

ASSEMBLY INSTRUCTIONS
FOR
**W4A BIG BRAKE BMW FRONT HAT KIT,
WITH 14.00" DIAMETER VENTED ROTOR**

1999 323i/328i Sedan Only, E46 • 2000 323i/328i All • 2001-2005 325i/330i Except xi
2001-2005 320i Sedan (Canada) • 2006 325i/330i Coupe and Convertible Except xi

PART NUMBER GROUP

140-11974

**DISC BRAKES SHOULD ONLY BE INSTALLED BY SOMEONE
KNOWLEDGEABLE AND COMPETENT IN THE FUNCTIONING
AND MAINTENANCE OF DISC BRAKES
READ ALL WARNINGS**

WARNING

IT IS THE RESPONSIBILITY OF THE PERSON INSTALLING ANY BRAKE COMPONENT OR KIT TO DETERMINE THE SUITABILITY OF THE COMPONENT OR KIT FOR THAT PARTICULAR APPLICATION. IF YOU ARE NOT SURE HOW TO SAFELY USE THIS BRAKE COMPONENT OR KIT, YOU SHOULD NOT INSTALL OR USE IT. DO NOT ASSUME ANYTHING. IMPROPERLY INSTALLED OR MAINTAINED BRAKES ARE DANGEROUS. IF YOU ARE NOT SURE, GET HELP OR RETURN THE PRODUCT. YOU MAY OBTAIN ADDITIONAL INFORMATION AND TECHNICAL SUPPORT BY CALLING WILWOOD AT (805) 388-1188, OR VISIT OUR WEB SITE AT WWW.WILWOOD.COM. USE OF WILWOOD TECHNICAL SUPPORT DOES NOT GUARANTEE PROPER INSTALLATION. **YOU**, OR THE PERSON WHO DOES THE INSTALLATION MUST KNOW HOW TO PROPERLY USE THIS PRODUCT. IT IS NOT POSSIBLE OVER THE PHONE TO UNDERSTAND OR FORESEE ALL THE ISSUES THAT MIGHT ARISE IN YOUR INSTALLATION.

RACING EQUIPMENT AND BRAKES MUST BE MAINTAINED AND SHOULD BE CHECKED REGULARLY FOR FATIGUE, DAMAGE, AND WEAR.



WARNING

**DO NOT OPERATE ANY VEHICLE ON UNTESTED BRAKES!
SEE MINIMUM TEST PROCEDURE WITHIN**

ALWAYS UTILIZE SAFETY RESTRAINT SYSTEMS AND ALL OTHER AVAILABLE SAFETY EQUIPMENT WHILE OPERATING THE VEHICLE

IMPORTANT • READ THE DISCLAIMER OF WARRANTY INCLUDED IN THE KIT

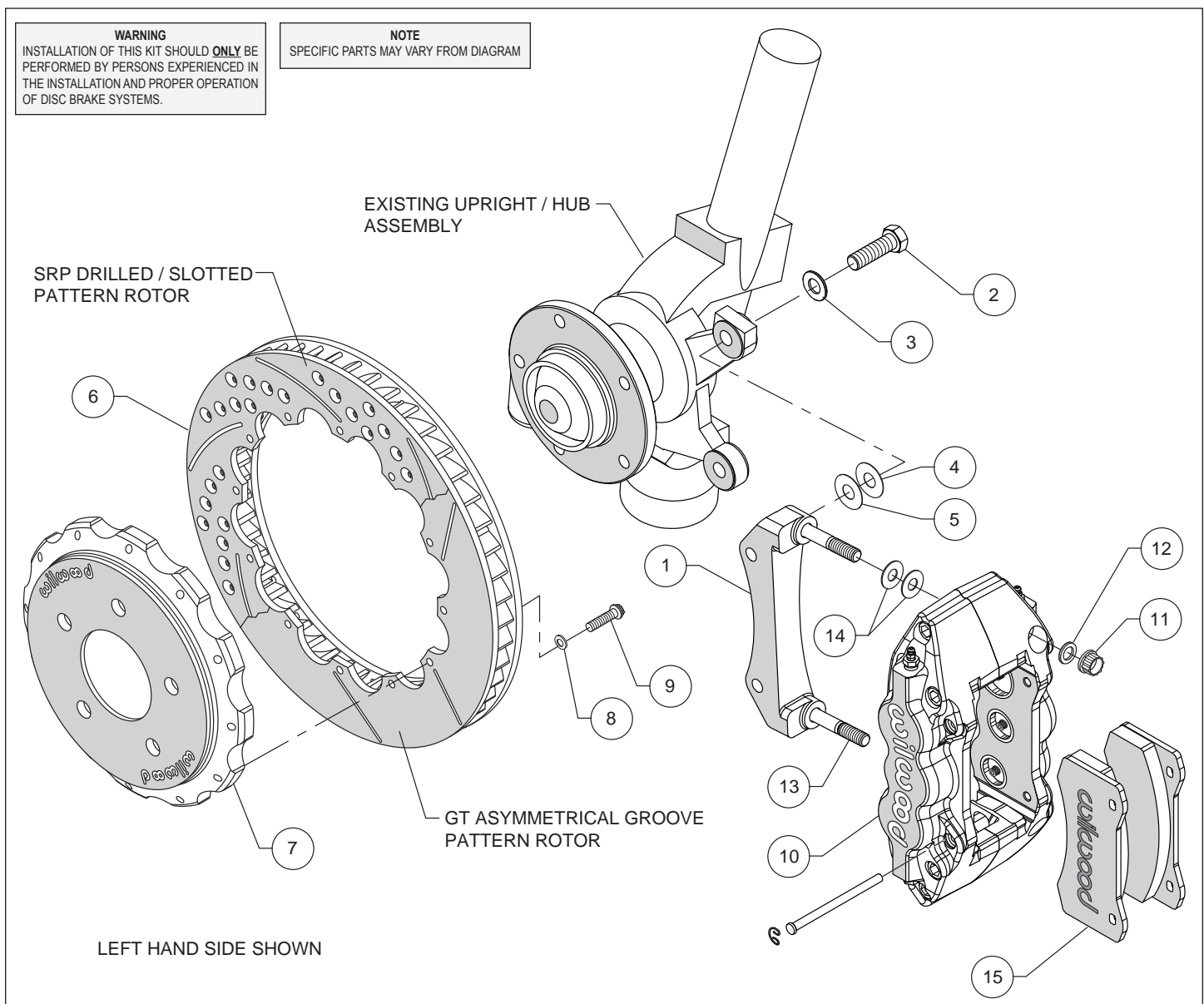
NOTE: Some cleaners may stain or remove the finish on brake system components. Test the cleaner on a hidden portion of the component before general use.

Important Notice - Read This First

Before any tear-down or disassembly begins, review the following information:

- Review the Wheel Clearance Diagram (Figure 2, page 3) to verify that there is adequate clearance with the wheels you will be using with the installation.
- Front brake kits do not include flex lines. OEM brake lines will not adapt to Wilwood calipers. Check the assembly instructions, or associated components section for brake line recommendations before assembly. In addition, Wilwood offers an extensive listing of brake lines and fittings on our web site: www.wilwood.com.
- Due to OEM production differences and other variations from vehicle to vehicle, the fastener hardware and other components in this kit may not be suitable for a specific application or vehicle.
- It is the responsibility of the purchaser and installer of this kit to verify suitability / fitment of all components and ensure all fasteners and hardware achieve complete and proper engagement. Improper or inadequate engagement can lead to component failure.

Exploded Assembly Diagram



Parts List

ITEM NO.	PART NO.	DESCRIPTION	QTY
1	250-11977	Bracket, Caliper Mounting	2
2	230-10646	Bolt, M12-1.75 x 40mm Long, Hex Head	4
3	240-0476	Washer, .477 I.D. x .922 O.D. x .063 Thick	4
4	240-6320	Shim, .033 Thick	8
5	240-5878	Shim, .015 Thick	12
6	160-8398/99	Rotor, GT - 1.25" x 14.00" Dia, 12 x 8.75" Bolt Circle (one each, right and left)	2
6A	160-8396/97-BK	Rotor, Black, SRP Drilled and Slotted (one each, right and left)	2
7	170-11975	Hat, Big Brake, .750 Offset, 12 x 8.75" Bolt Circle	2
8	240-11240	Washer, .265 I.D. x .500 O.D. x .063 Thick	24
9	230-6737	Bolt, 1/4-20 x 1.00" Long, 12 Point	24
10	120-11663/64-RS	Caliper, W6A (one each, right and left)	2
10A	120-11663/64-RSR	Caliper, W6A (one each, right and left), Red	2
11	230-9182	Nut, 7/16-20, Self-Locking, 12 Point	4
12	240-11101	Washer, .453 I.D. x .750 O.D. x .063 Thick	4
13	230-9080	Stud, 7/16-14 x 7/16-20 x 3.375 long (pre installed in bracket)	4
14	240-1848	Shim, .030 Thick	16
15	150-9488K	Pad, BP-10 Compound, Axle Set	1

NOTES: Part Number 230-4572 Rotor Bolt Kit, includes P/N's 230-6737 and 240-11240

Part Number 250-11976 Caliper Mounting Bracket Kit, includes P/N's 230-9182, 230-9080, 240-1848, 240-11101, 250-11977

Part Number 230-10974 Bracket to Spindle Mounting Bolt Kit, includes P/N's 230-10646, 240-0476, 240-5878 and 240-6320

Item 4A is an optional item and is included with the "-D" drilled kits. Add "-D" to end of part number when ordering.

Item 8A is an optional item and is included with the "-R" red kits. Add "-R" to end of part number when ordering.

Wilwood offers an optional Braided Stainless Steel Hose Kit. Order part number 220-11983 (not included in kit).

General Information and Disassembly Instructions

• Installation of this kit should **ONLY** be performed by persons experienced in the installation and proper operation of disc brake systems. Before assembling this Wilwood front disc brake kit, double check the following to ensure a trouble free installation.

• Inspect the contents of this kit against the parts list to ensure that all components and hardware are included.

• Make sure this is the correct kit to fit the exact make and model year of your vehicle. This kit is designed for direct bolt-on installation to 1999 through 2006 model year BMW E46 Series axle hubs.

• Verify your wheel clearance using Figure 2.

• Verify that the factory axle hub center register diameter and lug pattern match those in the new hat. **NOTE:** Axle hubs that have been modified with different size studs or lug patterns may require modifications to the new hat that must be performed by a qualified machinist.

Disassembly

• Disassemble the original equipment front brakes:

Raise the front wheels off the ground and support the front suspension according to the vehicle manufacturer's instructions.

Remove the front wheels, calipers, rotors, and rotor dust shields. **NOTE:** Removal of the OEM hub will be necessary to remove the dust shield. Reinstall the hub per the vehicle manufacturer's instructions.

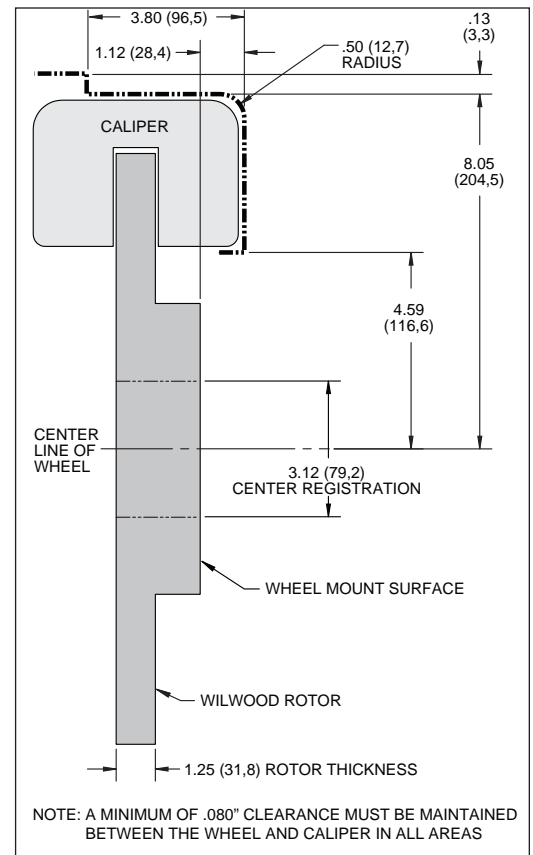


Figure 2. Wheel Clearance Diagram

• Remove any nicks or burrs on the axle hub and upright that may interfere with the installation of the new brake components.

• Clean and de-grease the axle hub and upright assembly.

Assembly Instructions

Assembly Instructions (numbers in parenthesis refer to the parts list and Figure 1 on the preceding pages):

- The caliper mount bracket (1) should initially be installed with clean, dry threads on the mounting bolts. Orient the bracket as shown in Figure 1 and Photo 1 and install using mount bolts (2) and washers (3). Initially place one each .033" thick shim (4), and .015" thick shim (5) on each bolt between the bracket and upright, Figure 1. Temporarily tighten the mounting bolts. **NOTE:** The bracket must fit squarely against the mount bosses on the upright. Inspect for interference from casting irregularities, machining ridges, burrs, etc. Later, after the caliper alignment has been checked, the mount bolts will be secured using red *Loctite*® 271.

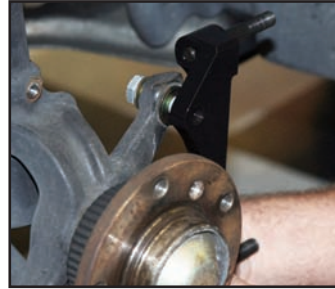


Photo 1



Photo 2

- Orient the rotor (6) and the hat (7) as shown in Figure 1 and Photo 2. Attach rotor to hat using bolts (9) and washers (8). Using an alternating sequence, apply red *Loctite*® 271 to the threads, and torque to 155 in-lbs. Safety wire bolts using standard 0.032 inch diameter stainless steel safety wire as shown in Figure 3. Please refer to Wilwood's data sheet DS-386 (available at www.wilwood.com/Pdf/DataSheets/ds386.pdf) for complete safety wire installation instructions.

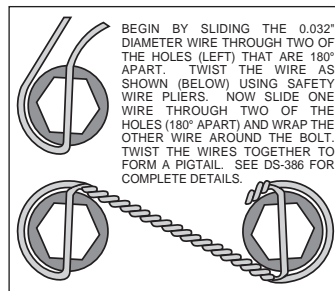


Figure 3. Safety Wire Diagram



Photo 3

- Slide the hat/rotor assembly onto the axle hub, Photo 3. **NOTE:** The hat must fit flush against the axle hub flange or excessive rotor run out may result. Install three lug nuts (finger tight) to keep the hat/rotor assembly in place while continuing with the installation.

- **NOTE:** This kit contains distinct right and left hand calipers that must be mounted in a specific direction, as described below. Lubricate the caliper mounting studs (13) with lightweight oil. Initially place two .030" thick shims (14) on each stud as shown in Figure 1 and Photo 4. With the bleed screws pointing up, mount the caliper (10) onto the bracket (1) using lock nuts (11) and washers (12), Figure 1. Ensure that the caliper is mounted so that the largest pistons are at the rotor exit end of the caliper, in relation to the direction of rotor rotation. Temporarily tighten the lock nuts and view the rotor through the top opening of the caliper. The rotor should be centered in the caliper, Photo 5. If not, adjust by adding or subtracting shims (4 and/or 5) between the bracket and the upright. Always use the same amount of shims on each of the two mounting bolts. Once the caliper alignment is correct, remove the bracket mounting bolts one at a time, apply red *Loctite*® 271 to the threads, and torque to 60 ft-lb.

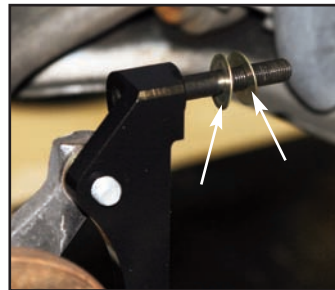


Photo 4

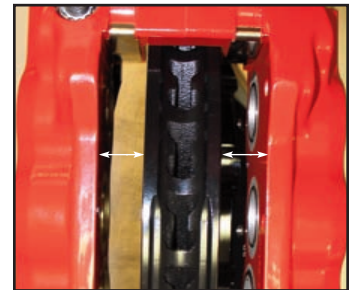


Photo 5

- Remove the two pad retaining pins from the caliper (10) by carefully popping out the pin retaining clips and sliding out the pins. Insert the brake pads (15) into the caliper, with the friction material facing the rotor, as shown in Photo 6. Check that the top of the brake pad is flush with the outside diameter of the rotor, Photo 7. If not, adjust by adding or subtracting shims (14) between the caliper and the bracket. After the caliper pad height is set, secure the brake pads in place with the pad retaining pins and clips. Torque the caliper lock nuts (11) to 47 ft-lb.



Photo 6

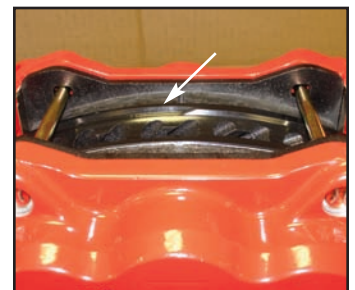


Photo 7

Assembly Instructions (Continued)

- Temporarily install the wheel and torque the lug nuts to the manufacturer's specification. Ensure that the wheel rotates freely without any interference.
- **NOTE:** OEM rubber brake hoses generally cannot be adapted to Wilwood calipers. The caliper inlet fitting is a 1/8-27 NPT. The preferred method is to use steel adapter fittings at the caliper, either straight, 45 or 90 degree and enough steel braided line to allow for full suspension travel and turning radius, lock to lock. Wilwood offers a brake flex line hose kit to fit this application, order P/N 220-11983. Hose kit includes hoses, fittings, etc., all in one package for this application. **Carefully route hoses to prevent contact with moving suspension, brake or wheel components.** **NOTE:** Wilwood hose kits are designed for use in many different vehicle applications and it is the installer's responsibility to properly route and ensure adequate clearance and retention for brake hose components.
- **NOTE:** Specified brake hose kits may not work with all Years, Makes and Models of vehicle that this brake kit is applicable to, due to possible OEM manufacturing changes during a production vehicle's life. It is the installer's responsibility to ensure that all fittings and hoses are the correct size and length, to ensure proper sealing and that they will not be subject to crimping, strain and abrasion from vibration or interference with suspension components, brake rotor or wheel.
- In absence of specific instructions for brake line routing, the installer must use his best professional judgment on correct routing and retention of lines to ensure safe operation. Test vehicle brake system per the 'minimum test' procedure stated within this document before driving. After road testing, inspect for leaks and interference. Initially after install and testing, perform frequent checks of the vehicle brake system and lines before driving, to confirm that there is no undue wear or interference not apparent from the initial test. Afterwards, perform periodic inspections for function, leaks and wear in a interval relative to the usage of vehicle.
- Bleed the brake system, referring to the additional information and recommendations below for proper bleeding instructions. Check system for leaks after bleeding.
- Install the wheel and torque the lug nuts to manufacturer's specifications.

Additional Information and Recommendations

- Fill and bleed the new system with Wilwood Hi-Temp^o 570 grade fluid or higher. For severe braking or sustained high heat operation, use Wilwood EXP 600 Plus Racing Brake Fluid. Used fluid must be completely flushed from the system to prevent contamination. **NOTE:** Silicone DOT 5 brake fluid is **NOT** recommended for racing or performance driving.
- To properly bleed the brake system, begin with the caliper farthest from the master cylinder. Bleed the outboard bleed screw first, then the inboard. Repeat the procedure until all calipers in the system are bled, ending with the caliper closest to the master cylinder. **NOTE:** When using a new master cylinder, it is important to bench bleed the master cylinder first.
- Test the brake pedal. It should be firm, not spongy and stop at least 1 inch from the floor under heavy load.
 - If the brake pedal is spongy, bleed the system again.
 - If the brake pedal is initially firm, but then sinks to the floor, check the system for fluid leaks. Correct the leaks (if applicable) and then bleed the system again.
 - If the brake pedal goes to the floor and continued bleeding of the system does not correct the problem, a master cylinder with increased capacity (larger bore diameter) may be required. Wilwood offers various lightweight master cylinders with large fluid displacement capacities.
- **NOTE:** With the installation of after market disc brakes, the wheel track may change depending on the application. Check your wheel offset before final assembly.
- If after following the instructions, you still have difficulty in assembling or bleeding your Wilwood disc brakes, consult your local chassis builder, or retailer where the kit was purchased for further assistance.

Brake Testing and Pad Bedding

WARNING • DO NOT DRIVE ON UNTESTED BRAKES BRAKES MUST BE TESTED AFTER INSTALLATION OR MAINTENANCE MINIMUM TEST PROCEDURE

- Make sure pedal is firm: Hold firm pressure on pedal for several minutes, it should remain in position without sinking. If pedal sinks toward floor, check system for fluid leaks. DO NOT drive vehicle if pedal does not stay firm or can be pushed to the floor with normal pressure.
- At very low speed (2-5 mph) apply brakes hard several times while turning steering from full left to full right, repeat several times. Remove the wheels and check that components are not touching, rubbing, or leaking.
- Carefully examine all brake components, brake lines, and fittings for leaks and interference.
- Make sure there is no interference with wheels or suspension components.
- Drive vehicle at low speed (15-20 mph) making moderate and hard stops. Brakes should feel normal and positive. Again check for leaks and interference.
- Always test vehicle in a safe place where there is no danger to (or from) other people or vehicles.
- Always wear seat belts and make use of all safety equipment.

PAD BEDDING PROCEDURE:

• Pump brakes at low speed to assure proper operation. On the race track, or other safe location, make a series of hard stops until some brake fade is experienced. Allow brakes to cool while driving at moderate speed to avoid use of the brakes. This process will properly burnish the brake pads, offering maximum performance.

Associated Components

<u>PART NO.</u>	<u>DESCRIPTION</u>
260-1874	Wilwood Residual Pressure Valve (2 lb for disc brakes)
260-1876	Wilwood Residual Pressure Valve (10 lb for drum brakes)
260-8419	Wilwood Proportioning Valve
290-0632	Wilwood Racing Brake Fluid (Hi-Temp° 570) (12 oz)
290-6209	Wilwood Racing Brake Fluid (EXP 600 Plus) (16.9 oz)
340-1285	Wilwood Floor Mount Brake Pedal (with balance bar)
340-1287	Wilwood Swing Mount Brake Pedal (with balance bar)
260-6764	Wilwood 3/4 inch High Volume Aluminum Master Cylinder
260-6765	Wilwood 7/8 inch High Volume Aluminum Master Cylinder
260-6766	Wilwood 1 inch High Volume Aluminum Master Cylinder
260-4893	1-1/16 inch Tandem Master Cylinder (aluminum housing)
250-2406	Mounting Bracket Kit (tandem master cylinder)
260-8555	Wilwood 1 inch Aluminum Tandem Chamber Master Cylinder
260-8556	Wilwood 1-1/8 inch Aluminum Tandem Chamber Master Cylinder
350-2038	1971 - 1973 Pinto Rack and Pinion (new, not rebuilt)
270-2016	Quick Release Steering Hub (3/4 inch shaft)
270-2017	Quick Release Steering Hub (5/8 inch shaft)
220-11983	Flexline Kit, 1999-2006 BMW E46, Front