ASSEMBLY INSTRUCTIONS

FOR

1998 - 2002 CHEVROLET CAMARO*

***For additional vehicle compatibility, visit www.wilwood.com**

REAR AXLE DISC / DRUM INTERNAL PARKING BRAKE KIT WITH 12.88” DIAMETER VENTED ROTOR

BASE PART NUMBER

140-9830

DISC BRAKES SHOULD ONLY BE INSTALLED BY SOMEONE EXPERIENCED AND COMPETENT IN THE INSTALLATION 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.

Need Additional Information? Use Your SmartPhone and Jump to Our Technical Tips Section on Our Web Site.

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.**
- **This brake kit is not supplied with hydraulic lines or fittings and may require the purchase of additional lines or fittings to complete the installation. Wilwood offers an extensive listing of brake lines and fittings on our web site: www.wilwood.com.**
- **This brake kit is not supplied with parking brake cables hardware or adapters. Please see the note in the assembly instructions for vendor recommendations to purchase these parts.**
- **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.**

Photographic Tip

Important and highly recommended: Take photos of brake system before disassembly and during the disassembly process. In the event, trouble-shooting photos can be life savers. Many vehicles have undocumented variations, photos will make it much simpler for Wilwood to assist you if you have a problem.

Exploded Assembly Diagram

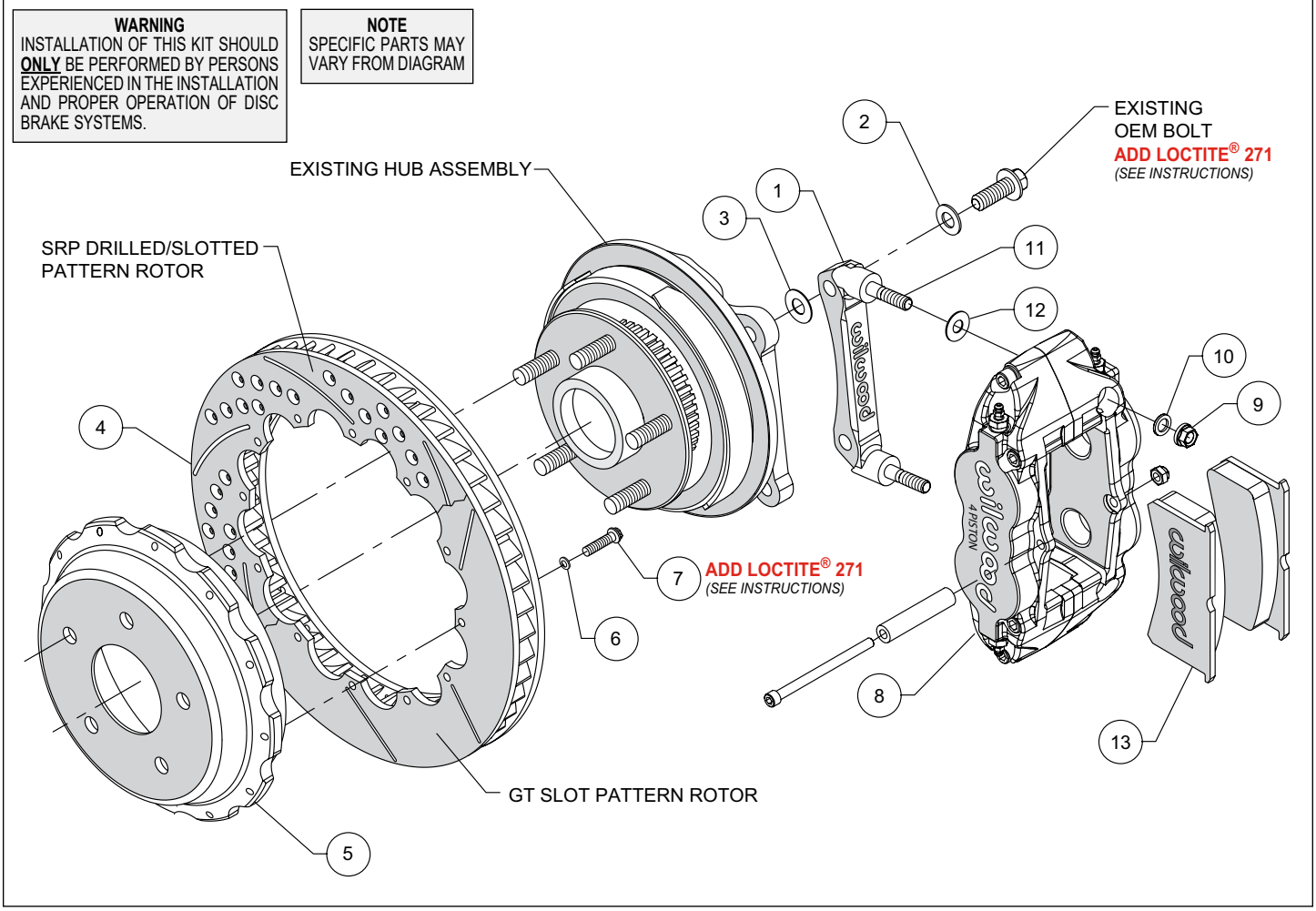


Figure 1. Typical Installation Configuration

Parts List

ITEM NO.	PART NO.	DESCRIPTION	QTY
1	250-9840	Bracket, Caliper Mounting	2
2	240-0476	Washer, .477” I.D. x .922” O.D. x .063” Thick	4
3	240-6320	Shim, .033” Thick	16
4	160-12961/62-GTB	Rotor, GT - 1.10” x 12.88” Dia, 12 x 8.75” Bolt Circle (one each, right and left)	2
4A	160-13543/44-BK	Rotor, SRP Drilled and Slotted (one each, right and left)	2
5	170-9839	Hat, 1.32” Offset, 12 x 8.75” Bolt Circle	2
6	240-11240	Washer, .265” I.D. x .500” O.D. x .063” Thick	24
7	230-6738	Bolt, 1/4-28 x .750” Long, 12 Point	24
8	120-11782-BK	Caliper, Billet Narrow Superlite 4R	2
9	230-16550	Nut, 3/8-24, Self-Locking Hex Head, 6 Point	4
10	240-10190	Washer, .391” I.D. x .625” O.D. x .063” Thick	4
11	230-9078	Stud, 3/8-16 x 3/8-24 x 2.50” long (pre-installed in bracket)	4
12	240-1159	Shim, .035” Thick	16
13	150-8855K	Pad, BP-10 Compound, Axle Set	1

NOTES:
Part Number 230-8217 Rotor Bolt Kit, includes part numbers 230-6738 and 240-11240
Part Number 250-9848 Caliper Bracket Mounting Bolt Kit, includes P/N 230-16550, 230-9078, 240-0476, 240-1159, 240-10190, 240-6320 & 250-9840
Item 4A is an optional item and is included with the “-”D” kits. Add “-D” to end of part number when ordering

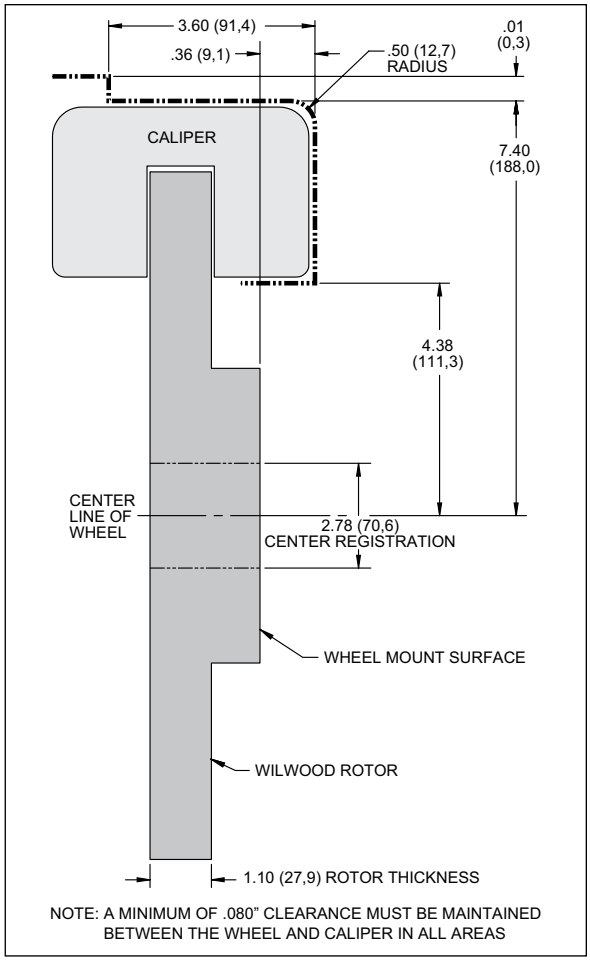
General Information

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

- Make sure this is the correct kit to fit the axle housing flange, not necessarily the rear end make. Many times after market manufacturers put a different make of axle housing flange on the stock rear end housing (see Figure 5). Example; Big Ford rear ends with Olds-Pontiac flanges, therefore, an Olds-Pontiac rear disc brake kit would be the correct kit to order. Also, shock clearance may be a problem. They may have to be modified and/or relocated to clear the Wilwood kit after final assembly.

- Inspect the package contents against the parts list to ensure that all components and hardware are included.

- **Verify The Following Measurements Before Assembly.**
  - Bearing outside diameter.
  - Axle housing flange mounting pattern is the same as pattern in bracket.
  - Stud pattern on axle flange is the same stud pattern in hat.
  - Dimension from wheel side of axle flange is the same as wheel side of axle housing flange (see Figure 5, lower right hand corner). This dimension is critical to ensure proper alignment of the rotor to the caliper, and should match offset given in the kit description.
  - Verify that the wheel axle stud size is either 12 mm or 0.50” diameter. The Wilwood hats utilized in these kits are drilled for a range of 12 mm - 0.50” diameter wheel studs.
  - Maximum axle flange diameter must be no larger than 6.50” w/.050” x 45° chamfer (see Figure 3).



The wheel clearance diagram is intended for general fitment purposes. ***DO NOT*** rely on this diagram to make custom wheels. Have the wheel company contact Wilwood for a 3D model of the brake kit before making custom wheels.

Figure 2. Wheel Clearance Diagram

Disassembly and Assembly Instructions

Disassembly

•Disassemble the original equipment rear brakes: Raise the rear wheels off the ground and support the rear suspension according to the vehicle manufacturer's instructions.

•Remove the wheel. Remove the two bolts from the backside of the upright that holds the stock caliper mounting bracket and lift off the bracket and stock caliper as one unit. You may have to unbolt the stock caliper from the caliper bracket before removal. Then slide off the rotor.

•Clean, de-grease and remove all nicks or burrs on the upright assembly as well as the stock caliper bracket bolts which will be reused during the assembly process.

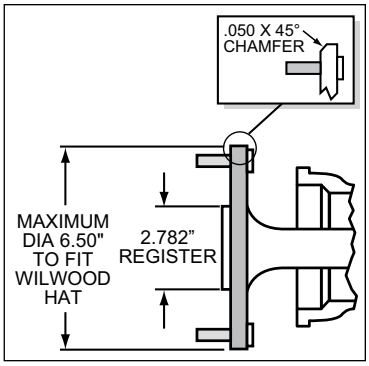


Figure 3. Axle Flange Maximum Dimension

Assembly Instructions (numbers in parenthesis refer to the parts list/diagram on the preceding pages):

•The caliper mount bracket assembly (1) should be installed first with clean, dry threads on the existing OEM mounting bolts. Install the bracket from the rear side of the hub by sliding stock bolt through flat washer (2), through the caliper mounting bracket (1) and shim washer (3) through the OEM caliper mounting bracket ears as shown in Figure 1 and Photo 1. The bracket must tighten squarely against the inboard side of the caliper mount bosses on the upright. Inspect for interference from casting irregularities, machining ridges, burrs, etc. Use one thin shim (3) between the bracket and upright during initial trial fitting. Later, after the caliper, pad, and rotor alignment has been checked, and any necessary shims have been put in place, the mounting bolt threads should be coated with red *Loctite*® 271 and torqued to 75 ft-lbs.

•Orient the rotor (4) and hat (5) as shown in Figure 1 and Photo 2. Attach the rotor to the hat with bolts (7) and washers (6). Apply red *Loctite*® 271 to the bolt threads and torque to 140 **in-lb** using a criss-cross pattern. For an added measure of security, the bolts may be safety wired using standard 0.032 inch diameter stainless steel safety wire as shown in Figure 4. Please refer to Wilwood's data sheet DS-386 (available at www.wilwood.com/Pdf/DataSheets/ds386.pdf) for complete safety wire installation instructions.

Photo 1

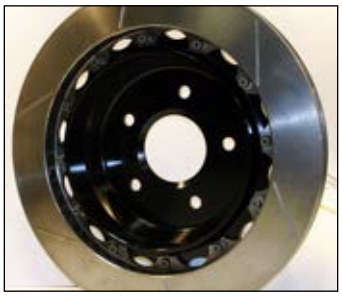


Photo 2

•Align the hole pattern on the hat and rotor assembly (4 and 5) with the stud pattern on the axle flange. Slide the hat/rotor assembly (4 and 5) over the wheel studs and against the axle flange face, Photo 3. Check to be sure the hat seats squarely against the axle flange face. The axle flange must be free from any rust, debris, casting burrs, machining irregularities, etc. Use three lug nuts to hold the rotor and hat firmly against the axle flange during the next phases of the installation and clearance checking procedures.

•Install one shim (12) over each stud (11) on the radial mount bracket (1), Photo 4. Slide the caliper (8) in place over the studs and rotor and install the washer (10) and lock nut (9) to hold the caliper in place, Photo 5. The caliper bleed screws should be pointing up. Snug the lock nuts (9) and check that the rotor (4) is centered in the caliper (8). Add or subtract .033" shims (3) as necessary between the caliper mount bracket (1) and the caliper mount bosses on the upright assembly to center the caliper.

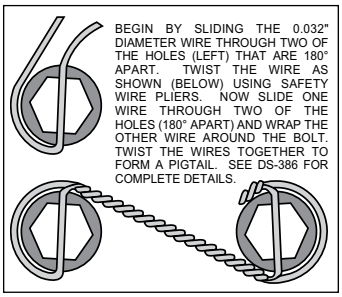


Figure 4. Safety Wire Diagram

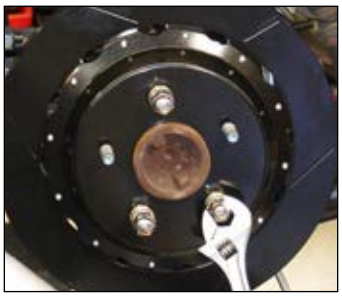


Photo 3

Assembly Instructions (Continued)

•Remove the caliper center bridge pad retainer bolt, nut, and tube from the caliper. Slide the brake pads (13) into place, Photo 6. They should install easily without interference. Check that the outside radius of the brake pad is aligned with the outside diameter radius of the rotor face. Add or subtract shims (12) between the caliper and mount bracket to gain the proper alignment. Reinstall the center bridge pad retainer tube, bolt, and locknut, Photo 7. The locknut should be snug without play in the bolt or tube. Be cautious not to over tighten.

Photo 4

Photo 5

•Adjust the parking brake shoes outward (using a drum shoe adjustment tool available at your local auto parts store) while spinning the hat (2) until a slight drag is felt against the hat/drum. Remove the lug nuts that were holding the hat/rotor in place. Install the wheel and lug nuts. Check to see that the wheel rotates freely without interference.

•Once all clearances have been checked, remove the wheel, caliper, hat/rotor from the axle flange. Secure the caliper mounting bracket (1) to the OEM caliper mounting ears using existing OEM bolt. Prior to installation, coat the bolt threads with red *Loctite*® 271. Torque the bolts to 75 ft-lbs. Reinstall the hat/rotor assembly and again use three lug nuts to hold it in place. Reinstall the caliper and torque the caliper nuts (9) to 30 ft-lbs.

Photo 6

Photo 7

•***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 (use PTFE tape on pipe threads of adapter fitting for proper sealing to caliper) and enough steel braided line to allow for full suspension travel and turning radius, lock to lock. **Carefully route lines to prevent contact with moving suspension, brake or wheel components.** 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. Wilwood offers a hose kit, P/N 220-6856, which includes hoses, fittings, etc., all in one package for this application.

•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 **'Additonal Information and Recommendations'** on page 6 as necessary for proper bleeding instructions.

•Install the wheel and torque the lug nuts to manufacturer's specification.

• Bed-in the brake pads per the procedure on page 8.

Assembly Instructions (Continued)

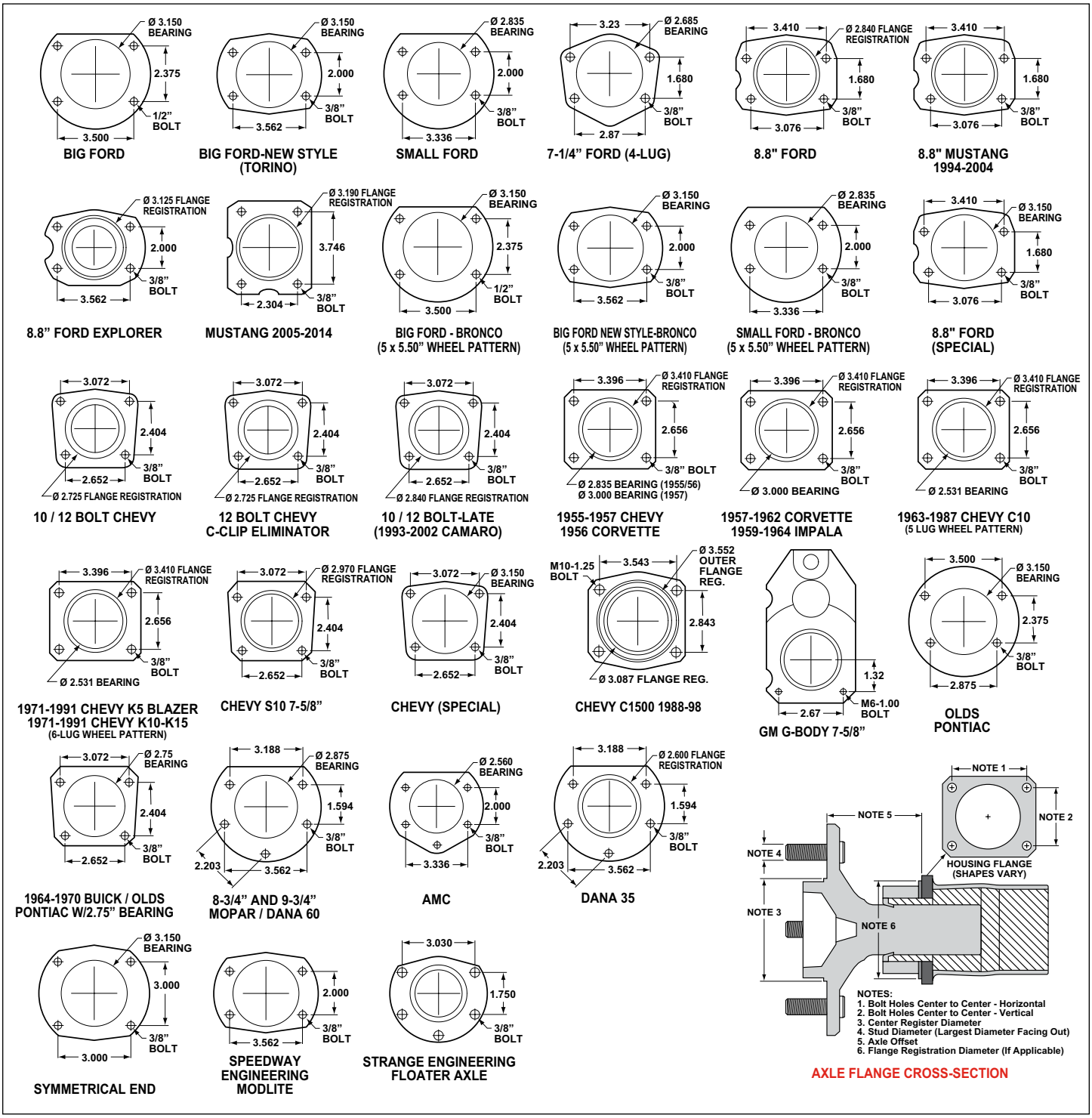


Figure 6. Rear Housing Flange Chart and Axle Flange / Offset Cross-Section

Additional Information and Recommendations

•***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.

•Please read the following concerning balancing the brake bias on 4 wheel disc vehicles.

This Camaro brake kit can be operated using the stock OEM master cylinder and proportioning system. However, as with most suspension and tire modifications (from OEM specifications), changing the brakes may alter the front to rear brake bias. Rear brakes should not lock up before the front. Brake system evaluation and tests should be performed by persons experienced in

Additional Information and Recommendations (Continued)

the installation and proper operation of brake systems. Evaluation and tests should be performed under controlled conditions. Start by making several stops from low speeds then gradually work up to higher speeds. Always utilize safety restraint systems while operating vehicle.

Use a Wilwood adjustable proportioning valve if necessary to achieve proper brake balance, or use a Wilwood brake pedal/balance bar assembly with dual master cylinders (requires custom mounting as used in fabricated chassis race cars). A balance bar brake system permits incremental front to rear brake pressure adjustments.

•For optimum performance, fill and bleed the new system with Wilwood Hi-Temp° 570 grade fluid or EXP 600 Plus. 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. If the caliper is fitted with bleed screws on four corners, make sure the bottom bleed screws are tight. Only bleed from the top bleed screws. ***NOTE:*** *When using a new master cylinder, it is important to bench bleed the master cylinder first.*

•If the master cylinder is mounted lower than the disc brake calipers, some fluid flowback to the master cylinder reservoir may occur, creating a vacuum effect that retracts the caliper pistons into the housing. This will cause the pedal to go to the floor on the first stroke until it has “pumped up” and moved all the pistons out against the pad again. A Wilwood in-line 2 lb. Residual Pressure Valve installed near the master cylinder will stop the fluid flowback and keep the pedal firm and responsive.

•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 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, either air may be trapped in the system, or a master cylinder with increased capacity (larger bore diameter) may be required. Wilwood offers various lightweight master cylinders with large fluid displacement capacities (custom fabricated mounting may be required).

Brake Testing

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 and Rotor Bedding

BEDDING STEPS FOR NEW PADS AND ROTORS – ALL COMPOUNDS

Once the brake system has been tested and determined safe to operate the vehicle, follow these steps for the bedding of all new pad materials and rotors. These procedures should only be performed on a race track, or other safe location where you can safely and legally obtain speeds up to 65 MPH, while also being able to rapidly decelerate.

- Begin with a series of light decelerations to gradually build some heat in the brakes. Use an on-and-off the pedal technique by applying the brakes for 3-5 seconds, and then allow them to fully release for a period roughly twice as long as the deceleration cycle. If you use a 5 count during the deceleration interval, use a 10 count during the release to allow the heat to sink into the pads and rotors.
- After several cycles of light stops to begin warming the brakes, proceed with a series of medium to firm deceleration stops to continue raising the temperature level in the brakes.
- Finish the bedding cycle with a series of 8-10 hard decelerations from 55-65 MPH down to 25 MPH while allowing a proportionate release and heat-sinking interval between each stop. The pads should now be providing positive and consistent response.
- If any amount of brake fade is observed during the bed-in cycle, immediately begin the cool down cycle.
- Drive at a moderate cruising speed, with the least amount of brake contact possible, until most of the heat has dissipated from the brakes. Avoid sitting stopped with the brake pedal depressed to hold the car in place during this time. Park the vehicle and allow the brakes to cool to ambient air temperature.

COMPETITION VEHICLES

- If your race car is equipped with brake cooling ducts, blocking them will allow the pads and rotors to warm up quicker and speed up the bedding process.
- Temperature indicating paint on the rotor and pad edges can provide valuable data regarding observed temperatures during the bedding process and subsequent on-track sessions. This information can be highly beneficial when evaluating pad compounds and cooling efficiencies.

POST-BEDDING INSPECTION – ALL VEHICLES

- After the bedding cycle, the rotors should exhibit a uniformly burnished finish across the entire contact face. Any surface irregularities that appear as smearing or splotching on the rotor faces can be an indication that the brakes were brought up to temperature too quickly during the bedding cycle. If the smear doesn't blend away after the next run-in cycle, or if chatter under braking results, sanding or resurfacing the rotors will be required to restore a uniform surface for pad contact.

PRE-RACE WARM UP

- Always make every effort to get heat into the brakes prior to each event. Use an on-and-off the pedal practice to warm the brakes during the trip to the staging zone, during parade laps before the flag drops, and every other opportunity in an effort to build heat in the pads and rotors. This will help to ensure best consistency, performance, and durability from your brakes.

DYNO BEDDED COMPETITION PADS AND ROTORS

- Getting track time for a proper pad and rotor bedding session can be difficult. Wilwood offers factory dyno-bedded pads and rotors on many of our popular competition pads and ***Spec 37*** GT series rotors. Dyno-bedded parts are ready to race on their first warm up cycle. This can save valuable time and effort when on-track time is either too valuable or not available at all, Dyno-bedding assures that your pads and rotors have been properly run-in and are ready to go. Contact your dealer or the factory for more information on Wilwood Dyno-Bedding services.

NOTE: *NEVER allow the contact surfaces of the pads or rotors to be contaminated with brake fluid. Always use a catch bottle with a hose to prevent fluid spill during all brake bleeding procedures.*

Parking Brake

WARNING • PARKING BRAKE

- Parking brake must be properly adjusted before use and must be manually readjusted for wear if parking brake handle or foot lever travel becomes excessive.
- The holding ability of the brake should be tested by stopping on a sloping surface and applying the parking brake while holding car with the hydraulic foot brake. This should be accomplished both facing up and down hill.
- Do not rely exclusively on the parking brake to hold the car; Curb wheels as recommended by the applicable diagram and put gear selector in park, or shift into first gear or reverse with a manual transmission.

- Diagram A - When parking facing downhill, turn front wheels towards the curb or right shoulder. This will keep from rolling into traffic if the brakes become disengaged.
- Diagram B - Turn the steering wheel to the left so the wheels are turned towards the road if you are facing uphill with a curb. The tires will catch the curb if the car rolls backward.
- Diagram C - When facing uphill without a curb, turn the wheels sharply to the right. If the vehicle rolls, it will go off the road rather than into traffic.
- When parking on a hill, always set the parking brake and move the gear selector into park, or shift into first or reverse gear if your vehicle has a manual transmission.

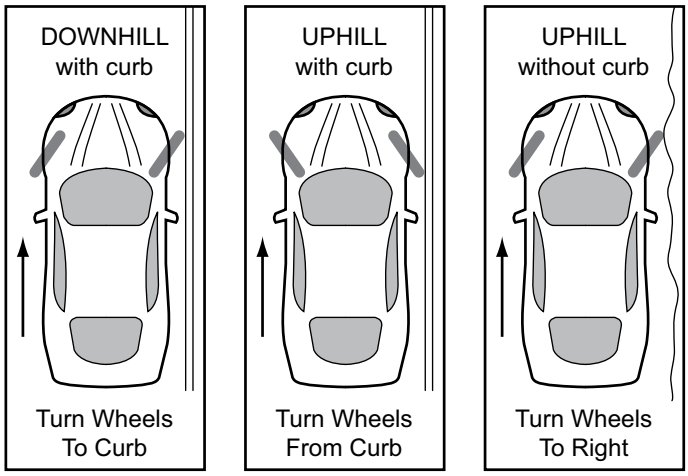


Diagram A Diagram B Diagram C

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Associated Components

PART NO.	DESCRIPTION
260-13706	Wilwood Residual Pressure Valve (2 lb for disc brakes)
260-13707	Wilwood Residual Pressure Valve (10 lb for drum brakes)
260-8419	Wilwood Proportioning Valve, Knob Style
260-8420	Wilwood Proportioning Valve, Lever Style
260-11179	Wilwood Combination Proportioning Valve with Brake Light Switch
290-0632	Wilwood Racing Brake Fluid (Hi-Temp° 570) (12 oz)
290-6209	Wilwood Racing Brake Fluid (EXP 600 Plus) (16.9 oz)
340-13831	Wilwood Floor Mount Brake Pedal (with balance bar)
340-13832	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)
260-8555	Wilwood 1 inch Aluminum Tandem Chamber Master Cylinder
260-8556	Wilwood 1-1/8 inch Aluminum Tandem Chamber Master Cylinder
220-7056	Stainless Steel Braided Flexline Kit, Universal, 14 Inch, Domestic, 3/8-24 IF
220-7699	Stainless Steel Braided Flexline Kit, Universal, 16 Inch, Domestic, 3/8-24 IF
220-8307	Stainless Steel Braided Flexline Kit, Universal, 18 Inch, Domestic, 3/8-24 IF
330-9371	Cable Kit, Parking Brake, Universal