

ASSEMBLY INSTRUCTIONS
FOR
REAR AXLE DISC / DRUM INTERNAL PARKING BRAKE KIT
WITH 12.90" DIAMETER VENTED ROTOR (2.36 OFFSET)
MOPAR 8-3/4 / DANA 60
FOR USE W/GREEN⁽¹⁾ NON-ADJUSTABLE BEARINGS W/SNAP RING
PART NUMBER GROUP
140-9222

**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.



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.

(1) FOR USE WITH GREEN BEARINGS, P/N MO400.

Parts List

ITEM NO.	PART NO.	DESCRIPTION	QTY
1	249-9782/83	Bracket Kit (pair, one each, left and right)	1
2	250-6286	Retainer, Bearing	2
3	170-9492	Hat, 5 x 4.50/4.75/5.00, 1.54 offset, 12 x 8.75 Bolt Circle	2
4	160-6833/34	Rotor, GT 1.10" Thk x 12.90" Dia, 12 x 8.75" Bolt Circle, Right & Left	2
4A	160-6835/36	Rotor, SRP Drilled and Slotted	2
5	240-2509	Washer, .250 I.D. x .500 O.D. x .063 Thick	24
6	230-6738	Bolt, 1/4-28 x .75 Long, 12 PTCS	24
7	249-9495/96	Bracket Caliper Mounting (pair, one each, left and right)	2
8	230-6318	Bolt, 5/16-24 x 1.75 Long, SHCS	6
9	240-0138	Washer, .312 I.D. x .583 O.D., Split	6
10	240-0541	Washer, .329 I.D. x .561 O.D. x .056 Thick	6
11	240-9609	Washer, .318 I.D. x .624 O.D. x .015 Thick Shim	12
12	300-9505	Spacer, Caliper Bracket	2
13	120-8062-R/L	Caliper, Superlite 4R	2
13A	120-8062-RP/LP	Caliper, Superlite 4R, Polished	2
13B	120-8062-RRD/LRD	Caliper, Superlite 4R, Red	2
14	230-9183	Nut, 3/8-24 Self-Locking Hex Head	4
15	240-2510	Washer, .391 I.D. x .625 O.D. x .057 Thick	4
16	230-9078	Stud, 3/8-16 x 3/8-24 x 2.50 Long (pre installed in bracket)	4
17	240-1159	Washer, .375 I.D. x .875 O.D. x .035 Thick Shim	16
18	150-8855K	Pad, BP-10 Compound, Axle Set	1

NOTES:

Part Number 250-6488 is included with the bracket kit assembly 249-9782/83

P/N 230-8217 Rotor Bolt Kit, includes part numbers 230-6738 and 240-2509

P/N 250-9632 Caliper Bracket Mounting Bolt Kit, includes P/N's 230-9183, 230-9078, 240-1159, 240-2510 and 249-9495/96

P/N 300-9740 Spacer Kit, includes part numbers 230-6318, 240-0138, 240-0541, 240-9609 and 300-9505

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

Item 13A is an optional item and included with the "-P" kits. Add "-P" to end of part number when ordering.

Item 13B is an optional item and included with the "-RD" kits. Add "-RD" 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 9). 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 to pattern in bracket.
- Stud pattern on axle flange to stud pattern in hat.
- Dimension from wheel side of axle flange to wheel side of axle housing flange (see Figure 9, 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 0.50" diameter. The Wilwood hats utilized in these kits are drilled for 0.50" diameter wheel studs.
- Maximum axle flange diameter must be no larger than 6.11" w/.050" x 45° chamfer (see Figure 5).

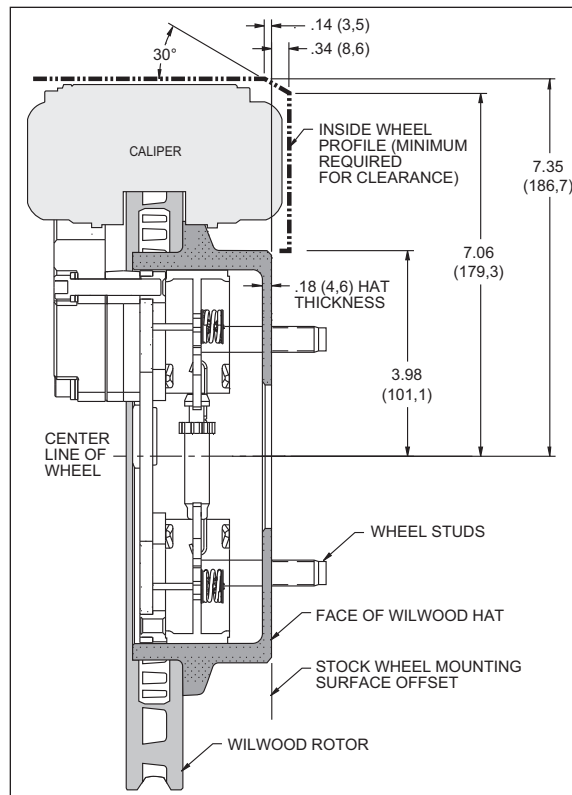


Figure 4. Wheel Clearance Diagram

Disassembly and Assembly Instructions

Disassembly Instructions

- Disassemble the original equipment rear brakes:

Raise the rear wheels off the ground and support the rear suspension according to the vehicles manufacturer's instructions.

Completely disassemble the stock brake system down to the bare axle. Dependent on the type of retainer supplied in the kit, the following steps must be performed.

- Full Circle Retainers** require the utilization of a qualified machine shop to press off the axle bearing and OEM retainer. Then have machine shop install new retainer (2), supplied with bracket kit with lip facing toward bearing, reference Figures 1, 6 and 7 (we suggest that you install a new bearing at this time, not supplied with kit).
- "U" Retainers** require the removal of the OEM retainer by cutting or grinding a notch in the retainer to facilitate removal. Once OEM retainer is removed, install new retainer (2) supplied with bracket kit with the "U" opening facing up and the lip facing toward bearing, reference Figures 1, 6 and 7.

- Degrease and remove any dings and burrs on housing flange as well as axle flange which may interfere with brake assembly.

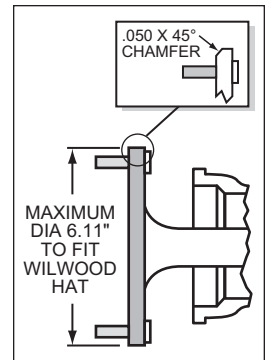


Figure 5. Axle Flange Maximum Dimension

Assembly Instructions (numbers in parenthesis refer to the parts list/diagram on the preceding pages): **CAUTION:** All mounting bolts must fully engage insert nuts. Be sure to check that all bolts are either flush or protruding through flanged side of insert nut after shimming.

- Determine that the appropriate snap ring style Green bearing has been installed on the axle. Remove snap ring from bearing and slide retainer (2) (full circle retainers only, "U" retainers can be installed later) and caliper mounting bracket assembly (1) onto axle and over bearing assembly. Reinstall snap ring (this can also be accomplished at the time of bearing installation on axle without the removal of the snap ring). Insert axle with caliper mounting bracket assembly into axle end. Align bracket (1) and retainer (2) with the five holes in the axle end and secure using the stock Original Equipment Manufacturer (OEM) bolts and nuts. Stock OEM hex nuts that retain the caliper mounting bracket assembly (1) and retainer (2) should be on the wheel side of the bracket. Apply red *Loctite*® 271 to the stock OEM bolt threads and torque to OEM specifications. Make sure the heads of the caliper mounting bracket assembly (1) insert nuts are FACING OUTWARD TOWARDS THE WHEEL.

- With the larger I.D. side of the rotor (4) facing away from the hat (3), bolt rotor (4) to hat (3) through the backside of the rotor using washers (5) and bolts (6). Torque bolts (6) in an alternating sequence to 103 **in-lb**. Safety wire bolts (6) using standard 0.032 inch diameter stainless steel safety wire as shown in Figure 8. Please refer to Wilwood's data sheet DS-386 (available at www.wilwood.org/ds386.pdf) for complete safety wire installation instructions.

- Align the correct hole pattern in the hat (3) with the stud pattern on the axle flange. **NOTE:** Some OEM and aftermarket axles come with stud sizes larger than 0.50" diameter. Verify stud size and have a qualified machine shop drill the hats to the correct size, if necessary. Slide the hat/rotor assembly (3 and 4) over the wheel studs covering the bracket kit assembly (1) and against the axle flange face. Check to be sure the hat seats squarely against the hub. Install a couple of lug nuts (finger tighten) to keep the rotor/hat assembly in place while continuing with the installation.

- NOTE:** Please reference the caution statement at the beginning of the assembly instructions. The caliper mounting bracket assembly (7) should be installed first with clean, dry threads on the mounting bolts (8). Install the bracket from the rear side of the bracket kit assembly (1) by sliding bolt (8) through lock washer (9), flat washer (10) bracket (7), shim washer (11) and finally through the spacer (12), see Figure 1. **NOTE:** End of bolt should not exceed inside face of insert. The bracket must tighten squarely against the back side of the bracket kit assembly (1). Inspect for interference from casting irregularities, machining ridges, burrs, etc. Use one thin shim (11) between the bracket (7) and spacer (12) during initial trial fitting.

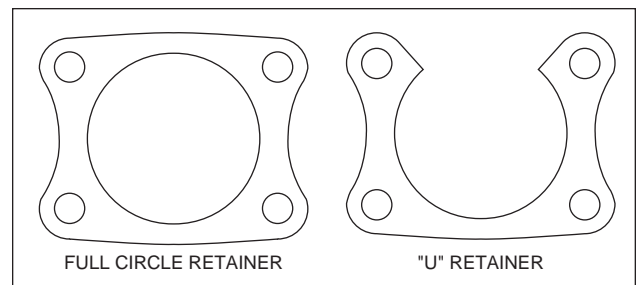


Figure 6. Retainer Styles

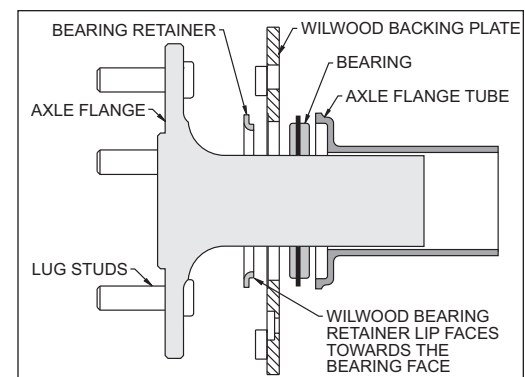


Figure 7. Retainer / Axle Diagram

Assembly Instructions (Continued)

- Install one washer (17) over each pre-installed stud (16) on the radial mount bracket (7). Slide the caliper (13) in place over the studs and rotor, then install the washer (15) and lock nut (14) to hold the caliper in place. The caliper bleed screws should be pointing up. Snug the lock nuts (14) and check that the rotor (4) is centered in the caliper (13). Add or subtract .015" shims (11) as necessary between the caliper mounting bracket (7) and the spacer (12) to center the caliper (9).

- Remove the caliper center bridge pad retainer bolt, nut, and tube from the caliper. Slide the brake pads (18) into place. 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 (17) between the caliper (13) and mount bracket (7) to gain the proper alignment. Reinstall the center bridge pad retainer tube, bolt, and locknut. The locknut should be snug without play in the bolt or tube. Be cautious not to over tighten.

- Adjust the parking brake shoes outward (using a drum shoe adjustment tool available at your local auto parts store) while spinning the hat (3) 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 bracket kit assembly (1). Secure the caliper mounting bracket (7) to the bracket kit assembly (1) using red *Loctite*® 271. Torque bolts (8) to 180 **in-lb**. Reinstall the hat/rotor assembly and again use lug nuts to hold it in place. Lubricate caliper mounting studs and nuts with lightweight oil, reinstall the caliper, torque the caliper nuts (14) to 30-35 ft-lb.

- **NOTE:** Clevis and cable kits which attach to the parking brake assembly are not included in the Wilwood parking brake kit. A universal cable kit, Wilwood part number 330-9371 is available. Lokar Performance Products and their distributors carry a complete line of cable kits and accessories that will fit this system. They can be reached at 865 / 966-2269.

- **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. **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.

- 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.

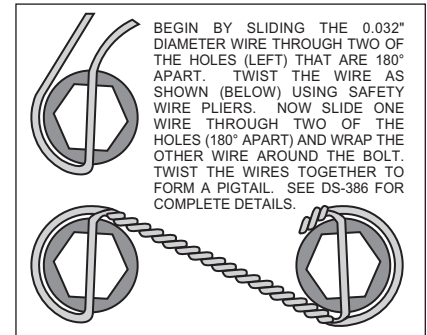


Figure 8. Safety Wire Diagram

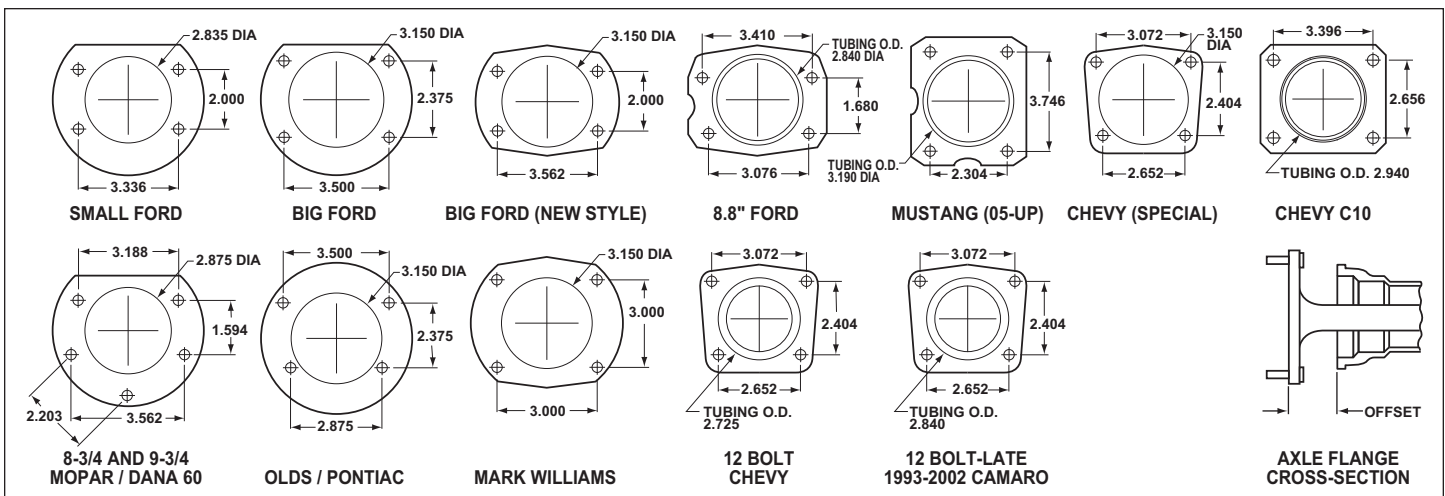


Figure 9. Rear Housing Flange Chart and Axle Flange / Offset Cross-Section

Assembly Instructions (Continued)

- Repeat this entire procedure for the other wheel.
- Bleed the brake system. Reference the general information and recommendations below for proper bleeding instructions.
- Remove the lug nuts that were used to hold the hat/rotor assembly in place during caliper installation. Install the wheel and lug nuts, torque to OEM specifications.

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 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 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^o 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.
- 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 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)
220-7056	Flexline Kit, Universal, 14 Inch, Domestic
220-7699	Flexline Kit, Universal, 16 Inch, Domestic
220-8307	Flexline Kit, Universal, 18 Inch, Domestic
330-9371	Cable Kit, Parking Brake, Universal

Bolt Torque Specifications

<u>BOLT SIZE</u>	<u>TORQUE</u>
1/4-20	85 in-lb
1/4-28	103 in-lb
5/16-18	180 in-lb
5/16-24	198 in-lb
3/8-16	22 ft-lb
3/8-24	30 ft-lb
7/16-14	42 ft-lb
7/16-20	47 ft-lb
1/2-13	65 ft-lb
1/2-20	77 ft-lb
9/16-12	95 ft-lb
9/16-18	105 ft-lb
5/8-11	110 ft-lb
5/8-18	120 ft-lb

NOTE: This bolt torque specification list is for use with specific grades of bolts as supplied in the particular Wilwood kit and is not intended as a guide for any other application.