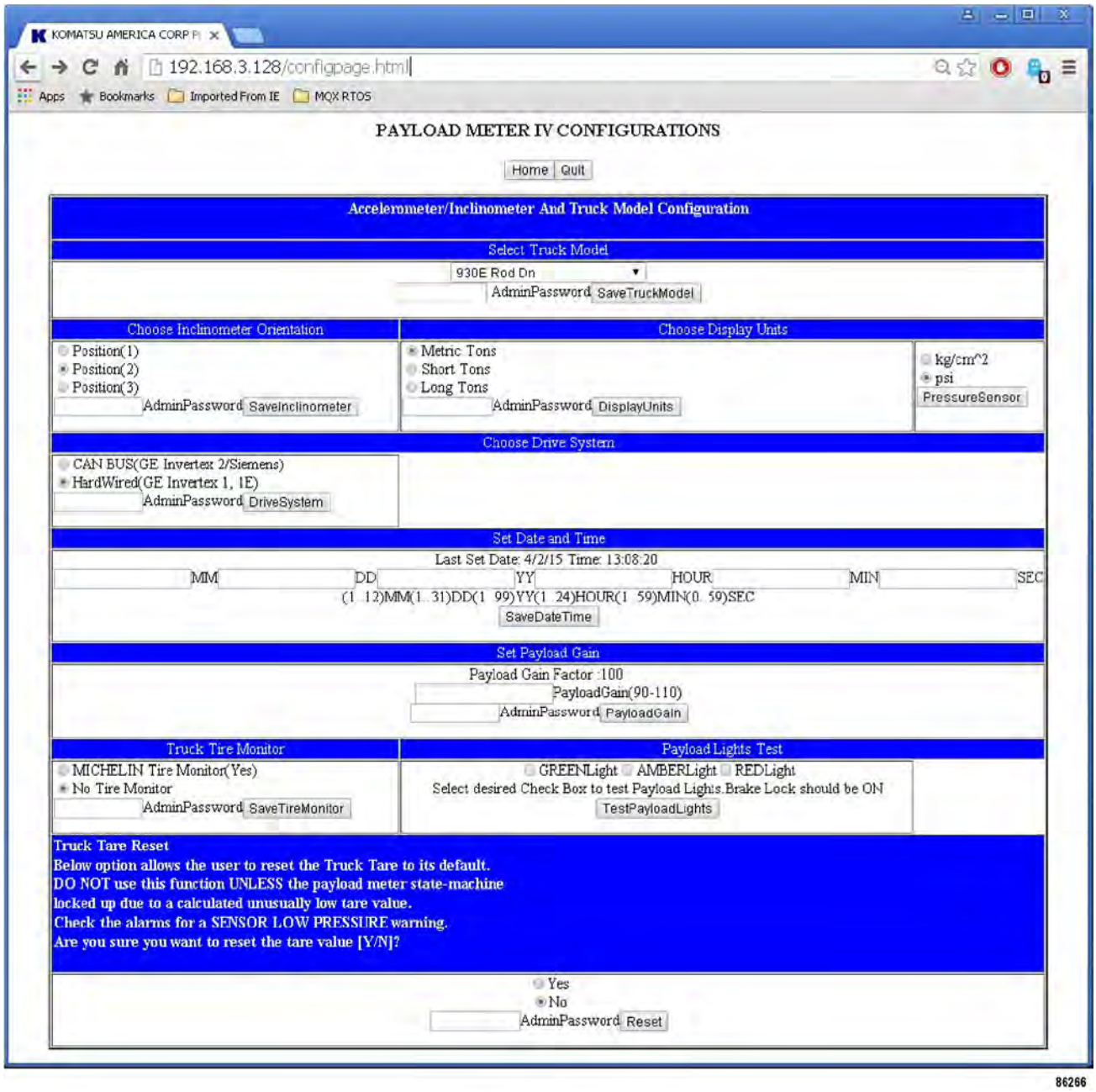


FIGURE 30-5. PLM IV SYSTEM CONFIGURATIONS PAGE

DUMP TRUCK

830E
930E
980E

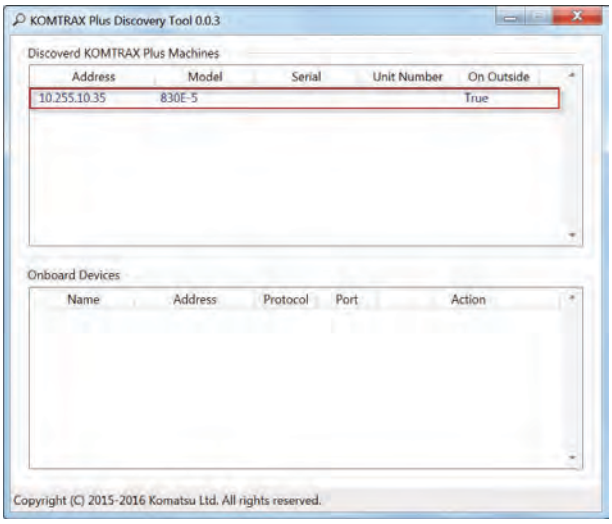
Machine model	Serial number
830E-5	A50005 and up
830E-5AT	A50005 and up
930E-5	A40004 and up
930E-5AT	A40004 and up
930E-5SE	A50001 and up
980E-5	A50003 and up
980E-5AT	A50003 and up
980E-5SE	A60001 and up

30 Testing and adjusting
Komatsu wireless bridge (KWB)

Testing the connection

1. Power up the NanoStation access point. Connect the service computer to the 0002KPLUS wireless network.
2. Ensure that a haul truck equipped with KWB and KOMTRAX Plus II is nearby. Open the *Data Collection PC Tool*.

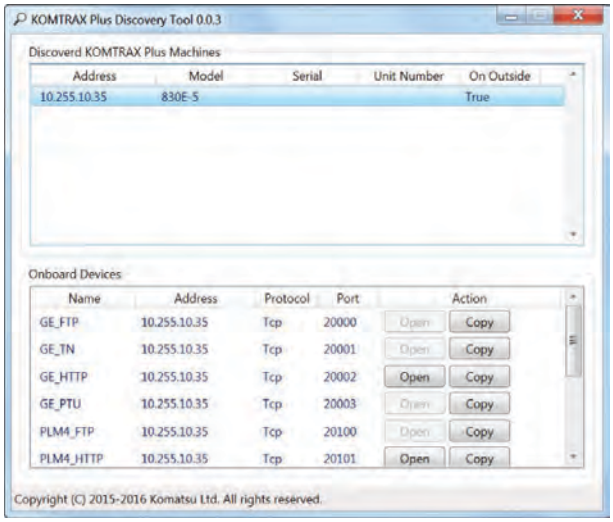
   The *Data Collection PC Tool* will automatically discover the truck and download data if more than 12 hours has passed since the previous download. Clicking on **Download** will force a download immediately.
3. Open the *Komtrax Plus Discovery Tool*. All trucks within wireless range will be displayed in the **Discovered Komtrax Plus Machines** window.



86984

FIGURE 30-9. KOMTRAX PLUS DISCOVERY TOOL WINDOW

4. Click on a truck to see links to the devices connected to the onboard local area network (LAN).



86985

FIGURE 30-10. KOMTRAX PLUS DISCOVERY TOOL WINDOW

7. Use the diagonal down right arrow to tab the red highlight box to the MAIN SETTING button on the screen, then press the alarm cancel button (see Figure 30-4). This will enable the main setting input screen (see Figure 30-5).
8. Set the machine code in the MAIN SETTING screen to the proper machine type (see Figure 30-5).
   a. Use the diagonal down right arrow to move the cursor to each data entry field.
   b. Press the alarm cancel button to change the data in the selected field.
   c. Use the up arrow and down arrow to move the cursor selection within each field's drop-down menu.
   d. Press the alarm cancel button to finalize the data selection.

**** Record on Data Sheet***

NOTE: Default values for the selected truck type will be seeded, and some values can be stored, as appropriate, for a standard truck after the SAVE button is selected. Confirm that the correct machine code is stored by selecting the BACK button, which returns to the Main Menu screen. Select the MAIN SETTING button again and confirm that the machine code matches the desired truck type.

9. Record the remaining data inputs from the main setting screen.

**** Record on Data Sheet***

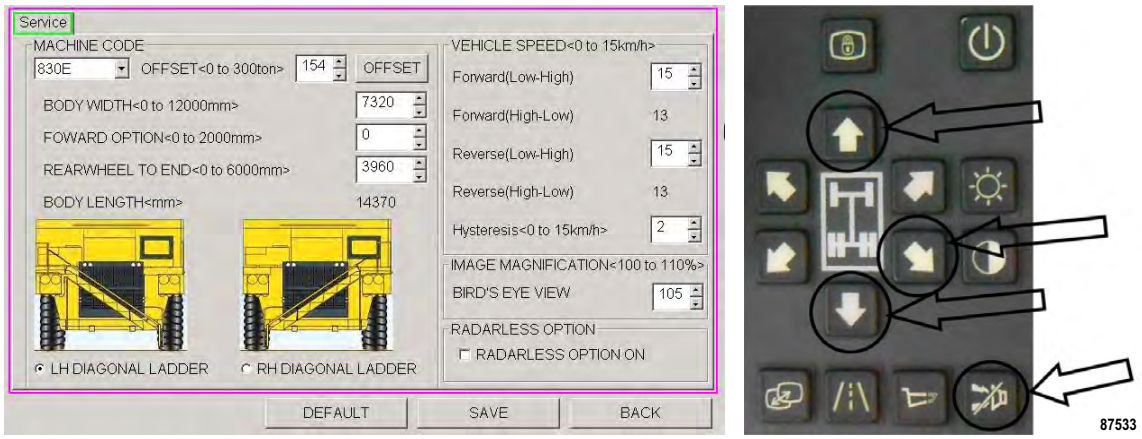


FIGURE 30-5. MAIN SETTING SCREEN

Step 18 - Green button lighting when not depressed? yes no

Step 19 - Radar target follows person correctly? yes no

Smooth transition in bird's eye view? yes no

Step 20 - Camera selection is functional for all 6 cameras? yes no

If "no", which cameras are malfunctioning? 1 2 3 4 5 6

Step 21 - Display buttons are functioning properly?

Monitor Display Mode button yes no

Guide Line Display button yes no

Lower Body Display button yes no

Bright button yes no

Dim button yes no

Step 22 - Rear camera view in REVERSE? yes no

Step 23 - Alarm sounds when target found in FORWARD or REVERSE? yes no

Alarm stops when in NEUTRAL or PARK? yes no

Step 24 - Speed at which screen enters standby mode in FORWARD _____

Screen returns to active mode when nearly stopped? yes no

Step 25 - Speed at which screen enters standby mode in REVERSE _____

Screen returns to active mode when nearly stopped? yes no

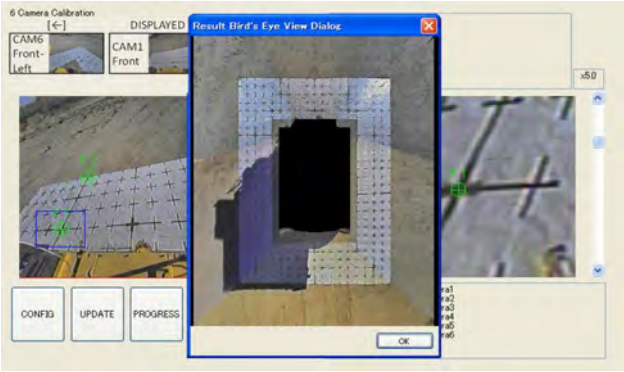
Step 26 - Active faults? yes no

Fault log cleared? yes no

Step 27 - Pre-shift inspection completed? yes no

f. When the “Result Bird's Eye View Dialog” screen appears, it will either be successful or require further attention. See Figure 30-26.

- If the Result Window states **“Calculation Completed Successfully”**, select NEXT in the “Result Bird's Eye View Dialog” screen and proceed to step 7.
- If the Result Window states **“Calculation Completed, But Large Error - x.x pixels”**, select MANUAL in the “Result Bird's Eye View Dialog” screen and repeat step 6.



85251

FIGURE 30-26. RESULT BIRD’S EYE VIEW DIALOG SCREEN

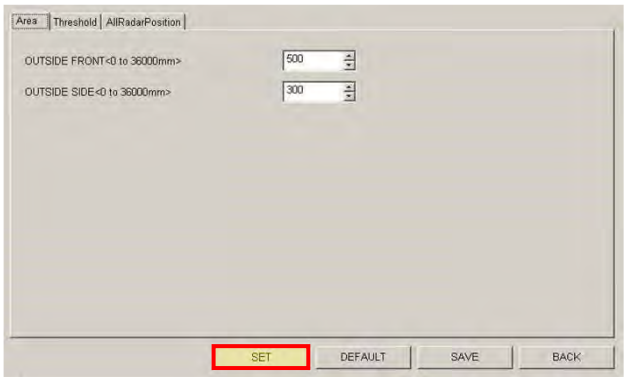
7. Repeat step 5 for the remaining cameras. It is acceptable once **“Calculation Completed Successfully”** is displayed in the Result Window for all six cameras.
8. Check the alignment of the calibration sheets in the “Result Bird's Eye View Dialog” picture. The sheets should be finely connected with no jagged breaks.
9. Select OK to close the “Result Bird's Eye View Dialog.” Select the EXIT button (5th Tab area) of the 6 Camera Calibration screen.
10. The "End Dialog" screen will appear. See Figure 30-27

- To save the calibration results, select END NEW SETTING. The screen returns to the maintenance screen.
- To perform the 6 camera calibration again, choose END OLD SETTING.

85252

FIGURE 30-27. END DIALOG SCREEN

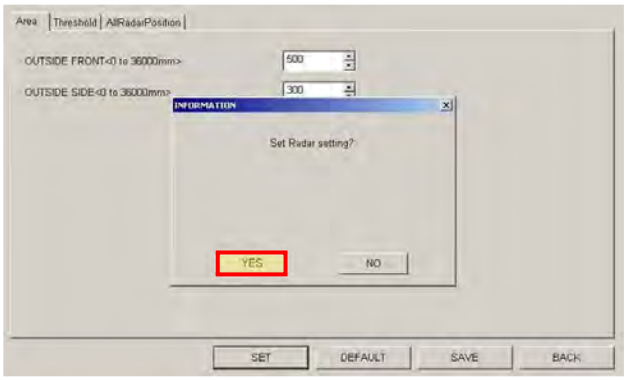
7. Select RADAR SETTING in the maintenance screen (Figure 30-46). In the Area tab, select the SET button. See Figure 30-48.



85265

FIGURE 30-48. AREA SCREEN

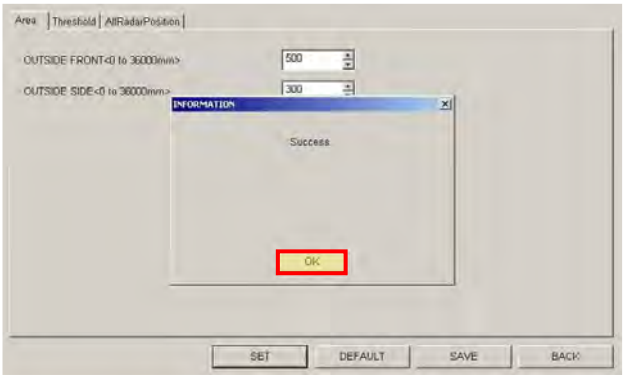
a. Select YES in the "Set Radar setting?" screen. See Figure 30-49.



85265

FIGURE 30-49. RADAR SCREEN

b. When SET is successful, select OK when the "Success" window appears. See Figure 30-50.



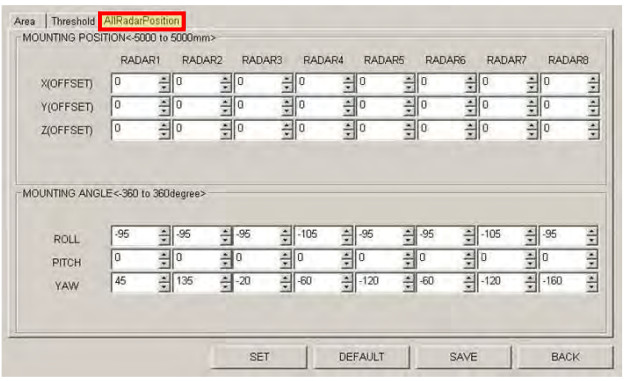
85265

FIGURE 30-50. RADAR SCREEN

8. Radar setting is complete. Select the BACK button to return to the maintenance screen.

⚠ IMPORTANT ⚠

If a radar is attached to the truck in a different position at the user's order, select the AllRadarPosition tab of the RADAR SETTING screen and input the values of for that radar's MOUNTING POSITION and MOUNTING ANGLE.



85268

FIGURE 30-51. ALL RADAR POSITION SCREEN

Checking system oil

R-134a air conditioning systems require the use of Polyalkylene Glycol (PAG) lubricating oil. This is the only oil recommended for use in this system. The Komatsu PAG oil (PC2279) is the oil that is furnished in the system on Komatsu trucks equipped with the compressor as shown in Figure 30-6.

- Avoid skin contact and inhalation of PAG oil, as these are normal precautions with any chemical.
- PAG oil removed from new or old components must not be retained for re-use. It must be stored in a marked container and properly sealed. PAG oil is an environmental pollutant and must be properly disposed of after use.
- PAG oil in containers or in an air conditioning system must not be left exposed to the atmosphere any longer than necessary. PAG oil absorbs moisture very rapidly, and therefore, any absorbed moisture could cause damage to an air conditioning system.

⚠CAUTION

It is critical to keep the correct amount of lubricant in the air conditioning system at all times. Failure to do so could result in damage to the compressor.

Damage to the compressor can be a result from not only a lack of oil, but also too much oil. A lack of oil will cause excess friction and wear on moving parts. Excessive oil can result in "slugging" the compressor. This condition occurs when the compressor attempts to compress liquid oil as opposed to vaporized refrigerant. Since liquid cannot be compressed, damage to internal parts results.

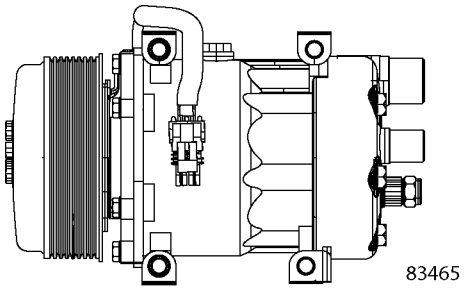


FIGURE 30-6. COMPRESSOR
300 ml - (10.1 oz.) PC2279 PAG OIL

⚠IMPORTANT⚠

The receiver-drier and accumulator must be replaced each time the system is opened.

1. Remove the compressor from the truck. With the compressor positioned horizontally, remove the drain plug and capture the oil in a clear graduated container. Rock the compressor back and forth and rotate the shaft to facilitate oil removal.

⚠CAUTION

Under no circumstances should the A/C compressor be stood upright onto the clutch assembly. Damage to the compressor clutch will result, leading to premature compressor failures.

2. Inspect the oil for any foreign particles. If particles are found, further investigation and service are necessary to determine the source. After repair, the system will need to be flushed. Refer to "Evacuating the air conditioning system". If no particles are found, proceed to the next step.
3. Add 300 ml (10.1 oz.) of PAG oil to the compressor sump. Add the oil through the drain port, and install the drain plug. It is important to only add the specified amount to ensure optimal system performance. Too much oil will result in a reduction in cooling. Too little oil will result in compressor failure.
4. Determine the correct amount of additional oil to add to the system by using the Replacing Oil table. Add this extra oil to the inlet side of the receiver drier or to the accumulator.

NOTE: If truck is being assembled for the first time, add 207 ml (7 oz.) of PAG oil to the inlet side of the receiver-drier or to the accumulator for initial lubrication of the A/C components.

EXAMPLE - If only the accumulator and receiver drier were replaced, then add 120 ml (4 oz.) of PAG oil to the inlet side of the receiver-drier or to the accumulator. If the evaporator was also replaced at this time, then add 150 ml (5 oz.) of PAG oil to the inlet side of the receiver-drier or to the accumulator.

NOTE: The proper quantity of oil may be injected into the system during charging as an alternate method of adding oil.

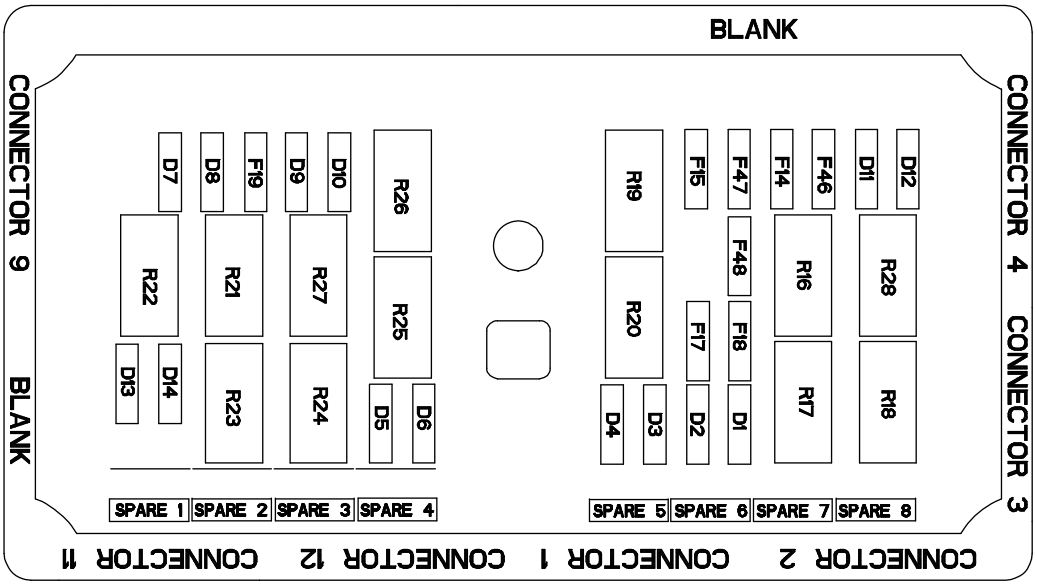
DUMP TRUCK

980E

Machine model	Serial number
980E-5	A50137 - A50140
980E-5SE	A60001 and up

30 Testing and adjusting
Automatic lubrication (auto lube) system

Vehicle Electrical Center (VEC-90)



84053

FIGURE 3-2. VEC-90

Table 2: VEC - 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
D1	3	Key Switch Run Diode
D2	3	Shift Selector Reverse Diode
D3	3	Shift Selector Neutral Diode
D4	3	Shift Selector Forward Diode
D5	3	Park Brake Diode
D6	3	Truck Moving Diode
D7	3	Brake Lock Diode
D8	3	Park Brake Latch Diode
D9	3	GE True Forward Signal Diode

NOTES

Fault Code A010

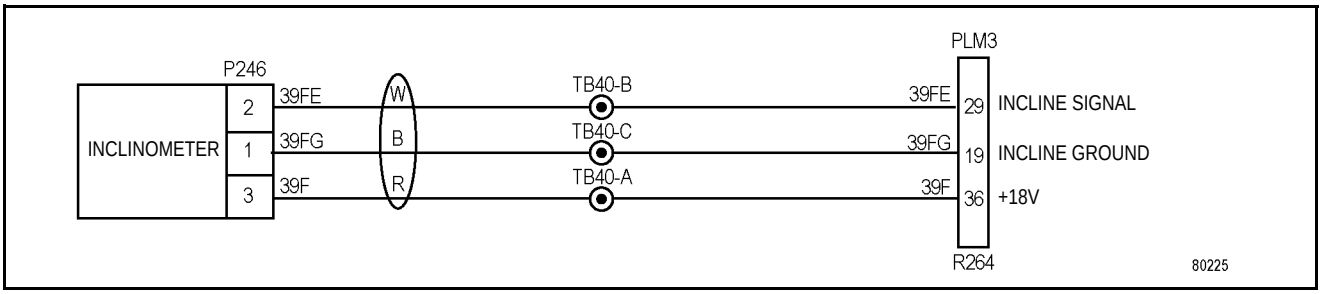
Operator Action	None
Description	Incline sensor signal low.
Fault Conditions	Sets if incline signal is out of range low (sensor voltage greater than 5.08 volts). Resets if reading returns to normal.
Operator Alerting System Response	Repair Monitor Display Operator Action: None Display Fault Description: INCLINE SENSOR LOW Display Fault Code: A010
Resulting Problem(s)	Bad payload computation.
Related Information	A laptop running "IM Realtime Data Monitor" software may be required to resolve this fault.

Table

1. This fault is generated by PLM in response to a problem in the sensor circuit. This sensor circuit may have a related fault that can be used to resolve the problem. Refer to the Troubleshooting Instructions for the active parameter fault(s).
2. If there are no active parameter fault codes, then based on the truck's setup while this fault is active, determine which of the parameters in the Table is not shown in its expected state on the IM Realtime Data Monitor program. Refer to the schematic to identify which item(s) may be causing the parameter(s) to be in the unexpected state. Troubleshoot these items.
3. If this fault is not currently active or if no parameters are currently in the unexpected state and the malfunction is still unresolved, then check each of the parameters in the Table for proper functionality. Troubleshoot all item(s) related to the parameter(s) which are found to be malfunctioning.

Parameter	Expected State and/or Related Fault(s)
Incline Sensor (PLM 36, 29, 19)	Sensor voltage <0.565: Failed high Sensor voltage >5.08: Failed low Sensor voltage >0.565 but <5.08: Valid readings Fault(s): A009

Related circuit diagram



Fault Code A101

Description	High pressure detected across a hydraulic pump filter.
Fault Conditions	Sets if: Keyswitch is on Engine is running Oil temperature is above 50°C (122°F) Hydraulic filter switch goes from normally closed to open Resets if hydraulic oil filter restriction returns to normal or after filter replacement.
Resulting Problem(s)	Hydraulic oil filters will bypass oil without filtration. Continuing operation may damage hydraulic system components.
Alert to Operator	Warning Monitor Indicator Lamp Alarm Buzzer **Display Fault Description**: HYD OIL FILT RESTRICT **Display Operator Action**: GO TO SHOP NOW
Related Information	1. A laptop running “IM Realtime Data Monitor” software may be required to resolve this fault. 2. This fault is generated by series input to IM from the hydraulic oil filter switches. Any one of three switches can open and cause the warning. 3. The normal corrective measure is to change one or more hydraulic filters.
Component/Circuit Schematic Search	Switch Hydraulic Filter #1 and #2 **(730E, 830E, 930E, 980E)**
	Switch Steering Filter **(730E, 830E, 930E, 980E)**
Expected State	Sensor data: Filter switches are normally closed (filter not restricted) during normal operation and open if a filter becomes restricted. 0: Hydraulic filter switches are closed. 1: One or more hydraulic filter switches are open.

Fault Code A124

Description	The drive system has generated a no propel / no retard or system not running input.
Fault Conditions	Sets if: No Propel / No Retard input is received from drive system on CAN bus System Running input is not received from drive system on wire input Keyswitch OR Park Brake not set Resets if CAN signal is removed or 3 seconds after the System Running signal appears. "Park brake set" is defined as follows: Park brake set pressure switch is closed. Park brake release pressure switch is open.
Resulting Problem(s)	The drive system is inoperable in either propel or retard.
Alert to Operator	Warning Monitor Indicator Lamp Alarm Buzzer **Display Fault Description**: NO PROPEL / RETARD **Display Operator Action**: STOP; PARK
Related Information	1. A laptop running “IM Realtime Data Monitor” or "WebPTU" software may be required to resolve this fault. 2. This fault is generated by drive system by placing a message on CAN/RPC in response to a problem in the propel system. The CAN/RPC circuits or drive system controller may have a related fault that can be used to resolve the problem.
Component/Circuit Schematic Search	CAN/RPC connection **(730E, 830E, 930E, 980E)**
Expected State	Sensor data: 0: system is running. 1: system not running.

NOTES

Fault Code A168

Description	Left front hydraulic oil temperature sensor is low.
Fault Conditions	Sets if sensor temperature reading drops to -51ºC (-60ºF) [.016 V] for 3 seconds or remains 10ºC (18ºF) below ambient temperature for 15 minutes after the engine runs. Resets if sensor temperature reading rises to -46ºC (-51ºF) [.032 V] for 3 seconds and recovers to within 10ºC (18ºF) of ambient temperature.
Resulting Problem(s)	Loss of monitoring of the left front brake temperature begins a compromise of the brake system temperature monitoring that can only worsen if other sensors are lost.
Alert to Operator	**Display Fault Description**: LF OIL TEMP SENS LO **Display Operator Action**: None
Related Information	1. A laptop running “IM Realtime Data Monitor” software may be required to resolve this fault. 2. This fault is generated by IM in response to a problem in the sensor circuit. This sensor circuit may have a related fault that can be used to resolve the problem. 3. The primary correction for this fault is to correct any external wiring or replace the sensor.
Component/Circuit Schematic Search	Sensor Brake Temp LH Front (**930E, 980E)**
Expected State	Sensor data: Normal reading: 0.016 to 4.89 V.

Fault Code A195

Description	Right front hydraulic oil temperature is high.
Fault Conditions	Sets at 120ºC (248ºF) [4.13 V] after 5 seconds. Resets at 103ºC (217ºF) [3.78 V] after 5 seconds or at steering bleed.
Alert to Operator	Warning Monitor Indicator Lamp Alarm Buzzer **Display Fault Description**: HOT HYD OIL RF **Display Operator Action**: STOP: PARK: RUN ENG
Resulting Problem(s)	Excessively hot oil can cause equipment damage and may reduce service brake effectiveness.
Related Information	1. A laptop running “IM Realtime Data Monitor” software may be required to resolve this fault. 2. This fault is generated by IM in response to a problem in the sensor circuit. This sensor circuit may have a related fault that can be used to resolve the problem.
Component/Circuit Schematic Search	Sensor Brake Temp RH Front (**930E, 980E)**
Expected State	Sensor data: Normal reading: 0.016 to 4.89 V.

Fault Code A205

Description	Brake Pressure Sensor Low
Fault Conditions	Sets if: Sensor pressure is at -2765 kPa (-401 psi) 2.4 mA for 5 seconds. Cranking state is not sensed. Engine speed is less than 600 RPM. Battery voltage is less than 18 V. Resets at -1420 kPa (-206 psi) 3.2 mA.
Resulting Problem(s)	Monitoring of brake pressure in KOMTRAX Plus 2 will be compromised.
Alert to Operator	**Display Fault Description**: BRAKE PRES SENS LO **Display Operator Action**: None
Related Information	1. A laptop running “IM Realtime Data Monitor” software may be required to resolve this fault. 2. This fault is generated by IM in response to a problem in the sensor circuit. This sensor circuit may have a related fault that can be used to resolve the problem. 3. The primary correction for this fault is to correct any external wiring or replace the sensor.
Component/Circuit Schematic Search	Sensor Brake Pressure (**730E, 830E, 930E, 980E)**
Expected State	Sensor data: Normal reading: 2.4 to 20.1 mA.

Fault Code A233

Description	Drive system CAN/RPC Control Link not connected
Fault Conditions	Sets after 5 seconds if park brake is not set, drive system Control Power is on, Crank Request is not on, and keyswitch is on. Sets after 60 seconds if park brake is set, drive system Control Power is on, Crank Request is not on, and keyswitch is on. Resets if truck speed is received from drive system. "Park brake set" is defined as follows: Park brake set pressure switch is closed. Park brake release pressure switch is open.
Resulting Problem(s)	Control commands not available to drive system. Warnings not available to driver or KOMTRAX Plus 2.
Alert to Operator	Warning Monitor Indicator Lamp Alarm Buzzer **Display Fault Description**: NO DRIVE SYS DATA **Display Operator Action**: STOP: PARK
Related Information	1. A laptop running “IM Realtime Data Monitor” software may be required to resolve this fault. 2. This fault is produced by IM in response to a problem in the CAN/RPC connection with drive system. The CAN circuit may have a related fault that can be used to resolve the problem. 3. Drive system should operate 60 seconds after initial power up.
Component/Circuit Schematic Search	CAN/RPC connection **(730E, 830E, 930E, 980E)**
Expected State	Sensor data: The IM should be receiving messages from the drive system on CAN inputs (IM1i,j,k).

Fault Code A243

Description	The engine coolant temp gauge in the display panel is defective.
Fault Conditions	Sets if display panel reports an engine coolant temperature gauge fault. Resets if digital display clears the fault or steering bleed valve comes on.
Resulting Problem(s)	Engine could overheat without warning.
Alert to Operator	Warning Monitor Indicator Lamp Alarm Buzzer **Display Fault Description**: ENG COOL TEMP GAUGE **Display Operator Action**: GO TO SHOP NOW
Related Information	1. A laptop running “IM Realtime Data Monitor” software may be required to resolve this fault. 2. Except for being masked by the steering bleed process, this fault is entirely contained within the display panel. The panel and communication to it must be working in order for IM to be aware of the fault. Therefore, the only diagnostic effort is to check the gauge and wiring within the panel and replace, if necessary.
Component/Circuit Schematic Search	Coolant Temp Gauge **(730E, 830E, 930E, 980E)**
Expected State	None

Fault Code A248

Description	Status module within the dash display panel is defective.
Fault Conditions	Sets if a status module fault is reported. Resets if the fault clears or steering bleed comes on.
Resulting Problem(s)	Proper operation will be difficult without status information.
Alert to Operator	Warning Monitor Indicator Lamp Alarm Buzzer **Display Fault Description**: STATUS MODULE FLT **Display Operator Action**: GO TO SHOP NOW
Related Information	1. A laptop running “IM Realtime Data Monitor” software may be required to resolve this fault. 2. Except for being masked by the steering bleed process, this fault is entirely contained within the dash display panel. The panel and communication to it must be working in order for interface module (IM) to be aware of the fault. Therefore, the only diagnostic effort is to check the gauge and wiring within the panel and replace, if necessary.
Component/Circuit Schematic Search	Display Panel (status module) **(730E, 830E, 930E, 980E)**
Expected State	None

Fault Code A261

Description	Low brake accumulator pressure warning for display to operator. It is designed to give immediate information to the operator, regardless of the cause of the problem.
Fault Conditions	Sets if pressure is low while engine is running or truck is moving 0.8 kph (0.5 mph) for 1 second. Resets if pressure returns or engine stops running and truck stops moving for 1 second.
Resulting Problem(s)	Service brake may not stop or hold the truck.
Alert to Operator	Warning Monitor Indicator Lamp Alarm Buzzer **Display Fault Description**: LOW BRAKE PRESSURE **Display Operator Action**: STOP: RUN WHEN CLR'D
Related Information	1. A laptop running “IM Realtime Data Monitor” software may be required to resolve this fault. 2. This fault is generated by IM in response to a problem in the sensor circuit. This sensor circuit may have a related fault that can be used to resolve the problem.
Component/Circuit Schematic Search	Switch Low Brake Accum Pressure **(730E, 830E, 930E, 980E)**
Expected State	Sensor data: 0: Brake accumulator pressure is normal. 1: Brake accumulator pressure is low.

Fault Code A272

Description	Brake lock switch power supply not off when required.
Fault Conditions	Sets if: Brake lock switch power supply is not off when brake lock is off. Truck speed is less than 0.5 kph (0.3 mph) and parking brake request is on. Engine speed has been 0 RPM for 15 seconds. J1939 data link is OK. Shutdown relay is on or the engine start switch is off for 3 seconds. Resets at power down. Sets if: Brake lock switch power supply is not off when brake lock is on. Truck speed is less than 0.5 kph (0.3 mph) and parking brake request is on. Engine speed has been 0 RPM for 15 seconds. J1939 data link is OK. Shutdown relay is on or the engine start switch is off for 1 second. Resets in 1 second if conditions change.
Resulting Problem(s)	Defective brake lock power supply circuitry makes it impossible to use the brake lock in a normal manner for loading and dumping operations.
Alert to Operator	Warning Monitor Indicator Lamp Alarm Buzzer **Display Fault Description**: BRK LOCK CKT FAULT **Display Operator Action**: GO TO SHOP NOW
Related Information	1. A laptop running “IM Realtime Data Monitor” software may be required to resolve this fault. 2. This fault is generated by IM in response to a problem in the sensor circuit. This sensor circuit may have a related fault that can be used to resolve the problem.
Component/Circuit Schematic Search	Brake Lock Switch Power Supply **(730E, 830E, 930E, 980E)**
Expected State	Sensor data: The IM receives brake lock power supply input on IM3L. 0: No power available for brake lock switch. 1: Power is available for brake lock switch.
Component/Circuit Schematic Search	Solenoid Brake Lock **(730E, 830E, 930E, 980E)**
Expected State	Sensor data: The IM receives input on IM2i during brake lock. 0: Brake lock valve is off. 1: Brake lock valve is on.

Fault Code A283

Description	An engine shutdown delay was aborted because the parking brake was not set.
Fault Conditions	Sets if: Engine start switch is turned OFF and engine shutdown delay is on. Engine is running, but parking brake set is not on. Resets if engine start switch is turned ON, engine shutdown delay is off, and engine is running. "Park brake set" is defined as follows: Park brake set pressure switch is closed. Park brake release pressure switch is open.
Resulting Problem(s)	The engine can suffer damage when shut down immediately, rather than in a controlled delay.
Alert to Operator	Repair Monitor Indicator Lamp **Display Fault Description**: NO SHT DWN DEL / PB **Display Operator Action**: None
Related Information	1. A laptop running “IM Realtime Data Monitor” software may be required to resolve this fault. 2. This fault is generated by IM in response to a problem in the sensor circuit. This sensor circuit may have a related fault that can be used to resolve the problem. 3. The normal corrective measure for this fault is to set the parking brake before turning off the engine start switch.
Component/Circuit Schematic Search	Switch Park Brake Set Pressure **(730E, 830E)**
	Switch Park Brake Set **(930E, 980E)**
Expected State	Sensor data: 0: Parking brake pressure switch indicating low pressure and applied parking brake. 1: Parking brake pressure switch indicating high pressure and unapplied parking brake.
Component/Circuit Schematic Search	Switch Park Brake Release Pressure **(730E, 830E, 930E, 980E)**
Expected State	Sensor data: 0: Parking brake pressure switch indicating high pressure and a released parking brake. 1: Parking brake pressure switch indicating low pressure and an applied parking brake.

Fault Code A304

Description	Low auto lube grease level is detected.
Fault Conditions	Sets when input switch indicates low grease level for 3 seconds. Resets when input switch indicates normal grease level for 3 seconds.
Resulting Problem(s)	Auto lubrication will not be completed without grease.
Alert to Operator	Repair Monitor Indicator Lamp **Display Fault Description**: AUTO LUBE GREASE LO **Display Operator Action**: None
Related Information	1. A laptop running “IM Realtime Data Monitor” software may be required to resolve this fault. 2. The primary correction for this fault is to replenish the grease. 3. If plenty of grease exists, then check sensor and wiring.
Component/Circuit Schematic Search	Switch Autolube Level (OPT) **(730E, 830E, 930E, 980E)**
Expected State	Sensor data: The IM receives input on IM3W when grease fill is at the specified minimum level. 0: Auto lube grease level is low. 1: Auto lube grease level is not low.

Fault Code A317

Description	Operation of brake auto apply circuit without a detected response.
Fault Conditions	Sets if operation of brake auto apply relay for 1 second does not cause the service brake pressure switch to operate or the front brake pressure to increase. Resets when parking brake is released for 5 seconds. "Park brake release" is defined as follows: Park brake set pressure switch is open. Park brake release pressure switch is closed.
Resulting Problem(s)	Failure of brake auto apply circuit could cause damage to parking brake.
Alert to Operator	Warning Monitor Indicator Lamp Alarm Buzzer **Display Fault Description**: BRK AUTO APPLY FLT **Display Operator Action**: GO TO SHOP NOW
Related Information	1. A laptop running “IM Realtime Data Monitor” software may be required to resolve this fault. 2. This fault is generated by IM in response to a problem in the sensor circuit. This sensor circuit may have a related fault that can be used to resolve the problem.
Component/Circuit Schematic Search	Auto Brake Apply Relay **(930E, 980E)**
Expected State	Sensor data: 0: Normal operation with parking brake either on or off. This valve operates only transiently when the parking brake is turned on. 1: Brake auto apply valve operates for 1.5 seconds after the parking brake is turned on if the truck is stopped. If moving, it will not operate until truck speed has dropped to 0.8 kph (0.5 mph). **Status - Open Load:** Unexpected if parking brake request and keyswitch are on. But expected if parking brake request is off or keyswitch is off. Troubleshoot if inconsistent. **Status - Normal:** Expected if parking brake request and keyswitch are on. Troubleshoot if status is normal with parking brake request off or keyswitch off. **Status - Shorted to ground:** Unexpected. Troubleshoot **Status - Overload:** Unexpected. Troubleshoot.
Component/Circuit Schematic Search	Switch Service Brake Pressure **(730E, 830E, 930E, 980E)**
Expected State	Sensor data: 0: Service brake not applied. 1: Service brake applied.
Component/Circuit Schematic Search	Sensor Brake Pressure **(730E, 830E, 930E, 980E)**
Expected State	Sensor data: Normal reading: 2.4 mA to 20.1 mA.

Fault Code A340

Description	The shifter controller has declared a fault.
Fault Conditions	Sets if the shifter controller detects a fault with the engine start switch on for 3 seconds. Resets if the fault goes away for 3 seconds or the steering bleed valve comes on.
Resulting Problem(s)	Truck may not be operational.
Alert to Operator	Warning Monitor Indicator Lamp Alarm Buzzer **Display Fault Description**: SHIFT CONTROL FAULT **Display Operator Action**: STOP: PARK: PWR ↓
Related Information	1. A laptop running “IM Realtime Data Monitor” software may be required to resolve this fault. 2. Except for being masked by the steering bleed process, this fault is contained within the shifter controller, the shift lever itself, or associated wiring.
Component/Circuit Schematic Search	Shifter Fault **(730E, 830E, 930E)**
Expected State	Sensor data: 0: Operation is normal. 1: A fault exists.

Fault Code A350

Description	Overload on output 1B.
Fault Conditions	Sets if driver chip detects over current or over temp on output 1B. Output is turned off when overload is detected. Resets at power down.
Resulting Problem(s)	Starting circuit is disabled.
Alert to Operator	Repair Monitor Indicator Lamp **Display Fault Description**: STRT ENABLE CKT FLT **Display Operator Action**: None
Related Information	1. A laptop running “IM Realtime Data Monitor” software may be required to resolve this fault. 2. This fault is generated by IM in response to a problem in the sensor circuit. This sensor circuit may have a related fault that can be used to resolve the problem.
Component/Circuit Schematic Search	Start Enable **(730E, 830E, 930E, 980E)**
Expected State	Sensor data: IM receives input on IM1B when cranking has been enabled. 0: One of several interlocking situations exist to prevent cranking: • excessive cranking history, • selector switch in wrong position, • engine red light, J1939 not OK, • engine speed either not 0 to begin cranking or over 400 rpm while cranking. 1: No interlocking situations exist to prevent cranking. **Status - Open Load:** Unexpected. Troubleshoot **Status - Normal:** Expected. No problem. **Status - Shorted to Ground:** Unexpected. Troubleshoot. **Status - Overload:** Unexpected. Troubleshoot.

Fault Code A360

Description	Overload on output 1S.
Fault Conditions	Sets if driver chip detects over current or over temp on output 1S. Output is turned off when overload is detected. Resets at power down.
Resulting Problem(s)	Unused outputs with short circuits on them might damage the driver chip if not corrected.
Alert to Operator	Repair Monitor Indicator Lamp **Display Fault Description**: IM OUTPUT 1S FAULT **Display Operator Action**: None
Related Information	1. A laptop running “IM Realtime Data Monitor” software may be required to resolve this fault. 2. Any spare wires connected to this output should be removed to prevent ultimate failure of the driver chip.
Component/Circuit Schematic Search	Spare IM Output (IM1S) **(730E, 830E, 930E, 980E)**
Expected State	Sensor data: 0: Off 1: On **Status - Open Load:** Unexpected. Troubleshoot. **Status - Normal:** Expected. No problem. **Status - Shorted to Ground:** Unexpected. Troubleshoot. **Status - Overload:** Unexpected. Troubleshoot.

NOTES

Fault Code A409

Description	Tire 2 (Front Right) High Pressure AMBER Fault.
Fault Conditions	Sets if pressure band AMBER high is on and Bad Value Sensor Error / Not Connected Fault is not on. Resets when conditions change or steering bleed valve comes on.
Resulting Problem(s)	Potential tire damage.
Alert to Operator	Warning Monitor Indicator Lamp Alarm Buzzer **Display Fault Description**: #2 TIRE PRESSURE HI **Display Operator Action**: GO TO SHOP NOW
Related Information	1. A laptop running “IM Realtime Data Monitor” software may be required to resolve this fault. 2. This fault is based entirely on data transmitted by the Tire Monitor.
Component/Circuit Schematic Search	CAN/RPC Connection **(830E, 930E)**
Expected State	Sensor data: IM receives Tire 2 Data from Tire Monitor on CAN/RPC (IM1i,j,k).

Fault Code A419

Description	Tire 3 (Rear Left Outboard) Low Pressure AMBER Fault.
Fault Conditions	Sets if pressure band AMBER low is on and Bad Value Sensor Error / Not Connected Fault is not on. Resets when conditions change or steering bleed valve comes on.
Resulting Problem(s)	Potential tire damage.
Alert to Operator	Warning Monitor Indicator Lamp Alarm Buzzer **Display Fault Description**: #3 TIRE PRESSURE LO **Display Operator Action**: GO TO SHOP NOW
Related Information	1. A laptop running “IM Realtime Data Monitor” software may be required to resolve this fault. 2. This fault is based entirely on data transmitted by the Tire Monitor.
Component/Circuit Schematic Search	CAN/RPC Connection **(830E, 930E)**
Expected State	Sensor data: IM receives Tire 3 Data from Tire Monitor on CAN/RPC (IM1i,j,k).

Fault Code A429

Description	Tire 4 (Rear Left Inboard) High Temperature RED Fault.
Fault Conditions	Sets if Temp limit RED is on and Bad Value Sensor Error / Not Connected Fault is not on. Resets if conditions change or if steering bleed valve comes on.
Resulting Problem(s)	Potential tire damage.
Alert to Operator	Warning Monitor Indicator Lamp Alarm Buzzer **Display Fault Description**: #4 TIRE TEMP HI **Display Operator Action**: STOP: PARK: PWR↓
Related Information	1. A laptop running “IM Realtime Data Monitor” software may be required to resolve this fault. 2. This fault is based entirely on data transmitted by the Tire Monitor.
Component/Circuit Schematic Search	CAN/RPC Connection **(830E, 930E)**
Expected State	Sensor data: IM receives Tire 4 Data from Tire Monitor on CAN/RPC (IM1i,j,k).

Fault Code A439

Description	Tire 5 (Rear Right Inboard) Bad Value Sensor Error / Not Connected Fault.
Fault Conditions	Sets if Last Tag Status Input is equal to 2. Resets if not equal to 2.
Resulting Problem(s)	Tire data is bad.
Alert to Operator	**Display Fault Description**: TIRE #5 BAD VALUE **Display Operator Action**: None
Related Information	1. A laptop running “IM Realtime Data Monitor” software may be required to resolve this fault. 2. This fault is based entirely on data transmitted by the Tire Monitor.
Component/Circuit Schematic Search	CAN/RPC Connection **(830E, 930E)**
Expected State	Sensor data: IM receives Tire 5 Data from Tire Monitor on CAN/RPC (IM1i,j,k).

DUMP TRUCK

860E
960E
980E

Machine model	Serial number	Machine model	Serial number
860E-1K	A30031 - A30035, A30041, A30042, A30044 - A30046, A30101, A30107 - A30110, A30117 and up	960E-1K	A50003 - A50010
		960E-2	A30027 and up
		960E-2K	A50011 and up
		960E-2KT	A50028 and up
		980E-4	A40003 and up
		980E-4AT	A40003 and up
860E-1KT	A30001 - A30030, A30036 - A30040, A30043, A30047 - A30100, A30102 - A30106, A30111 - A30116	980E-5	A50003 and up
		980E-5AT	A50003 and up
		980E-5SE	A60001 and up

40 Troubleshooting
Steering system

Table 2: Steering pump troubleshooting guide			
SYMPTOM	**POSSIBLE CAUSE**	**DIAGNOSTIC VERIFICATION**	**CORRECTIVE ACTION**
Noisy	Restricted oil at inlet	Pump stroke adjuster set too high. (High altitude trucks only.)	Reset stop. Refer to Testing and Adjusting section, **Steering, brake cooling and hoist hydraulic system**.
		Verify hydraulic oil viscosity is correct for current ambient temperature.	Correct or warm oil before starting.
		Check for clogged suction strainer. *Note: Maximum suction vacuum = 35 mm (1.4 in.) Hg.*	Clean hydraulic tank and strainer.
	Pump case has insufficient oil	Disconnect hose at pump fitting. Verify case is full.	Fill case.
	Air entering pump suction	Visually inspect suction hoses and connections. Coat suspect areas with heavy oil or grease.	Tighten loose fittings, repair seals as needed.
	Pump input shaft misaligned	Verify driveshaft fasteners are present and secure.	Install and tighten as needed.
		Verify pump mounting fasteners and brackets are present and secure. *Note: Maximum pump input shaft misalignment = 0.13 mm (0.005 in.) TIR.*	Install and tighten as needed.
	Internal pump damage	Examine hydraulic steering filter element for debris.	Replace pump and flush system. Install new steering and hoist filter elements.
		Perform pump case drain check.	Refer to "Pump case drain check".
Excessive heat	Air entering pump suction	Visually inspect suction hoses and connections. Coat suspect areas with heavy oil or grease.	Tighten loose fittings, repair seals as needed.
	Pump internal parts worn	Measure suction and case drain oil temperatures near the pump. Maximum temperature rise through case drain = 15° C (59° F).	Repair or replace.
		Measure suction and outlet oil temperatures near the pump. Maximum temperature rise through main line = 7° C (45° F).	Repair or replace.

DUMP TRUCK

730E
830E
930E
980E

Machine model	Serial number
730E-8	A40004 and up
730E-10	A50002 and up
830E-5	A50005 and up
830E-5AT	A50005 and up
930E-5	A40004 and up
930E-5AT	A40004 and up
930E-5SE	A50001 and up
980E-5	A50003 and up
980E-5AT	A50003 and up
980E-5SE	A60001 and up

40 Troubleshooting
KomVision

KOMVISION TROUBLESHOOTING					
KAC CODE	**SUB CODE**	**FAULT PART**	**PHENOMENON NAME**	**ACTION**	**KLTD CODE**
CM0803	RA04	UWB Radar 8	ERR_SENS_HARDWARE_FAILURE_ ONLINE	Exchange the Radar8	DQ18KT
CM0804	RB01	UWB Radar 8	COMMUNICATION_ERROR	Please check whether there are any abnormalities in a controller. If there are no abnormalities in a controller, Exchange the Radar8	DQ18KR
CM0804	RB02	UWB Radar 8	ERR_SENS_CAN_MESSAGE_ MISSING_OR_CONTENT_INVALID	Exchange the Radar8	DQ18KR
CM0804	RB03	UWB Radar 8	ERR_SENS_CAN_SYNC_TIMING_ INVALID	Exchange the Radar8	DQ18KR
CM0805	-	UWB Radar 8	VERSION FAULT	Exchange the Radar8 It may be caused by disconnection when the disconnection error has occurred simultaneously. Please cancel a disconnection error first.	DQ18KM

Electronic fan clutch troubleshooting

For trucks that are equipped with the electronic fan clutch, the fan clutch controller is installed in the auxiliary control cabinet. The controller has a single LED indicator on the cover. The color pattern and blinking frequency of the LED indicator provide status information about the fan clutch.

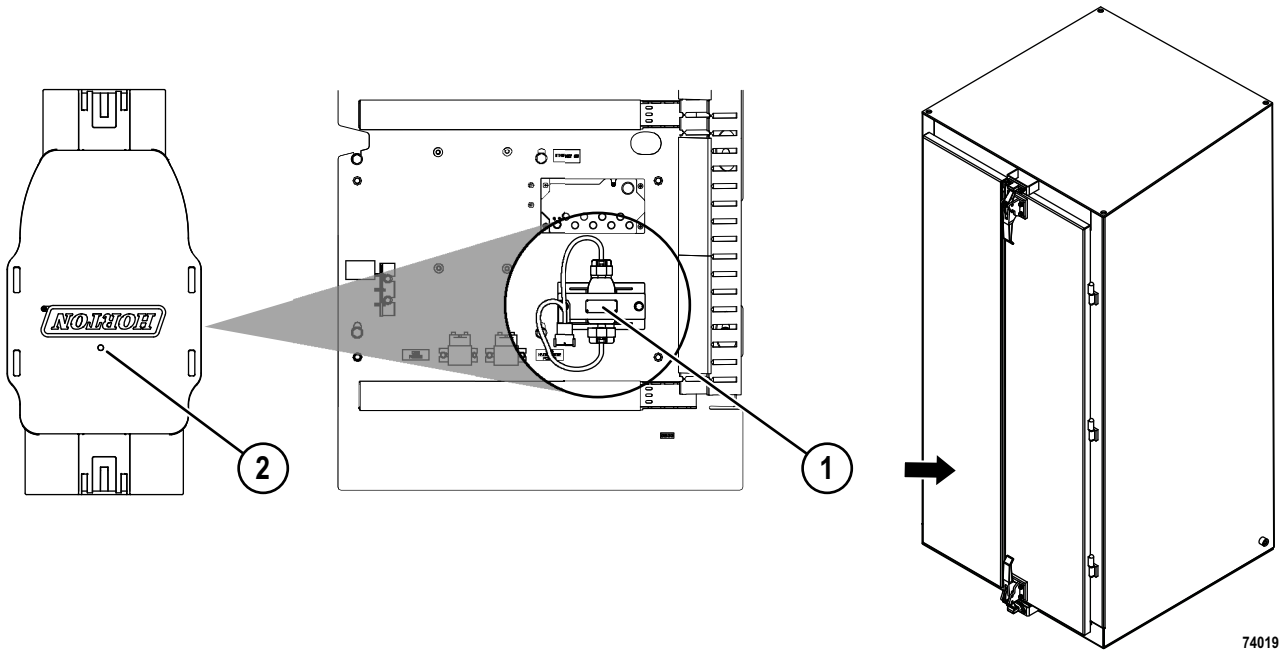


FIGURE 40-1. ELECTRONIC FAN CLUTCH CONTROLLER - SSDA16V160 ENGINE

1. Controller 2. LED Indicator

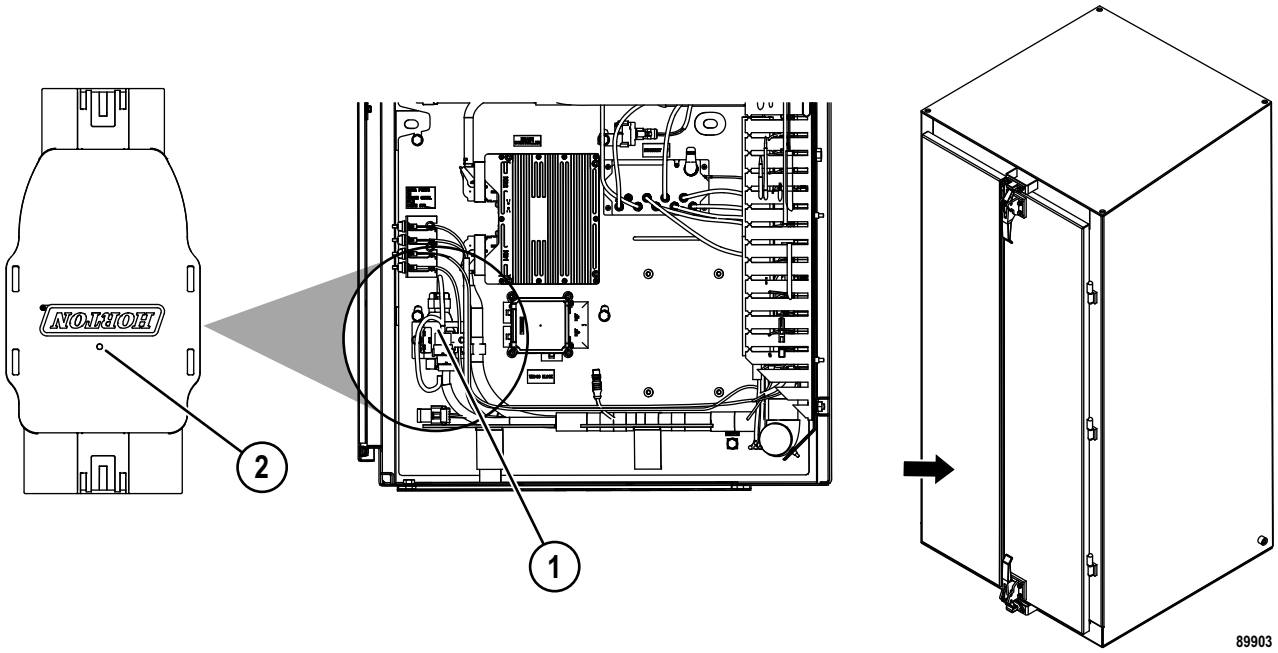


FIGURE 40-2. ELECTRONIC FAN CLUTCH CONTROLLER - SDA16V190 ENGINE

1. Controller 2. LED Indicator

DUMP TRUCK

980E

Machine model	Serial number
980E-5	A50052, A50053, A50137 - A50140
980E-5SE	A60001 and up

50 Disassembly and assembly
Wheels, spindles and rear axle

Rim and tire service

Rim components

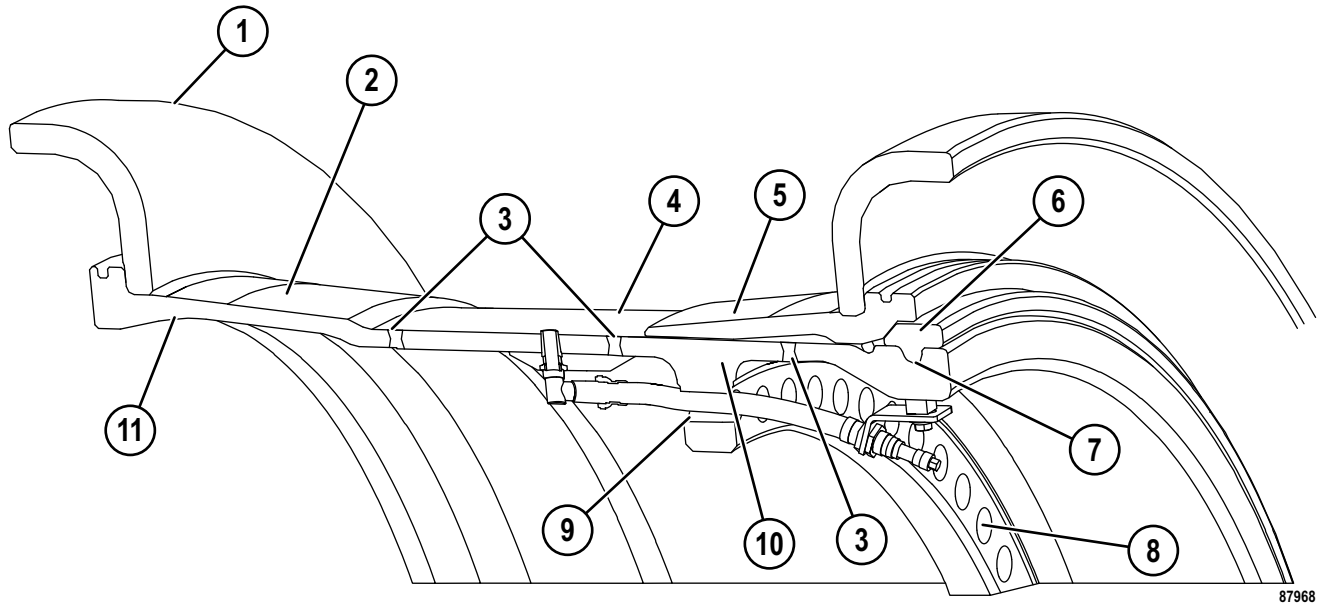


FIGURE 50-6. RIM COMPONENTS

1. Side ring
2. Bead seat area
3. Rim circum-weld
4. Rim base
5. Bead seat band
6. Lock ring
7. Gutter
8. Bolt hole
9. Valve hole (tube type)
10. Disc
11. Back Flange

Smart rim component layout

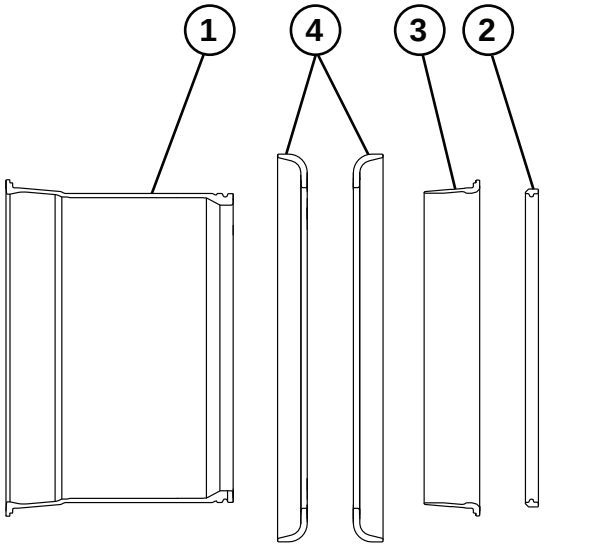


FIGURE 50-7. STANDARD RIM (5-PIECE)

1. Rim Base
2. Lock Ring
3. Bead Seat band
4. Side Ring

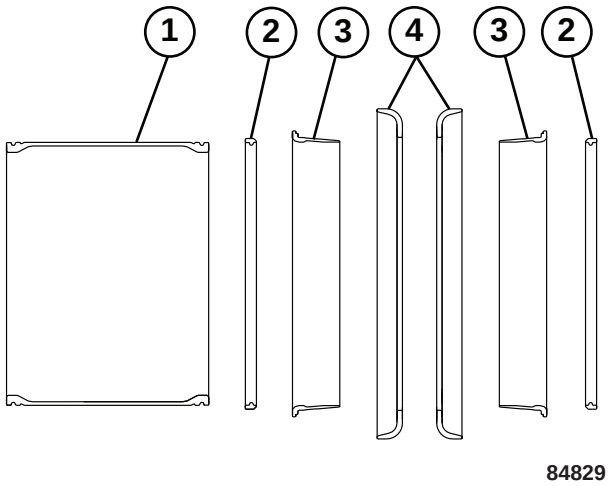


FIGURE 50-8. SMART RIM (7-PIECE)

1. Rim Base
2. Lock Ring
3. Bead Seat band
4. Side Ring

3. Move the bead seat band to gain access to the lock ring groove and O-ring groove.
4. Remove the expanded lock ring from the outside the inner dual. Refer to "Removing the lock ring".

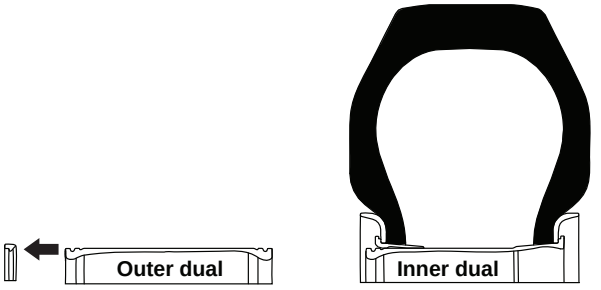


FIGURE 50-38.

5. Remove the O-ring from the rim.
6. Apply a bead breaker to the back flange area. Remove the tire bead from the bead seat of the rim back flange.

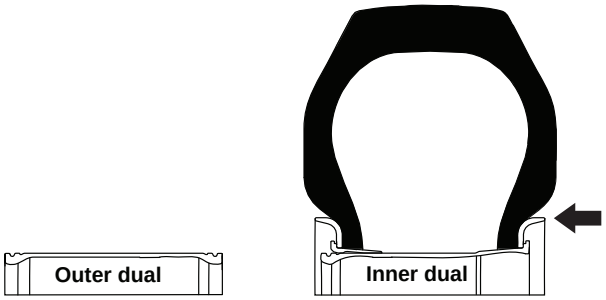


FIGURE 50-39.

7. Remove the tire and rim components as a unit. Store the tire in a safe and clean area.

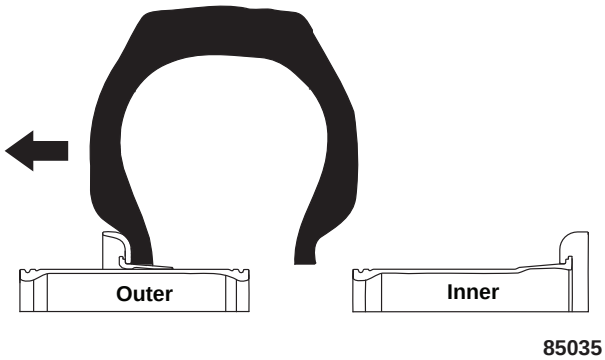


FIGURE 50-40.

Preparation before assembly

1. Confirm tire and rim component combination.
   a. Check the tire size and markings on the rim base, and ensure that the combination is correct.
   b. Check the markings on rim components and matching charts, and ensure that the combination is correct.
2. Clean rim components with a wire brush so that examination, maintenance, and mounting can be done correctly.

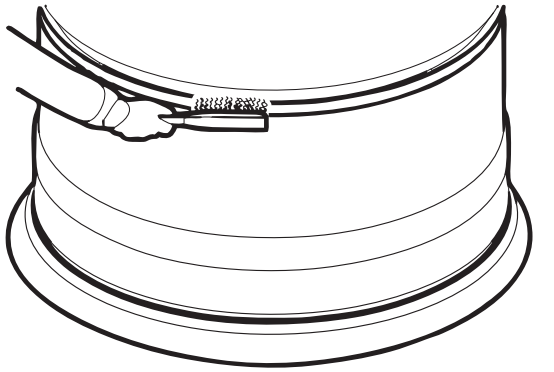


FIGURE 50-41.

3. Check that there is no deformation, cracking, wear, corrosion, or damage on the rim components.
4. Re-coat any areas where the anti-corrosive oil or paint is peeling.
5. Confirm there are no tire defects.
6. Apply lubricant to both tire bead seats. Refer to “Lubricants” for details.

⚠CAUTION

DO NOT apply tire lubricant to areas other than where the rim components come in contact with the tire. Doing so could cause circumferential slippage between rim components when the vehicle is being driven. Consult your tire dealer when selecting tire lubricant.

⚠WARNING

Heavy structures and high forces are involved in this procedure. Use caution at all times when applying force to these parts. Sudden release of the spindle could cause components to move forcefully and unexpectedly.

5. After the spindle removal tool has been installed, progressively increase the torque on the capscrews in a circular pattern until the tapered piston breaks loose, or until the maximum specified torque on the capscrews of **2 142 N·m (1,580 ft lb)** is reached.
6. If the specified torque is reached and the parts have not separated, slightly loosen the capscrews, then slowly and uniformly apply heat to spindle area (3 Figure 50-62).

   Heat must be applied in two locations 180 degrees apart. Allow the heat to penetrate into the spindle. Reapply heat as required. **Do not exceed 454 °C (850 °F) anywhere on the spindle**.

⚠CAUTION

Heating the spindle in excess of 454° C (850° F) may cause serious damage to the spindle.

7. Tighten the capscrews again to the maximum specified torque as described in step 5.
8. Use a large hammer and heat at the specified locations to carefully tap on the top surface of the spindle until the piston breaks free.

NOTE: In extreme cases, it may be necessary to remove additional steering arm retaining capscrews and use additional capscrews to apply more force.

10. After separation, use the lifting device to move the spindle, hub and brake assembly to a clean work area for repair.

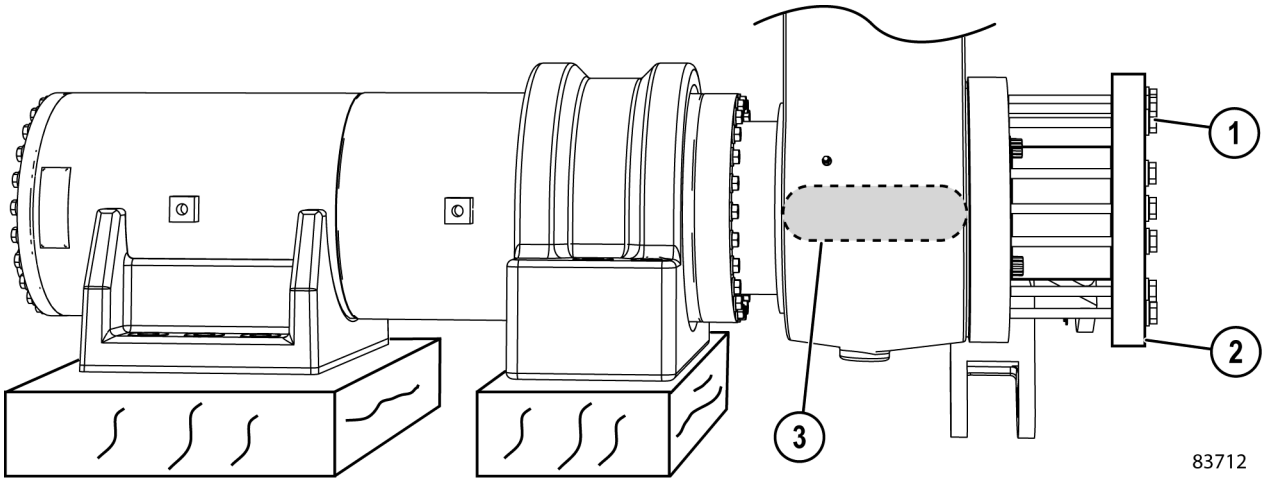


FIGURE 50-62. SPINDLE REMOVAL TOOL INSTALLATION OFF THE TRUCK

1. Capscrew & Hardened Flat Washer
2. Spindle Removal Tool
3. Area to heat

Assembly

⚠WARNING

Use a lifting device with adequate capacity to remove and install the components.

⚠ IMPORTANT ⚠

All mating surfaces of the wheel and brake components must be clean and dry during assembly. No thread lubricant is permitted on these surfaces.

NOTE: Always use new O-ring seals during assembly.

1. If removed, install bearing cups (1, Figure 50-76) and (2) in the wheel hub as follows:
   a. Preshrink the bearing cups by packing them in dry ice or by placing them in a deep-freeze unit.

⚠CAUTION

Do not cool below -54°C (-65°F). Cooling below this temperature can cause microstructure changes in the steel which may result in premature bearing failure. Liquid nitrogen MUST NOT be used for cooling.

   b. Install the bearing cups in the wheel hub bores.
   c. After the bearing cups have warmed to ambient temperature, press the bearing cups tight against the hub shoulder as follows:

Inner cup - Apply 22 680 kg (25 tons) of force.

Outer cup - Apply 20 860 kg (23 tons) of force.

2. Position the spindle vertically (hub end up).
3. Check both bearing cones for a slip fit on the spindle.
4. Install spacer (1, Figure 50-79). If necessary, tap lightly to seat the spacer against spindle (2). The spacer must fit tightly against the spindle shoulder.
5. Lightly lubricate the bearings with clean TO50 hydraulic oil before installation.
6. Install retainer pin (4) in the pin groove, then install inner bearing cone (5) against the spacer. The bearing cone is a loose fit on the spindle.

NOTE: To facilitate wheel bearing adjustment, do not install the brake assembly at this time.

7. Install wheel hub (3) onto spindle (2).
8. Install outer bearing cone (6) and retainer pin (7) in the wheel hub.

Floating seal assembly and installation

Failures of floating ring seals are usually caused by a combination of factors rather than one single cause, but many failures have one common denominator - assembly and installation issues.

There are five common failure modes:

- Oil leakage
- Galling
- Pumping mud past the O-ring
- O-ring failure
- Seal ring breakage

The following procedure using necessary installation tools must be accomplished to be assured of satisfactory floating seal performance

.

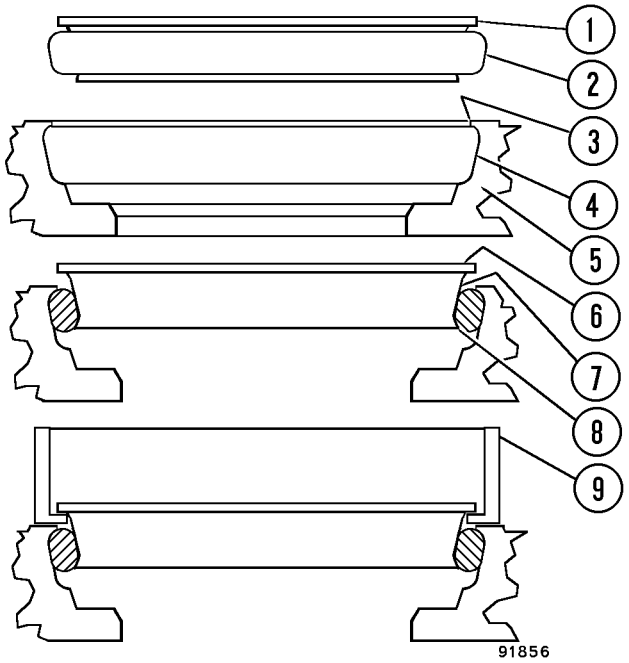


FIGURE 50-98. FLOATING RING SEAL TERMINOLOGY

1. Seal Ring
2. Rubber O-Ring
3. Housing Retainer Lip
4. Housing Ramp
5. Seal Ring Housing
6. Seal Ring Face
7. Seal Ring Ramp
8. Seal Ring Retainer Lip
9. Installation Tool

CAUTION

Seal rings must always be installed in matched pairs. The seal rings must be new. DO NOT mate a new ring with a used ring. DO NOT install two used rings. Always install new O-rings. The seals must be installed as a purchased set.

1. Prepare a completely clean work area to handle the large seal rings, O-rings and seal carriers. Absolute cleanliness is essential during the assembly process to prevent premature seal failure and possible oil leaks.

Use isopropyl alcohol in a spray bottle to clean the parts prior to assembly. Use clean, lint-free material such as Micro-Wipes # 05310 for cleaning and wiping. Do not use Stanosol or any other liquid that leaves an oily film or does not evaporate quickly.

2. Thoroughly clean the rubber O-rings with lint free cloth and isopropyl alcohol to remove the white powder-like coating and any other contaminants. Use lint free cloth and isopropyl alcohol to clean the seal contact surfaces on housing ramp (4, Figure 50-98) where the O-rings will be seated. Use lint free cloth and isopropyl alcohol to clean portion of brake housings, wheel hub, spindle and seal carriers that will contact the O-rings. Also clean the polished sealing surface on the seal rings. Allow surfaces to dry completely.
3. Carefully inspect the polished sealing surfaces on the seal rings for scratches or any other damage. Inspect the entire seal contact areas on all the parts for scratches or nicks that may damage the O-rings during installation or cause a path of leakage after installation. Inspect the O-rings for damage that could cause a leakage path. If scratches are present, hone and then clean the damaged area. Inspect the O-rings for damage that could cause a leakage path.
4. Use clean, lint-free cloths and isopropyl alcohol to remove all traces of oil, dust, protective coating or other foreign matter from the metal seal rings, the O-rings, the back plate and the seal contact areas on all of the parts. Allow the surfaces to dry completely.

NOTE: Oil from adjacent bearing installations or seal ring face lubrication MUST NOT get on the ramp or O-ring until after both seal rings are together in their final assembled position.

Removal and installation of rear axle

Removal

WARNING

Hydraulic oil escaping under pressure can have sufficient force to enter a person's body by penetrating the skin and cause serious injury, and possibly death, if proper medical treatment is not received immediately.

Relieve pressure before disconnecting any hydraulic lines. Tighten all connections securely before applying pressure.

1. Refer to the "Hydraulic system bleeddown procedure" in Testing and adjusting section **Steering, hoist, brake cooling and auxiliary hydraulic system**.
2. Remove the dump body. Refer to Disassembly and assembly section **Body and structures**.
3. Remove the rear suspensions. Refer to Disassembly and assembly section **Suspensions**.
4. Remove the anti-sway bar. Refer to "Removal and installation of anti-sway bar".
5. Remove the wheel motors. Refer to "Removal and installation of wheel motor".
6. Disconnect and unclamp all electrical harnesses that are attached to the rear axle housing.
7. Disconnect and unclamp all automatic lubrication system hoses that are attached to the rear axle housing. Secure the hoses to the frame to prevent interference during removal of the rear axle housing.
8. Remove the power cable grips at power cable mount (1, Figure 50-116) on the right side of the rear axle housing. Pull the power cables from the rear axle housing.

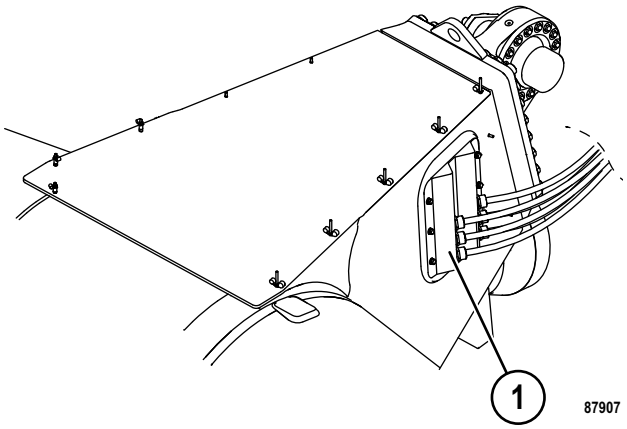


FIGURE 50-116. POWER CABLES

1. Power Cable Mount

Removal and installation of wheel motor

Preparation

- Remove the rear wheels. Refer to “Removal of rear wheel”.
- Bleed down the hydraulic system pressure. Refer to “Hydraulic system bleeddown procedure”.
- If necessary, remove the dump body. Refer to “Removal of dump body”.

Component Weights	
Wheel Motor Assembly	25,600 kg (56,440 lb)

⚠WARNING

The drive system power cables conduct high voltages. Touching high voltage cables could result in serious personal injury or death. Shut off all electrical power and verify that no voltage is present before touching any power cable or terminal.

⚠WARNING

Hydraulic oil escaping under pressure can have sufficient force to enter a person's body by penetrating the skin. This could cause serious injury and possibly death if proper medical treatment is not received immediately.

Relieve pressure before disconnecting any hydraulic lines. Tighten all connections securely before applying pressure.

Removal

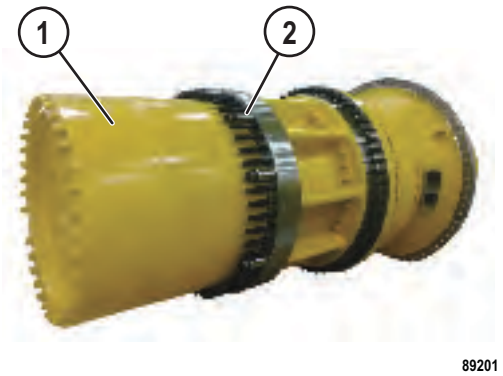


FIGURE 50-129. TRANSMISSION SUPPORT

1. Attach transmission supports (2, Figure 50-129) at regular intervals on studs around transmission (1).

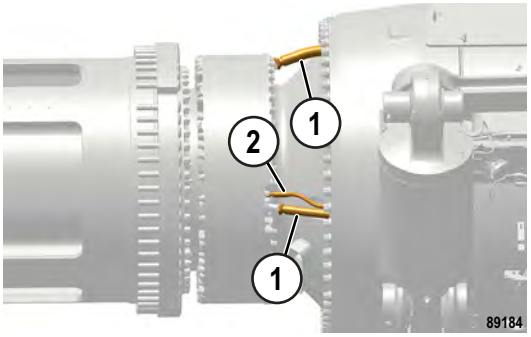


FIGURE 50-130. BRAKE COOLING AND BRAKE APPLY HOSES

2. Apply a vacuum to the hydraulic tank. Refer to “Hydraulic system vacuum procedure“.
3. Disconnect brake cooling hoses (1, Figure 50-130) and brake apply hose (2). Plug the hoses and brake ports. Remove the hose clamps and position the hoses out of the way.

DUMP TRUCK

980E

Machine model	Serial number
980E-5SE	A60001 and up

50 Disassembly and assembly
Brake system

Removal and installation of brake manifold

Removal

NOTE: If the brake manifold is leaking oil, an O-ring or cartridge can be replaced without removing the manifold from the truck. Refer to "Disassembly and assembly of brake manifold".

⚠WARNING

Hydraulic oil escaping under pressure can have sufficient force to enter a person's body by penetrating the skin and cause serious injury, and possibly death, if proper medical treatment is not received immediately.

Relieve pressure before disconnecting any hydraulic lines. Tighten all connections securely before applying pressure.

1. Refer to the "Hydraulic system bleeddown procedure" in Testing and adjusting section **Steering, hoist, brake cooling and auxiliary hydraulic system**.
2. Close all accumulator bleed valves (1, Figure 50-13) by rotating them clockwise.
3. Disconnect and tag all hydraulic lines from brake manifold (2). Plug all hydraulic lines and ports to prevent possible contamination.
4. Disconnect and tag all electrical wiring from the brake manifold components.
5. Remove 4 capscrews and washers (3) from mounting bracket (4). Move the brake manifold to a clean work area for disassembly.

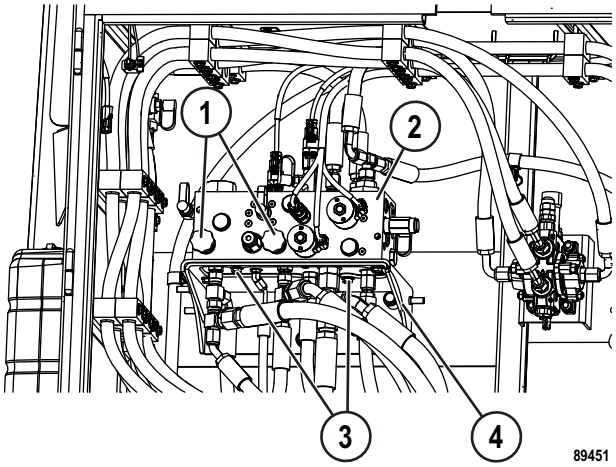


FIGURE 50-13. BRAKE MANIFOLD REMOVAL & INSTALLATION

1. Accumulator Bleed Valves
2. Brake Manifold
3. Capscrews and Washers
4. Mounting Bracket

Installation

1. Place brake manifold (2, Figure 50-13) into position on mounting bracket (4).
2. Install 4 capscrews and washers (3, Figure 50-13). Tighten capscrews to the standard torque.
3. Remove all plugs and connect all lines and electrical wiring to the proper locations.
4. Open accumulator bleed valves (1).
5. Start the engine. Check for leaks and for proper operation.
6. Shut off the engine and ensure that the hydraulic tank is filled to the proper level.

3. Assemble the backup ring and O-ring into the end cap groove. The backup ring must be toward the threaded side or outside of the end cap. Apply a light coat of grease to the threads and O-ring of the end cap.

NOTE: Check the face of piston and tube for any contamination before installing the end caps.

4. Secure the accumulator horizontally in a chain vise.
5. Install two lifting eyes or long capscrews in two of the three 5/8" - 11UNC lifting holes in the end cap.
6. Use a bar to tighten the end cap clockwise to a torque of **300 N·m (221 ft lb)**.

   After the end cap is tightened, the end cap should be flush ± 1.5 mm (± 0.06 in) with the end of the accumulator housing.
7. Repeat steps 5 and 6 for the other end cap.
8. Remove the screws from both end caps. Clean the excess lubricant from the end cap areas at both ends of the accumulator.
9. Install plugs (2, Figure 5-22) in the oil end cap. Also install a plug in place of flange (1) and the hose fitting.
10. Before closing up the ports, add 1.4 L (48 oz) of oil to the gas end.
11. Install the charging valve with a new O-ring. Tighten valve body (3, Figure 5-21) to **22 N·m (16 ft lb)**.
12. Test the accumulator for leaks. Refer to "Piston accumulator leak testing" in Testing and adjusting section **Accumulators and suspensions**.

Disassembly and assembly of front wheel brake

Disassembly

IMPORTANT

Disassemble and reassemble the brake assembly on a clean, dry work surface. The work surface should be wooden. If the work surface is metal or concrete, use padding to prevent damage to machined surfaces. Handle all parts carefully to avoid damage to polished sealing surfaces.

WARNING

Use a lifting device with adequate capacity to remove and install the components.

1. Remove the brake assembly from the truck. Refer to the Disassembly and assembly section **Wheels, spindles and rear axle**.
2. Ring gear retainer bars (1, Figure 50-27) must be installed to retain the inner gear inside the brake assembly.
3. Position the brake assembly on a work surface so that the ring gear retainer bars are on the bottom as shown in Figure 50-28.

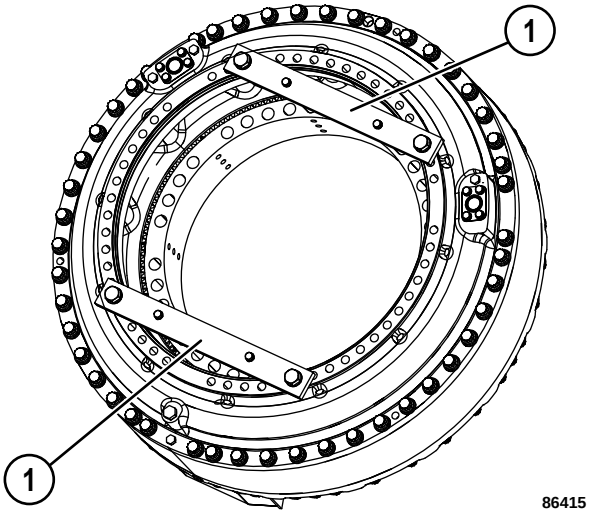


FIGURE 50-27. RING GEAR RETAINER BARS ON BRAKE ASSEMBLY

1. Ring Gear Retainer Bars

Cleaning and inspection

⚠ IMPORTANT ⚠

If the brake wear indicator test indicates that internal brake components are worn to the maximum allowable limit, all friction discs, separator plates and dampers must be replaced with new parts. Always replace seal assemblies and O-rings with new parts.

1. Clean all parts thoroughly before inspection.
2. For the rear brake assembly, remove and discard the seal assemblies in seal carrier (6, Figure 50-35) and back plate (1, Figure 50-36).
3. Inspect piston housing (7, Figure 50-40) for nicks and scratches in the piston seal area. If any nicks or scratches cannot be removed by polishing, replace the piston housing.
4. Inspect the piston seal assembly grooves for damage.
5. Inspect piston retract springs (3, Figure 50-40). Check the free height and test for height under load. Replace the springs if they are not within approximately 10% of specification.
   - ❑ Free Height:. . . . . 88.9 mm (3.50 in.)
   - ❑ Height at 1 290 N (290 lb) working load: . . . . . 74.60 mm (2.937 in.)
   - ❑ Height at 2 669 N (600 lb) working load: . . . . . 56.46 mm (2.223 in.)
6. Inspect friction discs (3, Figure 50-37) for warping, tooth wear, and excessive friction material wear. Replace the friction discs if wear exceeds the minimum allowable groove depth.
   - ❑ Disc thickness including friction material: . . . . . .7.7 ± 0.3 mm (0.30 ± 0.01 in.)
   - ❑ Friction material thickness (new): . . . . . .1.1 mm (0.04 in.)
   - ❑ Nominal friction material groove depth: . . . . . .0.63 mm (0.025 in.)
   - ❑ Minimum allowable friction material groove depth:. . . . . .0.25 mm (0.010 in.)
   - ❑ Flatness over friction material (new): . . . . . .0.45 mm (0.018 in.)
7. Inspect separator plates (4, Figure 50-37) for warping and tooth wear.
   - ❑ Disc thickness (new): . . . . . .3.7 ± 0.1 mm (0.146 ± 0.004 in.)
   - ❑ Flatness (new): . . . . . .0.5 mm (0.020 in.)
8. Inspect dampers (2, Figure 50-37) for warping, tooth wear and excessive facing material wear.
   - ❑ Disc thickness including facing material: . . . . . .6.9 ± 0.5 mm (0.272 ± 0.020 in.)
   - ❑ Disc thickness, steel plate only (new): . . . . . .3.7 ± 0.1 mm (0.146 ± 0.004 in.)
   - ❑ Flatness, steel plate (new): . . . . . .0.5 mm (0.020 in.)
9. Inspect outer ring gear (6, Figure 50-39) for excessive tooth wear and for nicks and scratches in the O-ring seal grooves.
10. Inspect inner gear (5, Figure 50-38) for excessive tooth wear and damage at the capscrew holes.

18. To test the floating seal assembly installation, place the spindle, hub and brake assembly on a test stand as shown in Figure 13. Pump oil through the brake cooling chamber at an inlet pressure of 83 - 103 kPa (12 - 15 psi). Rotate the hub as follows:
    a. Run right at 12 rpm for 10 minutes.
    b. Run left at 12 rpm for 10 minutes.
    c. Run right at 24 rpm for 10 minutes.
    d. Run left at 24 rpm for 10 minutes.
    e. Run right at 36 rpm for 10 minutes
    f. Run left at 36 rpm for 10 minutes

    No visible leakage should be detected during this test.

FIGURE 50-57. SPINDLE, HUB AND BRAKE ASSEMBLY TEST STAND

DUMP TRUCK

980E

Machine model	Serial number
980E-5	A50003 and up
980E-5AT	A50003 and up
980E-5SE	A60001 and up

50 Disassembly and assembly
Steering system

Removal and installation of steering column

Removal

1. Park truck on a hard, level surface and block all the wheels.
2. Place the shift control lever in PARK and turn the rest switch ON. Turn the key switch OFF to shut down the engine and allow 90 seconds for the steering system accumulators to bleed down.
3. Remove lower dash panel cover (1, Figure 50-13).

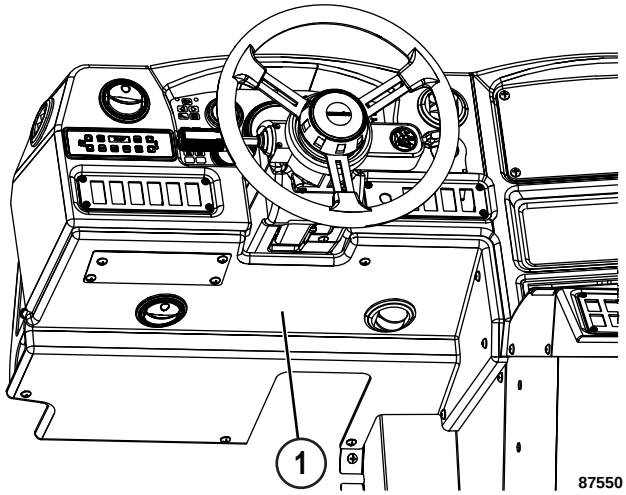


FIGURE 50-13. ACCESSING THE STEERING COLUMN

1. Lower Dash Panel Cover

4. Disconnect and unclamp speed control switch harness (1, Figure 50-14) and multi-function switch harness (2).
5. Remove steering column bottom cover (3) and coupling cover (4).

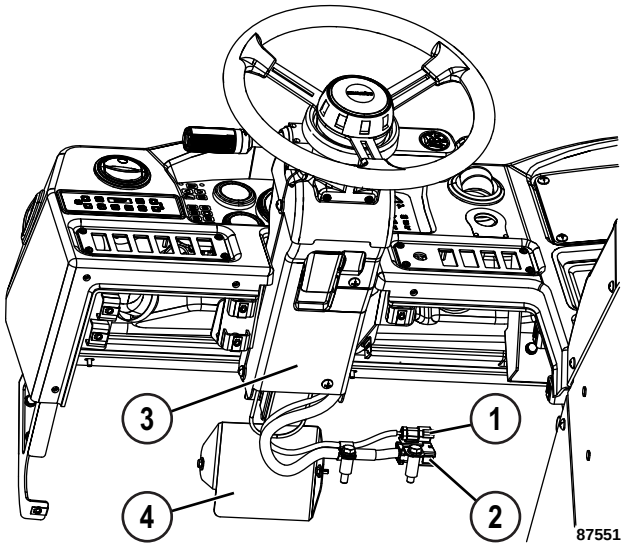


FIGURE 50-14. REMOVING THE STEERING COLUMN

1. Speed Control Switch Harness
2. Multi-Function Switch Harness
3. Steering Column Bottom Covers
4. Coupling Cover

6. Remove piston bearing (5, Figure 50-26) and piston seal assembly (4) from the outside of piston (3).
7. Remove both backup rings (1) and O-ring (2) from the bore of piston (3).

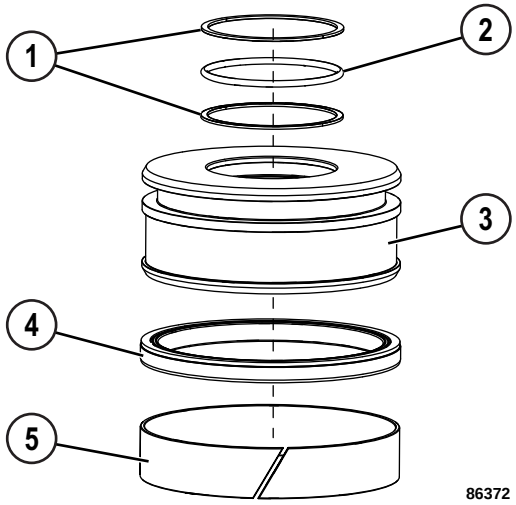


FIGURE 50-26. PISTON DISASSEMBLY & ASSEMBLY

1. Backup Rings
2. O-ring
3. Piston
4. Piston Seal Assembly
5. Piston Bearing

Cleaning and inspection

⚠WARNING

When using cleaning agents, follow the solvent manufacturer's instructions.

1. Clean all parts thoroughly in fresh cleaning solvent. Use a solvent that does not leave a film after evaporation such as trichloroethane, acetone or lacquer thinner.
2. Dry all parts completely using only dry, filtered compressed air and lint free wiping materials.
3. Inspect all parts for evidence of wear or damage. Inspect plated surfaces for scratches, nicks or other defects. Replace or repair any damaged parts.

NOTE: Contact your local Komatsu distributor for repair information and instructions not covered in this manual.

Assembly

NOTE: Lubricate the O-rings with clean hydraulic oil before installation.

1. Install O-ring (2, Figure 50-26) and both backup rings (1) in the bore of piston (3).
2. Install piston seal assembly (4) and piston bearing (5) on the outside of piston (3).

NOTE: If the gland removed used three seals, it must be replaced with a four seal style gland before continuing this procedure.

3. Install rod bearing (5, Figure 50-25), buffer seal (4), and main seal (3) in the bore of gland (6).
4. Install secondary wiper seal (2, Figure 50-27) then primary wiper seal (3) in the bore of gland (4). To ensure optimal seal life, it is important to install the seals properly. Evenly press the seals into the gland using the wiper seal installation tool (1). A press may be used to assist installation.

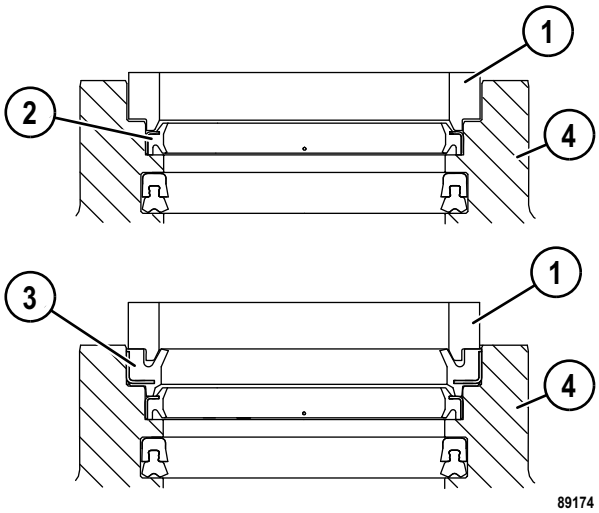


FIGURE 50-27. WIPER SEAL INSTALLATION

1. Installation Tool
2. Secondary Wiper Seal
3. Primary Wiper Seal
4. Gland

5. Install O-ring (7, Figure 50-25) and backup ring (6) on the outside of gland (5).
6. Slowly push rod (1, Figure 50-24) through the top of gland (2). Be careful not to damage the seals and bearing.

5. Secure the accumulator horizontally in a chain vise.
6. Install two lifting eyes or long capscrews (1, Figure 50-48) in two of the three 5/8" - 11UNC lifting holes in end cap (3).
7. Use a bar to turn the end cap counterclockwise. Remove the end cap.
8. Repeat steps 5 and 6 for the other end cap.

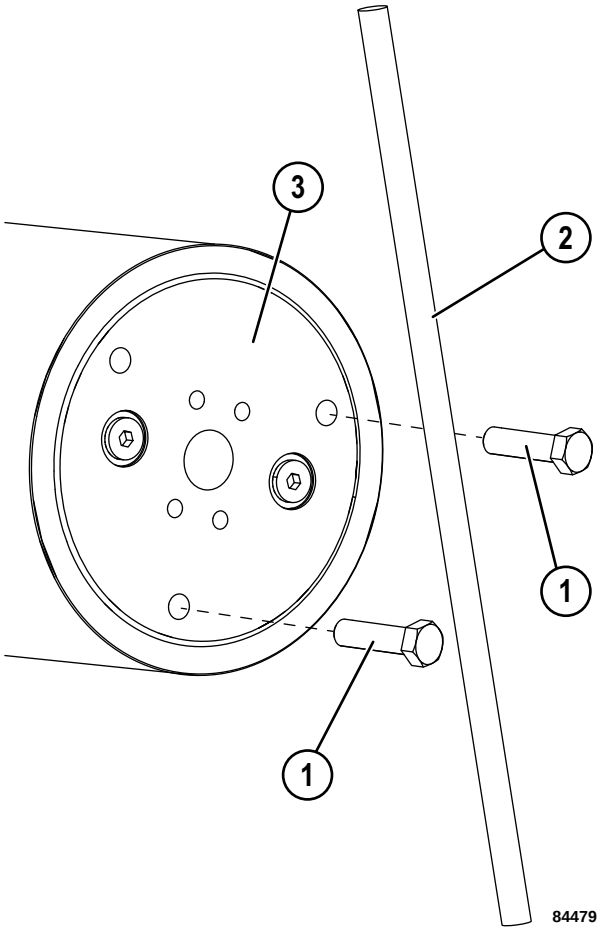


FIGURE 50-48. REMOVING THE END CAP

1. Capscrew
2. Bar
3. End Cap

9. Use a long dowel (wood, plastic or padded) or push rod (XA6348) to carefully tap piston (1, Figure 5-49) out of the accumulator housing. Be careful not to damage the piston or seals on the end cap threads.

NOTE: Never use pressurized air to remove the piston.

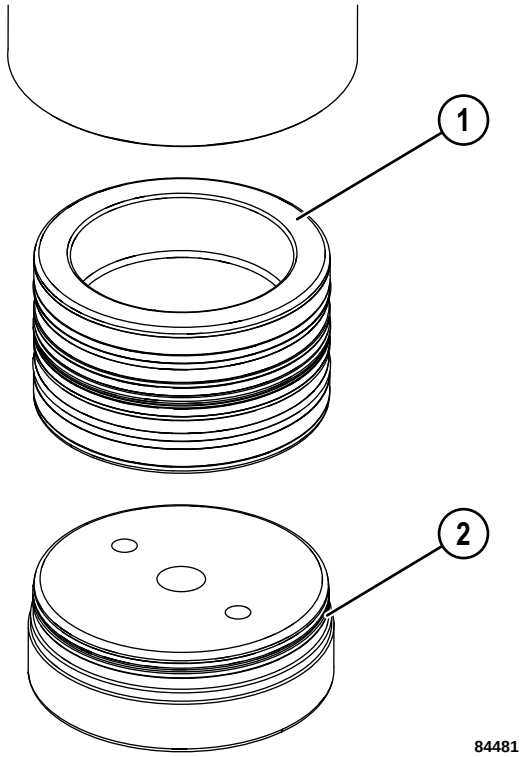


FIGURE 50-49. PISTON REMOVAL (TYPICAL)

1. Piston
2. End Cap

5. Tighten all 14 capscrews to **1 356 ± 136 N·m (1,000 ± 100 ft lb)** in the sequence shown in Figure 50-12.

NOTE: Use a properly calibrated torque wrench to ensure accuracy.

NOTE: Do not exceed 4 rpm tightening speed. Do not hammer or jerk the wrench while tightening.

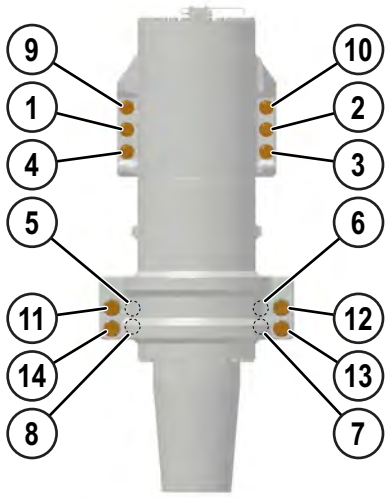


FIGURE 50-12. TIGHTENING SEQUENCE

6. Loosen capscrew (1, Figure 50-12).

NOTE: Only loosen one fastener at a time. It is important to fully tighten each fastener to its final torque before moving on to the next.

7. Tighten the capscrew to a torque of **95 N·m (70 ft lb).**

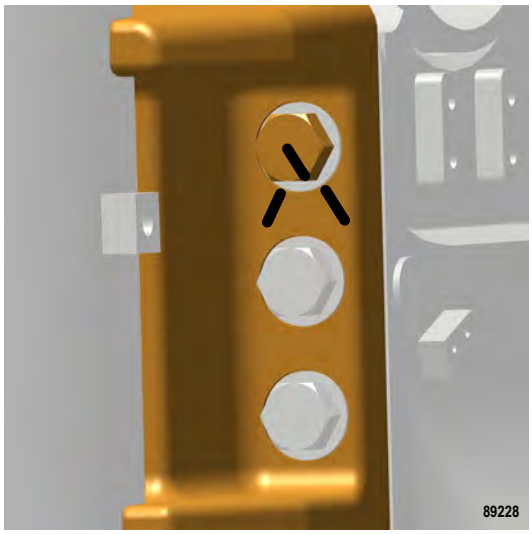


FIGURE 50-13. 60 DEGREE REFERENCE LINES

8. Make 60 degree reference lines as follows. See Figure 50-13.
   a. Make a mark on a corner of the capscrew head.
   b. Make a mark on the suspension that is aligned with the mark on the capscrew.
   c. Make a mark on the suspension that is offset by 60 degrees from the first mark on the suspension.

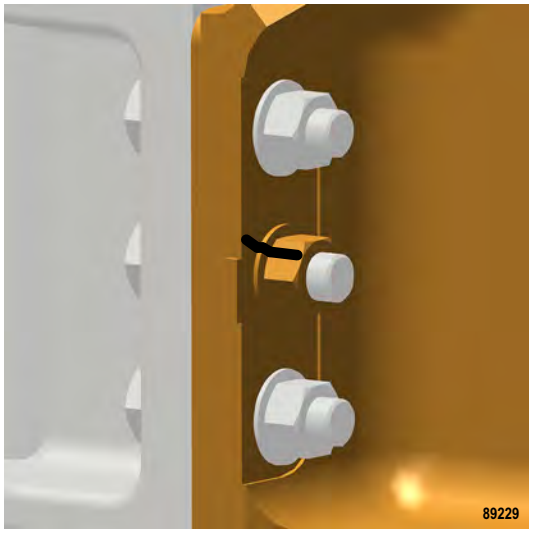


FIGURE 50-14. REFERENCE LINE FOR PROPER TORQUE

9. Draw a reference line across the nut, washer, and frame. See Figure 50-14.

Removal and installation of rear suspension

Removal

WARNING

Use lifting equipment/devices with adequate capacity to remove and install the components.

Component Weights	
Rear Suspension Assembly (oil filled)	1 015 kg (2,238 lb)
Rear Suspension Assembly (without oil)	960 kg (2, 117 lb)
Pin	70 kg (155 lb)

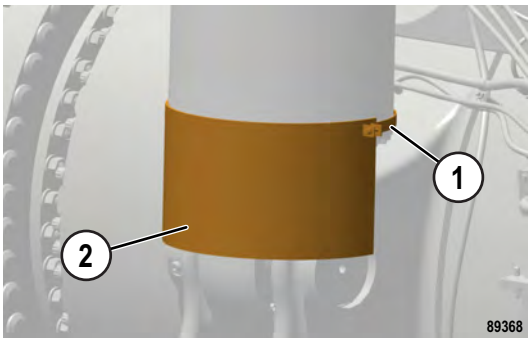


FIGURE 50-31. BOOT REMOVAL

1. Remove the clamp (1, Figure 50-31) and boot (2) from the rear suspension.

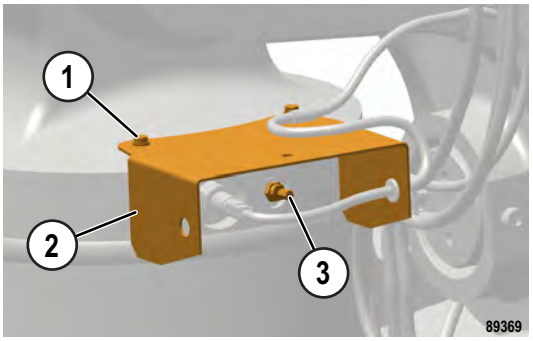


FIGURE 50-32. COVER REMOVAL

2. If necessary, remove mounting hardware (1, Figure 50-32) and remove protective cover (2) to access charging valve (3).

WARNING

Wear a face mask or goggles. Make sure that only that the swivel nut turns. Turning the entire charging valve assembly may result in the valve assembly being ejected from the suspension by the gas pressure inside.

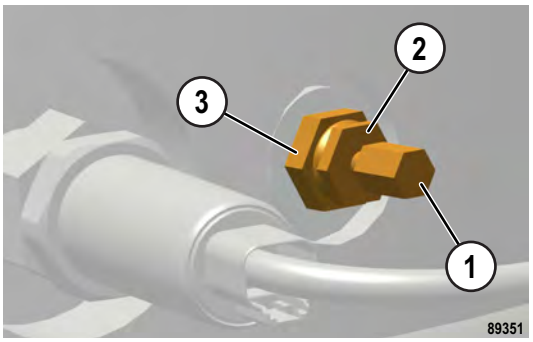


FIGURE 50-33. CHARGING VALVE

3. Discharge the nitrogen pressure from the suspension as follows:
   a. Remove cap (1, Figure 50-33) from the charging valve.
   b. Connect the nitrogen charging kit to the charging valve. Refer to "Suspension oiling and charging procedures" in Testing and adjusting section **Accumulators and suspensions** for the charging kit installation information.

NOTES

4. Remove four nuts (1, Figure 50-8) and flat washers (2). Remove transition plate (3) and bearing plate (4) as a unit. Remove the O-ring from the bearing plate.
5. Remove the capscrews that secure bearing plate (4) to transition plate (3). Separate the plates and remove the O-ring. Remove the dowels if necessary.

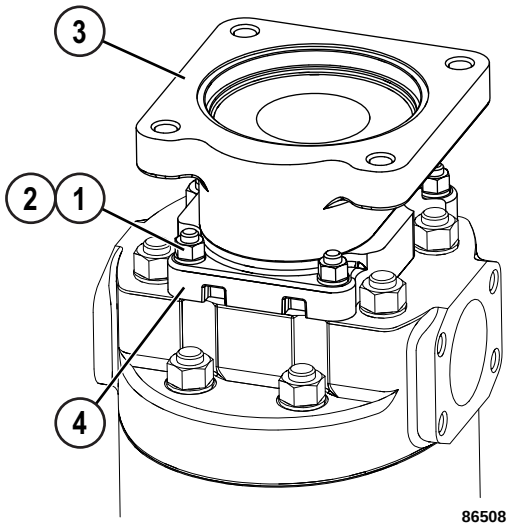


FIGURE 50-8. HOIST PUMP DISASSEMBLY & ASSEMBLY

1. Nut
2. Flat Washer
3. Transition Plate
4. Bearing Plate

6. Remove eight nuts (1, Figure 50-9) and flat washers (2). Remove connector plate (3) and the O-ring. If the connector plate is stuck, tap it lightly with a plastic hammer to loosen it.
7. Remove studs (4), the dowels and shaft bearings from connector plate (3) if necessary.

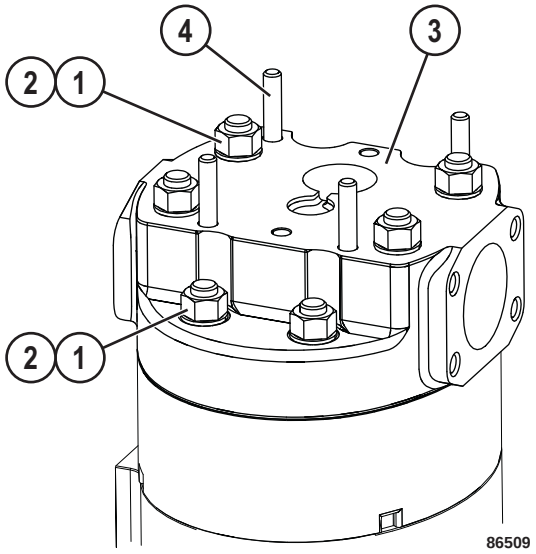


FIGURE 50-9. HOIST PUMP DISASSEMBLY & ASSEMBLY

1. Nut
2. Flat Washer
3. Connector Plate
4. Stud

Installation

⚠WARNING

Use a lifting device with adequate capacity to remove and install the component.

1. Attach a suitable lifting device to hoist valve (5, Figure 50-22). Move the hoist valve into position on top of the mount.
2. Secure the hoist valve with three nuts (1), lockwashers (2), flat washers (3) and capscrews (4). Tighten the nuts to the standard torque.
3. Unplug the hydraulic lines and valve ports. Install new O-rings at the flange fittings, then connect six hydraulic tubes (2, Figure 50-21) and three hydraulic hoses (3) to the hoist valve. Tighten the flange capscrews to the standard torque.
4. Connect three hydraulic hoses to pilot hose fittings (4).
5. Check the hydraulic tank oil level and add oil, if needed.
6. Start the engine. Raise the body and remove the body-up retention cable. Lower and raise the body to check for proper operation and leaks.

Disassembly and assembly of hoist valve

O-ring replacement

NOTE: It is not necessary to remove the individual valve sections to accomplish repairs unless the O-rings between the valve sections must be replaced to prevent leakage. Loosening and re-tightening the main valve tie rod nut could cause distortion, resulting in binding or severely sticking plungers, poppet and spools.

To replace the O-rings between the valve sections:

1. Remove four nuts and washers (5, Figure 50-23) from the tie rods on one end of the hoist valve. Slide tie rods (6) from the valve and separate the valve sections.

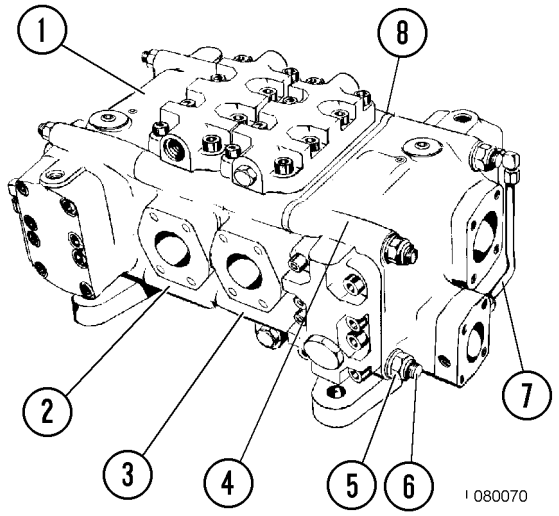


FIGURE 50-23. HOIST VALVE ASSEMBLY

1. Inlet Section (Rear)
2. Spool Section (Work Ports)
3. Spool Section (Tank Ports)
4. Inlet Section (Front)
5. Nuts and Washers
6. Tie Rods
7. Tube
8. Separator Plate

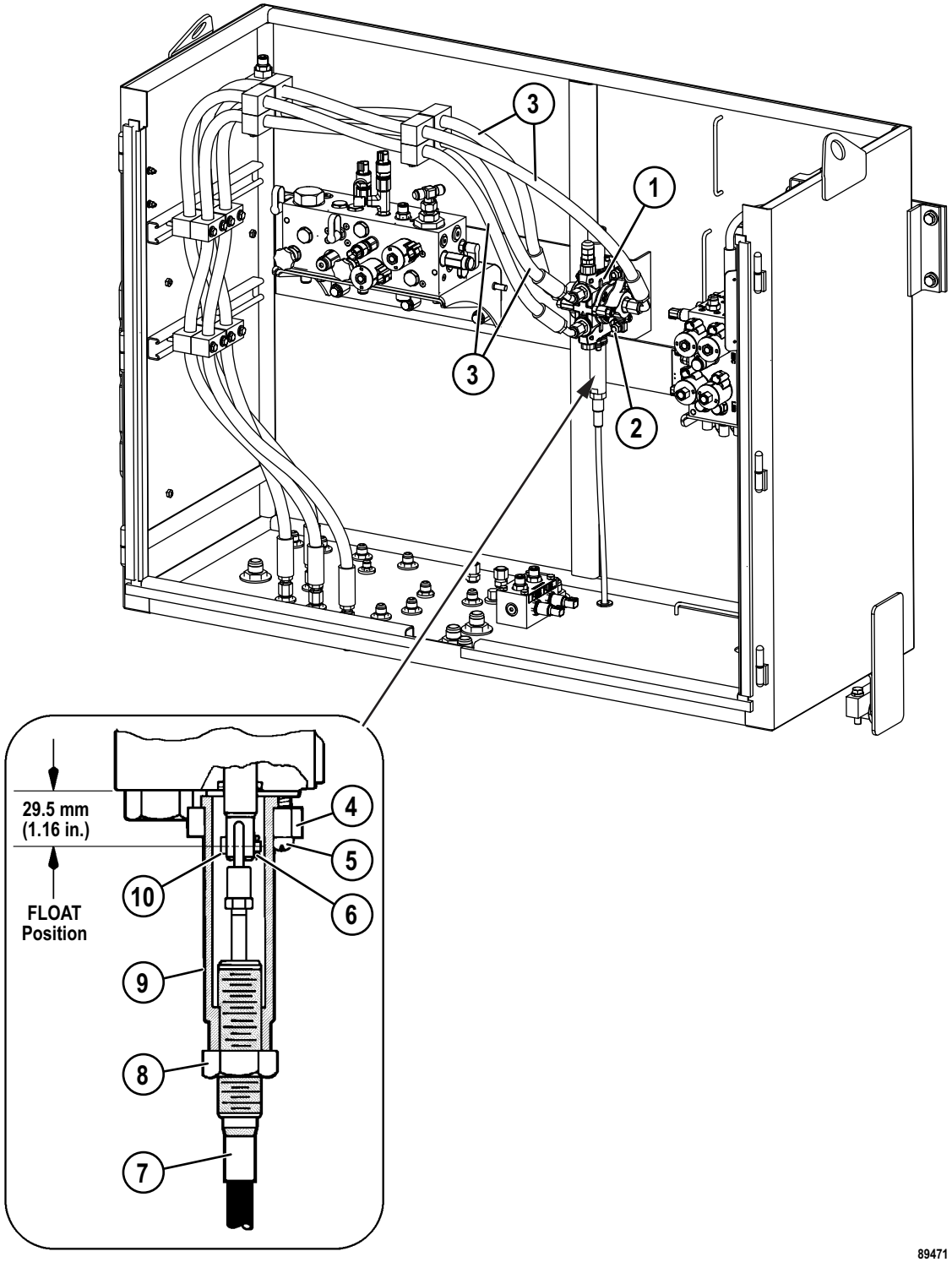


FIGURE 50-33. HOIST PILOT VALVE & PIPING

1. Hoist Pilot Valve
2. Mounting Hardware
3. Hydraulic Lines
4. Flange
5. Machine Screw
6. Cotter Pin
7. Control Cable
8. Jam Nut
9. Sleeve
10. Pin

Cleaning and inspection

NOTE: Use only fresh cleaning solvent, a lint-free wiping cloth and dry, filtered compressed air when cleaning and handling hydraulic cylinder parts. Immediately after cleaning and inspection, coat all surfaces and parts with clean Type C-4 hydraulic oil.

1. Thoroughly clean and dry all parts.
2. Inspect all parts for damage and excessive wear.
3. If the cylinder bores or plated surfaces are excessively worn or grooved, the parts must be replaced or, if possible, re-plated and machined to original specifications.
4. Check the tightness of quill assembly (2, Figure 50-50) if it has not previously been tack welded.
   a. Use special tightening tool SS1143 (see Figure 50-50) to apply a tightening torque of **1 356 N·m (1,000 ft lb)** to the quill.
   b. If the quill moves, remove the quill and clean the threads in the cover assembly and quill.
   c. To install the quill, refer to "Installation of the quill".
5. When the cylinder assembly is dismantled, check all capscrews carefully for distress. Replace the capscrews if in doubt.

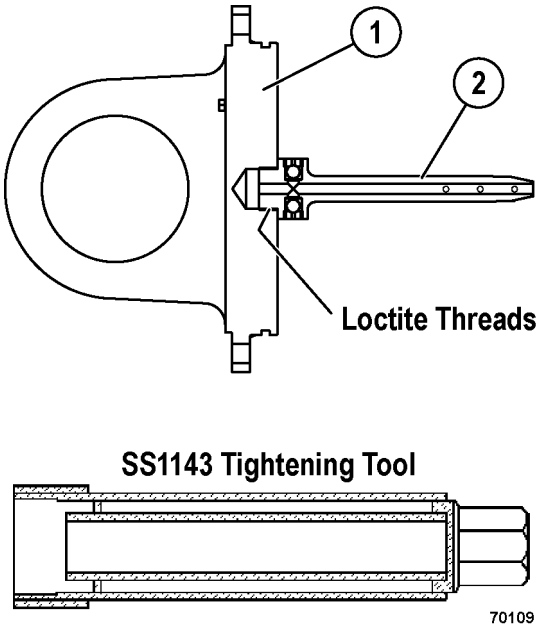


FIGURE 50-50. QUILL ASSEMBLY TIGHTENING

1. Cap Assembly
2. Quill Assembly

Removal and installation of dump body

⚠WARNING

Inspect the condition and rating of all lifting devices, slings, chains, and cables. Refer to the manufacturer's manual for correct capacities and safety procedures when lifting components. Replace any questionable items.

Ensure that the lifting device is rated for the appropriate capacity. Slings, chains, and cables used for lifting components must be rated to supply a safety factor of approximately 2.5X the weight being lifted. When in doubt as to the weight of components or any service procedure, contact the Komatsu area representative for further information.

Lifting eyes and hooks must be fabricated from the proper materials and rated to lift the load being placed on them.

Never stand beneath a suspended load. Use of guy ropes are recommended for guiding and positioning a suspended load.

Before raising or lifting the body, ensure that there is adequate clearance between the body and overhead structures or electric power lines.

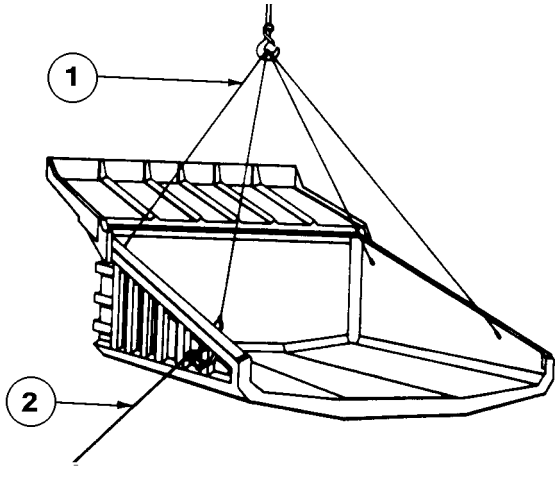


FIGURE 50-1. DUMP BODY REMOVAL

1. Lifting Cables
2. Guide Rope

Removal

1. Park truck on a hard, level surface and block all the wheels.
2. Place the directional control lever in PARK and turn the rest switch ON. Turn the key switch OFF to shut down the engine and allow 90 seconds for the steering system accumulators to bleed down.
3. Attach lifting cables (1, Figure 50-1) and a lifting device to the dump body and take up the slack.
4. Remove the mud flaps from both sides of the dump body. Remove any electrical wiring and hoses that are attached to the dump body.
5. Attach chains around the upper end of the hoist cylinders to support them after the mounting pins are removed.
6. At the hoist cylinder upper mounting bracket, remove locknut (6, Figure 50-2), flat washer (5) and shoulder bolt (4). Use a brass drift and hammer to drive pivot pin (3) from mounting bracket (1).

NOTE: Do not lose two spacers (2) between the cylinder bearing and mounting bracket (1).

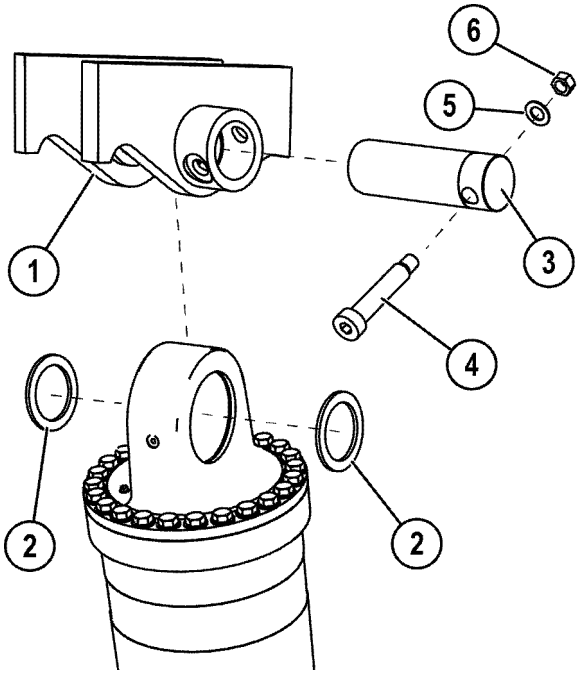


FIGURE 50-2. HOIST CYLINDER UPPER MOUNT

1. Mounting Bracket
2. Spacer
3. Pin
4. Shoulder Bolt
5. Flat Washer
6. Locknut

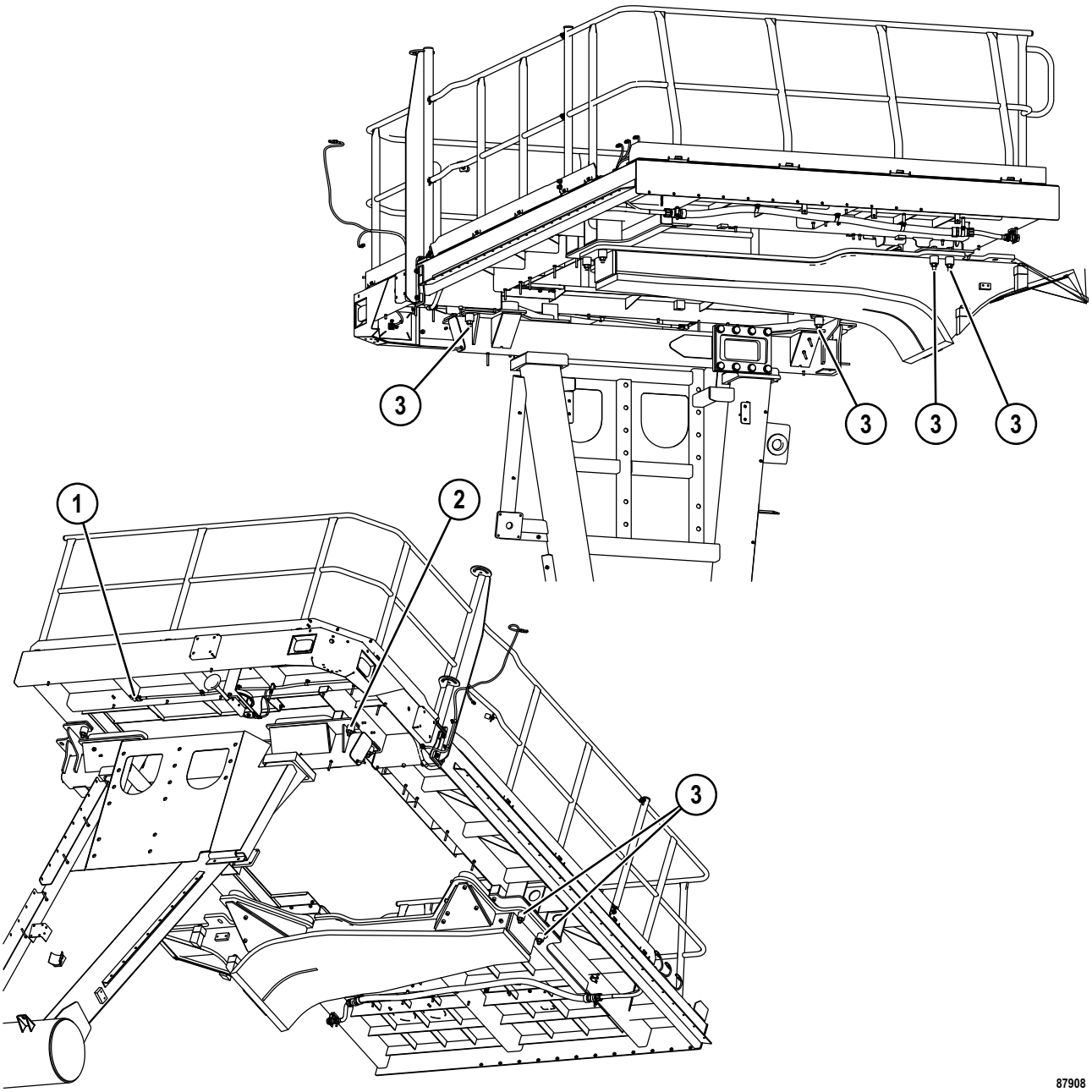


FIGURE 50-9. LH DECK REMOVAL & INSTALLATION

1. Deck Lighting Harness
2. Front Deck Mounting Hardware and Shim
3. Rear Deck Mounting Hardware and Shim

DUMP TRUCK

980E

Machine model	Serial number
980E-5	A50052, A50053, A50137 - A50140
980E-5SE	A60001 and up

50 Disassembly and assembly
Operator cab

5. Lift the door glass into the window frame so that it is near the top. While holding the glass in place, tilt the window frame outward and lift window assembly (1, Figure 50-14) out of the door.
6. Move the window assembly to a work area where the glass can be removed. Slide the glass down and out of the window channels.

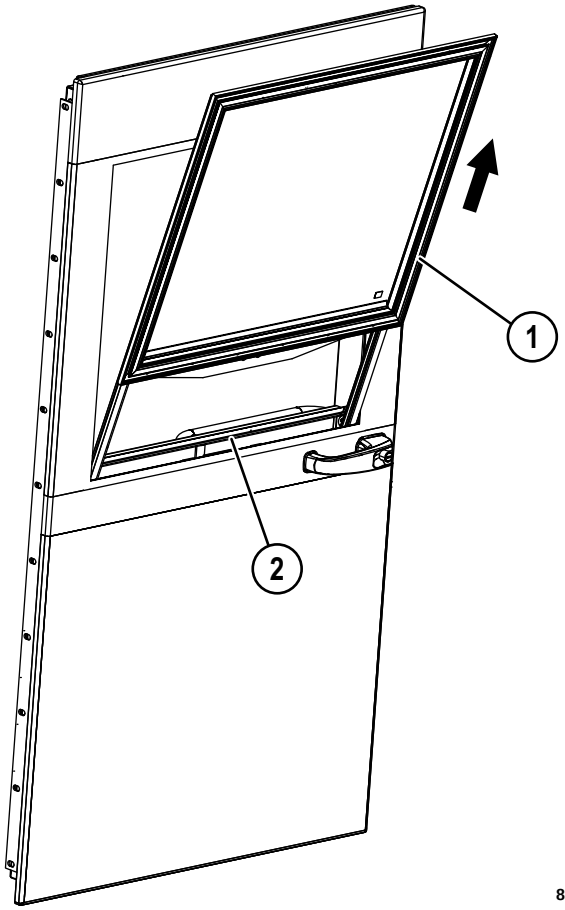


FIGURE 50-14. WINDOW ASSEMBLY REMOVAL

1. Window Assembly
2. Window Inner Seal

Installing the door glass

1. Before installing the door glass, inspect glass wipe (1, Figure 50-15) and frame filler (2) for wear and damage. Replace components if necessary.
2. Ensure that the rubber felt inserts in both window channels (3) are in good condition. Replace the inserts if necessary.

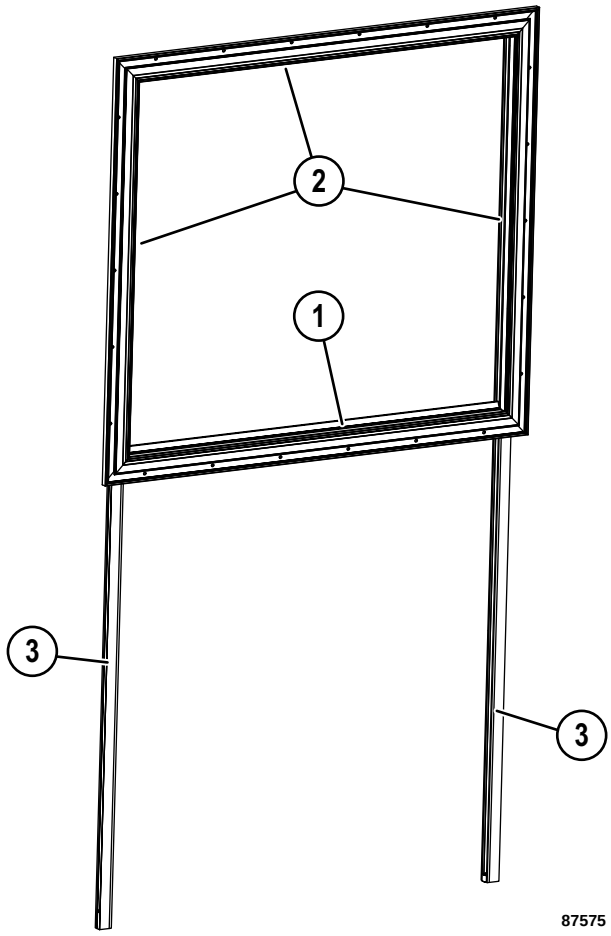


FIGURE 50-15. WINDOW ASSEMBLY

1. Glass wipe
2. Frame Filler
3. Window Channel

Removal and installation of side window glass

Recommended tools and supplies

- Cold knife, pneumatic knife, or a piano wire cutting device, long knife. Cutout tools are available at an auto glass supply store.
- Heavy protective gloves
- Safety eyeglass goggles
- Windshield adhesives, proper cleaners, primers and application gun
- SM2897 glass installation bumpers
  (9 for front side window, 11 for rear side window)

Recommended adhesives:

- SikaTack Ultrafast or Ultrafast II (both heated). Vehicle can be put into service in 4 hours under optimum conditions. Heated adhesives require a Sika approved oven to heat adhesive to 80° C (176° F).
- Sikaflex 255FC or Drive (unheated). Vehicle can be put into service in 8 hours under optimum conditions.

  Sika Corporation
  30800 Stephenson Hwy.
  Madison Heights, MI 48071
  Toll Free Number: 1-800-688-7452
  Fax number: 248-616-7452
  http://www.sika.com or
  http://www.sikasolutions.com

⚠WARNING

Due to the severe duty application of off-highway vehicles, the cure times listed by the adhesive manufacturer should be doubled before a truck is moved. If the cure time is not doubled, vibration or movement from a moving truck will weaken the adhesive bond before it cures, and the glass may fall off the cab.
If another adhesive manufacturer is used, follow that manufacturer's instructions for use, including the use of any primers, and double the allowances for proper curing time.

Removal

⚠IMPORTANT⚠

The first concern with all glass replacement is SAFETY! Wear heavy protective gloves and safety eyeglass goggles when working with glass.

1. Use a cut-out tool to slice into the existing urethane adhesive and remove the window glass.
2. Carefully clean and remove all broken glass chips from any remaining window adhesive. The surface should be smooth and even. Use only clean water.

NOTE: Removal of all old adhesive is not required. Remove just enough to provide an even bedding base.

3. Use a long knife to cut the remaining urethane from the opening, leaving a bed 2 - 4 mm (0.08 - 0.15 in.) thick. If the existing urethane is loose, completely remove it. Leave the installation bumpers in place, if possible.

NOTES

17. Remove engine air intake duct support rods (2, Figure 50-9) from the bottom of center deck (1). Remove any hoses, electrical cables and ground straps that are attached to the center deck.

18. Install lifting bolts and attach an overhead hoist to the center deck. Remove the deck mounting hardware, then lift center deck (1) from truck.

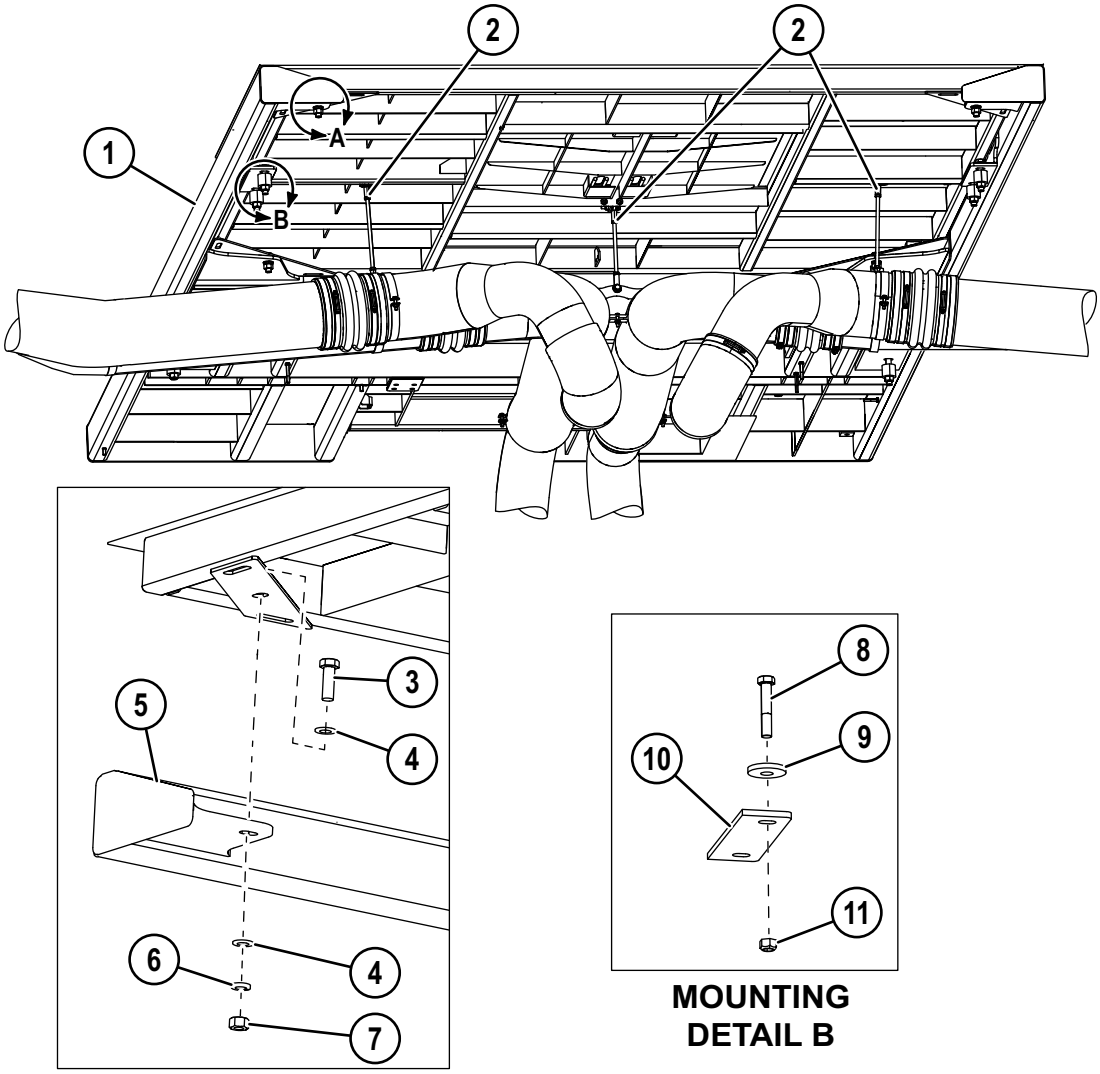


FIGURE 50-9. CENTER DECK REMOVAL & INSTALLATION

1. Center Deck
2. Duct Support Rod
3. Capscrew
4. Flat Washer
5. Structure Mount
6. Lockwasher
7. Nut
8. Capscrew
9. Washer
10. Structure Mount
11. Nut

4. Remove access cover (1, Figure 50-26) on either side of the flywheel housing. Reach through the access opening to remove 20 capscrews and hardened flat washers (2) that join engine flexplate to the alternator rotor adapter.

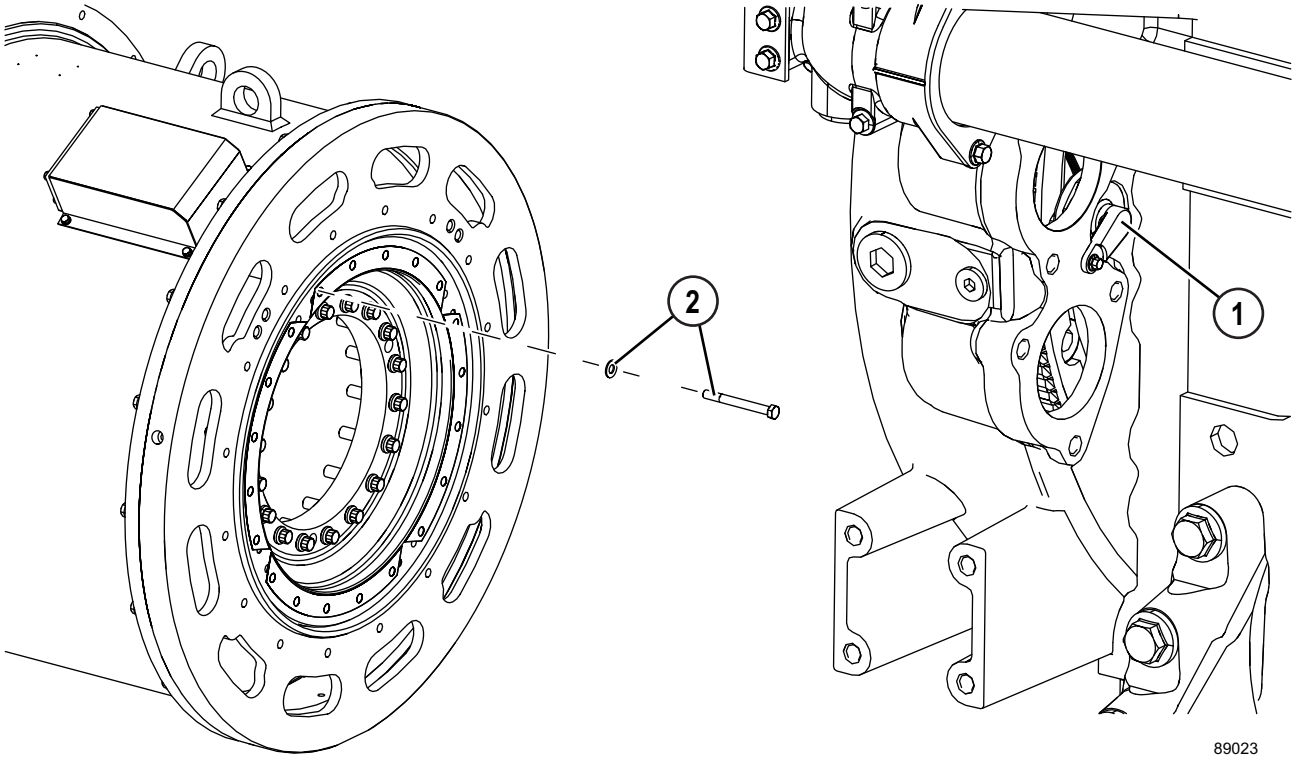


FIGURE 50-26. ENGINE DRIVE RING/ALTERNATOR ROTOR CONNECTION

1. Access Cover
2. Capscrew (5/8" - 11NC) & Hardened Flat Washer