

BRAKES

SERVICE TOOLS

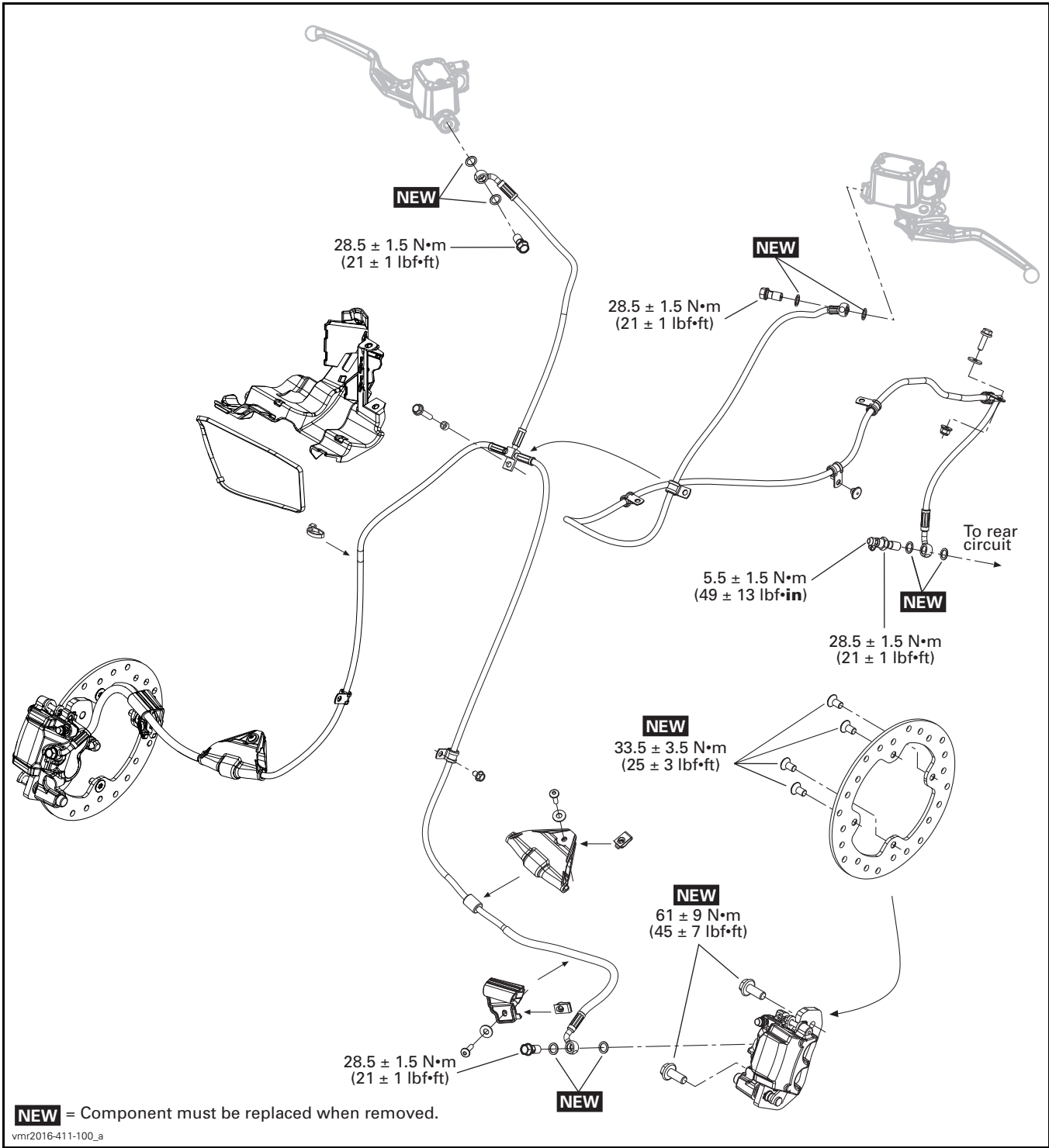
Description	Part Number	Page
ECM ADAPTER TOOL.....	529 036 166	9

SERVICE PRODUCTS

Description	Part Number	Page
XPS BRAKES AND PARTS CLEANER (USA)	219 701 705	12
XPS BRAKES AND PARTS CLEANER	219 701 776	12
XPS SYNTHETIC GREASE.....	293 550 010	10

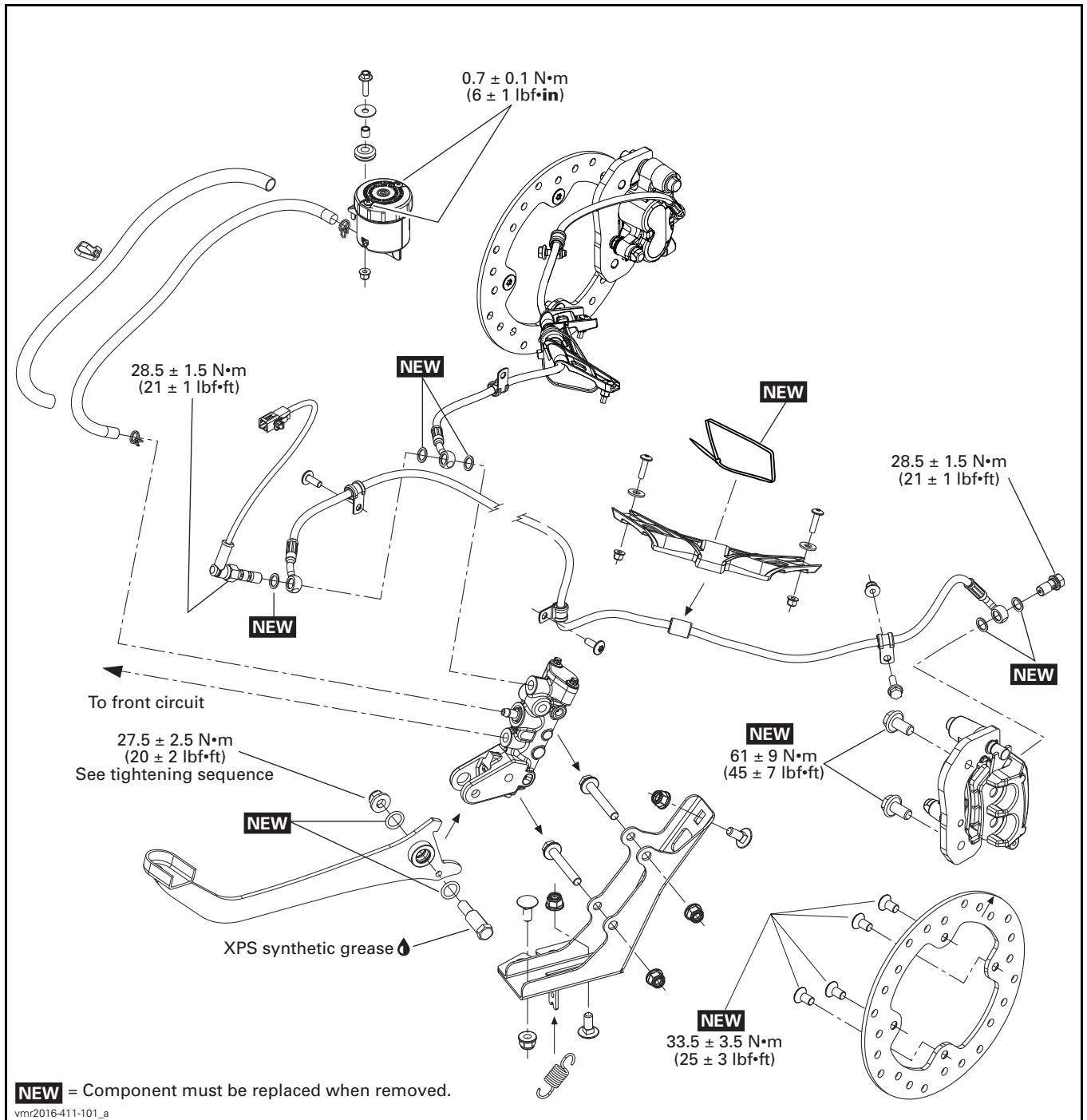
FRONT CIRCUIT

All Except CE Models



REAR CIRCUIT

All Except CE Models

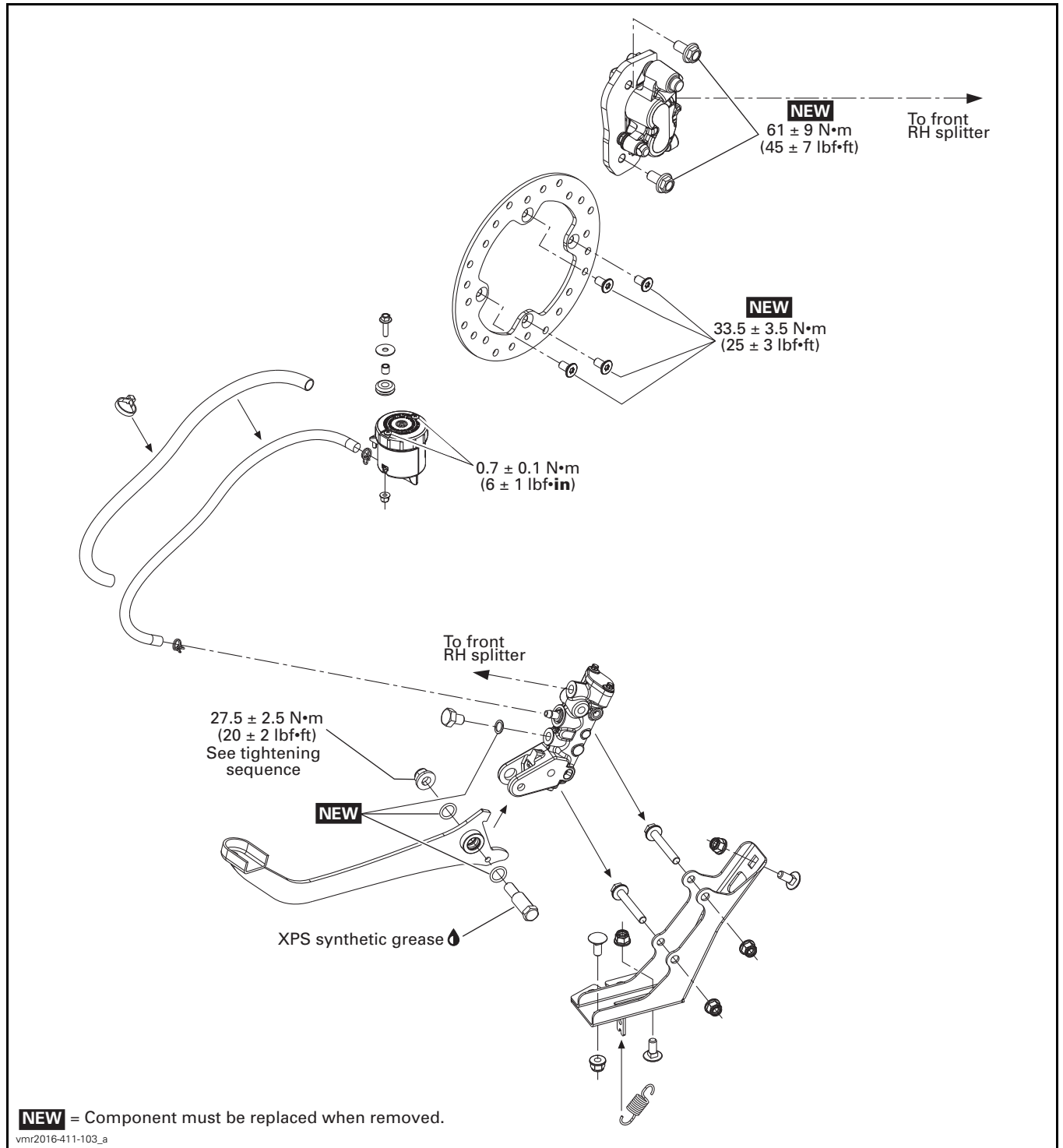


CE Models



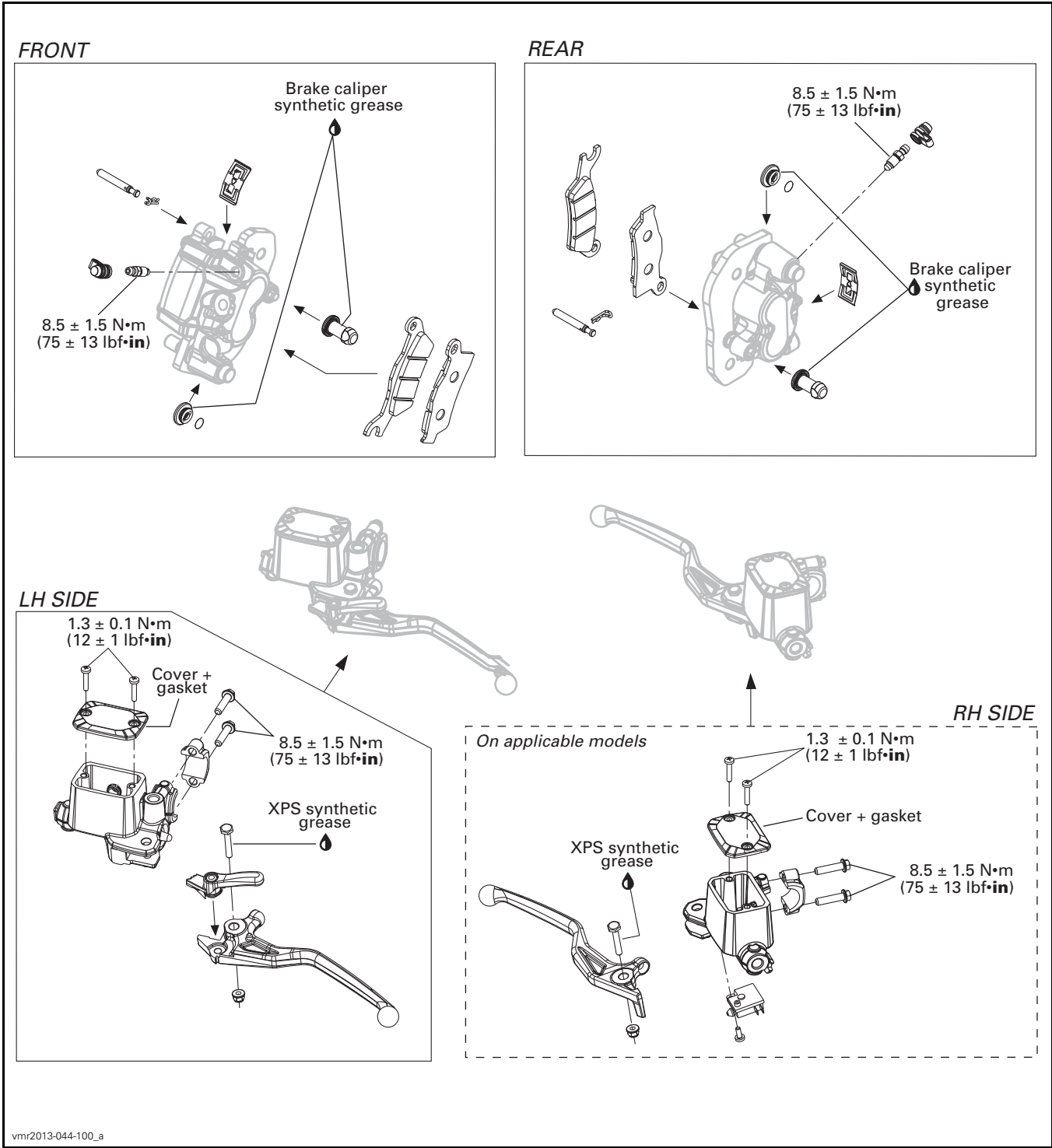
REAR CIRCUIT

CE Models



CALIPERS AND BRAKE LEVERS

All Models



vmr2013-044-100_a

GENERAL

⚠ WARNING

Always check brake system operation after removing or servicing a brake component.

NOTICE Avoid spilling brake fluid on plastic, rubber or painted parts. Protect these parts with a rag when servicing brake system.

NOTICE Sealing washers must be discarded and replaced with new ones every time a Banjo bolt is unscrewed.

NOTICE Always clean the area around a brake component before servicing.

SYSTEM DESCRIPTION

A disc brake system with twin-piston sliding calipers is used.

Disc Brake Configurations

MODELS	NUMBER OF DISC BRAKES	
	FRONT	REAR
All except CE models	2	2
CE models	2	1

Brake Controls and Circuit Configurations

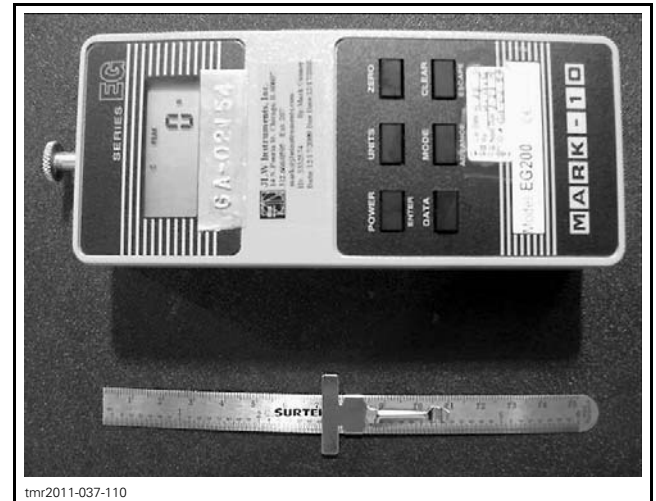
MODELS	LH BRAKE LEVER	RH BRAKE LEVER	BRAKE PEDAL
All except CE models	Controls rear brakes	Controls front brakes	Controls rear brakes
CE models	Controls rear brakes	Controls front brakes	Controls front and rear brakes

INSPECTION

BRAKE SYSTEM PRESSURE VALIDATION

Required Tools

Use an appropriate compression force gauge such as *MARK-10 EG-200* and a ruler.

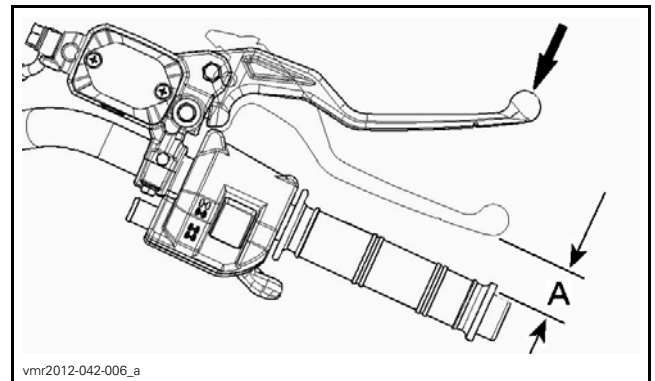


TYPICAL

Brake Lever Verification

NOTE: Do not pump up the brakes repeatedly before doing the validation.

1. Position force gauge perpendicularly on brake lever edge.
2. Position a ruler perpendicularly to handlebar grip.
3. Push brake lever at distance **A** from handlebar grip using force gauge.



A. Distance from handlebar (refer to table)

4. Read load recorded by the force gauge.
5. Load reading must be as per the following table.

BRAKE LEVER VERIFICATION		
LEVER	DISTANCE A	MINIMUM LOAD
LH side lever	25 mm (1 in)	150 N (34 lbf)
RH side lever (if applicable)	25 mm (1 in)	130 N (29 lbf)

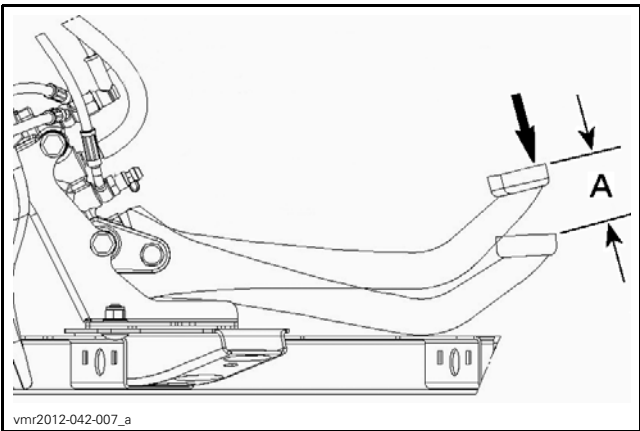
- 6. If load reading is not in accordance with the specification:
 - 6.1 Perform a brake system inspection and cleaning.
 - 6.2 Bleed brake system.

NOTE: Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.

Brake Pedal Verification

NOTE: Do not pump up the brakes repeatedly before doing the validation.

- 1. Position force gauge perpendicularly on brake pedal edge.
- 2. Position a ruler perpendicularly to brake pedal.
- 3. Push brake pedal from distance **A** using force gauge.



A. Distance to push (refer to table)

- 4. Read load recorded by the force gauge.
- 5. Load reading must be as per the following table.

BRAKE PEDAL VERIFICATION		
MODELS	DISTANCE A	MINIMUM LOAD
Renegade CE	55 mm (2-5/32 in)	180 N (40 lbf)
All Renegade except CE	55 mm (2-5/32 in)	220 N (49 lbf)

- 6. If load reading is not in accordance with the specification:
 - 6.1 Perform a brake system inspection and cleaning.
 - 6.2 Bleed brake system.

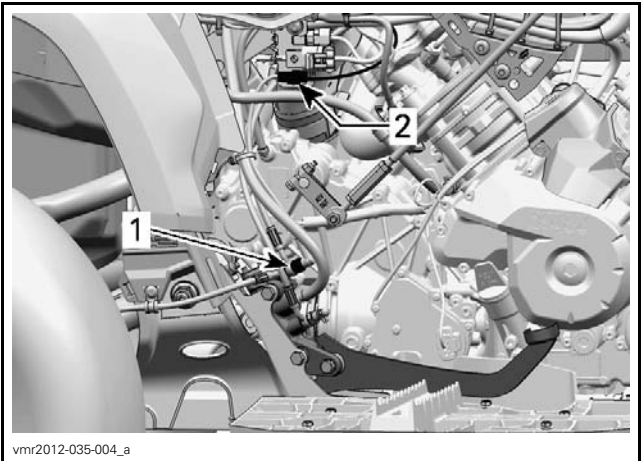
NOTE: Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.

PROCEDURES

BRAKE LIGHT SWITCHES

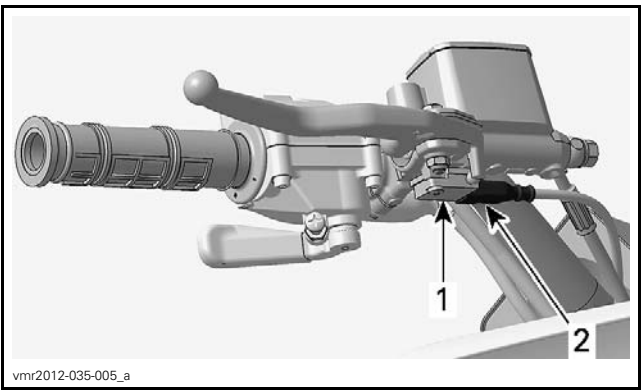
Brake Light Switch Location

MODELS	BRAKE SWITCH LOCATIONS		
	BRAKE PEDAL MASTER CYLINDER	RH BRAKE LEVER	FRONT BRAKE MANIFOLD
All except CE models	X	X	
CE models		X	X



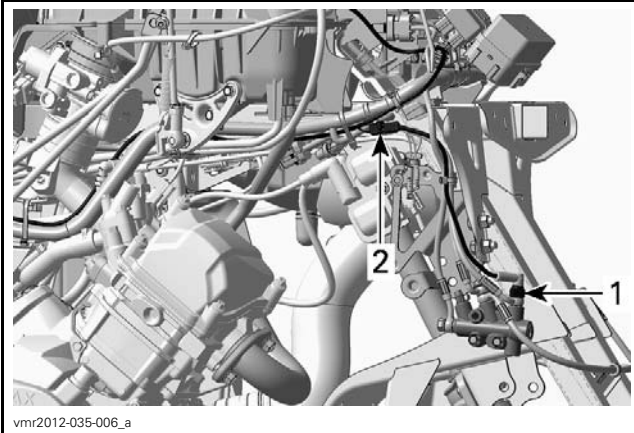
BRAKE PEDAL MASTER CYLINDER

- 1. Brake light switch
- 2. Brake light switch connector



RH BRAKE LEVER

- 1. Brake light switch
- 2. Brake light switch connector



FRONT BRAKE MANIFOLD

1. Brake light switch
2. Brake light switch connector

Brake Light Switch Resistance Test

1. Disconnect brake light switch connector.
2. Check switch operation as follows.

BRAKE LIGHT SWITCH POSITION	PIN		RESISTANCE
Firmly pushed	1	2	Close to 0 Ω
Released			Infinite (OL)

If switch is defective, replace with a new one.

If the switch tests good, verify wire continuity between harness connector and ECM connector. Refer to *BRAKE SYSTEMS WIRING DIAGRAM*.

REQUIRED TOOL
ECM ADAPTER TOOL (P/N 529 036 166)



Brake Light Switch Replacement

Brake Light Switch Located on Brake Lever

1. Disconnect brake light switch connector.
2. Replace brake light switch by a new one.
3. Connect brake light switch connector.

Brake Light Switch Located on Master Cylinder or Manifold

1. Disconnect brake light switch connector.
2. Drain brake line.
3. Remove brake light switch.

NOTE: Use shop rags to catch any spilled brake fluid.

4. Install **NEW** sealing washers.
5. Install brake light switch.

TIGHTENING TORQUE	
Brake light switch	28.5 N•m $\pm$ 1.5 N•m (21 lbf•ft $\pm$ 1 lbf•ft)

6. Connect brake light switch connector.
7. Refill and bleed brake system, refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.

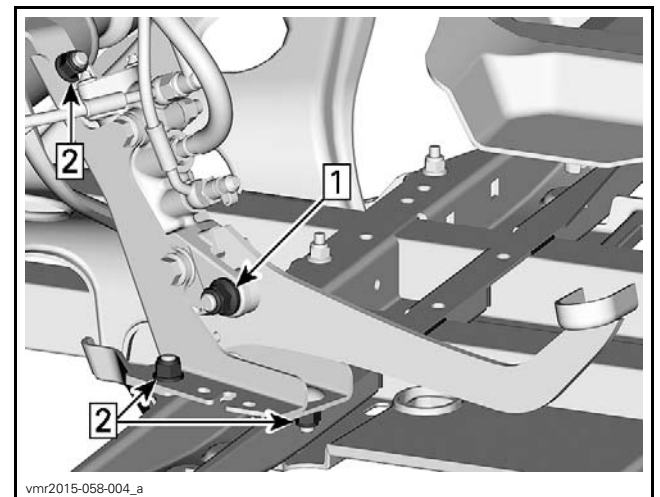
BRAKE PEDAL

Brake Pedal Removal

1. Drain brake system, refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.
2. Remove RH footrest panel. Refer to *BODY* subsection.
3. Remove engine panel. Refer to *BODY* subsection.

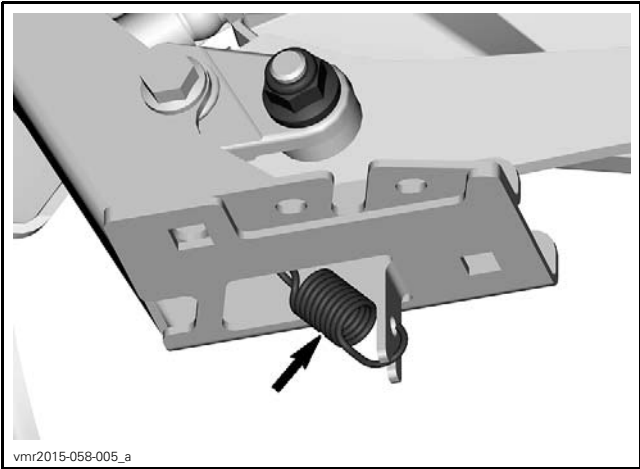
NOTE: Loosen brake pedal bolt before removing support from frame.

4. Remove master cylinder support from frame.

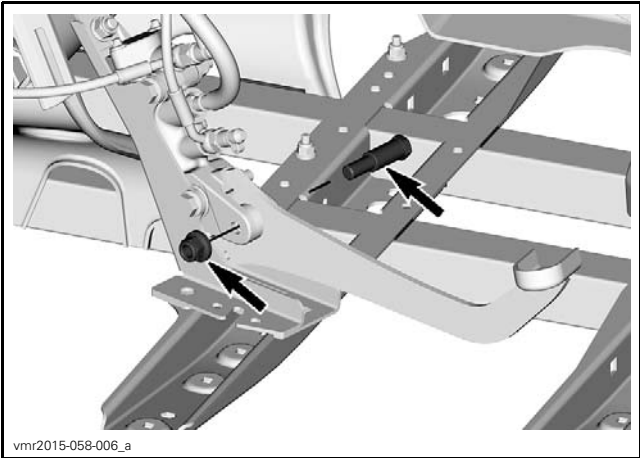


Step 1: Loosen brake pedal pivot
Step 2: Remove nuts

5. Remove brake pedal spring.



6. Remove brake pedal.



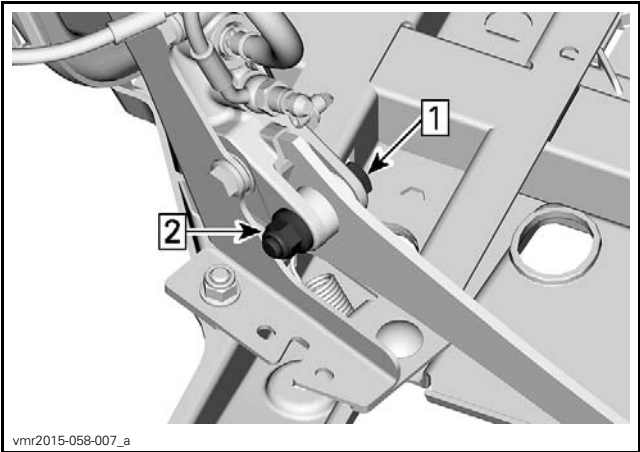
Brake Pedal Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.
Install **NEW** brake pedal O-ring.
Lubricate brake pedal pivot.

LUBRICATION	
Brake pedal pivot	XPS SYNTHETIC GREASE (P/N 293 550 010)

Tighten brake pedal nut as per the following sequence.

TIGHTENING SEQUENCE		
STEP 1	Brake pedal bolt (pivot)	10 N•m ± 2 N•m (89 lbf•in ± 18 lbf•in)
STEP 2	Brake pedal nut	27.5 N•m ± 2.5 N•m (20 lbf•ft ± 2 lbf•ft)

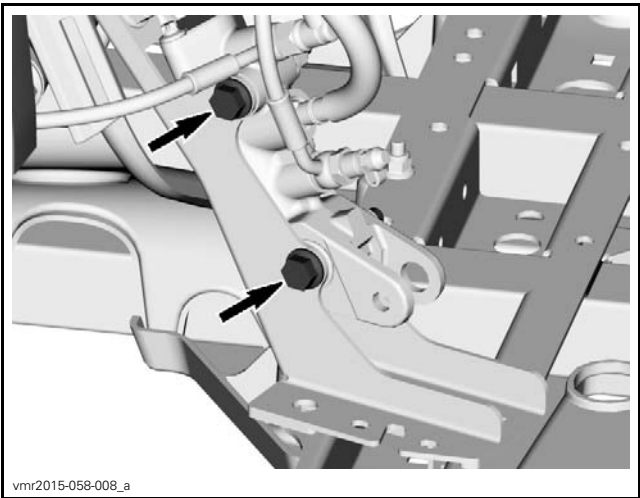


TIGHTENING SEQUENCE
Step 1: Tighten bolt
Step 2: Hold bolt then tighten nut

MASTER CYLINDER

Master Cylinder Removal

- 1. Remove *BRAKE PEDAL*. See procedure in this subsection.
- 2. Remove master cylinder from support.



- 3. Remove hoses and bleeder from master cylinder.

Master Cylinder Inspection

Check boot for crack.
Check rod for wear and scratch.
Check master cylinder housing for leak or damage.

Master Cylinder Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.
Tighten brake hoses and bleeder to specification.

TIGHTENING TORQUE	
Brake hose screw (banjo fitting)	28.5 N•m ± 1.5 N•m (21 lbf•ft ± 1 lbf•ft)
Bleeder	8.5 N•m ± 1.5 N•m (75 lbf•in ± 13 lbf•in)

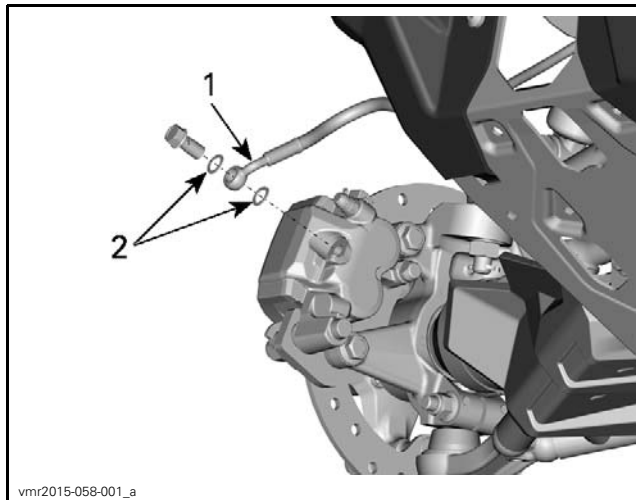
Install **NEW** sealing washers.

Refill and bleed brake system, refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.

CALIPER

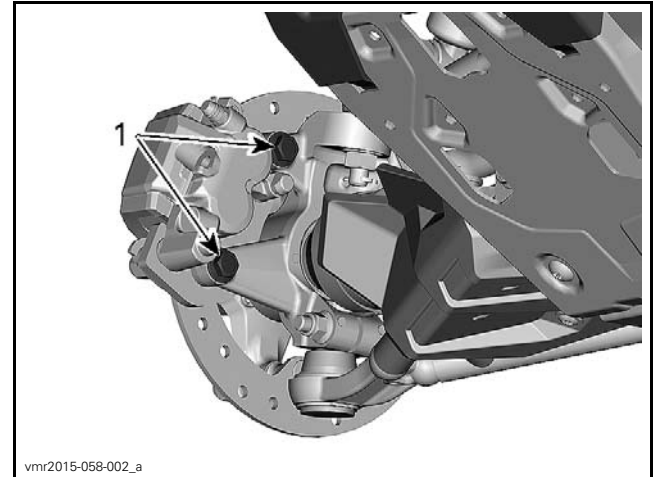
Caliper Removal

1. Safely lift and support the vehicle.
2. Remove wheel, refer to *WHEELS AND TIRES* subsection.
3. If caliper is removed from vehicle for replacement:
 - 3.1 Drain brake system, refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.
 - 3.2 Unscrew brake hose from caliper.



1. Brake hose
2. Sealing washers

4. Remove fasteners retaining brake hose.
5. Remove screws securing caliper support.



1. Caliper screws

6. Place caliper assembly onto a support.

NOTICE Do not let caliper hang by the hose and do not stretch or twist hose.

Caliper Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.

If caliper was removed for replacement:

- Refill and bleed brake system, refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.
- Install **NEW** sealing washers.

Install **NEW** caliper retaining screws.

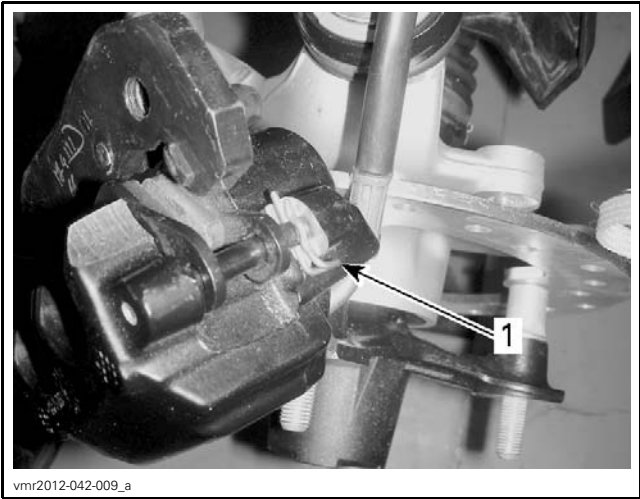
Tighten caliper retaining screws to specification.

TIGHTENING TORQUE	
Caliper retaining screws	61 N•m ± 9 N•m (45 lbf•ft ± 7 lbf•ft)

BRAKE PADS

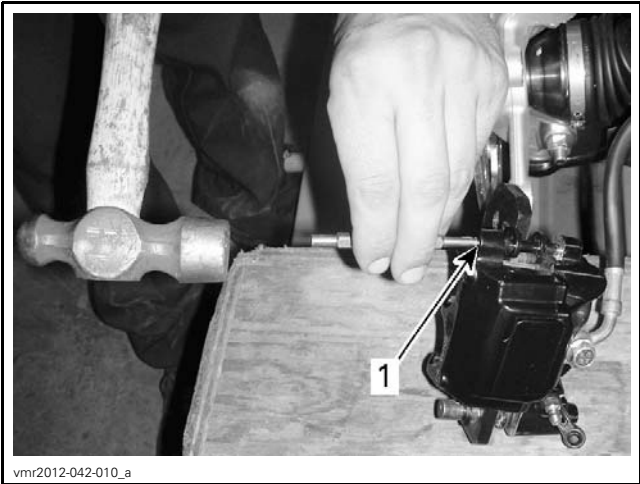
Brake Pads Replacement

1. Remove caliper, refer to *CALIPER REMOVAL* in this subsection.
2. Remove pin retainer securing brake pad pin.



1. Pin retainer

3. Remove brake pad pin from caliper.



TYPICAL
1. Brake pad pin

4. Carefully remove brake pads.

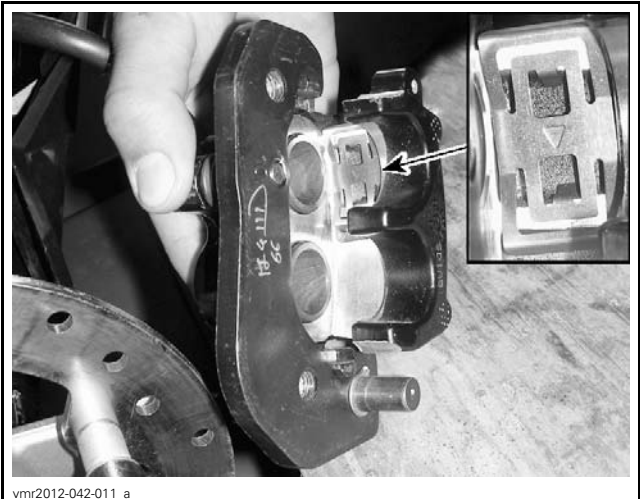
5. Clean pistons end using the following product or and equivalent.

REQUIRED SERVICE PRODUCT	
USA	XPS BRAKES AND PARTS CLEANER (USA) (P/N 219 701 705)
For all other countries	XPS BRAKES AND PARTS CLEANER (P/N 219 701 776)

6. Push caliper pistons inward.

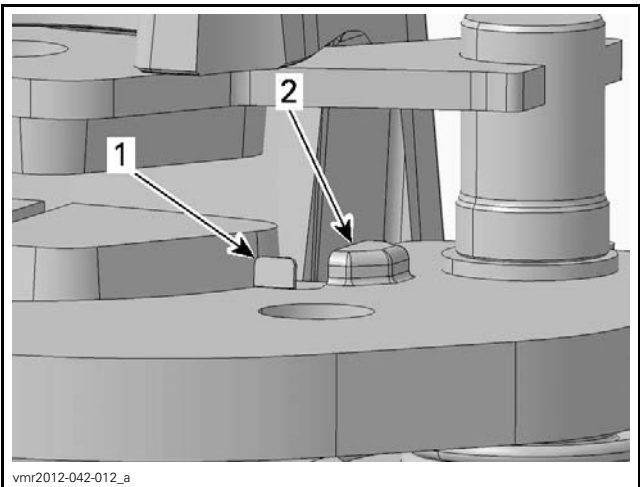
NOTE: To avoid damaging pistons, use an old pad to push it into the caliper using a C-clamp.

7. Ensure brake pad spring is properly positioned onto caliper and not damaged.



BRAKE PAD SPRING

8. Ensure pad stopper is properly aligned with caliper support protrusion.



1. Pad stopper
2. Caliper support protrusion

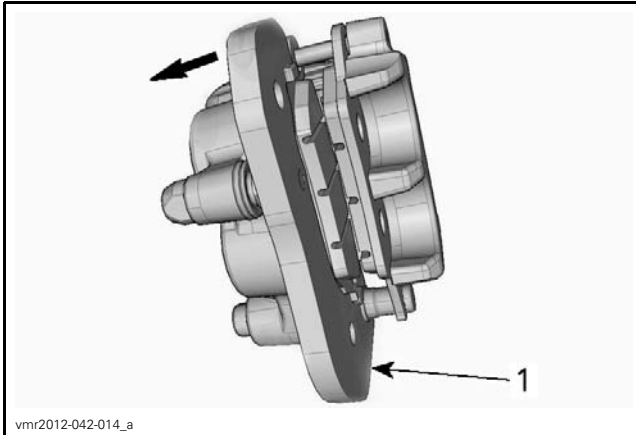
NOTICE Prior to installing brake pads, pad stopper must be properly positioned and not damaged.

9. Install **NEW** brake pads.

10. Clean and install brake pad pin on caliper.

11. Install pin retainer to secure brake pad pin.

12. Slide caliper support completely into caliper.



1. Caliper support

13. Install caliper, refer to *CALIPER INSTALLATION* in this subsection.

BRAKE DISC

Brake Disc Inspection

1. Check disc surfaces for scratches or grooves on both sides.
2. Measure thickness of the disc.

DISC MINIMUM THICKNESS	
FRONT	4.0 mm (.157 in)
REAR	4.0 mm (.157 in)

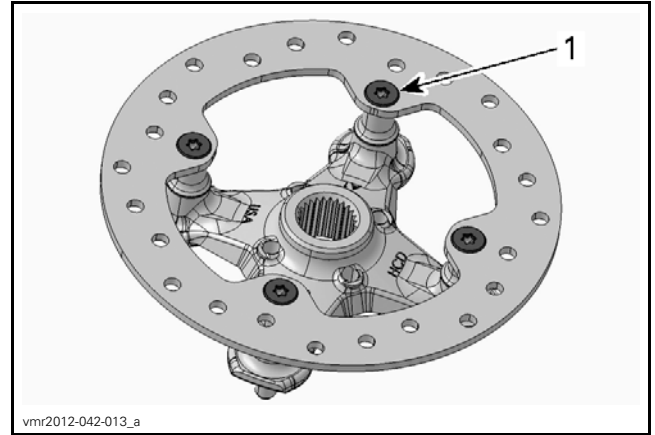
NOTICE Brake discs must never be machined.

3. Check warpage of the disc.

MAXIMUM DISC WARPAGE	
FRONT	0.2 mm (.01 in)
REAR	

Brake Disc Replacement

1. Remove caliper, refer to *CALIPER REMOVAL* in this subsection.
2. Remove wheel hub, refer to *FRONT DRIVE* or *REAR DRIVE* subsection.
3. Remove screws securing brake disc to wheel hub.



1. Brake disc screw

4. Replace brake disc.
5. Install **NEW** brake disc screws.
6. Tighten brake disc screws to specification.

TIGHTENING TORQUE	
Brake disc screws	33.5 N•m ± 3.5 N•m (25 lbf•ft ± 3 lbf•ft)

7. Install wheel hub then caliper.
8. Install **NEW** cotter pin to secure wheel hub nut.