Caterpillar

247B

Undercarriage Repair Manual

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Product Safety

This section contains product safety information for your Track Loader. Read and understand all product safety information before attempting to service any Compact Track Loader.

**Safety Alert Symbol**
This symbol means: Attention! Be alert! Your safety is involved!

The safety alert symbol is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

This symbol is used as an attention-getting device throughout this manual as well as on decals and labels fixed to the machinery to assist in potential hazard recognition and prevention.

Property or equipment damage warnings in this publication are identified by the signal word "NOTICE".

**NOTICE**
“NOTICE” Indicates a hazardous situation which, if not avoided, could result in property or equipment damage.

The word “Note” is used throughout this manual to draw your attention to specific topics or to supplement the information provided in that section.

Improper or incomplete maintenance/repair of a Compact Track Loader can be dangerous and may result in machine damage, injury or death.

Do not attempt to perform any type of repair or maintenance on a Compact Track Loader until you have read and fully understood both this manual and the machine specific operation and maintenance manual.

Refer to the Operation and Maintenance manual for instructions regarding proper machine operation and maintenance techniques before operating or servicing any Compact Track Loader.

The person(s) in charge of servicing a Compact Track Loader may be unfamiliar with many of the systems on the machine. This makes it especially important to use caution when performing service tasks. Familiarize yourself with the affected system(s) and components before attempting any type of maintenance or service.

It is not possible to anticipate every potential hazard. The safety messages included in this document and displayed on the machine are not all-inclusive. They are intended to make you aware of potential risks and encourage a safe approach to performing service work. If you use a tool, procedure, work method or operating technique that is not specifically recommended by the manufacturer, you must satisfy yourself that it is safe for you and others. You must also ensure that the machine will not be damaged or be made unsafe by the operation, lubrication, maintenance or repair procedures that you choose.

**Basic Precautions**

**Safety Labels**
Safety labels have been included and are displayed in various places throughout the machine to serve as warnings of potentially dangerous conditions. Read and understand all "Safety" labels on any Compact Track Loader before attempting to operate, maintain or repair it. Replace any damaged, illegible or missing labels immediately, prior to service.

**Personal Protective Equipment**
Personal protection equipment is recommended when performing maintenance or service on a machine. Always wear appropriate protective equipment for working conditions when working on or around the machine. Loose clothing should not be worn and long hair should be restrained. Wear hard hats, protective face/eyewear, safety shoes and any other equipment necessary to ensure your safety and the safety of others around you as you work.
Entering and Exiting
Always use steps and handholds when entering or exiting a Compact Track Loader. Clean any mud or debris from steps or work platforms before using them. Always face the machine when using steps and handholds. When it is not possible to use the designed entry/exit system, utilize ladders, scaffolds, or work platforms to safely gain access to the machine.

Lifting
Use a hoist when lifting components that weigh 50 lb (23 kg) or more, to avoid back injury. Make sure all chains, hooks, slings, etc., are in good condition and are of the correct capacity. Be sure hooks are positioned correctly and equipped with a spring latch. Lifting eyes are not to be side loaded during a lifting operation.

Hot Fluids and Components
Stay clear of hot components and system fluids of the engine, exhaust, radiator/oil cooler and hydraulic lines/tubes. Also, use caution when removing fill caps, breathers and plugs on the machine. Hold a rag over the cap or plug to prevent being sprayed or splashed by liquids under pressure. Be especially careful if the machine has been operated recently, fluids may still be hot.

To ensure your safety, allow the machine to cool before attempting any service procedure that involves hot fluids or components.

Corrosion Inhibitor
Corrosion inhibitor contains alkali. Avoid contact with eyes. Avoid prolonged or repeated contact with skin. Do not take internally. In case of contact, wash skin immediately with soap and water. For eyes, flush with large amounts of water for at least 15 minutes. Call Physician. Keep out of reach of children.

Batteries
Do not smoke when inspecting the battery electrolyte level. Never disconnect any charging unit circuit or battery circuit cable from the battery when the charging unit is operating. A spark can cause an explosion from the flammable vapor mixture of hydrogen and oxygen that is released from the electrolyte through the battery outlets. Do not let electrolyte solution make contact with skin or eyes. Electrolyte solution is an acid. In case of contact, immediately wash skin with soap and water. For eyes, flush with large amounts of water for at least 15 minutes. Call Physician. Keep out of reach of children.

Pressurized Items
1. Do not use hands or any other body part to check for fluid leaks in the hydraulic system. Always use a solid material like wood or metal to check for this type of leak. Leaking fluid under pressure can penetrate body tissue. Fluid penetration can cause serious injury and even death. If fluid is injected into your skin, get treatment immediately. Seek treatment from a doctor that is familiar with this type of injury.

2. Relieve pressure from the hydraulic system before disconnecting or removing any lines, fittings or related items. Do this by relaxing all hydraulic actuators. If the lift arms are raised, make sure they are securely braced. Be alert for possible pressure release when disconnecting any device from a pressurized system.

3. Lower the lift arms before performing any work on the machine. If this cannot be done, make sure they are securely braced to prevent them from dropping unexpectedly during service.

4. Loose or damaged fuel, oil, hydraulic, lines, tubes and hoses can cause fires. Do not bend or strike high pressure lines or install ones that have been bent or damaged. Check lines, tubes and hoses carefully. See item 1 for precautions on checking for fluid leaks.

5. Pressurized air or water can also cause injury. When pressurized air or water is used for cleaning, wear a protective face shield, protective clothing, and protective shoes. The recommended maximum air pressure for cleaning purposes is 30 psi (205 kPa). When using a pressure washer, keep in mind that nozzle pressures are typically very high. Generally, pressures are well above 2000 psi (13790 kPa). Follow all recommended practices provided by the pressure washer manufacturer.
Repair

Accidental machine starting can cause injury or even death to personnel working on a Compact Track Loader.

As a precaution, disconnect the battery cables from the battery terminals, tape the battery clamps and remove the key from the ignition switch prior to performing any service work on a Compact Track Loader.

Place a “Do Not Operate” tag prominently on the machine to inform personnel that the machine is being serviced.

1. Disconnect the battery and discharge any capacitor before beginning work on a machine. Attach a Do Not Operate tag in the cab to alert any operator that service is in progress.

2. If possible, make all repairs with the machine parked on a level, hard surface. Use blocks to prevent the machine from rolling while working on or under the machine.

3. Do not work on or under any machine that is supported only by a hydraulic jack or hoist. Always use suitable mechanical supports to ensure that the machine will not fall.

4. Make sure the work area around the machine is safe and make yourself aware of any hazardous conditions that may exist. If the engine needs to be started inside an enclosure, make sure that the engine’s exhaust is properly vented.

5. Be sure all protective devices including guards and shields are properly installed and functioning correctly before beginning any service task. If a guard or shield must be removed to perform the repair work, use extra caution.

6. Always use the appropriate tools for the work to be performed. Tools should be in good condition and you should understand how to use them properly before performing any service work.

7. When replacing fasteners, use parts of equivalent grade and size. Do not use a lesser quality fastener if replacements are necessary.

8. Be prepared to stop an engine if it has been recently overhauled or the fuel system has been recently serviced. If the engine has not been assembled correctly, or if the fuel settings are not correct, the engine can possibly overspeed and cause bodily injury, death or property damage. Be prepared to shut off the fuel and air supply to the engine in order to stop the engine.

9. Be careful when removing cover plates. Gradually back off the last two bolts or nuts located on opposite sides of the cover. Then, pry the cover loose to relieve any spring or other pressure before removing the last two nuts or bolts completely.

10. Repairs requiring welding should be performed only by personnel adequately trained and knowledgeable in welding procedures and with the guidance of appropriate reference information. Determine the type of metal being welded and select the correct welding procedure and filler material to provide a weld that is as strong or stronger than the original weld.

Prior to welding, disconnect the following to prevent component damage:
- Negative battery cable
- Engine ECU (firewall)
- Main controller (firewall)
- Output module (firewall)
- Display (machine)

A proper ground is essential to protect the machine from damage when welding. Improper grounding can cause damage to mechanical, hydraulic and electrical components.

As a precaution, connect the welding ground clamp as close as possible to the weld area.

11. Take precautions to avoid damaging wiring during removal and installation operations. Carefully route wires so that they will not contact sharp corners, objects or hot surfaces during operation.

12. When performing service that requires the lift arms to be in the raised position, always utilize the lift arm brace located on the rear of the loader tower.

13. Relieve hydraulic system pressure by relaxing all hydraulic actuators prior to attempting any hydraulic maintenance or repair.

14. Always tighten connections to the correct torque specification. Make sure that all shields, clamps and guards are installed correctly to avoid excessive heat, vibration or unwanted contact between parts during operation. Shields that protect exhaust components from oil spray in event of a line, tube or seal failure must be correctly installed.

15. Do not operate a machine if any rotating part is damaged or contacts other parts during operation. Any high speed rotating component that has been damaged or altered should be checked for balance before reusing. Make sure all protective devices, including guards and shields, are properly installed and functioning correctly before starting the engine or operating the machine.
Attachments

Only use compatible attachments as defined by the machine specific operation and maintenance manual.

Make sure that all necessary guards and protective equipment are in place and functioning prior to operating any attachment.

Wear protective glasses and protective equipment as required by conditions or as recommended in the attachment’s operation manual.

When replacement parts are required for your machine, use only genuine OEM replacement parts or parts that meet or exceed original specifications including, but not limited to physical dimensions, type, strength and material.

Installing lesser components can lead to premature failures, product damage, personal injury or death.

Ensure that all personnel are far enough away from the work area so they will not be struck by flying objects.

Stay clear of the cutting edges, pinching surfaces or crushing surfaces of the attachment while performing any attachment maintenance, testing or adjustments.

Machine Labels and Decals

Labels and decals placed on the machine provide safety information and operating instructions. Familiarize yourself with the location and significance of these labels to ensure your safety.

Safety Label Examples

Examples of the labels and decals displayed on the machine are shown on this page.
Product Safety

Jacking Procedure
Occasionally, your machine may need to be suspended off of the ground to perform maintenance. Exercise caution when jacking the machine. Always use a jack that is capable of lifting the machine and support its weight with suitable mechanical supports while suspended. Never work on or under a machine supported only by a jack.

To safely jack your machine:
1. Remove any attachments that may be fastened to the machine and raise the lift arms.
2. Install the lift arm brace according to manual.
3. Once the lift arms are secured, carefully exit the machine.
4. Roll or slide your jack under the front of the machine and center the lifting pad directly under the middle of the front torsion axle.
5. Once in place, jack the machine upward making sure it remains stable until it has reached sufficient height to install suitable mechanical supports beneath the machine.

Mechanical supports may not be placed beneath the belly pans as they are not designed to support the weight of the machine. They must be placed beneath the torsion axles or beneath the perimeter chassis tubes only.

6. Slide the support(s) into place making sure they are placed in such a way that the machine remains stable when the jack is lowered and the front of the chassis rests on the supports.
7. Once the supports are in place, slowly lower the machine onto them and then remove the jack.

Repeat steps 4-7 at the rear of the machine should both ends of the machine need to be off of the ground for service.
Undercarriage Disassembly and Assembly

⚠ Personal Safety
Improper or incomplete maintenance/repair of a Compact Track Loader can be dangerous and may result in machine damage, injury or death.

Do not attempt to perform any type of repair or maintenance on a Compact Track Loader until you have read and fully understood the information in this manual.

Refer to the Operation and Maintenance manual for instructions regarding proper machine operation techniques before operating any Compact Track Loader.

Prior to performing any type of service work on a Compact Track Loader, read and understand Pages 1-5 (Product Safety) for personal safety information.

⚠ Machine Preparation
Accidental machine starting can cause injury or death to personnel working on a Compact Track Loader.

As a precaution, disconnect the battery cables from the battery terminals, tape the battery clamps and remove the key from the ignition switch prior to performing any service work on a Compact Track Loader.

Place a “Do Not Operate” tag prominently on the machine to inform personnel that the machine is being worked on.

Undercarriage Disassembly and Assembly Procedures
Disassembly and assembly procedures are provided for the following undercarriage components.

- Center wheels
- End wheels
- Sprocket rollers
- Tracks
- Outboard bearings
- Drive sprockets
- Drive motors

Note: Procedures are provided for only those undercarriage components listed above. However, other helpful information can be obtained from the Compact Track Loader Parts Manual.

Center Wheel Removal and Installation
The tools required for wheel removal and installation are listed in Table 1. Use manufacturer-recommended tools whenever possible.

<table>
<thead>
<tr>
<th>Table 1: Required Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheel Extractor</td>
</tr>
<tr>
<td>Channel Lock Pliers</td>
</tr>
<tr>
<td>Socket Wrench</td>
</tr>
<tr>
<td>Screw Driver</td>
</tr>
</tbody>
</table>

NOTE: This manual covers several different models.
Wheel Removal

1. Locate the wheel cap snap ring.

2. Use a screwdriver to remove the snap ring that secures the wheel cap.

3. Using a large channel lock pliers, remove the wheel cap.

4. Using a socket, remove the nut that fastens the wheel to the shaft. Remove the wheel with the wheel extractor.

5. To remove an inside wheel, slide under the machine and repeat the wheel removal procedure.

6. With wheels removed, inspect the bearings and axle for wear or damage.
End Wheels
The tools required for wheel removal and installation are listed in table 2. Use manufacturer recommended tools whenever possible.

Table 2: Required Tools

<table>
<thead>
<tr>
<th>Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy duty hydraulic jack</td>
</tr>
<tr>
<td>Combination wrench</td>
</tr>
<tr>
<td>Suitable mechanical supports (2)</td>
</tr>
<tr>
<td>Wheel Extractor</td>
</tr>
<tr>
<td>Channel Lock Pliers</td>
</tr>
<tr>
<td>Socket Wrench</td>
</tr>
<tr>
<td>Screw Driver</td>
</tr>
</tbody>
</table>

Removal

1. Raise and support the machine on Suitable mechanical supports in the front and rear.

2. Clean the threads with a plastic or wire bristle brush, then loosen the turnbuckle as shown to lower the drive table and create slack in the track.

3. Use a screw driver to remove the snap ring that secures the wheel cap.

4. Using Large Channel Lock Pliers, Remove The Snap Ring

5. Using a socket, remove the nut that fastens the wheel to the shaft. Remove the wheel with the wheel extractor.

6. Slide the track outward as you pull on the wheel to remove the wheel.

7. With wheels removed, inspect the bearings and axle for wear or damage. See Figure 6, Page 7
Sprocket Rollers

The tools required for sprocket roller removal and installation are listed in table 3. Use manufacturer recommended tools whenever possible.

Table 3: Required Tools

<table>
<thead>
<tr>
<th>Combination/Socket Wrench</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retaining Bolt</td>
</tr>
<tr>
<td>Ring</td>
</tr>
<tr>
<td>Roller</td>
</tr>
<tr>
<td>Steel Pin</td>
</tr>
<tr>
<td>Drive Table</td>
</tr>
</tbody>
</table>

Note: Replace rollers and pins (if necessary) as a set. This will simplify future inspection and minimize redundant maintenance.

Track Removal and Installation

The tools required for track removal and installation are listed in table 4. Use manufacturer recommended tools whenever possible.

Table 4: Required Tools

<table>
<thead>
<tr>
<th>Socket/impact wrench</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy duty hydraulic jack</td>
</tr>
<tr>
<td>Combination wrench</td>
</tr>
<tr>
<td>Suitable mechanical supports</td>
</tr>
</tbody>
</table>

Removal

1. Perform the end wheel removal procedure located on page 8 of this section.

2. Once the wheel has been removed, pull the track off of the front of the undercarriage, then lift over the drive sprocket and off of the rear of the undercarriage to remove.

Installation

1. To install the track, reverse the removal procedure.

   Note: When installing the track it is helpful to lubricate the inner front wheel surface to help slide the track into position.
Outboard Bearing Removal and Installation

The tools required to remove and install the outboard bearing assembly are listed in table 5. Use manufacturer recommended tools whenever possible.

<table>
<thead>
<tr>
<th>Table 5: Required Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combination/socket wrench</td>
</tr>
<tr>
<td>Snap ring pliers</td>
</tr>
<tr>
<td>Puller</td>
</tr>
<tr>
<td>Hammer/chisel</td>
</tr>
</tbody>
</table>

Removal

1. Remove the four bolts securing the bearing to the mounting plate.

2. Remove the 3 bolts securing the mounting plate to the drive table, then use a chisel to gently separate the two components. Remove the mounting plate from the machine.

3. Use a hammer to drive a screwdriver in along the edge of the rubber cap. Pry the cap out as shown. (The cap must be replaced after service)

4. Use a snap ring pliers to remove the snap ring retainer from the shaft as shown.

5. Use a puller to remove the bearing assembly from the machine as shown.

Installation

1. To install the outboard bearing, reverse the removal procedure.
Drive Sprocket Removal and Installation
The tools required to remove and install the drive sprocket assembly are listed in table 6. Use manufacturer recommended tools whenever possible.

Table 6: Required Tools
<table>
<thead>
<tr>
<th>Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combination/socket wrench</td>
</tr>
<tr>
<td>Snap ring pliers</td>
</tr>
<tr>
<td>Puller</td>
</tr>
<tr>
<td>Hammer/chisel</td>
</tr>
</tbody>
</table>

Removal
1. Perform the outboard bearing removal procedure as described on page 10 of this manual.

2. Remove the nuts securing the sprocket to the drive motor, then carefully remove the drive sprocket.

Installation
1. To install the drive sprocket, reverse the removal procedure.

Drive Motor Removal and Installation
The tools required to remove and install the drive motor are listed in table 7. Use manufacturer recommended tools whenever possible.

Table 7: Required Tools
<table>
<thead>
<tr>
<th>Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combination/socket wrench</td>
</tr>
<tr>
<td>Crow's foot</td>
</tr>
</tbody>
</table>

Removal
1. Perform the drive sprocket removal procedure as described on this page.

2. Remove the bolts securing the drive motor to the drive table as shown.

3. Disconnect the various hoses from the drive motor (noting their positions and orientations for reassembly), then remove the drive motor from the machine. (cap or plug all tubes/hoses/fittings)

Installation
1. To install the drive motor, reverse the removal procedure.
Track Tension

Proper track tension is very important for optimum performance and long track life. Tracks that are run too loose can cause misfeeding and ratcheting possibly causing damage to the track. During the first 50 hours of operation, the tracks will "break in" and will most likely require adjustment.

Track Tension Adjustment Procedures

1. Locate the jam nut on the track tensioner and clean the threads thoroughly before proceeding.

2. Loosen the jam nut. You can use the wrench supplied with the machine, but a standard wrench is preferred for shop use.

3. After loosening the jam nut, turn the track tensioner until the track tension is within specifications.

4. Once proper tension is achieved, retighten the jam nut.

Checking for Proper Track Adjustment

1. Drive the machine forward five feet to remove any slack from the lower and rearward portions of the track.

2. Lay a straightedge along the top of the track between the sprocket and the front idler wheel.

3. Using a rope or wire, put 50 pounds (23 kg) of down force on the track at the midpoint of the straightedge.

4. Using a ruler, measure the distance between the straightedge and track. The track should not deflect more than 0.75" (1.9 cm) between the top of the track and the straightedge.

Trouble Shooting:

- Track makes popping noise.

Probable Cause:

1. Track too loose. (Refer to track adjustment section.)
2. Worn or stuck drive teeth. Outer roller should pivot as lug comes into sprocket.
3. Loose or worn sprocket.
4. Worn track lugs.