

CHAPTER 9

BRAKES

GENERAL SPECIFICATIONS	9.2
TORQUE SPECIFICATIONS	9.2
SPECIAL TOOLS	9.2
BRAKE SYSTEM SERVICE NOTES	9.3
BRAKE NOISE TROUBLESHOOTING	9.3
HYDRAULIC BRAKE SYSTEM OPERATION	9.4
BRAKE SYSTEM EXPLODED VIEW	9.5
MASTER CYLINDER	9.6
FOOT BRAKE PEDAL	9.6
BRAKE BLEEDING / FLUID CHANGE	9.7
PARKING BRAKE	9.8
EXPLODED VIEW (XP / HD / CREW)	9.8
EXPLODED VIEW (6X6)	9.9
INSPECTION / CABLE TENSION ADJUSTMENT	9.10
PARKING BRAKE CALIPER SERVICE (4X4)	9.12
CALIPER REMOVAL	9.12
CALIPER DISASSEMBLY / INSPECTION	9.13
NEW BRAKE PAD INSTALLATION / CALIPER INSTALLATION	9.14
PARKING BRAKE CALIPER SERVICE (6X6)	9.15
CALIPER REMOVAL	9.15
CALIPER DISASSEMBLY / INSPECTION / NEW BRAKE PAD INSTALLATION	9.16
CALIPER INSTALLATION	9.17
PARKING BRAKE DISC SERVICE	9.17
FRONT BRAKE PADS	9.18
PAD REMOVAL / INSPECTION	9.18
PAD ASSEMBLY / INSTALLATION / BRAKE BURNISHING PROCEDURE	9.19
FRONT CALIPER SERVICE	9.20
CALIPER REMOVAL	9.20
CALIPER DISASSEMBLY	9.21
CALIPER INSPECTION / ASSEMBLY	9.22
CALIPER INSTALLATION	9.23
FRONT BRAKE DISC	9.24
REAR BRAKE PADS (XP / HD)	9.25
PAD REMOVAL	9.25
PAD INSPECTION / INSTALLATION / BRAKE BURNISHING PROCEDURE	9.26
REAR BRAKE PADS (CREW / 6X6)	9.27
PAD REMOVAL / INSPECTION	9.27
PAD ASSEMBLY / INSTALLATION / BRAKE BURNISHING PROCEDURE	9.28
REAR CALIPER SERVICE (XP / HD)	9.29
CALIPER REMOVAL	9.29
CALIPER DISASSEMBLY / INSPECTION	9.30
CALIPER ASSEMBLY / INSTALLATION	9.31
REAR CALIPER SERVICE (CREW / 6X6)	9.32
CALIPER REMOVAL	9.32
CALIPER DISASSEMBLY	9.33
CALIPER INSPECTION / ASSEMBLY	9.34
CALIPER INSTALLATION	9.35
REAR BRAKE DISC	9.36
TROUBLESHOOTING	9.37

BRAKES

GENERAL SPECIFICATIONS

FRONT BRAKE SYSTEM		
Item	Standard	Service Limit
Front Brake Pad Thickness	.298 ± .007" / 7.56 ± .178 mm	.180" (4.6 mm)
Front Brake Disc Thickness	.188" (4.78 mm)	.170" (4.32 mm)
Front Brake Disc Runout	-	.010" (.254 mm)

REAR BRAKE SYSTEM		
Item	Standard	Service Limit
Rear Brake Pad Thickness	.298 ± .007" / 7.56 ± .178 mm	.180" (4.6 mm)
Rear Brake Disc Thickness	.188" (4.78 mm)	.170" (4.32 mm)
Rear Brake Disc Runout	-	.010" (.254 mm)

PARK BRAKE SYSTEM		
Item	Standard	Service Limit
Park Brake Pad Thickness	Inboard - .304" (7.72 mm) Outboard - .360" (9.14 mm)	.240" (6.1 mm) .310" (7.87 mm)
Park Brake Disc Thickness	0.164" - 0.173" (4.17 - 4.39 mm)	.150" (3.81 mm)

TORQUE SPECIFICATIONS

Item	Torque ft. lbs.	Torque Nm
Front Caliper Mounting Bolts	30	41
Rear Caliper Mounting Bolts	30	41
Park Brake Assembly Bolts	35	47
Park Brake Caliper to Mount Bracket Bolts	18	24
Park Brake Mount Bracket to Transmission Bolts (4x4)	40	54
Park Brake Mount Bracket to Rear Gearcase Bolts (6x6)	18	24
Park Brake Lever Mount Bolts	13	18
Brake Line Flare Fittings	12-15	16-20
Brake Line Banjo Bolts (All)	15	20
Front Brake Disc to Hub Bolts	18	24
Rear Brake Disc to Hub Bolts	28	38
Park Brake Disc Mounting Bolt	10-15	14-20
Brake Switch	12-15	16-20
Master Cylinder Mount Bolts	15	20

SPECIAL TOOLS

Part Number	Tool Description
2870975	Mity Vac™ Pressure Test Tool

SPX Corp: 1-800-328-6657 or <http://polaris.spx.com/>

BRAKE SYSTEM SERVICE NOTES

Disc brake systems are light weight, low maintenance, and perform well in the conditions this vehicle will routinely encounter. There are a few things to remember when replacing disc brake pads or performing brake system service to ensure proper system function and maximum pad service life.

- Optional pads are available to suit conditions in your area. Select a pad to fit riding style and environment.
- DO NOT over-fill the master cylinder fluid reservoir.
- Make sure the brake pedal returns freely and completely.
- Adjust stop pin on front caliper after pad service.
- Check and adjust master cylinder reservoir fluid level after pad service.
- Make sure atmospheric vent on reservoir is unobstructed.
- Test for brake drag after any brake system service and investigate cause if brake drag is evident.
- Make sure caliper moves freely on guide pins (where applicable).
- Inspect caliper piston seals for foreign material that could prevent caliper pistons from returning freely.
- Perform a brake burnishing procedure after installing new pads to maximize service life.
- DO NOT lubricate or clean the brake components with aerosol or petroleum products. Use only approved brake cleaning products.

BRAKE NOISE TROUBLESHOOTING

Dirt or dust buildup on the brake pads and disc is the most common cause of brake noise (squeal caused by vibration). If cleaning does not reduce the occurrence of brake noise, Permatex™ *Disc Brake Quiet* can be applied to the back of the pads. Follow directions on the package. This will keep pads in contact with caliper piston(s) to reduce the chance of squeaks caused by dirt or dust.

Brake Noise Troubleshooting	
Possible Cause	Remedy
Dirt, dust, or imbedded material on pads or disc	Spray disc and pads with CRC Brakeleen™ or an equivalent non-flammable aerosol brake cleaner. Remove pads and/or disc hub to clean imbedded material from disc or pads.
Pad(s) dragging on disc (noise or premature pad wear) because of improper adjustment Master cylinder reservoir overfilled Master cylinder compensating port restricted Master cylinder piston not returning completely Caliper piston(s) not returning Operator error (riding the brake)	Adjust pad stop (front calipers) Set to proper level Clean compensating port Inspect. Repair as necessary Clean piston(s) seal Educate operator
Loose wheel hub or bearings	Check wheel and hub for abnormal movement.
Brake disc warped or excessively worn	Replace disc
Brake disc misaligned or loose	Inspect and repair as necessary
Noise is from other source (axle, hub, disc or wheel)	If noise does not change when brake is applied check other sources. Inspect and repair as necessary
Wrong pad for conditions	Change to a softer or harder pad

BRAKES

HYDRAULIC BRAKE SYSTEM OPERATION

The Polaris brake system consists of the following components or assemblies: brake pedal, master cylinder, hydraulic brake lines, brake calipers, brake pads, and brake discs, which are secured to the drive line.

When the foot activated brake lever is applied it applies pressure on the piston within the master cylinder. As the master cylinder piston moves inward it closes a small opening (compensating port) within the cylinder and starts to build pressure within the brake system. As the pressure within the system is increased, the pistons located in the brake calipers move outward and apply pressure to the moveable brake pads. These pads contact the brake discs and move the calipers in their floating bracket, pulling the stationary side pads into the brake discs. The resulting friction reduces brake disc and vehicle speed.

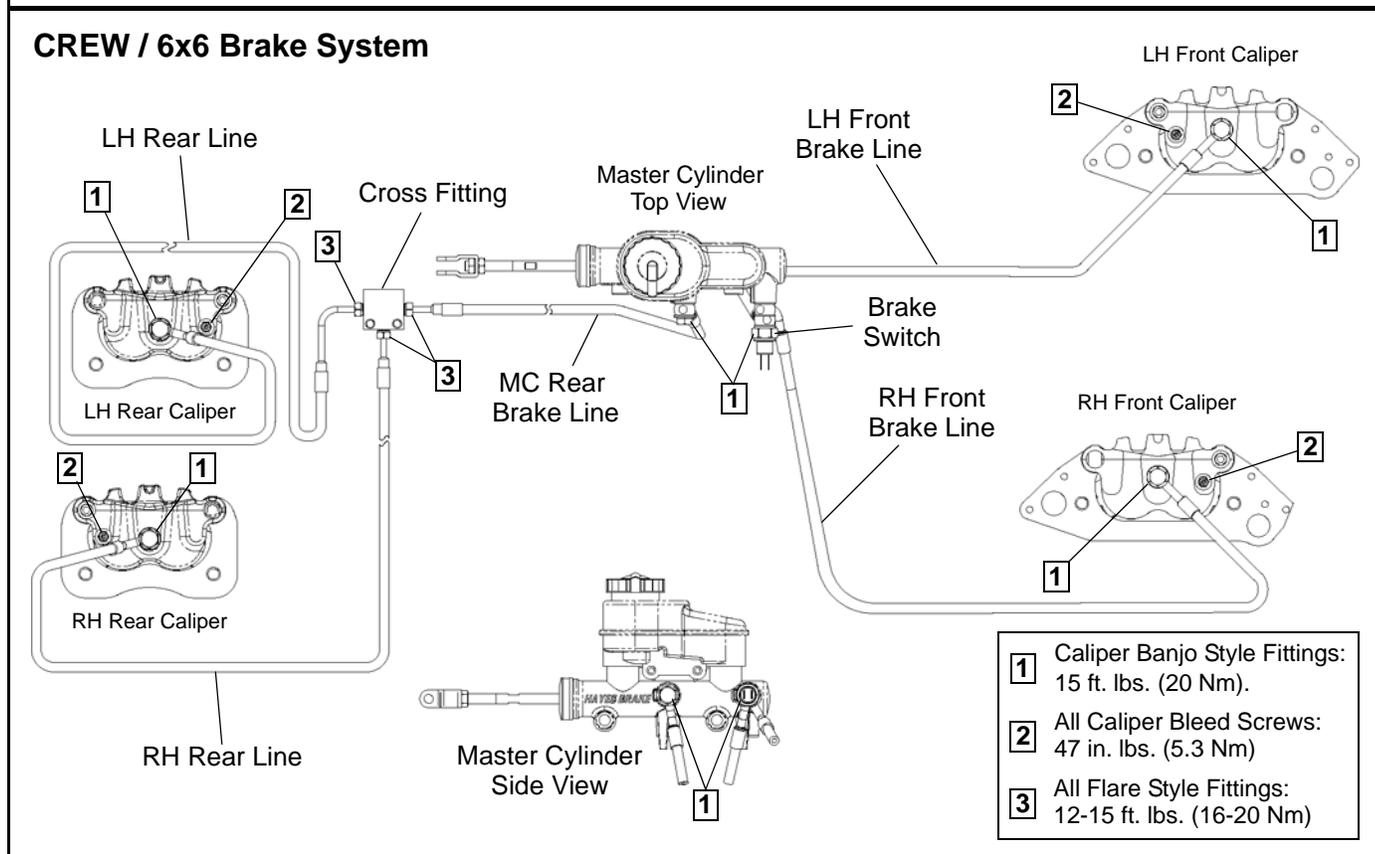
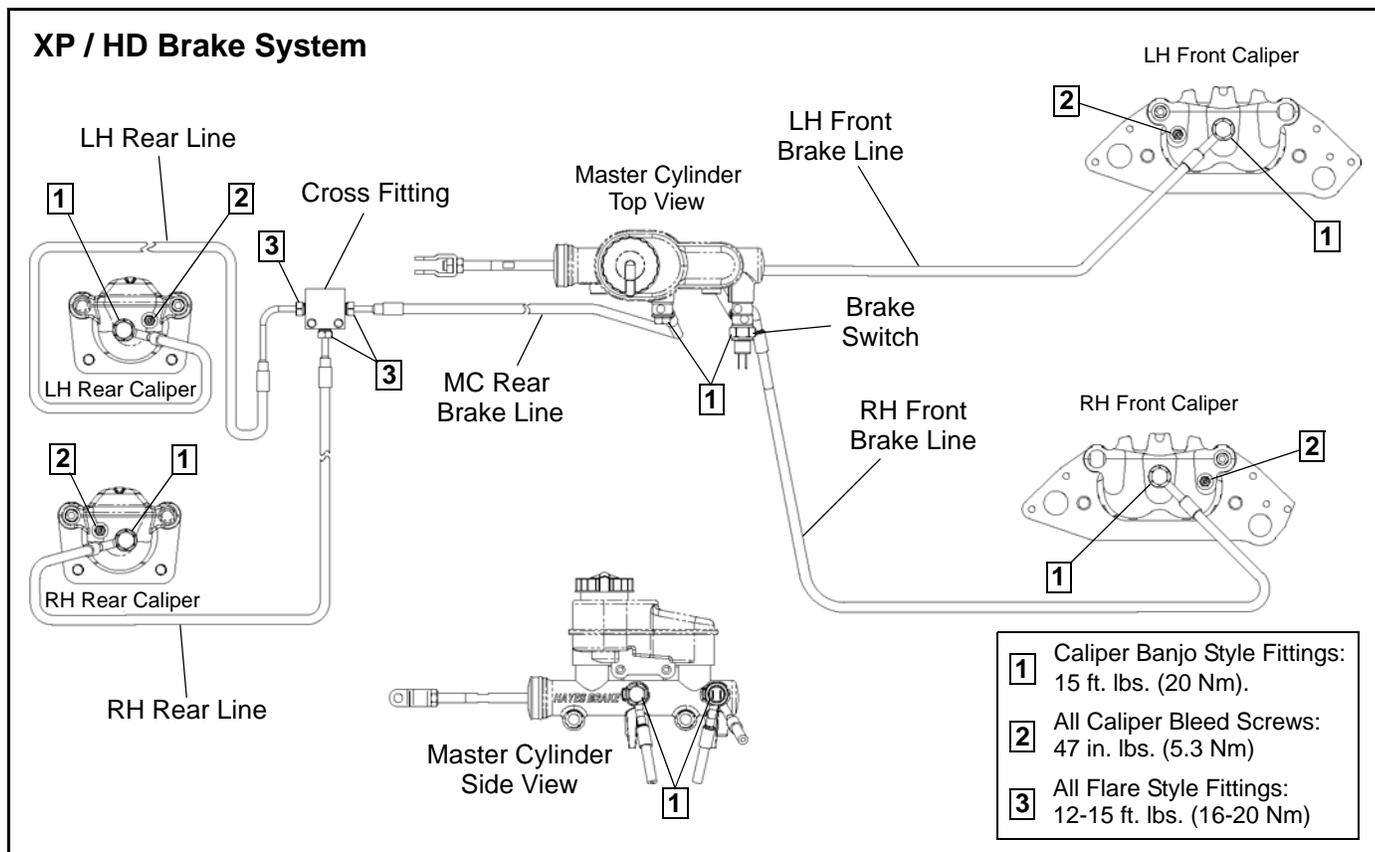
The friction applied to the brake pads will cause the pads to wear. As these pads wear, the piston within the caliper moves further outward and becomes self adjusting. Fluid from the reservoir fills the additional area created when the caliper piston moves outward.

Brake fluid level is critical to proper system operation. Too little fluid will allow air to enter the system and cause the brakes to feel spongy. Too much fluid could cause brakes to drag due to fluid expansion.

Located within the master cylinder is the compensating port which is opened and closed by the master cylinder piston assembly. As the temperature within the hydraulic system changes, this port compensates for fluid expansion or contraction. Due to the high temperatures created within the system during heavy braking, it is very important that the master cylinder reservoir have adequate space to allow for fluid expansion. **Never overfill the reservoir! Do not fill the reservoir beyond the MAX LEVEL line!**

When servicing Polaris brake systems use only **Polaris DOT 4 Brake Fluid (PN 2872189)**. **WARNING:** Once a bottle is opened, use what is necessary and discard the rest in accordance with local laws. Do not store or use a partial bottle of brake fluid. Brake fluid is hygroscopic, meaning it rapidly absorbs moisture. This causes the boiling temperature of the brake fluid to drop, which can lead to early brake fade and the possibility of serious injury.

BRAKE SYSTEM EXPLODED VIEW

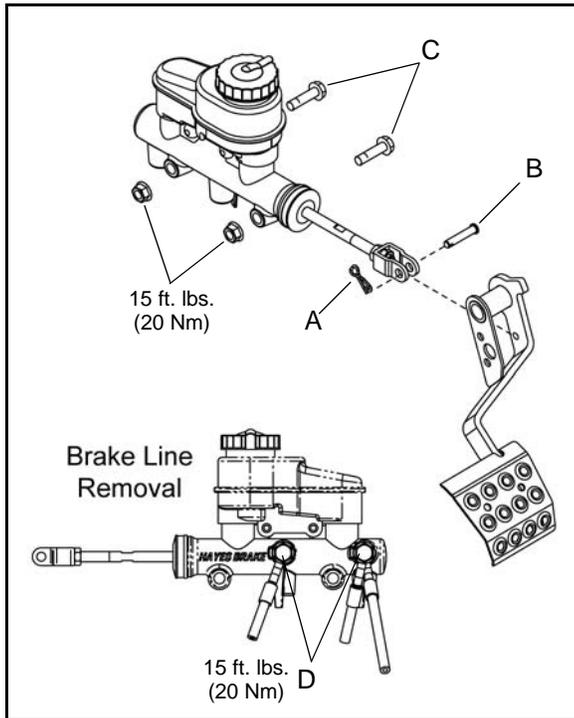


BRAKES

MASTER CYLINDER

Removal

1. Remove retaining clip (A) from the clevis pin (B) that attaches the master cylinder to the brake pedal lever.
2. Remove LH wheel well panel to access master cylinder.



3. Remove the two mounting bolts (C) that secure the master cylinder to the frame.
4. Remove master cylinder and place a fluid catch container under the master cylinder brake line banjo bolts (D).



CAUTION

Brake fluid will damage finished surfaces.
Do not allow brake fluid to come in contact
with finished surfaces.

5. Loosen the brake line banjo bolts (D) and allow the fluid to drain.

NOTE: Make note of front and rear brake line orientation on the master cylinder.

6. Dispose of brake fluid properly and do not re-use.

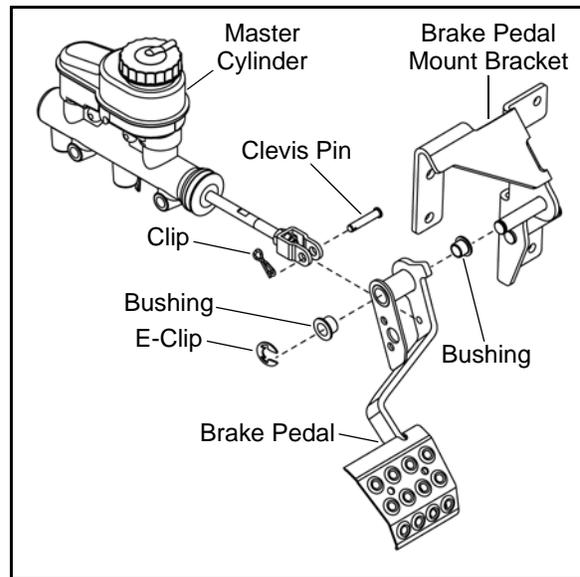
Installation

1. Reverse Steps 1-5 for master cylinder installation. **Refer to the torque specifications in the illustration.**

FOOT BRAKE PEDAL

Pedal Removal

1. Remove the E-clip from the end of the brake pedal mount bracket.



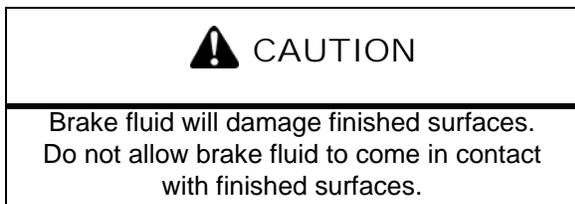
2. Remove the retaining clip and clevis pin from the master cylinder to free it from the brake pedal.
3. Slide the brake pedal and bushings off the mount bracket.

Pedal Installation

1. Reverse Steps 1-3 for foot brake installation.
2. Use a new E-clip upon installation.

BRAKE BLEEDING / FLUID CHANGE

NOTE: When bleeding the brakes or replacing the fluid always start with the furthest caliper from the master cylinder. This procedure should be used to change fluid or bleed brakes during regular maintenance.



1. Locate master cylinder reservoir in the front LH wheel well area (Figure 1-6). Clean reservoir cover thoroughly.
2. Remove cover from reservoir.
3. If changing fluid, remove old fluid from reservoir with a Mity Vac™ pump or similar tool.



4. Add brake fluid to the indicated MAX level of reservoir (Figure 1-6).

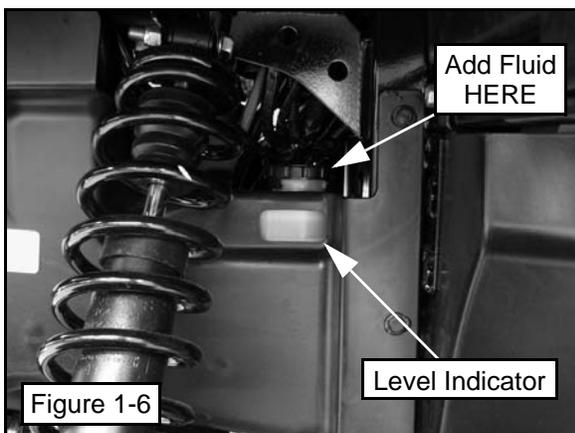
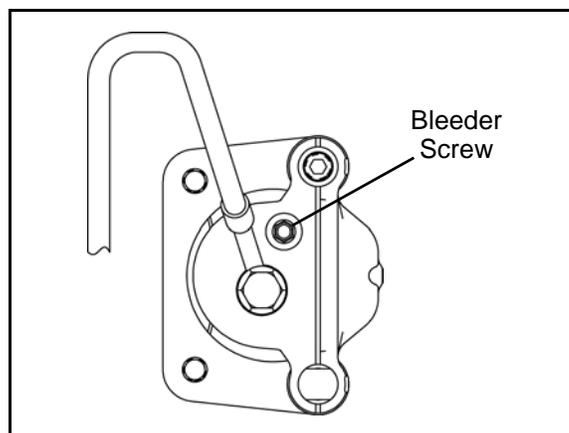


Figure 1-6



5. Begin bleeding procedure with caliper furthest from master cylinder.
6. Install a box-end wrench on caliper bleeder screw.

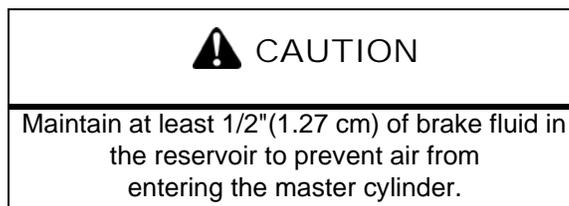
7. Attach a tight-fitting, clear hose to the bleeder fitting.



8. Place a small amount of fresh brake fluid into a small, clear container and place the other end of bleeder hose into the container.
9. Have an assistant slowly pump the brake pedal until pressure builds and then hold.
10. Quickly open and close the bleed screw while holding pressure on the brake pedal.

NOTE: Do not release brake pedal before bleeder screw is tight or air may be drawn into master cylinder.

11. Release brake pedal pressure. Check level of fluid in reservoir and add if necessary (Figure 1-6).
12. Repeat Steps 9, 10, and 11 until brake pedal is firm and no air can be seen moving through the clear hose. Add fluid as necessary to maintain level in reservoir.

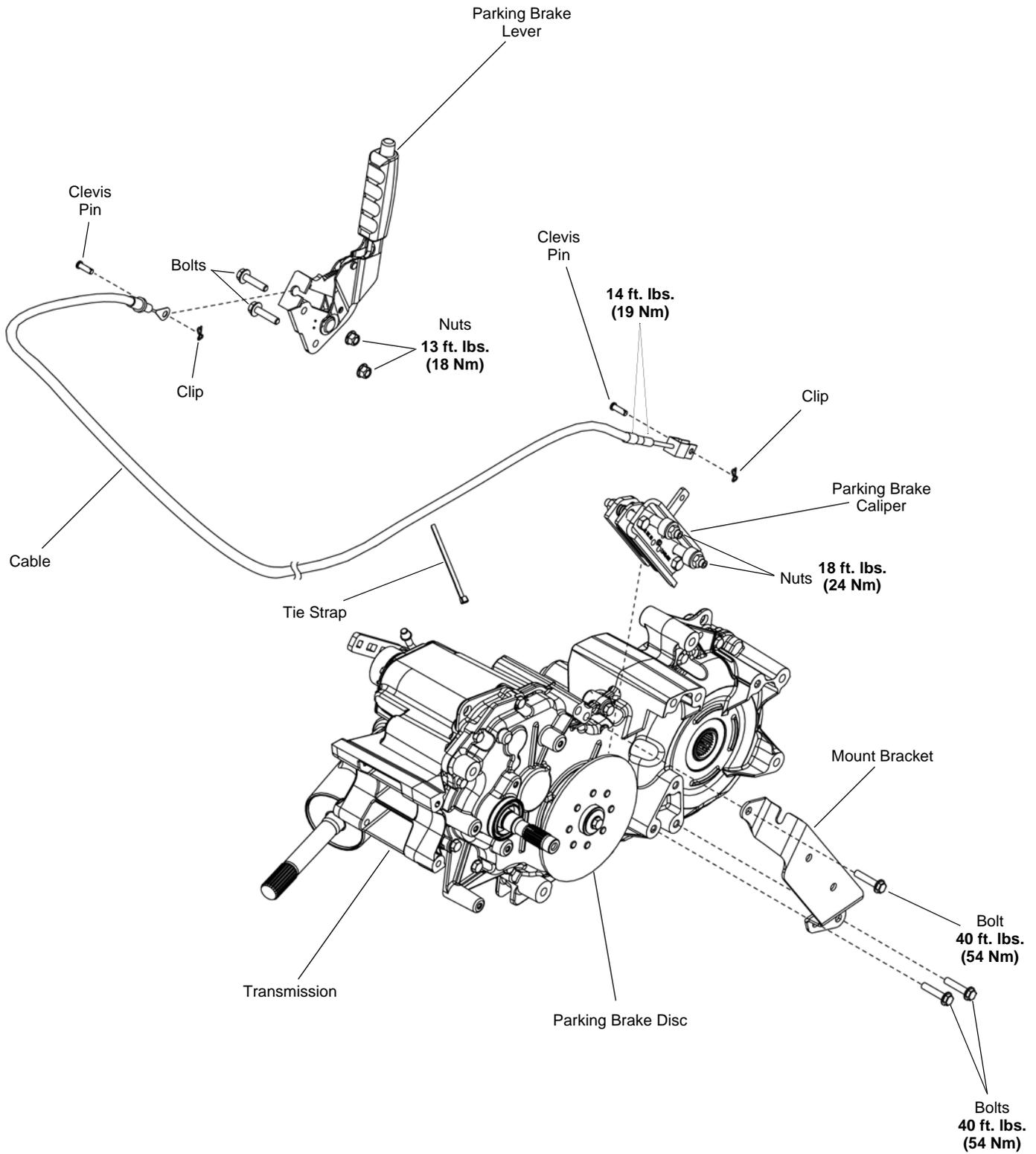


13. Tighten bleeder screw and remove bleeder hose. Torque bleeder screw to **47 in. lbs. (5.3 Nm)**.
14. Repeat Steps 9 - 13 for the remaining brake calipers.
15. Install master cylinder reservoir cover.
16. Field test machine at low speed before putting into service. Check for proper braking action and pedal reserve. With pedal firmly applied, pedal reserve should be no less than 1/2" (1.3 cm).
17. Check brake system for fluid leaks.

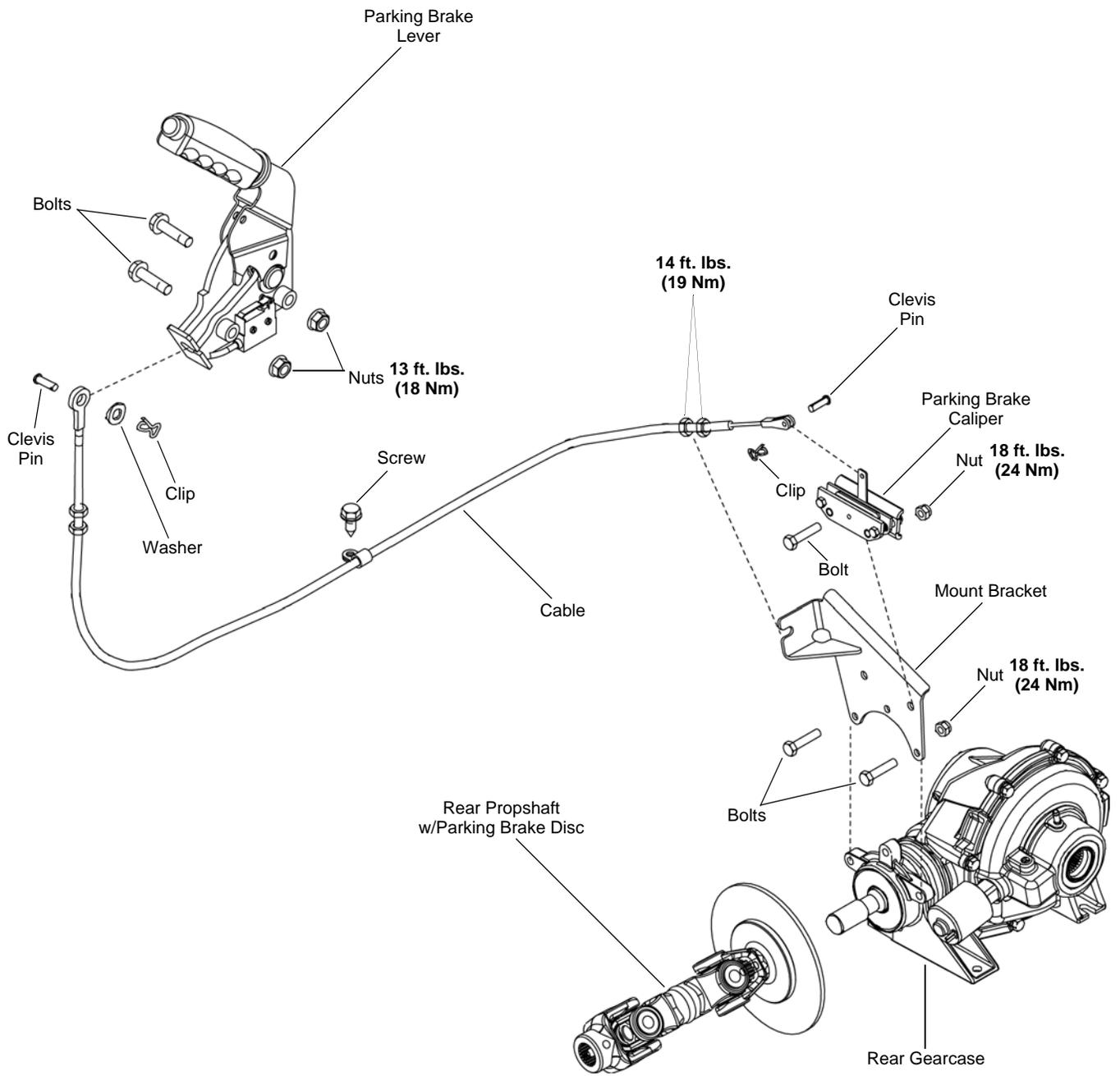
BRAKES

PARKING BRAKE

Exploded View (XP / HD / CREW)



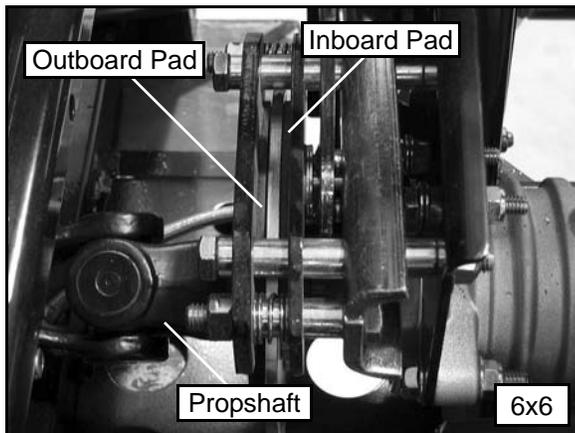
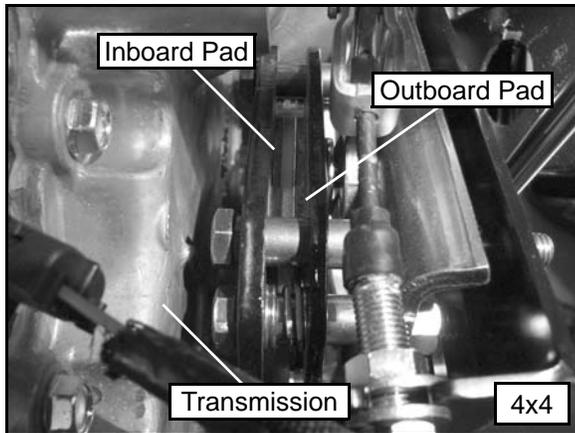
Exploded View (6x6)



BRAKES

Inspection

1. Inspect the parking brake cable and brake pads on the caliper assembly. Refer to the appropriate **“Parking Brake Caliper Service”** procedure for brake pad replacement information.



Cable Tension Adjustment

When the parking brake is fully engaged and the parking brake indicator is illuminated, engine speed is limited to 1300 RPM in all gears, including neutral. If throttle is applied, this limiting feature prevents operation, which protects the parking brake pads from excessive wear.

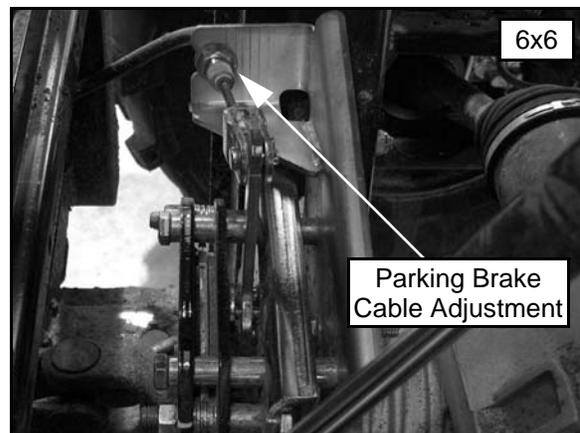
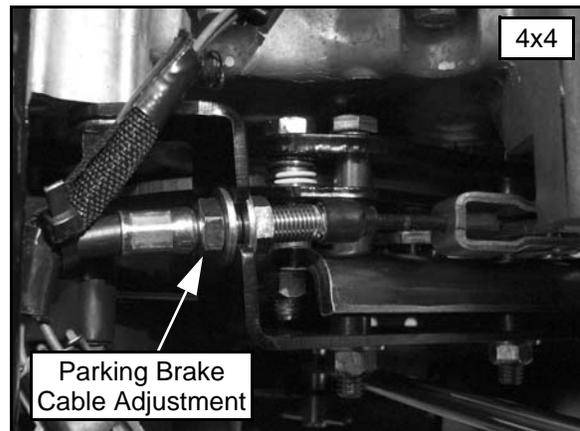
NOTE: Inspect the parking brake cable tension after the first 25 hours of operation and every 100 hours of operation afterwards to ensure proper cable tension.

Loss of tension in the parking brake cable will cause illumination of the parking brake light and activation of the limiting feature. If this occurs, inspect and adjust parking brake cable tension. If performing this service is difficult due to conditions or location, open the hood and temporarily disconnect the parking brake connector. Reconnect parking brake connector as soon as it is practical and adjust parking brake cable to proper tension.

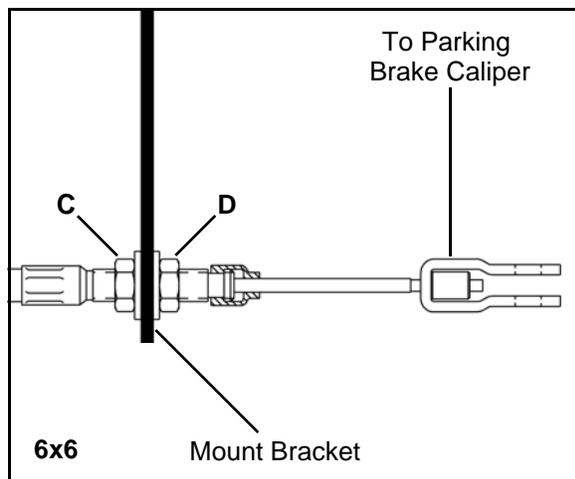
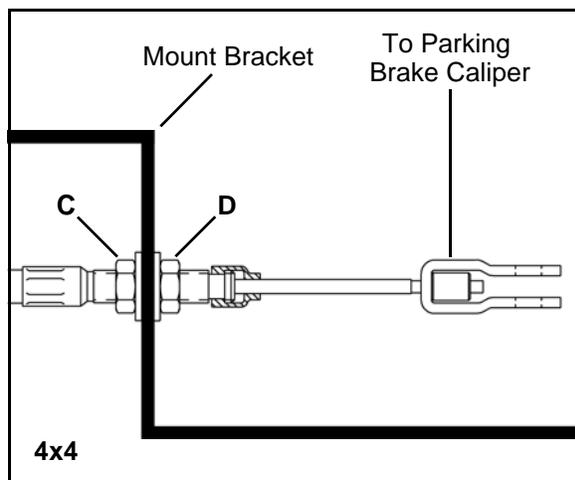
1. Pull back on the parking brake lever (located in the dash).
2. After 3 clicks the “(P)” brake light should illuminate on the instrument cluster and the wheels of the vehicle should not rotate when turning by hand. After 8 full clicks of lever travel, the vehicle should not roll while parked.
3. If the vehicle moves, adjustment is necessary.
4. Adjust the parking brake cable where the cable attaches to the caliper mount bracket. The mount bracket is located on the left-hand side of the transmission behind the outer PVT cover (4x4) or on the rear gearcase (6x6).

Adjustment Procedure

1. Place the vehicle in neutral on a flat level surface.
2. Carefully lift the rear of the vehicle off the ground and stabilize on jack stands.
3. Locate the parking brake cable adjustment area where the cable attaches to the caliper mount bracket.



- Use two open-end wrenches and loosen the outer jam nut (D). Back out the outer jam nut (D) 1 1/2 turns.



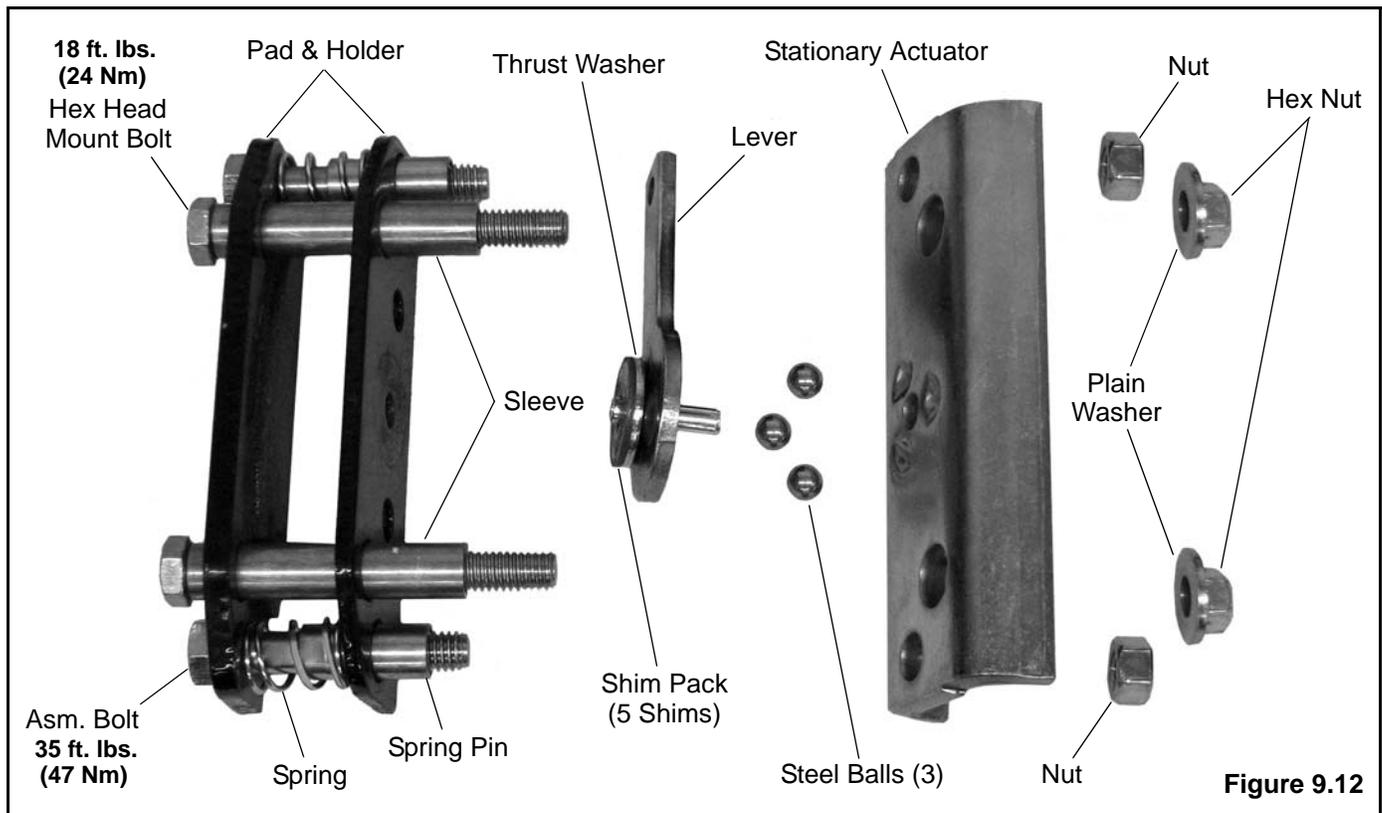
- Now hold the outer jam nut (D) and turn in the inner jam nut (C) clockwise, until the jam nut is tight against the bracket.
- Repeat Step 4 and Step 5 until the proper adjustment is obtained for the parking brake.

NOTE: See Chapter 10 for more information on the parking brake switch.

BRAKES

PARKING BRAKE CALIPER SERVICE (4X4)

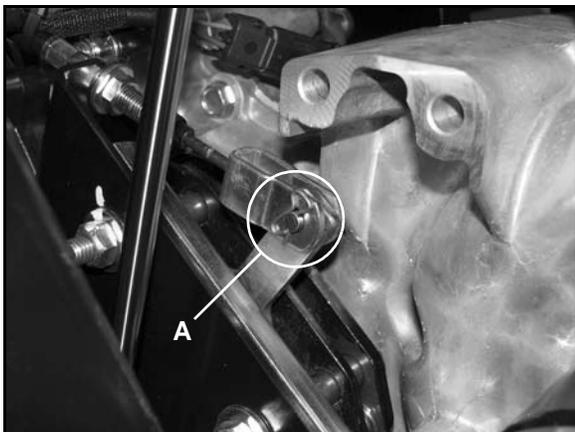
Exploded View



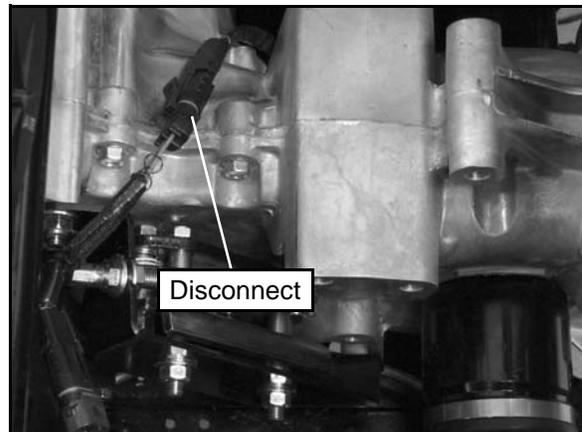
Caliper Removal

NOTE: Do not get oil, grease, or fluid on the parking brake pads. Damage to or contamination of the pads may cause the pads to function improperly.

1. Remove the clip and pin (A) from the parking brake cable.



2. Disconnect the rear differential solenoid harness.



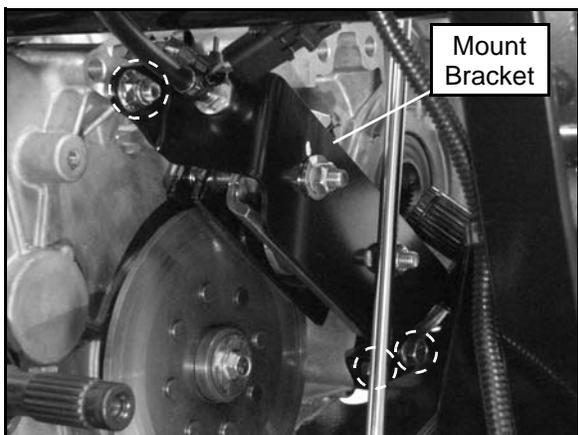
NOTE: Be sure the parking brake is not engaged.

9.12

- Loosen the (2) bolts that retain the caliper to the mount bracket.



- Remove the (3) fasteners retaining the parking brake mount bracket and remove the parking brake caliper as an assembly. **NOTE: The image shown below has the PVT system removed for picture clarity.**



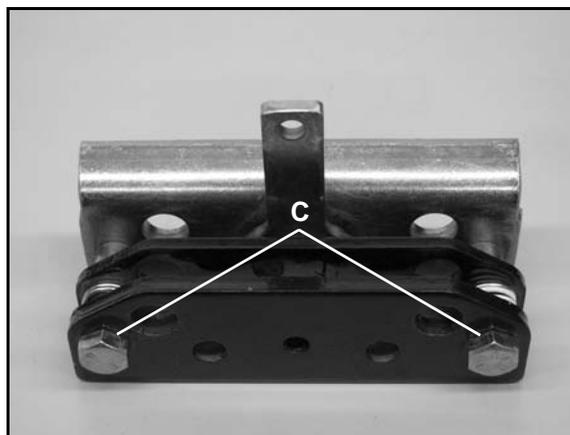
- Lift the parking brake caliper and mount bracket off the brake disc. Remove the (2) caliper mounting bolts and remove the caliper from the mount bracket.



Caliper Disassembly / Inspection

NOTE: Refer to the "Electronic Parts Catalog" for parking brake caliper replacement information.

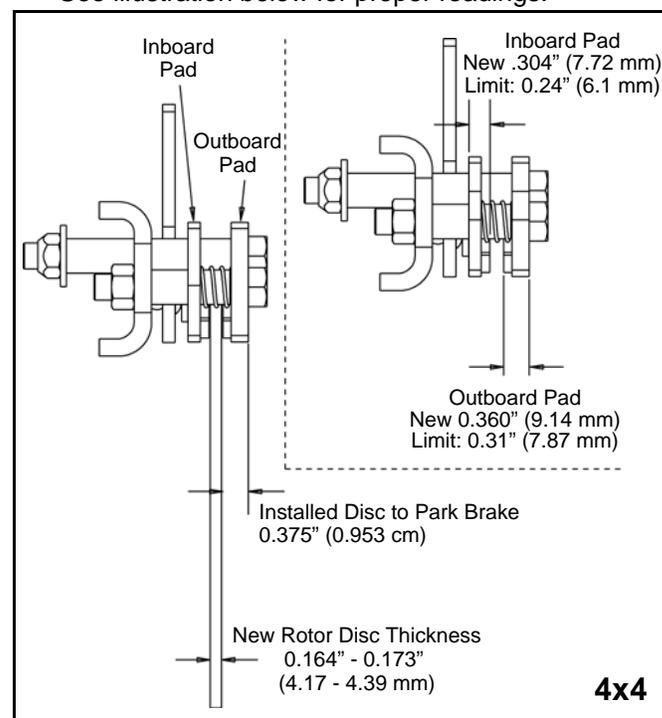
- Remove the two caliper assembly bolts (C).



- Slide the brake pads and springs from the assembly.

NOTE: Retain the lever and ball bearings for reassembly.

- Inspect brake pads for excessive wear. Replace as needed.
- Check the three steel balls for any signs of cracking. Replace as needed.
- Check ball seats in lever and stationary actuator. If excessively worn, replace parts as needed.
- Measure the thickness of the rear caliper parking brake pads. Replace assembly or pads as needed. See illustration below for proper readings.



BRAKES

New Brake Pad Installation

NOTE: Parking Brake Pads can be replaced by ordering one of the following kits:

PN 2203148 - Brake Pad and Shim Kit

PN 2203147 - Brake Pad Kit

There may be more parts in the service kit than your brake requires. Check the parts list included with the kit for the exact quantities.

1. Using the stationary actuator, assemble the caliper components as shown below. Do not install the springs or shims yet. Measure the gap for the brake disc. Disassemble and add shims between thrust washer and the inside brake pad as needed to close the gap to .203" - .193" (5.16 - 4.90 mm). For shim location, see **Figure 9.12** on page 12.



2. Once you have determined the correct amount of shims to use, install the assembly bolts through the sleeves. Install the nuts and the correct amount of shims, the inner brake pad, springs, and outer brake pad. Torque the assembly nuts to **35 ft. lbs. (47 Nm)**.



Parking Brake Caliper - Assembly Bolts:
35 ft. lbs. (47 Nm)

3. Ensure the parking brake assembly functions properly by actuating the lever before reinstallation.

Caliper Installation

1. Attach the parking brake caliper to the mount bracket and finger tighten the (2) mounting bolts.

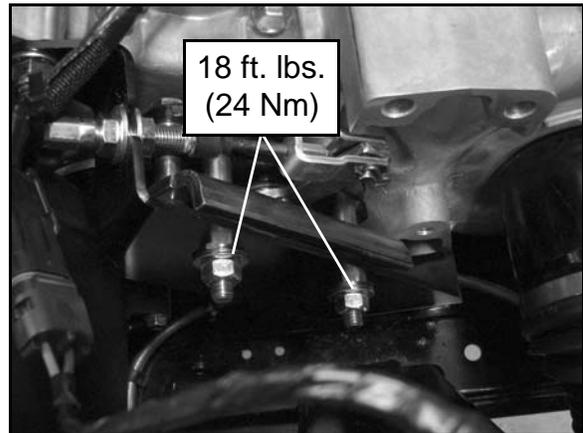


2. Place the parking brake assembly into place. Install and tighten the (3) mount bracket fasteners to specification.



Parking Brake Caliper - Mount Bracket Bolts:
40 ft. lbs. (54 Nm)

3. Tighten the (2) parking brake caliper mounting bolts to specification.



Parking Brake Caliper - Mounting Bolts:
18 ft. lbs. (24 Nm)

4. Connect the rear differential solenoid harness.
5. Install the cable, pin and clip. Test the park brake for proper function.

PARKING BRAKE CALIPER SERVICE (6X6)

Exploded View

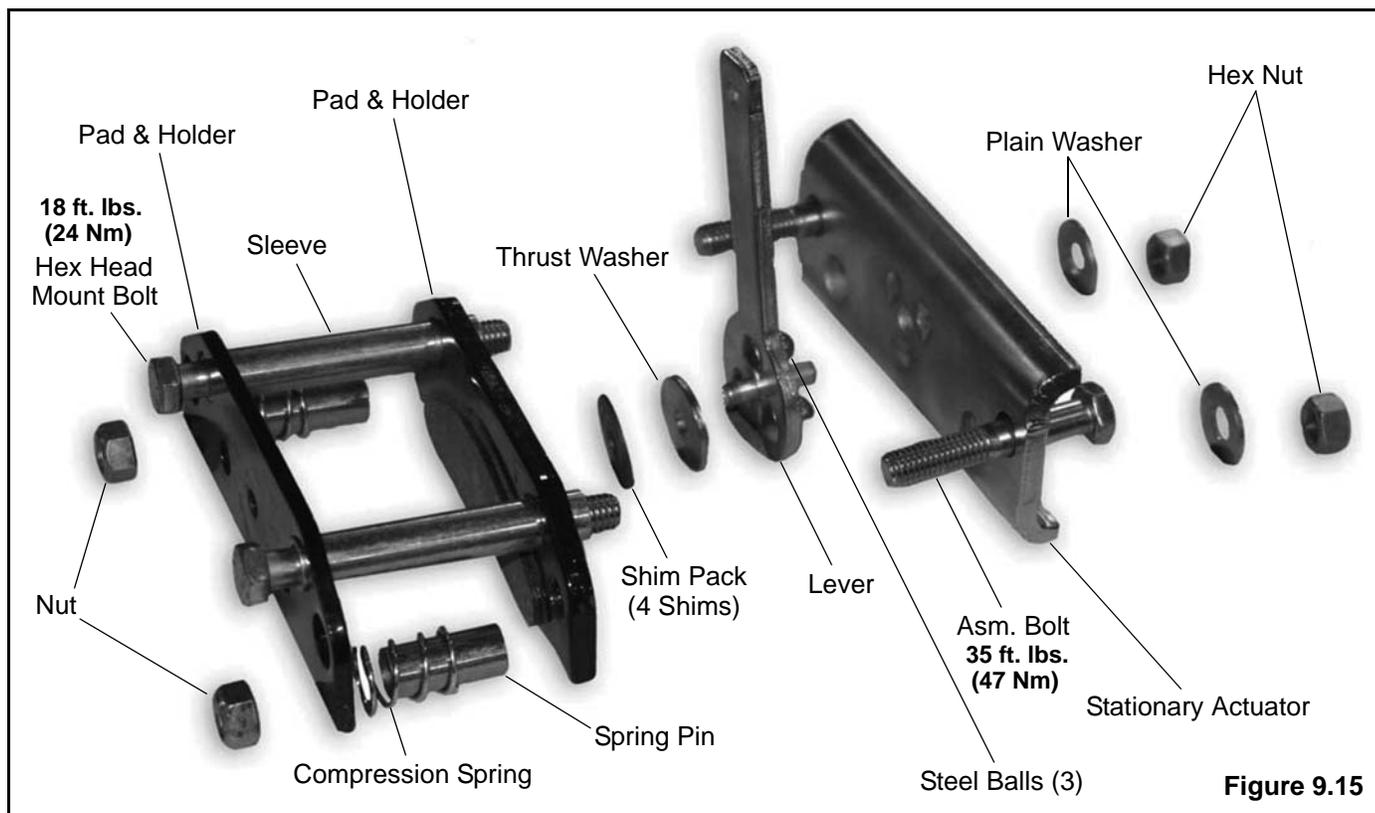


Figure 9.15

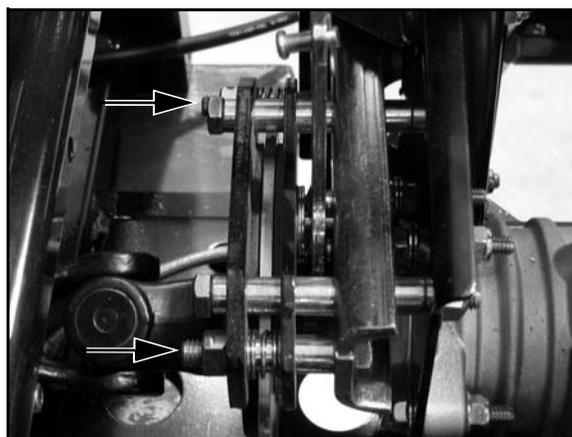
Caliper Removal

NOTE: Do not get oil, grease, or fluid on the parking brake pads. Damage to or contamination of the pads may cause the pads to function improperly.

1. Remove the clip and pin (A) from the parking brake cable.



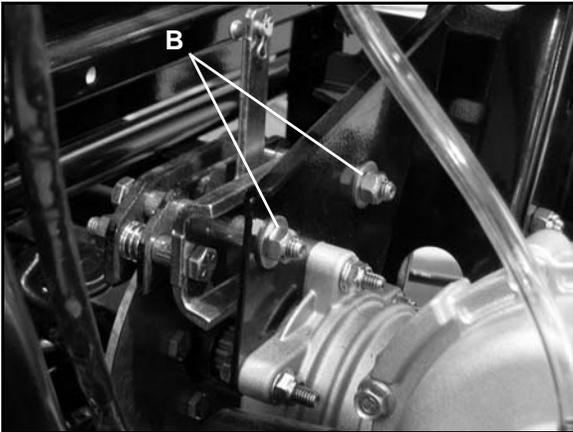
2. If replacing the brake pads, slightly loosen the caliper assembly bolts before removing the complete caliper assembly. This will ease the caliper disassembly procedure later.



NOTE: Be sure the parking brake is not engaged.

BRAKES

- Loosen the two brake caliper mounting bolts (B) in equal increments.

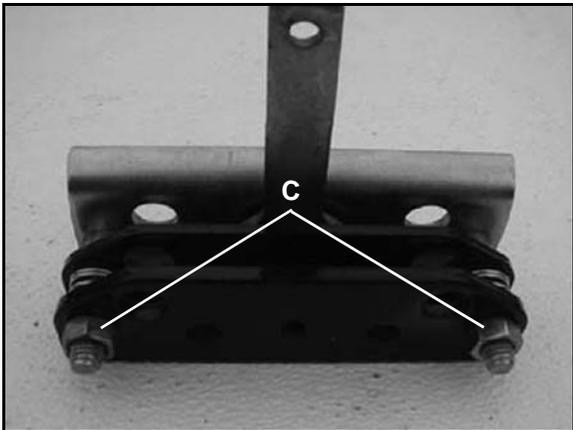


- Remove mounting bolts from mount bracket and lift the parking brake caliper assembly out of the vehicle.

Caliper Disassembly / Inspection

NOTE: Refer to the "Electronic Parts Catalog" for parking brake caliper replacement information.

- Remove the two caliper assembly nuts (C) that were previously loosened during Step 2 of "Caliper Removal".

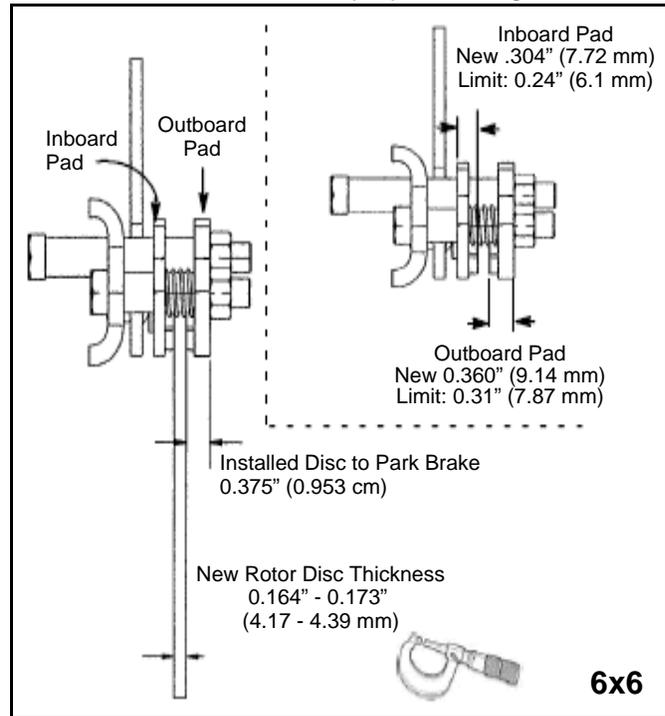


- Slide the brake pads and springs from the assembly.

NOTE: Retain the lever and ball bearings for reassembly.

- Inspect brake pads for excessive wear. Replace as needed.
- Check the three steel balls for any signs of cracking. Replace as needed.
- Check ball seats in lever and stationary actuator. If excessively worn, replace parts as needed.

- Measure the thickness of the rear caliper parking brake pads. Replace assembly or pads as needed. See illustration below for proper readings.



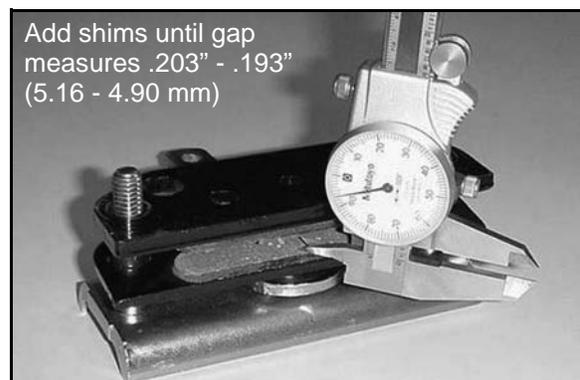
New Brake Pad Installation

NOTE: Parking Brake Pads can be replaced by ordering one of the following kits:

- PN 2203148 - Brake Pad and Shim Kit
- PN 2203147 - Brake Pad Kit

There may be more parts in the service kit than your brake requires. Check the parts list included with the kit for the exact quantities.

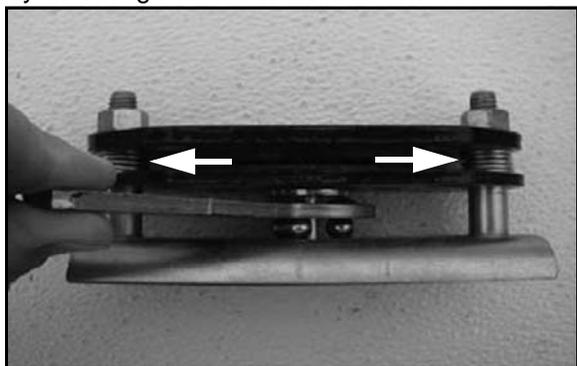
- Using the stationary actuator, assemble the caliper components as shown below. Do not install the springs or shims yet. Measure the gap for the brake disc. Disassemble and add shims between thrust washer and the inside brake pad as needed to close the gap to .203" - .193" (5.16 - 4.90 mm). For shim location, see **Figure 9.15** on page 15.



- Once you have determined the correct amount of shims to use, install the assembly bolts through the sleeves. Install the nuts and the correct amount of shims, the inner brake pad, springs, and outer brake pad. Torque the assembly nuts to **35 ft. lbs. (47 Nm)**.

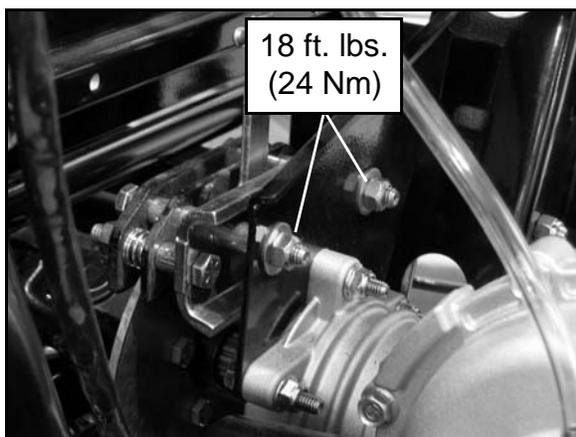
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Parking Brake Caliper - Assembly Bolts: 35 ft. lbs. (47 Nm)

- Ensure the parking brake assembly functions properly by actuating the lever before reinstallation.



Caliper Installation

- Install the parking brake assembly into place. Tighten the two mounting bolts in increments.



- Torque the two mounting bolts to specification.

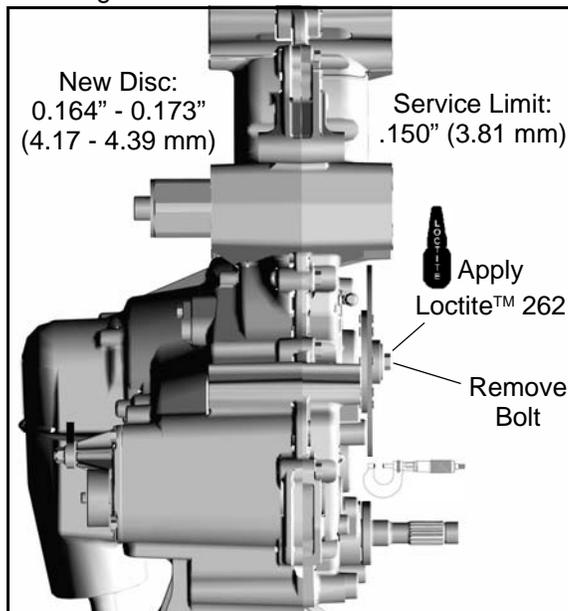
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Parking Brake Caliper - Mounting Bolts: 18 ft. lbs. (24 Nm)

- Install the cable, pin, and clip. Test the park brake for proper function.

PARKING BRAKE DISC SERVICE

Disc Inspection / Removal (4x4)

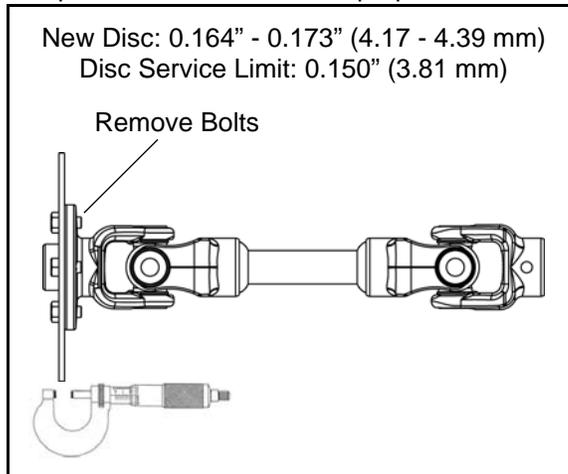
- Measure brake disc with a micrometer. If thickness of disc is less than specified, replace the disc assembly.
- Remove the outer PVT cover, belt, drive clutch, driven clutch and inner PVT cover (see Chapter 6).
- Using a 1/2" socket and ratchet, remove brake disc retaining bolt and remove disc from the transmission.



- Reverse this procedure to reinstall brake disc. Torque the disc mounting bolt to **10-15 ft. lbs. (14-20 Nm)**.

Disc Inspection / Removal (6x6)

- Measure the brake disc with a micrometer. If the thickness of the disc is less than specified, replace the rear propshaft assembly.
- Follow the rear prop shaft removal procedure listed in Chapter 7 to remove the rear propshaft assembly.



- Refer to Chapter 7 to install rear propshaft assembly.

BRAKES

FRONT BRAKE PADS

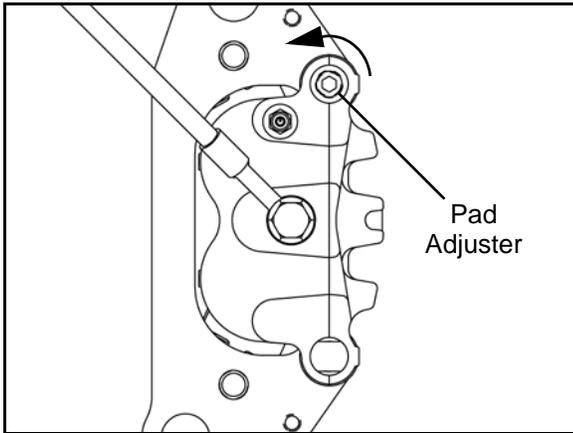
Pad Removal

1. Elevate and support front of vehicle.

 **CAUTION**

Use care when supporting vehicle so that it does not tip or fall.
Severe injury may occur if machine tips or falls.

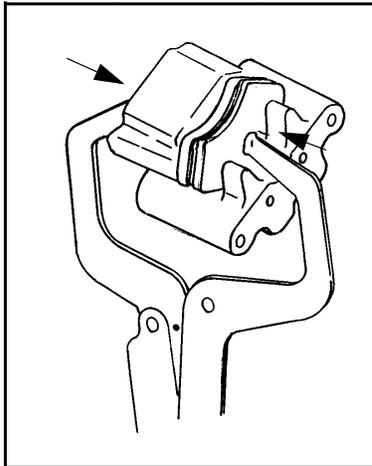
2. Remove the wheel nuts, washers and front wheel. Loosen pad adjuster screw.



3. Remove the upper and lower caliper mounting bolts and remove the caliper from the front hub.

NOTE: When removing caliper, use care not to damage brake line. Support caliper to avoid kinking or bending brake line.

4. Push caliper piston into caliper bore slowly using a C-clamp or locking pliers with pads installed.



NOTE: Brake fluid will be forced through compensating port into master cylinder fluid reservoir when piston is pushed back into caliper. Remove excess fluid from reservoir as required.

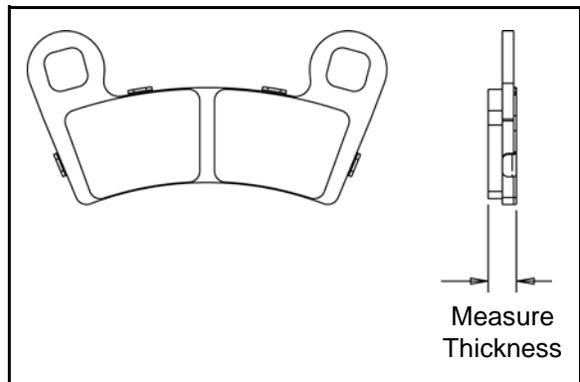
5. Push the mounting bracket inward and slip outer brake pad out between the bracket and caliper body.



6. Remove the inner pad from the bracket and caliper.

Pad Inspection

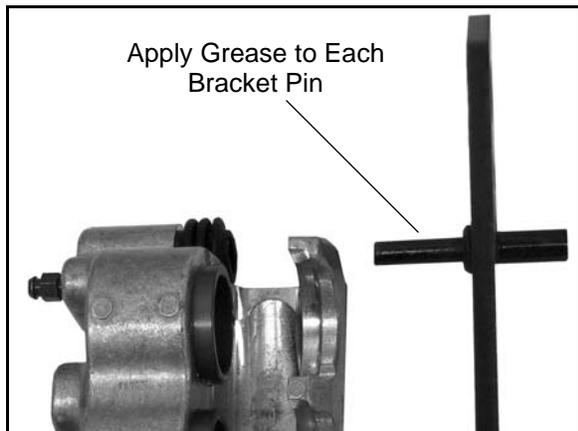
1. Measure the thickness of the pad material. Replace pads if worn beyond the service limit.



Front Brake Pad Thickness
New: $.298 \pm .007$ " (7.56 ± .178 mm)
Service Limit: $.180$ " (4.6 mm)

Pad Assembly / Installation

1. Lubricate mounting bracket pins with a light film of silicone grease and install rubber dust boots.

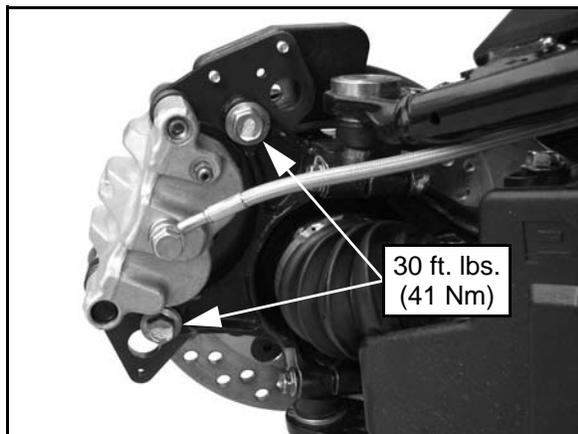


2. Compress mounting bracket and make sure dust boots are fully seated. Install pads with friction material facing each other.

⚠ WARNING

If brake pads are contaminated with grease, oil, or liquid soaked do not use the pads.
Use only new, clean pads.

3. Install caliper onto front hub and torque mounting bolts to specification.

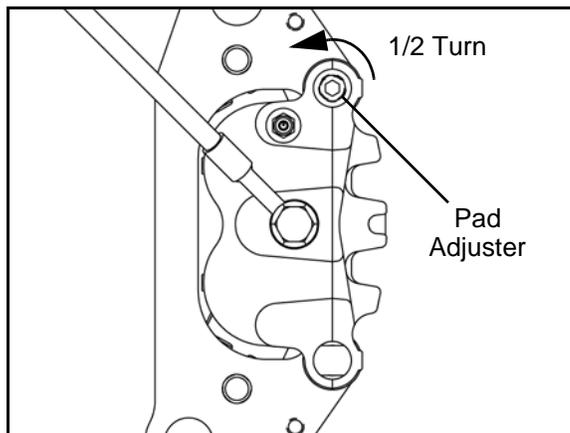


⚙ = T

Front Caliper Mounting Bolts:
30 ft. lbs. (41 Nm)

4. Slowly pump brake pedal until pressure has been built up. Maintain at least 1/2, (12.7 mm) of brake fluid in reservoir to prevent air from entering brake system.

5. Install the pad adjuster set screw and turn clockwise until stationary pad contacts disc, then back off 1/2 turn (counterclockwise).



6. Verify fluid level in reservoir is up to MAX line inside reservoir and install reservoir cap.

Master Cylinder Fluid

Up to MAX line inside reservoir

7. Install wheel and torque wheel nuts to specification.

⚙ = T

Wheel Nuts:
Steel Wheels: 35 ft. lbs. (47 Nm)
Aluminum Wheels: 30 ft. lbs. + 90° (1/4 turn)

Brake Burnishing Procedure

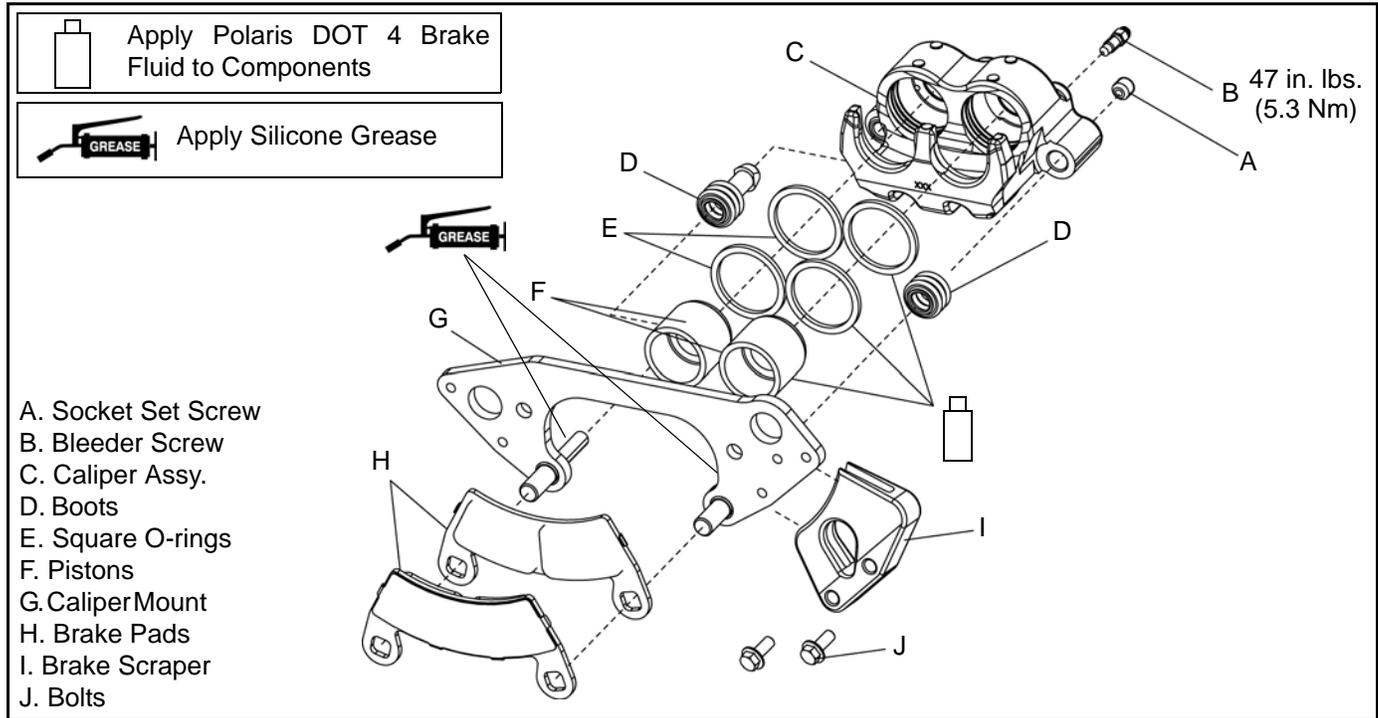
It is required that a burnishing procedure be performed after installation of new brake pads to extend service life and reduce noise.

Start machine and slowly increase speed to 30 mph. Gradually apply brakes to stop machine. Allow pads and disc to cool sufficiently during the procedure. Do not allow pads or disc to become hot or warping may result. Repeat this procedure 10 times. **Do not make more than 3 stops per 1 mile (1.6 km).**

BRAKES

FRONT CALIPER SERVICE

Caliper Exploded View



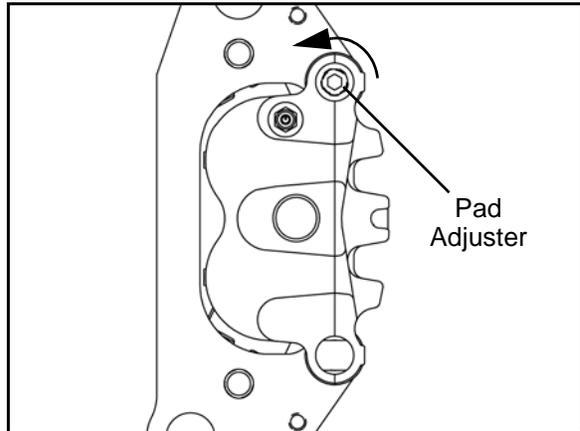
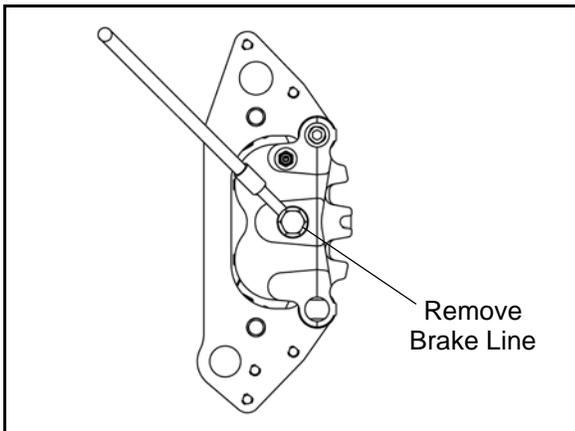
Caliper Removal

1. Elevate and safely support the front of the vehicle.
2. Remove the (4) wheel nuts and the front wheel.
5. Loosen brake pad adjustment set screw to allow brake pad removal after the caliper is removed.

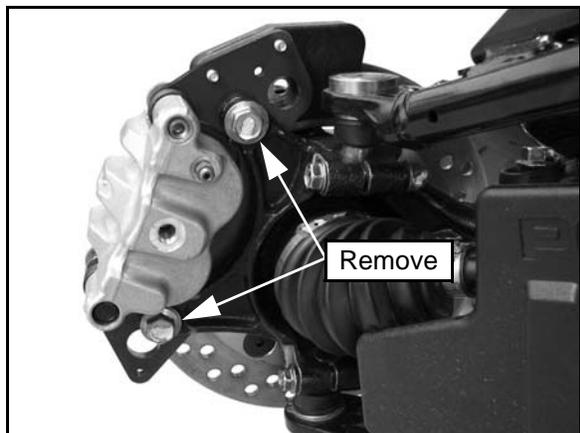
CAUTION

Use care when supporting vehicle so that it does not tip or fall. Severe injury may occur.

3. Clean caliper area before removal.
4. Place a container below the caliper to catch brake fluid when removing line. Remove brake line from caliper.

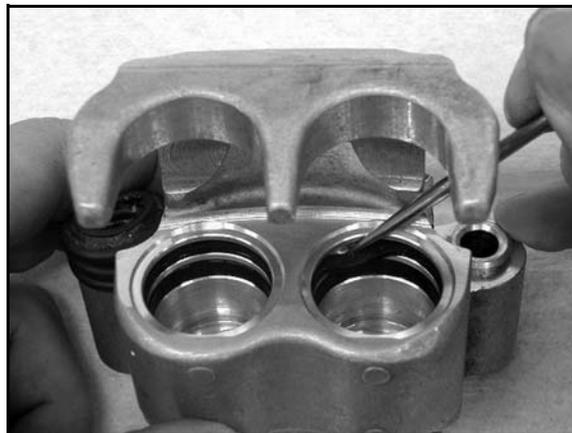


- Remove the two caliper mounting bolts and caliper.



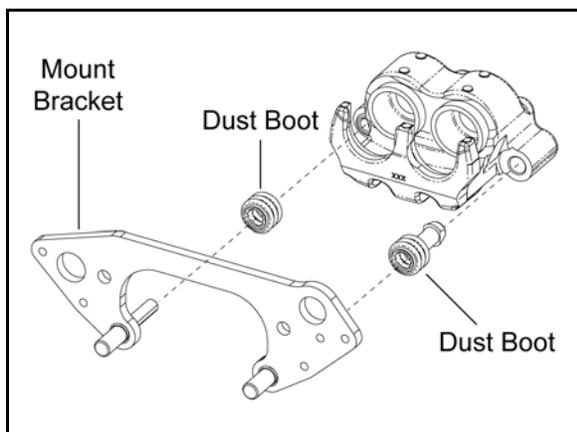
IMPORTANT: Do not remove the caliper pistons with a standard pliers. The piston sealing surfaces will become damaged if a standard pliers is used.

- Once the pistons are removed, use a pick to carefully remove the square O-rings from the caliper. O-rings should be replaced during caliper service.

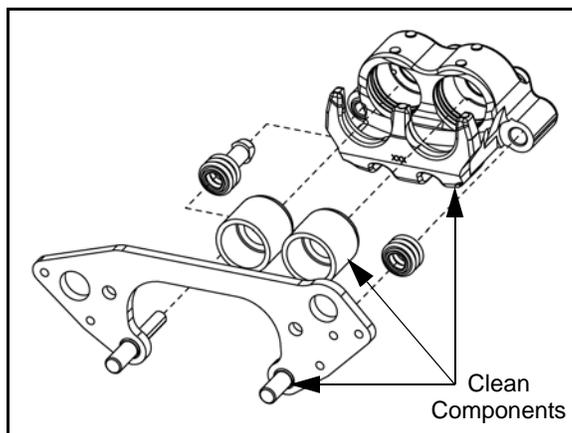


Caliper Disassembly

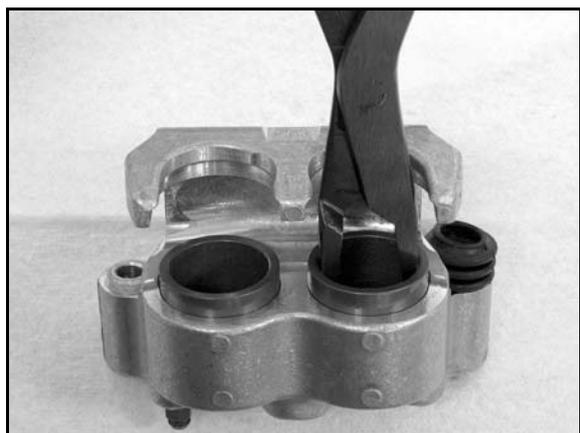
- Remove both brake pads from the caliper (see "FRONT BRAKE PADS - Pad Removal").
- Remove the mount bracket assembly and dust boots from caliper. Thoroughly clean caliper before disassembly and prepare a clean work area.



- Clean the caliper body, piston, and retaining bracket with brake cleaner or alcohol.



- Use a commercially available caliper piston pliers to extract the pistons from the caliper.

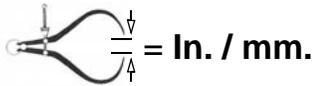


IMPORTANT: Be sure to clean the seal grooves in caliper body.

BRAKES

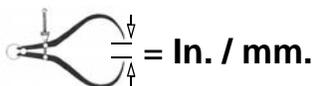
Caliper Inspection

1. Inspect caliper body for nicks, scratches, pitting or wear. Measure bore size and compare to specifications. Replace if damaged or worn beyond service limit.



Caliper Piston Bore I.D.:
Std: 1.373" (34.87 mm)
Service Limit: 1.375" (34.93 mm)

2. Inspect piston for nicks, scratches, pitting or wear. Measure piston diameter and replace if damaged or worn beyond service limit.

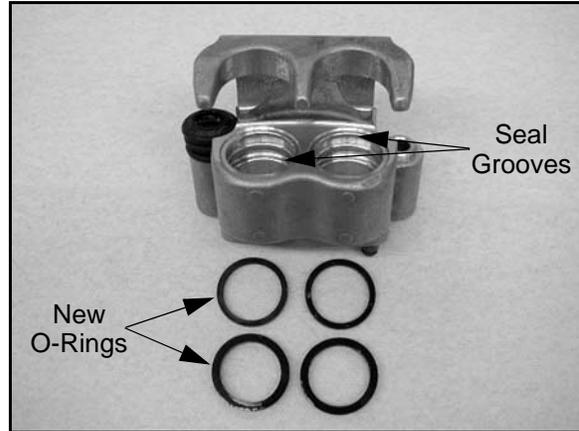


Caliper Piston O.D.:
Std: 1.370" (34.80 mm)
Service Limit: 1.368" (34.75 mm)

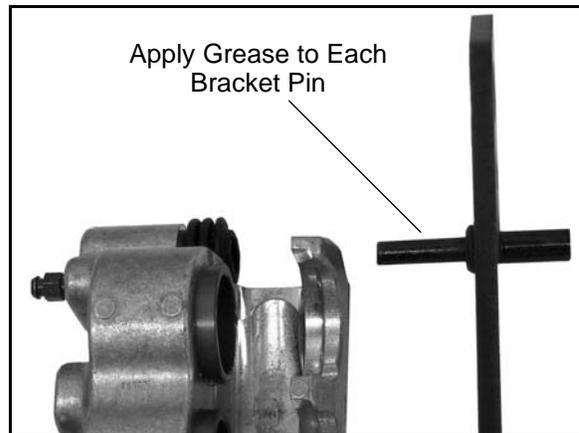
3. Inspect brake disc and pads as outlined in this chapter.

Caliper Assembly

1. Install new O-rings in the caliper body. Be sure the grooves are clean and free of residue or brakes may drag upon assembly.



2. Coat pistons with clean Polaris DOT 4 Brake Fluid. Install pistons with a twisting motion while pushing inward. Piston should slide in and out of bore smoothly, with light resistance.
3. Lubricate the mounting bracket pins with silicone grease and install the rubber dust seal boots.

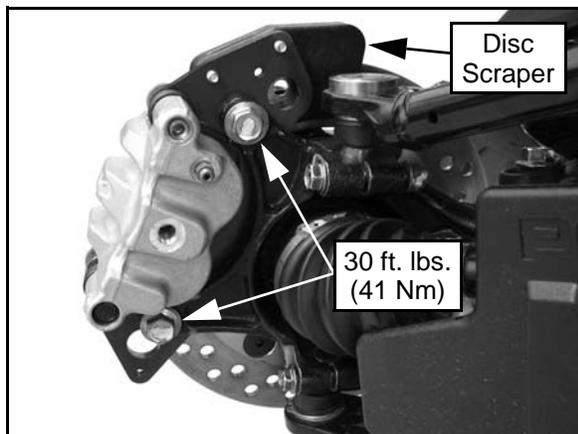


4. Compress the mounting bracket and make sure the dust seal boots are fully seated. Install the brake pads. Clean the disc and pads with brake parts cleaner or denatured alcohol to remove any dirt, oil or grease.

Caliper Installation

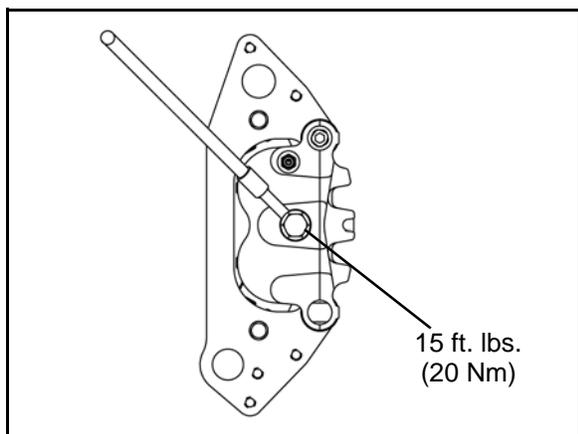
1. Install caliper and torque mounting bolts to specification.

IMPORTANT: If brake disc scraper was removed, be sure to reinstall it upon caliper installation.

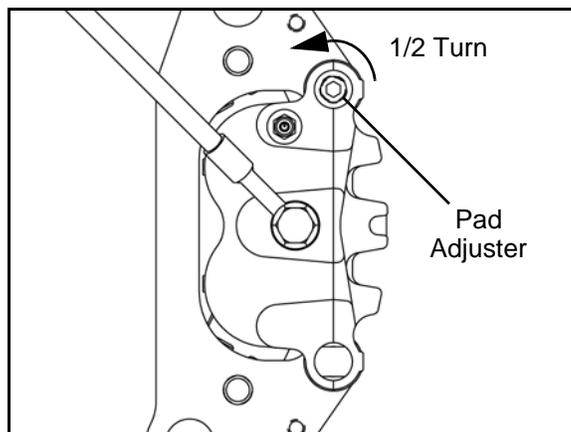


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Front Caliper Mounting Bolts: 30 ft. lbs. (41 Nm)

2. Install brake line and torque the banjo bolt to the proper torque specification.



3. Install the pad adjustment screw and turn until stationary pad contacts disc, then back off 1/2 turn.



4. Perform brake bleeding procedure as outlined earlier in this chapter.
5. Install wheel and torque wheel nuts to specification.

 = T
Wheel Nuts: Steel Wheels: 35 ft. lbs. (47 Nm) Aluminum Wheels: 30 ft. lbs. + 90° (1/4 turn)

6. Field test unit for proper braking action before putting into service. Inspect for fluid leaks and firm brakes. Make sure the brake is not dragging when pedal is released. If the brake drags, re-check assembly and installation.

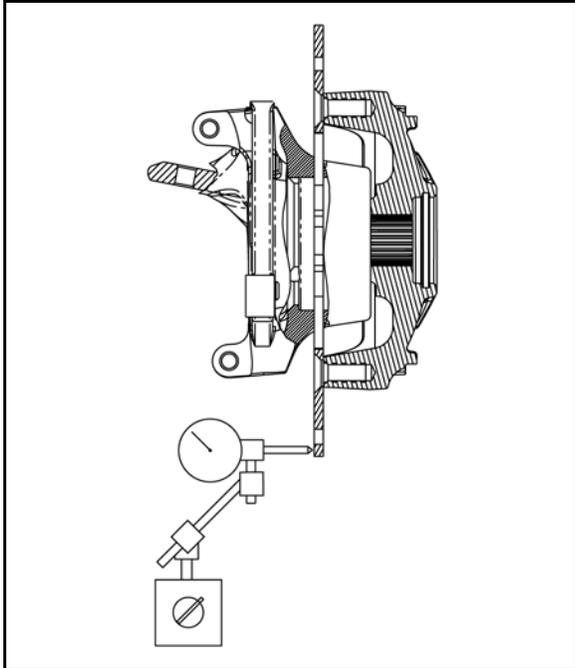
NOTE: If new brake pads are installed, brake burnishing is recommended (see “FRONT BRAKE PADS - Brake Burnishing Procedure”).

BRAKES

FRONT BRAKE DISC

Disc Runout

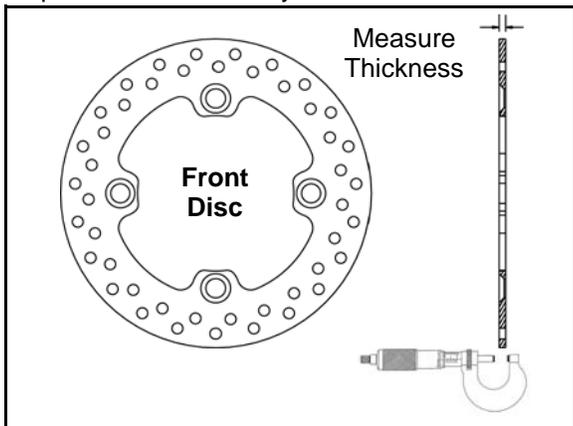
1. Mount dial indicator as shown. Slowly rotate the disc and read total runout on the dial indicator. Replace disc if runout exceeds specification.



**Brake Disc Runout:
Service Limit .010" (.254 mm)**

Disc Inspection

1. Visually inspect disc for scoring, scratches or gouges. Replace the disc if any deep scratches are evident.
2. Use a 0-1" micrometer and measure disc thickness at eight different points around the pad contact surface. Replace disc if worn beyond service limit.

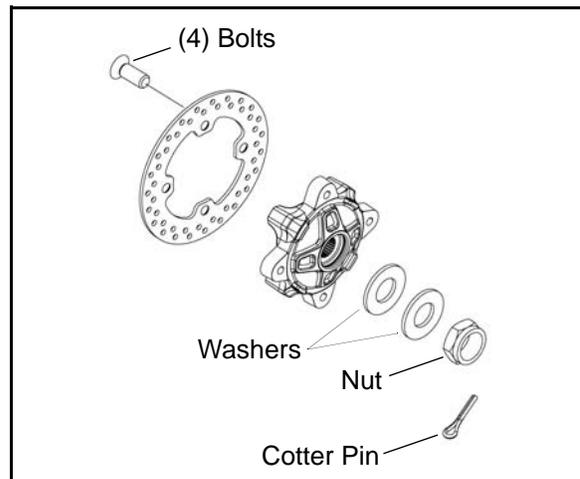


**Brake Disc Thickness
New .188" (4.78 mm)
Service Limit .170" (4.32 mm)**

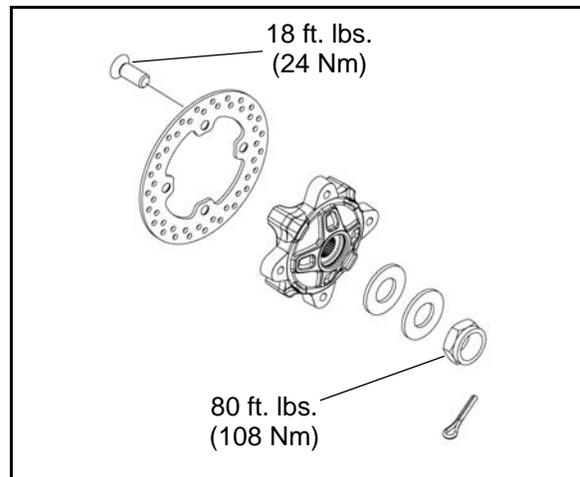
**Brake Disc Thickness Variance
Service Limit: .002" (.051 mm)
difference between measurements**

Disc Removal / Replacement

1. Remove front brake caliper (see "Front Caliper Service").
2. Remove cotter pin, castle nut and washers.
3. Remove the wheel hub assembly from the vehicle and remove the (4) bolts retaining the disc to the hub.



4. Clean the wheel hub mating surface and install new disc on wheel hub. Torque new bolts to **18 ft. lbs. (24 Nm)**.



⚠ CAUTION

Always use new brake disc mounting bolts. The bolts have a pre-applied locking agent which is destroyed upon removal.

5. Install wheel hub assembly, washers, and castle nut. Torque castle nut to **80 ft. lbs. (108 Nm)** and install a new cotter pin.
6. Install front brake caliper (see "Front Caliper Service"). Follow bleeding procedure outlined earlier in this chapter.
7. Field test unit for proper braking action before putting into service. Inspect for fluid leaks and firm brakes. Make sure the brake is not dragging when pedal is released. If the brake drags, re-check assembly and installation.

REAR BRAKE PADS (XP / HD)

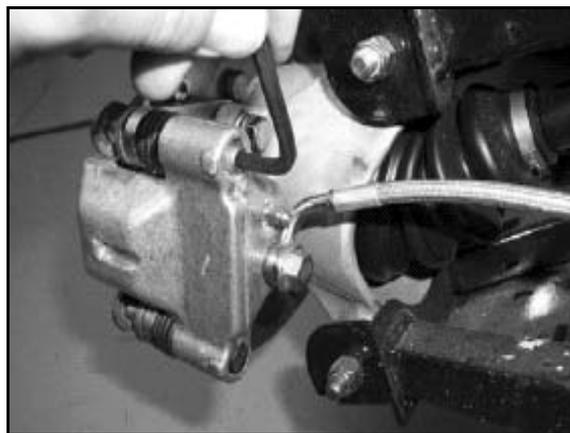
Pad Removal

1. Elevate and support rear of machine.

⚠ CAUTION

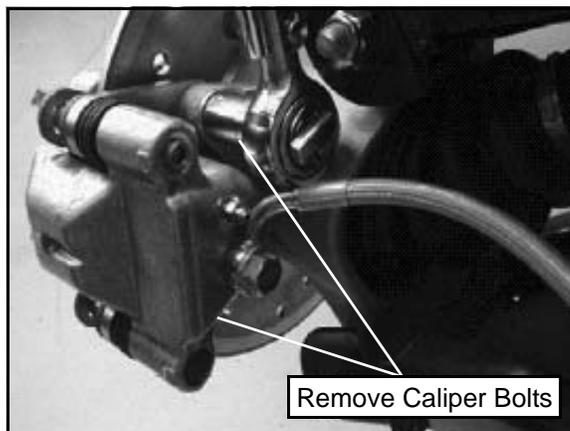
Use care when supporting vehicle so that it does not tip or fall. Severe injury may occur if machine tips or falls.

2. Remove the rear wheel. Loosen pad adjuster screw 2-3 turns.



3. Clean caliper area before removal.
4. Remove caliper mounting bolts and lift caliper off of disc.

NOTE: When removing caliper, be careful not to damage brake line. Support caliper so as not to kink or bend brake line.



5. Push caliper piston into caliper bore slowly with pads installed.

BRAKES

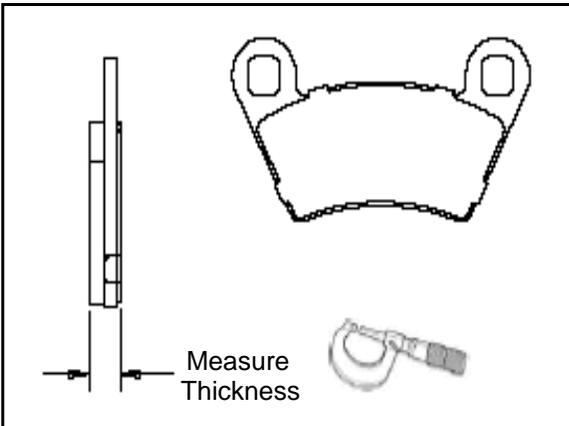
NOTE: Brake fluid will be forced through compensating port into master cylinder fluid reservoir when piston is pushed back into caliper. Remove excess fluid from reservoir as required.

6. Remove the brake pads.



Pad Inspection

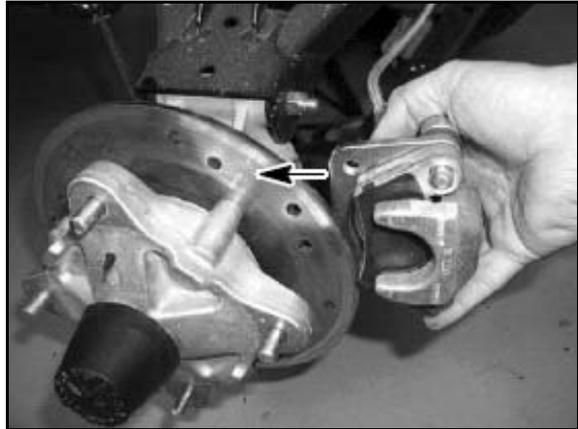
1. Clean the caliper with brake cleaner or alcohol.
2. Measure the thickness of the pad material. Replace pads if worn beyond the service limit.



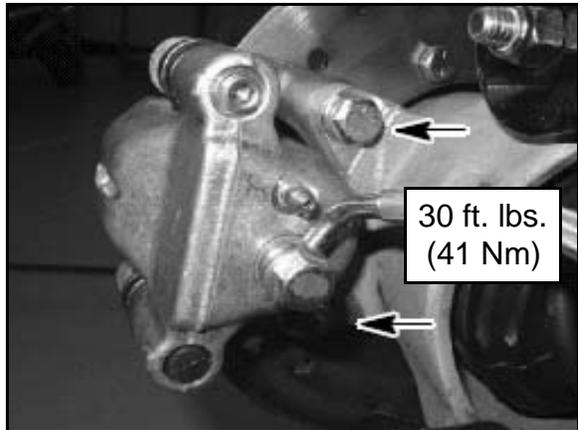
Rear Brake Pad Thickness
New .298 + .007" (7.56 + .178 mm)
Service Limit .180" (4.6 mm)

Pad Installation

1. Install new pads in caliper body.



2. Install caliper and torque mounting bolts.



Rear Brake Caliper Mounting Bolts:
30 ft. lbs. (41 Nm)

3. Turn adjuster screw back in finger tight using a hex wrench.
4. Slowly pump brake pedal until pressure has been built up. Maintain at least 1/2" (12.7 mm) of brake fluid in reservoir to prevent air from entering master cylinder.

Brake Burnishing Procedure

It is required that a burnishing procedure be performed after installation of new brake pads to extend service life and reduce noise.

Start machine and slowly increase speed to 30 mph. Gradually apply brakes to stop machine. Allow pads and disc to cool sufficiently during the procedure. Do not allow pads or disc to become hot or warping may result. Repeat this procedure 10 times. **Do not make more than 3 stops per 1 mile (1.6 km).**

REAR BRAKE PADS (CREW / 6X6)

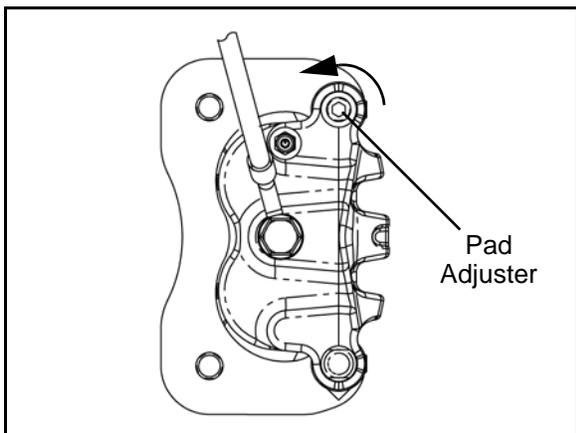
Pad Removal

1. Elevate and support rear of vehicle.

⚠ CAUTION

Use care when supporting vehicle so that it does not tip or fall.
Severe injury may occur if machine tips or falls.

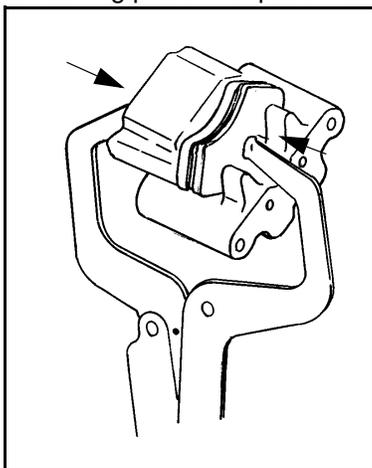
2. Remove the wheel nuts, washers and rear wheel. Loosen pad adjuster screw.



3. Remove the upper and lower caliper mounting bolts and remove the caliper from the front hub.

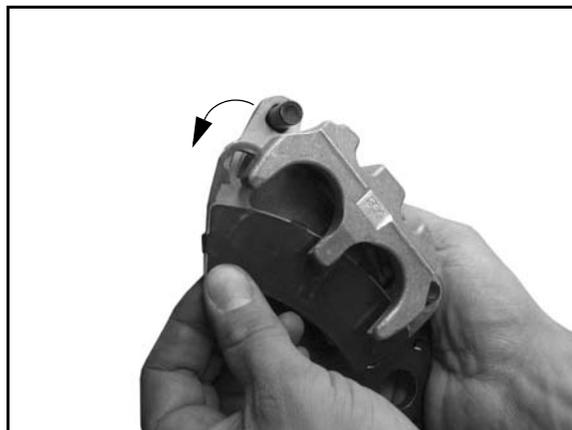
NOTE: When removing caliper, use care not to damage brake line. Support caliper to avoid kinking or bending brake line.

4. Push caliper piston into caliper bore slowly using a C-clamp or locking pliers with pads installed.



NOTE: Brake fluid will be forced through compensating port into master cylinder fluid reservoir when piston is pushed back into caliper. Remove excess fluid from reservoir as required.

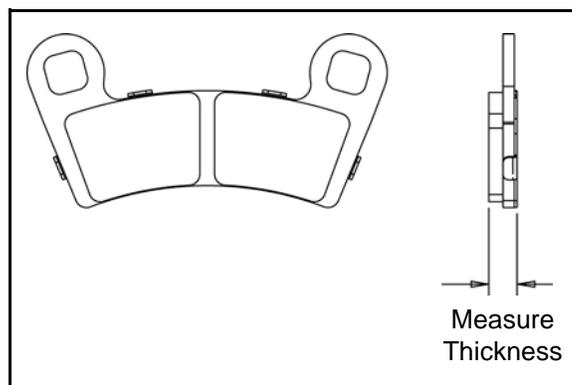
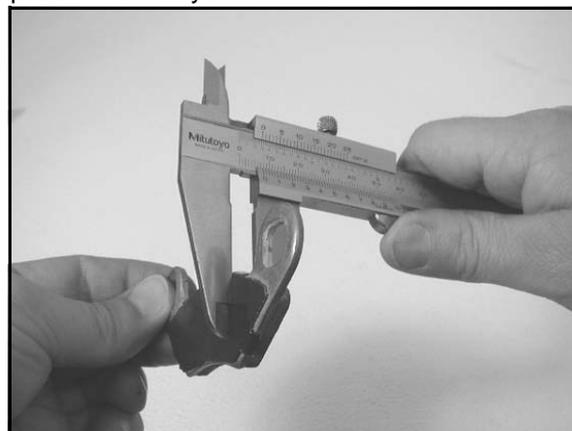
5. Push the mounting bracket inward and slip outer brake pad out between the bracket and caliper body.



6. Remove the inner pad from the bracket and caliper.

Pad Inspection

1. Measure the thickness of the pad material. Replace pads if worn beyond the service limit.



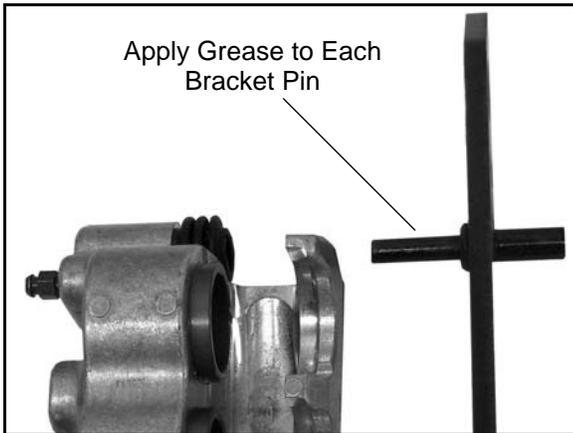
Front Brake Pad Thickness

New: $.298 \pm .007$ " (7.56 ± .178 mm)
Service Limit: $.180$ " (4.6 mm)

BRAKES

Pad Assembly / Installation

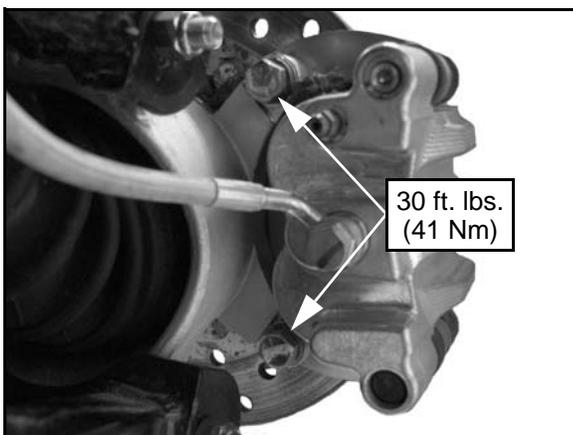
1. Lubricate mounting bracket pins with a light film of silicone grease and install rubber dust boots.



2. Compress mounting bracket and make sure dust boots are fully seated. Install pads with friction material facing each other.

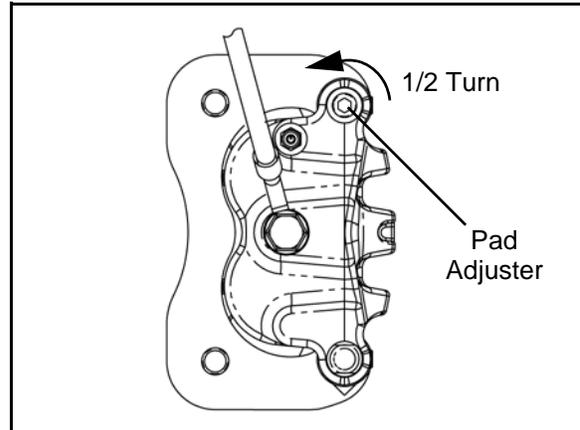
 WARNING
If brake pads are contaminated with grease, oil, or liquid soaked do not use the pads. Use only new, clean pads.

3. Install caliper onto rear hub and torque mounting bolts to specification.



 = T
Rear Caliper Mount Bolt Torque: 30 ft. lbs. (41 Nm)

4. Slowly pump the brake pedal until pressure has been built up. Maintain at least 1/2, (12.7 mm) of brake fluid in the reservoir to prevent air from entering the brake system.
5. Install the pad adjuster set screw and turn clockwise until stationary pad contacts disc, then back off 1/2 turn (counterclockwise).



6. Verify fluid level in reservoir is up to MAX line inside reservoir and install reservoir cap.

Master Cylinder Fluid:
Up to MAX line inside reservoir

7. Install wheel and torque wheel nuts to specification.

 = T
Wheel Nuts: Steel Wheels: 35 ft. lbs. (47 Nm) Aluminum Wheels: 30 ft. lbs. + 90° (1/4 turn)

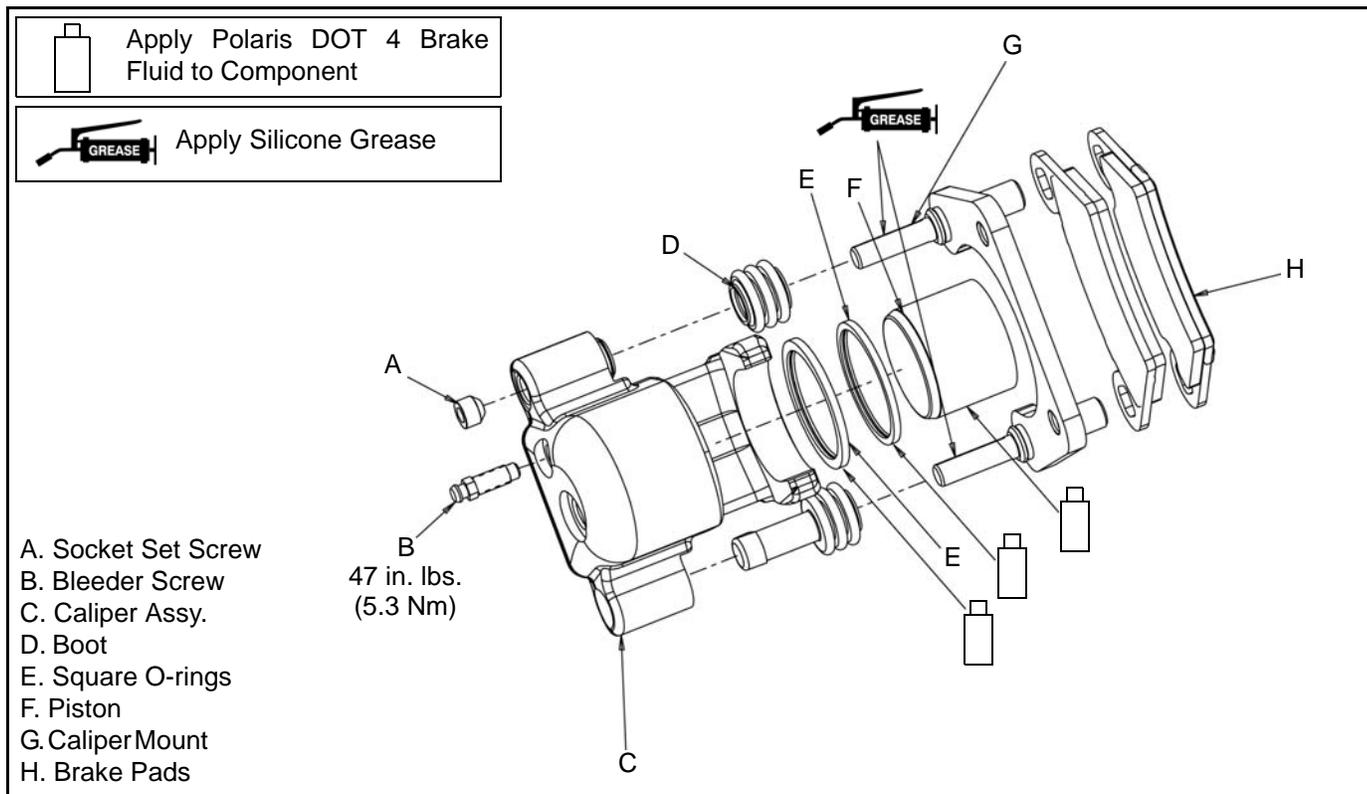
Brake Burnishing Procedure

It is required that a burnishing procedure be performed after installation of new brake pads to extend service life and reduce noise.

Start machine and slowly increase speed to 30 mph. Gradually apply brakes to stop machine. Allow pads and disc to cool sufficiently during the procedure. Do not allow pads or disc to become hot or warping may result. Repeat this procedure 10 times. **Do not make more than 3 stops per 1 mile (1.6 km).**

REAR CALIPER SERVICE (XP / HD)

Rear Caliper Exploded View



Caliper Removal

1. Safely support the rear of the machine.

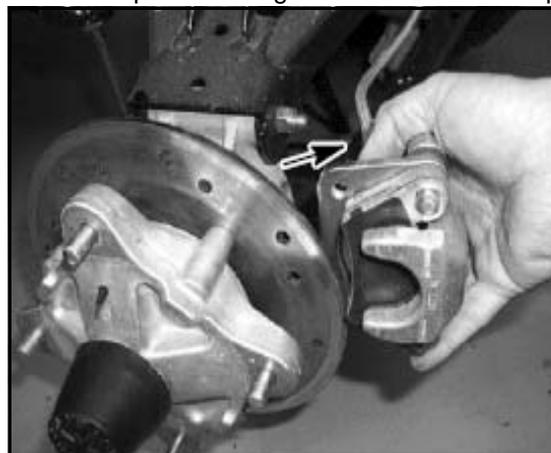
⚠ CAUTION

Use care when supporting vehicle so that it does not tip or fall. Severe injury may occur if machine tips or falls.

2. Place a container to catch brake fluid draining from brake lines. Use a wrench to remove the brake line.



3. After the fluid has drained into the container, remove the two caliper mounting bolts and remove caliper.

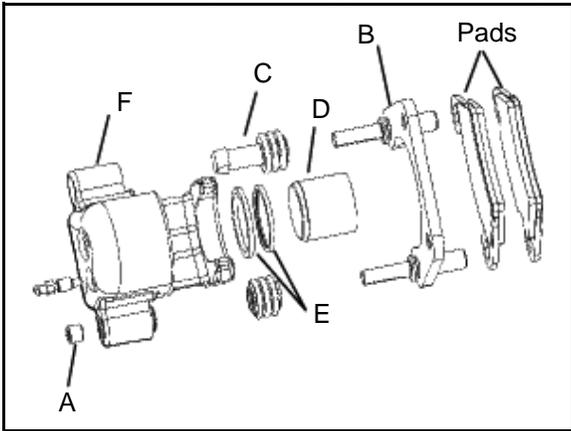


4. Clean disc, caliper body, and pistons with brake cleaner or alcohol.

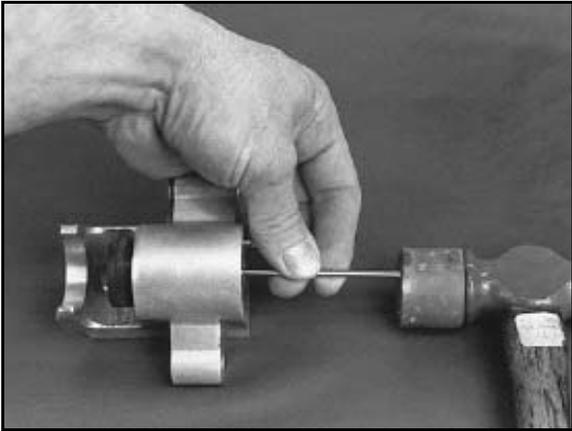
BRAKES

Caliper Disassembly

1. Remove brake pad adjuster screw (A).
2. Push upper pad retainer pin inward and slip brake pads past edge, if pads are still installed.
3. Remove mounting bracket (B) and dust boot (C).



4. Remove piston (D) and square O-rings (E) from the caliper body (F).

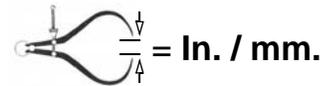
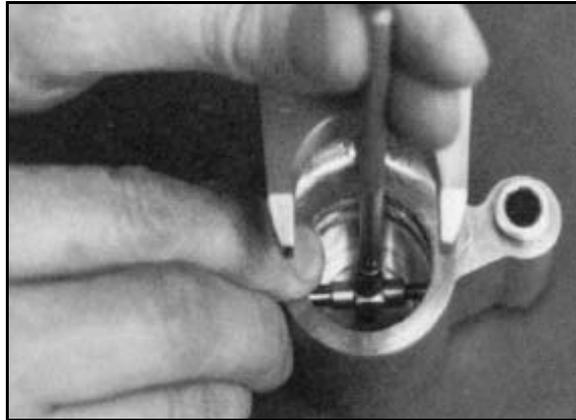


5. Clean the caliper body, piston, and retaining bracket with brake cleaner or alcohol.

NOTE: Be sure to clean seal grooves in caliper body.

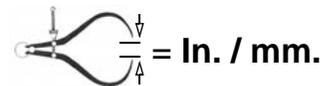
Caliper Inspection

1. Inspect caliper body for nicks, scratches or wear. Measure bore size and compare to specifications. Replace if damage is evident or if worn beyond service limit.



Caliper Piston Bore I.D.:
Std: 1.505" (38.23 mm)
Service Limit: 1.507" (38.28 mm)

2. Inspect piston for nicks, scratches, wear or damage. Measure diameter and replace if damaged or worn beyond service limit.

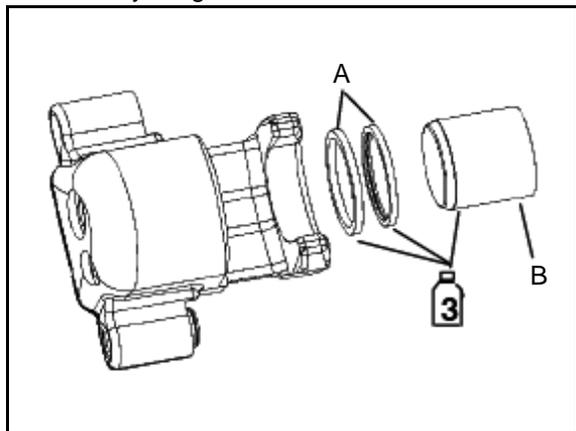


Caliper Piston O.D.:
Std: 1.500" (38.10 mm)
Service Limit: 1.498" (38.05 mm)

3. Inspect the brake disc and pads as outlined for brake pad replacement in this chapter.

Caliper Assembly

1. Install new square O-rings (A) in the caliper body. Be sure that the grooves are clean and free of residue or brakes may drag.



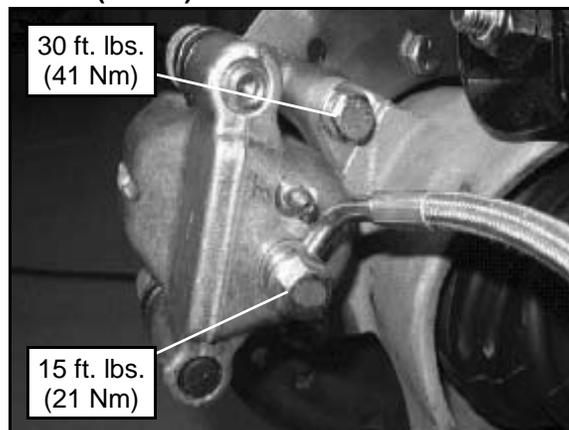
2. Coat the piston with clean DOT 4 Brake Fluid (PN 2872189). Install piston (B) with a twisting motion while pushing inward. Piston should slide in and out of bore smoothly, with light resistance.
3. Lubricate the mounting bracket pins with silicone grease and install the rubber dust seal boots.



4. Compress the mounting bracket and make sure the dust seals are fully seated. Install the brake pads. Clean the disc and pads with brake parts cleaner or denatured alcohol to remove any dirt, oil or grease.

Caliper Installation

1. Install the rear caliper onto the mounting bolts. Torque mounting bolts to **30 ft. lbs. (41 Nm)**.
2. Install brake line banjo bolt. Torque banjo bolt to **15 ft. lbs. (21 Nm)**.



3. Install the rear wheel and torque wheel nuts to specification. Carefully lower the vehicle.

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Wheel Nuts: Steel Wheels: 35 ft. lbs. (47 Nm) Aluminum Wheels: 30 ft. lbs. + 90° (1/4 turn)

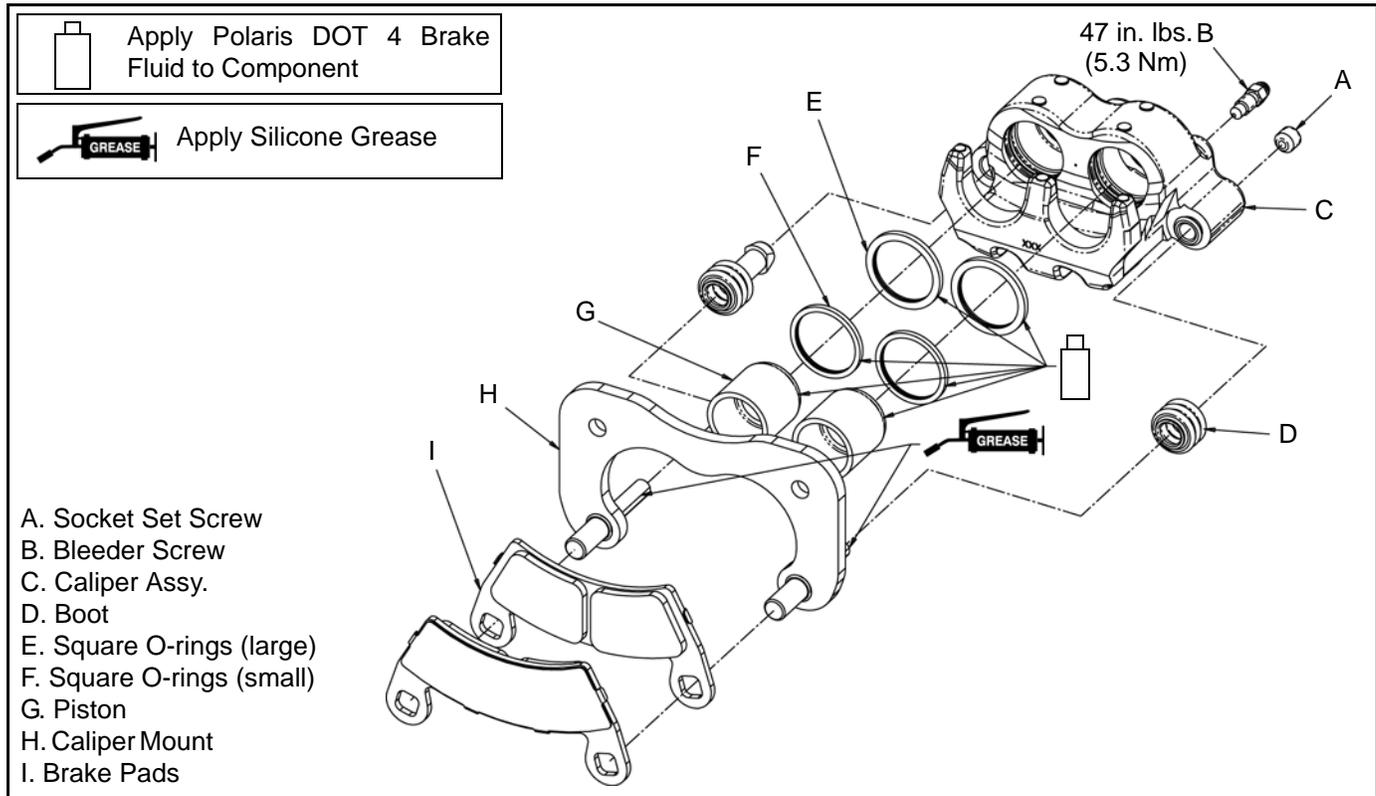
4. Field test unit for proper braking action before putting into service. Inspect for fluid leaks and firm brakes. Make sure the brake is not dragging when pedal is released. If the brake drags, re-check assembly and installation.

NOTE: If new brake pads are installed, brake burnishing is recommended (see "REAR BRAKE PADS - Brake Burnishing Procedure").

BRAKES

REAR CALIPER SERVICE (CREW / 6X6)

Rear Caliper Exploded View



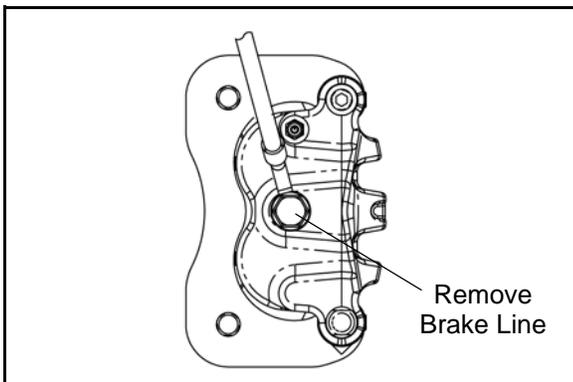
Caliper Removal

1. Elevate and safely support the rear of the vehicle.

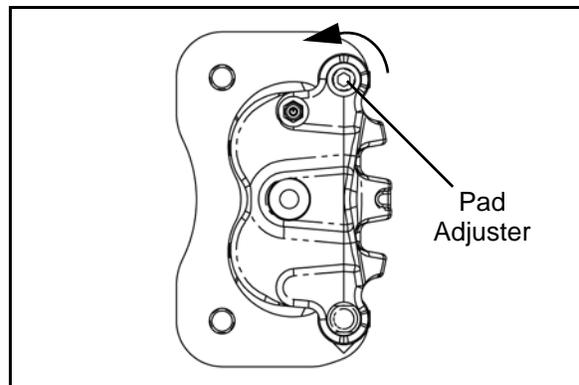


Use care when supporting vehicle so that it does not tip or fall. Severe injury may occur.

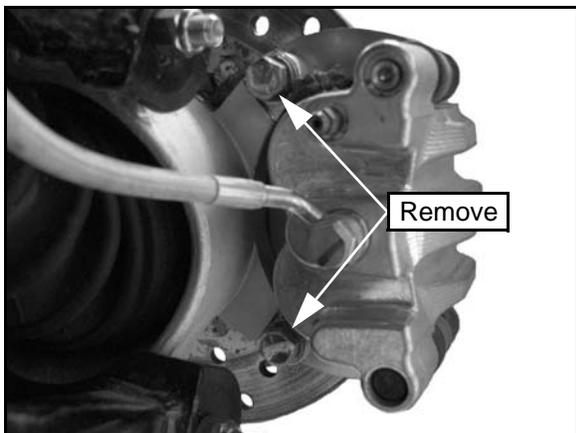
2. Remove (4) wheel nuts, (4) washers and rear wheel.
3. Clean caliper area before removal.
4. Place a container below the caliper to catch brake fluid. Remove brake line from caliper.



5. Loosen brake pad adjustment set screw to allow brake pad removal after the caliper is removed.

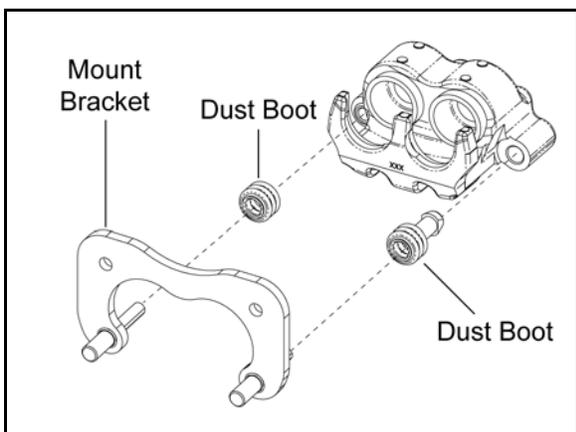


- Remove the two caliper mounting bolts and caliper.

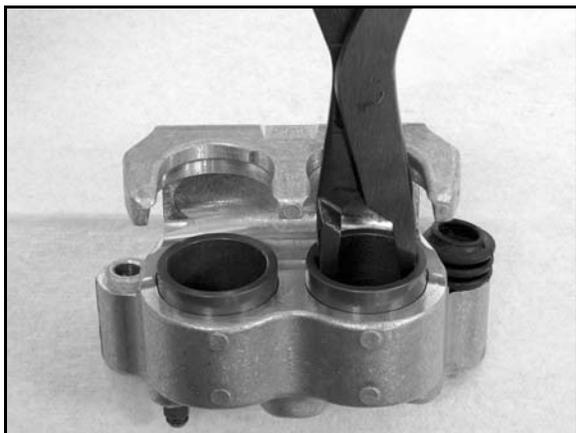


Caliper Disassembly

- Remove both brake pads from the caliper. Refer to "REAR BRAKE PADS (CREW / 6X6)".
- Remove mount bracket assembly and dust boots from caliper. Thoroughly clean caliper before disassembly and prepare a clean work area for disassembly.

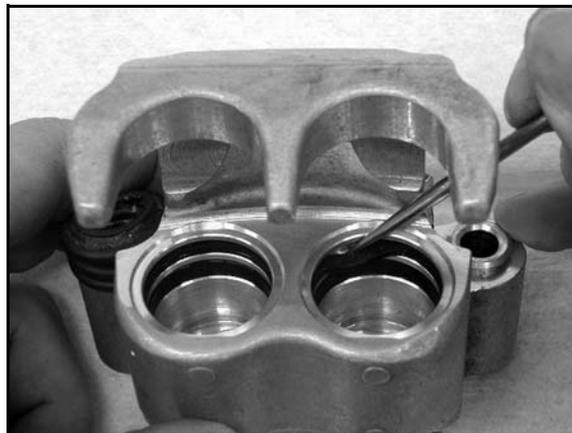


- Use a commercially available caliper piston pliers to extract the pistons from the caliper.

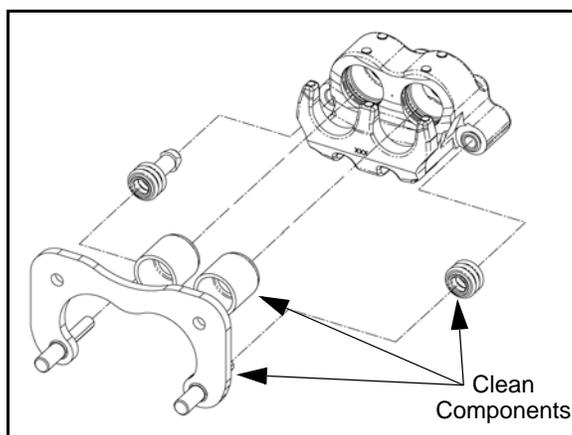


IMPORTANT: Do not remove the caliper pistons with a standard pliers. The piston sealing surfaces will become damaged if a standard pliers is used.

- Once the pistons are removed, use a pick to carefully remove the square O-rings from the caliper. O-rings should be replaced during caliper service.



- Clean the caliper body, piston, and retaining bracket with brake cleaner or alcohol.

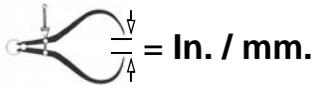


IMPORTANT: Be sure to clean the seal grooves in caliper body.

BRAKES

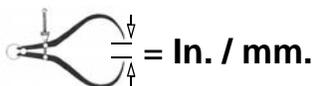
Caliper Inspection

1. Inspect caliper body for nicks, scratches, pitting or wear. Measure bore size and compare to specifications. Replace if damaged or worn beyond service limit.



Caliper Piston Bore I.D.:
Std: 1.192" (30.28 mm)
Service Limit: 1.194" (34.33 mm)

2. Inspect piston for nicks, scratches, pitting or wear. Measure piston diameter and replace if damaged or worn beyond service limit.

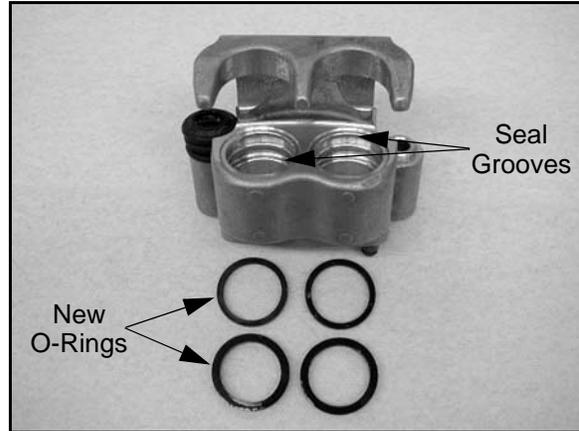


Caliper Piston O.D.:
Std: 1.186" (30.12 mm)
Service Limit: 1.184" (30.07 mm)

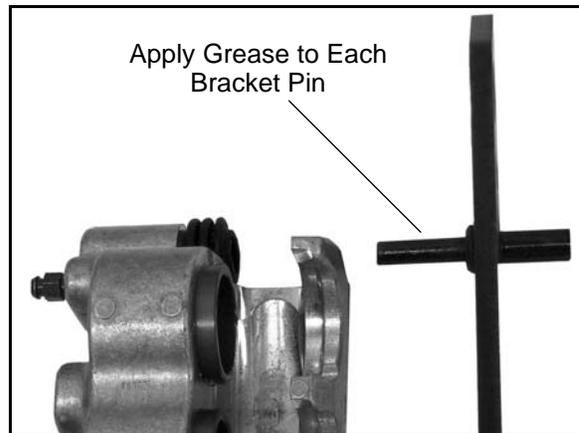
3. Inspect the brake disc and pads as outlined in this chapter.

Caliper Assembly

1. Install new O-rings in the caliper body. Be sure the grooves are clean and free of residue or brakes may drag upon assembly.



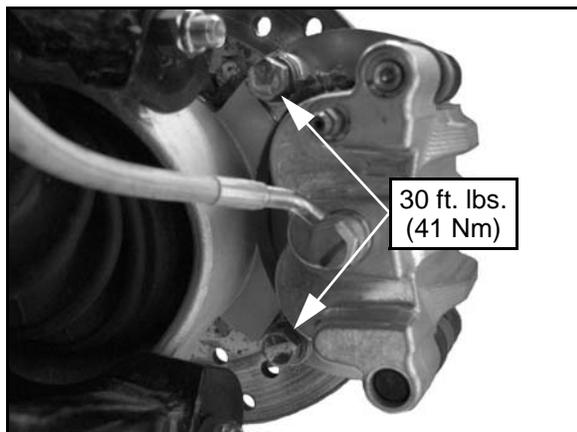
2. Coat pistons with clean Polaris DOT 4 Brake Fluid. Install pistons with a twisting motion while pushing inward. Piston should slide in and out of bore smoothly, with light resistance.
3. Lubricate the mounting bracket pins with silicone grease and install the rubber dust seal boots.

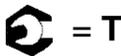


4. Compress the mounting bracket and make sure the dust seal boots are fully seated. Install the brake pads. Clean the disc and pads with brake parts cleaner or denatured alcohol to remove any dirt, oil or grease.

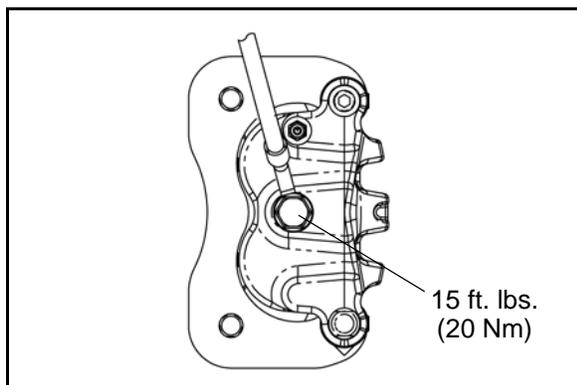
Caliper Installation

1. Install caliper and torque bolts to specification.

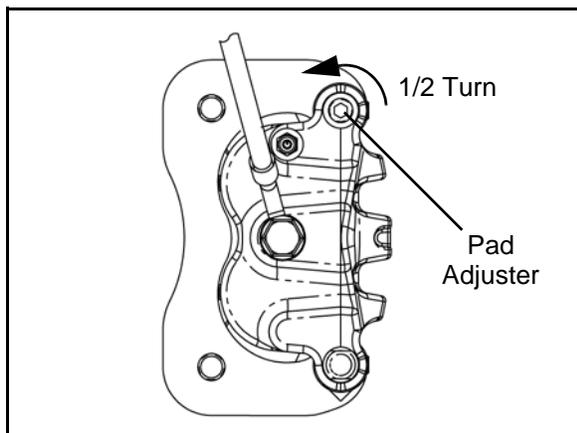


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Rear Caliper Mount Bolt Torque: 30 ft. lbs. (41 Nm)

2. Install brake line and torque the banjo bolt to the proper torque specification.



3. Install the pad adjustment screw and turn until stationary pad contacts disc, then back off 1/2 turn.



4. Perform brake bleeding procedure as outlined earlier in this chapter.
5. Install wheel and torque wheel nuts to specification.

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Wheel Nuts: Steel Wheels: 35 ft. lbs. (47 Nm) Aluminum Wheels: 30 ft. lbs. + 90° (1/4 turn)

6. Field test unit for proper braking action before putting into service. Inspect for fluid leaks and firm brakes. Make sure the brake is not dragging when pedal is released. If the brake drags, re-check assembly and installation.

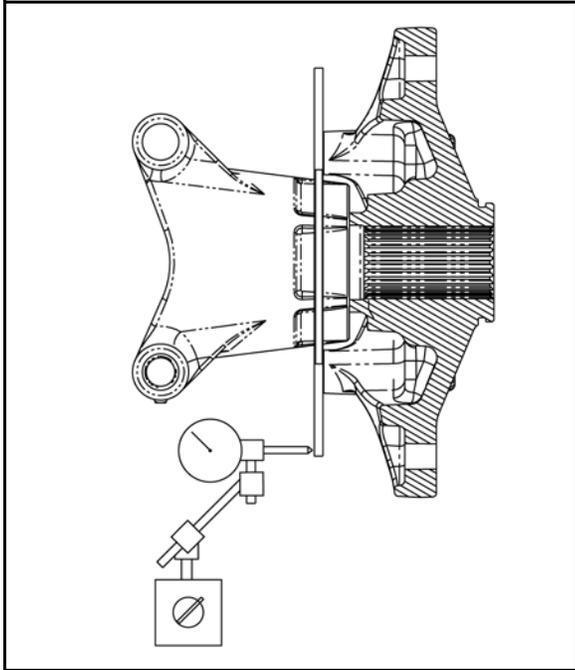
NOTE: If new brake pads are installed, brake burnishing is recommended (see "REAR BRAKE PADS - Brake Burnishing Procedure").

BRAKES

REAR BRAKE DISC

Disc Runout

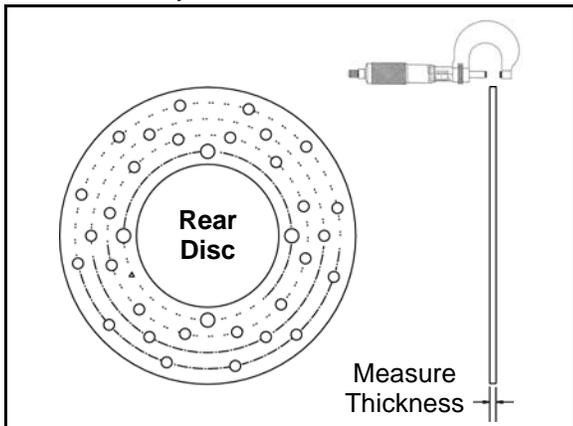
1. Mount a dial indicator and measure disc runout. Slowly rotate the disc and read total runout on the dial indicator. Replace the disc if runout exceeds specification.



**Brake Disc Runout
Service Limit .010" (.254 mm)**

Disc Inspection

1. Visually inspect disc for scoring, scratches or gouges. Replace disc if any are evident.
2. Use a 0-1" micrometer and measure disc thickness at 8 different points around perimeter of disc. Replace disc if worn beyond service limit.

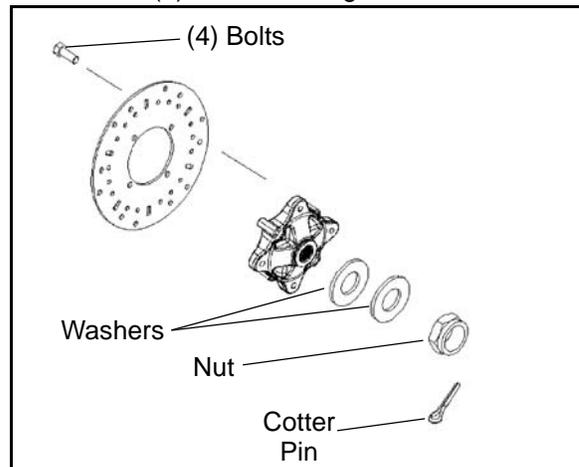


**Brake Disc Thickness:
New .188" (4.78 mm)
Service Limit .170" (4.32 mm)**

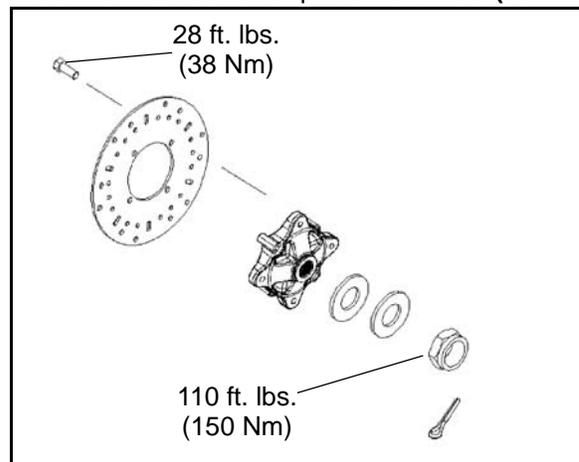
**Brake Disc Thickness Variance:
Service Limit .002" (.051 mm)
difference between measurements**

Disc Removal / Replacement

1. Remove rear brake caliper (see "Rear Caliper Service").
2. Remove cotter pin, castle nut and washers.
3. Remove the wheel hub assembly from the vehicle and remove the (4) bolts retaining the disc to the hub.



4. Clean the wheel hub mating surface and install new disc on wheel hub.
5. Install new bolts and torque to **28 ft. lbs. (38 Nm)**.



 CAUTION

Always use new brake disc mounting bolts. The bolts have a pre-applied locking agent which is destroyed upon removal.

6. Install wheel hub assembly, washers, and castle nut. Torque castle nut to **110 ft. lbs. (150 Nm)** and install a new cotter pin.
7. Install rear brake caliper (see "REAR CALIPER SERVICE"). Follow the bleeding procedure outlined earlier in this chapter.
8. Field test unit for proper braking action before putting into service. Inspect for fluid leaks and firm brakes. Make sure the brake is not dragging when pedal is released. If the brake drags, re-check assembly and installation.

TROUBLESHOOTING

Brakes Squeal / Poor Brake Performance

- Air in system
- Water in system (brake fluid contaminated)
- Caliper/disc misaligned
- Caliper dirty or damaged
- Brake line damaged or lining ruptured
- Worn disc and/or friction pads
- Incorrectly adjusted stationary pad
- Worn or damaged master cylinder or components
- Damaged break pad noise insulator

Pedal Vibration

- Disc damaged
- Disc worn (runout or thickness variance exceeds service limit)

Caliper Overheats (Brakes Drag)

- Compensating port plugged
- Pad clearance set incorrectly
- Parking brake lever incorrectly adjusted
- Brake pedal binding or unable to return fully
- Parking brake left on
- Residue build up under caliper seals
- Operator riding brakes

Brakes Lock

- Alignment of caliper to disc
- Caliper pistons sticking
- Improper assembly of brake system components

