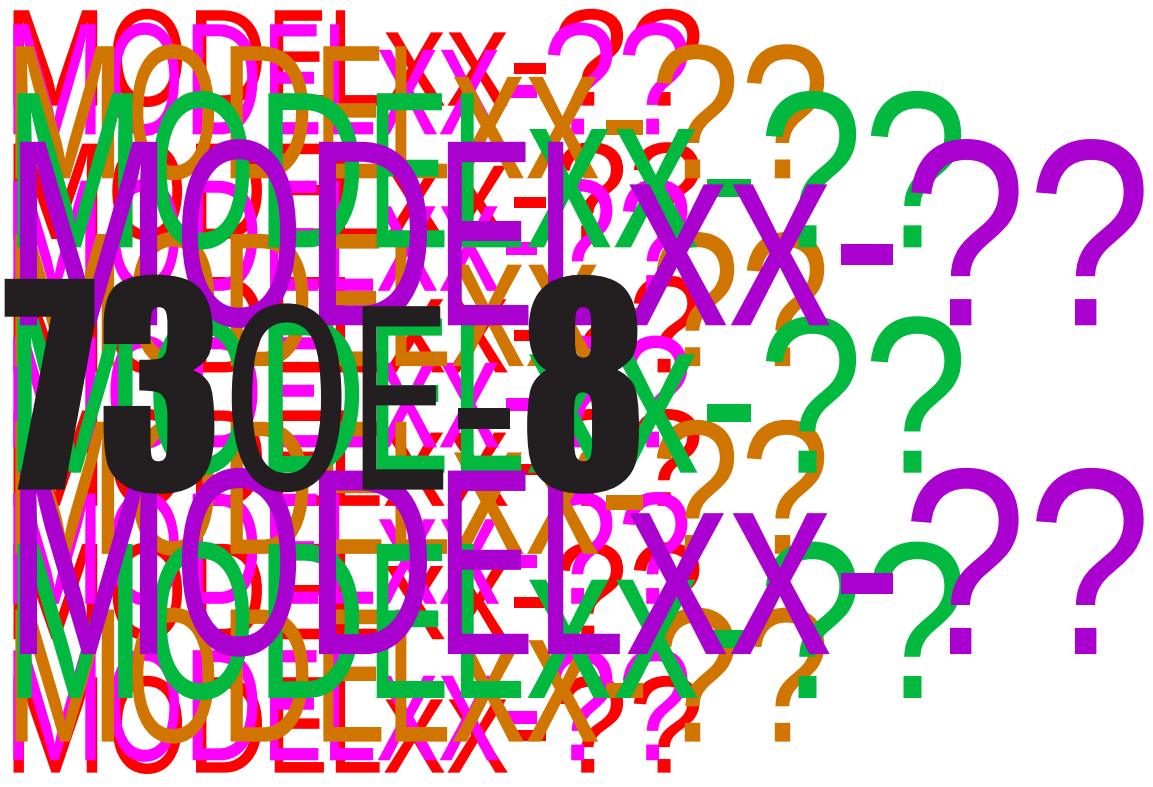
ORIGINAL INSTRUCTIONS
SEBM032503

Shop Manual Supplement



DUMP TRUCK

SERIAL NUMBERS	MODEL DESCRIPTION	
SERIAL NUMBERS	MODELXXXXXXXX	SER# and up
SERIAL NUMBERS	MODELXXXXXXXX	SER# and up
SERIAL NUMBERS	MODELXXXXXXXX	SER# and up
SERIAL NUMBERS	MODELXXXXXXXX	SER# and up
SERIAL NUMBERS	730E-8	A40018 - A40034, A40041 - A40044, A40065, A40066
	MODELXXXXXXXX	SER# and up
	MODELXXXXXXXX	SER# and up
	MODELXXXXXXXX	SER# and up
	PC228USLC-1LE0	SER# and up
	MODELXXXXXXXX	SER# and up
	MODELXXXXXXXX	SER# and up
	MODELXXXXXXXX	SER# and up

KOMATSU

How to read the shop manual

- Some attachments and optional parts in this shop manual may not be delivered to certain areas. If one of them is required, consult KOMATSU distributors.
- Materials and specifications are subject to change without notice.
- Shop manuals are divided into the “Chassis volume” and “Engine volume”. For the engine unit, see the engine volume of the engine model mounted on the machine.

Composition of shop manual

This shop manual contains the necessary technical information for services performed in a workshop. For ease of understanding, the manual is divided into the following sections.

00. Index and foreword
This section explains the shop manuals list, table of contents, safety, and basic information.

01. Specification
This section explains the specifications of the machine.

10. Structure and functions
This section explains the structure and functions. The structure and function sub-section explains the structure and function of each component. It serves not only to give an understanding of the structure, but also serves as reference material for troubleshooting. The maintenance standard sub-section explains the criteria and remedies for disassembly and service.

20. Standard value table
This section explains the standard values for new machine and judgment criteria for testing, adjusting, and troubleshooting. This standard value table is used to check the standard values in testing and adjusting and to judge parts in troubleshooting.

30. Testing and adjusting
This section explains measuring instruments and measuring methods for testing and adjusting, and method of adjusting each part. The standard values and judgment criteria for testing and adjusting are explained in Testing and adjusting.

40. Troubleshooting
This section explains how to find out failed parts and how to repair them. The troubleshooting is divided by failure modes.

50. Disassembly and assembly
This section explains the special tools and procedures for removing, installing, disassembling, and assembling each component, as well as precautions for them. In addition, tightening torque and weight of components are also explained.

90. Diagrams and drawings
This section gives hydraulic circuit diagrams and electrical circuit diagrams.

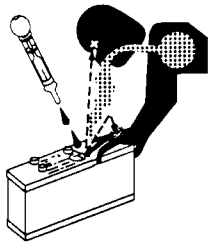
Revision and distribution

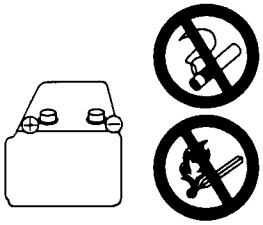
Any additions, revisions, or other change of notices will be sent to KOMATSU distributors. Get the most up-to-date information before you start any work.

Working near batteries

Battery hazard prevention

- Battery electrolyte contains sulfuric acid, which can quickly burn the skin and eat holes in clothing. If you spill acid on yourself, immediately flush the area with water.
- Battery acid can cause blindness if splashed into your eyes. If acid gets into your eyes, flush them immediately with large quantities of water and see a doctor at once.
- If you accidentally drink acid, drink a large quantity of water, milk, beaten eggs or vegetable oil. Call a doctor or poison prevention center immediately.
- Always wear safety glasses or goggles when working with batteries.
- Batteries generate hydrogen gas. Hydrogen gas is very explosive and can easily be ignited with a small spark or flame.
- Before working with batteries, stop the engine and turn the key switch to the OFF position.
- Avoid short-circuiting the battery terminals through accidental contact with metallic objects, such as tools, across the terminals.
- When removing or installing batteries, check which is the positive (+) terminal and the negative (-) terminal.
- Tighten battery caps securely.
- Tighten the battery terminals securely. Loose terminals can generate sparks and lead to an explosion.





A030005

Handling

⚠WARNING

Ensure that the tire handling equipment is capable of lifting and maneuvering the load.

Due to the size and weight of the tire and rim assemblies, special handling equipment, such as a modified fork lift called a “tire handler”, as shown in Figure 00-8, is desirable. Consult local tire vendors for sources of equipment designed especially to remove, repair, and install large off-highway truck tires.

Handling of tires and rims must only be done by personnel who have received training and accreditation based on instruction from a qualified work supervisor.

There are several types of tools that are used for tire and rim handling. Ensure that the personnel have a proper understanding of how to use the tools properly.

When moving tires and rims, be careful to avoid accidental drops or falls that could injure others in the vicinity.

Regarding dual tire assemblies: DO NOT operate the truck with a single tire on a dual tire assembly. The load capacity of the tire and rim will be drastically reduced and may result in damage.

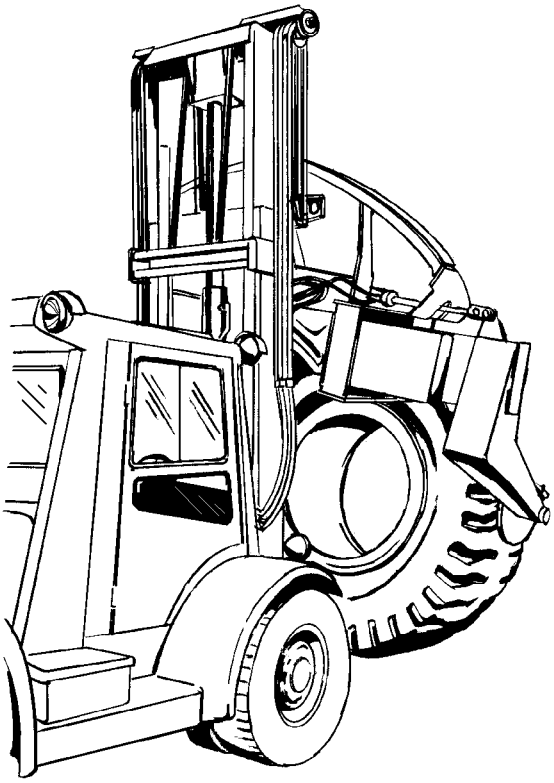


FIGURE 00-8. TYPICAL TIRE HANDLER

Short isolated capacitor terminals

⚠WARNING

Hazardous voltages may be present in this equipment even if the engine and capacitor charge lights are off.

Use measurement and protective equipment rated for 2000 VDC minimum to verify that no voltage is present before touching any terminal.

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

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

Any capacitor that is isolated from the DC link and confirmed discharged must have its terminals electrically shorted together to prevent static charge build up. Use bare wire to jumper all four terminals on the capacitor. See Figure 00-18. Proceed to troubleshoot and repair the control group to restore it to original functionality.

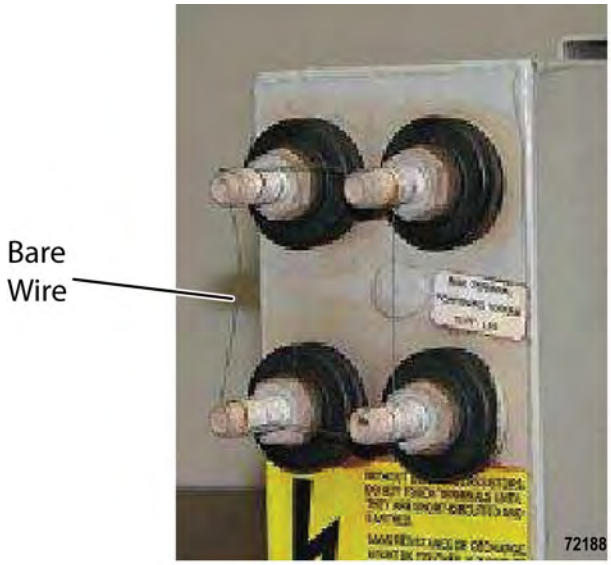


FIGURE 00-18. JUMPER ALL TERMINALS ON ISOLATED CAPACITOR

SAE grade 5 and grade 8 hex head capscrew and nut assemblies

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

NOTE: Capscrew threads and seats shall be lubricated when assembled. Unless instructions specifically recommend otherwise, these standard torque values are to be used with simple lithium base chassis grease (multi-purpose EP NLGI) or an approved rust preventive grease on the threads.

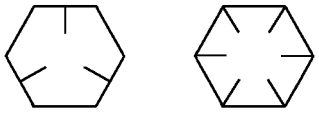
NOTE: Torques are calculated to give a clamping force of approximately 75% of proof load. The maximum torque tolerance shall be within ±10% of the torque value shown.

In the following table under “Capscrew Size”, the first number represents the shank diameter (in.). The second number represents threads per inch.

Example: 7/16 - 20

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

20 = threads per inch



GRADE 5 GRADE 8

Table 3: Standard tightening torques for SAE hex head capscrew and nut assembly with lubricated threads

Thread Size	Torque - Grade 5			Torque - Grade 8			Thread Size	Torque - Grade 5			Torque - Grade 8		
	N·m	ft lb	kg·m	N·m	ft lb	kg·m		N·m	ft lb	kg·m	N·m	ft lb	kg·m
1/4-20	9.5	7	0.97	13.6	10	1.38	3/4-16	319	235	32.5	454	335	46.3
1/4-28	10.8	8	1.11	14.9	11	1.52	7/8-9	475	350	48.4	678	500	69.2
5/16-18	20.3	15	2.07	28	21	2.90	7/8-14	508	375	51.9	719	530	73.3
5/16-24	22	16	2.21	30	22	3.04	1.0-8	712	525	72.6	1017	750	103.7
3/8-16	34	25	3.46	47	35	4.84	1.0-12	759	560	77.4	1071	790	109.3
3/8-24	41	30	4.15	54	40	5.5	1.0-14	773	570	78.8	1085	800	110.6
7/16-14	54	40	5.5	79	58	8.0	1 1/8-7	881	650	89.9	1424	1050	145
7/16-20	61	45	6.2	84	62	8.57	1 1/8-12	949	700	96.8	1546	1140	158
1/2-13	88	65	9	122	90	12.4	1 1/4-7	1234	910	125.9	2007	1480	205
1/2-20	95	70	9.7	129	95	13.1	1 1/4-12	1322	975	134.8	2142	1580	219
9/16-12	122	90	12.4	169	125	17.3	1 3/8-6	1627	1200	166	2630	1940	268
9/16-18	129	95	13.1	183	135	18.7	1 3/8-12	1776	1310	181	2874	2120	293
5/8-11	169	125	17.3	237	175	24.2	1 1/2-6	2142	1580	219	3471	2560	354
5/8-18	183	135	18.7	258	190	26.2	1 1/2-12	2305	1700	235	3756	2770	383
3/4-10	298	220	30.4	420	310	42.8							
1 N·m = 0.738 ft lb = 0.102 kgm													

DUMP TRUCK

730E

Machine model	Serial number
730E-8	A40002 and up

01 Specification
Specification and technical data

DUMP TRUCK

730E

Machine model	Serial number
730E-8	A40002 and up

10 Structure and functions
Steering circuit

Full pump volume

Control piston (1, Figure 10-8) controls the angle of swashblock (4). When the control piston moves to the full right position, the pump is at maximum pumping capacity.

The driveshaft turns splined housing (2), which contains pistons (3). When the housing is rotated, the pistons move in and out of their bores and the piston shoes “ride” against the angled swashblock.

As the cylinder rotates, the individual piston bores are connected alternately to the left (port “A”) and right (port “B”) crescent shaped ports in the valve plate. While connected to left side (suction) port “A”, each piston moves outward, drawing oil from port “A” into the piston bore until its outermost stoke is reached. At that point, the piston bore passes from the left crescent port to the right crescent port.

While rotating across the right side crescent, each piston moves downward on the angled swashblock face. Thus, each piston is forced inward. Each piston displaces fluid through the right side crescent to port “B” until its innermost stroke is reached. At that point, the piston bore again passes from the right to the left side crescent and the operating cycle is repeated.

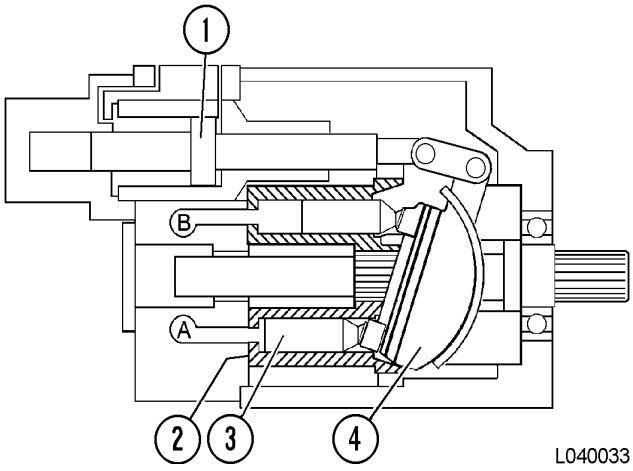


FIGURE 10-8. FULL PUMP VOLUME

1. Control Piston
2. Splined Housing
3. Piston
4. Swashblock

Half pump volume

The position of control piston (1, Figure 10-9) is near the center of its travel. Swashblock (4) is not angled as steeply as before. Therefore, the pistons have a shorter stroke. As the piston stroke gets shorter, the pump output also decreases.

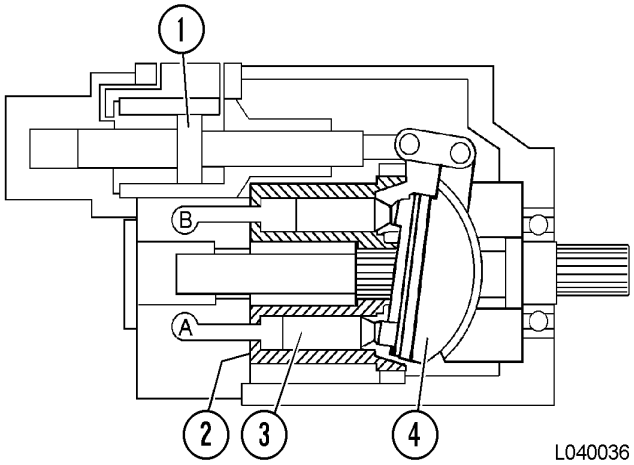


FIGURE 10-9. HALF PUMP VOLUME

1. Control Piston
2. Splined Housing
3. Piston
4. Swashblock

DUMP TRUCK

730E

Machine model	Serial number
730E-8	A40002 and up

10 Structure and functions
Hoist circuit

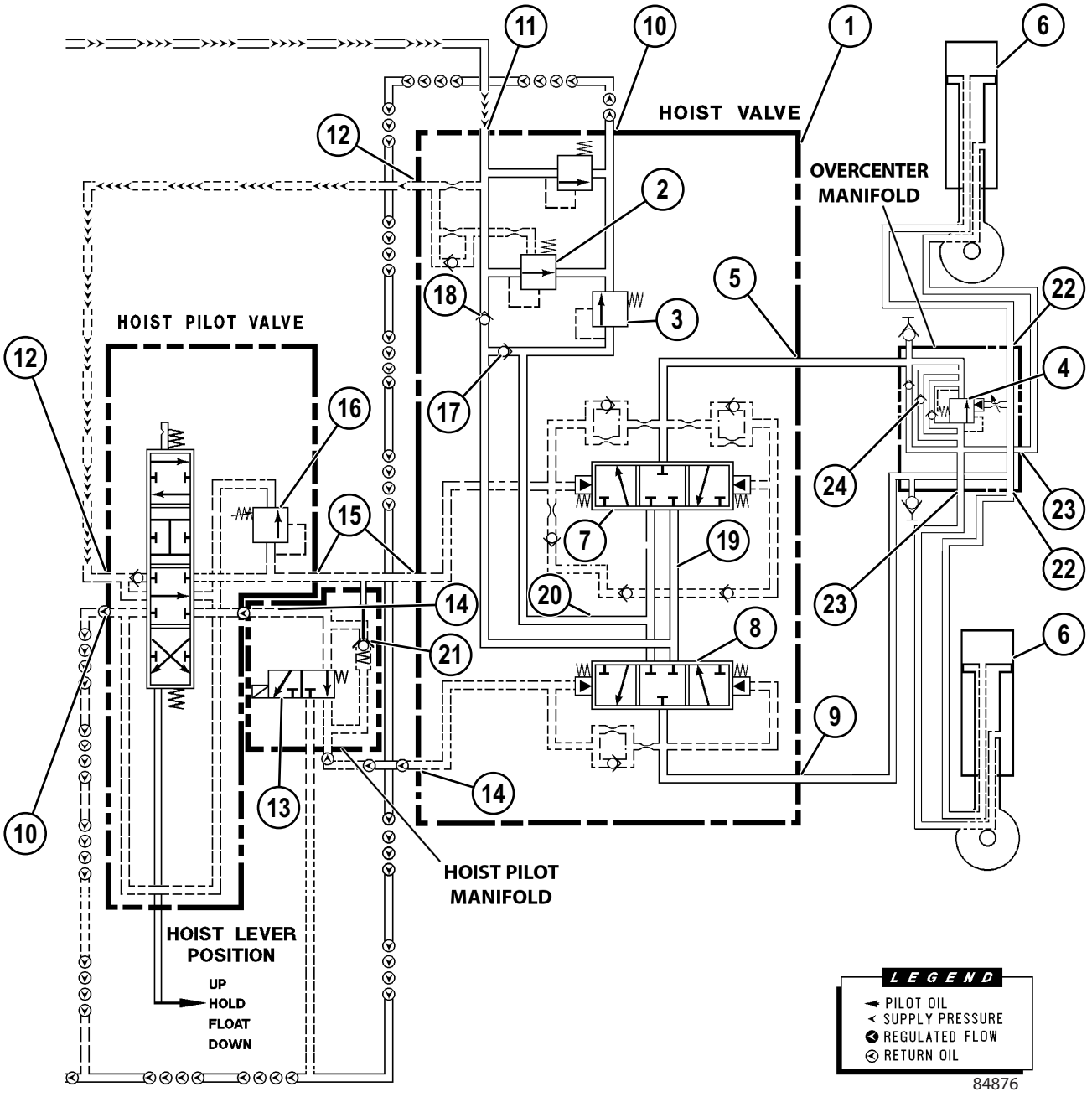


FIGURE 10-6. HOLD POSITION

1. Hoist Relief Valve 17 238 (2,500 psi)
2. Flow Control Valve
3. Low Pressure Relief Valve 517 kPa (75 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. 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 10 341 kPa (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. Power-Up Port
23. Power-Down Port
24. Overcenter Manifold Check Valve (CV)

Secondary braking and auto apply

The function of the secondary brake system is to provide reserve braking in the event of any single failure. The system is divided into multiple circuits, each with its own isolation check valve, accumulator, and circuit regulator.

Brake accumulators (1, Figure 10-1) perform two functions:

- Rapid flow for good response
- Store energy for secondary braking

The check valves ensure that this energy is retained if a failure occurs in the brake system supply or an accumulator circuit.

If a failure occurs in the pump, steering circuit, or either brake accumulator circuit, a low brake pressure warning message will appear on the digital display and an audible alarm in the cab will sound, indicating that the truck must be stopped as soon as practical. When the pressure in both accumulator circuits is less than the preset level, all the service brakes will be automatically applied. Automatic brake application is accomplished by automatic apply valve (11) located in the brake manifold. This valve senses the low brake accumulator pressure. When the pressure is less than 11 376 kPa (1,650 psi), the valve shifts, operating the brake treadle valve hydraulically and applying the brakes.

Regardless of the location of a failure, sensing the lowest brake accumulator circuit pressure ensures two to four full brake applications after the low brake warning message and alarm, and before automatic apply. This allows the operator time to safely stop the truck after the warning has been activated.

Parking brake circuit operation

The parking brake is spring applied and hydraulically released.

NOTE: Whenever the parking brake solenoid is de-energized, a spring in the solenoid valve will shift the spool into position to allow the parking brake to be applied.

Normal operation
(key switch ON, engine running)

- **Directional control lever in PARK**
  Parking brake solenoid (9) is de-energized. The oil pressure in the parking brake lines return to tank and the springs in the parking brake will apply the brake. Parking brake release pressure switch (2) will close at 8 618 kPa (1,250 psi), completing a path to ground and illuminating the parking brake light on the instrument panel.
- **Directional control lever not in PARK**
  Parking brake solenoid (9) is energized. The pressure oil is routed from the parking brake solenoid to the parking brake pistons for release. By using the wheel motor speed sensor to monitor wheel movement, the parking brake circuit is protected from accidental application while the truck is in motion.
- If the key switch is turned OFF while the directional control lever is in PARK, the parking brake will not apply until the truck speed is less than 0.5 kph (0.3 mph) due to the monitoring of the wheel motor speed.
- If loss of hydraulic supply pressure occurs while the directional control lever not in PARK, parking brake solenoid (9) will still be energized. The hydraulic supply circuit is still open to the parking brake pistons. A check valve in the parking brake hydraulic supply circuit traps the oil, holding the parking brake in the release position.

NOTE: Normal internal leakage in the parking brake solenoid and the pressure reducing valve may allow leakage of the trapped oil to return to tank and eventually allow parking brake application.

- If 24 volt power to the parking brake solenoid is interrupted, the parking brake will apply at any truck speed. The spring in the parking brake solenoid will cause it to shift, opening a path for the oil pressure in the parking brake line to return to tank and causing the springs in the parking brake to apply the brake. Parking brake release pressure switch (2) will close, completing a path to ground and illuminating the parking brake light on the on the instrument panel.

Relays

Relays (1, Figure 10-5) are used to switch heavy loads on various electrical circuits. These relays are rated at 24V, 75 amps.

- Low Mounted Low Beam Headlights
- High Mounted Low Beam Headlights
- Rear Backup Light
- Ladder/Deck Light
- Horn
- Keyswitch/Control Power
- High Beam Headlights
- Key Switch Power
- 12V Power

Terminal boards

Terminal boards (2) provide an easy access point for troubleshooting the various electrical circuits throughout the truck.

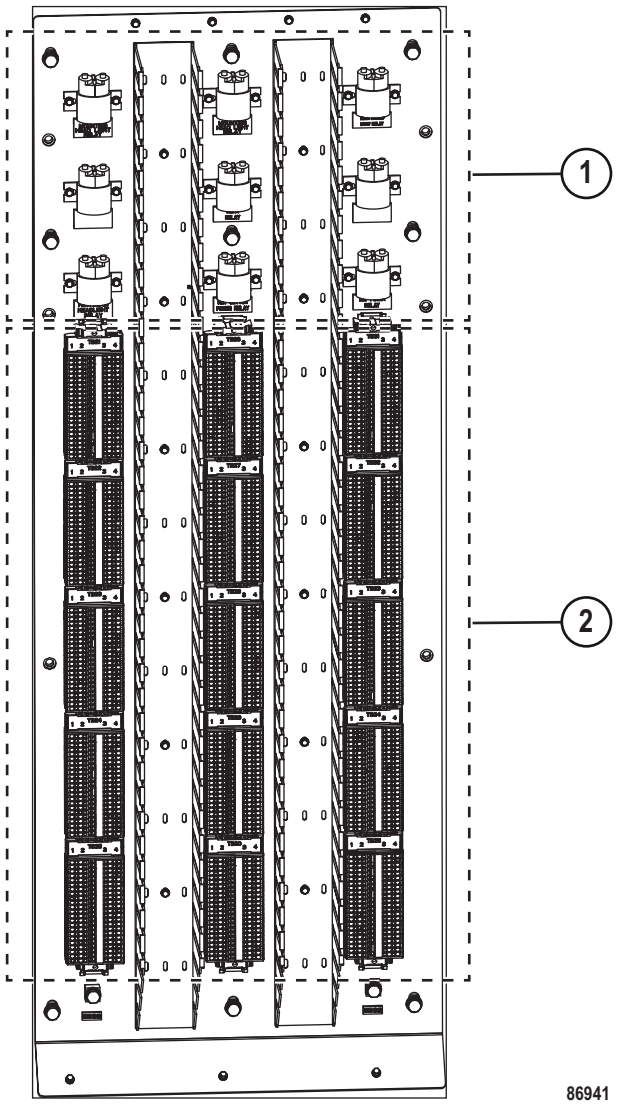


FIGURE 10-5. AUXILIARY CONTROL CABINET 24VDC COMPONENTS - REAR WALL

1. Relays 2. Terminal Boards

Transitions between states under normal operational conditions (no failures, etc.) are described as follows:

Transition to Startup/Shutdown State (for Startup): The system will transition to the Startup/Shutdown state for the purpose of "startup" whenever execution control is initially transferred to the application program (after application of power, system reset, etc).

Transition to Startup/Shutdown State (for Shutdown): The system will transition to the Startup/Shutdown state for the purpose of "shutdown" from the Test, Rest, Ready, or Startup/Shutdown (if previously entered for the purpose of startup) state if all of the following conditions are true:

- System power is removed, or the control power switch or key switch is turned off.
- The truck is not moving.
- There is essentially no voltage on the DC link.
- Any testing in progress is complete.

NOTE: Testing in progress does not have to be successful, but for the purpose of ensuring an orderly shutdown it must be complete before the current state is exited.

Transition from Startup/Shutdown State to Test State: This transition will occur automatically once initialization is complete (functions performed while in Startup/Shutdown state for the purpose of startup have been completed).

Transition from Test State to Ready State: This transition will occur upon completion of any required testing if the Rest state request is not active and there is sufficient voltage on the DC link.

Transition to Rest State: This transition will occur automatically from the Test or Ready state if a request for Rest state is received and all of the following conditions are true:

- Any testing in progress is complete.
- The system temperatures are cool enough to allow the Rest state (function of IGBT phase module, chopper module, and motor temperatures).
- The AFSE panel is disconnected and there is essentially no voltage on the DC link.
- The truck is not moving.

Transition from Ready State to Test State: This transition will occur if the truck is not moving and a request for testing is received.

Transition from Ready State to Propel State: This transition will occur if all of the following conditions are true:

- The accel pedal is pressed.
- A direction has been chosen (the truck is either in FORWARD or REVERSE).
- There is sufficient voltage on the DC link.
- At least one of the following conditions is true:
  a. The retard pedal or lever is not pressed or is pressed such that an insignificant amount of retarding effort is requested.
  b. Truck speed is such that retard is not allowed.
  c. Truck speed is less than the motor overspeed limit.
  d. The accel inhibit function is not active.

Table 1: DRIVE SYSTEM COMPONENTS DESCRIPTION			
REFERENCE	**FIG. NO.**	**COMPONENT**	**FUNCTION**
VID		Virtual Information Display	Provides maintenance personnel with the ability to monitor the operational status of certain truck systems and perform system diagnostic test.
DIGITAL I/O CARD		Digital Input/Output Card	Receives contactor, relay and switch feedback signals and provides drive signals to relays, contactors, indicator lamps, etc. Located in DSC and TCI.
DSC	10-4	Drive System Controller	The DSC is the main controller for the AC drive system. All propulsion and retarding functions are controlled by the DSC based on internally stored software instructions.
DSC Link		DSC Link	State of the LINK charging machine.
ETC2	10-4	Ethernet #2 Control Group 2 Connector	Provides alternate connection for PTU
FDR	10-5	Filter Discharge Resistor	Resistor divider network connected across the DC link, provides secondary discharge link for the DC link. Normal discharge is through RP1.
FP	10-5	Filter Panel	Filters electrical noise on 3 phases of Alternator output.
GBMC	10-5	Grid Blower Motor Capacitor	Works in conjunction with the GBMR to condition the electrical current during blower operation.
GBMR	10-4	Grid Blower Motor Capacitor Discharge Resistor	Works in conjunction with the GBMC to condition the electrical current during blower operation.
GDP	10-4	Gate Driver Power Converter	Converts 19 to 95 VDC from the Gate Drive Power Supply to 25 kHz, 100 VRMS, square wave power to drive Inverter 1 & 2 IGBT Phase and Chopper Modules. (Input to the Gate Drive Power Converter is 24V DC.)
GF	10-4	Generator Field Contactor	Connects the AFSE to the Alternator field.
GFCO	10-4	Generator Field Contactor Cutout Switch	Disables Alternator output.
GFR	10-4	Generator Field Relay	Picks up with GF contactor and applies B+ to the AFSE (battery boost) during initial acceleration phase.
GRID1	10-5	Grid Current Sensor	Detects amount of current flow through the grid.
GRR	10-5	Ground Resistor Panel	Detects power circuit grounds.
GRR9, 10	10-4	Resistors	Used with GRR to detect power circuit grounds.
KEYSW		Key Switch	Connects battery voltage to CPR and control circuits when closed. (Located on instrument panel.)
LFC1 - 6	10-4	Line Filter Capacitors 1, 2, 3, 4, 5, and 6	Absorbs and releases current to the DC link for the grid resistors when a current spike occurs.
LINK1	10-4	Link Current Sensor	Detects amount of current flow through the DC link.
LTS	10-4	Light Switch	This switch turns the Control Cabinet illumination lights ON and OFF. Lights are located in the various Control Areas.
P1A+, 1B+, 1C+ P2A+, 2C+	10-4	IGBT Phase Modules	Provide positive driving voltages (PWM or square wave, depending on truck speed) for each of the three windings of the Traction Motors.
P1A-, 1B-, 1C- P2A-, 2C-	10-4	IGBT Phase Modules	Provide negative driving voltages (PWM or square wave, depending on truck speed) for each of the three windings of the Traction Motors.

Desiccant is located at the bottom of the accumulators to remove moisture that is trapped in the system.

The cycle is completed when the heated low pressure gas is again drawn into the compressor through the suction side.

This simplified explanation of the principles of refrigeration does not call attention to the fine points of refrigeration technology. Some of these will be covered in the following discussions of the components, controls, and techniques involved in preparing the unit for efficient operation.

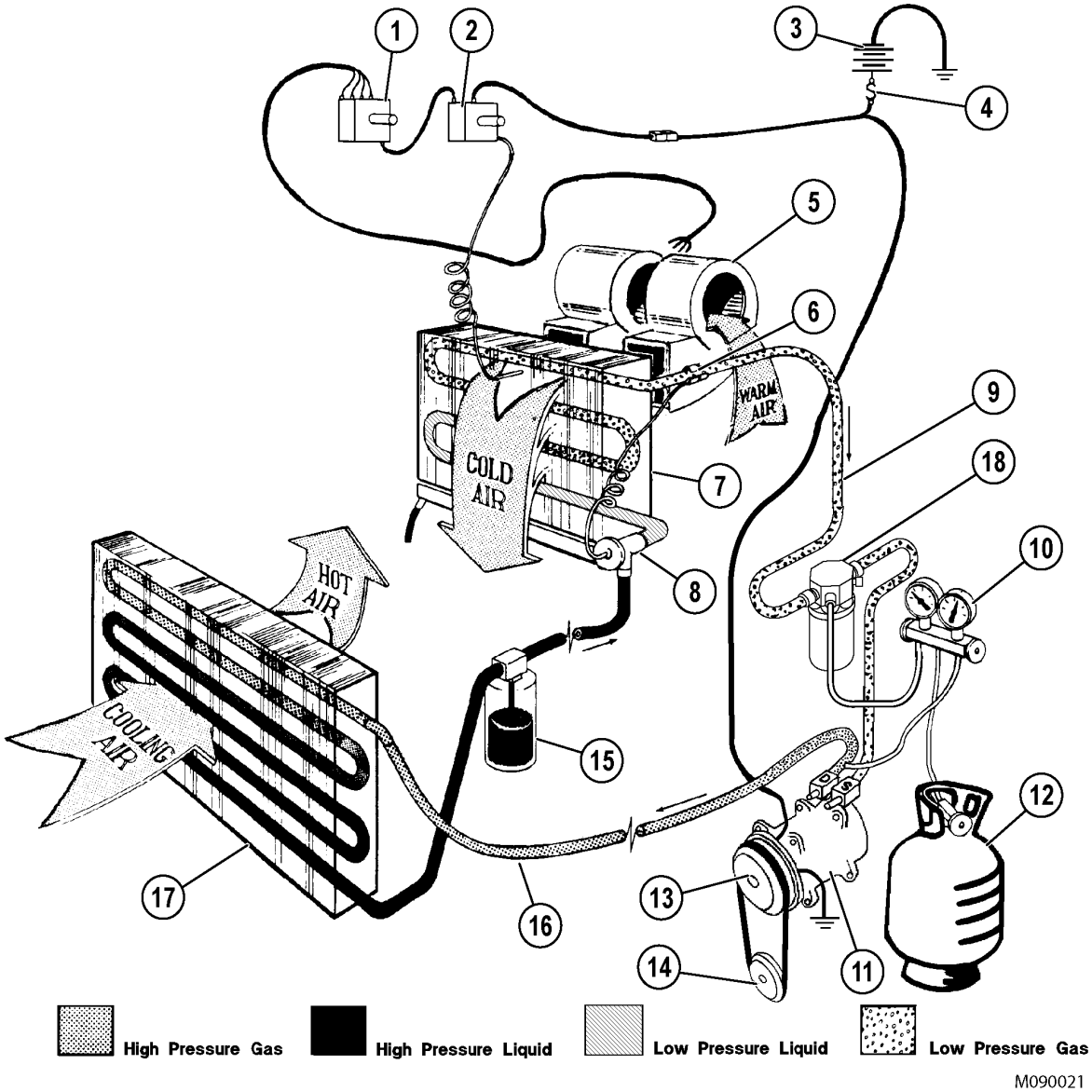


FIGURE 10-1. BASIC AIR CONDITIONING SYSTEM

1. Blower Switch
2. Thermostatic Switch
3. Battery Supply
4. Circuit Breaker
5. Blower
6. Temperature Sensor
7. Evaporator
8. Expansion Valve
9. Suction Line
10. Test Gauges & Manifold
11. Compressor
12. Refrigerant Container
13. Magnetic Clutch
14. Compressor Drive Pulley
15. Receiver-Drier
16. Discharge Line
17. Condenser
18. Accumulator

Standard value table for truck

Truck model					730E-8	
Check item			Measurement conditions	Unit	Standard value for new truck	Permissible value
Travel speed	Maximum speed in forward gear	0% grade	• Dry road surface • Engine coolant temperature within operating range • Body unloaded • Travel resistance: 2.0% • Standard tires	kph (mph)	64 (40)	64 (40)
		12% grade			22 (14)	22 (14)
Engine speed	Rated		• Engine coolant temperature within operating range	rpm	1,900	1,900
	Idle				750	750
	Max. overspeed				2,030	2,030
Operating force	Steering wheel	Stationary steering effort (If stationary steering is impossible, measure steering effort at low speed.)	• On flat dry load surface • Steering wheel speed: 30 rpm • Engine low idle	N (lb)	21.6 ± 2.0 (4.85 ± 0.45)	Max. 115 (Max. 25.8)
Dimension		Play	• Engine stopped • Dimension on periphery of grip • Until front wheel starts moving	Deg	5	5
Number of rotations		Rotation range	• Lock to lock	Number of rotations	4.2	4.2 ± 0.5

Preliminary steps

1. The steering accumulators, brake accumulators and auxiliary system accumulator must have the correct precharge and must be at normal operating temperature. Refer to Testing and adjusting section **Accumulators and suspensions** for the accumulator charging procedures.

**** Record on Data Sheet***

NOTE: For best performance, charge the accumulators in the ambient conditions in which the machine will be operating.

2. Install 35 000 kPa (5,000 psi) calibrated pressure gauges at the following locations:
   a. steering pump test port "GPA"
   b. bleeddown manifold test port "T3"
   c. bleeddown manifold test port "T2"
   d. both steering cylinder manifold test ports
3. Install 24 000 kPa (3,500 psi) calibrated pressure gauges at the following locations:
   a. both hoist filter test ports
   b. overcenter manifold test port "TPD"

Hydraulic system flushing procedure

4. Install a jumper hose between the "QD Supply" and "QD Return" ports on the bleeddown manifold (see Figure 30-5). The hose must be rated for at least 24 000 kPa (3,500 psi) in case the steering system becomes fully pressurized. However, the pressure a during the flushing procedure should be less than 3 500 kPa (500 psi).
5. Remove and retain check valve #4 (7, Figure 30-5) from the steering bleeddown manifold. Install a #20 O-ring boss plug (VM0320) in the valve cavity.

NOTE: Do not leave the plug in the valve cavity after flushing is complete.

6. Use two flushing blocks (PC3074) to join the piston end and rod end hoist cylinder hoses if not already assembled.
7. An optional hose/needle assembly for manually bleeding down the steering accumulators can be used. This hose/needle valve assembly is only for convenience and is not required. It provides a way to manually bleed down both steering accumulators any time during the checkout procedure.

   The assembly will consist of two 1/4” diameter hoses connected to a needle valve. The hose material can be 1/4” diameter SAE 100R2, which has 35 000 kPa (5,000 psi) rating. The needle valve will allow simple opening/closing and must be rated for 27 500 kPa (4,000 psi) or above. The length of the hoses is not critical and can be selected to provide the best accessibility to the needle valve. Connect the opposite ends of the hose/needle valve assembly as follows.
   a. Ensure that the steering accumulators, brake accumulators and auxiliary accumulator are bled down.
   b. Remove the test coupling from steering bleeddown manifold test port T4 (5, Figure 30-5). Install a #6 O-ring boss to #4 JIC fitting (WB0576) in its place. This port is connected to the steering supply port and ACC2 port and will allow both steering accumulators to bleed down when the needle valve is opened.
   c. Connect one end of the hose/needle valve assembly to the fitting in test port T4.
   d. Remove the plug in brake manifold port "T6" and install another #6 O-ring boss to #4 JIC fitting (WB0576) in its place. This port will return oil that is bled from the steering accumulators to the hydraulic tank.
   e. Connect hose/needle valve assembly to the fitting in port "T6".
   f. Retain the plugs that were removed from the manifolds for replacement when the hose/ needle valve assembly is removed.

NOTE: Use of optional bleeddown hose/needle valve assembly does not substitute for the use of jumper hose installed in step 4.

Hydraulic system checkout data sheet

**** Acceptable values of each measurement are shown in ().**

1. Steering and brake accumulator precharge pressures:

Front steering accumulator, ACC1	(1400 ± 10 psi at 70º F)	_____ at _____
Rear steering accumulator, ACC2	(1400 ± 10 psi at 70º F)	_____ at _____
Front brake accumulator, AF1	(1400 ± 10 psi at 70º F)	_____ at _____
Rear brake accumulator, AR1	(1400 ± 10 psi at 70º F)	_____ at _____
Auxiliary accumulator, A6	(1400 ± 10 psi at 70º F)	_____ at _____

15. Was low steering accumulator precharge warning A115 displayed before start-up? (circle one)

(No) YES NO

21. Pressure at bleeddown manifold test port T3:

a.) Does bleed down occur when stopping with engine shutdown switch? (circle one)

(No) YES NO

Pressure at port “T3”	(approximately 3000 psi)	_____
Faults	(none)	_____

Pressure at port "T3" and faults after each bleeddown cycle:

1st Bleeddown cycle		
Pressure after bleeddown	(0 - 15 psi)	_____
Faults	(none)	_____
2nd Bleeddown cycle		
Pressure after bleeddown	(0 - 15 psi)	_____
Faults	(none)	_____
3rd Bleeddown cycle		
Pressure after bleeddown	(0 - 15 psi)	_____
Faults	(none)	_____
4th Bleeddown cycle		
Pressure after bleeddown	(0 - 15 psi)	_____
Faults	(none)	_____
5th Bleeddown cycle		
Pressure after bleeddown	(0 - 15 psi)	_____
Faults	(none)	_____

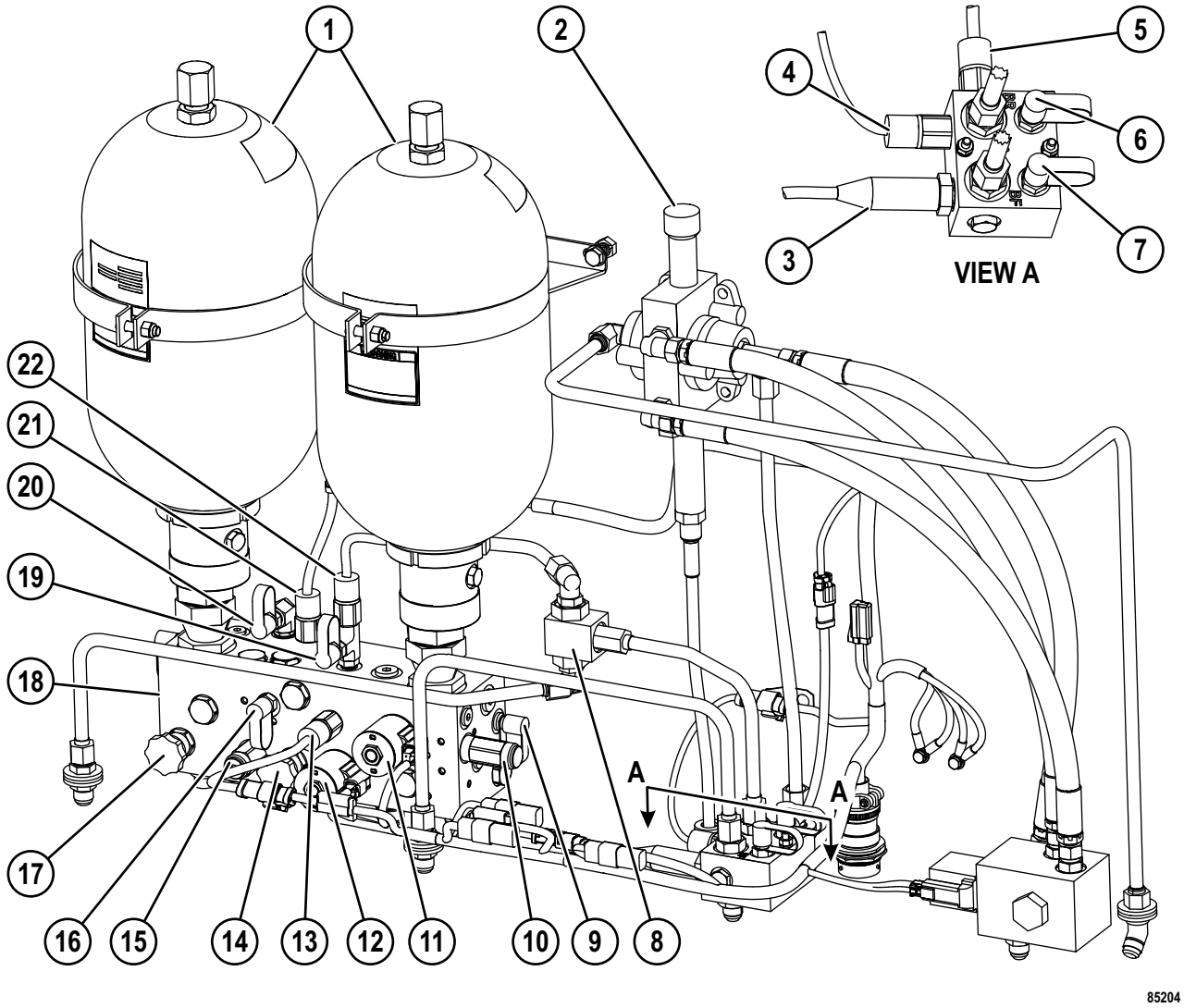


FIGURE 30-1. HYDRAULIC BRAKE CABINET

1. Brake Accumulator
2. Hoist Pilot Valve
3. (Front) Brake Pressure Sensor
4. Stop Light Pressure Switch
5. Brake Lock Degradation Switch
6. Rear Brake (BR) Pressure Test Port
7. Front Brake (BF) Pressure Test Port
8. Brake Lock Shuttle Valve
9. Brake Lock (PP3) Pressure Test Port
10. Pressure Reducing Valve (PR)
11. Brake Lock Solenoid Valve (SV1)
12. Parking Brake Solenoid Valve (SV2)
13. Parking Brake Pressure Switch
14. Front Brake Accumulator Bleed Valve
15. Auto Apply Sequence Valve
16. Low Brake Accumulator (LAP1) Pressure Test Port
17. Rear Brake Accumulator Bleed Valve
18. Brake Manifold
19. Parking Brake (PK3) Pressure Test Port
20. Auto Apply Signal (PS1) Pressure Test Port
21. Low Brake Pressure Switch
22. Parking Brake Pressure Switch

STEP 36 _____ Low brake accumulator pressure (LAP1) when front brake accumulator is completely depressurized

_____ Auto apply signal (PS1) pressure when front brake accumulator is completely depressurized

_____ Front brake (BF) pressure when front brake accumulator is completely depressurized

_____ Rear brake (BR) pressure when front brake accumulator is completely depressurized

STEP 37 _____ Low brake accumulator (LAP1) pressure after auto apply occurs

_____ Auto apply signal (PS1) pressure after auto apply occurs

_____ Front brake (BF) pressure after auto apply occurs

_____ Rear brake (BR) pressure after auto apply occurs

STEP 41 _____ Fault A260 displayed (yes or no)

_____ Low brake accumulator (LAP1) pressure when fault A261 displayed

_____ Auto apply signal (PS1) pressure when fault A261 displayed

_____ Front brake (BF) pressure when fault A261 displayed

_____ Rear brake (BR) pressure when fault A261 displayed

STEP 42 _____ Low brake accumulator pressure (LAP1) when front brake accumulator is completely depressurized

_____ Auto apply signal (PS1) pressure when front brake accumulator is completely depressurized

_____ Front brake (BF) pressure when front brake accumulator is completely depressurized

_____ Rear brake (BR) pressure when front brake accumulator is completely depressurized

STEP 43 _____ Low brake accumulator (LAP1) pressure after auto apply occurs

_____ Auto apply signal (PS1) pressure after auto apply occurs

_____ Front brake (BF) pressure after auto apply occurs

_____ Rear brake (BR) pressure after auto apply occurs

Piston assembly adjuster grip force

1. Inspect the piston assembly adjuster grip force. This is the force required to cause the adjuster pin to slip in the pair of adjuster grip subassemblies.
2. Provide the special tools. Refer to Figure 30-5 and Figure 30-6.

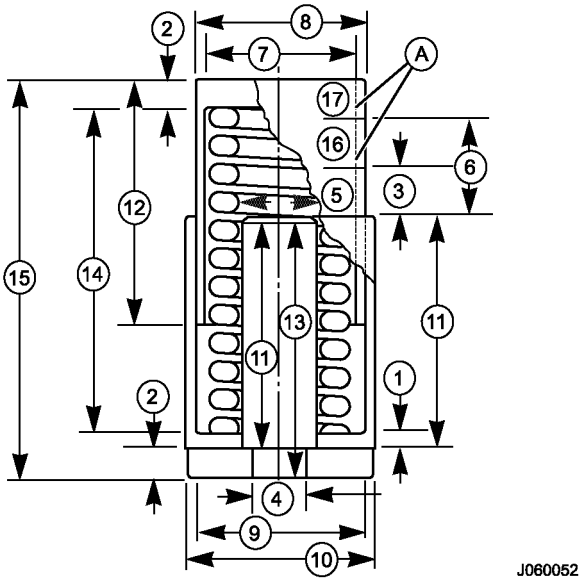


FIGURE 30-5. CALIBRATED SPRING POD

A. Scribe and Mark
1. 6.35 mm (0.25 in.)
2. 9.7 mm (0.38 in.)
3. 15.7 mm (0.62 in.)
4. 19.05 mm (0.75 in.)
5. 25.4 mm (1.00 in.)
6. 33.27 mm (1.31 in.)
7. 50.8 mm (2.00 in.)
8. 57.15 mm (2.25 in.)
9. 58.67 mm (2.31 in.)
10. 65.02 mm (2.56 in.)
11. 82.5 mm (3.25 in.)
12. 85.9 mm (3.38 in.)
13. 92.0 mm (3.62 in.)
14. 114.3 mm (4.5 in.) Free Length
15. 139.7 mm (5.50 in.) Free Length
16. 173 kg (380 lbs)
17. 362 kg (800 lbs)

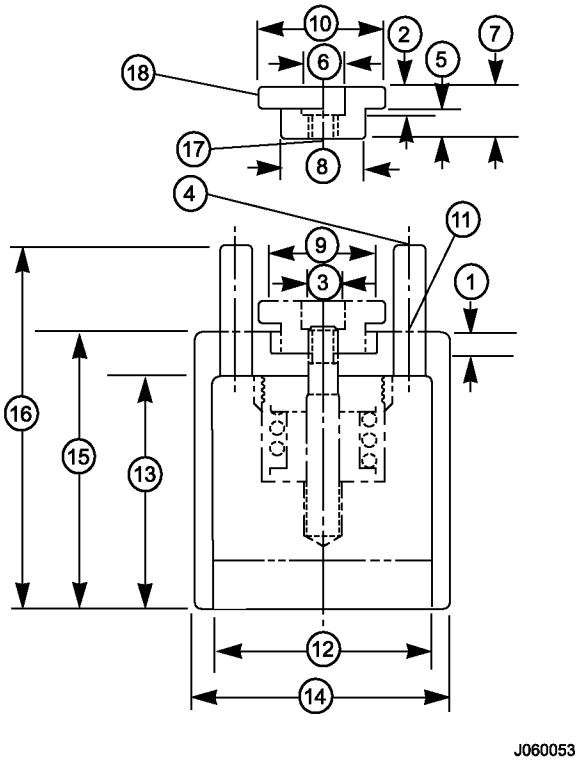


FIGURE 30-6. ADJUSTER PIN EXTENDER TOOL

1. 6.35 mm (in.)
2. 7.9 mm (0.31 in.)
3. 8.6 mm (0.34 in.)
4. Three dowels 0.375 in. dia. x 1.5 in long
5. 9.7 mm (0.38 in.)
6. 12.7 mm (0.50 in.)
7. 15.7 mm (0.62 in.)
8. 25.4 mm (1.0 in.)
9. 31.8 mm (1.25 in.)
10. 38.1 mm (1.5 in.)
11. See 11 below
12. 76.2 mm (3.0 in.) +0.127 mm (0.005 in.) -0.00 mm (0.00 in.)
13. 71.4 mm (2.81 in.)
14. 85.9 mm (3.38 in.)
15. 84.1 mm (3.31 in.)
16. 109.5 mm (4.31 in.)
17. 5/16-24 UNF Thread
18. Diamond Knurl

Item 11. Drill and ream for slip fit with 0.375 in dowel, three holes equal space on two inch diameter.

⚠CAUTION

If the precharge is not added slowly, the bladder may suffer permanent damage. A "starburst" rupture in the lower end of the bladder is a characteristic failure caused by charging too quickly.

12. When 172 kPa (25 psi) of precharge pressure is obtained, close the nitrogen container valve. Set the regulator (5) for the charging pressure based on the current ambient temperature. Refer to Table 1. Then, slowly open the nitrogen container valve again and fill the accumulator. The proper fill time for the bladder accumulator is approximately **three minutes**.
13. After the accumulator is charged to the desired pressure, shut off the charging kit and wait 15 minutes to allow the gas temperature to stabilize. If the desired pressure is maintained, proceed to step 19. If the desired pressure is exceeded:
    a. Close the nitrogen container valve, inlet valve (4) and both outlet valves (3).
    b. Disconnect the hose that connects the manifold (6) to regulator valve (5).

NOTE: A small blast of pressure will escape.

    c. Open inlet valve (4) then slowly open each outlet valve (3) independently until the correct precharge pressure is obtained in each accumulator.

⚠CAUTION

Do not reduce pressure by depressing the valve core with a foreign object. High pressure may rupture the rubber valve seat.

14. Turn the "T" handle (1) on the charging valve adapters all the way out (counterclockwise) to close the accumulator gas valve.
15. Hold the gas valve on the accumulator stationary. Loosen the swivel nut on the charging valve adapter to remove the nitrogen charging kit.
16. Use a common leak reactant to check for nitrogen leaks.
17. Install protective cap (1, Figure 30-1) on the gas valve.
18. Operate the truck and check the steering operation.

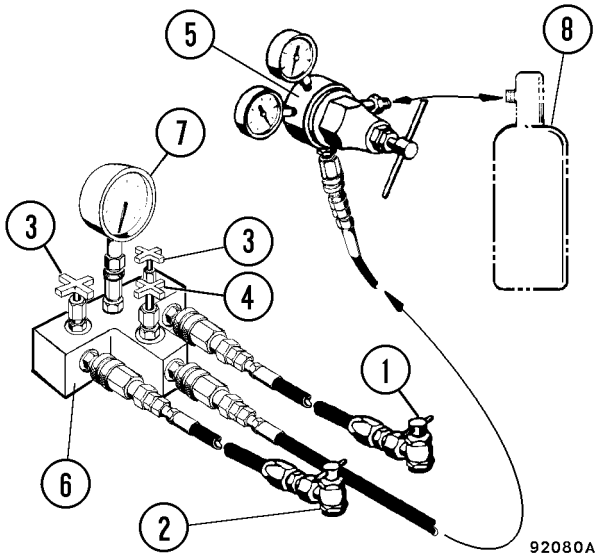


FIGURE 30-2. HYDRAIR® CHARGING KIT

NOTE: The arrangement of parts may vary from the illustration depending on the kit part number.

1. "T" Handle Valve
2. Charging Valve Adapter
3. Manifold Outlet Valves (from gauge)
4. Inlet Valve (from regulator)
5. Regulator Valve (Nitrogen Pressure)
6. Manifold
7. Charging Pressure Gauge
8. Dry Nitrogen Gas Container

Suspension oiling and charging procedures

WARNING

All suspensions are charged with compressed nitrogen gas with sufficient pressure to cause injury and/or damage if improperly handled. Follow all safety instructions, cautions, and warnings provided in the following procedures to prevent any accidents during oiling and charging. Contact your Komatsu representative for more information as needed.

These procedures cover the suspension oiling and charging of Hydrair® II suspensions on Komatsu electric drive dump trucks. Suspensions that have been properly charged will provide improved handling and ride characteristics while also extending the life of the truck frame and improving tire wear.

The oiling and charging procedures must e performed on flat ground and under specific controlled conditions.

Inflation pressures and exposed piston lengths are calculated for a normal truck gross vehicle weight (GVW). Additions to truck weight, such as body liners, tailgates, water tanks, etc, should be considered part of the payload. It is important to monitor dirt rings to ensure the suspension is operating properly where body weight or truck modifications have significantly affected vehicle weight. Keeping the truck GVW within the specification shown on the grade/speed chart in the operator cab will extend the service life of the truck main frame and allow the suspensions to produce a comfortable ride.

For best results, suspensions should be charged in pairs (front suspensions together and rear suspensions together). If rear suspensions are to be charged, the front suspensions should be charged first. If the truck lifts off of support blocks before charging is complete, stop charging even if the listed pressures are not reached. If both front and rear suspensions are serviced, DO NOT remove the front suspension support blocks until after the rear suspensions have been completely serviced.

Before servicing the suspensions, allow at least three hours for the oil and nitrogen to separate. Alternatively, the nitrogen can be bled with the charging kit and the oil can be drained and refilled to the specifications in Table 2 and Table 3.

Anytime the suspensions are charged, the calibration of the payload meter (PLM) system is affected. To ensure accurate payload records, perform a "Clean Truck Tare" and an inclinometer calibration before returning the truck to operation. Refer to the payload meter information later in this section.

Required equipment

- Hydrair® charging kit (see Figure 30-7)
- Jacks and/or overhead crane
- Support blocks for oiling
- Support blocks for charging
- Hydrair® oil
- Friction modifier
- Dry nitrogen

6. Remove vent plug (1, Figure 30-17), pressure sensor (2) and charging valve (3).

NOTE: If the pressure fill method is being used, skip to Step 11.

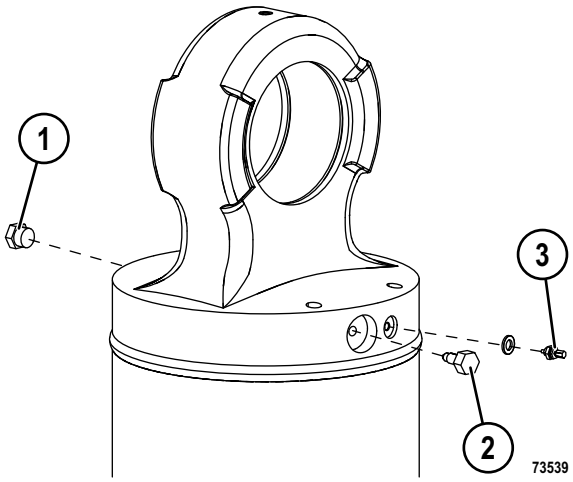


FIGURE 30-17. REAR SUPENSION PORTS

1. Vent Plug
2. Pressure Sensor
3. Charging Valve

TOP FILL METHOD

7. To fill the suspension from the top, use one of the open ports to fill the suspension cylinder with a clean suspension oil mixture (with 6% friction modifier) until the oil weeps from the open ports. Use drip pans and clean all spillage from the outside of the suspension.
8. Allow the suspension to settle for at least 15 minutes. Add more suspension oil mixture if necessary.
9. Install vent plug (1) and pressure sensor (2) into the suspension cylinder.
10. Install a new O-ring onto charging valve (3) and install the charging valve into the suspension cylinder.

PRESSURE FILL METHOD

11. Is an alternative to Steps 7-10, the suspension can be pressure filled from the rod drain port at the bottom of the cylinder. This method eliminates the 15 minute wait period for the air to purge.
    a. Remove the oil drain plugs from the suspensions. To drain the oil, use the jacks or overhead crane to lower the truck.
    b. After the oil is drained, use the jacks or overhead crane to raise the truck to correct oiling height.
    c. Insert a hose or fitting (PB6528) into the oil drain port. Connect either a hand pump or 12 volt transfer pump.
    d. Pump clean suspension oil mixture (with 6% friction modifier) into the suspension. By pushing the oil from the bottom, no air is trapped in the suspension and existing air is purged from the suspension.
    e. Stop pumping oil when oil starts to come out of the top fill port.
    f. Install vent plug (1) and pressure sensor (2) into the suspension cylinder.
    g. Install a new O-ring onto charging valve (3) and install it into the suspension cylinder.
    h. Remove the hose or fitting from the oil drain port and install the oil drain plug. With the top ports plugged, a small vacuum is created to minimize oil loss.
12. Connect the nitrogen charging kit to the charging valve. Refer to Installing the charging kit.
13. Charge the suspensions with nitrogen gas to a charging height of approximately 305 mm (12 in.). Close inlet valve (4, Figure 30-7).

⚠WARNING

Be aware that the truck may lower suddenly when releasing nitrogen gas from the suspensions.

14. Slowly release nitrogen gas until the charging heights of both rear suspensions match the charging height listed in Table 5

NOTE: There is no specific charging pressure that must be maintained. The required pressure for maintaining the charging height will depend upon the weight of the dump body.

15. Close inlet valve (4, Figure 30-7). Leave outlet valves (3) open for five minutes to allow the pressures in the suspensions to equalize.

IM checkout sheet

TABLE 1. INTERFACE MODULE (IM) CHECKOUT SHEET			
Function Description	**Expected Result**	**Result (OK/Fail)**	**Comments**
DIGITAL INPUT CHECKS			
1 - Hydraulic Tank Level	1 to 0		
2 - Low Steering Precharge	0 to 1		
3 - Pump Filter Switches	1 to 0		
4 - Park Brake Released	1 to 0		
5 - Park Brake Request	1 to 0		
6 - GE Batt +	1		
7 - Starter Motor 1 Energized	0 to 1		
8 - Starter Motor 2 Energized	0 to 1		
9 - Crank Sense	0 to 1		
10 - Selector Switch [PARK]	1 to 0		
11 - Selector Switch [FNR]	PARK=0 F/N/R=1		
12 - Steering Bleed Pressure	0 to 1		
13 - Brake Lock Switch Power Supply	0 to 1		
14 - Brake Lock	0 to 1		
15 - Service Brake Set	0 to 1		
16 - Engine Shutdown Delay	0 to 1		
17 - Secondary Engine Shutdown	1 to 0		
18 - Keyswitch	1		
19 - Mode Switch 1	1 to 0		
20 - Mode Switch 2	1 to 0		
21 - Mode Switch 3	1 to 0		
22 - Mode Switch 4	1 to 0		
23 - Crank Request	0 to 1		
24 - Park Brake Set	0 to 1		
25 - Seat Belt Switch	0 to 1		

KOMTRAX Plus initialization form

This form is available in electronic "fill-in" format, which is preferred. Send request to ServicePrograms@KomatsuNA.com.
After filling out the form, save the file using the Model Type, Serial Number and "KOMTRAX Plus Initialization" in the file name.
*(Example: **960E-1-A3-KOMTRAX Plus Initialization.pdf**)*
E-mail the completed form to the Service Systems Support Team at ServicePrograms@KomatsuNA.com.

Customer Information	
Company Name	
Site Name	
Customer Employee Contact	
Mailing Address	
Phone Number	
Fax Number	
E-mail	
Distributor Information	
Distributor Name	
Distributor Service System Support Administrator Name and E-mail	
Distributor Branch	
Distributor Branch Employee Contact and E-mail	
Distributor 4 + 2 Code	
Machine Information	
Machine Model And Type	
Machine Serial Number	
Customer Unit Number	
Engine 1 Serial Number	
Engine 2 Serial Number	
Transmission or Alternator Serial Number	
KOMTRAX Plus Controller Part Number	
KOMTRAX Plus Controller Serial Number	
Setting Tool Information	
Setting Date (MM/DD/YYYY)	
Setting Time (HH:MM:SS)	
GMT (Time Zone)	
Daylight Savings Time (DST) (Yes/No)	
Service Meter Reading (SMR)	
New WebCARE & MyKomatsu.com User Information	
Distributor Name, Branch And Code	
Employee Name	
Title	
E-mail	
Primary Area of Responsibility (circle one)	Admin Sales Parts Service PSSR Other
Reason for Form Submittal (Check One)	
Factory Installed KOMTRAX Plus Initialization	
Retrofitted KOMTRAX Plus Initialization	
KOMTRAX Plus Controller Replacement	
Major Component (Engine/Transmission Replacement)	
Customer or Distributor Change	
Setting Tool Information Change	
New WebCARE & MyKomatsu.com User Request	

Payload meter IV software installation

1. Insert a blank USB drive into the service computer. Format the USB drive to FAT32 by right-clicking on the correct drive letter and selecting "Format".
2. Copy the truck application software to the USB drive.
3. Remove the USB drive, then insert the USB drive into either USB 2.0 port (1, Figure 30-1) on the PLM IV communication module.
4. Turn the truck's engine start switch to ON.
5. Ensure that the service computer is set up to communicate with the PLM IV controller. If not, refer to "Payload meter IV system configuration".
6. On the home page, click on the "Program Flash" link. See Figure 30-3.
7. On the next web page, enter the password **Kac2300** in the field at the bottom of the page. Click on "Start Program" to begin installing the truck application code.

   This process may take approximately 10 minutes to complete. **Do not turn off 24V truck power during this process.** The completion percentage will be shown and periodically updated on the web page as the installation progresses.
8. When the software installation is complete, payload meter will automatically restart.

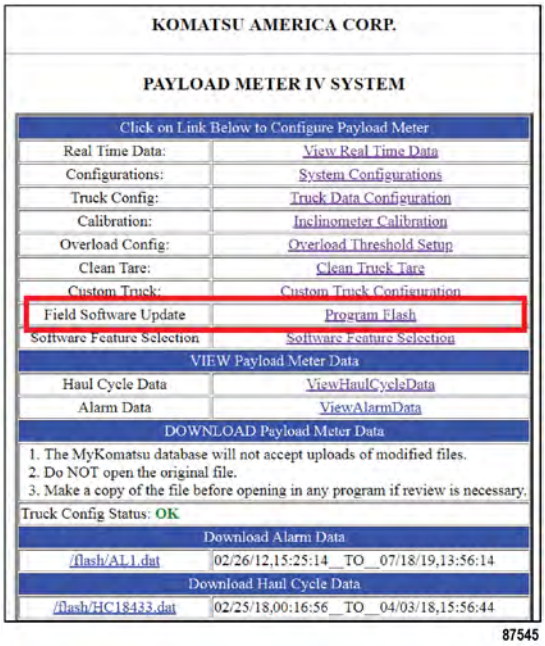
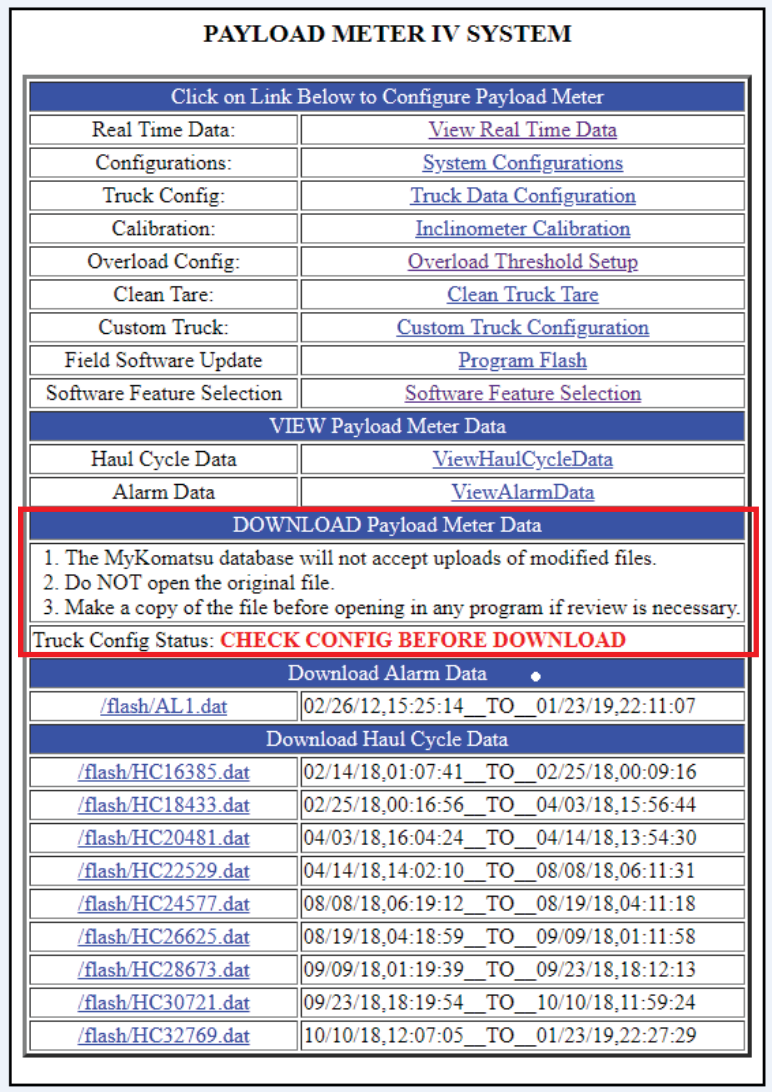


FIGURE 30-3. PLM IV HOME PAGE



PAYLOAD METER IV SYSTEM

Click on Link Below to Configure Payload Meter	
Real Time Data:	View Real Time Data
Configurations:	System Configurations
Truck Config:	Truck Data Configuration
Calibration:	Inclinometer Calibration
Overload Config:	Overload Threshold Setup
Clean Tare:	Clean Truck Tare
Custom Truck:	Custom Truck Configuration
Field Software Update	Program Flash
Software Feature Selection	Software Feature Selection
VIEW Payload Meter Data	
Haul Cycle Data	ViewHaulCycleData
Alarm Data	ViewAlarmData
DOWNLOAD Payload Meter Data	
1. The MyKomatsu database will not accept uploads of modified files. 2. Do NOT open the original file. 3. Make a copy of the file before opening in any program if review is necessary.	
Truck Config Status: **CHECK CONFIG BEFORE DOWNLOAD**	
Download Alarm Data	
/flash/AL1.dat	02/26/12,15:25:14__TO__01/23/19,22:11:07
Download Haul Cycle Data	
/flash/HC16385.dat	02/14/18,01:07:41__TO__02/25/18,00:09:16
/flash/HC18433.dat	02/25/18,00:16:56__TO__04/03/18,15:56:44
/flash/HC20481.dat	04/03/18,16:04:24__TO__04/14/18,13:54:30
/flash/HC22529.dat	04/14/18,14:02:10__TO__08/08/18,06:11:31
/flash/HC24577.dat	08/08/18,06:19:12__TO__08/19/18,04:11:18
/flash/HC26625.dat	08/19/18,04:18:59__TO__09/09/18,01:11:58
/flash/HC28673.dat	09/09/18,01:19:39__TO__09/23/18,18:12:13
/flash/HC30721.dat	09/23/18,18:19:54__TO__10/10/18,11:59:24
/flash/HC32769.dat	10/10/18,12:07:05__TO__01/23/19,22:27:29

88871

FIGURE 30-12. PLM IV CONFIG ERROR PRESENT

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.

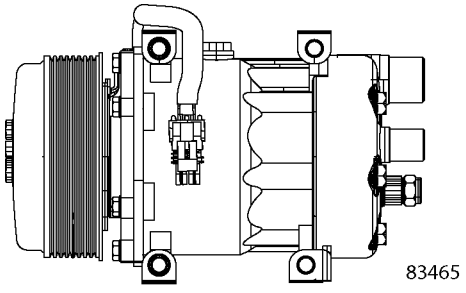


FIGURE 30-6. COMPRESSOR
300 ml - (10.1 oz.) PC2279 PAG OIL

⚠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

730E

Machine model	Serial number
730E-8	A40002 and up

40 Troubleshooting
Fuse and circuit breaker locations

Fault code tables

The tables on the following pages list the possible events (faults) which may be displayed on the user interface panel on the rear wall of the operator cab.

- Table 1 defines the restrictions to operation of the propulsion and retarding systems when a particular fault occurs. The fault codes listed in the tables may be updated in later software versions.
- Fault codes numbered 000 through 099 are applicable to the propulsion control portion of the drive system controller (DSC). See Table 2.
- Fault codes numbered 100 through 199 are applicable to Inverter 1. Fault codes numbered 200 through 299 are applicable to Inverter 2. See Table 3.
- Fault codes numbered 600 through 699 are applicable to the truck control portion of the drive system controller (DSC). See Table 4.

Table 1: Operational Restrictions

Restriction	Definition
NO_PROPEL	NO PROPEL red light is illuminated in the operator cab. No propulsion effort allowed. Retard effort and DC link energization is allowed.
NO_POWER	NO RETARD red light is illuminated in the operator cab. No propulsion effort and no retard effort are allowed. The DC Link is de-energized.
SPD_LIM / SYSWARN	Propel System Caution amber light is illuminated in the operator cab. Propel, retard and DC link energization are allowed. The truck is under a speed limit restriction of 16/24 kph (10/15 mph).
SPDLIM_LOW	Speed limit is set to a lower speed point of 8 kph (5 mph).
INV1_OFF INV2_OFF	When active, this prohibits the system from enabling the inverter's run drive signal.
ENGSPD_ RP	When active, this raises the engine speed to account for a possible stuck RP contactor/chopper and closes RP1/CM1.
SYSEVENT	There are no restrictions. This event is for informational purposes only.
DELAYED_SHTDWN	Indicates a that NO_PROPEL/NO_RETARD is imminent. Delayed shutdown restrictions have an operator override. After the truck comes to a stop, the operator can operate the truck with a 50% torque de-rate and 8 kph (5 mph) speed limit by holding down the override / reset switch. An unloaded truck can be operated for five minutes. A loaded truck can be moved approximately 100m (328 ft) or three minutes. RETARD IS NOT AVAILABLE IN THIS MODE.
LOADBOX_DIS	Loadbox is disabled.
NO_RETARD	Retard mode is restricted.

NOTE: For restriction where ramps are indicated, timing for short ramp is 0 seconds, medium ramp is 1.2 seconds, and long ramp is 2.4 seconds.

Table 2: DSC/PSC Event List				
Fault code		**Description**	**Restriction**	**Cause or definition**
	:09	A3P Reading	NO_POWER (long ramp)	AP3 reading detected
	:10	Alternator FPGA Timed Out		Timeout issue after software download
	:11	Controller Reset		Timeout issue after software download
077		Inverter VI Test Failed	NO_POWER (long ramp)	Inverter 1 or 2 failed during switch from REST to READY mode
078		Inverter Communication Failure		
	:01	Inverter 1 TMC1 card	SYSEVENT	Communication error with DSC or PSC CPU card
	:02	Inverter 2 TMC2 card		
	:03	Inverter 1 TMC1 card		
	:04	Inverter 2 TMC2 card		
	:05	Inverter 1TMC1 card		
	:06	Inverter 2 TMC2 card		
	:07	Inverter 3 DAB card		
	:08	Inverter 3 DAB card		
	:09	Inverter 3 DAB card		
079	:09	FB173 CPU Card Failed	NO_POWER (long ramp)	Alternator 3-phase voltage does not match expected DC link voltage.
080		Cruise Control Lever Error		
	:01	Out of Range or Not Present	SYSEVENT	Cruise control lever output voltage is out of range or not present
	:02	Not Returning to Default Position		Cruise control lever output voltage is not returning to default range
081		Quad Chopper Failure		
	:01	Grid Current High Value	SPD_LIM	Grid current value is high
	:02	Link Current High Value		Link current value is high
	:03	Grid Current Sensor Loadbox		Grid current sensor is out of range
	:04	Link Current Sensor Loadbox		Link current sensor is out of range
	:05	High Chopper Percent On		Detected high chopper percent on - CM2 may not have closed
082	:01	Grid Protection	SPD_LIM ENGSPD_RP	Chopper modules are on excessively in Propel mode
083	:01	Too Many Boots Not From Power Up	SPD_LIM	Multiple 86 events recorded not from power up
084		Control Power Switch Off	System event	Control power switch (CPS) feedback lost with truck motion
085		Auxiliary Cooling		
	:01	Sensor Fault	SYSEVENT	Axle box air pressure not sensed
	:02	Auxiliary RPM FB/CMD Input		Auxiliary cooling motor (if equipped) RPM out of range
	:03	Auxiliary RPM FB/CMD Mismatch		Auxiliary cooling motor (if equipped) command does not match feedback
	:04	Abnormal Shutdown		Auxiliary cooling motor (if equipped) commanded to run but did not run
086		System Boot Not From Power Up		
	:02	Slow Watchdog	SYSEVENT	PSC or DSC CPU card reset due to slow watchdog timer expiring
	:03	Software Request		Card reset due to request from software
	:06	Power Monitor		Card reset due to +5VDC power monitoring
	:07	Push Button Reset		Card reset due to reset pin jumper
	:08	Fast Watchdog		Card reset due to fast watchdog expiring

Table 3: Inverter Event List				
Fault code		**Description**	**Restriction**	**Cause of fault**
136/236		INVERTER, PHASE C+	System event	
	:02	Cup temp short		Phase C up thermistor short
	:03	Cup temp open		Phase C up thermistor open
	:04	Cup temp warm		Phase C up thermistor warm
	:05	Cup temp hot		Phase C up thermistor hot
	:06	Cup fb not off S		Phase C up not off with enable/DC volts
	:07	IGBT_PS_CP		IGBT protective shutoff
137/237		INVERTER, PHASE C-	INV1 (INV2) disable	
	:01	alarm CN		Phase C negative IGBT did not turn off.
	:02	Cdn fb not off		Phase C down feedback is not off.
	:03	phase C modl neg		Phase C negative module failed.
	:04	hold CN		Phase C positive and negative IGBTs are on (negative turn on).
	:05	Cdn fb not on		Phase C down feedback is not on.
	:06	Cdn IGBT not on		Phase C negative IGBT did not turn on.
	:07	IGBT_PS_CN		IGBT protective shutoff
138/238		INVERTER, PHASE C- (NR)	System event	
	:02	Cdn temp short		Phase C down thermistor short
	:03	Cdn temp open		Phase C down thermistor open
	:04	Cdn temp warm		Phase C down thermistor warm
	:05	Cdn temp hot		Phase C down thermistor hot
	:06	Cdn fb not off S		Phase C down not off with enable/DC volts
141/241		INVERTER, PHASE C VOLTS	INV1 (INV2) disable	
	:01	V sensor phase C		Phase C voltage sensor failed.
	:02	VC not ok		Phase C voltage too high
143/243		INVERTER, TM SPEED SENSOR	INV1 (INV2) disable	
	:01	ss rate hi		Speed sensor high rate of change
	:02	ss no input		Speed sensor no frequency input
	:03	SS_INTERMIT		Speed sensor feedback signal intermittent
	:04	phase A overcurrent		Phase A current is too high.
	:05	phase B overcurrent		Phase B current is too high.
	:06	phase B overcurrent		Phase C current is too high.
	:07	felt volts hi		Felt voltage is above limit.
144/244		INVERTER, TM SPEED SENSOR (NR)	System event	
	:01	ss one channel		Speed sensor single channel operation
	:02	ss rate hi		Speed sensor high rate of change
	:03	ss no input		Speed sensor no frequency input

Fault Code A001: Left front suspension pressure sensor signal high

Operator Action	None
Fault Code	A001
Description	Left front suspension pressure sensor signal high.
Fault Conditions	Sets if pressure signal is out of range high (sensor current over 22 ma). Resets if reading returns to normal.
Operator Alerting System Response	Repair Lamp Display Operator Action: None Display Fault Description: PLM LF PRESS SENS HI Display Fault Code: A001
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)
Left Front Pressure Sensor (PLM III 36,39)	Sensor current >22 ma: Failed high Sensor current <2 ma: Failed low Sensor current >2 ma but less than 22 ma: Valid readings Fault(s): A002

Related circuit diagram
58D-06-00440 SH14 (N-1) LEFT FRONT PAYLOAD PRESSURE SENSOR.

Fault Code A011: Payload meter speed sensor signal has Failed

Operator Action	None
Fault Code	A011
Description	Payload meter speed sensor signal has failed.
Fault Conditions	Sets when PLM declares a speed sensor fault. Resets when PLM resets the speed sensor fault.
Operator Alerting System Response	Lamp or Buzzer: None - Maintenance Item Display Fault Description: PLM TRK SPD SENSOR Display Fault Code: A011
Resulting Problem(s)	Payload and haul cycle data is bad.
Related Information	A laptop running "IM Realtime Data Monitor" software may be required to resolve this fault.

Table

1. This fault is produced by PLM in response to a problem in the generation of truck speed by GE or transmission of the truck speed signal via CAN/RPC to PLM. The CAN 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)
Payload CAN/RPC Not Connected (PLM III 11, 21, 31)	CAN/RPC working: Truck speed is updated CAN/RPC not working: No truck speed updates Fault(s): A257
Drive System Control Link (CAN/RPC) Not Connected (IM1I, j, k)	CAN/RPC working: Truck speed is updated CAN/RPC not working: No truck speed updates Fault(s): A233

Related circuit diagram

58D-06-00440 SH14 (O-11) CAN/RPC CONNECTION TO PLM III.
58D-06-00440 SH12 (K-2) CAN/RPC CONNECTION TO GE.
58D-06-00440 SH15 (E-5) CAN/RPC WIRING.

Related circuit diagram
SAME SCHEMATIC AS A018.

Related circuit diagram

58D-06-00440 SH13 (N-2) LOW STEERING PRESSURE SWITCH.

58D-06-00440 SH5 (J-4) LOW STEERING PRESSURE SWITCH GROUND.

Fault Code A127: IM-furnished +5 volt output for sensors is low

Operator Action	Go To Shop Now
Fault Code	A127
Description	IM-furnished +5 volt output for sensors is low.
Fault Conditions	Sets when Sensor +5V Input drops below 4.52 volts for 2 seconds. Resets when Sensor +5V Input recovers to 4.66 volts for 2 seconds.
Operator Alerting System Response	Sound Buzzer Operate IM Warning Indicator Display Operator Action: GO TO SHOP NOW Display Fault Description: TEMP SENSOR +5V LOW Display Fault Code: A127
Resulting Problem(s)	All 5 temperature sensors using the +5 Volt supply will report low readings. Control of engine speed and warnings of high oil temperature will be compromised. Equipment damage may result.
Related Information	A laptop running "IM Realtime Data Monitor" software may be required to resolve this fault.

Table	
1. No additional fault codes are available for this function. 2. Check external wiring and sensors to determine if problem is outside of IM.	
Parameter	**Expected State and/or Related Fault(s)**
Sensor +5V Analog Input (IM3j)	>4.52 Volts: Normal voltage <4.52 Volts: Voltage low
Sensor +5V Output (IM3c)	

Related circuit diagram

58D-06-00440 SH13 (D-7) FIVE VOLT SENSOR CIR-
CUITS.

Related circuit diagram

58D-06-00440 SH13 (D-16) B+ INPUT TO IM.
58D-06-00440 SH7 (I-18) IM GROUND CONNEC-TION.
58D-06-00440 SH12 (F-17) IM GROUND CONNEC-TION.
58D-06-00440 SH5 (H-2) IM GROUND CONNEC-TION.
58D-06-00440 SH4 (G-5) PARK BRAKE RELEASED PRESSURE SWITCH INPUT TO IM.
58D-06-00440 SH13 (G-14) PARK BRAKE RELEASED PRESSURE SWITCH GROUND.
58D-06-00440 SH (F-14) PARK BRAKE APPLIED PRESSURE SWITCH INPUT TO IM.

Fault Code A201: Brake pressure sensor is high

Operator Action	None
Fault Code	A201
Description	Brake Pressure Sensor is high.
Fault Conditions	Sets at 4025 psi (20.1mA) for 5 seconds. Resets at 3650 pi (18.6 mA) for 5 seconds.
Operator Alerting System Response	Lamp or Buzzer: None - Maintenance Item Display Fault Description: BRAKE PRES SENS HI Display Fault Code: A201
Resulting Problem(s)	Monitoring of the service brake system for driver input as well as KOMTRAX Plus data will be compromised.
Related Information	A laptop running "IM Realtime Data Monitor" software may be required to resolve this fault.

Table	
1. The primary correction for this fault is to correct any external wiring or replace the sensor. 2. This fault's logic contains only one parameter.	
Parameter	**Expected State and/or Related Fault(s)**
Brake Pressure Sensor (IM3p)	2.4 mA to 20.1 mA: Good readings < 2.4 mA or more than 20.1 mA: Defective sensor or circuit Fault(s): A205

Related circuit diagram

58D-06-00440 SH13 (B-1) BRAKE PRESSURE SENSOR INPUT TO IM.
58D-06-00440 SH12 (F-16) GROUND FOR BRAKE PRESSURE SENSOR SHIELD.
58D-06-00440 SH5 (H-2) GROUND FOR BRAKE PRESSURE SENSOR SHIELD.

Park Brake Request (IM3V)	0: Shifter is not in the forward, neutral, or reverse positions or the engine oil pressure is below the setpoint of the engine oil pressure switch 1: Shifter is in the forward, neutral, or reverse positions and the engine oil pressure is above the setpoint of the engine oil pressure switch Fault(s): A264
Engine Speed [RPM] (CAN/J1939) (IM1q,r,s)	< 300 RPM: Engine is not running > 300 RPM for 4 seconds: Engine is running Fault(s): A184
Truck Speed [kph] (CAN/J1939) (IM1i,j,k)	0: Truck is not moving > 0: Truck is moving Fault(s): A233
CAN J1939 connection (IM1qrs)	Fault(s): A184
Keyswitch (IM3G)	0: Keyswitch is off and the truck is not moving and the engine is not running 1: Keyswitch is on or the truck is moving (GE power not yet off) Fault(s): A240
Park Brake Solenoid (IM1E)	Status - Open Load: Unexpected. Troubleshoot Status - Normal: Expected. No Problem Status - Shorted to Ground: Expected if shifter is in the forward, neutral, or reverse positions and the engine oil pressure is above the setpoint of the engine oil pressure switch. Otherwise unexpected and must troubleshoot Status - Overload: Unexpected. Troubleshoot 0: Shifter is not in the forward, neutral, or reverse positions or the engine oil pressure is below the setpoint of the engine oil pressure switch and either the speed of the truck has been 0.8 kph (0.5 mph) or less for 1 second or the service brakes are applied 1: Shifter is in the forward, neutral, or reverse positions and the engine oil pressure is above the setpoint of the engine oil pressure switch Fault(s): A216, A351

Related circuit diagram

58D-06-00440 SH6 (L-5) ENGINE RUN OIL PRESSURE SWITCH CIRCUIT.
58D-06-00440 SH3 (N-18) GROUND FOR ENGINE RUN OIL PRESSURE SWITCH.
58D-06-00440 SH7 (G-18) SELECTOR SWITCH & PARK BRAKE CONTROL CIRCUITS.
58D-06-00440 SH12 (F-16) GROUND CONNECTION FOR R18 VARISTOR.
58D-06-00440 SH5 (I-9) PARK BRAKE SOLENOID CIRCUIT.
58D-06-00440 SH5 (H-3) GROUND CONNECTIONS.
58D-06-00440 SH4 (H-10) PARK BRAKE RELEASED PRESSURE SWITCH CIRCUIT.
58D-06-00440 SH13 (F-15) GROUND FOR PARK BRAKE RELEASED PRESSURE SWITCH.
58D-06-00440SH13 (F-13) PARK BRAKE SET PRESSURE SWITCH CIRCUIT.
58D-06-00440 SH13 (F-14) PARK BRAKE SET INPUT.
58D-06-00440 SH4 (H-10) PARK BRAKE RELEASE INPUT.
58D-06-00440 SH6 (I-12) CAN/J1939 AT ENGINE.
58D-06-00440 SH15 (B1-B6) CAN/J1939 WIRING.
58D-06-00440 SH13 (J-12) CAN/J1939 AT IM.
58D-06-00440 SH13 (C-9) KEYSWITCH OR INPUT TO IM.

Related circuit diagram

58D-06-00440 SH13 (I-9) IM CONNECTION TO CAN/RPC.
58D-06-00440 SH12 (F-16) GROUND FOR CAN/RPC SHIELD.
58D-06-00440 SH5 (H-2) GROUND FOR CAN/RPC SHIELD.
58D-06-00440 SH12 (K-3) GE CONNECTION TO CAN/RPC.
58D-06-00440 SH14 (O-12) PLM III CONNECTION TO CAN/RPC.
58D-06-00440 SH15 (E-9) CAN/RPCNETWORK.
58D-06-00440 SH12 (C-15) VHMS CONNECTION TO CAN/RPC.
58D-06-00440 SH8 (F-7) DIGITAL DISPLAY CONNECTION TO CAN/RPC.
58D-06-00440 SH13 (C-9) KEYSWITCH OR INPUT TO IM.
58D-06-00440 SH5 (B-2) GE CONTROL POWER INPUT TO IM.
58D-06-00440 SH4 (I-5) CRANK REQUEST INPUT TO IM.
58D-06-00440 SH4 (H-10) PARK BRAKE RELEASED PRESSURE SWITCH CIRCUIT.
58D-06-00440 SH13 (F-15) GROUND FOR PARK BRAKE RELEASED PRESSURE SWITCH.
58D-06-00440 SH13 (F-13) PARK BRAKE SET PRESSURE SWITCH CIRCUIT.

Fault Code A242: Fuel gauge within the display panel is defective

Operator Action	None
Fault Code	A242
Description	The fuel gauge within the display panel is defective.
Fault Conditions	Sets if a fuel gauge fault is reported. Resets if the fault clears.
Operator Alerting System Response	Display Operator Action: None Display Fault Description: FUEL GAUGE FAULT Display Fault Code: A242
Resulting Problem(s)	Truck could run out of fuel.
Related Information	A laptop running "IM Realtime Data Monitor" software may be required to resolve this fault.

Table

1. 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.

Parameter	Expected State and/or Related Fault(s)
Steering Bleed Valve	0: Steering bleed valve is off 1: Steering bleed valve is on

Related circuit diagram

58D-056-00440 SH8 (B-4) DIGITAL DISPLAY GAUGES.

Fault Code A252: Start enable output circuit is open or shorted to ground

Operator Action	None
Fault Code	A252
Description	The start enable output circuit is either open or shorted to ground.
Fault Conditions	Sets if the start enable relay circuit is open or short to ground for 2 seconds. Resets only at power down.
Operator Alerting System Response	Repair Status Light On Display Operator Action: None Display Fault Description: STRT ENABLE CKT FLT Display Fault Code: A252
Resulting Problem(s)	Starting will either not be possible, or will lack the protections that IM provides for the start enable circuit (excessive cranking, selector switch position, J1939 ok, and engine speed 0 to start and not above 400rpm at finish).
Related Information	A laptop running "IM Realtime Data Monitor" software may be required to resolve this fault.

Table

1. This fault's logic contains more than one parameter, each of which may have it's own related fault code(s). This fault may be resolved by resolving the parameter(s) active fault code(s). 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)
Start Enable (IM1B)	Status - Open Load: Unexpected. Troubleshoot Status - Normal: Expected. No problem. Status - Shorted to Ground: Unexpected. Troubleshoot. Status - Overload: Unexpected. Troubleshoot. 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. Fault(s): A350
Steering Bleed Valve	0: Steering bleed valve is off 1: Steering bleed valve is on

Related circuit diagram

58D-06-00440 SH4 (J-11) START ENABLE RELAY COIL CIRCUIT.

Related circuit diagram

58D-06-00440 SH13 (F-14) LOW BRAKE ACCUMULATOR PRESSURE SWITCH.
58D-06-00440 SH6 (I-12) CAN/J1939 AT ENGINE.
58D-06-00440 SH15 (B1-B6) CAN/J1939 WIRING.
58D-06-00440 SH13 (J-12) CAN/J1939 AT IM.
58D-06-00440 SH12 (K-4) CAN/RPC CONNECTION AT GE CONTROL.
58D-06-00440 SH15 (E3-E10) CAN/RPC WIRING.
58D-06-00440 SH13 (I-12) CAN/RPC CONNECTION AT IM.

NOTES

Related circuit diagram

58D-06-00440 SH4 (H-10) PARK BRAKE RELEASE CONNECTION.
58D-06-00440 SH13 (G-14) PARK BRAKE RELEASE SWITCH GROUND.
58D-06-00440 SH13 (E-14) PARK BRAKE SET CONNECTION.
58D-06-00440 SH7 (M-17) BRAKE LOCK CONNECTION TO IM.
58D-06-00440 SH13 (F-15) BRAKE LOCK SOLENOID GROUND.
58D-06-00440 SH10 (M-18) DIODE GROUND.

Fault Code A281: Brake lock degrade switch is defective

Operator Action	Go to Shop Now
Fault Code	A281
Description	Brake lock degrade switch is defective.
Fault Conditions	Sets if brake lock degrade switch is not on when neither service brake nor brake lock are on for 5 seconds. Service brake is off when the service brake pressure switch is off and front brake pressure is below 150 psi. Resets if brake lock degrade switch actuates.
Operator Alerting System Response	Sound Buzzer Flash IM Warning Indicator Display Operator Action: GO TO SHOP NOW Display Fault Description: BAD BRK DEGRADE SW Display Fault Code: A281
Resulting Problem(s)	Operator may not be warned of degradation of brake lock pressure.
Related Information	A laptop running "IM Realtime Data Monitor" software may be required to resolve this fault.

Table

1. This fault's logic contains more than one parameter, each of which may have it's own related fault code(s). This fault may be resolved by resolving the parameter(s) active fault code(s). 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)**
Brake Lock Degrade Switch (IM2V)	0: Brake lock degrade not on 1: Brake lock degrade is on
Brake Lock (IM2i)	0: Brake lock not on 1: Brake lock is on
Service Brake Pressure Switch (IM3C)	0: Service brake not applied 1: Service brake applied
Brake Pressure (kPa) (IM3bp)	< 1034 kPa (150 psi): Front brake not applied > 1034 kPa (150 psi): Front brake applied Fault(s): A201, A205

Related circuit diagram

58D-06-00440 SH‘13 (G-13) BRAKE LOCK DEGRADE SWITCH CIRCUIT.
58D-06-00440 SH7 (H-2) SERVICE BRAKE PRESSURE SWITCH POWER.
58D-06-00440 SH7 (H-2) SERVICE BRAKE PRESSURE SWITCH.
58D-06-00440 SH7 (H-19 SERVICE BRAKE PRESSURE SWITCH & BRAKE LOCK CONNECTION TO IM.
58D-06-00440 SH13 (F-15) GROUND FOR BRAKE LOCK SOLENOID.
58D-06-00440 SH10 (M-19) GROUND FOR BRAKE LOCK DIODE.
58D-06-00440 SH13 (C-1) SERVICE BRAKE PRESSURE SENSOR CIRCUIT.
58D-06-00440 SH12 (F-16) GROUND FOR SHIELD.
58D-06-00440 SH5 (H-3) GROUND FOR SHIELD.

Fault Code A304: Auto lube grease level fault

Operator Action	None
Fault Code	A304
Description	Auto lube grease level fault.
Fault Conditions	Sets when input switch indicates low grease level for 3 seconds. Resets when input switch indicates normal grease level for 3 seconds.
Operator Alerting System Response	Repair Lamp Display Fault Description: AUTO LUBE GREASE LO Display Fault Code: A304
Resulting Problem(s)	Auto lubrication will not be completed without grease.
Related Information	A laptop running "IM Realtime Data Monitor" software may be required to resolve this fault.

Table	
1. The primary correction for this fault is to replenish the grease. 2. If plenty of grease exists, then check sensor and wiring.	
Parameter	**Expected State and/or Related Fault(s)**
Auto Lube Grease Level Low Input (IM3W)	0: Auto Lube Grease Level Low 1: Auto Lube Grease Level Not Low

Related circuit diagram
58D-06-00440 SH13 (P-15) AUTOLUBE GREASE LEVEL CIRCUIT.

Related circuit diagram

58D-06-00440 SH3 (J-13) CRANKING MOTOR CIRCUITS
58D-06-00440 SH5 (B-2) CRANK SENSE INPUT TO IM.
58D-06-00440 SH4 (J-11) START ENABLE RELAY CIRCUIT & CRANKING MOTOR INPUTS TO IM.

Fault Code A351: Overload on output 1E

Operator Action	Go to shop now
Fault Code	A351
Description	Overload on output 1E.
Fault Conditions	Sets if driver chip detects overcurrent or over temp on output 1E. Output is turned off when overload is detected. Resets at power down.
Operator Alerting System Response	Sound Buzzer Flash IM Warning Indicator Display Operator Action: GO TO SHOP NOW Display Fault Description: PRK BRK COMMAND FLT Display Fault Code: A351
Resulting Problem(s)	Park Brake Solenoid Valve circuit is disabled (park brake won't release).
Related Information	A laptop running "IM Realtime Data Monitor" software may be required to resolve this fault.

Table

1. This fault's logic contains just one parameter, which may have additional fault code(s). This fault may be resolved by resolving the parameter(s) active fault code(s). 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)
Park Brake Solenoid (IM1E)	Status - Open Load: Unexpected. Troubleshoot Status - Normal: Expected. No Problem Status - Shorted to Ground: Expected if Park Brake Request is in the 24 volt condition Otherwise unexpected and must troubleshoot Status - Overload: Unexpected. Troubleshoot 0: Park Brake Request Input is in the low voltage (request) condition 1: Park Brake Request Input is in the high voltage (not requested) condition Fault(s): A214, A216

Related circuit diagram

58D-06-00440 SH2 (I-19) PARK BRAKE SOLENOID CONNECTION.
58D-06-00440 SH6 (I-9) PARK BRAKE SOLENOID CIRCUIT.
58D-06-00440 SH6 (I-9) GROUND FOR PARK BRAKE RELEASE RELAY.
58D-06-00440 SH12 (F-16) GROUND FOR VARISTOR.
58D-06-00440 SH5 (H-3) GROUND FOR VARISTOR.

Fault Code A361: Overload on output 1T

Operator Action	None
Fault Code	A361
Description	Overload on output 1T.
Fault Conditions	Sets if driver chip detects overcurrent or over temp on output 1T. Output is turned off when overload is detected. Resets at power down.
Operator Alerting System Response	Repair Lamp Display Fault Description: AUTO LUBE CIRCUIT Display Fault Code: A361
Resulting Problem(s)	Auto lube circuit is disabled.
Related Information	A laptop running "IM Realtime Data Monitor" software may be required to resolve this fault.

Table

1. This fault's logic contains just one parameter, which may have additional fault code(s). This fault may be resolved by resolving the parameter(s) active fault code(s). 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)
Auto Lube Output (IM1T)	Status - Open Load: Unexpected. Troubleshoot Status - Normal: Expected. No problem Status - Shorted to Ground: Unexpected except momentarily at termination of a lube cycle. If detected any other time, troubleshoot Status - Overload: Unexpected. Troubleshoot 0: Turns off between lubrication cycles 1: Turns on during lubrication cycle Fault(s): A190

Related circuit diagram

58D-06-00440 SH13 (O-15) AUTO LUBE SOLENOID CIRCUITS.

58D-06-00440 SH12 (F-15) GROUND CIRCUIT FOR VARISTOR.

PROBLEM: Extremely Low Refrigerant Charge in the System

Indications:

Low side pressure - LOW.
High side pressure - LOW.
Discharge air is warm.
The low pressure switch may have shut off the compressor clutch.

Possible Causes	Suggested Corrective Actions
- Extremely low or no refrigerant in the system. Possible leak in the system.	Check for leaks by performing leak test. ***No Leaks Found:*** Recover refrigerant from the system. Recharge using a scale to ensure correct charge. Check A/C operation and performance. ***Leaks Found:*** Add refrigerant (make sure system has at least 50% of its normal amount) and leak test system. It may be necessary to use a jumper wire to enable the compressor to operate if the compressor has shut down due to faulty pressure sensing switch. Repair any leaks and evacuate the system if necessary, Replace the receiver-drier if the system was opened. Recharge the system using a scale and add oil as necessary. Check A/C operation and do system performance test.

PROBLEM: Air and/or Moisture in the System

Indications:

Low side pressure - Normal
High side pressure - Normal
Discharge air is only slightly cool.
(In a cycling type system with a thermostatic switch, the switch may not cycle the clutch on and off, so the low pressure gauge will not fluctuate.)

Possible Causes	Suggested Corrective Actions
Leaks in the system.	Test for leaks, especially around the compressor shaft seal area. When the leak is found, recover refrigerant from the system and repair the leak. Replace the receiver-drier or accumulator because the desiccant may be saturated with moisture. Check the compressor and replace any refrigerant oil lost due to leakage. Evacuate and recharge the system with refrigerant using a scale. Check A/C operation and performance.

Steering circuit troubleshooting guidelines

These troubleshooting guidelines are intended to assist in diagnosing steering pump problems. However, before troubleshooting the pump, basic checks should be performed on the steering and braking systems. These checks are listed in the topic Basic Hydraulic System Checks. These checks are sequenced to determine whether the issue is due to the pump or elsewhere in the system. Failure to perform these checks may result in unnecessary component replacement or unnecessary repairs.

⚠WARNING

Various hydraulic pressure settings are referenced in this bulletin. Use only those values for the truck model being serviced. Damage or injury may result if incorrect values are used.

⚠WARNING

DO NOT loosen or disconnect hydraulic lines or components until the engine is stopped and the key switch has been OFF for at least 90 seconds.

Pressurized hydraulic fluid can have sufficient force to enter a person's body by penetrating the skin. This can cause serious injury and possibly death. If fluid has penetrated the skin, immediately seek the proper medical treatment by a physician familiar with this injury.

Depressurize system accumulators before opening hydraulic circuits or installing test gauges.

For the steering circuit, turn the key switch to OFF and allow 90 seconds for the accumulators to depressurize. After 90 seconds, turn the steering wheel to verify that pressure has been purged from the circuit. If the wheels do not move, the steering circuit is safe to service.

For the brake circuit, chock the wheels. Then open the shut-off valves on the brake manifold. Opening the valves allows accumulator pressure to be released.

⚠IMPORTANT⚠

Verify all pressure gauges being used are in good working condition and properly calibrated.

⚠CAUTION

To prevent hydraulic system contamination, clean system components before installing gauges or removing hoses, fittings, etc. Use caps and plugs on open hoses and fittings to keep dirt from entering the system during testing and maintenance.

12. Install the poppet, spring and unload valve bonnet (3). Tighten the bonnet body to **115 N•m (85 ft lb)**.

13. Verify the final valve setting. Refer to "Setting pump pressure controls" for details.

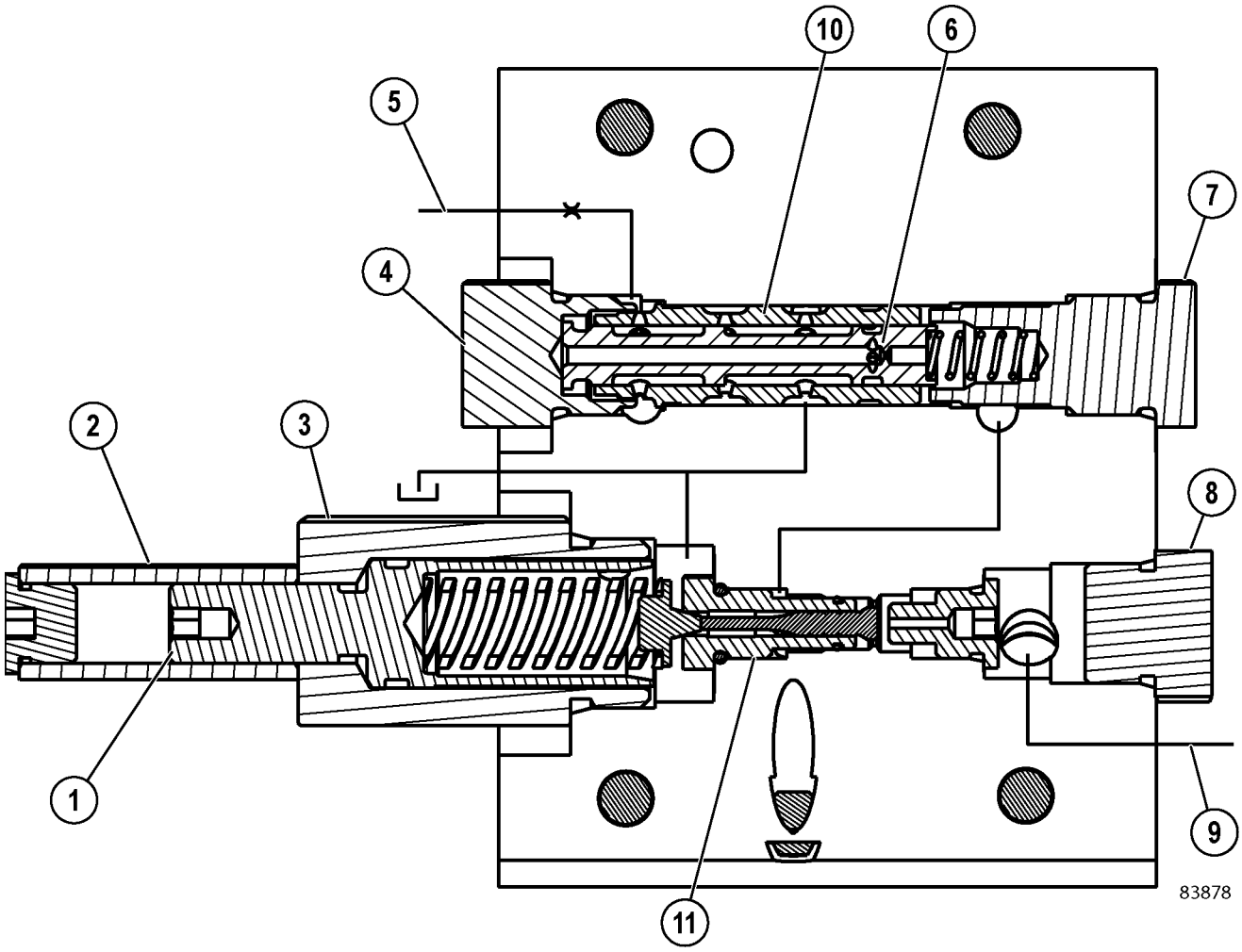


FIGURE 40-3. CONTROL VALVE ASSEMBLY

1. Adjustment Screw
2. Locking Cap
3. Unload Valve Bonnet
4. Cap (Spool)
5. Pressure (From Pump)
6. 4-Way Valve Spool (with Orifices)
7. Cap (Spring Access)
8. Cap
9. Accumulator Feedback Port (ACC)
10. Valve Sleeve
11. Unload Valve Seat

DUMP TRUCK

730E

Machine model	Serial number
730E-8	A40002 and up

50 Disassembly and assembly
Service tools

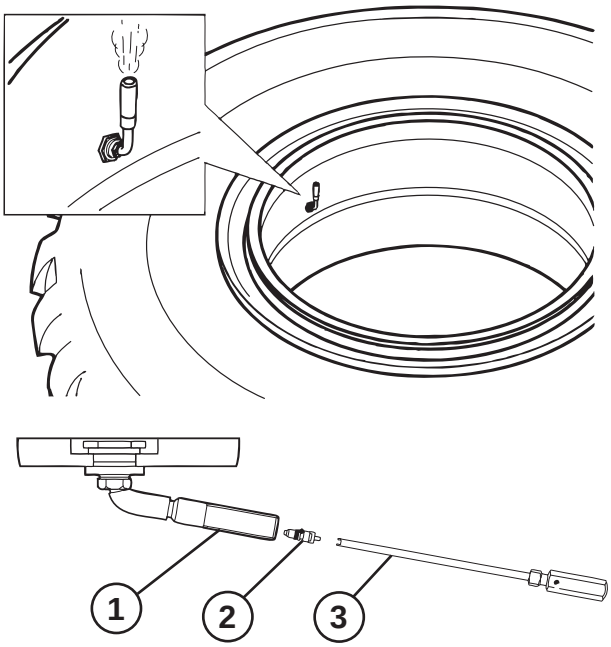
General precautions for tires and rims

Improper servicing of tires and rims entails a serious risk of an explosive separation of the rim, which can lead to serious, even fatal, accidents for the worker as well as to others in the vicinity. Workers and persons responsible for supervising the work must comply strictly with the following precautions.

⚠WARNING

- When servicing tires and rims, always start by completely deflating the tire.
- Before removing the tire and rim from a truck, completely deflate the tire before removing the clamp components and other parts installed in the rim base.
- Before servicing a tire, remove the valve core to ensure that all of the air can escape.
- Identify the appropriate combination of rim components by using the matching charts and product markings.
- If air pressure has fallen 80% below the pressure at the time of inflation, or the tire has been punctured, dismantle the rim and determine the cause. After the cause has been determined, replace any deformed or damaged rim components that may have caused air leaks.
- Until the above-mentioned checks have been performed, DO NOT inflate the tire.
- DO NOT combine rim components from different manufacturers. There may be differences in terms of shape and other features between components from other companies and components manufactured by an authorized supplier (lock rings, rim bases, bead seat bands, side rings). Ensure that components are not mixed by checking the manufacturer’s markings prior to assembly.
- DO NOT use lock rings with open ends (ends that do not touch). There is a danger that the lock ring will not set correctly.
- DO NOT remove or install components or otherwise modify a rim in such a way that the product specifications are changed.
- DO NOT make modifications involving welding, heating, soldering, etc. Such modifications could lead to the deformation as well as the deterioration of the strength and structural integrity of the rim components.
- When the tire is being mounted, it is strictly forbidden to perform tasks that may generate heat, flames, or sparks such as welding, soldering or grinding. Resulting gases inside the tire may ignite, causing an explosion.
- Prior to inflation, it may be necessary to tap the rim components into position to set them. DO NOT use a steel mallet. Use a soft metal or hard plastic mallet. Using a steel mallet could cause deformation or cracking of components.
- While inflating the tire, when the air pressure reaches 35 kPa (5 psi), check whether the rim components are set correctly. If they are not set correctly, immediately stop the work in progress, deflate the tire completely and disassemble the components. Inspect the component's mating surfaces and discard any components or materials that interfere with complete assembly. When the problem is resolved, resume assembly.
- Comply with the air pressure recommended by the tire manufacturer. DO NOT exceed the standard air pressure without checking first with your authorized tire dealer.

1. Before demounting the tire from the rim, release the air by using valve tool (3) to remove valve core housing (2, Figure 50-8).



84830

FIGURE 50-8. VALVE REMOVAL

1. Valve
2. Valve Core Housing
3. Valve Tool

2. After fully releasing the air, place the tire and rim on the ground with the gutter side facing up.

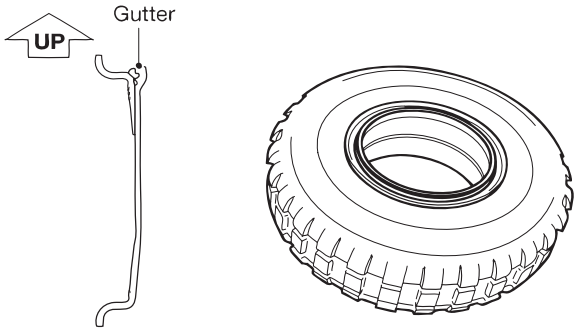


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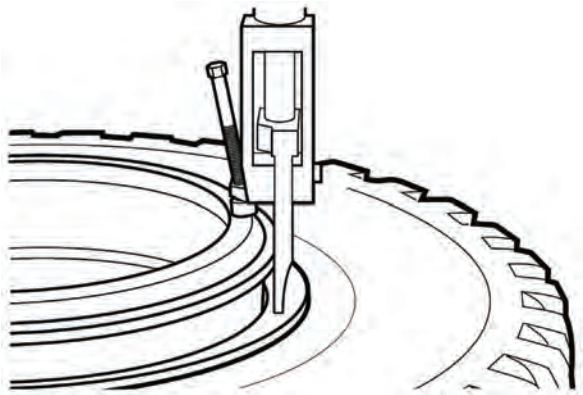
FIGURE 50-9.

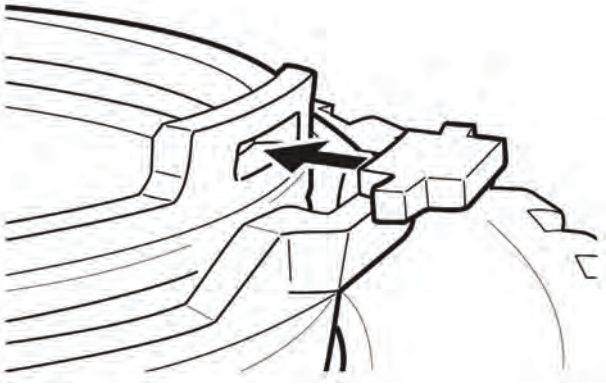
3. Mount bead breaker on the bead seat band. Operate the bead breaker, push down the side ring, and unseat the tire bead from the bead seat band.



84859

FIGURE 50-10.

4. If equipped, remove the driver key.



84885

FIGURE 50-11.

CAUTION

Do not apply pressure to the hydraulic ram until all 13 capscrews are installed.

The maximum force that can be applied during the spindle removal process is not to exceed 6 875 200 N (1,545,600 lb).

25. Install the remaining 13 capscrews and tighten them to **68 N·m (50 ft lb)**. This is to ensure that all capscrews will pull evenly when pressure is applied by the hydraulic ram.

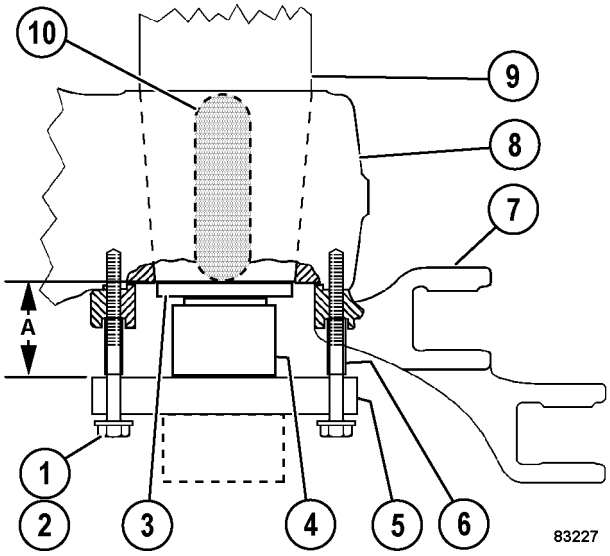


FIGURE 50-37. SPINDLE REMOVAL TOOL INSTALLATION WITH RAM

1. Capscrew (KC7095)
2. Hardened Washer (WA0366)
3. Reaction Plate
4. Hydraulic Ram
5. Spindle Removal Tool
6. Spacer
7. Steering Arm
8. Spindle
9. Suspension Piston
10. Area to heat

WARNING

Heavy components 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.

26. Start applying pressure to the hydraulic ram to separate spindle (8) from suspension piston (9).
27. If the specified maximum force of the hydraulic ram is reached and the spindle has not been separated from the suspension piston, slowly and uniformly apply heat to spindle area (10, Figure 50-37).

    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.

28. Use heat as specified in the previous step and a large hammer to carefully tap the top surface of spindle (8) until the spindle breaks free.

    If the spindle does not separate from the suspension piston, the spindle, hub and brake assembly and the front suspension must be removed from the truck as an assembly. Refer to "Spindle removal (off the truck)" to separate the spindle from the suspension.
29. After separation, lower the spindle, hub and brake assembly from the suspension piston. Be careful during removal to prevent damage to the suspension piston rod taper and the tapered spindle bore.
30. Move the spindle, hub and brake assembly to a clean work area for repair.

Assembly

WARNING

Use lifting equipment and lifting devices with adequate capacity to support the components.

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

1. If removed, install bearing cups (2, Figure 50-51) and (3) in the wheel hub as follows:

   a. Preshrink the cups by packing them in dry ice or by placing them in a deep-freeze unit.

   NOTE: Do not cool below -65°C (-54°F).

   b. Install the cups in the wheel hub bores.

   c. After the cups have warmed to ambient temperature, press the cups tight against the hub shoulder as follows:

   Inner cup (29) - Apply **13 610 kg (15 tons)** force.

   Outer cup (6) - Apply **10 435 kg (11.5 tons)** force.

2. If removed, install one half of face seal (1) in the wheel hub. The metal ring must be facing outward.

NOTE: Refer to the topic "Hub floating ring seal assembly and installation" for the proper installation instructions for both halves of the seal.

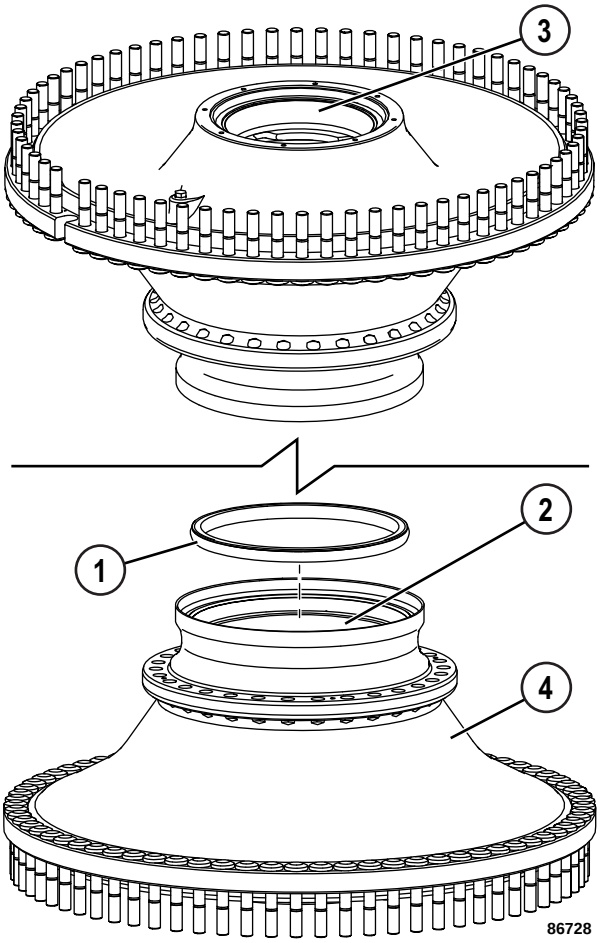
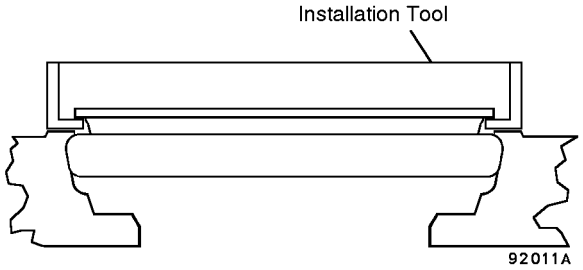


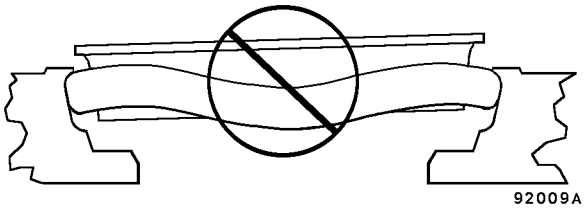
FIGURE 50-51. FACE SEAL & BEARING REMOVAL & INSTALLATION

1. Face Seal (one half)
2. Inner Bearing Cup
3. Outer Bearing Cup
4. Wheel Hub

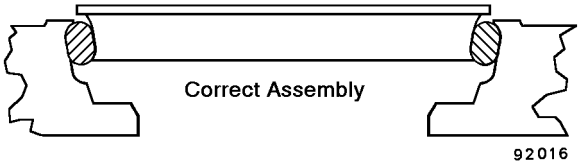
7. If small adjustments are necessary, **do not push directly on the seal ring.** Make any required adjustments with the installation tool.

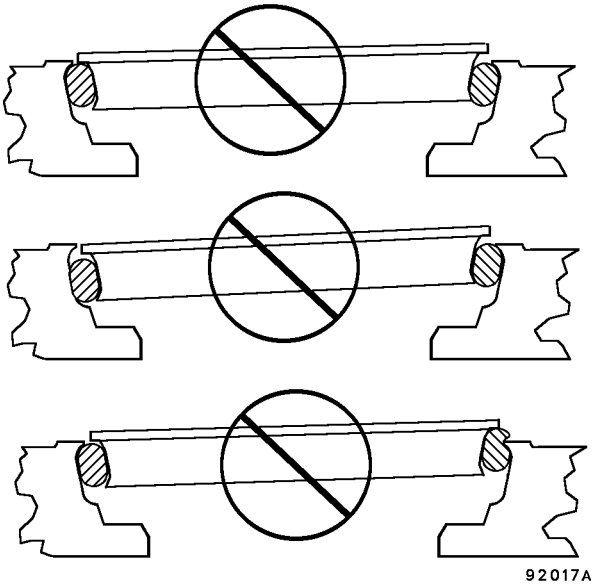


NOTE: The toric ring can twist if it is dry on one spot or if there are burrs or fins on the housing retaining lip. A bulging toric or cocked seal can contribute to eventual failure.



8. The toric ring must not slip on the ramps of either the seal ring or housing. To prevent slippage, wait at least two minutes to let all the solvent evaporate before further assembly. Once it is correctly in place, the toric ring must roll on the ramps only. If correct installation is not obvious, repeat Steps 4 through 7.





12. Install a puller in the tapped holes in the head of pivot pin (1). Pull out the pivot pin.

NOTE: It may be necessary to place a pry bar or jack between the mounting structure and the pivot eye to push the pivot eye downward and away from the mounting structure. Both spacers (2) will fall free.

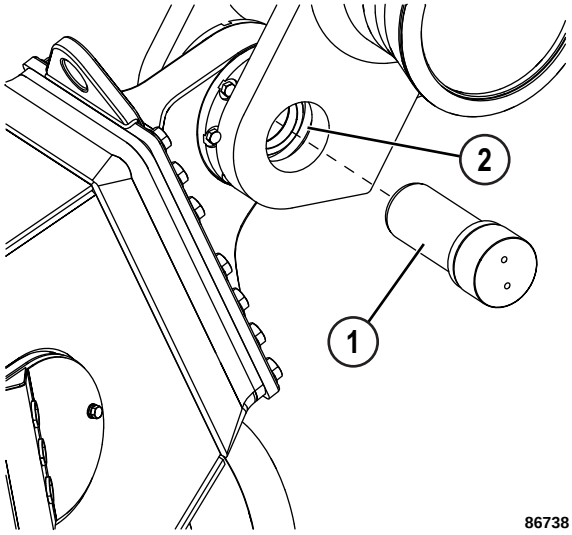


FIGURE 50-73. PIVOT PIN REMOVAL & INSTALLATION

1. Pivot Pin 2. Spacer

Installation

WARNING

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

1. Raise the pivot eye into position between the frame bores. Ensure that the inner race of the pivot eye bearing is aligned with the pin bore.
2. Install one bearing spacer (2, Figure 50-73).
3. Place pin (1) into position on the right side of the frame mount. Push the pin through the spacer.
4. Push pin (1) through the pivot eye bearing. Insert the second bearing spacer on the other side of the pin bore, then continue pushing the pin into the other mounting bore.
5. Install pin retainer (4, Figure 50-72) and 12-point capscrews (3) on the end of the pivot pin.
6. Install capscrews (1) and lockwashers (2) to secure the pivot pin.
7. Tighten capscrews (1) to **170 N·m (125 ft lb)**. Tighten 12-point capscrews (3) to **2 325 ± 232 N·m (1,715 ± 171 ft lb)**.
8. Install ground wire (2, Figure 50-71) between the pivot eye and the main frame.
9. Connect pivot eye bearing lubrication line (1). Pump grease into the bearing to verify that the line and the automatic lubrication system are operational.
10. Charge the front suspension. Refer to Testing and adjusting section **Accumulators and suspensions** for the proper charging procedure.
11. Charge the rear suspensions with nitrogen until the pistons are fully extended. Refer to Testing and adjusting section **Accumulators and suspensions** for the proper charging procedure.
12. Release the nitrogen from the rear suspension, then charge them again.

NOTES

6. Remove the valve guard and Dyna-seal (1, Figure 50-10) from the top of each brake accumulator. Depress the valve core to release any gas precharge pressure from the bladder.

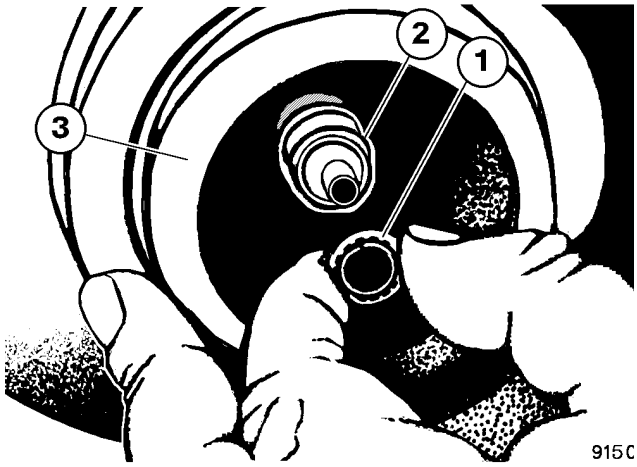


FIGURE 50-10. DYNA-SEAL REMOVAL & INSTALLATION

1. Dyna-Seal
2. Charging Valve
3. Accumulator

7. Disconnect and tag all hydraulic lines from the brake manifold. Plug all hydraulic lines and ports to prevent possible contamination.
8. Disconnect and tag all electrical wiring from the brake manifold components.
9. Loosen the accumulator mounting clamps. Loosen the accumulator fittings and remove brake accumulators (3, Figure 50-9) from brake manifold (2).
10. Remove mounting hardware (1, Figure 50-11) from the bottom of the hydraulic brake cabinet and move the brake manifold to a clean work area for disassembly.

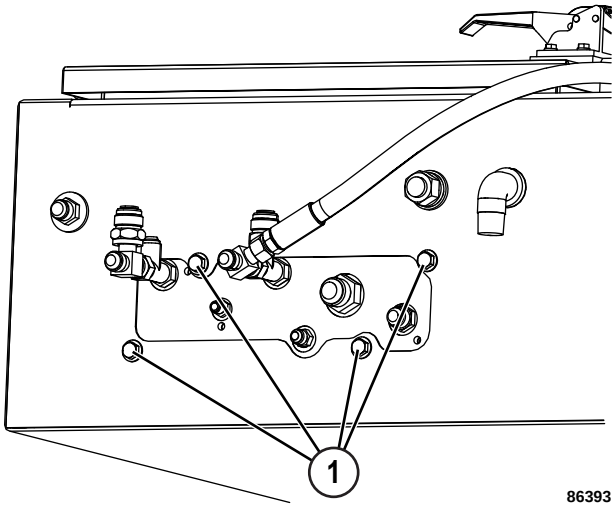


FIGURE 50-11. BRAKE MANIFOLD REMOVAL & INSTALLATION

1. Brake Manifold Mounting Hardware

Installation

1. Place the brake manifold into position in the hydraulic brake cabinet. Install and tighten mounting hardware (1, Figure 50-11) to the standard torque.
2. Install brake accumulators (3) in the accumulator mounting clamps and on the fittings on top of brake manifold (2). Tighten the fittings and clamp hardware to the standard torques.
3. Remove all plugs and connect all lines and electrical wiring to the proper locations.

NOTE: Before starting the engine, the accumulators must have the proper nitrogen precharge. Refer to Testing and adjusting section ***Accumulators and suspensions*** *for the accumulator charging procedure.*

4. Start the engine. Check for leaks and for proper operation.
5. Shut off the engine and ensure that the hydraulic tank is filled to the proper level.

7. Inspect the end plates. If any end plate is bent or cracked, or if the grooves will not allow the brake lining backplate to slide freely, replace the end plate.
8. As the lining material wears, the lining backing plate will move along the end plate tabs. End plate wear is normally uniform over this area. Replace the end plates if either of the following conditions exist:

- The localized groove on either end plate tab is wider than the lining backing plate with a depth of more than 0.50 mm (0.020 in.). See example A in Figure 50-27.
- The wear surface of the end plate (either tab) is uniform over the normal travel distance of the lining backing plate, but the depth of the wear is more than 0.50 mm (0.020 in.). See example B in Figure 50-27.

⚠WARNING

Failure to adhere to these guidelines may result in reduced braking performance, damage to braking components or failure of a brake caliper.

9. Inspect the end plate capscrews and the tapped holes in the housing. These capscrews are highly stressed and must be replaced if their condition appears questionable.

   A 3/4" - 16UNF - 28 tap lubricated with a light oil may be used to inspect the tapped holes in the housing for thread damage and to clean up any minor thread roughness.
10. Thoroughly clean the housings and pistons. After cleaning, the passages, cavities and external surfaces should be blown dry with clean, dry compressed air. The pistons should also be cleaned and blown dry.

NOTE: Do not leave cleaned and dried parts exposed for any appreciable time without a protective coating of lubricant. For short term storage, coating all internal cavities, passages and bosses with hydraulic oil will be adequate protection. For longer term storage, wipe the cavities, connector bosses and threads with a protective grease such as petroleum jelly.

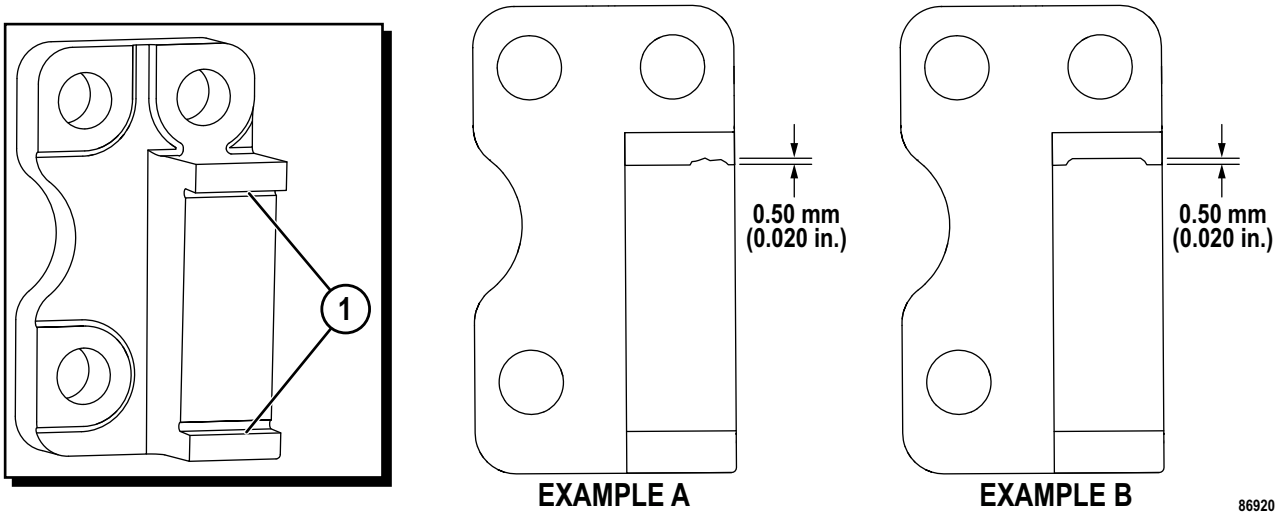


FIGURE 50-27. END PLATE INSPECTION

1. End Plate Tab Inspection Areas

15. Use a suitable tool to push parking piston (3, Figure 50-42) out of caliper housing (4).
16. Remove 127 mm (5 in.) diameter O-ring (1) and backup ring (2) from the parking piston. Discard the O-ring and backup ring.

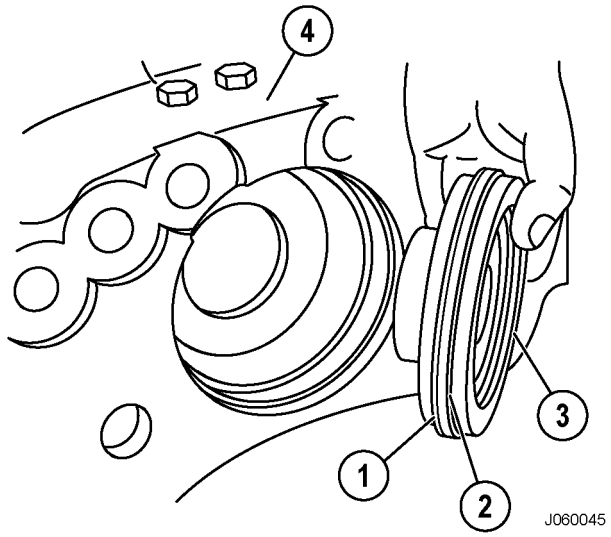


FIGURE 50-42. PARKING PISTON

1. O-Ring
2. Backup Ring
3. Parking Piston
4. Caliper Housing

17. Use a suitable tool to remove 63.5 mm (2.5 in.) diameter O-ring (1, Figure 50-43) and backup ring (2) from the caliper housing. Discard the O-ring and backup ring.

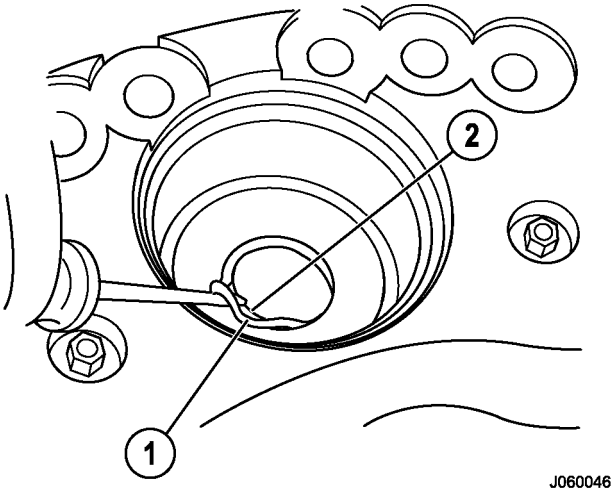


FIGURE 50-43. PARKING PISTON O-RING

1. O-Ring
2. Backup Ring

18. Position the caliper housing so that the ends of the adjuster pin and nut are facing upward. Use a 5/32 inch hex wrench to hold the pin, then remove the nut and washer from the caliper housing.
19. Use a suitable dowel or drift to push both piston assemblies (1, Figure 50-44) out of each caliper housing.
20. Use a suitable tool to remove two dust seals (2) from the caliper housing. Discard the dust seals.

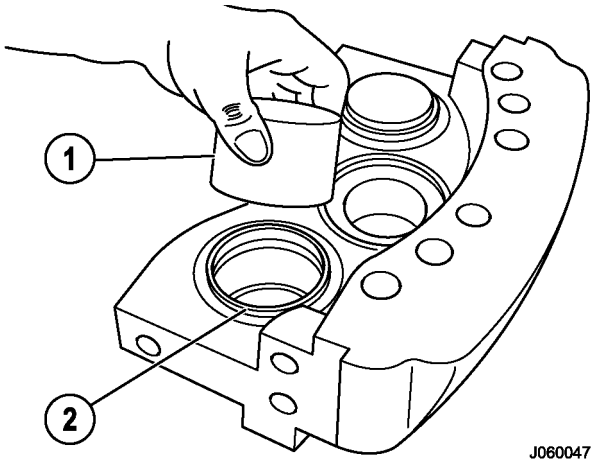


FIGURE 50-44. SERVICE PISTONS

1. Piston Assembly
2. Dust Seal

21. Use a suitable tool to remove 76.2 mm (3 in.) diameter O-ring (1, Figure 50-45) and backup ring (2) from each piston bore groove. Discard the O-rings and backup rings.

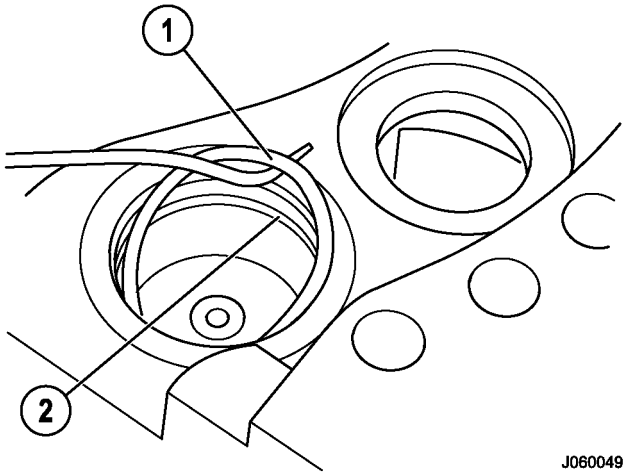


FIGURE 50-45. SERVICE PISTON O-RINGS

1. O-Ring
2. Backup Ring

NOTES

11. Position the steering control unit so that housing (1, Figure 50-10) is horizontal. Slowly guide lubricated spool assembly (2) with fitted parts into the bore using light turning movements.

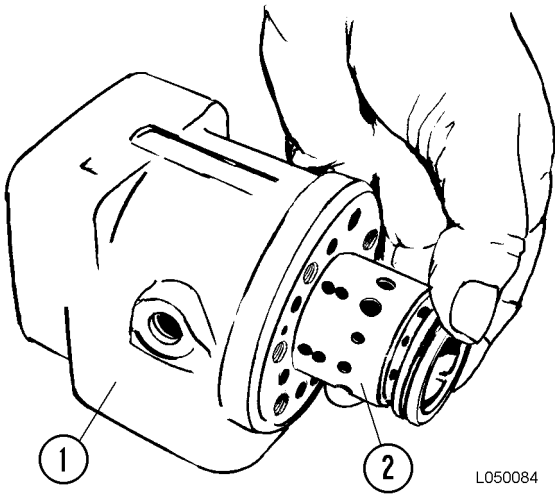


FIGURE 50-10. SPOOL INSTALLATION

1. Housing
2. Spool Assembly

⚠ IMPORTANT ⚠

The cross pin must remain horizontal when the spool and sleeve are pushed into the bore to prevent the pin from dropping out of the spool.

12. Install check ball (2, Figure 50-11) in hole (1). Install and lightly tighten the threaded bushing.
13. Lubricate O-ring (3) with light grease and install it in the groove of housing (4).
14. Install distribution plate (15, Figure 50-5) so that the plate holes match the corresponding holes in the housing.
15. Guide cardan shaft (11) down into the bore with the slot in the cardan shaft aligned with cross pin (9).
16. Position the inner gear wheel onto the cardan shaft. It may be necessary to rotate the gear slightly to find the matching splines on the cardan shaft. Splines are machined to ensure proper alignment of the cardan shaft and inner gear wheel.
17. Lubricate O-rings (17) and (18) on both sides of the outer gear wheel with light grease and install them.
18. Align the outer gear wheel bolt holes with the tapped holes in the housing and the match marks.
19. Align cover (19), using the match marks as a reference. Install capscrews (23) and washers (20).
20. Install capscrew with pin (22) into the proper hole.
21. Install the end cover. Install and tighten the capscrews with washers hand-tight in a criss-cross pattern.

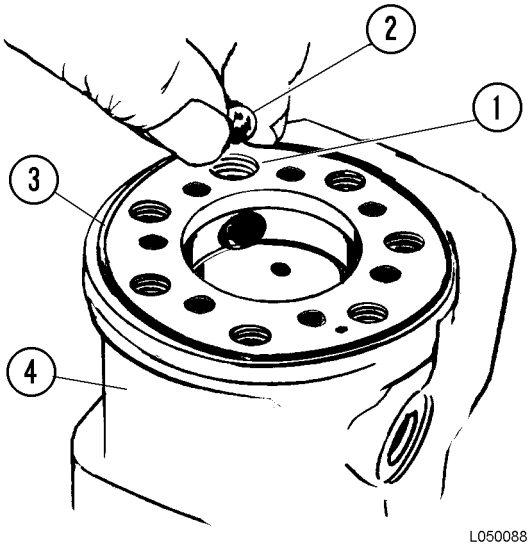


FIGURE 50-11. CHECK BALL INSTALLATION

1. Hole
2. Check Ball
3. O-ring
4. Housing

NOTE: Use vacuum pump kit (XB0887) to hold the oil back in the hydraulic tank. Before disconnecting hydraulic hoses, tag the hoses for proper identification during installation.

9. Disconnect and plug all hydraulic hoses and tubes from the flow amplifier.

⚠WARNING

If necessary, use a lifting device with adequate capacity to remove and install the components.

NOTE: The weight of the flow amplifier is approximately 29 kg (64 lb).

10. Remove mounting hardware (1, Figure 50-25), then remove flow amplifier (2).

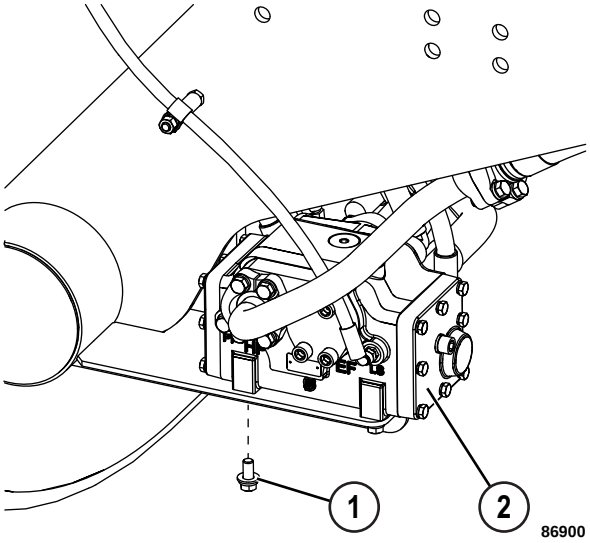


FIGURE 50-25. FLOW AMPLIFIER REMOVAL & INSTALLATION

1. Mounting Hardware 2. Flow Amplifier

Installation

1. Move flow amplifier (2, Figure 50-25) into position and support the flow amplifier against the mounting bracket.
2. Install and tighten mounting hardware (1) to the standard torque.

NOTE: Use vacuum pump kit (XB0887) to hold the oil back in the hydraulic tank.

3. Unplug the hydraulic hoses and tubes. Install new O-rings on the flange fittings and connect the hydraulic lines at their proper locations. Tighten the fittings securely.
4. Perform the hydraulic system checkout procedures. Refer to Testing and adjusting section **Steering and hoist hydraulic system**.

Installation

NOTE: Lubricate the O-ring with clean Type C-4 hydraulic oil before installation.

1. Install new O-ring (2, Figure 50-37) and seating rings (6) in the hoist pump mounting flange.
2. Ensure that the steering/brake pump splined coupler is in place inside the hoist pump before installation.
3. Lubricate the splines of the pump shaft with a light coat of multipurpose grease.

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

4. Move steering/brake pump (1, Figure 50-37) into position. Engage the pump shaft with the splined drive coupler in the hoist pump.
5. Install two nuts (4), two lockwashers (5) and two capscrews (3). Tighten the hardware to the standard torque.

NOTE: Use vacuum pump kit (XB0887) to hold the oil back in the hydraulic tank.

6. Remove all plugs from the hoses and ports. Install new O-rings on the flange fittings and connect steering filter hose (1, Figure 50-36), unloader feedback hose (2) and supply hose (3) to the steering/brake pump. Tighten the capscrews securely.

NOTE: Do not connect case drain hose (4) at this time.

7. Before connecting the case drain hose, remove the hose fitting from the pump housing. Add clean C-4 hydraulic oil to the pump through the opening until the pump housing is full. This may require 2 to 3 liters (2 to 3 qt.) of oil.
8. Install the case drain fitting and tighten it to the standard torque. Connect case drain hose (4) to the fitting.
9. Perform the hydraulic system checkout procedures. Refer to Testing and adjusting section **Steering and hoist hydraulic system**.

DUMP TRUCK

730E

Machine model	Serial number
730E-8	A40002 and up
730E-10	A50002 and up

50 Disassembly and assembly
Suspensions

31. Install spindle, wheel and tire. Refer to Disassembly and assembly section **Wheels, spindles and rear axle**.
32. Service the front suspensions. Refer to Testing and adjusting section **Accumulators and suspensions** for the oiling and charging procedure.
33. Install the boot and the clamp.

NOTE: Visual inspections of the bolted joints are required after the truck has been released for operation. Inspect the joints at each front suspension at the following intervals: 8 hours, 50 hours, 250 hours, and 500 hours. If the reference lines on the hardware (Figure 50-15 and Figure 50-21) have remained in alignment, the truck may remain in operation. If even one of the capscrews has shown signs of movement, the truck must be taken out of service. The suspension mounting capscrews must be removed, cleaned, and inspected. If any capscrews have signs of damage, replace all capscrews. Install the capscrews again according to this installation procedure.

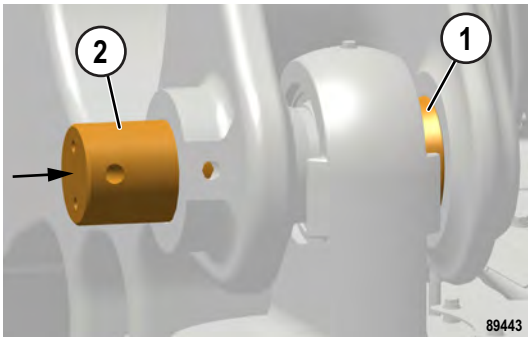


FIGURE 50-45. INNER BEARING SPACER INSTALLATION

9. Install another spacer (1, Figure 50-45) on the other side of the top suspension eye.
10. Push pin (2) through the spherical bearing and into the inner upper frame mounting ear.

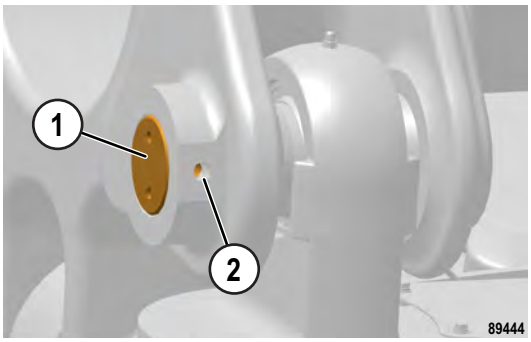


FIGURE 50-46. UPPER PIN INSTALLATION

11. Push pin (1, Figure 50-46) until the shoulder bolt hole in the pin is aligned with shoulder bolt hole (2) in the outer frame mounting ear.

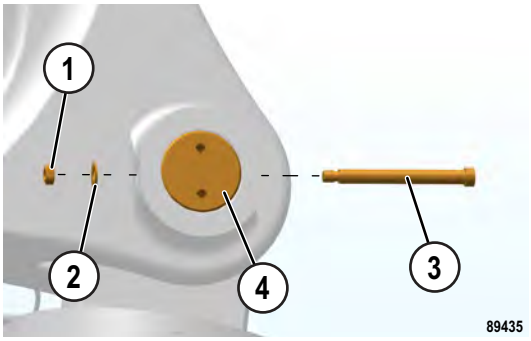


FIGURE 50-47. SHOULDER BOLT INSTALLATION

12. Insert shoulder bolt (3, Figure 50-47) through pin (4). Install flat washer (2) and locknut (1). Tighten the locknut to **68 N·m (50 ft lb)**.

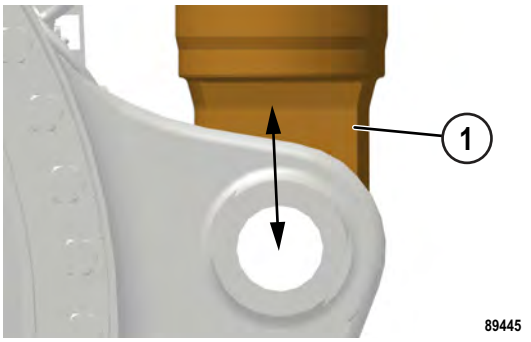


FIGURE 50-48. LOWER SUSPENSION EYE ALIGNMENT

13. Adjust the height of piston rod (1, Figure 50-48) until the lower suspension eye is aligned with the lower frame mounting ears.
14. Repeat steps 4-12 to install the bottom pin.

NOTE: The mounting arrangement for the top and bottom pins is identical.

Removal and installation of hoist pump

Removal

NOTE: The hoist pump can be removed without disconnecting the steering/brake pump hydraulic hoses from the truck if desired.

⚠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 and auxiliary hydraulic system**.
2. Remove rear axle blower hose (1, Figure 50-1) to allow hoist pump (2) to be lowered from the pump mount bracket.

NOTE: Use vacuum pump kit (XB0887) to hold the oil back in the hydraulic tank. Before disconnecting hydraulic hoses, tag the hoses for proper identification during installation.

3. Clean the hoist pump and surrounding area carefully to help avoid contamination of hydraulic oil when the hoses are disconnected are opened.

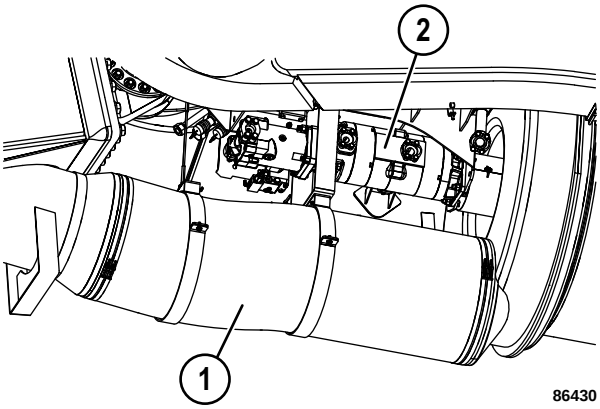


FIGURE 50-1. REAR AXLE BLOWER HOSE

1. Rear Axle Blower Hose
2. Hoist Pump

Inspection

1. Inspect the gear bores in both gear plates (2, Figure 50-16). During the initial break-in, the gears cut into the aluminum gear plates. The nominal depth of this cut is 0.203 mm (0.008 in.) and should not exceed 0.381 mm (0.015 in.).

   As the gear teeth cut into the gear plates, metal is rolled against the pressure plates. Use a knife or sharp pointed scraper to remove the metal that was rolled against the pressure plates. Remove all metal chips that were broken loose.

⚠ IMPORTANT ⚠

When removing the rolled up metal, do not attempt to remove gear track-in grooves (1).

2. Inspect the pressure plates. They should not show excessive wear on the bronzed side. If deep, curved wear marks are visible, replace the pressure plates.
3. Inspect the gears. If excessive wear is visible on the journals, sides, or face of the gears, or at the point where the drive gear rotates in the lip seal, replace the gears.
4. If any of the internal parts show excessive wear, replace them. Replace all O-rings and seals.
5. Inspect the bearings. If they are worn beyond the gray Teflon™ into the bronze material, the entire flange, connector plate or bearing plate must be replaced.

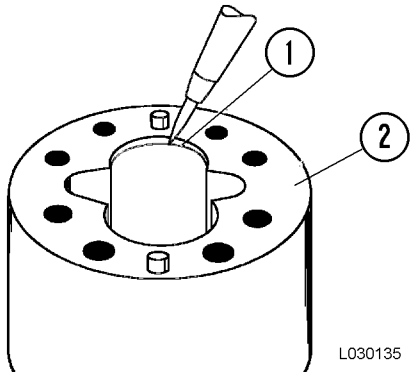


FIGURE 50-16. GEAR BORE INSPECTION

1. Gear Track-In Groove 2. Gear Plate

NOTE: Installing a new bearing in the flange, connector plates or bearing plate is not recommended due to close tolerances and special tooling required for crimping the bearing in place to prevent bearing spin.

6. Inspect the flange seal bore for scratches and gouges which may interfere with shaft seal installation.

Disassembly of spool section

NOTE: It is not necessary to remove inlet section (1, Figure 50-23) or outlet section (4) to disassemble spool section (3).

NOTE: Match mark or identify each part when removed in respect to its location or respect to its mating bore to aid reassembly.

1. Remove the capscrews and lift spool cover (1, Figure 50-29) from the housing.
2. Remove poppet (6) from the spool cover. Remove and discard O-ring (8).

NOTE: The poppet contains a small steel ball (7). Do not misplace it.

3. Remove and discard O-rings (4) and (5).
4. Remove restrictor poppet (9). Note the position of the restrictor poppet when removed to ensure correct reassembly.

NOTE: Remove and discard O-ring (2, Figure 50-28) and backup ring (3), if used.

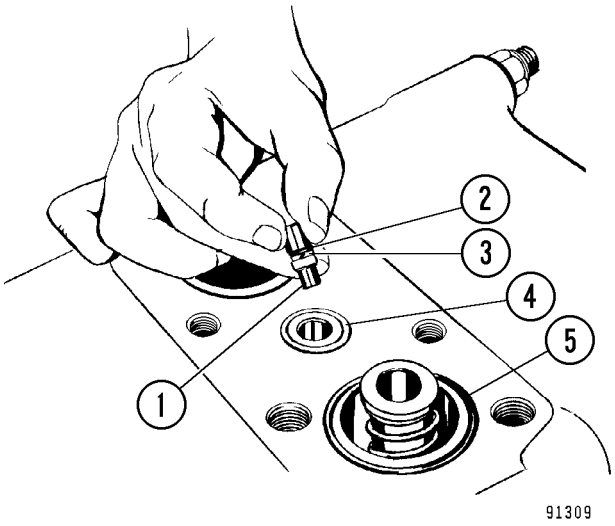


FIGURE 50-28. RESTRICTOR POPPET

1. Restrictor Poppet
2. O-Ring *
3. Backup Ring *
4. O-Ring
5. O-Ring

** Items 2 and 3 not used on all valves.*

5. Remove spool assembly (20, Figure 50-29). Note the color of the lower spring (blue) to ensure proper location during reassembly. Also note the “V” groove on the top end of the spool.
6. Remove plug (4) from the end of the spool. Remove spring seat (2) and spring (11). Remove poppet (21) and spool end (15).

NOTE: Pay special attention to restrictor poppets (12) and (21) during removal to ensure proper location during reassembly. Poppets may be identified with a colored dot (blue or white). If the poppets are not color coded, use the table below and the specified drill bit to measure the orifice diameter for proper identification.

POPPET COLOR	ORIFICE DIAMETER	DRILL SIZE
Blue	1.200 mm (.046 in.)	#56
White	1.600 mm (.063 in.)	#52

7. Repeat step 6 to disassemble the opposite end of spool assembly (20). Note that there is no plug or restrictor poppet in the opposite end and the spring is blue.
8. Remove spool assembly (14). At the top end of the spool, remove plug (3). Remove spring seat (2) and spring (11). Remove restrictor poppet (12) and spool end (15).
9. At the opposite end, remove plug (3), spring seat (2) and spring (16). Remove restrictor poppet (12) and spool end (15).
10. Remove spool cover (19) and O-rings (4), (5) and (10). Remove poppet (18).

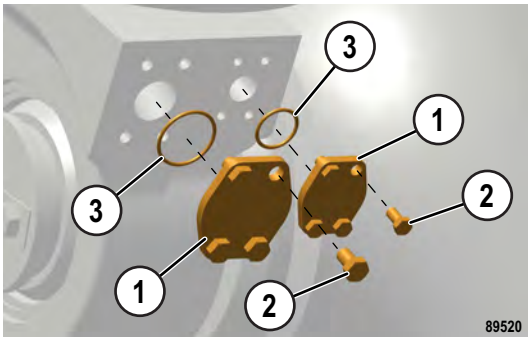


FIGURE 50-41. SHIPPING KIT INSTALLATION

6. Install shipping kit plates (1, Figure 50-41), capscrews (2) and O-rings (3) to cover the ports on the hydraulic cylinder.

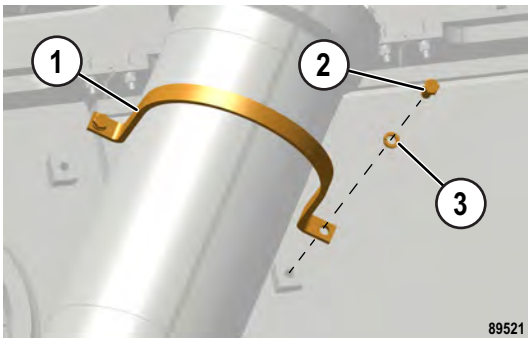


FIGURE 50-42. CLAMP INSTALLATION

7. Install clamp (1, Figure 50-42) to secure the hoist cylinder to the frame. Install capscrews (2) and lockwashers (3) into the mounts on the frame.

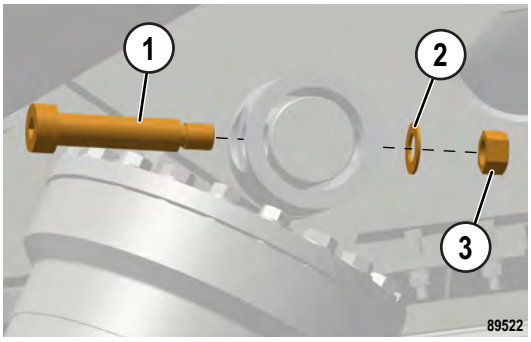


FIGURE 50-43. SHOULDER BOLT REMOVAL

8. At the hoist cylinder upper mount, remove nut (3, Figure 50-43), flat washer (2) and shoulder bolt (1).

⚠WARNING

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

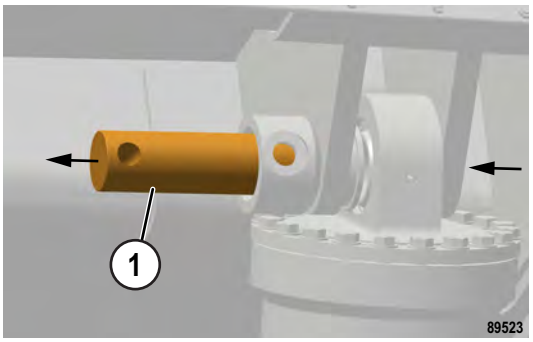


FIGURE 50-44. PIVOT PIN REMOVAL

9. Use a brass drift and hammer to drive pivot pin (1, Figure 50-44) from the upper pivot structure. **Make sure that the pin is supported during removal.**

⚠WARNING

Push the pin slowly and gently. Quickly ejecting the pin from the bore may cause serious injury and/or death.

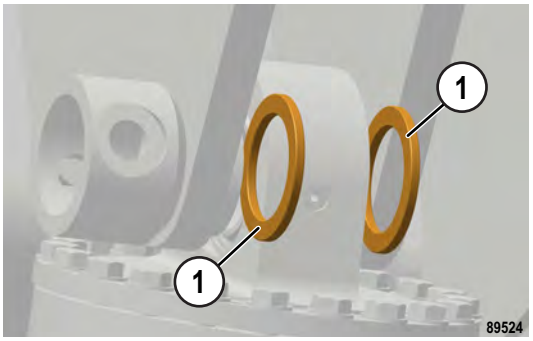


FIGURE 50-45. BEARING SPACER REMOVAL

10. Remove two bearing spacers (1, Figure 50-45) between the upper cylinder bearing and upper pivot structure.

Installation of the quill

NOTE: Use only new seals, bearings and O-rings during reassembly. Thoroughly lubricate all parts and seals with hydraulic oil to aid in assembly and to provide lubrication during initial operation.

1. Inspect plugs (3, Figure 50-72) and check balls (4) in the quill to ensure that the plugs are tight and the ball seats are not damaged. Refer to "Installation of check balls and plugs in quill" on the next page.
2. Secure cap assembly (1) in a sturdy fixture. Ensure that the threads in the cap and the threads on the quill are clean, dry and free of oil and solvent.
3. Spray the mating threads of both cap assembly (1) and quill assembly (2) with LOCQUIC® Primer T (Komatsu part number TL8753) or equivalent. Allow the primer to dry for three to five minutes.
4. Apply Loctite® Sealant #277 (Komatsu part number VJ6863) or equivalent to the mating threads of both the cap assembly and quill assembly.
5. Install the quill. Use SS1143 tool to tighten the quill to **1 356 N·m (1,000 ft lb)**. Allow the parts to cure for two hours before exposing the threaded areas to oil.

NOTE: If LOCQUIC Primer T (TL8753) was not used, the cure time will require 24 hours instead of two hours.

6. Tack weld the quill in two places as shown in Figure 50-72.
7. Remove all slag and foreign material from the tack weld area before assembling the cylinder.

During future cylinder rebuilds, removal of the quill will not be necessary unless it has loosened or is damaged. Removal will require a break-loose force of at least **2 712 N·m (2,000 ft lb)** after the tack welds are ground off.

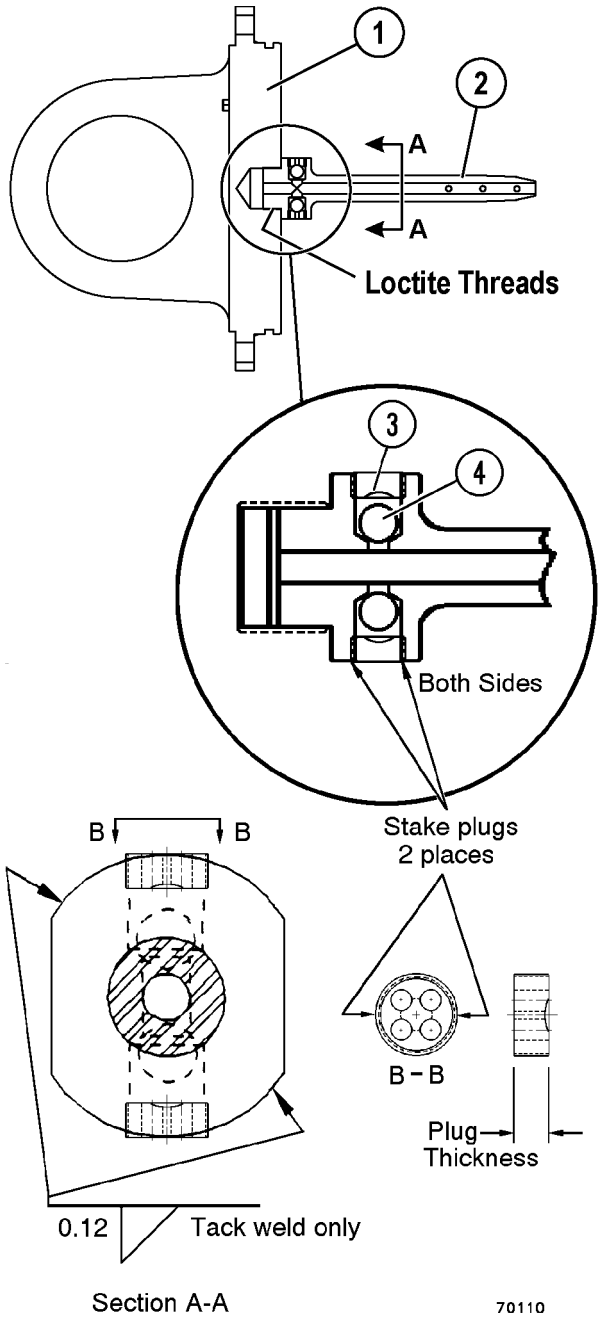


FIGURE 50-72. QUILL ASSEMBLY INSTALLATION

1. Cap Assembly
2. Quill Assembly
3. Plug
4. Check Ball

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.

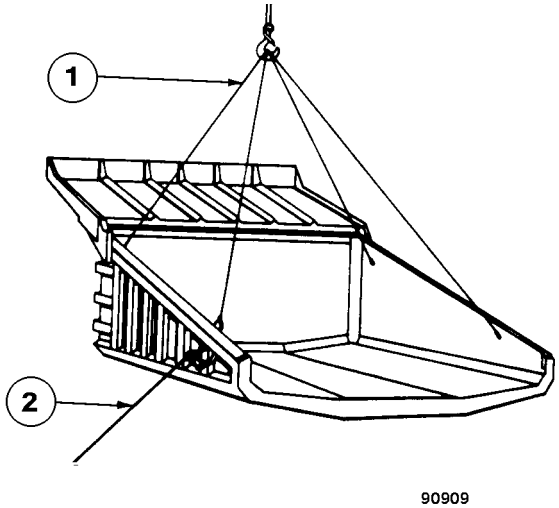


FIGURE 50-1. DUMP BODY REMOVAL

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).

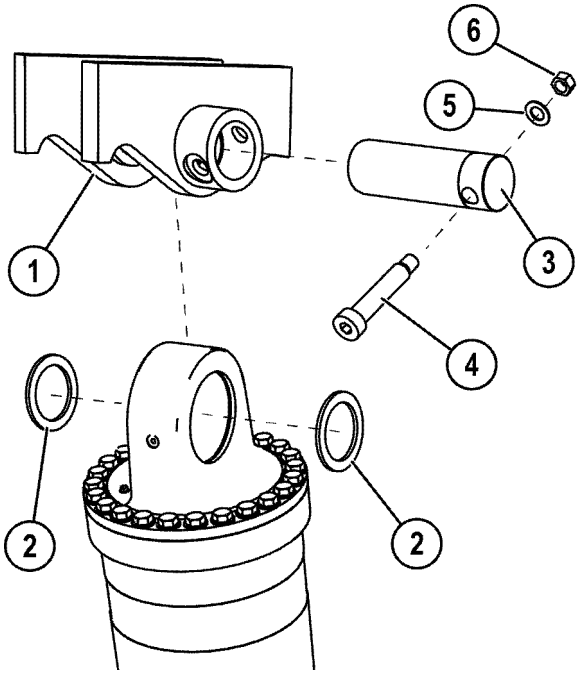


FIGURE 50-2. HOIST CYLINDER UPPER MOUNT

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

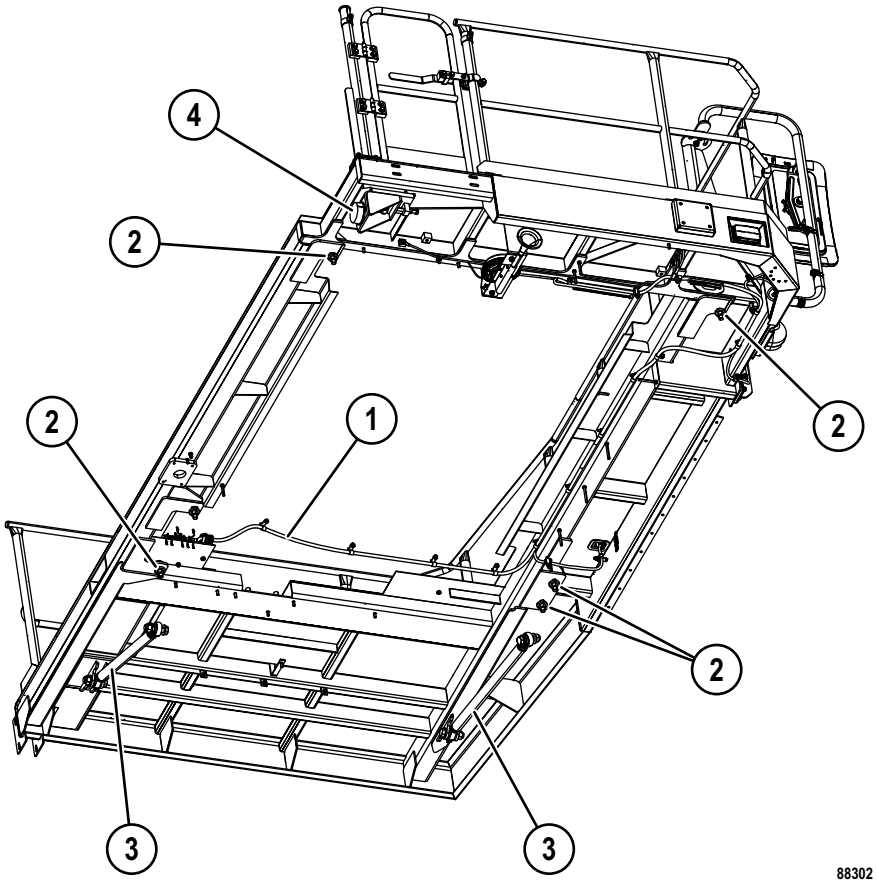


FIGURE 50-9. LH DECK REMOVAL & INSTALLATION

1. Deck Lighting Harness
2. Deck Mounting Hardware and Shim
3. Deck Support Tube
4. Radiator Bumper

DUMP TRUCK

730E

Machine model	Serial number
730E-8	A40002 and up

50 Disassembly and assembly
Operator cab

Replacing door assembly seal and door hinge seal

1. The door assembly seal is glued on the door. This seal can be replaced by peeling the seal away from the door frame. Then use a suitable cleaner to remove the remaining seal and glue material.
2. The area where the door seal mounts should be free of dirt and oil. Spread or spray a glue which is quick drying and waterproof onto the area where the seal is to installed.
3. Install the seal so that the corners of the seal fit up into the corners of door frame (3, Figure 50-9).
4. Door hinge seal (2, Figure 50-10) is glued to the hinge. Use the same procedure as above for this seal.

Replacing door opening seal

1. Starting at the lower center of the door opening, pull up on one end of the seal. The seal should pull loose from the cab opening lip. Pull door opening seal (1, Figure 50-9 and Figure 50-10) loose all the way around the opening.
2. Inspect the cab opening lip for damage, dirt, and oil. Repair or clean the cab opening as necessary. Remove all dirt and old sealant Ensure that the perimeter of the opening is clean and free of burrs.
3. Install the seal material around the door opening in the cab. Start at the bottom center of the cab opening and work the seal lip over the edge of the opening. Go all the way around the opening. Ensure that the seal fits tightly in the corners. A soft face tool may be used to work the seal up into the corners.
4. Continue going all the way around the opening. When the ends of the seal meet at the bottom center of the cab opening, it may be necessary to trim off some of the seal.

NOTE: The ends of the seal material need to be square-cut to assure a proper fit.

5. Fit both ends so that they meet squarely. Then while holding the ends together, push them firmly into the center of the opening.

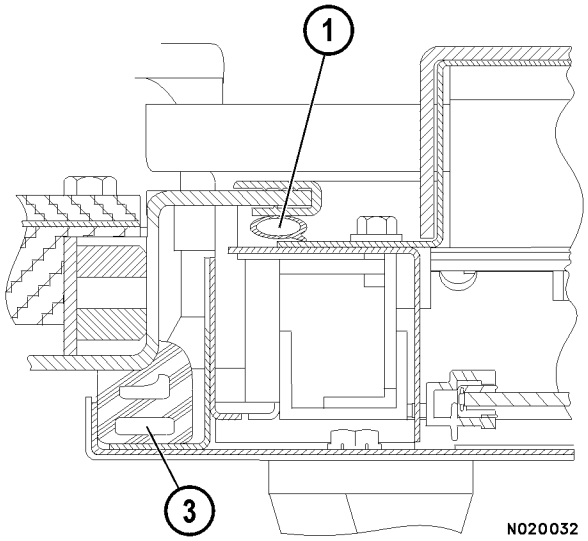


FIGURE 50-9. DOOR SEALS

1. Door Opening Seal 3. Door Assembly Seal

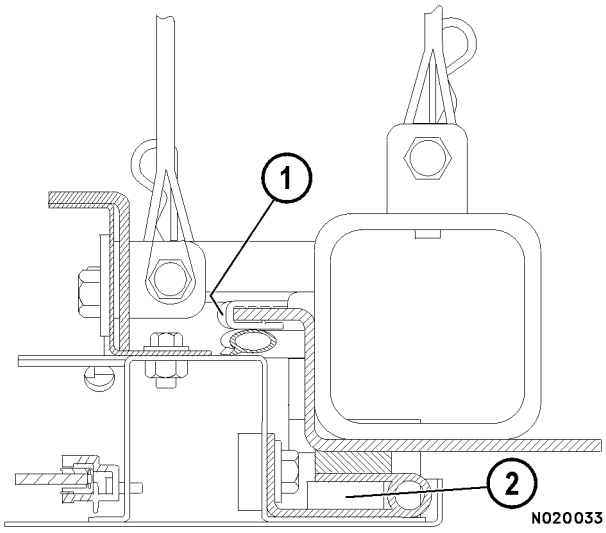


FIGURE 50-10. DOOR SEALS

1. Door Opening Seal 2. Door Hinge Seal

Installation

1. Place wiper motor (1, Figure 50-25) into position on plate (5).
2. Install three capscrews (6), flat washers (7) and lockwashers (8). Tighten the capscrews to **8-9 N·m (71-79 in lb)**.
3. Align the motor output shaft with wiper linkage (9). Install nut (10). Hold the linkage stationary and tighten the nut to **22-24 N·m (16-18 ft lb)**.
4. Connect the wiper motor harness connector.

NOTE: In case the wiper motor operates incorrectly, lift the wiper arms off the windshield to avoid possible damage.

5. Verify that the wipers operate properly and park in the proper position (See to Figure 50-27).

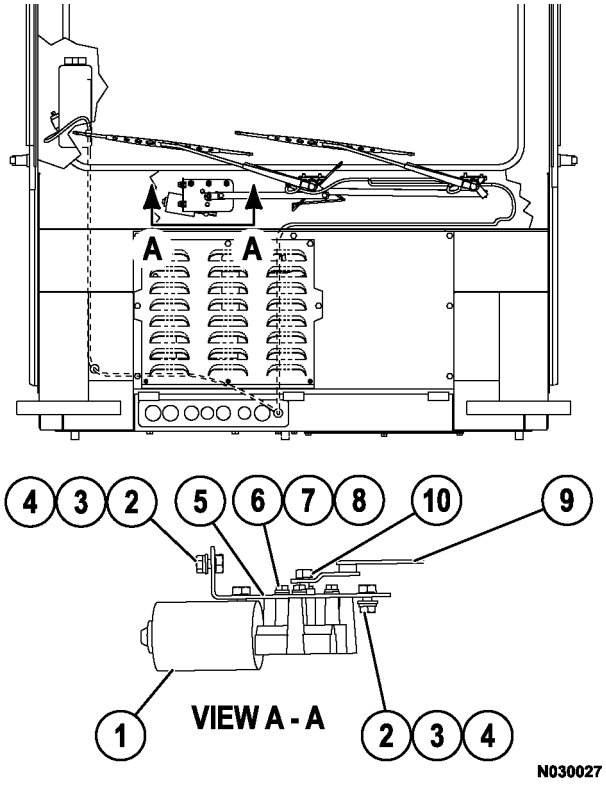


FIGURE 50-25. WINDSHIELD WIPER INSTALLATION

1. Wiper Motor
2. Capscrew
3. Flat Washer
4. Lockwasher
5. Plate
6. Capscrew
7. Flat Washer
8. Lockwasher
9. Wiper Linkage
10. Nut

Removal and installation of windshield wiper arm

Removal

1. Note the parked position of wiper arm (1, Figure 50-26).
2. Lift the wiper arm cover. Remove nut (2) and washer (3).
3. Disconnect the washer hose, then remove the wiper arm.

Installation

1. Place wiper arm (1, Figure 50-26) into the parked position noted during removal. Install washer (3) and nut (2). Tighten the nut to **16-20 N·m (142-177 in lb)**. Close the wiper arm cover.
2. Connect the washer hose to the wiper arm.
3. Verify that the wipers operate properly and park in the proper position (See to Figure 50-27).

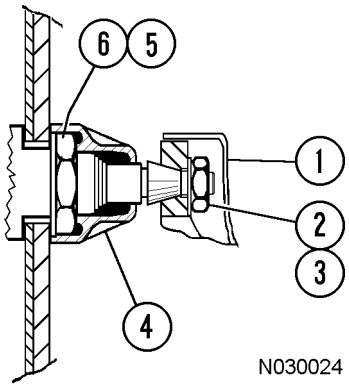


FIGURE 50-26. WIPER ARM DETAIL

1. Wiper Arm
2. Nut
3. Spring Washer
4. Cap
5. Washer
6. Nut

Installation

1. Install tether (3, Figure 50-48) and seat belt buckle (1) to seat with capscrew and flange nut (2). Tether belt is to be positioned at 45 degree angle. Tighten flange nut to **68 N·m (50 ft lb)**.
2. Connect the harness and secure with clip (4), if equipped.
3. If required, install bracket (7, Figure 50-47) with capscrew, flat washer and locknut (10) and bracket (7). Tighten locknut to **47 N·m (35 ft lb)**.
4. Install seat belt retractor (4) and tether (6) using flat washer and capscrew (5). Tether belt is to be positioned at 45 degree angle. Tighten capscrew (5) to **68 N·m (50 ft lb)**.
5. While installing adjuster (2), ensure that shoulder belt (3) is not twisted. Install adjuster (2) onto mount with two nuts (1). Tighten nuts to **68 N·m (50 ft lb)**.
6. Ensure the shoulder belt is not twisted. Slowly extend the shoulder belt and install shoulder belt retractor (9) to bracket (7). Install carriage bolt, flat washer and locknut (8). Tighten locknut to **68 N·m (50 ft lb)**.
7. Test the seat belt function by buckling and unbuckling the seat belt, and fully extending it. Also, rapidly pull on the shoulder belt to check the locking function. Remove the cardboard warning tag from the belt.

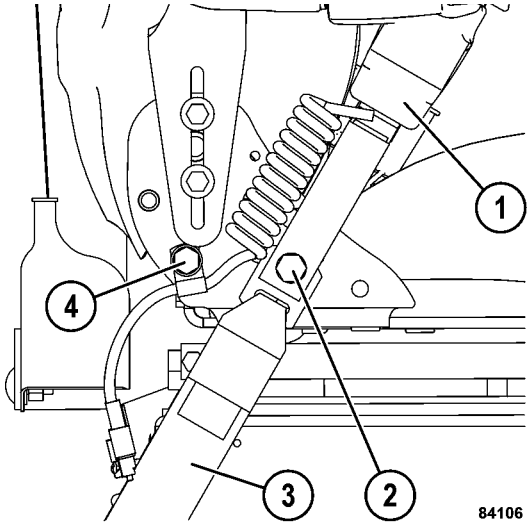


FIGURE 50-48. SEAT BELT BUCKLE

1. Seat Belt Buckle
2. Capscrew and Flange Nut
3. Tether
4. Clip

NOTES

19. Disconnect service center hose (1, Figure 50-9) and the engine oil reserve hoses (if equipped) from engine oil pan (2). Plug the hoses and ports. Move the hoses away from engine compartment to prevent interference with power module removal.

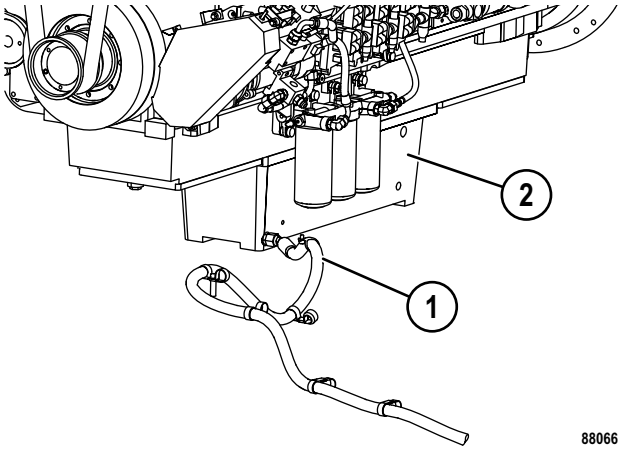


FIGURE 50-9. SERVICE CENTER HOSE

1. Engine Oil Hose 2. Engine Oil Pan

20. Disconnect coolant hose (1, Figure 50-10) from the coolant pipe beneath the radiator. Plug the hose and port. Move the hose away from engine compartment to prevent interference with power module removal.

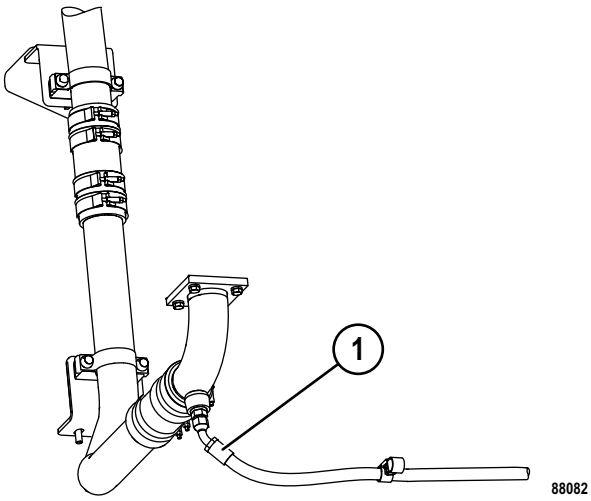


FIGURE 50-10. SERVICE CENTER HOSE

1. Coolant Hose

21. Disconnect all power cables (1, Figure 50-11) and other wiring from the traction alternator.

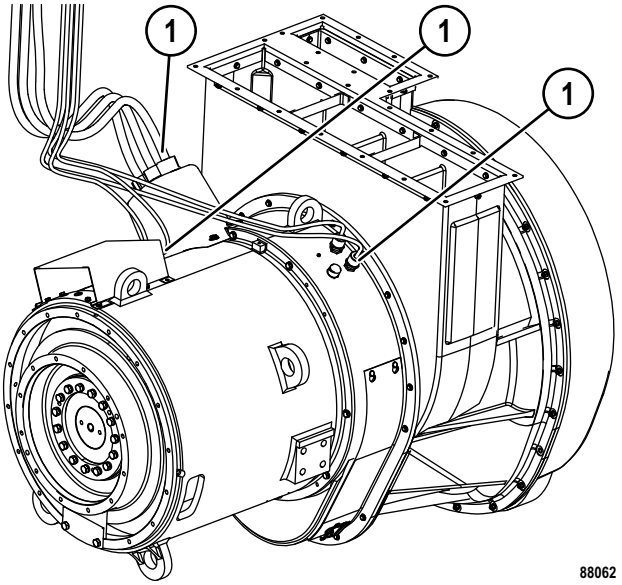


FIGURE 50-11. TRACTION ALTERNATOR POWER CABLES

1. Power Cables

22. Remove upper support rod (1, Figure 50-12) at both sides of the radiator.

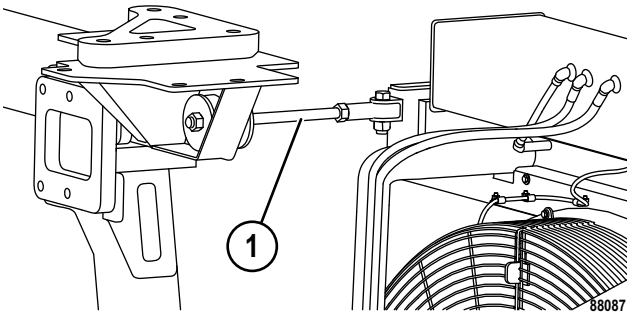


FIGURE 50-12. UPPER SUPPORT ROD

1. Upper Support Rod

Installation

If the flywheel housing adapter is removed, install flywheel housing adapter (2, Figure 50-26) on the engine flywheel housing. Install 12 capscrews and hardened flat washers (3). Tighten the capscrews to **95 N·m (70 ft lb)**.

⚠CAUTION

The following instructions must be followed to ensure proper alignment and engine crankshaft endplay. Failure to follow these instructions can result in serious damage to the engine and/or alternator.

- Loosen or remove fan belts before measuring crankshaft endplay to ensure that the crankshaft moves easily and completely.
- When taking measurements, always clean mating surfaces, then take four equally spaced readings and average them.
- A reference to crankshaft rotation - clockwise (CW) or counterclockwise (CCW) - is the direction of rotation when looking at the front (damper end) of engine.
- All measurements are set to three decimal places.
- Ensure that a surface reference (such as a flat steel bar) used for dial indicating is calibrated periodically for flatness and dimensional accuracy to within +/-.0.023 mm (0.0009 in). Also, ensure that all instruments used for measurements are calibrated on a periodic basis.
- Forward is defined as the front of truck and rearward is defined as the rear of the truck.

Summary of Axial & Radial Runout Limits	
Description	**Specification**
Engine Crankshaft Endplay	0.13 mm (.005 in.) - 0.51 mm (.020 in.)
Alternator Endplay	0.69 mm (0.027 in.)
Flywheel Housing Radial Runout	0.25 mm (0.010 in.)
Flywheel Housing Face Runout	0.25 mm (0.010 in.)
Flywheel/Flexplate Radial Runout	0.08 mm (0.003 in.)
Flywheel/Flexplate Face Runout	.89 mm (0.035 in.)
Rotor Shaft Radial Runout (assembled)	0.13 mm (0.005 in.)

7. Disconnect, cap and unclamp four upper surge tank hoses (1, Figure 50-39). Mark each hose for proper installation.
8. Disconnect, cap and unclamp two lower surge tank hoses (2). Mark each hose for proper installation.
9. Disconnect two hoses (3) from the radiator. Cap or plug the hoses and ports.
10. Disconnect and unclamp the harness from coolant level switch (4). Remove the switch from the surge tank if required.

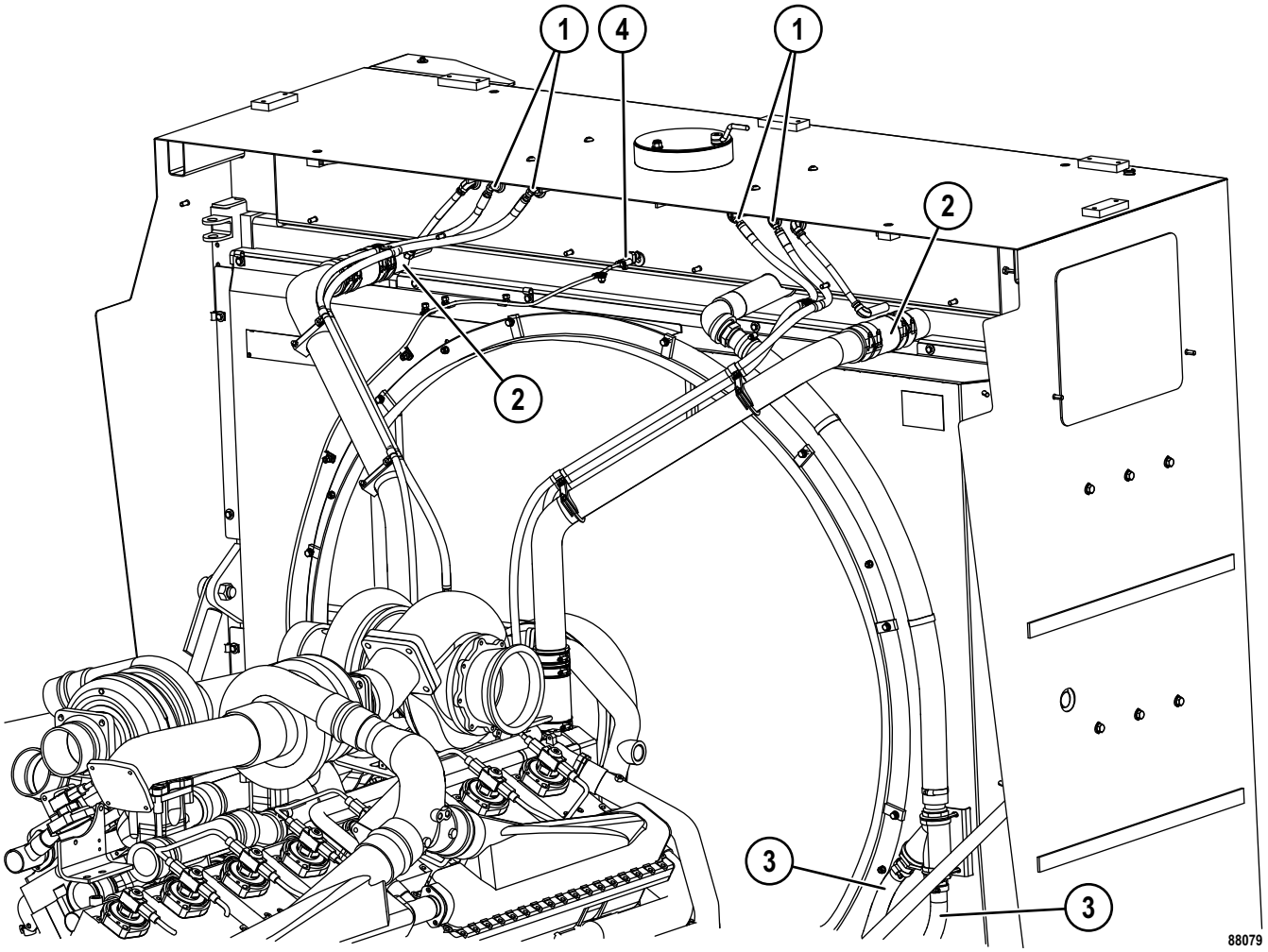


FIGURE 50-39. RADIATOR PIPING - UPPER

1. Upper Surge Tank Hoses
2. Lower Surge Tank Hoses
3. Hoses
4. Coolant Level Switch

NOTES

BACKUP LAMPS

47S-003-AC1 (LBL 16ga)
47S-002-CC1 (LBL 16ga)
0-145-CC1 (BLK 16ga)
SWITCH MANUAL BACKUP LIGHT
SH3:F-11 712K-003-CC1 (LBL 14ga)
47S-001-CC1 (LBL 16ga)
47L-000-CC1 (BRN 16ga)
0-146-CC1 (BLK 16ga)
0-143-CC1 (BLK 16ga)
PC1500
P23
J1-001-CC1 (BLK 16ga)
J03 P03
47S-003-AC1 (LBL 16ga)
47L-001-AC1 (BRN 16ga)
TB22
SH8:A-5

REVERSE RELAY
R87
SH6:G-12 72R-002-AA1 (PUR 18ga)
0-079-AA1 (BLK 18ga)
79-000-AA1 (LBL 14ga)
EK4991
SH10:B-14 79A-004-AH2 (DBL 16ga)
P16 J16
79A-005-AA18 (DBL 16ga)
79A-000-AA1 (DBL 14ga)
TB35
TB38
79-001-AA13 (LBL 14ga)
FB3:F6 10A 08041-01000
79A-001-AA1 (DBL 14ga)

MANUAL BACKUP LIGHT RELAY
R87
TB22
47S-000-AA1 (LBL 18ga)
0-080-AA1 (BLK 18ga)
47B-000-AA13 (TAN 14ga)
79A-001-AA1 (DBL 14ga)
FB2:E17 13A 08041-01500
SH10:D-14 47-004-AH2 (GRY 14ga)
P16 J16
47-005-AA18 (GRY 16ga)
47-000-AA1 (GRY 14ga)

DECK BACKUP LIGHT RELAY
R87
0-081-AA1 (BLK 18ga)
SH4:I-2
47A-000-AA1 (PNK 14ga)
47A-001-AA13 (PNK 14ga)
FB2:F18 10A 08041-01500
TB29
47-001-AA1 (GRY 18ga)
47D-000-AA1 (DGR 14ga)
44-000-AA18 (GRY 16ga)
44-005-AH2 (GRY 14ga)
J16 P16

GB72 RH FRAME GROUND
0-221-FF2 (BLK 8ga)
GB51 RIGHT DECK GND BLOCK
0-214-FF1 (BLK 16ga)
0-216-FF1 (BLK 16ga)
0-215-FF1 (BLK 16ga)
SH13:A-9
SH13:C-9
LAMP RIGHT DECK BACKUP (OPT)
RBUL_CP
RBUL_CP
58D-06-10880
47D-001-FF1 (DGR 16ga)
TB90
47D-003-AR1 (DGR 16ga)
GB70 LH FRAME GROUND
0-235-GG2 (BLK 8ga)
GB50 LEFT DECK GND BLOCK
0-226-GG1 (BLK 16ga)
0-225-GG1 (BLK 16ga)
SH10:L-18
LAMP LEFT DECK BACKUP (OPT)
LBUL_CP
LBUL_CP
58D-06-10880
47D-002-GG1 (DGR 16ga)
TB70
47D-004-AR1 (DGR 16ga)
P13 J13
47D-005-AA19 (DGR 16ga)
47D-006-AA19 (DGR 16ga)

HORN RIGHT BACKUP
SH10:D-6 79A-004-AH2 (DBL 16ga)
TB60
79A-002-DD1 (DBL 16ga)
RRBH(+) 736131C2 RRBH(-)
0-256-DD1 (BLK 16ga)
GRD-REAR AXLE GND
HORN LEFT BACKUP
79A-003-DD1 (DBL 16ga)
LRBH(+) 736131C2 LRBH(-)
0-253-DD1 (BLK 16ga)
LAMP BACKUP REAR RIGHT
47-002-DD1 (GRY 16ga)
RRBL 58D-06-10351
0-257-DD1 (BLK 16ga)
47-003-DD1 (GRY 16ga)
SH10:E-6 47-004-AH2 (GRY 14ga)
LRBL
0-254-DD1 (BLK 16ga)
GRD-REAR AXLE GND

LAMP STOP/TAIL LEFT
TB60
44-003-DD1 (GRY 16ga)
LRSTL LRSTL 58D-06-00821
0-250-DD1 (BLK 16ga)
SH10:H-16
41T-013-DD1 (TAN 16ga)
SH8:M-12 41T-017-AH2 (TAN 14ga)
SH10:G-15 41T-015-DD1 (TAN 16ga)
SH10:I-15 41T-016-DD1 (TAN 16ga)
TB61
LAMP STOP/TAIL RIGHT
44-004-DD1 (GRY 16ga)
RRSTL RRSTL 58D-06-00821
0-255-DD1 (BLK 16ga)
41T-014-DD1 (TAN 16ga)

REAR TURN/ TAIL/ STOP LAMPS

SERVICE BRAKE RELAY
K86
SH5:I-14 44R-003-AA1 (GRY 18ga)
0-063-AA1 (BLK 18ga)
SH4:H-2
FB2:F16 10A 08041-01000
44A-000-AA13 (WHT 14ga)
44-000-AA1 (GRY 14ga)
TB35
EK4991
44-002-AC3 (GRY 16ga)

RETARD LIGHT RELAY
R87
FB3:F24 08041-00500
74ZA-001-AA13 (DGR 16ga)
TB31
74ZA-000-AA1 (DGR 18ga)
74ZB-001-AA1 (BRN 18ga)
74ZB-000-AA5 (BRN 18ga)
GE CONTROL INTERFACE
RETARD LAMP DRIVE
PX4
TB35
44D-000-AA1 (LBL 14ga)
44C-000-AA1 (BRN 14ga)
44C-001-AA13 (BRN 14ga)
FB3:F5 10A 08041-01000
EK4991
44D-006-AA18 (LBL 16ga)
P70
J16 P16
44D-005-AH2 (LBL 14ga)

SH8:J-8 45RL-013-AA18 (DBL 16ga)
SH8:K-8 45RL-014-AA18 (DBL 16ga)
J16 P16
45RL-010-AH2 (DBL 14ga)
45RL-011-AH2 (DBL 16ga)
SH8:M-18
TB60
SH10:E-14 41T-015-DD1 (TAN 16ga)
45RL-009-DD1 (DBL 16ga)
MC087
P707 J707
45RL-006-MM1 (GRN 16ga)
41T-007-MM1 (BLK 16ga)
MC087 SP038 MC088
SP039
45RL-007-MM1 (GRN 16ga)
41T-008-MM1 (BLK 16ga)
MC088
RSCL1 RSCL1 58D-06-00821
0-238-MM1 (WHT 16ga)
SP037
0-237-MM1 (WHT 16ga)
MC087
J707 P707

LAMP RETARD LEFT REAR
LRL RRL 58D-06-00831
44D-004-DD1 (LBL 16ga)
0-252-DD1 (BLK 16ga)
SH10:E-18
0-250-DD1 (BLK 16ga)
GRD-REAR AXLE GND
LAMP RETARD RIGHT REAR
44D-003-DD1 (LBL 16ga)
0-251-DD1 (BLK 16ga)
MC089
45RL-008-MM1 (GRN 16ga)
41T-009-MM1 (BLK 16ga)
LAMP BODY RIGHT REAR MARKER
MC089
RSCL2 RSCL2 58D-06-00821
0-239-MM1 (WHT 16ga)
MC089

SH8:I-8 45LL-013-AA18 (BRN 16ga)
J16 P16
45LL-010-AH2 (BRN 14ga)
TB60
SH10:F-14 41T-016-DD1 (TAN 16ga)
45LL-009-DD1 (BRN 16ga)
MC090
P706 J706
45LL-006-MM2 (GRN 16ga)
41T-010-MM2 (BLK 16ga)
MC090 SP041 MC091
SP042
45LL-007-MM2 (GRN 16ga)
41T-011-MM2 (BLK 16ga)
MC091
LSCL1 LSCL1 58D-06-00821
0-241-MM2 (WHT 16ga)
SP040
0-240-MM2 (WHT 16ga)
MC090
J706 P706
MC092
45LL-008-MM2 (GRN 16ga)
41T-012-MM2 (BLK 16ga)
LAMP BODY LEFT REAR MARKER
MC092
LSCL2 LSCL2 58D-06-00821
0-242-MM2 (WHT 16ga)
MC092

LAMP SERVICE BRAKE OP-CAB
SBL RED EM8073
44-001-CC3 (GRY 16ga)
LAMP DYNAMIC RETARD OP-CAB
DRL AMB EM8074
44D-001-CC3 (LBL 16ga)
44D-002-AC3 (LBL 16ga)
P04 J04

LAMP BODY RIGHT SIDE MARKER
SH4:J-2 0-279-AA18 (BLK 14ga)
SH4:J-2 0-280-AA18 (BLK 14ga)
J16 P16
TB61
0-265-AH2 (BLK 14ga)
0-264-AH2 (BLK 14ga)
SH10:M-16 0-247-DD2 (BLK 10ga)
0-249-DD1 (BLK 16ga)
0-248-DD1 (BLK 16ga)

FRONT VEHICLE HORN

FB1:F2 10A 08041-01000
63-000-AA13 (PNK 16ga)
TB23
63-008-AC1 (PNK 16ga)
P03 J03
63-004-CC1 (PNK 16ga)
TB10
63-006-CC1 (PNK 16ga)
63-005-CC1 (PNK 16ga)
63-007-CC1 (PNK 16ga)
63W-003-AC1 (GRY 16ga)
J03 P03
J84A
63W-002-CC1 (GRY 16ga)
63W-001-CC1 (GRY 16ga)
63W-000-CC1 (GRY 16ga)
PC1150

FB2:E19 15A 08041-01500
11A-004-AA13 (TAN 14ga)
TB35
RELAY HORN POWER (HRNRLY)
86 87 85 30
PB7276
11A-001-AA1 (TAN 14ga)
11H-000-AA1 (DGR 14ga)
TB22
11H-002-AC1 (DGR 16ga)
P03 J03
11H-001-CC1 (DGR 16ga)
SWITCH HORN BUTTON
PC1621
P020
11HS-000-AA1 (DBL 14ga)
TB38
11HS-005-AA19 (DBL 16ga)
11HS-004-AR1 (DBL 16ga)
J13 P13
TB70
11HS-001-GG1 (DBL 16ga)
SH10:F-4 0-226-GG1 (BLK 16ga)
VEHICLE HORN
HORN 58F-54-20450
11A-002-AA1 (TAN 14ga)
11A-006-AC2 (TAN 16ga)
SH14:C-14
11A-010-AA18 (TAN 14ga)
J16 P16
11A-009-AH2 (TAN 14ga)
TB60
11A-008-DD2 (TAN 16ga)
SH10:G-19 0-247-DD2 (BLK 10ga)
GRD REAR AXLE GND
0-246-DD2 (BLK 16ga)
P704 J704
11A-007-DD3 (TAN 16ga)

REAR AXLE SERVICE LAMP

0-245-DD3 (BLK 14ga)
MC093 SP043
0-243-DD3 (BLK 16ga)
SWITCH REAR AXLE SERVICE LIGHT
PLS-2 SR8325 PLS-3
TIMER REAR AXLE SERVICE LIGHT
PLT-3 PLT-6
PLT-NO PLT-C
PC2644
11AL-001-DD3 (BRN 16ga)
11AL-000-DD3 (BRN 16ga)
0-244-DD3 (BLK 16ga)
LAMP REAR AXLE SERVICE
PLT PL 58D-06-10660
11ALT-000-DD3 (WHT 14ga)

SWITCH COMBO
63-001-CC1 (PNK 16ga)
P021
63T1-000-CC1 (PUR 16ga)
63L2-000-CC1 (LBL 16ga)
PC1709
TIMER WIPER DELAY MOD
P10
PC0566
63P-000-CC1 (DBL 16ga)
TIMER WASHER DELAY MODULE (WADT)
PC1838
J86A
63L1-001-CC1 (BRN 16ga)
63L1-000-CC1 (BRN 16ga)
63L1-002-CC1 (BRN 16ga)
63L1-003-CC1 (BRN 16ga)
56B-06-11510
D68 (WSD)
PC28341

SH7:J-12 0-151-CC1 (BLK 16ga)
SH11:K-7 0-150-CC1 (BLK 16ga)
G810 CAB FRONT GND
RELAY WIPER MOTOR LOW
0-148-CC1 (BLK 16ga)
63L-000-CC1 (DGR 16ga)
63-002-CC1 (PNK 16ga)
P09
PC1730
P09
SH6:L-18 0-166-CC1 (BLK 16ga)
SH8:L-9 0-162-CC1 (BLK 16ga)
G810 CAB FRONT GND
RELAY WIPER MOTOR HIGH
0-160-CC1 (BLK 16ga)
63H-000-CC1 (TAN 16ga)
63H1-000-CC1 (LTG 16ga)
63-003-CC1 (PNK 16ga)
P08
PC1730
P08
MOTOR WINDSHIELD WIPER
MOTOR
P0167
PB9923
P016
0-169-CC1 (BLK 16ga)
0-168-CC1 (BLK 16ga)
G810 CAB FRONT GND
0-170-CC1 (BLK 16ga)
SH5:K-13
SH11:P-4 0-167-CC1 (BLK 14ga)
J03 P03
0-195-AC1 (BLK 16ga)
MOTOR WINDSHIELD WASHER
PUMP
WW(-) WW(+)
PB7514

SH5:E-9 0-027-AB1 (BLK 14ga)
P240 J240
0-018-BB1 (BLK 14ga)
11A-003-AB1 (TAN 14ga)
SWITCH HYDRAULIC CABINET DOME LIGHT
HDLS-3 SR8325 HDLS-2
11A-000-BB1 (TAN 14ga)
11A1-000-BB1 (LBL 14ga)
SP002
11A1-001-BB1 (LBL 14ga)
G68 HYD CABINET GROUND BLOCK
0-016-BB1 (BLK 16ga)
11A1-002-BB1 (LBL 14ga)
0-017-BB1 (BLK 16ga)
LAMP HYDRAULIC CABINET #2
HDL2 PC3010
LAMP HYDRAULIC CABINET #1
HDL1 PC3010

HYD CABINET LAMP

WINDSHIELD WIPER/ WASHER

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ELECTRICAL SCHEMATIC

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