Maintenance_manual

Contents

Chapter 1. Control of Hazardous Energy

Lockout/Tagout

For safety and to obey OSHA Regulations, (Standards - 29 CFR), control of hazardous energy (Lockout/Tagout - 1910.147), Crown Equipment Corporation has instructions for the correct energy control when completing maintenance on the pallet truck. Before completing maintenance on the pallet truck, see the applicable sections in this manual for the following procedures.

Crown Equipment Corporation recommends that all technicians wear applicable protective items when servicing Crown equipment. Some examples of these protective items are:

- Eye protection
- Work gloves
- Safety-toe shoes

Battery

Safety Procedures

Wear protective items when doing maintenance on the batteries. Some examples of these protective items are:

- A rubber apron
- Gloves
- Boots
- A full-face shield

CAUTION:

Risk of burns by battery acid

- The battery contains battery acid which could cause burns if you touch it.
- Do not let the battery acid touch your eyes, skin, or clothing.
- If battery acid touches your skin, immediately clean the area with soap and water and get medical aid.

- If battery acid touches your eyes, immediately flush your eyes with clean water and get medical aid.
- If you spill battery acid, use a Battery Spill Kit (300035) to make the battery acid neutral and clean it up. Follow the manufacturer directions to use the kit.

Battery Charging

Warning:

Risk of gas explosion.

- Battery gases are explosive. Severe injury or death may result if the battery gas explodes.
- Do not smoke, use an open flame, or make an arc or sparks around the battery.
- Make sure the area where you charge the battery is well vented. Use designated areas for charging batteries if they are available.

Note:

- See the battery charger manual or see ELECTRICAL SYSTEM / Battery / Battery Charger for instructions on operation and maintenance.

Battery Maintenance

Warning:

Risk of burns by short circuits and high current.

- Unapproved handling of tools on batteries can cause an injury or damage to the pallet truck.
- Do maintenance and repair on batteries only if you are approved for this work.
- Do not allow metal objects to come in contact with the top of battery cells.

Note:

- Make sure that the battery charger has the same voltage and amperage as the pallet truck battery. The voltage is on the pallet truck data plate.
- Before connecting or disconnecting a battery to a battery charger, make sure that the battery charger is off. If the battery is connected or disconnected and the battery charger is on, an injury could occur to you, the battery, and the battery charger.
- Make sure that the battery has the same weight, dimension, amperage, and voltage specifications as the pallet truck (see to the pallet truck data plate). Do not operate a pallet truck without the correct battery.

Battery Removal and Installation

Warning:

Conductive objects that touch the connectors of the battery cells cause a short circuit.

- Use an insulator (such as plywood) as a cover on the top of the battery before and during removal and installation.

Warning:

Risk of a crushing hazard.

If the battery is pulled from the pallet truck without a battery roller stand in position, the battery can tip over and cause a severe injury.

- Put the battery roller stand in position before moving the battery.

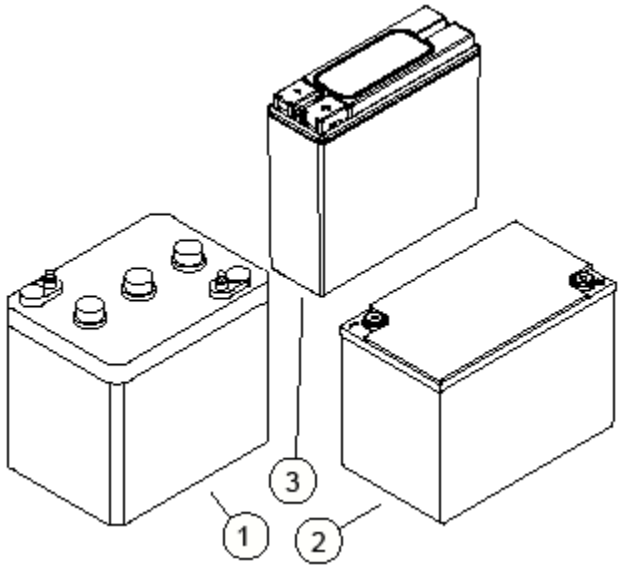
CAUTION:

Risk of tip over.

The incorrect battery weight and dimensions can make the pallet truck unstable.

- Install the same battery or a battery of equal weight and dimension in the pallet truck.
- See the data plate for the minimum battery weight and dimension

- For industrial battery removal and installation procedures, see ELECTRICAL SYSTEM / Battery / Industrial Battery Removal and Installation.
- For battery pack removal and installation procedures, see ELECTRICAL SYSTEM / Battery / Battery Pack Removal and Installation.



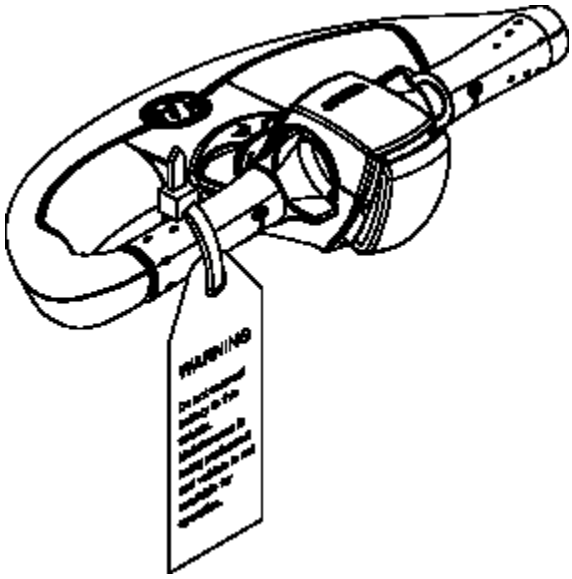
1	Wet or dry cell battery
2	Maintenance free battery
3	Thin plate pure lead (TPPL) battery

Lockout / Tagout Procedures

Lockout / tagout procedures for the pallet truck

- Technician Tips: A lockout / tagout kit (300037) is available. See the One Source Catalog.
- Technician Tips: These procedures let the other personnel know that the pallet truck is not available for operation.

1. Turn off the pallet truck.
2. Remove the key.
3. See Figure 2. Apply a tag to the grip with a cable tie. The tag provides a warning that the pallet truck is not available for operation.



Performing maintenance on the pallet truck (with the battery in the pallet truck)

1. Disconnect the battery.
2. Remove the primary power fuses.
3. Install a lockout device on the battery connector.

Performing maintenance on the pallet truck (with the battery out of the pallet truck)

1. Remove the primary power fuses.
2. If possible, install a lockout device on the pallet truck battery connector.Or, install a tag with a cable tie on the pallet truck battery connector.

Capacitance

Warning:
charged capacitor could be dangerous.

⚠ Uncontrolled discharge of stored electrical energy in some control modules can cause injury or damage the pallet truck.

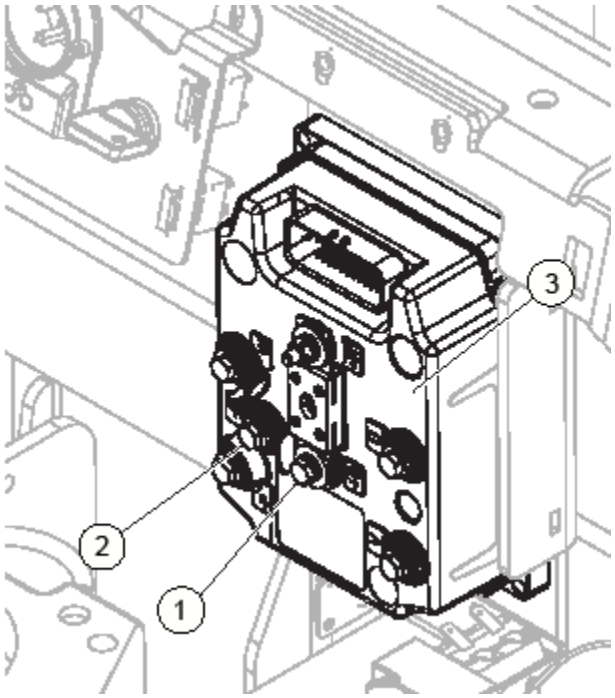
- When performing pallet truck maintenance around the bus bars and related power cables, discharge the capacitors.
- See SAFETY / Control of Hazardous Energy / Capacitance for procedures to discharge the capacitors.

Discharging the capacitor

1. Move the pallet truck to a maintenance area with a level floor.
2. Fully lower the forks.
3. Turn off the pallet truck.
4. Disconnect the battery.
5. Put the chocks against the wheels to prevent the movement of the pallet truck. See SAFETY / Control of Hazardous Energy / Lifting and Blocking.
6. Complete the lockout / tagout procedures for the pallet truck. See SAFETY / Control of Hazardous Energy / Lockout/Tagout Procedures.
7. Turn the key switch to the start position and hold a minimum of 10 s.
8. See Figure 3. To make sure that the capacitors discharge, put a DVOM across the positive (1) and negative terminals (2) of Access 3™ (3). The voltage must be less than 1 V.
9. Turn off the pallet truck and remove the key.

Figure 1.

(35306)



Releasing the Parking Brake

Warning:

Risk of a crushing hazard.

When you manually release the brake on the pallet truck, the parking brake is out of order. If the pallet truck is not chocked, the pallet truck can move.

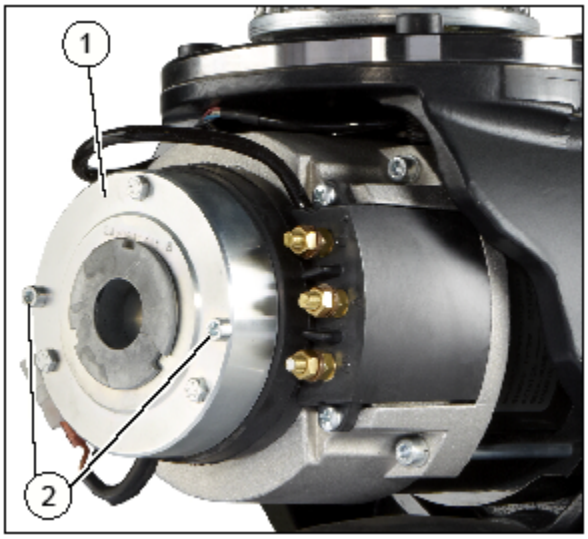
- Remove the load on the forks before releasing the brake.
- See to SAFETY / Control of Hazardous Energy / Lockout/Tagout Procedures to fully prepare the pallet truck for maintenance.

Releasing the parking brake manually

See Figure 2. The parking brake (1) is spring-applied and electrically released. When the pallet truck is de-energized, the parking brake is applied.

- To move the pallet truck while it is de-energized, the parking brake has two screws (2) that must be manually loosened to release the parking brake.

Figure 2. (26016-01)



Hydraulic Pressure

Releasing the pressure from the hydraulic system

1. Turn on the pallet truck.
2. Push the lower switch.
    - The forks lower.
3. With the forks fully lowered, keep the lower switch pushed for a minimum of 10 s.
    - The pressure in the hydraulic system decreases to 0 psi (0 bar).
4. Turn off the pallet truck.
5. Complete the lockout / tagout procedures for the pallet truck. See SAFETY / Control of Hazardous Energy / Lockout/Tagout Procedures.

Lifting and Blocking

Special tools and equipment:

- Hydraulic jack: Capacity 3,620 kg (8,000 lb)
-
    - Part number: 122599
    - Collapsed height minimum: 60 mm (2.25 in)
    - Lift height maximum: 400 mm (16 in)

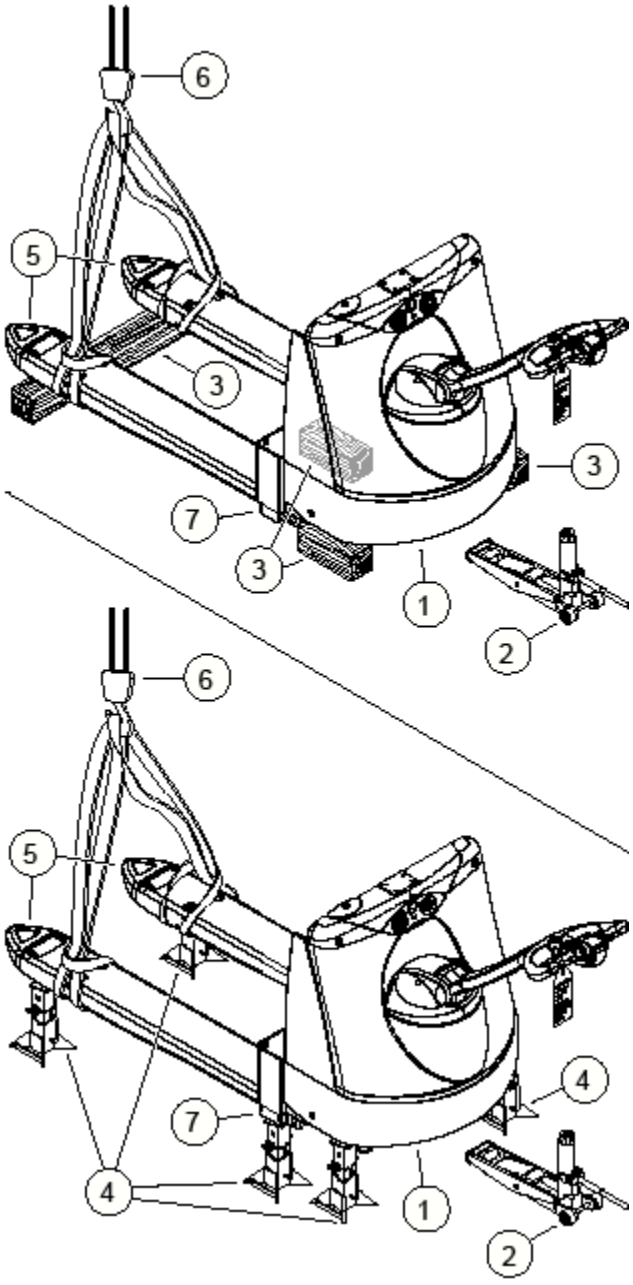
- Jack stand: Capacity 4,500 kg (10,000 lb)
- Lift straps: Capacity 900 kg (2,000 lb)

Lifting and blocking the pallet truck

1. See SAFETY / Control of Hazardous Energy / Lockout/Tagout Procedures to prepare the pallet truck for maintenance.
2. Remove the battery. See SAFETY / Control of Hazardous Energy / Battery Removal and Installation.
3. See Figure 3 *(on page 13)*. Lift the power unit end (1) with a hydraulic jack (2) and put two hardwood blocks (3) or two jack stands (4) below the pallet truck skirt. Make sure that you set the hydraulic jack to the applicable height, which is no more than 400 mm (16 in).

4. Lift the forks (5) with a lifting device (6). When using hardwood blocks (3), put one below the forks and one below the center of the battery compartment (7). When using jack stands (4), put two below the forks and two below each side of the battery compartment.

Figure 3. (25805-01)



Chapter 2. Lift Pump and Lift Pump Motor

Warning:

High-pressure fluid can go through the skin and cause injury.

High-pressure fluid that goes into the skin is a medical emergency. There is a delayed start of pain, and severe tissue damage may occur. Seek medical aid from a specialist who has had experience with this type of injury.

- ◦ Avoid high-pressure fluids.
  ◦ Release the pressure before you disconnect the hydraulic lines.
  ◦ Tighten all connections before you apply the pressure.
  ◦ Keep your hands and body away from pin-holes which eject high-pressure fluids.
  ◦ Use a piece of cardboard or paper to examine for leaks. Do not use your hand

Lift pump and lift pump motor removal

Special tools and equipment

Catch pan or other absorbent material

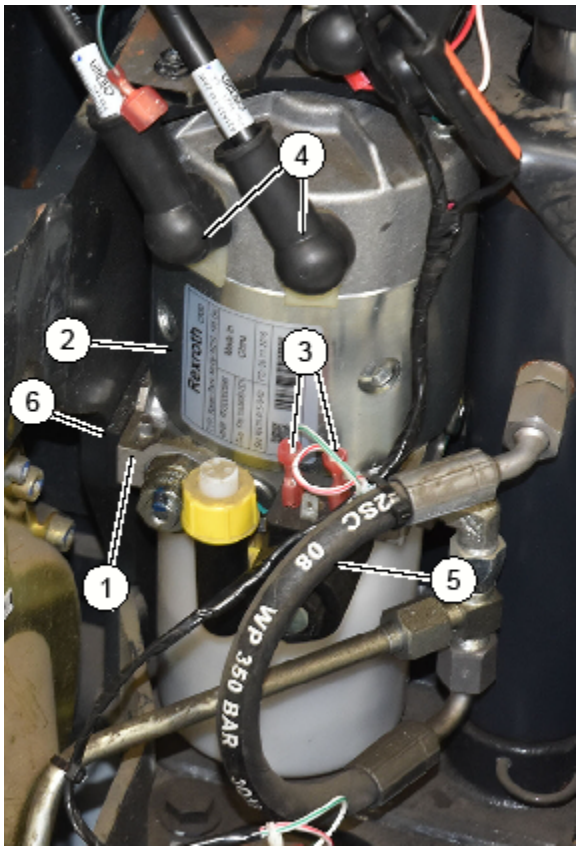
Removing the lift pump and the lift pump motor

See Figure 1 *(on page 15)*.

1. If the lift pump (1) and the lift pump motor (M2) (2) are disassembled, prepare to catch hydraulic oil or other absorbent material with a catch pan.
2. Disconnect the solenoid valve (SV) wires (3).
3. Disconnect the M2 power cables (4).
4. Disconnect the connection for the lift pump output (5).
5. Support the lift pump (1) and M2 (2).
6. Remove the two screws (6) from the power unit to remove the lift pump (1) and M2 (2).

Figure 4.

fig.1 (35314)



Suction filter replacement

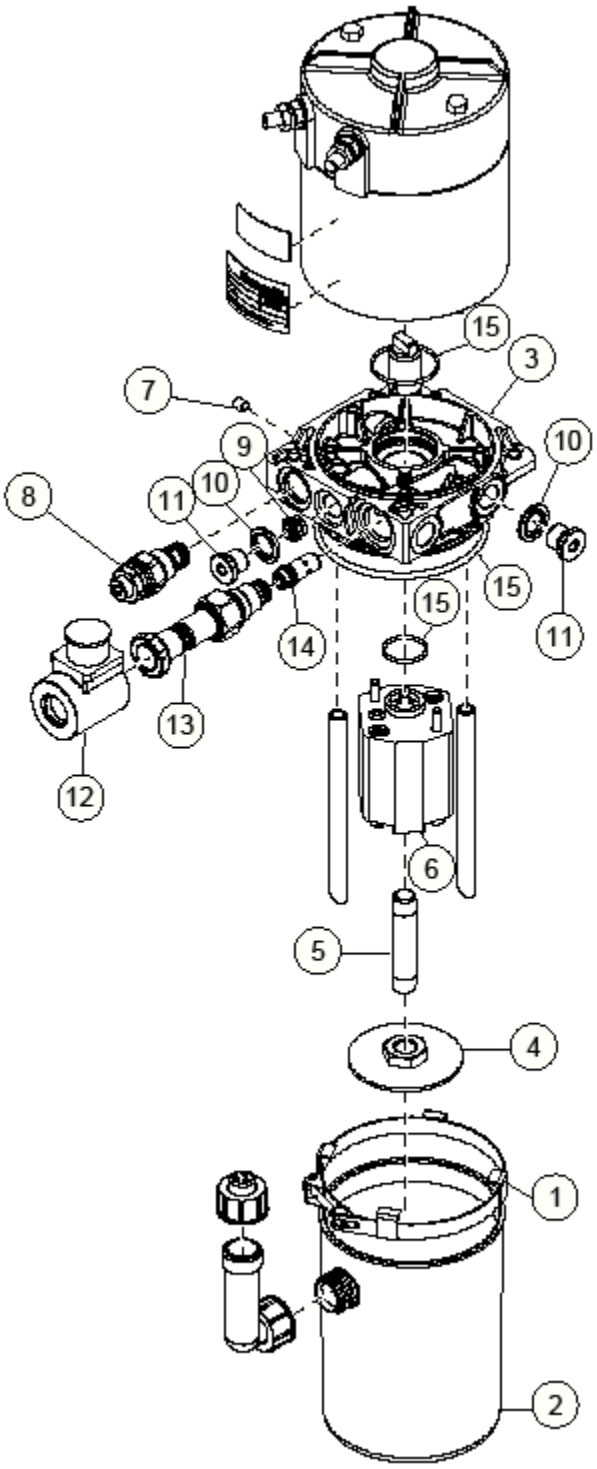
See Figure 2. *(on page 16)*

Replacing the suction filter

1. Remove the clamp (1) to remove the tank (2) from the lift pump manifold (3).
2. Remove the suction filter (4) from the suction pipe (5).

3. Install the new suction filter (4). Torque the new suction filter (4) to 10 N m (7 ft lb).

Figure 5. fig 2 (5315)



Inspecting the lift pump

1. Remove the clamp (1) to remove the tank (2) from the lift pump manifold (3).

> **Tip:**
>
> Technician Tips: The lift pump (6) is not a serviceable part. Replace the lift pump if repair is necessary.

2. Remove and inspect the following components. Make sure that the components are clean, not damaged, and correctly lubricated with hydraulic oil before replacement.
    - Sealing plug ball (7)
    - Relief valve (8)
    - Check valve (9)
    - Seals (10)
    - Plugs (11)
    - Solenoid coil (12)
    - Solenoid valve (13)
3. Inspect the lift pump (6) for damage and replace the lift pump if necessary.
4. Inspect the lift pump manifold (3) and the port threads for damage and replace the lift pump manifold if necessary.

Lift pump inspection

See Figure 2. *(on page 16)*

Inspecting the lift pump

Lift pump replacement

Replacing the lift pump

1. Lubricate the O-rings (15) with hydraulic oil.
2. Install the O-rings (15).
3. Install the lift pump (6) and the tank (1) on the lift pump manifold (3) with the clamp (1). Torque the clamp (1) to 3–4 N m (27–35 in lb).
4. Install the lift pump and M2 on the power unit with the two screws (6). Torque the two screws to 10 N m (7 ft lb).
5. Connect the connection for the lift pump output (5).

6. Connect the M2 power cables (4). Torque the M2 power cables to 8 N m (6 ft lb).
7. Connect the SV wires (3).

Preparing the pallet truck for operation

> **Tip:**
>
> Technician Tips: Do not operate the lift pump without hydraulic oil.

1. Fill the reservoir with clean, filtered (10 micron minimum) hydraulic oil approximately 20 mm (0.75 in) below the bottom of the vent cap.
2. Remove the lockout / tagout device.
3. Connect the battery.
4. Remove the chocks from the wheels.
5. Turn on the pallet truck.
6. Without a load on the forks, push the raise switch (RAS) to operate the lift pump and to make sure that there is sufficient lubrication.
    - If the hydraulic oil foams after 20 seconds, refer to the Lift Pump Troubleshooting table.
7. When the hydraulic system is at operating temperature, make sure that the connections do not leak.
8. Install the power unit covers.

Lift Pump Troubleshooting

Lift Pump Troubleshooting

The lift pump makes an unusual noise.

The hydraulic oil supply is low.

Check the level of the hydraulic oil in the reservoir.

The hydraulic oil is too heavy.

Check for the correct hydraulic oil viscosity.

There is an air leak in the inlet hose.

Check the hydraulic plumbing.

The suction hose has a blockage.

Check the suction hose for unwanted material.

Lift Pump Troubleshooting_1

The hydraulic oil has foam.

There is air in the lift pump.

1. Check the level of the hydraulic oil in the reservoir.
2. Check for the correct hydraulic oil viscosity.
3. Check the hydraulic plumbing.

There is water in the hydraulic oil.

Check the reservoir and replace the hydraulic oil.

Lift Pump Troubleshooting_2

The hydraulic oil or the lift pump is too hot.

The hydraulic oil is too thin.

Drain and fill the reservoir with the correct viscosity hydraulic oil.

The hydraulic oil is contaminated.

Drain, clean, and fill the reservoir with clean hydraulic oil.

There is air in the lift pump.

Check the hydraulic plumbing.

The oil passes through the relief valve (RV) and into the reservoir.

1. Check the RV for contamination.
2. Check the RV for a broken spring.
3. Check the RV setting.
4. Check for a load that is too heavy.

Lift Pump Troubleshooting_3

There is low hydraulic oil flow.

There is air in the lift pump.

1. Check the level of the hydraulic oil in the reservoir.
2. Check for the correct hydraulic oil viscosity.
3. Check the hydraulic plumbing.

RV leaks or is set too low

1. Check the RV for contamination.
2. Check the RV for a broken spring.
3. Check the RV setting.
4. Check for a load that is too heavy.

Lift Pump Troubleshooting_4

There is no pressure

The RV is not adjusted correctly.

1. Check the RV for contamination.
2. Check the RV for a broken spring.
3. Check the RV setting.
4. Check for a load that is too heavy.

The hydraulic oil supply is low.

Check the level of the hydraulic oil in the reservoir.