

'08 BREMBO BRAKE CONVERSION

The information in this document is a process the author used to convert the '08 Brembo non-ABS brake system to a 2007 Harley Davidson Ultra. Older Harley Davidson Touring motorcycles may require additional or different parts and/or procedures than as outlined below.

Since my '07 Ultra was new, I have been less than happy with the braking performance; especially from the front dual system. I had questioned the soft, uneven action of the front brakes with the Dealer shortly after purchase, and was told the '07's had a lot of travel at the lever and that if the lever was tested on several bikes they would all have a different "feel".

At approximately 18,000 miles I decided, after a lot of research, to install the Diamondback braided brake lines on the front. I had ridden an '06 Screamin' Eagle Ultra that had exceptional front brakes and felt a lot of the positive feel was due to the braided lines. After installing new front H-D Diamondback braided lines, new Lyndall Gold+ pads, and spending countless hours bleeding the system using all the recommended procedures I still had poor braking performance. The lever would have a quick positive feel at first then feel mushy with a lot of travel. During the install of the front brake pads, I followed the excellent brake cleaning procedure as outlined here on the Lyndall site: http://www.lyndallracingbrakes.com/service_tech.htm Bottom line was I never had a consistent feel/action from one ride to the next. After a lot of discussion with Paul Kittrell at Lyndall, we both felt the master cylinder was either failing or had excessive limits in the bore. Shortly thereafter, I did some service work for a good friend that had purchased an '08 Ultra with the standard Brembo (non-ABS) brake system. After a short test ride, I immediately fell in love with the brake action on this bike. A nice, smooth, linear, confidence-inspiring action that felt better than any OEM braking system I had ever encountered on a Touring bike. I soon started investigating what was different on this '08 as compared to my '07. Found out it was mostly different parts hung on the same front forks and handlebars.

In the following paragraphs I will attempt to show others how easy this conversion was and hope this information will prove worthwhile. I have listed the necessary parts for the conversion at the end of this article. This should allow the option of printing a parts list rather than printing the entire article.

After scouring Ebay, I came across a seller that was offering a front braking package taken off a new, low mileage '08 Touring bike that included the clutch perch with lever, front master cylinder with lever, both front Brembo brake calipers, both front rotors, and the left and right switch housings. After some negotiation, I secured the purchase and had all the parts in hand in a matter of days. The parts appeared to have only a few miles on them as the calipers and master cylinder still had the blue protective covering on the caliper medallions and reservoir cover decal. Rotors were also in excellent condition. As a note, the switch housings were not needed for this conversion. They are the same as the ones on the '07 Ultra with the exception of the lower right housing which doesn't have the holes for the throttle and idle cables since the '08s use an electronic, "cable-less", throttle control.

Having the '07 Touring Parts Catalog and Service Manual, my next step was to secure the appropriate pages from an '08 Touring Parts Catalog along with the necessary pages from an '08 Touring Service manual. I would recommend anyone considering this conversion to at least have the Service Manual for their particular year model bike. Torque values are particularly important when installing the new '08 system. With the '08 parts in hand and the appropriate '08 Parts Catalog pages, I made a list of the necessary parts and hardware that would be needed to complete the conversion along with new brake pads since the take-off calipers didn't have the pads with them.

CLUTCH PERCH/LEVER INSTALLATION:

Once all additional necessary parts were either in hand or soon to be delivered, I started with changing the clutch perch and lever. Note that changing to the '08 clutch perch and lever is not absolutely necessary. There is a difference in appearance and I wanted the levers to match on both sides. When switching the clutch lever side, the only common parts used on both mounts/levers is the #45021-86 anti-rattle spring and #90770-79 screw. The perch, lever, lever pivot pin, and cable pin are all new/different items. It's not necessary to change the Clutch Cable though the adjustment at the boot may be different since the '08 lever appears to have a different length travel when compared to the '07. Simply introduce all the slack in the cable adjuster prior to swapping the perch and lever. Below are some pics of the '07 and '08 clutch controls. The first photo shows the '07 lever and components on the left with the '08 on the right. Common anti-rattle spring and screw in the middle.

Note the very different white plastic cable retainer pins.



The unique '08 cable retainer pin:



Next is a view with the cable retainer pins installed in levers. '08 is on the right and appears to be an improved design.



Next is the bottom side of clutch levers. As noted, anti-rattle spring and screw are common to both.



Finally, a view of both levers from the front:



Installation of the clutch perch and components is pretty much straight forward, and the only recommendation I would make is to install the cable/lever assembly prior to mounting the perch assembly to the handlebar:

1. After installing the anti-rattle spring and screw in the '08 clutch lever, insert clutch cable eyelet into the groove of the lever. After aligning eyelet with hole in lever, insert the anchor pin through lever and eyelet with pin oriented as depicted in picture above. The pin has a small tab that fits into a specific mating hole in the lever.
2. Insert lever into groove of clutch perch, and utilizing the slack previously introduced at the adjuster, insert the end of the cable housing into the bore hole on the inboard side of the perch.
3. After aligning the hole in the lever with hole in perch install the pivot pin then the pivot pin retaining ring in bottom pin groove. Verify the retaining ring is completely seated in the groove. **NOTE:** Be very careful with the pin retaining ring as they are easily lost during the install. An application correct pair of retaining ring pliers is a good investment.
4. After applying a small amount of blue thread locker, use the two T27 TORX screws and washers to secure the handlebar clamp to the clutch perch. Starting with the top screw, complete a final tightening to 60-80 **in.-lbs.**

Here are rear and front views of the clutch perch assembly installed:





FRONT MASTER CYLINDER INSTALLATION:

Since the master cylinder is a major component of this conversion, I'll start with a few views that illustrate the new design of the '08 unit:





Note the blue rubber plug that's barely visible at the master cylinder outlet port. Since this was a take-off unit, the reservoir was still filled with brake fluid and the rubber plug had it sealed. This proved to be a big plus since it saved me the time of bench bleeding the unit. For anyone purchasing a new or un-filled master, I would highly recommend filling the unit on the bench and getting some fluid in the pump assembly so as to create

some pressure when moving the lever. This procedure will save a lot of time when it comes to final bleeding the entire system.

Should you decide to purchase new components, you would need #44551-08 Master Cylinder Assembly which would include everything except the banjo bolt, banjo bolt washers, half-clamp, mounting screws, and mounting screw washers. The mounting screws and their washers are common to older models.

Prior to starting the master cylinder installation it is highly recommended that the installer cover all adjacent **painted parts** (fuel tank, lowers, front fender, inner fairing) with old used beach towels or suitable. The DOT 4 brake fluid used in late model installations will ruin factory paint! I also took the opportunity at this time to drain the entire existing front brake system of all fluid by removing the existing master cylinder cover and attaching a clear hose to each brake caliper bleed screw. Opening the caliper bleed screws will allow you to gravity drain all fluid into a suitable container.

This would also be a good time to replace the existing brake line if it's being updated to a '08 unit or one of the very desirable stainless braided lines. Secure an old shop towel or sandwich bag over the brake line ends prior to caliper installation. This will help prevent any unwanted drainage of brake fluid while the ends are hanging loosely.

NOTE: I found it much simpler to loosely install the brake line (with '08 banjo bolt and new copper washers) to the master cylinder, while holding it in a vertical position with the port straight up, before final install to the handlebar. This greatly reduces the chance of spilling brake fluid on painted parts. Simply snug the banjo bolt which will still allow the brake line fitting to rotate during final installation:

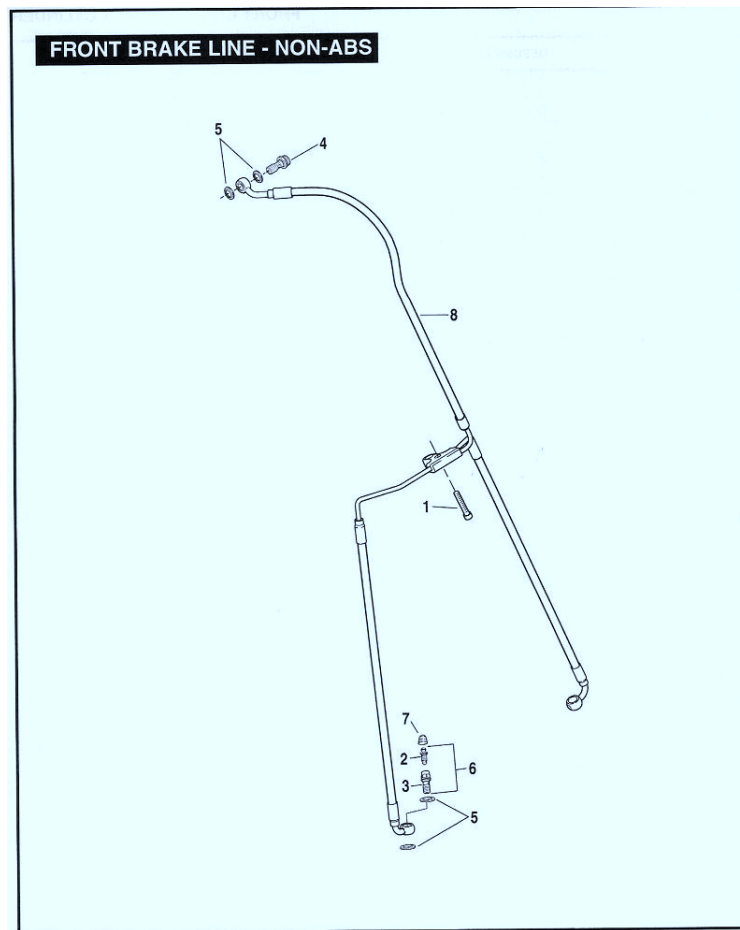
1. Place a 1/8th – 3/16th piece of cardboard or end of a cable strap eyelet between the brake lever and lever bracket. This is absolutely necessary to eliminate the chance of damaging the brake stoplamp switch that's protruding from the right switch housing.
2. Position the lever/master cylinder assembly inboard of the switch housing while engaging the tab on the lower switch housing with the groove at the top of the brake lever bracket.
3. After applying a small amount of blue thread locker to the mounting screw threads, position the handlebar clamp to the master cylinder and install the two mounting screws (with washers). After making sure the master cylinder assembly is shouldered against the handlebar switch housings, begin tightening the mounting screws starting with the top screw and finishing with a final torque of 72-80 **in.-lbs.**
4. Position the brake line and fitting to accommodate proper routing next to the handlebar, and final tighten the banjo bolt to 13-15 **ft.-lbs.** if using the stock brake line or to 17-22 **ft.-lbs.** if using the optional #41843-08 CHROME BANJO BOLT KIT.
5. **Do not** activate the brake lever until all components of the system are assembled, and the system properly bled. This greatly reduces the chance of the brake fluid that's in the master cylinder from being ejected at the wrong time!

Here we have rear and front views of the master cylinder and brake line after final installation:



FRONT BRAKE LINE INSTALLATION:

Since I used my existing H-D Diamondback braided brake line, I didn't have the opportunity to get any pictures of an '08 line. Here's a view from a catalog that will help familiarize us with the shape/design of the '08 line:



The major difference that I can see is the caliper ends of the brake line extend out to the right and left of the appropriate caliper. Reason being there's a stop formed on top of each caliper to aid in final tightening of the banjo bolt/bleeder assemblies. The '07 and earlier brake lines have the ends extending towards the front of the bike. Again, my use of the '07 line presented no problems with installation or final tightening of the banjo bolts. You simply have to hold the brake line fitting, during final tightening of the banjo bolt, to keep it from turning on the caliper.

FRONT ROTOR INSTALLATION:

The next step involves removing the front wheel assembly, and again I would recommend having a factory Service Manual for your bike for this procedure. After removing front wheel we will remove the existing brake rotors. This is easily done using a T40 TORX bit and appropriate breaker bar while holding the wheel assembly upright.

The '08 rotors must be used in this conversion as they are 300mm in diameter while the earlier rotors are 292mm (11 ½ inches). It is also highly recommended to use 10 **new** #3655A rotor mounting screws.

Here's the new '08 rotor that is correctly marked for right or left side installation:



Also note the button at the 10-11 o'clock position. Some initially thought this was part of the ABS Braking System but “unofficial” sources call it a *whine-damping button*. Here is a view of the back-side of the rotor and “button”:



Installation of the rotors begins with mounting the appropriate (right or left) disc to the wheel hub with new T40 TORX bolts. If purchased from Dealer, these bolts already have thread locker applied. In recent years, the factory Service Manual would have us mount the rotors in the same location on both sides of the wheel. In fact, there was an entire section on **BRAKE DISC LOCATION AND ALIGNMENT**. From the '07 Service Manual:

“Verify that the brake discs are correctly aligned. A long Phillips screwdriver or straight piece of drill rod can be inserted straight through the vent holes of both the left and right brake discs when correctly aligned.”

The '08 Service Manual makes no mention of this procedure although I did align both rotors with the “anti-whine buttons” straight across from each other. Don't know if this was necessary, but I've had trouble-free operation on my '07 Ultra.

To finalize the rotor installation, just make sure the appropriate right and left discs are installed on the correct side of the wheel and alternately tighten the new mounting screws to 16-24 **ft.-lbs.** Then, using the appropriate service manual, follow the instructions to install the wheel back onto the front fork assembly.

FRONT CALIPER INSTALLATION:

This section of the conversion will begin with a couple of views of the new '08 Brembo calipers. Note how the bleeder screw and banjo bolt are one unit and that they are mounted at the top of the caliper:



In these two views above we can also see the brake pad spring, pad pin, and pad pin retaining clip.

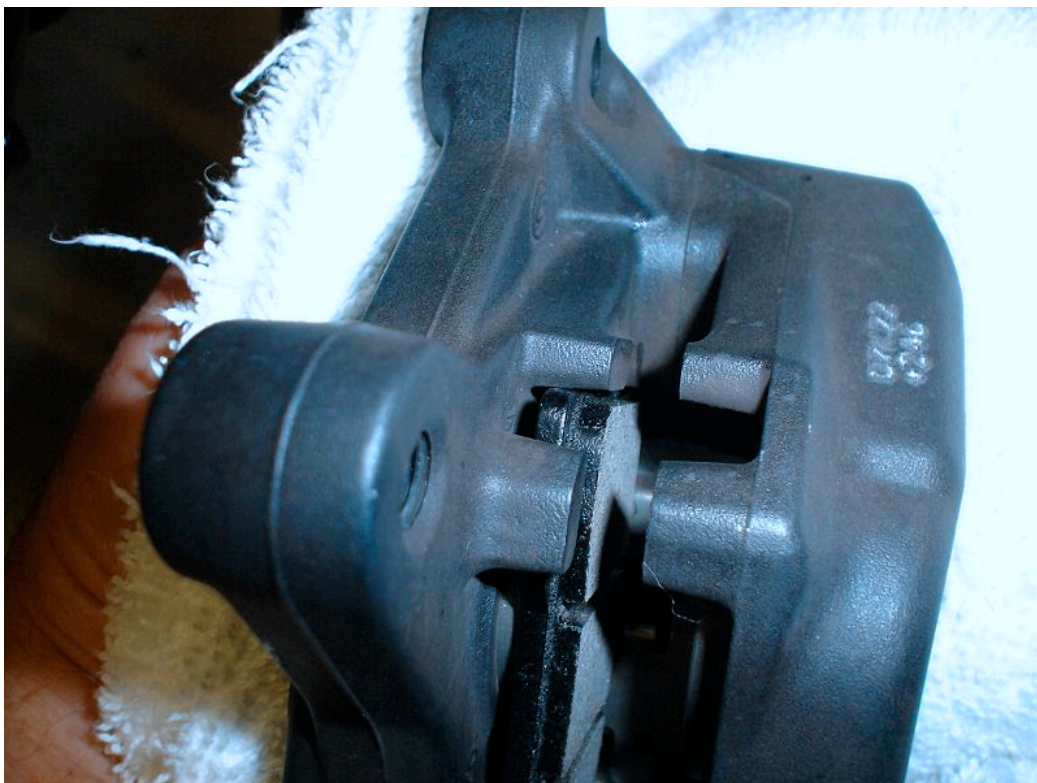
For installation procedures, I will also include steps for installing brake pads. If you purchase take-off components, they will most likely not include brake pads. I chose to install the excellent Z+ pads manufactured by Lyndall Racing Brakes of California: <http://www.lyndallracingbrakes.com/products.htm> In my opinion, these are perfect brake pads for a Touring bike. If you have purchased new caliper assemblies from Harley Davidson, they will include new factory brake pads.

At this point the old calipers would have been unbolted from the forks during wheel removal and discarded. Our procedure for installing new pads is as follows:

1. Remove screen from caliper using a small flat screwdriver and prying the screen tab that's next to the bleeder fitting up and away from the caliper.
2. Using small needle nose pliers, pull the retaining clip from the pad pin groove.
3. Using a 5mm (metric) Allen plug remove the pad pin.
4. Remove pad spring only if damaged or worn. If removed, seat **new** pad spring on flat in caliper so that clips on spring engage indentations in caliper. Be sure that forked end of pad spring is on the pad pin side of caliper.

Installing new brake pads:

1. Hold inner brake pad so that the pad pin tab is on the same side as pad pin hole in caliper.
2. Insert opposite side of brake pad into caliper engaging square shaped corner of pad in slot of caliper:



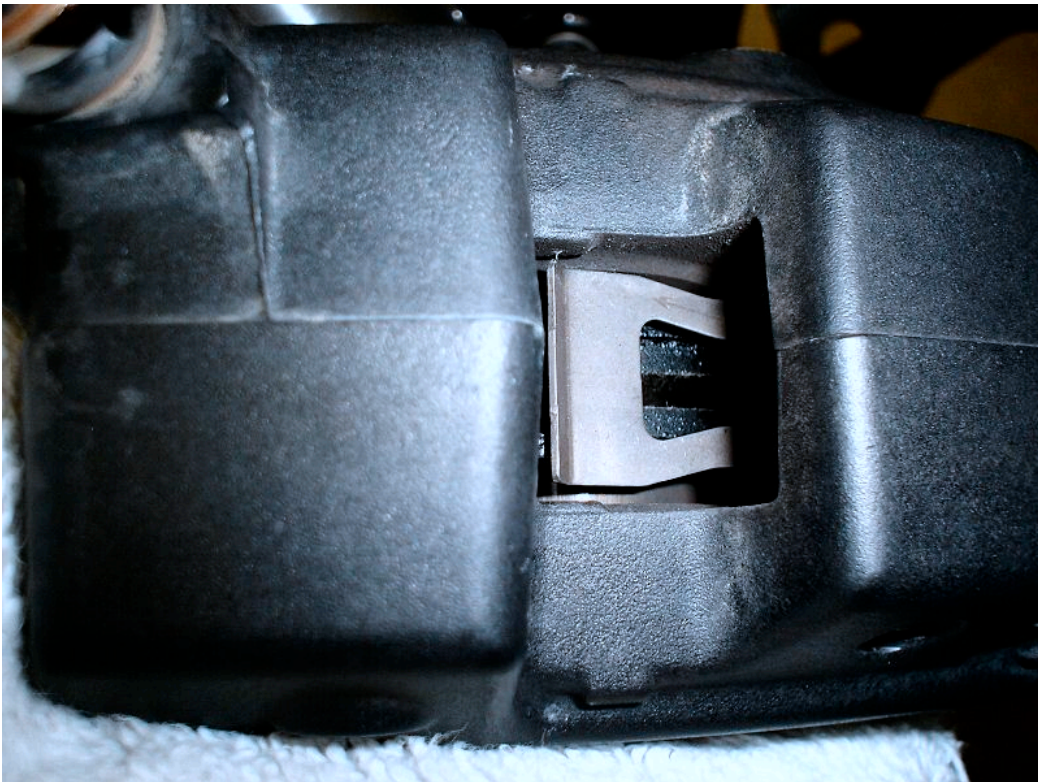
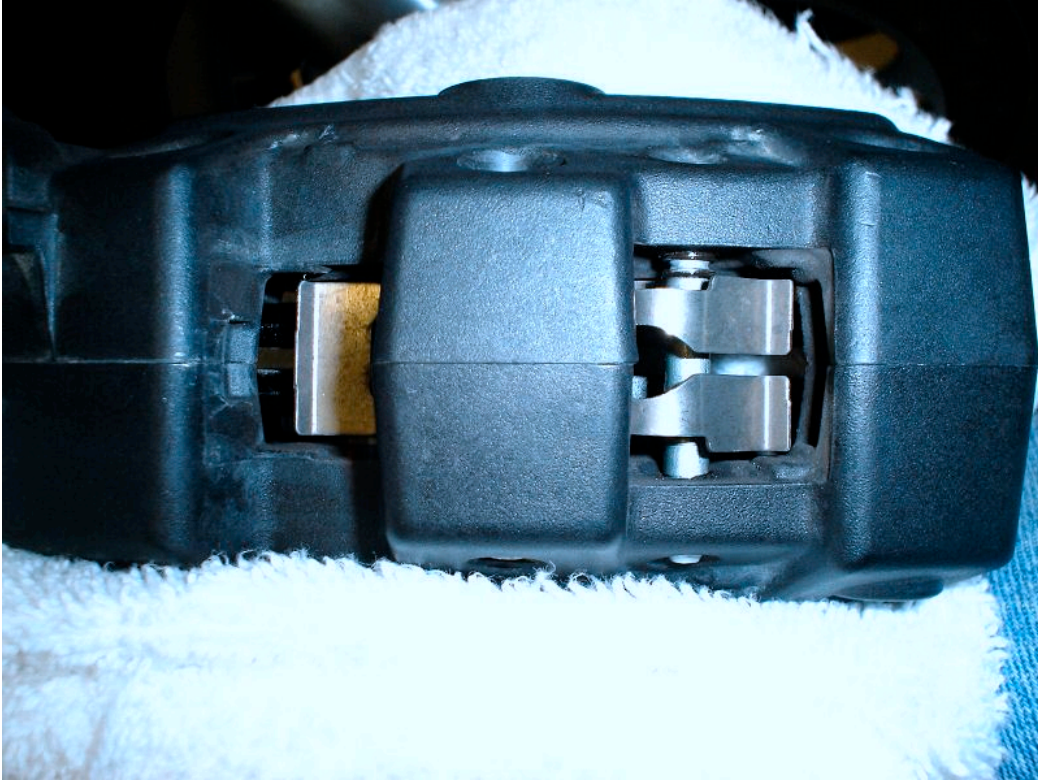
3. Push pad pin tab side of brake pad into caliper until seated.
4. Verify that brake pad friction material faces the brake disc gap in caliper:



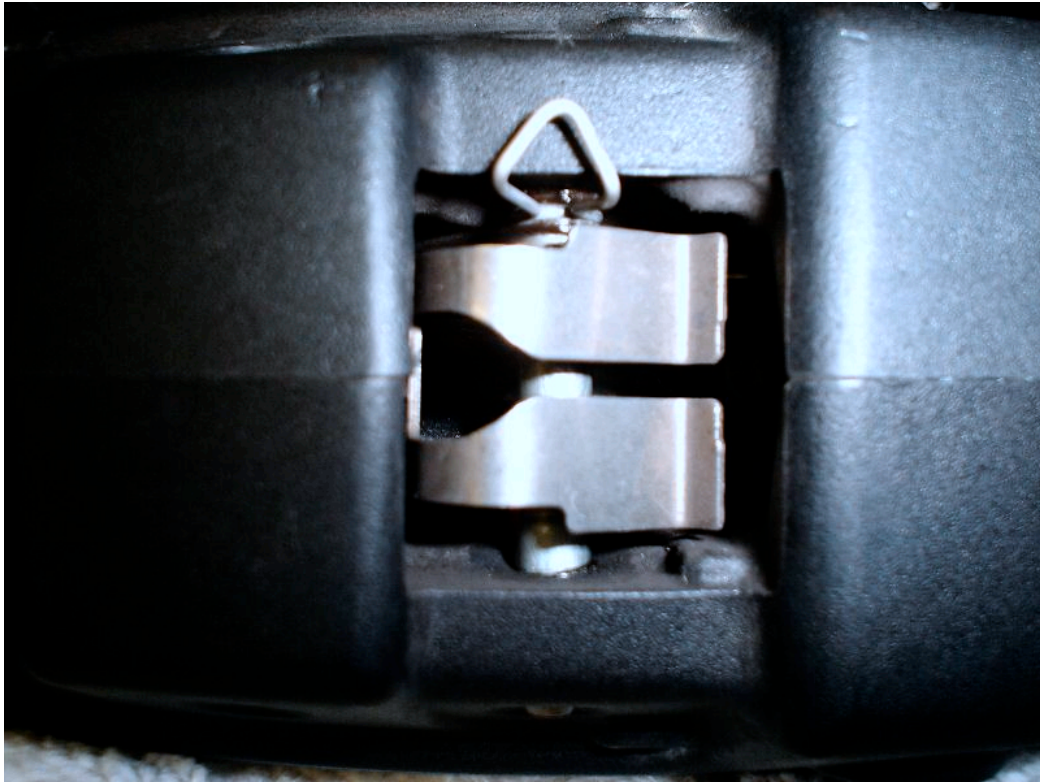
5. Repeat steps to install outer brake pad.



6. Turn caliper over and verify that pad pin tabs are centered under the forks of the pad spring.



7. Install pad pin and tighten to 75-102 **in.-lbs.** **NOTE:** Though not mentioned in the Service Manual, I personally used some disc brake caliper lube and applied a very light coating on the pad pin prior to installation.
8. Install retaining clip in groove of pad pin so that lip over-hangs caliper housing:



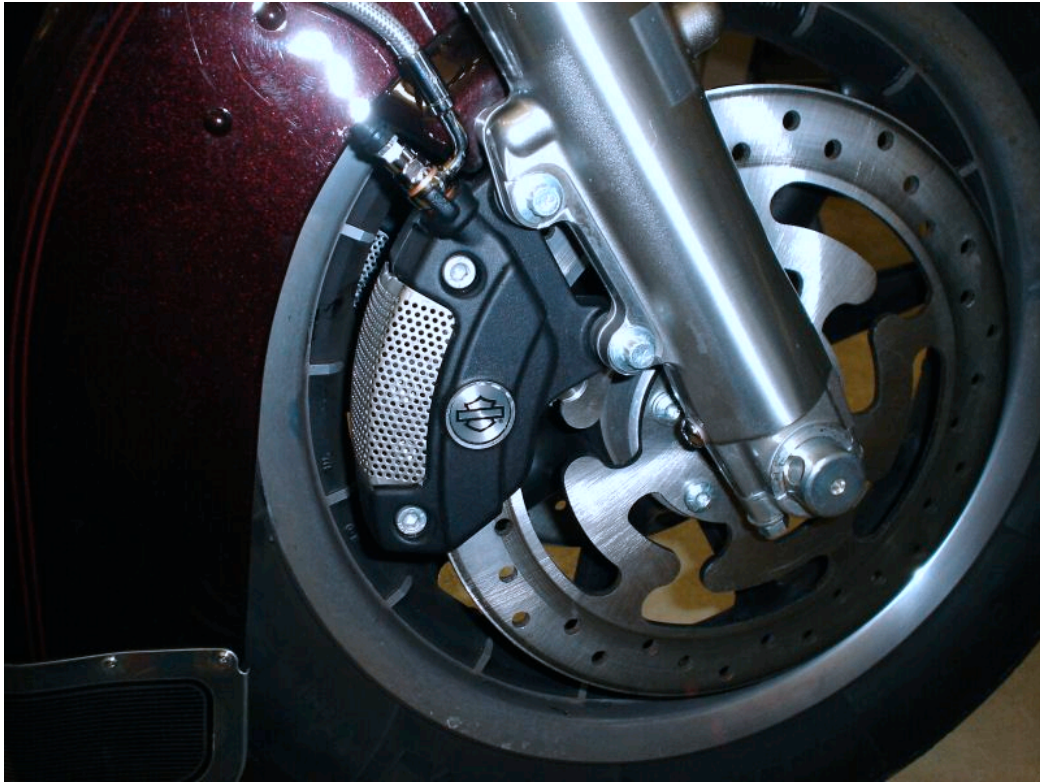
Caliper installation is as follows:

1. With the bleeder screw topside install the caliper assembly by sliding the front open area of the brake pads onto the bottom of the brake disc.
2. Slide caliper assembly straight up and around the disc until mounting holes are aligned with the lugs on the fork slider. After applying a small amount of blue thread locker, install the two mounting screws.
3. Alternately tighten the mounting screws to a final torque of 28-38 **ft.-lbs.**
4. Repeat for other side.

Installation of brake lines to calipers:

1. Remove any shop towels or tape from ends of brake line fittings. Be sure surfaces that contact the banjo bolt and caliper are clean. If temporarily installed also remove banjo bolt/bleeder assemblies from calipers.
2. Using **new** copper washers insert '08 banjo bleeder bolt through brake line end and thread into left and right calipers.
3. Tighten banjo bleeder bolts to caliper to a final torque of 17-19 **ft.-lbs.** If using the optional Chrome Banjo Bolt Kit final torque specs are 17-22 **ft.-lbs.**
4. Remove bleeder screws and apply Teflon tape to the threads. This will aid in preventing any air to leak past the threads during system bleeding.
5. Reinstall bleeder screws in bleeder bolt and only hand tighten.

Some views of the calipers and lines installed on the bike:



Fill and bleed brake system:

After following several procedures for bleeding brakes on my old stock system, I can recommend what worked quickly and easily for my '08 conversion. Having the bike, or at least the front end, off the ground I installed a short length of clear hose over each calipers' bleeder fitting and placed the other end of each hose in a suitable container. Next I turned the front wheel all the way to the left and locked the handlebars in place with the

ignition switch. If a lift is not available, simply rest the motorcycle on the jiffy stand and turn front wheel toward the left fork stop until the master cylinder reservoir is level. With protective coverings still over all painted parts in vicinity of the front brake system, remove the master cylinder reservoir cover. Next, using new DOT 4 brake fluid, fill the reservoir with fluid. Open both bleeder screws and allow the system to gravity bleed while making sure the master cylinder does not run dry of fluid. Once satisfied that sufficient bubble-free fluid is exiting both caliper bleeder screws, close the right side screw then the left. I then used a simple, inexpensive Mityvac to suction bleed first the left caliper then the right. Having a helper to keep the reservoir full during this procedure is a big plus. Once I again had bubble-free fluid coming from both calipers, I then proceeded to pressure bleed the system using the conventional process of:

1. Pump the brake lever several times to build up hydraulic pressure.
2. While holding the brake lever, open **left** brake caliper bleeder screw about $\frac{3}{4}$ turn. Close bleeder screw as soon as a loss of hydraulic pressure is detected or when the lever has moved $\frac{1}{2}$ to $\frac{3}{4}$ of its full range of travel. Allow lever to return slowly to its released position.
3. Repeat steps 1-2 until all air bubbles are purged and a solid column of fluid is observed in the bleeder tube. Be certain the master cylinder is not allowed to run dry of fluid!
4. Tighten bleeder screw to 80-100 **in.-lbs.** and install bleeder screw cap.
5. Repeat process for right brake caliper.
6. Add brake fluid to fill master cylinder to proper level.
7. Install master cylinder cover and final tighten cover screws to 7-10 **in.-lbs.**
8. Verify proper operation of the master cylinder, then pump the lever several times and tie back the lever to the throttle grip. Leave lever tied back overnight if at all possible. Lever should only be tied back $\frac{1}{2}$ to $\frac{3}{4}$ of its travel or where the feel is firm and appropriate pressure is being applied. A large rubber band worked well for this task.
9. Final checks would be to verify operation of the brake lights when applying the front lever, then test ride the bike.

PARTS REQUIRED FOR CONVERSION:

NOTE: The parts listed below were used for the conversion of an '07 Ultra to the '08 Harley-Davidson Brembo front braking system. Older Touring bikes may require different and/or additional parts. Purchase of take-off components will have many of the listed parts included.

CLUTCH CONTROL ASSEMBLY:

PART NO.	DESCRIPTION	QUANTITY
4132	SCREW	2
6101	WASHER	2
11143	RETAINING RING	1
38700-08A	BRACKET, CLUTCH LEVER	1
38738-08	PIN, CLUTCH LEVER PIVOT	1
38900-08	PIN, CLUTCH CABLE TO LEVER	1
45138-08A	HALF-CLAMP, CLUTCH BRACKET (black)	1
45015-08	CLUTCH LEVER ASSEMBLY (which includes items below)	1
45021-86	SPRING, ANTI-RATTLE	1
45423-92	BUSHING	1
90770-79	SCREW, ANTI-RATTLE SPRING	1

FRONT BRAKE MASTER CYLINDER ASSEMBLY:

PART NO.	DESCRIPTION	QUANTITY
4132	SCREW	2
6101	WASHER	2
41750-06B	BANJO BOLT, brakeline	1
41751-06A	GASKET, BANJO BOLT	2
45138-08A	HALF-CLAMP, MASTER CYLINDER	1
44551-08A	MASTER CYLINDER ASSEMBLY (which includes items below)	1
42854-06	RESERVOIR SIGHT GLASS KIT	1
42855-06B	MASTER CYLINDER COVER KIT	1
42859-06B	BRAKE LEVER ASSEMBLY	1
42861-06B	MASTER CYLINDER PUSHROD	1
42862-06A	MASTER CYLINDER PISTON SERVICE KIT	1

FRONT BRAKE LINE – NON ABS:

PART NO.	DESCRIPTION	QUANTITY
43350-08	FRONT BRAKE LINE ASSEMBLY	1
42853-06	CAP, BLEEDER SCREW	2
41751-06A	GASKET, BANJO BOLT	4
41783-08	BANJO BOLT BLEEDER ASSEMBLY (which includes items below)	1
4890	BLEEDER SCREW	2
5431A	BANJO BOLT, CALIPER	2

OPTIONAL COMPONENTS:

41843-08	CHROME BANJO BOLT KIT (which includes items below)	1
5468M	CHROME BANJO BOLT	3
41735-08	CHROME BANJO BOLT/BLEEDER SCREW ASSEMBLY	2
41751-06A	BRAKE LINE GASKET	10

RECOMMENDED COMPONENTS:

44106-08	DIAMONDBACK MODULAR UPPER BRAKE LINE	1
44905-08	DIAMONDBACK MODULAR LOWER BRAKE LINE	1

FRONT BRAKE ROTORS:

PART NO.	DESCRIPTION	QUANTITY
41808-08	FRONT BRAKE DISC, RIGHT	1
41809-08	FRONT BRAKE DISC, LEFT	1
3655A	BRAKE DISC MOUNTING SCREW	10

FRONT BRAKE CALIPERS:

PART NO.	DESCRIPTION	QUANTITY
44160-00	CALIPER MOUNTING BOLT	4
43023-08	CALIPER ASSEMBLY, RIGHT (which includes items below)	1
43027-08	CALIPER ASSEMBLY, LEFT (which includes items below)	1
41854-08	BRAKE PAD <u>and</u> 42849-08 PAD PIN KIT	2
42849-08	PAD PIN KIT	2
42851-06	CALIPER COVER	2
42852-06A	ANTI-RATTLE PAD SPRING	2
44341-08	BRAKE CALIPER MEDALLION	2

OPTIONAL COMPONENTS:

7254	LYNDALL RACING Z PLUS BRAKE PADS	2
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WARNING:

The information contained in this article is for entertainment purposes only. A rider's safety always depends upon the correct installation of optional/replacement components. Certain procedures may not be within a rider's capabilities or you may not have the correct tools to successfully complete installation of optional/replacement components. Always consult with a trained professional when considering installation of any replacement part. **Improper installation of any optional/replacement component could result in death or serious injury.**