SERVICE REPAIR

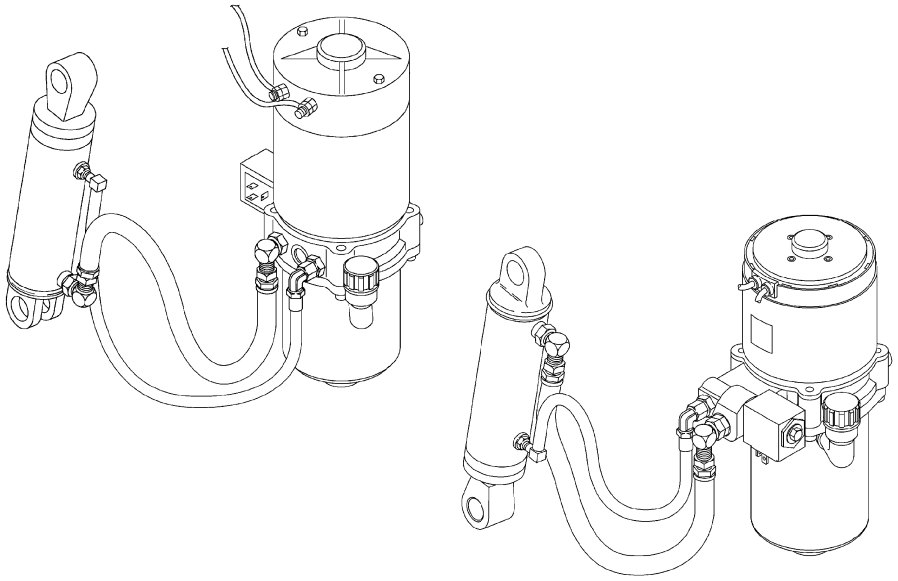
MANUAL

Hyster B229 (W60Z, W65Z, W80Z) Forklift

HYSTER

WALKIE HYDRAULIC SYSTEMS

B60Z [A230];
B80Z [A233];
C60Z [A478];
C80Z [A479];
W60Z [A231, B231];
W65Z [A229, B229];
W80Z [A234, B234];
B60Z^{AC} [B230];
B80Z^{AC} [B233];
C60Z^{AC} [B478];
C80Z^{AC} [B479]



HYSTER

PART NO. 1500201 **1900 SRM 0964**

SAFETY PRECAUTIONS
MAINTENANCE AND REPAIR

- The Service Manuals are updated on a regular basis, but may not reflect recent design changes to the product. Updated technical service information may be available from your local authorized Hyster® dealer. Service Manuals provide general guidelines for maintenance and service and are intended for use by trained and experienced technicians. Failure to properly maintain equipment or to follow instructions contained in the Service Manual could result in damage to the products, personal injury, property damage or death.
- When lifting parts or assemblies, make sure all slings, chains, or cables are correctly fastened, and that the load being lifted is balanced. Make sure the crane, cables, and chains have the capacity to support the weight of the load.
- Do not lift heavy parts by hand, use a lifting mechanism.
- Wear safety glasses.
- DISCONNECT THE BATTERY CONNECTOR before doing any maintenance or repair on electric lift trucks. Disconnect the battery ground cable on internal combustion lift trucks.
- Always use correct blocks to prevent the unit from rolling or falling. See HOW TO PUT THE LIFT TRUCK ON BLOCKS in the Operating Manual or the Periodic Maintenance section.
- Keep the unit clean and the working area clean and orderly.
- Use the correct tools for the job.
- Keep the tools clean and in good condition.
- Always use HYSTER APPROVED parts when making repairs. Replacement parts must meet or exceed the specifications of the original equipment manufacturer.
- Make sure all nuts, bolts, snap rings, and other fastening devices are removed before using force to remove parts.
- Always fasten a DO NOT OPERATE tag to the controls of the unit when making repairs, or if the unit needs repairs.
- Be sure to follow the WARNING and CAUTION notes in the instructions.
- Gasoline, Liquid Petroleum Gas (LPG), Compressed Natural Gas (CNG), and Diesel fuel are flammable. Be sure to follow the necessary safety precautions when handling these fuels and when working on these fuel systems.
- Batteries generate flammable gas when they are being charged. Keep fire and sparks away from the area. Make sure the area is well ventilated.

NOTE: The following symbols and words indicate safety information in this manual:

WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury and property damage.

On the lift truck, the WARNING symbol and word are on orange background. The CAUTION symbol and word are on yellow background.

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

This section is for the following models:

(B60Z) [A230];
(B80Z) [A233];
(C60Z) [A478];
(C80Z) [A479];
(W60Z) [A231, B231];
(W65Z) [A229, B229];
(W80Z) [A234, B234];
(B60ZAC) [B230];
(B80ZAC) [B233];
(C60ZAC) [B478];
(C80ZAC) [B479]

General

This section covers the troubleshooting and repair procedures for the hydraulic components on B60Z, B80Z, B60Z, B80Z^{AC}, C60Z, C80Z, C60Z, C80Z^{AC}, W60Z, W65Z, and W80Z lift trucks.

It also includes the remove and install procedures for the solenoid coil used to activate the lowering valve.

For troubleshooting and repairs of the electrical components, see the sections Electrical System 2200SRM0929, Electrical System 2200SRM1052, Electrical System 2200SRM1357, or Electrical System 2200SRM1287. See the sections Curtis 1297 Transistor Motor Controller 2200SRM0928, AC Motor Controller 2200SRM1352, or AC Motor Controller 2200SRM1286 for Controller functions.

Description of Operation

The hydraulic system of the B60Z, B80Z, B60Z, B80Z^{AC}, C60Z, C80Z, C60Z, C80Z^{AC}, W60Z, W65Z, and W80Z lift trucks includes:

- Reservoir
- Pump
- Check Valve
- Relief Valve
- Lowering Valve
- Lift Cylinder
- Connecting Hoses and Tubes

WARNING

Always wear the proper protective equipment including eye protection and petroleum-resistant gloves when handling hydraulic oil. Thoroughly wash oil from exposed areas of skin as soon as possible.

Never check for leaks by putting hands on hydraulic lines or components under pressure. Hydraulic oil under pressure can be injected into the skin.

Completely lower forks to relieve hydraulic pressure before disassembling any part of the lift pump or disconnecting any hydraulic hoses.

The hydraulic oil is hot at normal operating temperatures. Be careful when draining the oil.

CAUTION

Protect the hydraulic system from dirt and contaminants when servicing the hydraulic system.

Never operate the pump without the proper amount of oil in the hydraulic system. The operation of the hydraulic pump with low oil levels will damage the pump.

The reservoir contains the hydraulic fluid necessary for the operation of the system. It acts as a heat sink to provide cooling. As the hydraulic oil leaves the reservoir, it passes through a strainer in the reservoir. See Figure 1.

The hydraulic pump provides the flow of the hydraulic oil which activates the cylinder.

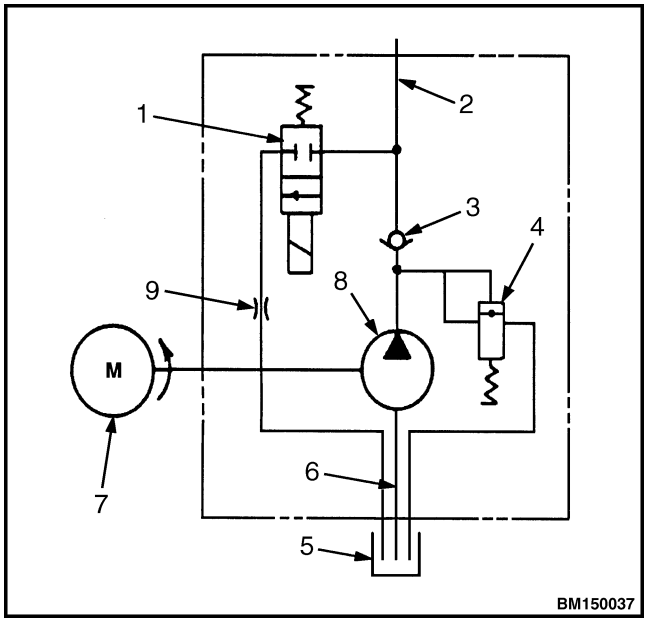
A check valve allows flow of the hydraulic oil in one direction only. In this hydraulic system, it prevents the oil from flowing backwards through the pump.

A relief valve limits maximum system pressure to protect the hydraulic system components.

The lowering valve is a normally closed valve. When it opens, hydraulic oil from the lift cylinder is allowed to return to the reservoir, and the forks lower.

The lift cylinder rod extends to operate the lift linkages to raise the forks.

The connecting hoses and tubing connect the various hydraulic components in the lift truck to complete the hydraulic circuit. See Figure 2 and Figure 3.



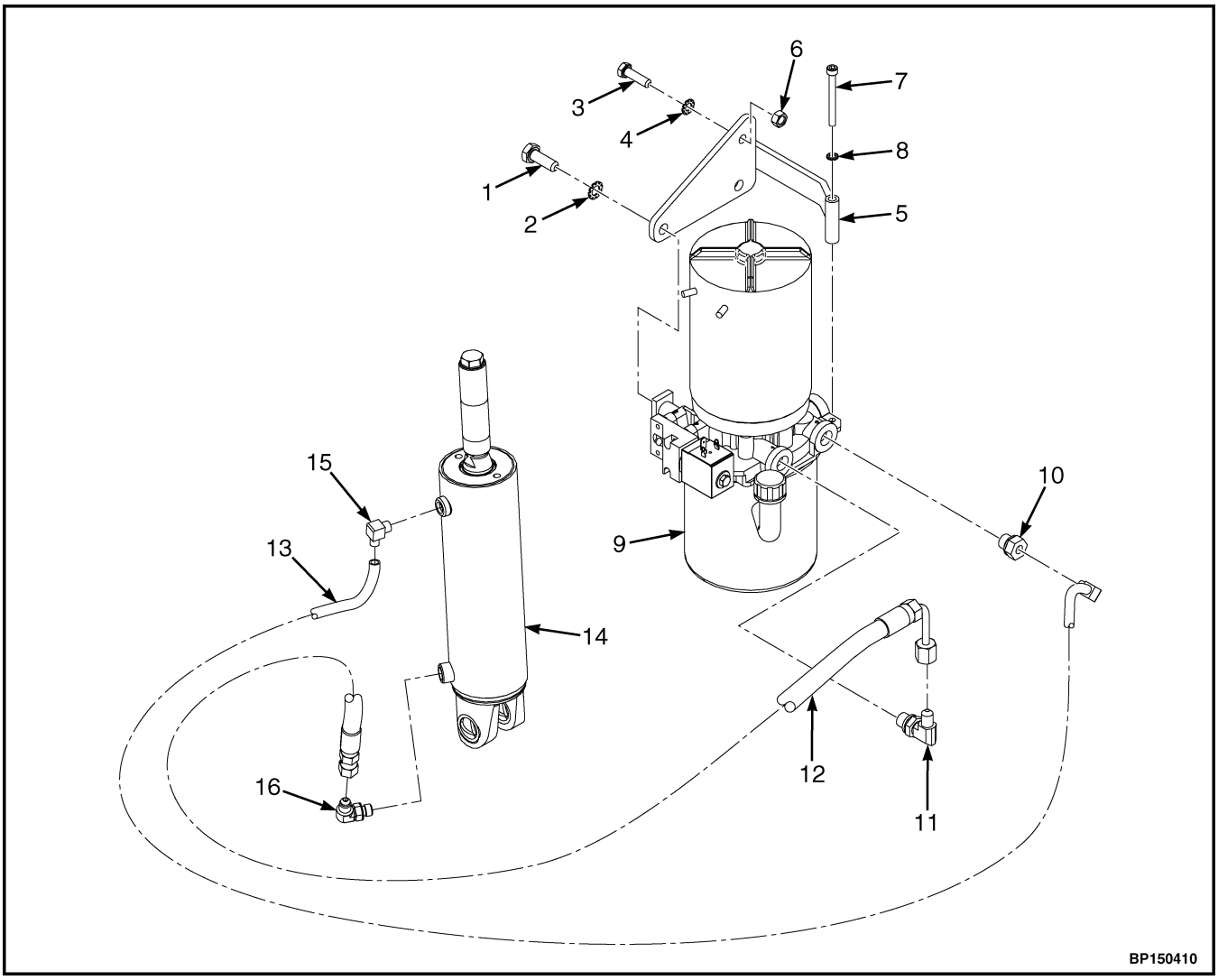
1. LOWERING SOLENOID VALVE
2. TO LIFT CYLINDER
3. CHECK VALVE
4. RELIEF VALVE
5. RESERVOIR
6. INLET LINE
7. PUMP MOTOR
8. LIFT PUMP
9. ORIFICE

Figure 1. Lift Pump and Motor Assembly Schematic

LIFTING A LOAD

To raise a load, the lift button must be depressed. Depressing this button will activate the lift pump motor. Torque is transferred to the pump from the motor through the motor shaft and the coupling.

Hydraulic oil is pumped through the system as the pump begins to operate. Atmospheric pressure forces oil into the low pressure area at the pump inlet. Air, which is drawn into the reservoir through the breather, displaces the pumped oil, allowing oil to be sent through the system. See Figure 1.



1. CAPSCREW
2. WASHER
3. CAPSCREW
4. WASHER
5. MOUNTING BRACKET
6. NUT
7. SCREW
8. WASHER
9. PUMP AND MOTOR ASSEMBLY
10. ADAPTER
11. FITTING
12. HOSE
13. TUBE
14. CYLINDER ASSEMBLY
15. FITTING
16. FITTING

Figure 2. Hydraulic System for B60Z, B60Z^{AC}, C60Z, C60Z^{AC}, and W60Z Lift Trucks

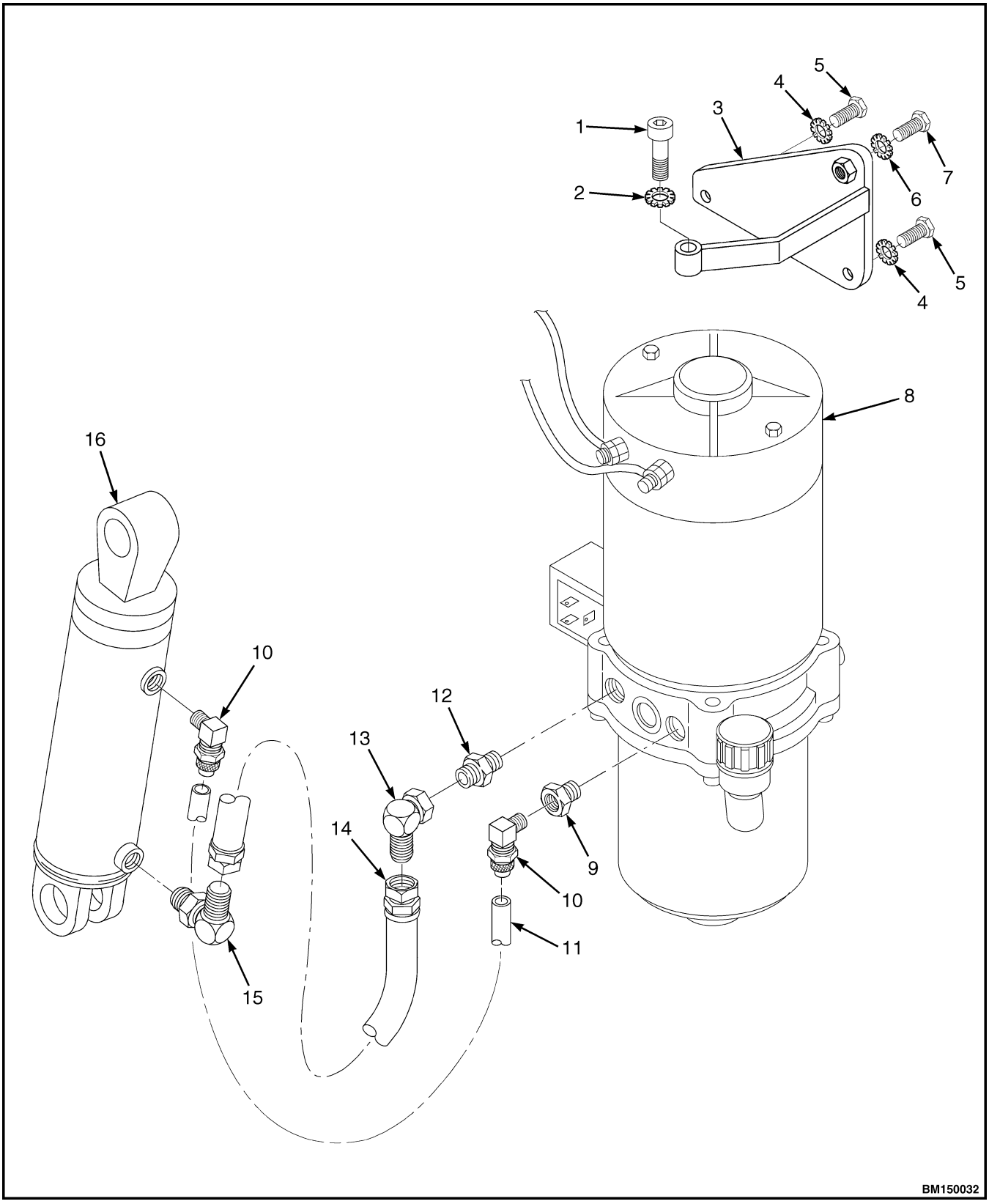


Figure 3. Hydraulic System for B80Z, B80Z^{AC}, C80Z, C80Z^{AC}, W65Z, and W80Z Lift Trucks

Legend for Figure 3

1. SOCKET-HEAD SCREW
2. LOCKWASHER
3. MOUNTING BRACKET
4. LOCKWASHER
5. CAPSCREW
6. LOCKWASHER
7. CAPSCREW
8. LIFT PUMP AND MOTOR ASSEMBLY
9. ADAPTER
10. FITTING
11. TUBE ASSEMBLY
12. ADAPTER
13. ELBOW FITTING
14. HOSE ASSEMBLY
15. ELBOW FITTING
16. LIFT CYLINDER ASSEMBLY

As oil is displaced by the pump, it passes through a one-way check valve to the lift cylinder. The check valve prevents oil from flowing back to the pump when lifting ceases, which holds the lift cylinder in the raised position until lowered.

The piston will begin to lift the load when fluid pressure acting against it is high enough to overcome the weight of the load.

When the piston is fully extended to the end of its stroke or if the load is too heavy, pressure will continue to build until the rated pressure needed to operate the relief valve is reached. When this occurs, the relief valve, which is normally closed, is forced back against its spring, creating a path for the fluid to flow back to the reservoir.

When relief pressure is reached, hydraulic oil will continue to be diverted from the relief valve to the reservoir until the lift button is released, controller time-out is reached, or electrical power is interrupted.

LOWERING A LOAD

A load is lowered by depressing the lower button. When the lower button is depressed, electric current is sent to the normally closed solenoid lowering valve, which causes it to change position and open a path for the trapped hydraulic oil to flow from the cylinder back to the reservoir.

HYDRAULIC LINES

1. All hydraulic hoses and tubes must be thoroughly cleaned before installation.

2. When making repairs, use the least number of fittings and connections to minimize flow resistance and the possibility of leakage.

HYDRAULIC OIL

The hydraulic oil in the system performs the dual function of the power transmission and lubrication. Using the correct fluid is essential to proper system operation. See the section Periodic Maintenance 8000SRM1453 for the recommended hydraulic oil.

The hydraulic oil level should be checked first when troubleshooting lifting problems. Low oil levels may make it appear that a problem exists with the battery or hydraulic system.

CLEAN

Adhere to the following precautionary steps to ensure that the hydraulic system remains clean.

1. Clean the reservoir and pump area to prevent contaminants from entering the hydraulic system.

2. Clean (flush) the entire system when a failure is encountered to make sure all paint, metal chips, welding shot, and debris are removed.

3. Filter each change of oil to prevent the introduction of contaminants into the system.

4. Provide continuous protection from airborne contamination by keeping the breather cap clean and serviceable.

SOUND LEVEL

Hydraulic system noise may be caused by both improperly selected oil and loose or damaged system components.

- Cavitation - Can be caused by high fluid viscosity, cold fluid temperatures, or a restriction in the inlet screen or inlet tubing. At startup, low temperatures can cause pump noises due to cavitation.
- Aerated Hydraulic Oil - Results in system noise that is similar to cavitation. Aerated oil is caused by the ingestion of air through the joints of the inlet lines and high-velocity discharge lines. Aeration can also be caused by oil discharging above the fluid level in the hydraulic reservoir. Aerated hydraulic oil occurs when air does not have sufficient time to escape from the fluid while in the reservoir before recycling through the system.

Special Precautions

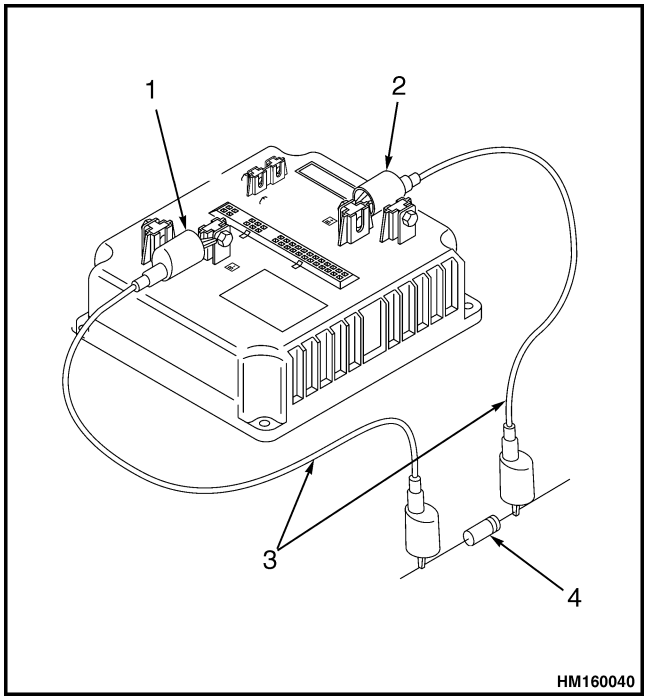
WARNING

The capacitor in the transistor controller can hold an electrical charge after the battery is disconnected. To prevent an electrical shock and personal injury, discharge the capacitor before inspecting or repairing any component in the drive unit compartment. Wear safety glasses. Make certain that the battery has been disconnected.

CAUTION

To avoid controller damage, always disconnect the battery, discharge the capacitor, and never put power to the controller while any power wires are disconnected. Never short any controller terminal or motor terminal to the battery. Make sure to use proper procedure when servicing the controller.

1. Verify that the key switch is in the OFF position and the battery connector is completely disconnected.
2. Discharge the capacitors in the controllers by connecting a 200-ohm, 2-watt resistor across the controller's B+ and B− terminals. DO NOT short across the motor controller terminals with a screwdriver or jumper wire. Remove the 200-ohm, 2-watt resistor before reconnecting the battery. See Figure 4 or Figure 5.



1. POSITIVE CONNECTION
2. NEGATIVE CONNECTION
3. JUMPER WIRES
4. 200-OHM, 2-WATT RESISTOR

Figure 4. Discharging the Capacitors (B60Z, B80Z, C60Z, C80Z, W60Z, W65Z, and W80Z)

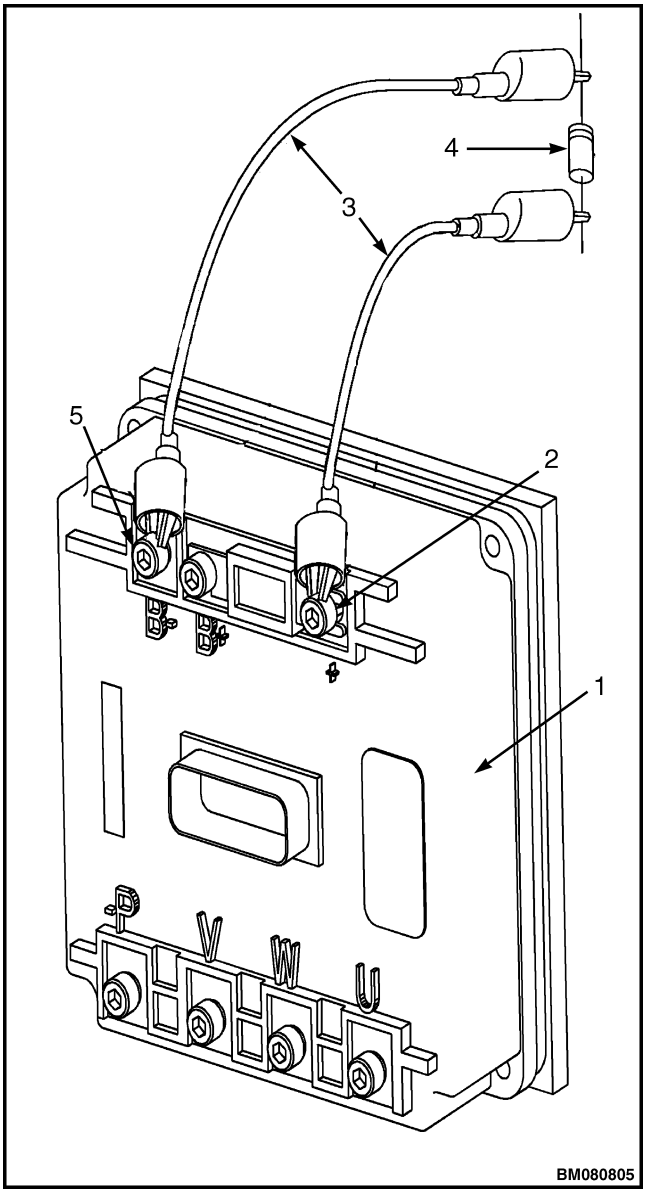


Figure 5. Discharging the Capacitors (B60Z^{AC}, B80Z^{AC}, C60Z^{AC}, and C80Z^{AC})

Legend for Figure 5

1. POSITIVE CONNECTION
2. NEGATIVE CONNECTION
3. JUMPER WIRES
4. 200-OHM, 2-WATT RESISTOR

Hydraulic Reservoir

DESCRIPTION

The hydraulic reservoir is made of a durable, translucent plastic that allows the operator to see how much hydraulic oil is in the reservoir. The reservoir is clamped to the adapter plate on the bottom of the pump and motor assembly in the drive unit compartment. The reservoir has MIN and MAX marks on the side. With the truck on level surface, the forks lowered completely, and the oil at room temperature, the reservoir should be filled to the MIN mark. See Table 1.

Table 1. Hydraulic Reservoir

Model	Reservoir Markings	Reservoir Capacity
B60Z, B60Z ^{AC}, C60Z, C60Z ^{AC}, and W60Z	MIN and MAX	MIN: 0.71 liter (0.75 qt)
B80Z, B80Z ^{AC}, C80Z, C80Z ^{AC}, W65Z, and W80Z	MIN and MAX	MIN: 0.85 liter (0.90 qt)

Drive Unit Compartment Covers

C60Z, C80Z, C60Z^{AC}, AND C80Z^{AC}

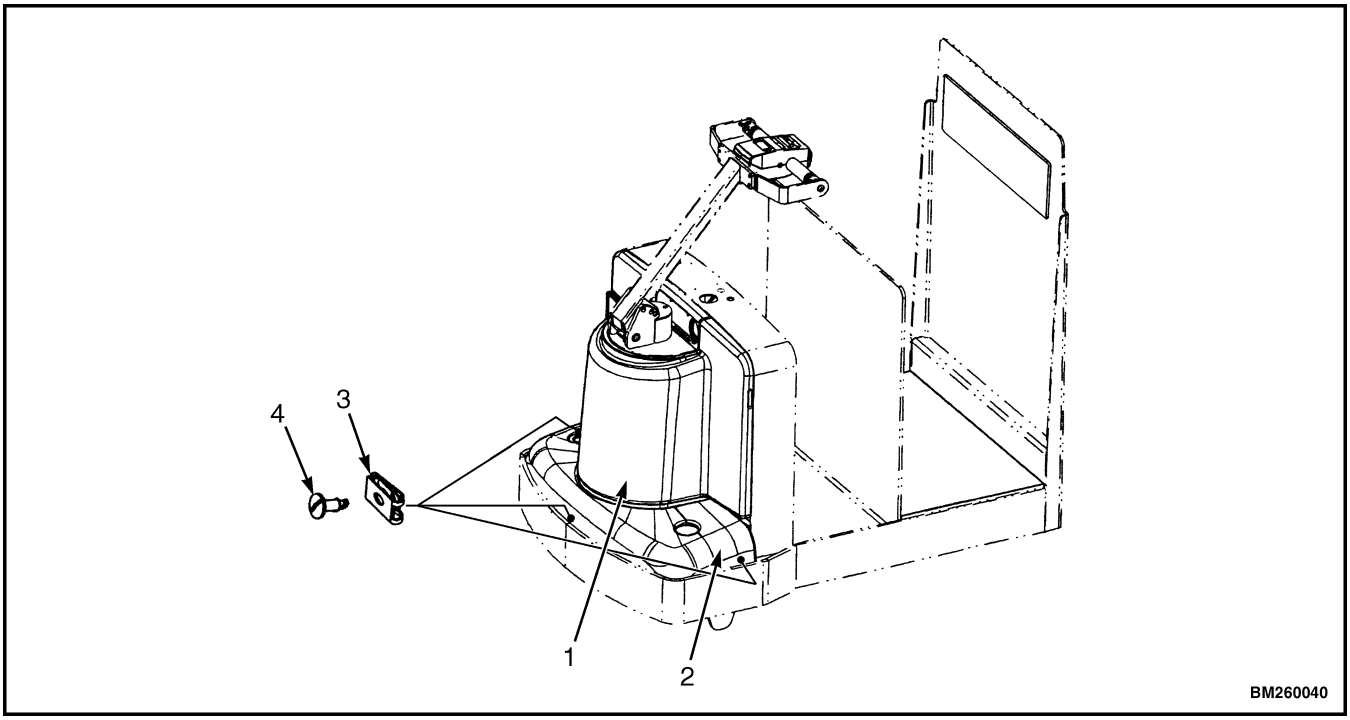
Many procedures will require access to the drive unit compartment. The drive unit compartment is located at the front of the truck, in front of the battery, and below the control handle assembly. Two covers must be removed to access the drive unit compartment. The covers must be correctly reinstalled to protect the electrical system and other components housed in the drive unit compartment. See Figure 6.

Remove

1. Move the lift truck to a safe and level area.
2. Lower the forks completely to relieve pressure from the hydraulic system.
3. Turn the key switch to the OFF position and disconnect battery.
4. Block load wheels to prevent lift truck from moving. Refer to the section Periodic Maintenance 8000SRM1032 or Periodic Maintenance 8000SRM1368 - How to Put A Lift Truck on Blocks.
5. Remove the three screws retaining the lower cover to the truck.
6. Lift the lower cover from the drive unit compartment.
7. Pull the bottom edge on one side of the upper cover from the drive unit compartment. Continue pulling around the edge of the cover until completely free of the truck.

Install

1. Place the top corners of the upper cover into the retaining clips in the drive unit compartment. See Figure 6.
2. Working around each side, bump the cover into place using the heel of the hand or a rubber hammer.
3. Place the lower cover into the bottom of the drive unit compartment. Align the clip nuts with the cover holes.
4. Secure lower cover into place using three screws.



1. UPPER COVER
2. LOWER COVER
3. CLIP NUT
4. SCREW

Figure 6. Drive Unit Compartment Covers (C60Z, C80Z, C60Z^{AC}, and C80Z^{AC})

B60Z, B80Z, B60Z^{AC}, B80Z^{AC}, W60Z, W65Z, AND W80Z

The drive unit compartment is concealed behind a molded cover which fits securely around the drive unit and steer support to the frame. The floor mat fits snugly in the operator platform after the drive unit cover is installed.

Remove

1. Move the lift truck to a safe and level area.

2. Lower the forks completely to relieve pressure from the hydraulic system.

3. Turn the key switch to the OFF position and disconnect battery.

4. Block load wheels to prevent lift truck from moving. Refer to the section Periodic Maintenance 8000SRM0919 or Periodic Maintenance 8000SRM1298 - How to Put A Lift Truck on Blocks.

5. Lift the corners of the floor mat and pull it out away from the drive unit. See Figure 7.

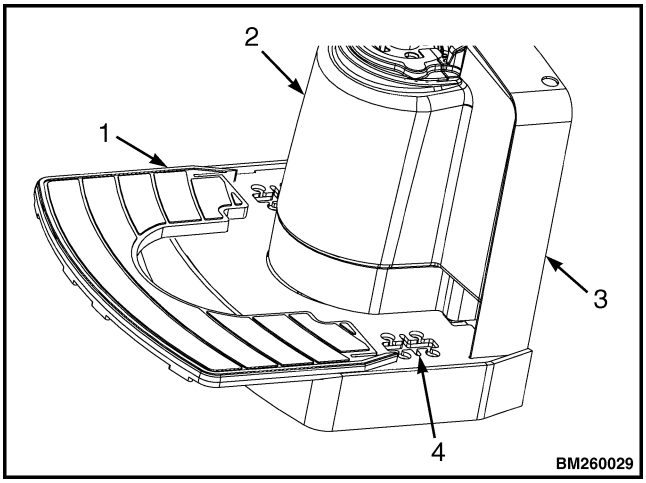
6. Reach under the side of the drive unit cover near the bottom and find the grip slot. See Figure 8. With both hands, pull up and away from the truck until the bottom of the cover kicks out from the retaining clips. Repeat this for the other side of the cover. Work around the edge of the cover until free from the truck.

Install

1. Make sure the floor mat is pulled away from the drive unit. Place the bottom of the drive unit cover onto the operator platform and position the lower edges partially into the lower retaining clips.

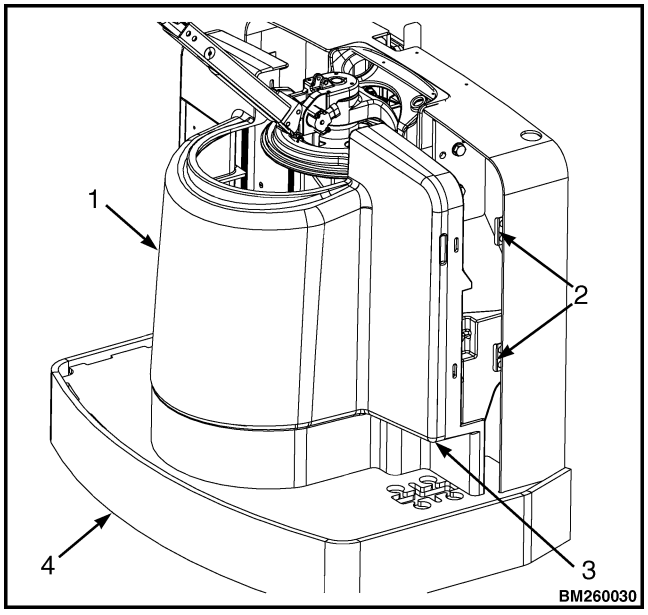
2. Push the top of the cover partially into the upper retaining clips. DO NOT push either edge of the cover in completely before starting all edges into the proper place.

3. When the cover is aligned and started properly, press the cover completely into the retaining clips and place the floor mat into the operator platform around the cover.



1. FLOOR MAT
2. DRIVE UNIT COMPARTMENT COVER
3. FRAME
4. CASTER MOUNTING ACCESS

Figure 7. Floor Mat (B60Z, B80Z, B60Z^{AC}, B80Z^{AC}, W60Z, W65Z, and W80Z)



1. DRIVE UNIT COMPARTMENT COVER
2. RETAINER TABS
3. GRIP SLOT
4. FRAME

Figure 8. Drive Unit Compartment Cover

Lift Pump and Motor

GENERAL

The lift pump and motor assembly consist of:

- Electric Motor
- Lift Pump
- Lowering Valve
- Relief Valve
- Check Valve
- Reservoir
- Inlet Tube and Strainer
- Breather/Filler Cap

The lift pump and motor assemblies are mechanically joined together as a compact unit, combining the reservoir, pump, valves, and motor. The lift pump is located inside the hydraulic reservoir and coupled to the motor by an adapter plate, coupling, and four capscrews.

Lift pump and motor assembly servicing is best performed by removing the unit from the truck to a clean work area.

NOTE: It is not necessary to remove the complete lift pump and motor assembly to remove the reservoir. When removing only the reservoir, see Remove Reservoir.

REMOVE

Lift Pump and Motor Assembly

WARNING

Always wear the proper protective equipment including eye protection and petroleum-resistant gloves when handling hydraulic oil. Thoroughly wash oil from exposed areas of skin as soon as possible.

Completely lower forks to relieve hydraulic pressure before disassembling any part of the lift pump or disconnecting any hydraulic hoses.

CAUTION

Make certain the hydraulic cylinder rod is fully retracted.

Protect the hydraulic system from dirt and contaminants when servicing the hydraulic system.

1. Move the lift truck to a safe and level area.
2. Lower the forks completely to relieve pressure from the hydraulic system.
3. Turn the key switch to the OFF position and disconnect battery.
4. Block load wheels to prevent lift truck from moving. Refer to the section Periodic Maintenance 8000SRM0919, Periodic Maintenance 8000SRM1032, Periodic Maintenance 8000SRM1368, or Periodic Maintenance 8000SRM1298 - How to Put A Lift Truck on Blocks.
5. Remove the drive unit compartment covers. See Drive Unit Compartment Covers.
6. Discharge the capacitor. See Special Precautions.
7. Tag and disconnect all power wires and control wires to the lift pump and motor assembly.
8. Disconnect the hydraulic hoses.

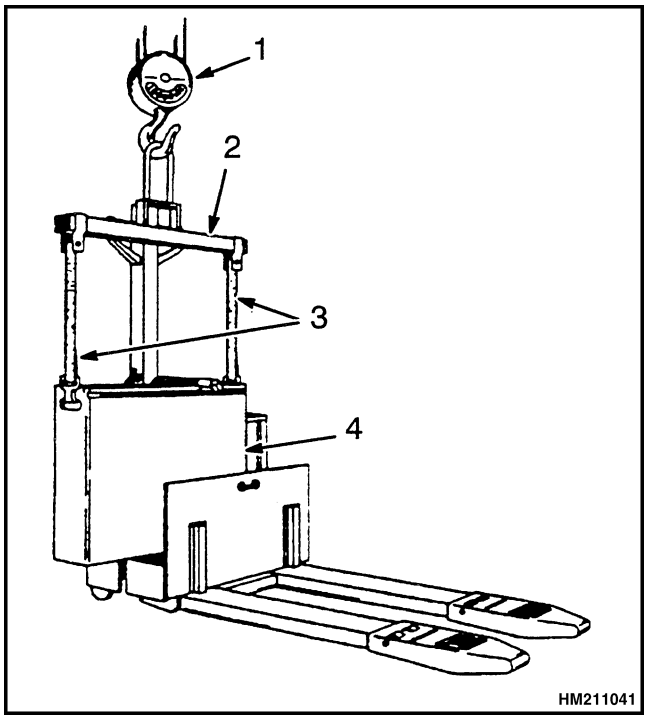
WARNING

Batteries are heavy and can cause personal injury. Use care to avoid injury. DO NOT put hands, arms, feet, and/or legs between the battery and a solid object. Make sure the capacity of the crane and spreader bar is greater than the weight of the battery. The weight of the battery is normally shown on the battery case. The maximum battery weight is shown on the lift truck nameplate. The spreader bar must NOT be made of metal or it must have insulated straps.

9. If necessary, remove the battery. Use a spreader bar and an overhead lifting device (crane) to remove the battery. DO NOT let the battery move from side to side. Make sure the battery cables have clearance. See Figure 9.

NOTE: On B60Z, B60Z^{AC}, C60Z, C60Z^{AC}, and W60Z lift trucks, it is recommended to connect a piece of string/rope to the power wires to help guide the wires back to the controller when reinstalling the lift pump and motor assembly.

10. Loosen and remove the three capscrews and lockwashers retaining the lift pump and motor assembly to the frame. Support the lift pump and motor assembly as the capscrews are being removed. Remove lift pump and motor assembly.
11. Place lift pump and motor assembly in a vise on a workbench in an upright position.



1. CRANE
2. SPREADER BAR
3. INSULATOR STRAPS
4. BATTERY

Figure 9. Battery Removal

DISASSEMBLE

Remove Reservoir

1. If the lift pump and motor assembly has not been previously removed, perform Step 1 through Step 6 in RemoveLift Pump and Motor Assembly.

NOTE: On B60Z, B60Z^{AC}, C60Z, C60Z^{AC}, and W60Z lift trucks, the capscrews that hold the reservoir to the pump assembly also hold the motor to the pump assembly. When the capscrews are removed, the motor will be resting on the pump assembly. When reinserting the capscrews, ensure that the motor is located correctly and the coupling is seated properly.

2. Remove the four capscrews retaining the reservoir to the lift pump. See Figure 10 or Figure 11.

3. Carefully remove the reservoir from the lift pump and motor.

4. If removed, place the pump and motor assembly on a clean drip pan.

5. Remove and inspect the O-ring seal located between the lift pump assembly and the hydraulic reservoir. Verify that the O-ring seal is not damaged. Replace as needed.

6. Inspect the inlet strainer. On B80Z, B80Z^{AC}, C80Z, C80Z^{AC}, W65Z, and W80Z lift trucks, also inspect the return strainer. If necessary, remove the retaining clip to access the screen. Replace parts that are damaged or cannot be cleaned.

CAUTION

Disposal of lubricants and fluids must meet local and environmental regulations.

7. Pour oil from reservoir in a container suitable for disposal.

CAUTION

If oil is contaminated or excessively dirty, the entire hydraulic system should be thoroughly cleaned.

8. Examine the hydraulic reservoir. Inspect the hydraulic reservoir for dirt, foreign materials, or contamination. Clean and flush the hydraulic reservoir as necessary.

9. Remove the breather/filler cap. Using a small pry bar, separate the top and bottom of the breather/filler cap. Clean and inspect the breather element and the flat seal. Replace parts that are damaged or cannot be cleaned. Assemble the breather/filler cap.

Remove Pump Motor

B60Z, B60Z^{AC}, C60Z, C60Z^{AC}, and W60Z

1. Lift the motor away from the pump assembly.

2. Inspect the motor output shaft, the pump input shaft, and the coupling. Replace worn or damaged parts.

B80Z, B80Z^{AC}, C80Z, C80Z^{AC}, W65Z, and W80Z

1. Remove the two capscrews from top of motor.

2. Lift the motor from the pump assembly.

3. Inspect the motor output shaft, the pump input shaft, and the coupling. Replace worn or damaged parts.

Disassemble Pump

B60Z, B60Z^{AC}, C60Z, C60Z^{AC}, and W60Z

1. Remove the clamp retaining the inlet tube to the pump.

2. Remove the inlet tube and strainer by pulling down and out.

3. Remove the lowering valve. See Lowering ValveRemove.

4. Remove the relief valve. See Relief Valve, Remove.

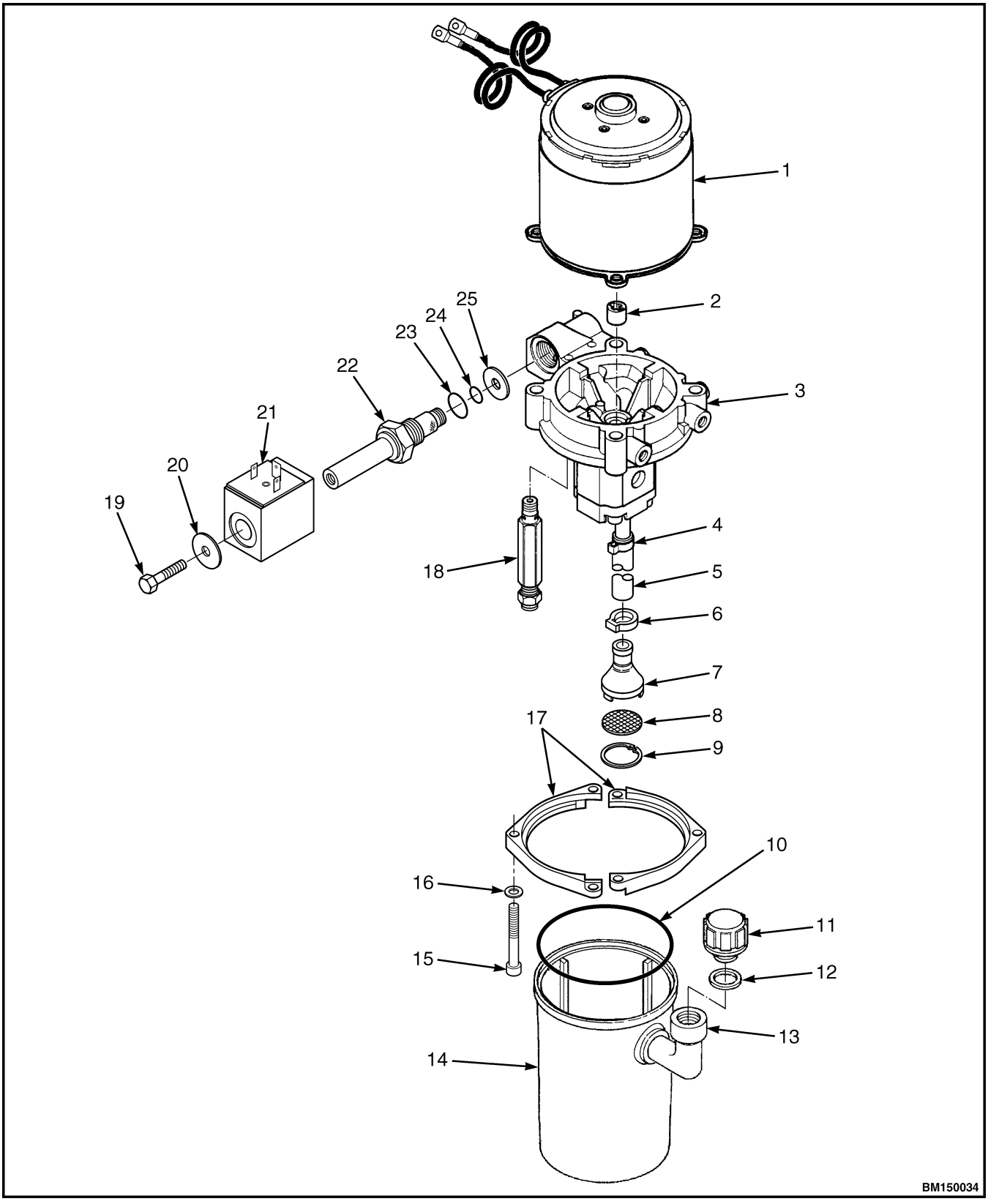


Figure 10. Lift Pump and Motor Assembly for B60Z, B60Z^{AC}, C60Z, C60Z^{AC}, and W60Z Lift Trucks

Legend for Figure 10

1. LIFT PUMP MOTOR
2. COUPLING
3. LIFT PUMP
4. CLAMP
5. TUBE
6. CLAMP
7. STRAINER
8. SCREEN
9. RETAINER
10. O-RING
11. BREATHER/FILLER CAP
12. FLAT SEAL
13. FILLER ELBOW
14. RESERVOIR
15. CAPSCREW
16. WASHER
17. TWO-PIECE CLAMP
18. RELIEF VALVE
19. CAPSCREW
20. WASHER
21. LOWERING VALVE COIL
22. LOWERING VALVE CARTRIDGE
23. O-RING
24. O-RING
25. LOWERING ORIFICE

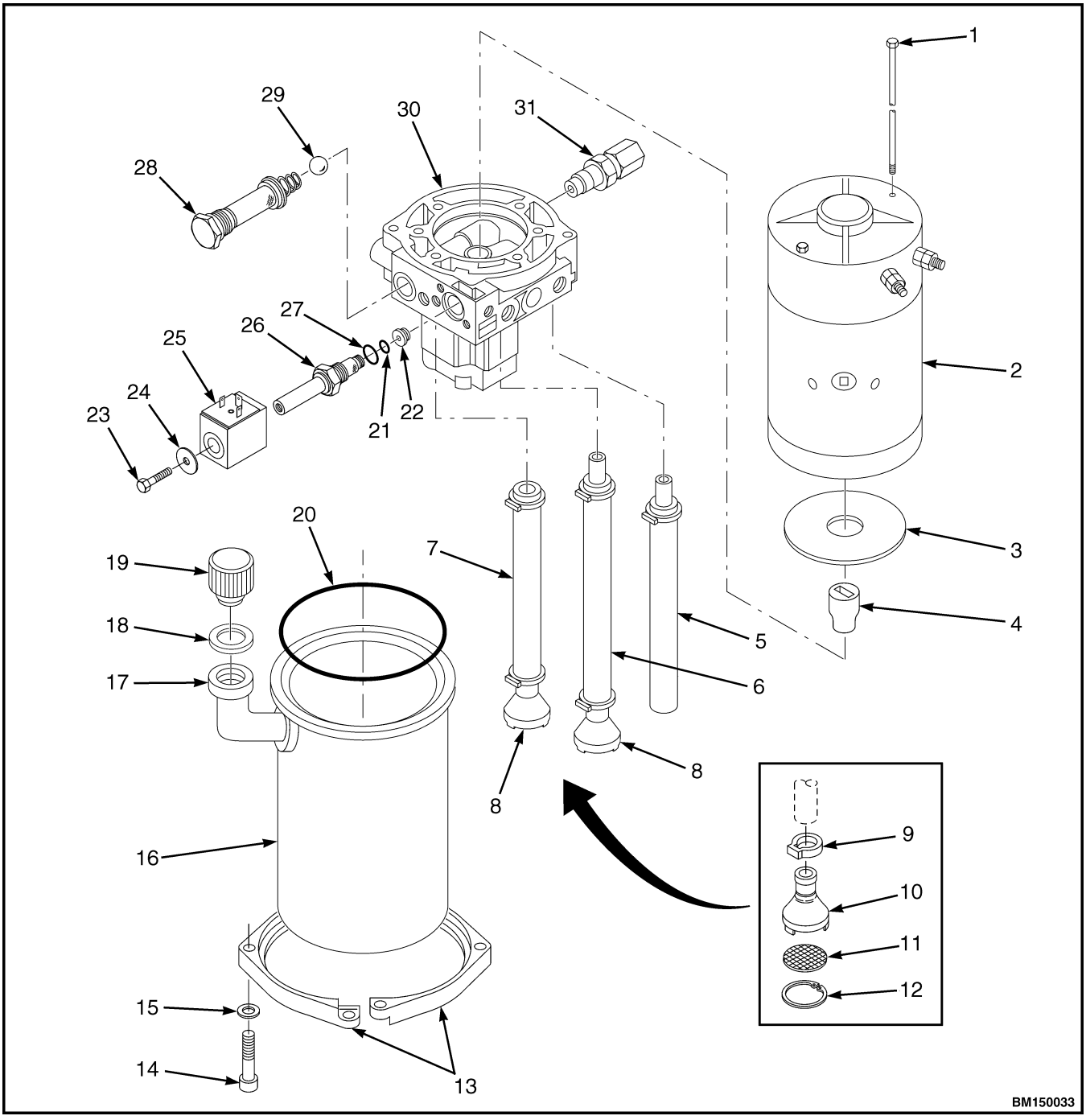


Figure 11. Lift Pump and Motor Assembly for B80Z, B80Z^{AC}, C80Z, C80Z^{AC}, W65Z, and W80Z Lift Trucks

Legend for Figure 11

1. CAPSCREW
2. LIFT PUMP MOTOR
3. ADAPTER PLATE
4. COUPLING
5. TUBE
6. INLET TUBE
7. RETURN TUBE
8. STRAINER
9. CLAMP
10. STRAINER HOUSING
11. SCREEN
12. RETAINER
13. TWO PIECE CLAMP
14. CAPSCREW
15. WASHER
16. RESERVOIR
17. FILLER ELBOW
18. FLAT SEAL
19. BREATHER/FILLER CAP
20. O-RING
21. O-RING
22. LOWERING ORIFICE
23. CAPSCREW
24. WASHER
25. LOWERING VALVE COIL
26. LOWERING VALVE CARTRIDGE
27. O-RING
28. CHECK VALVE
29. CHECK VALVE BALL
30. LIFT PUMP
31. RELIEF VALVE

B80Z, B80Z^{AC}, C80Z, C80Z^{AC}, W65Z, and W80Z

1. Tag and identify each tube with their corresponding location.

2. Remove tubes and associated items from the bottom of pump.

3. Remove the lowering valve from pump assembly. See Lowering ValveRemove.

4. Remove the check valve from pump assembly. See Valve RepairRemove.

5. Remove the relief valve from pump assembly. See Relief Valve, Remove.

ASSEMBLE

Assemble Pump

B60Z, B60Z^{AC}, C60Z, C60Z^{AC}, and W60Z

1. Clean and lubricate all components using clean hydraulic oil.

2. Install the lowering valve. See Lowering ValveInstall.

3. Install the inlet tube and strainer.

4. Install the new clamp.

5. Install the relief valve. See Relief Valve, Install.

B80Z, B80Z^{AC}, C80Z, C80Z^{AC}, W65Z, and W80Z

1. Clean and lubricate all components using clean hydraulic oil.

2. Install the relief valve. See Relief Valve, Install.

3. Install the check valve. See Valve RepairInstall.

4. Install the lowering valve. See Lowering ValveInstall.

5. Install tubes and related items to bottom of pump as removed.

Install Pump Motor

WARNING

Always wear the proper protective equipment including eye protection and petroleum-resistant gloves when handling hydraulic oil. Thoroughly wash oil from exposed areas of skin as soon as possible.

CAUTION

Protect the hydraulic system from dirt and contaminants when servicing the hydraulic system.

1. Lubricate the motor output shaft and the pump input shaft with a light coating of Molykote® G-N paste.

2. Install the coupling on the pump shaft.

3. Align the slot in the motor shaft with the coupling. Lower the motor onto the pump, rotating the body as necessary to engage the coupling.

4. Use the following procedure that applies to your lift truck:

   a. Align the pump assembly mounting holes with the holes in the pump motor. Install the capscrews and tighten to 8 N•m (71 lbf in).

   b. Align the pump motor mounting holes with the holes in the adapter plate. Install the capscrews and tighten to 8 N•m (71 lbf in).

Install Reservoir to Pump

NOTE: If only the reservoir has been removed, perform Step 3 through Step 7.

1. Place reservoir in an upright position on the workbench.

2. Install breather/filler cap to reservoir.

NOTE: The reservoir may be filled at this point or it may be filled after the lift pump and motor assembly have been installed.

3. Fill the hydraulic reservoir to proper level. See Hydraulic Reservoir, Table 1.

4. Install O-ring seal on pump assembly. If necessary, use a small amount of grease to hold the O-ring seal in position.

5. Position lift pump and motor assembly onto the reservoir.

6. Install two piece clamp to reservoir and pump assembly.

7. Install four capscrews and torque to 8 N•m (71 lbf in).

INSTALL

Lift Pump and Motor Assembly

1. Align the lift pump and motor assembly with the mounting holes in the frame.

2. Apply Loctite® 242 to the threads of the mounting capscrews. Install three capscrews with lockwashers and torque to the proper torque. See Figure 12.

3. Install hydraulic hoses to lift pump and motor assembly.

4. Connect power wires and control wires to lift pump and motor assembly.

CAUTION

Never operate the pump without the proper amount of oil in the hydraulic system. The operation of the hydraulic pump with low oil levels will damage the pump.

5. Remove breather/filler cap and fill the hydraulic reservoir to proper level. See Hydraulic Reservoir, Table 1.

6. Install breather/filler cap.

7. If removed, install the battery.

8. Remove blocks from wheels.

9. Connect the battery and turn the key switch to the ON position.

10. Operate the hydraulic functions several times to purge air from the hydraulic circuit.

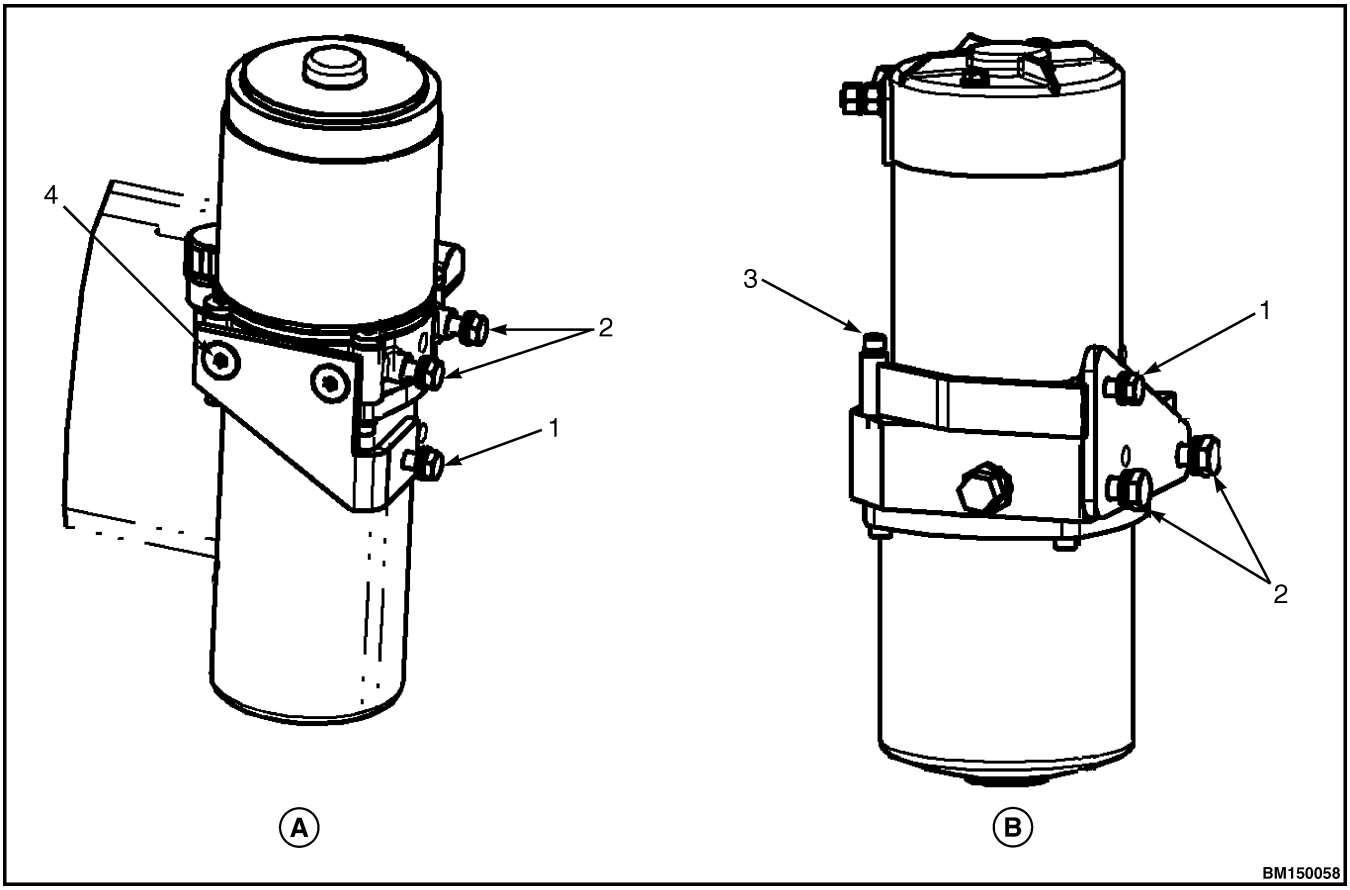
WARNING

Never check for leaks by putting hands on hydraulic lines or components under pressure. Hydraulic oil under pressure can be injected into the skin.

11. Test lift truck by lifting and lowering a load several times. Check for leaks.

12. Recheck hydraulic oil level in reservoir, and fill to proper level if needed. Hydraulic Reservoir, Table 1.

13. Install drive unit compartment covers. See Drive Unit Compartment Covers.



A. 6000 LBS CAPACITY **B.** 8000 LBS CAPACITY

Figure 12. Torque Values

Model	Location 1	Location 2	Location 3	Location 4
B60Z, B60Z^{AC}, C60Z, C60Z^{AC}, and W60Z	26 N•m (19 lbf ft)	26 N•m (19 lbf ft)	N/A	26 N•m (19 lbf ft)
B80Z, B80Z^{AC}, C80Z, C80Z^{AC}, W65Z, and W80Z	26 N•m (19 lbf ft)	39 N•m (29 lbf ft)	10 N•m (7 lbf ft)	N/A
NOTE: Apply Loctite® 242 to all locations shown during assembly.				

Valve Repair

LOWERING VALVE

Remove

1. Move lift truck to a safe and level area.
2. Lower the forks completely to relieve pressure from the hydraulic system.
3. Turn the key switch to the OFF position and disconnect battery.
4. Block load wheels to prevent lift truck from moving. See the section Periodic Maintenance 8000SRM0919, Periodic Maintenance 8000SRM1032, Periodic Maintenance 8000SRM1368, or Periodic Maintenance 8000SRM1298 - How to Put A Lift Truck on Blocks.
5. Remove the drive unit compartment covers. See Drive Unit Compartment Covers.
6. Discharge the capacitor. See *Special Precautions*.
7. Tag and disconnect the control wiring from the coil.
8. Remove the capscrew and washer retaining the coil to the valve cartridge.
9. Slide the coil off the valve cartridge.
10. Slowly loosen and remove the valve cartridge.

Install

1. Verify that the O-rings on the valve cartridge are not damaged. Replace as needed.
2. Verify that the valve cartridge, cartridge filter, and pump assembly housing are clean and not damaged.
3. Lubricate the valve cartridge threads and O-rings with clean hydraulic oil.
4. Install the valve cartridge and torque to 28 to 38 N•m (20.7 to 28.0 lbf ft).
5. Slide the coil onto the valve cartridge with the lettering out toward the coil retainer.
6. Install washer and capscrew and torque to 7 N•m (62 lbf in).
7. Connect the control wiring to the coil.
8. Remove blocks from wheels.
9. Connect battery and turn the key switch to the ON position.
10. Operate the hydraulic functions several times to purge air from the hydraulic circuit.
11. Test the lift truck by lifting and lowering a load several times. Check for leaks.
12. Check hydraulic oil level in the reservoir and fill to proper level. See Hydraulic Reservoir, Table 1.
13. Install the drive unit compartment covers. See Drive Unit Compartment Covers.

RELIEF VALVE

B60Z, B60Z^{AC}, C60Z, C60Z^{AC}, and W60Z

Remove

1. Move lift truck to a safe and level area.
2. Lower the forks completely to relieve pressure from the hydraulic system.
3. Turn the key switch to the OFF position and disconnect battery.
4. Block load wheels to prevent lift truck from moving. See the section Periodic Maintenance 8000SRM0919, Periodic Maintenance 8000SRM1032, Periodic Maintenance 8000SRM1368, or Periodic Maintenance 8000SRM1298 - How to Put A Lift Truck on Blocks.
5. Remove the drive unit compartment covers. See Drive Unit Compartment Covers.
6. Discharge the capacitor. See *Special Precautions*.
7. Remove the hydraulic reservoir. See Lift Pump and MotorRemove Reservoir.
8. Slowly loosen and remove the relief valve.

Install

1. Verify that the O-rings on the valve cartridge are not damaged. Replace as needed.
2. Verify that the valve cartridge and pump assembly housing are clean and not damaged.
3. Lubricate the valve cartridge threads and O-rings with clean hydraulic oil.
4. Install the valve cartridge and torque to 32 N•m (24 lbf ft).
5. Install the hydraulic reservoir. See Lift Pump and MotorInstall Reservoir to Pump.
6. Remove blocks from wheels.
7. Connect the battery and turn the key switch to the ON position.
8. Operate the hydraulic functions several times to purge air from the hydraulic circuit.
9. Verify that the relief valve settings are correct. See Relief Valve Adjustment.
10. Test lift truck by lifting and lowering a load several times. Check for leaks.
11. Check hydraulic oil level in reservoir and fill to proper level. See Hydraulic Reservoir, Table 1.
12. Install drive unit compartment covers. See Drive Unit Compartment Covers.

B80Z, B80Z^{AC}, C80Z, C80Z^{AC}, W65Z, and W80Z

Remove

WARNING

Always wear the proper protective equipment including eye protection and petroleum-resistant gloves when handling hydraulic oil. Thoroughly wash oil from exposed areas of skin as soon as possible.

Completely lower forks to relieve hydraulic pressure before disassembling any part of the lift pump or disconnecting any hydraulic hoses.

CAUTION

Protect the hydraulic system from dirt and contaminants when servicing the hydraulic system.

1. Move the lift truck to a safe and level area.
2. Lower the forks completely to relieve pressure from the hydraulic system.
3. Turn the key switch to the OFF position and disconnect battery.
4. Block load wheels to prevent lift truck from moving. See the section Periodic Maintenance 8000SRM0919, Periodic Maintenance 8000SRM1032, Periodic Maintenance 8000SRM1368, or Periodic Maintenance 8000SRM1298 - How to Put A Lift Truck on Blocks.
5. Remove the drive unit compartment covers. See Drive Unit Compartment Covers.
6. Discharge the capacitor. See *Special Precautions*.
7. Remove the lift pump and motor assembly. See Lift Pump and MotorRemove.
8. Remove the cap on the relief valve.
9. Remove the locking nut from the relief valve.
10. Slowly loosen and remove the relief valve cartridge.

Install

1. Verify that the O-rings on the valve cartridge are not damaged. Replace as needed.
2. Verify that the valve cartridge and pump assembly housing are clean and not damaged.
3. Lubricate the valve cartridge threads and O-rings with clean hydraulic oil.
4. Install the valve cartridge and torque to 32 N•m (24 lbf ft).
5. Install the relief valve locking nut and torque to 15 N•m (11 lbf ft).