

4 PISTON BRAKE CALIPERS AND ROTORS

ATTENTION

Statements in these instructions that are preceded by the following words are of special significance:

Warning

This means there is the possibility of injury to yourself or others.

Caution

This means there is the possibility of damage to the motorcycle.

Note

Information of particular importance has been placed in *italics*.

Important Notice

- Before installing a caliper or rotor kit, read through these instructions completely; this will familiarize you with the way in which the parts fit together and the tools needed to complete the job.
- In the course of installing these kits you will be replacing the stock brake caliper(s) and/or rotor(s) with a high-performance brake caliper. Please pay special attention to the section of the instructions dealing with the centering of the caliper over the brake rotor.
- PM products are design to use both DOT 4 and DOT 5 brake fluid, please use the manufactures suggested brake fluid. Never reuse brake fluid, Never mix DOT 4 and DOT 5 brake fluid, don't use brake fluid that you are not sure is new and clean. This installation should only be attempted by a mechanic with a thorough understanding of and experience with motorcycle hydraulic systems.
- If you plan on using the stock brake line/hose that runs between the master cylinder and the caliper, then you will be just switching the line at the caliper's banjo fitting. We recommend that you do not disconnect the line from the stock caliper until you have the new caliper bolted in place and are ready to bleed the brake system. This way the brake fluid will not run completely out of the master cylinder before you have the new caliper conected up to it.

Disclaimer

These Performance Machine parts are designed for high performance motorcycle applications and are intended for the very experienced rider only. The installation of these Performance Machine parts may adversely affect or void your factory warranty.

Front Caliper(s)

Performance Machine makes calipers designed to fit most 1978 and later Harley-Davidson® front fork/wheel assemblies.

For a complete listing of brake caliper kits and brake rotor applications, see page 11 of this manual.

Caliper Finish

Caliper kits are available in a standard clear anodized, polished or chrome finish. Make sure that your caliper kit has the correct finish on it before you start to install it; you cannot return it for incorrect finish once it has been installed.

Preparation

Before starting to assemble a PM caliper kit on your motorcycle, check the packing list to make sure that the kit you received is the correct one for your model motorcycle. Have a new bottle of manufacturer's suggested brake fluid on hand.

Dual Disc Models

On motorcycles that have dual disc front brakes, it is recommended that you install the calipers one at a time and bleed the air out of the brake system on the side with the new caliper before installing and bleeding the second caliper. Installing and bleeding the calipers in this manner will make the brake system easier to bleed.

FXSTS Softail Springer

For detailed instructions for FXSTS models see page 4.

Removing The Stock Caliper (except FXSTS)

Loosen brake line at caliper (do not remove) and retighten using minimum effort to keep line from leaking. This makes line removal easier once the caliper is removed from fork leg.

Using a 5/16" hex wrench, remove the two mounting bolts from the stock caliper. Remove the caliper from the fork legs. On '84 and later calipers, reinstall the lower mounting bolt into the stock caliper; this will keep the outer brake pad carrier from falling out. Using a short piece of wire, hang the stock caliper from the handlebars, up out of your working area.



**XL & FXLR W/WIRE WHEEL '87 UP
PN 1219-0017**



**XL-FXR-FXST-FLST- FLH '84 UP PN
1213-0018 (DUAL DISC)**



**FXSTS '88 UP
PN 1217-0017**



**XL-FX '78 THRU '83 (10" DISC)
PN 1208-0017**



PHOTO 1



PHOTO 2



PHOTO 3



PHOTO 4



PHOTO 5

Installing The Front Caliper (except FXSTS)

Note

Before installing your new PM caliper, check the brake rotor for wear and flatness; use an appropriate straight edge. If the rotor is worn or warped, replace it with a new one prior to installing this caliper.

CALIPER MOUNT 1984 & UP

'84 and later models: slip the PM caliper mount behind the mounting bosses on the fork leg. Attach it using 2 ea. 3/8-16X1" socket head cap screws, with a drop of Loctite #242 (blue) on their threads, and 2 ea. 3/8" aluminum flat washers. Torque the bolts to 20 ft.lbs, see Photo 1.

CALIPER MOUNT 1978-1983

'78 thru '83 models: slip the PM caliper mount on the outside of the upper mounting boss and on the inside of the lower mounting boss. Attach it to the top fork boss using a 3/8-16 x 1 3/4" socket head cap screw, one 3/8"x.187" spacer (the spacer fits between the mounting bracket and the boss on the fork leg) & a 3/8 lock nut. Use a 3/8-16 x 1 1/2" socket head cap screw, one 3/8" x .187" spacer (the spacer fits between the boss on the fork leg and the mounting bracket) and a 3/8 lock nut. Torque the bolts to 20 ft. lbs, see Photo 2.

Installing The Caliper

Slide the caliper down over the rotor and attach it to the mount with two 3/8-16 x 1 1/8" socket head cap screws, two 3/8" lock washers and two 3/8" flat washer. Tighten these screws finger tight at this time, see Photo 3.

Centering The Caliper

After you have installed the new PM brake caliper onto your motorcycle you must align its center to the center of the brake rotor; otherwise you will not get maximum brake performance or brake pad wear. The center line of the caliper is where the two halves of the caliper are joined together, see Photo 4. Look down from the top of the caliper onto the rotor; if it is off-set to the outside then you will need to install mounting bolt shims. The caliper shim kit that is included in the caliper kit contains 6 shims: 2ea. .016", 2ea. .032" and 2ea. .062". These shims are to be inserted between the mounting boss on the fork slider/rear caliper mount and the caliper's mounting boss to position the caliper so that its center line is over the rotor's center line. To install the shims, remove the caliper mounting bolt, slip the shim into place and replace the mounting bolt, see Photo 5. Check the caliper for centering at both ends; on most installations the same thickness of shim will be needed behind each mounting boss.

After the caliper is centered over the rotor, install the lock washers from the kit and torque the caliper mounting bolts to 22 ft.lbs.

Warning

Failure to center the brake caliper over the brake rotor will impede the performance of the brakes. Rotate wheel slowly and with wheel raised, check for possible interference between caliper, wheel and disc assembly. After brake is bled, check for free rotation before and after master cylinder is activated.

FXSTS Softail Springer

To install the PM brake kit on the Springer front fork, you must remove the front wheel assembly and raise the motorcycle on a suitable lift until the front is off the ground.

Warning

Center the motorcycle on the lift so that it will not fall while you are working on it.

Photo 1: 1) Loosen brake line and remove the 2 bolts at A, lift the caliper up off the rotor and use a short length of wire to hang it from the handle-bars, up out of your way. 2) On the 3/8" bolt at B, remove the cotter pin from the rear, unscrew the lock-nut, unscrew the bolt from the threaded bushing in the fender mount and pull it out of the caliper mount and reaction link. On '93 and later models, use a piece of wire to hold the fender up out of your way. 3) Unscrew the axle nut, C, slide the axle out of the fork and lower the wheel to the ground. 4) Remove the caliper mount from the wheel hub.

Photo 2: The Springer uses a combination axle seal and caliper mount bushing, with a wavy-washer and bronze thrust washer behind the caliper mount, A; remove and discard the bronze thrust washer. The PM mount has this thrust washer built-in, B. Install the PM caliper mount on the axle seal caliper mount bushing and raise the wheel assembly up into the fork. Slide the axle part way into the fork/wheel to hold it in place.

Photo 3: Install the outer caliper mount thrust washer, A, between the caliper mount and the lower fork rocker. This is a factory part that was on the fork assembly; the copper colored side faces the caliper. Slide the axle through the fork, install the flat washer and axle nut; tighten the axle nut to 65 ft.lbs.

Photo 4: Remove the 2 end bolts from the caliper body, slip the caliper over the rotor and install the 5/16 x 1 3/4" socket head bolts and flat washers, A, to attach it with.

Photo 5: Slide the 3/8-16 x 2 1/2" socket head bolt, A, through the caliper mount, reaction link, flat washer, fender mount and thread it into the fender mount bushing. Install the lock-nut and cotter pin.

Note

Before the caliper is tightened down, it must be centered over the rotor; see page 3 for the proper procedure.

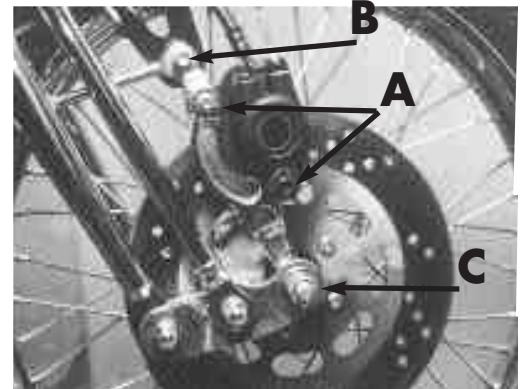


PHOTO 1

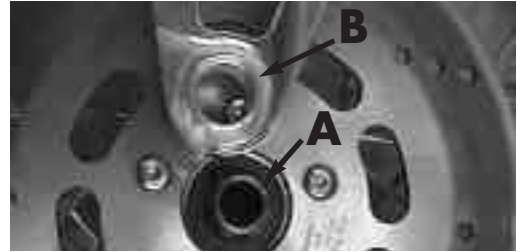


PHOTO 2



PHOTO 3

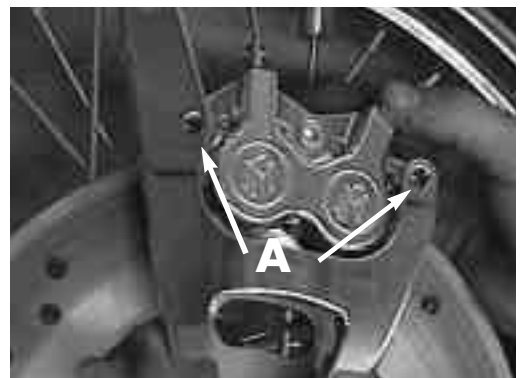


PHOTO 4

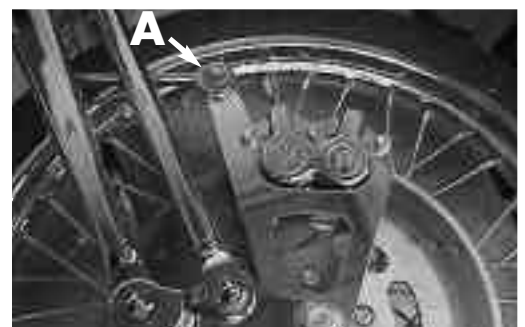


PHOTO 5

Installing Brake Rotors

Performance Machine makes several different styles of brake rotors for Harley-Davidson motorcycles. The rotors all install in one of two ways:

- A) With counterbored bolts that attach the rotor by screwing directly into the hub of cast wheels.
- B) With counterbored bolts and lock-nuts that attach the rotor to the hub flange of wire wheels.

Note

*Front and rear brake rotors are not the same. Front brake rotors use **5/16"** bolts and rear brake rotors use **3/8"** bolts.*

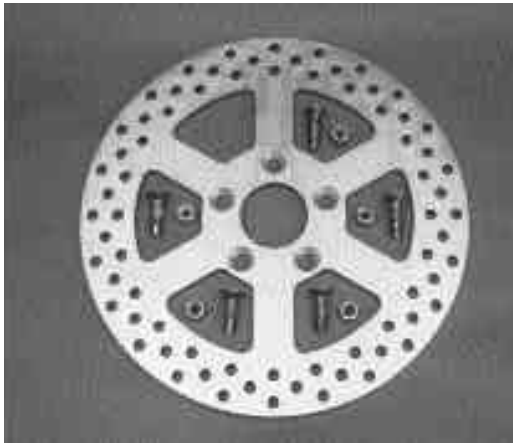


PHOTO 1
11.5" One Piece Rotor PN 0131-1518
Bolt Set PN 0109-0014-CH

Photo 1: A rear brake rotor (PN 0131-1518) and 3/8-16 Torex head bolts and lock-nuts (PN 0109-0014-ch) needed to attach it to a stock Harley-Davidson wire wheel. Brake rotor mounting bolts are not included with PM brake rotors, they must be purchased separately. See PM catalog.



PHOTO 2

Photo 2: A rear wire wheel, with the stock brake rotor removed. Make sure that the mounting surface of the hub is clean and free of nicks or burs; smooth the hub flange with a flat file if necessary.

Photo 3: The brake rotor should slip into place on the wheel hub with no more than firm hand pressure. If the rotor will not go over the hub, check the hub for burs and dress any down with a flat file. Do not force the rotor onto the hub. Make sure that the rotor is all the way down on the hub before installing or tightening any mounting bolts.



PHOTO 3

Photo 4: Insert the rotor mounting bolts through the rotor and into the hub. On cast wheels they screw directly into the wheel, on spoke wheels lock-nuts are screwed onto the bolts from the rear of the wheel hub flange.

Note

If you are using chrome plated hardware, put a drop of Loctite #242 (blue) on the bolt threads to keep them from galling the threads in the wheel or lock-nuts.

Torque the mounting bolts down in a "star" pattern, as shown in Photo 4. Torque specs: 5/16" bolts to 16-19 ft.lbs.; 3/8" bolts to 23-27 ft.lbs.

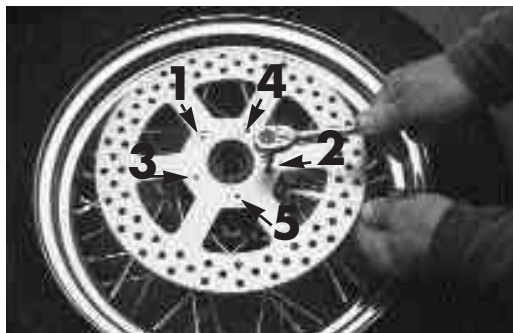


PHOTO 4

Rear Caliper Kits

Performance Machine 4 piston rear brake caliper kits are engineered to fit specific Harley-Davidson models. The mounting brackets are designed for ease of installation and maximum brake performance. Before starting the installation of this caliper kit, make sure it is the correct one for your motorcycle and your brake rotors.

Note

*PM makes separate caliper kits to fit **2 different rotor thicknesses:***

A) Calipers for .200"-.225" thick rotors which fit the stock Harley Davidson rotors, the PM Image 11.5" x .225" rotors and the PM 11.5"x .200 full-floating rotors with the stainless steel outer section. The part number of these calipers are 0052-2400, 0052-2400-P, 0052-2400-CH.

B) Calipers for .275" thick rotors which fit PM 11.5" x .275" standard one-piece cast iron rotors and the PM 11.5" x .275" full floating rotors with the cast iron outer section. The part number of these calipers are 0052-2401, 0052-2401-P, 0052-2401-CH.

For a complete listing of brake caliper kits and brake rotor applications, see page 11 of this manual.

Caliper Finish

Caliper kits are available in a standard clear anodized, polished or chrome finish. Make sure that your caliper kit has the correct finish on it before you start to install it; you cannot return it for incorrect finish once it has been installed.

Special Installation Notes

To install a PM rear brake caliper and/or brake rotor, you will be removing the motorcycles rear wheel assembly. Please be aware that the reinstallation of the rear wheel assembly will require the alignment of the wheel in the motorcycles frame and the correct tensioning of the drive belt/chain. You will need the service manual for your model motorcycle for the complete instructions on the correct procedures to do these adjustments.



SOFTAIL BRAKE SYSTEM: PN 1274-0059
11.5" X .275" ROTOR: PN 0131-1518



FXD (DYNA) BRAKE SYSTEM: PN 1279-0059
11.5" X .275" ROTOR: PN 0131-1518



FX BRAKE SYSTEM: PN 1268-0059
11.5" X .275" ROTOR: PN 0131-1518



1973-1984 BRAKE SYSTEM: PN 1255-0059
11.5" X .275" ROTOR: PN 0131-1518



PHOTO 1

Installing Rear Calipers On FXR, FXWG, FXD & FL Models

Removing The Stock Brakes

The basic steps are the same to install a PM rear brake caliper kit on any of the late model Harley Davidson "swingarm" style motorcycles; all require the removal of the rear wheel. Using a suitable lift, raise the motorcycle high enough off the ground to allow you to remove the rear wheel assembly.

Warning

Center the motorcycle on the lift so that it will not fall while you are working on it.



PHOTO 2

Photo 1: Loosen brake line at caliper. Remove the rear brake caliper assembly by unscrewing the 2 caliper mounting bolts that go through the caliper into the caliper mounting bracket. Lift the caliper up and off the mounting bracket and brake rotor, fold the caliper back out of your working area. Don't remove the brake line from the caliper yet; you will do this just before you are ready to hook it up to the new caliper. The brake pads are held into the caliper mounting bracket by 2 spring clips; slide the brake pads out of the mounting bracket and remove the retaining springs. Loosen the axle adjuster nuts and remove the rear wheel assembly.



PHOTO 3

Remove the stock caliper mounting bracket. Clean the inside of the swingarm of any dirt or grease.

Photo 2: Slide the PM caliper mounting bracket into position on the swingarm. The brackets for the FX, FXR and FL models fit over the swingarm tube and the bracket for the FXD Dyna fits onto a lug that is welded onto the inside surface of the swingarm. Make sure that the bracket slides all the way onto the swingarm; remove any nicks or burs that keep the bracket from seating on the swingarm.

Photo 3: Raise the wheel up into position with the drive belt/chain on the rear sprocket; slide the axle through the swingarm, the axle spacer (from the caliper kit, if a spacer other than the stock one is needed), the caliper mount, the wheel and any axle spacers that were used on the drive side of the wheel.



PHOTO 4

Photo 4: Adjust the wheel, per the service manual so that it is centered in the swingarm and so that the drive belt/chain is correctly tensioned. Mount the PM caliper onto the bracket using the 3/8-16 X 1" button head cap screws; tighten them only hand tight. Check for any clearance problems by rotating the wheel. Center the caliper per instructions on page 3 and install the brake line and bleed the system per instructions on page 10.

Installing Rear Calipers On 1987 & Up Softail Models

Installing a rear caliper requires the removal of the rear wheel. Using a suit-able lift, raise the motorcycle high enough off the ground to allow you to remove the rear wheel assembly.

Warning

Center the motorcycle on the lift so that it will not fall while you are working on it.

Loosen brake line at caliper.

Photo 1: Remove the stock rear brake caliper, rear wheel and caliper mount per instructions on page 7 — photo 1. Slide the PM caliper mounting bracket onto the lug on the swingarm.

Photo 2: Raise the wheel up into position in the frame, slip the drive belt onto the rear pulley, slide the axle through the swingarm, the caliper mount, the axle spacer, the wheel and the axle spacers that were used on the drive side of the wheel. Next, with the axle adjuster screws loosened up as far as they will go, slide the wheel assembly as far forward as it will go. You need to do this to allow for clearance to install the caliper mounting bolts.

Photo 3: Set the caliper onto the mounting bracket and over the rotor and attach it with two 3/8-16 X 1" button head cap screws; tighten the screws only hand tight at this time. Slide the wheel into its normal operating position, tighten up the axle nut and check the centering of the caliper over the rotor. Measure the caliper's offset from the rotor's centerline and setup the amount of shims needed to correct it. Next loosen the axle nut, slide the axle forward, remove the caliper mounting bolts and insert the shims between the caliper and the caliper mount. Reinstall the caliper mounting bolts with 3/8" star lock washers and tighten the bolts to 25 ft.lbs.

Photo 4: Adjust the wheel, per the service manual so that it is centered in the swingarm and so that the drive belt is correctly tensioned. On the bottom of the caliper mount is a hex head bolt and jam nut that clamps the mount to the lug on the swingarm, tighten this bolt up to 10 ft. lbs. Next, tighten the jam nut onto the caliper mount. This bolt and jam nut takes the place of the rubber stopper used on the stock caliper mount.

Photo 5: Remove the end of the brake line from the stock caliper; you will need a 3/8" 12 point socket wrench or box end wrench to remove the banjo bolt from the stock caliper. Attach the end of the brake line to the new PM caliper using the PM supplied seal washers, one washer goes on each side of the banjo fitting; apply a dab of grease to the washers to prevent leaks. Lastly, bleed the brake system as described on page 10.



PHOTO 1



PHOTO 2



PHOTO 3



PHOTO 4



PHOTO 5

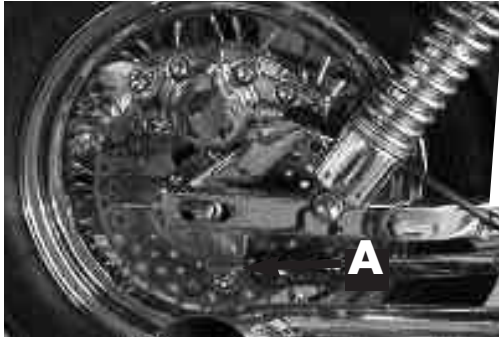


PHOTO 1

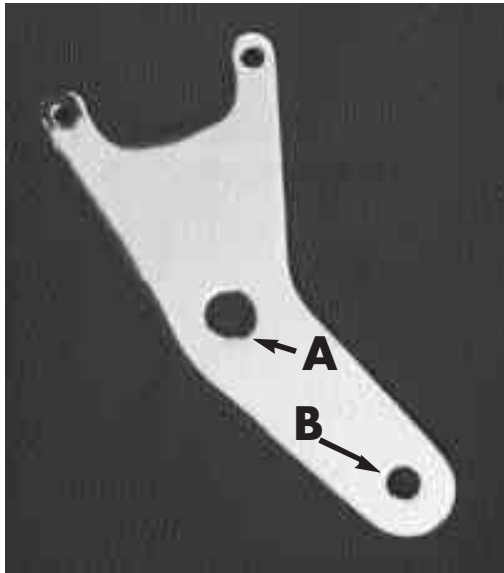


PHOTO 2



PHOTO 3

Installing Rear Calipers On 1973 to 1983 FX, FLH Models

Removing The Stock Brakes

The basic steps are the same to install a PM rear brake caliper kit on any of the Harley-Davidson motorcycles that are equipped with a “banana caliper”, whether they have 10” or 11.5” rotors. Installing the caliper kit requires the removal of the rear wheel. You will need to use a suitable lift to raise the motorcycle high enough off the ground to allow you to remove the rear wheel assembly.

Warning

Center the motorcycle on the lift so that it will not fall while you are working on it.

Loosen brake line at caliper.

Photo 1: Remove the rear wheel by loosening the axle adjuster nuts, remove the lower caliper bracket to strut bolt at A, unscrew the axle nut and remove the axle, lower the rear wheel assembly down to the ground and swing the caliper and its mount out of your working area. Clean the inside of the swingarm of any dirt or grease.

Photo 2: The PM 4 piston caliper mount; the rear wheel axle passes through hole A and the stabilizing strut attaches at hole B. Two size brackets are available, PN 0024-0026CJ, for use with 10” rotors and PN 0024-1526CJ, for use with 11.5” rotors

Photo 3: Assemble the caliper mount to the lower strut by inserting 1/2-20 X 1 1/2” bolt through the rear of the caliper mount and into the strut, install the 1/2” flat washer, then the lock washer and the 1/2” lock-nut, tighten to 45 ft.lbs. Raise the wheel up into position, install the axle through the swingarm, the 3/4” axle spacer (included in the caliper kit), caliper bracket, wheel and the stock axle spacers used on the drive side. Adjust the wheel, per the service manual so that it is centered in the swingarm and so that the drive chain is correctly tensioned. Tighten the axle nut to specifications in the manual. Mount the PM caliper onto the bracket using the 3/8-16 X 1” socket head cap screws and lock washers; tighten them only hand tight. Check for any clearance problems by rotating the wheel. Check the caliper’s offset from the rotor’s centerline; if there is any, remove the caliper mounting bolts and insert shims between the caliper and the caliper mount to center the caliper over the rotor. Reinstall the caliper mounting bolts and tighten the bolts to 25 ft.lbs., install the brake line and bleed the system per instructions on page 10.

Completing The Brake Installation

Attaching The Brake Line

First tape handle bar master lever 1/2 way closed. This will prevent fluid from free flowing from hose. Remove the end of the brake line from the stock caliper; you will need a 3/8" 12 point socket wrench or box end wrench to remove the banjo bolt from the stock caliper. Working rapidly, so that an excessive amount of brake fluid does not run out of the end of the brake hose, attach the end of the brake line to the new PM caliper using the PM supplied seal washers, one washer goes on each side of the banjo fitting; see Photo 1.



PHOTO 1

Note

Position the banjo fitting so that the brake hose does not rub on the front fender or other part of the motorcycle.

Tighten banjo bolt to 10 ft.lbs. of torque.



PHOTO 2

Bleeding The Brake System

You will find it is easier to bleed the brake system if you have a helper. First, fill the master cylinder with manufactures suggested brake fluid and put the cover back on the master cylinder. Attach a short length of rubber hose to the bleeder screw on the brake caliper, see Photo 2; put the other end of the hose into a coffee can or other suitable catch can. Have your helper pull in on the front brake lever or push down on the rear brake pedal 5 times, see Photo 3. At the end of the 5th stroke, have your helper hold the brake lever in or pedal down. While the helper holds the lever/pedal, open the bleeder fitting on the caliper, you will need a 1/4" end wrench for this. Air and brake fluid should come out of the end of the hose that is connected to the bleeder fitting. After the air and brake fluid have stopped coming out of the hose, close the bleeder fitting; your helper can now release the brake lever/pedal. This action will force the air that is trapped in the brake system out the bleeder screw, because the brake system can contain more air than you can expel in one bleeding; you will need to repeat this procedure more than once. Check the fluid level in the master cylinder after each bleeding, don't let the master cylinder run dry as this will push air back into the brake system which will require the bleeding procedure to be started over again.



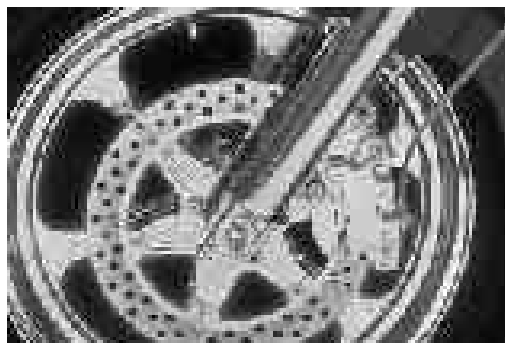
PHOTO 3

Note

Do not over tighten the bleeder screw.

Warning

Failing to bleed all the air out of the brake system will impede the performance of the brakes.



COMPLETED FRONT BRAKE CALIPER INSTALLATION