Tigercat®

AXLES

SERVICE AND REPAIR MANUAL

ISSUE 2.0, DECEMBER 2018

Tigercat Industries Inc.

P.O. Box 637
Brantford, Ontario
Canada N3T 5P9
Tel: (519) 753-2000
Fax: (519) 753-8272

ITEM	PART DESCRIPTION
1	KIT, BRAKE, SAHR W/BUSHING
2	HOUSING, BRAKE
3	SHAFT, AXLE
4	PLUG, MAGNETIC
5	O-RING
6	BOLT
7	WASHER
8	BOLT
9	WASHER
10	SPACER
11	PIN, SPRING
12	SHIM
13	DIFFERENTIAL, OSCILLATING
14	PLANETARY
15	SHIM
16	SHIM
17	SHIM

LIQUID NITROGEN

⚠ WARNING

Only workers trained in handling liquid nitrogen may do so. See the MSDS or PSDS for proper handling and storage of liquid nitrogen. Do not attempt to use liquid nitrogen until you have received proper training.

Liquid nitrogen is used to shrink-fit bearing races, bushings, pins, shafts etc. It is extremely dangerous if not handled properly.

VENTILATION

⚠ WARNING

Do not burn discarded items except in an approved incineration process. Burning such items creates hazardous fumes.

Hazardous gases, fumes and vapours are the by-products of internal combustion engines, solvent and cleansers. Verify your work area is adequately ventilated and utilize appropriate PPE as required.

- Work in a ventilated area. Provide sufficient ventilation to prevent the build-up of toxic exhaust fumes. If indoors, use exhaust extensions to the outdoors or open the shop doors. Run the engine only when it is necessary for testing or adjustments.

WORKING WITH OIL

Direct contact with oil implies a risk of skin complaints such as eczema, for example. Strict hygiene should always be observed.

Other safety advice includes:

- Oil used in this machine may be hot enough to cause serious burns.
- Avoid contact with oil, particularly heated oil.
- Wash off oil on the skin immediately with soap and water.
- Wear protective gloves. Hands should be clean before putting on gloves. Apply protective cream to the hands to make washing easier.
- DO NOT put oily rags in your pockets.
- Change oil soiled clothing as soon as possible.
- Keep an extra change of work cloths nearby.
- Attend to cuts and abrasions immediately. Clean them and apply first-aid.
- DO NOT breath in oil fumes.
- Wash hands and arms frequently (example: at each meal break or as often as possible).

COMPRESSED AIR

Compressed air is a concentrated, high pressure, high speed stream of air that can seriously injure or kill. Air pressures of 5–10 psi can cause serious injury. Most pneumatic tools operate at 80–120 psi.

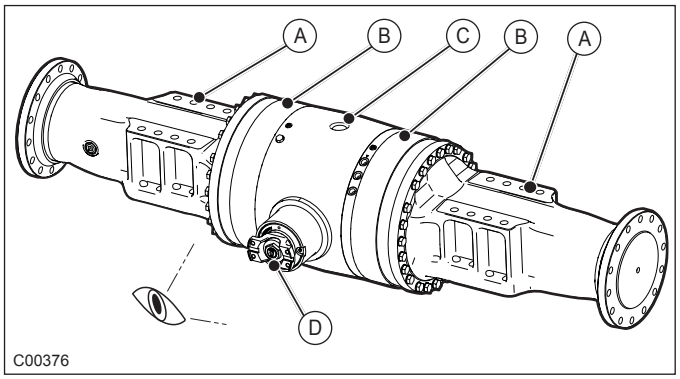
Follow acceptable Health and Safety protocols for using compressed air.

- DO NOT clean clothing or skin using compressed air.
- Verify the air stream is not aimed at a fellow worker or positioned in a way to cause debris to strike someone or other equipment.
- Use a chip guard.
- Air pressure of 30 psi (at the nozzle) is permitted to dry objects.

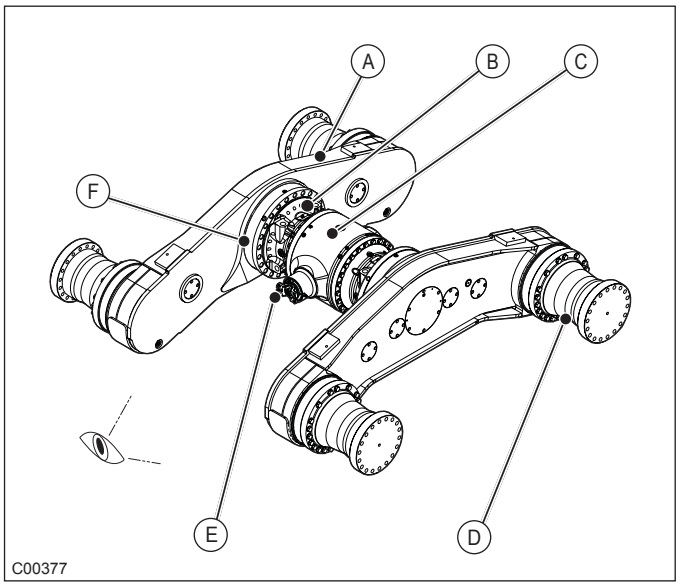
SAFETY

See, SAFETY on page 1.4 for references to safety warnings and messages.

MACHINE ORIENTATION



A	Planetary
B	Brake (optional)
C	Differential
D	Yoke



A	Bogie Arm
B	Brake Housing
C	Differential
D	Planetary
E	Yoke
F	Slew Bearing

References to left or right of the axle or bogie axle are based on viewing the axle with the differential yoke facing the observer.

PREPARING TO DISASSEMBLE THE AXLE

⚠ WARNING

Axles and axle components are heavy. Use appropriate lifting devices. Support and brace major components so they DO NOT fall or roll. When removing one major component from another ensure that both components are adequately supported and level.

See, MATERIAL LIFTING AND HANDLING on page 1.8

See, PERSONAL SAFE LIFTING AND CARRYING on page 1.9.

See,SAFE SUPPORT OF COMPONENTS on page 1.9.

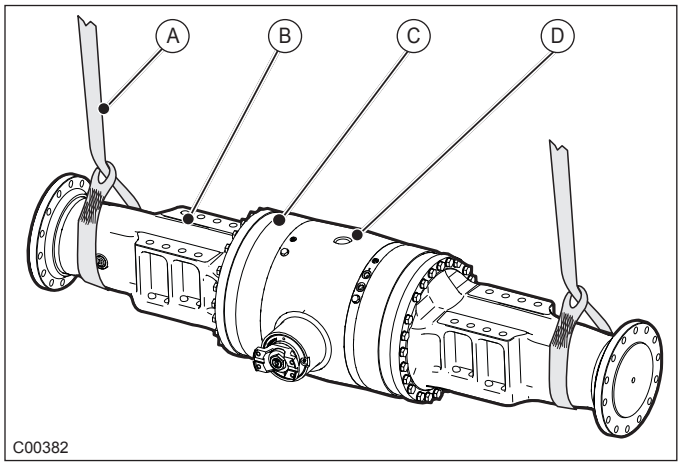
See,CLEAN AND INSPECT on page 1.11.

Service the axle or components on a clean, robust work surface or on a floor or section of ground. The work area:

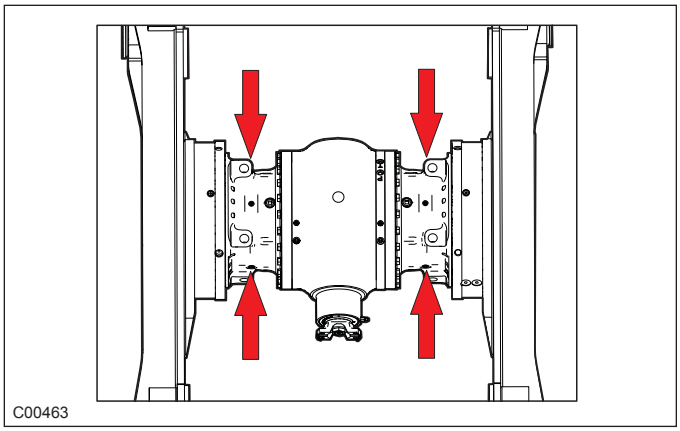
- Must be level
- Must be clean
- Have a barrier (tarpaulin or sheets of plywood) on the ground if not in a workshop.
- Must have components blocked to eliminate movement

MOVING AXLES/AXLE COMPONENTS

Axles may be shipped as complete units or partially disassembled.



A	Lifting Strap
B	Planetary
C	Brake Housing
D	Differential



A Use indicated ports for SAHR brake retraction

1. Release the parking brakes if SAHR (Spring Applied Hydraulic Release) brakes are present. This activity may require two persons; one to activate oil pressure, the other to remove the axle. If there are no brakes, or service brakes only, proceed to step 10.

   a. Refer to the associated machine service manual to determine which ports on the axle must be energized to release the brakes.

   b. Install an M14 input fitting suitable for use with the available oil supply system into the port indicated in the machine service manual.

   c. Connect the oil supply to the fitting and activate the oil pressure to retract the SAHR brake.

2. Remove the axle shaft from the differential.

   Left and right axle shaft

   a. Pull the shaft straight out, perpendicular to the differential.

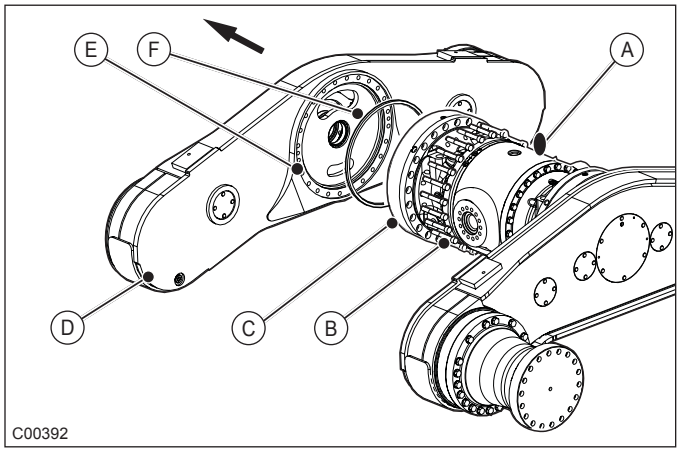
   Left axle shaft only

   b. Verify that a shaft spacer, shims and spring pin are secured to the long spline end of the left axle shaft. These components must be accounted for during disassembly. If they remain in the differential they will cause severe damage to the differential.

3. Repeat steps 1 to step 10 for the right side bogie axle shaft.

4. Cinch lifting straps and tension them in preparation to support and move the bogie housing. See, MOVING AXLES/AXLE COMPONENTS on page 2.3 .

DISCONNECT BOGIE ARM FROM SLEW BEARING



A Differential
B Bolts
C Slew Bearing
D Bogie Arm (with axle shaft removed)
E Slew Bearing Mounting Surface
F Oil Seal

MARK THE ALIGNMENT OF THE SLEW BEARING BALL PORTS RELATIVE TO THE BRAKE HOUSING AND THE BOGIE HOUSING.

1. Brace components with stands or wooden blocks or cinch lifting straps to the bogie mounting housing and tension them in preparation to support and move the housing. See, MOVING AXLES/AXLE COMPONENTS on page 2.3.

2. Attach lifting rings to the lifting plates on the bogie arm if using a lifting device.

3. Verify that the bogie axle shaft for the side of the bogie being serviced has been removed. See, AXLE DISASSEMBLY on page 2.7

4. Remove the bolts from the slew bearing:

   a. Remove bolts from the top half of the slew bearing that secure it to the bogie arm.

   b. Leave two bolts horizontally opposed in the slew bearing.

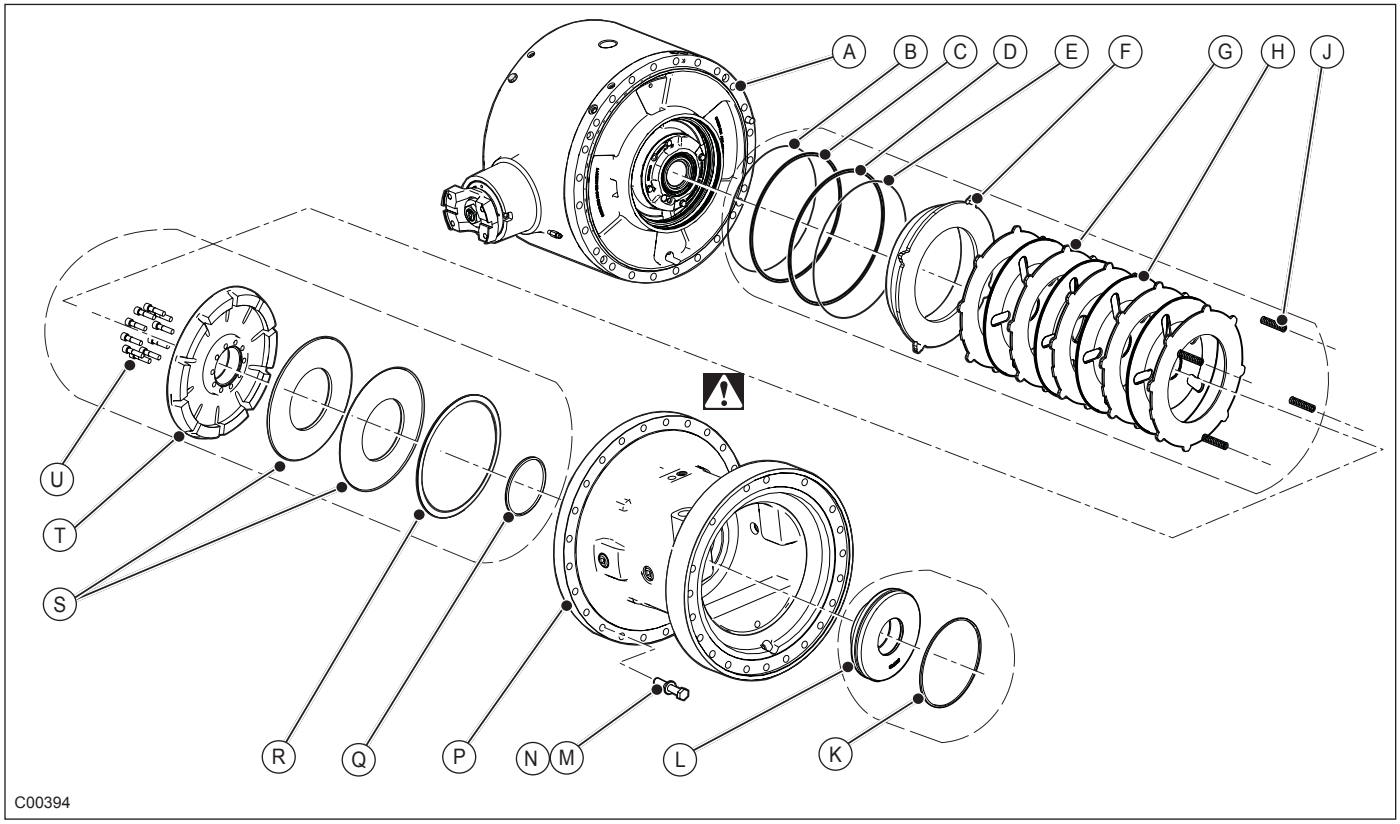
   c. Remove the bolts from the bottom half of the slew bearing.

5. Remove the two remaining bolts from the slew bearing.

6. Move the bogie arm perpendicular to the differential using a lift or pry bars. The bogie mounting plate must clear the end of the slew bearing. DO NOT tip the bogie arm over.

7. Follow step 1 to step 6 to remove the other bogie arm.

INSTALL BRAKES



Service Brakes			
A	Differential	F	Brake Piston
B	Inner Backup Ring	G	Reaction Plate
C	Inner Square O-ring	H	Friction Plate
D	Outer Square O-ring	J	Piston Return Spring
E	Outer Backup Ring		

SAHR (Spring Applied Hydraulic Release) Brakes			
K	SAHR Brake Rod Seal	Q	SAHR Brake Piston Seal
L	SAHR Brake Piston	R	SAHR Brake Thrust Washer
M	Bolt	S	Belleville Washers
N	Washer	T	SAHR Spring Retainer
P	Brake Housing	U	Bolts

Tigercat axles may be built without brakes, with service brakes, or with service brakes and SAHR brakes.

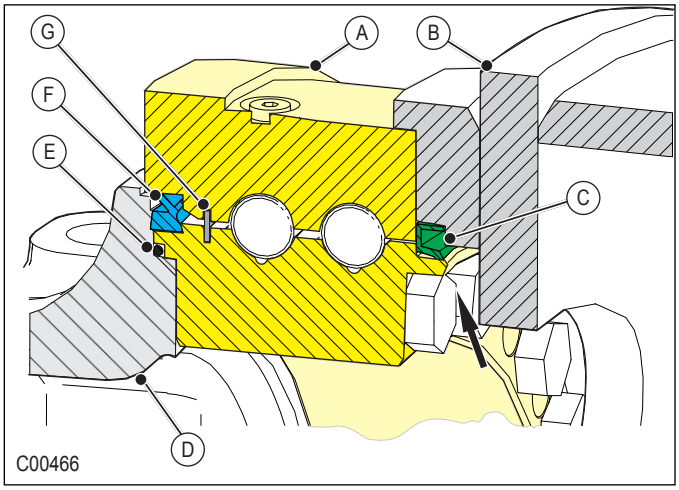
If the axle being serviced does not come equipped with brakes, proceed to INSTALL BRAKE HOUSING/AXLE HOUSING on page 3.13.

4. Apply a light coat of grease to the scraper ring, and scraper ring groove on the slew bearing, then insert the scraper ring in the groove of the slew bearing. The large rib on the scraper ring faces out towards the brake housing.

5. Apply a light coat of oil to the O-ring then install the O-ring on the brake housing. The O-ring must not be twisted.

NOTICE

Align slew bearings on each side of the axle in the same direction and orientation.



A Slew Bearing
B Bogie Arm
C Oil Seal (Grease is NOT permitted to seep from this oil seal)
D Brake Housing
E O-ring
F Scraper Ring
G Internal Seal

6. Align the slew bearing for mounting on the chassis or brake housing:

   a. Position the slew bearing with the scraper ring and O-ring facing the axle/brake housing.

   b. Align the marks made on the slew bearing and the brake housing at the time of removal. Align the slew bearing on the bogie arm:

   c. Align the slew bearing as described in step 1. The port may or may not align perfectly along the vertical axis. If the ball port on one slew bearing is slightly off centre with the ball port, ensure that the other ball port is off centre in the same direction and by the same amount.

7. Clean bolts with isopropyl alcohol, then apply Loctite Thread Locker 242 and Loctite 7649 Primer to each bolt. See, APPLYING LOCTITE PRODUCTS on page 1.12.

8. Seat the slew bearing against the brake housing/ chassis. Verify the correct orientation, then thread bolts finger tight. Torque each to 560Nm (405 lbf-ft) in a star pattern.

4. Verify that the planetary is correctly prepared for installation to the bogie arm.
   a. Verify that planetary retaining rings are present.
   b. Verify that centre retaining ring is present.
5. Raise the planetary using a lifting device, then lower it onto the guide pins until the planet gears and sun gear almost meet.
6. Align the sun gear teeth and the planet gear teeth, then lower the planetary. Use a pry bar to carefully rotate each planet gear as required to achieve alignment.
7. Apply Loctite 7649 Primer to the bolts and threaded holes used to secure the planetary on the bogie arm. See, APPLYING LOCTITE PRODUCTS on page 1.12.
8. Apply Loctite 242 Thread Locker to the bolts and threaded holes used to secure the planetary on the bogie arm. See, APPLYING LOCTITE PRODUCTS on page 1.12.
9. Insert bolts finger tight, then torque each:
   a. For bogie axles 74.3", 75.0 in. and 77.5" long, tighten M18 bolts in a star-shaped pattern. Verify the thread pitch and torque to values listed.
   b. For bogie axles 68 inches long, tighten M16 bolts in a star-shaped pattern. Verify the thread pitch and torque to values listed.

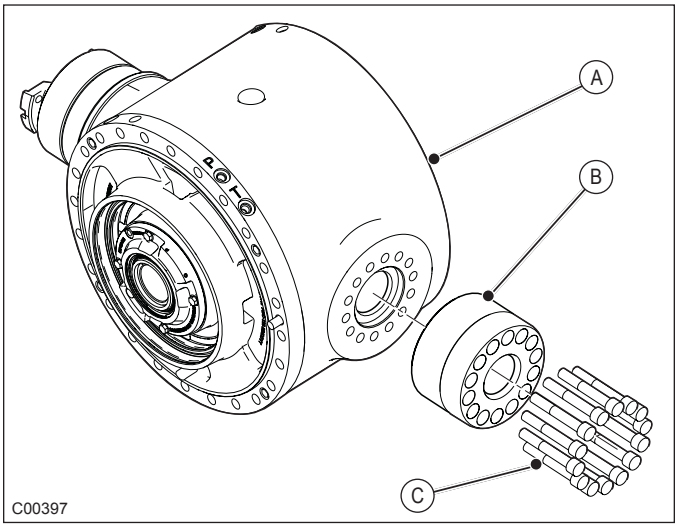
   M18 x 1.5 - 441Nm (325 lbf-ft)

   M18 x 2.5 - 393Nm (290 lbf-ft)

   M16 x 2.0 - 278Nm (205 lbf-ft)

INSTALL TRUNNIONS

INSTALL TRUNNION PIN



A	Differential
B	Trunnion Pin
C	Bolts

1. Clean the trunnion pin, bolts and threaded bolt holes in the differential with isopropyl alcohol, then apply Loctite Thread Locker 242 and Loctite 7649 Primer to each bolt. See, APPLYING LOCTITE PRODUCTS on page 1.12.
2. Seat the trunnion pin against the differential and thread bolts finger tight. Torque each to 339Nm (250 lbf-ft) in a star pattern. Verify that there is no gap between the trunnion pin and the differential housing.