

**ASSEMBLY INSTRUCTIONS
FOR
ROADSTER SHOP MUSTANG II UPRIGHT***
***For additional vehicle compatibility, visit www.wilwood.com**

**AERO6 FRONT BRAKE KIT WITH 14.00"
DIAMETER VENTED ROTOR**

BASE PART NUMBER

140-18367

**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.



wilwood *DISC BRAKES*

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

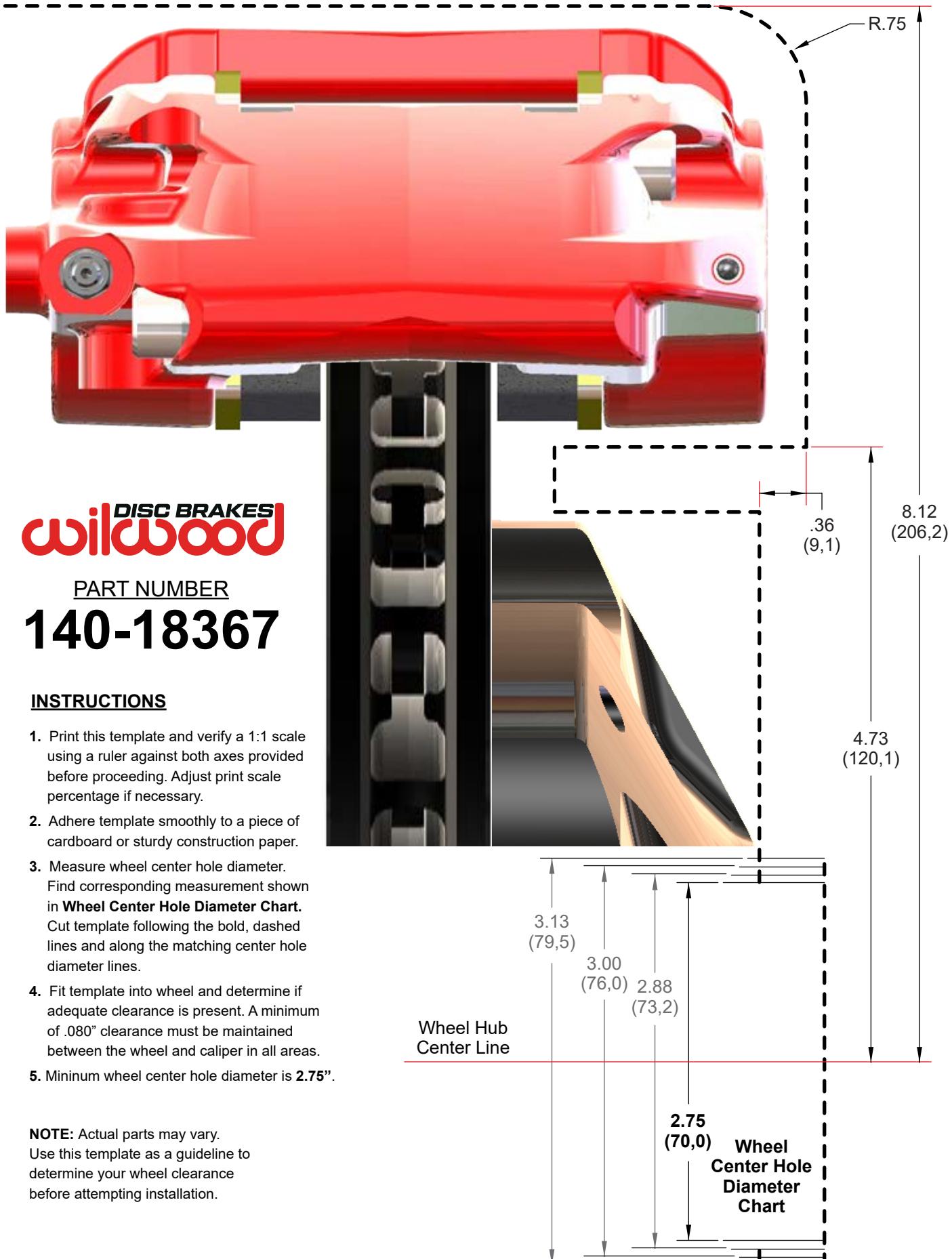
WARNING
DO NOT OPERATE ANY VEHICLE ON UNTESTED BRAKES!
SEE MINIMUM TEST PROCEDURE WITHIN

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.

WHEEL CLEARANCE DIAGRAM



Exploded Assembly Diagram

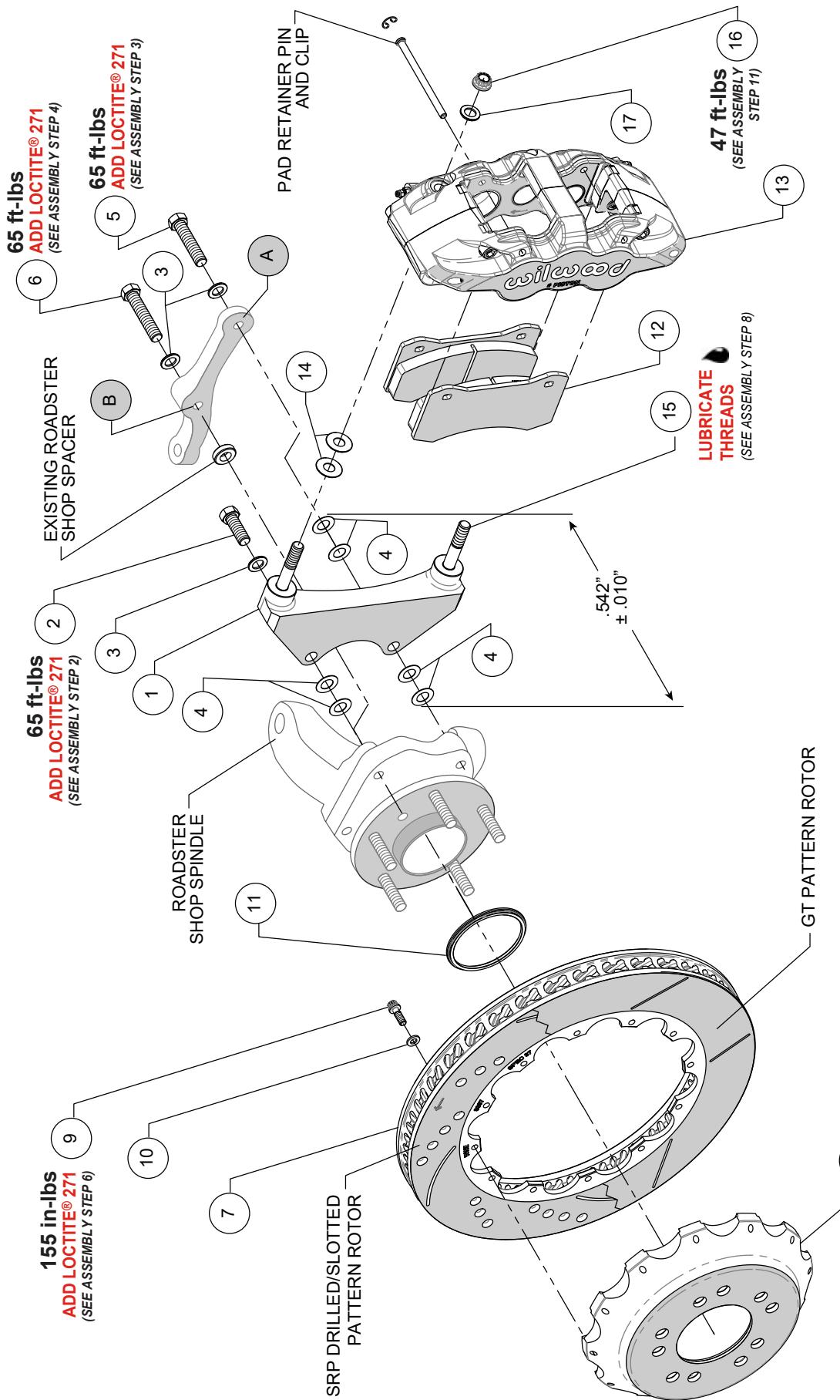


Figure 1. Typical Installation Configuration

Important Notice - Read This First

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

- Review the wheel clearance diagram on page 2 to verify there is adequate clearance with the wheels you will be using with the installation.
- This brake kit does 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.

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.

Parts List

ITEM NO.	PART NO.	DESCRIPTION	QTY
1	250-18374	Bracket, Caliper Mounting	2
2	230-9897	Bolt, 7/16-20 x 1.25" Long, Hex Head	2
3	240-11101	Washer, .453" I.D. x .750" O.D. x .063" Thick	6
4	240-5680	Shim, .016" Thick	12
5	230-9896	Bolt, 7/16-20 x 2.00" Long, Hex Head	2
6	230-9895	Bolt, 7/16-20 x 2.25" Long, Hex Head	2
7	160-8398/99-GTB	Rotor, GT, 1.25" Thick x 14.00" Dia, 12 x 8.75" Bolt Circle (one each, right & left)	2
7A	160-8396/97-BK	Rotor, SRP Drilled and Slotted (one each, right & left)	2
8	170-11937	Hat, 5 x 4.50"/4.75", 1.50" Offset, 12 x 8.75" Bolt Circle	2
9	230-8037	Bolt, 1/4-20 x 0.75" Long, 12 Point, Lock Wire Drilled	24
10	240-11240	Washer, .265" I.D. x .500" O.D. x .063" Thick	24
11	300-11532	Adapter, Rotor Registration Ring	2
12	150-20-6617K	Pad, BP-10, Axle Set	4
13	120-13289/90-BK	Caliper, AERO6, Black (one each, right & left)	2
13A	120-13289/90-RD	Caliper, AERO6, Red (one each, right & left)	2
14	240-1848	Shim, .030" Thick	8
15	230-9080	Stud, 7/16-14 x 7/16-20 x 3.375" Long (pre-installed in bracket)	4
16	230-9182	Nut, 7/16-20 Self-Locking, 12 Point	4
17	240-11101	Washer, .453" I.D. x .750" O.D. x .063" Thick	4

NOTES: Part Number 230-8008, Rotor/Hat Bolt Kit, includes part numbers 230-8037 and 240-11240

Part Number 230-9894 Bracket/Spindle Bolt Kit, includes part numbers 230-9895, 230-9896, 230-9897, 240-11101 and 300-9824 (Not Used)

Part Number 250-18373 Caliper Mount Bracket Kit, includes part numbers 230-9080, 230-9182, 240-11101, 240-1848, 240-5680, and 250-18374

Item 7A is an optional item and is included in the -"D" drilled rotor kits. Add "-D" to end of part number when ordering.
Item 13A is an optional item and is included in the -"R" red caliper kits. Add "-R" 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 disc brake kit, double check the following items to ensure a trouble free installation.

- Inspect the package contents against the parts list to ensure that all components and hardware are included.
- Verify your wheel clearance using the Wheel Clearance diagram on page 2.

- This front kit is designed for direct bolt-on installation to Roadster Shop upright.
- Verify the hub stud pattern in this kit Roadster Shop Spindle 5 on 4.75" matches the lug pattern of the vehicles wheels.

Assembly Instructions

NOTE: Numbers in parenthesis refer to the parts list and Figure 1 on the preceding pages.

STEP 1 The caliper 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.

STEP 2 Install the bracket (1) at top upright hole using 1.25" long bolt (2) washer (3), and two .016" thick shims (4) between the bracket and upright, Figure 1.

STEP 3 Orient the steering arm, and identify the hole marked 'A', as shown in Figure 1. Install at bottom upright hole using 2.00" long bolt (5) and .063" thick washer (3), two .016" thick shims (4) between the bracket and steering arm, and another two .016" thick shims (4) between the bracket and upright, Figure 1. The bracket is located between the steering arm and upright. **NOTE:** The bracket and shim washers must add up to a total thickness of $.542" \pm .010"$.

STEP 4 Finish attaching the steering arm through the hole marked 'B', as shown in Figure 1. Install using 2.25" long bolt (6), washer (3), and .250" thick existing Roadster Shop spacer, Figure 1.

STEP 5 Temporarily tighten all mounting bolts. **NOTE:** The bracket and steering arm must fit squarely against the mounting points 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.

STEP 6 Orient the rotor (7) and the hat (8) as shown in Figure 1, and Photo 2. Attach rotor to hat using bolts (9) and washers (10). Apply red Loctite® 271 to the bolt threads and torque to value shown in Figure 1 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 2. Refer to Wilwood's data sheet DS-386 (available at www.wilwood.com/Pdf/DataSheets/ds386.pdf) for complete safety wire installation instructions.

STEP 7 Install the rotor registration adapter (11) onto the register of the hub assembly with the smaller O.D. facing outward, Photo 3. Slide the rotor/hat assembly (7/8) onto the hub, Figure 1, Photo 4. **NOTE:** The hat must fit flush against the hub face or excessive rotor run out may result.

STEP 8 **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 (15) with lightweight oil. Initially place two .035" thick shims (14) on each stud (15) between the caliper and the bracket, as shown in Figure 1 and Photo 5. Mount the caliper (13) onto the bracket (1) using lock nuts (16) and washers (17), Figure 1. Temporarily tighten the lock nuts. Ensure that the caliper is mounted so the largest pistons are at the rotor exit end of the caliper, in relation to the forward rotation of the rotor. View the rotor through the top opening of the caliper. The rotor should be centered in the caliper, Photo 6. If not, proceed as follows:

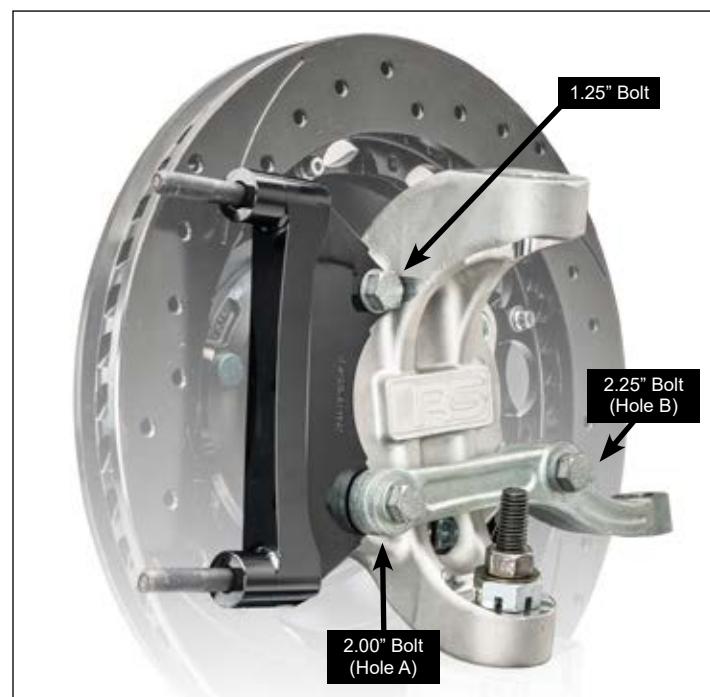


Photo 1



Photo 2

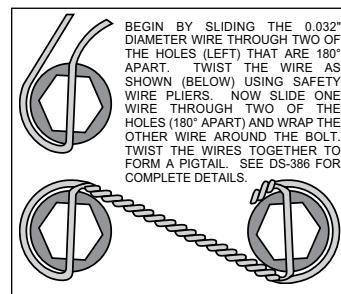


Figure 2. Safety Wire Diagram



Photo 3



Photo 4

Assembly Instructions (Continued)

• Adjust by adding or subtracting shims (4) between the bracket and the upright. Always use the same amount of shims on each of the two bolts between bracket and upright.



Photo 5

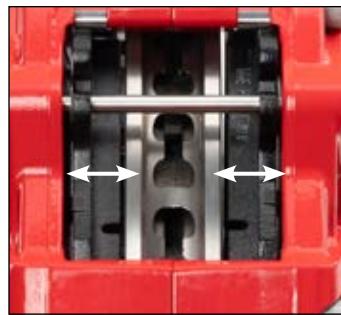


Photo 6

• For the lower bracket mount bolt, if a shim (4) was added between the bracket and upright, then a shim must be removed between the steering arm and bracket, such that the total thickness of bracket and shims remain equal to $.542 \pm .010$ ", Figure 1.

• Conversely, if a shim was removed between bracket and upright, one must be added between steering arm and bracket. Again, maintaining a total thickness of $.542 \pm .010$ ".

STEP 9 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 value shown in Figure 1.

STEP 10 Remove the caliper (13), then remove the two pad retaining pins from the caliper by carefully popping out the pin retaining clips and sliding out the pins, Figure 1. Insert the brake pads (12) into the caliper from the bottom, with the friction material facing the rotor as shown in Photo 7. Secure the brake pads in place with the pad retaining pins and clips, Figure 1.



Photo 7



Photo 8

STEP 11 Reinstall the caliper onto the caliper mounting bracket and temporarily tighten the lock nuts (16). Check that the top of the brake pad is flush with the outside diameter of the rotor, Photo 8. If not, adjust by adding or subtracting shims (14) between the caliper and the bracket. After the caliper pad height is set, torque the caliper lock nuts (16) to value shown in Figure 1

STEP 12 Temporarily install wheel and torque lug nuts to manufacturer's specification. Ensure that the wheel rotates freely without any interference. Remove wheel for next step.

STEP 13 Attach brake line to caliper. **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. **Ensure hoses are routed to prevent contact with moving suspension, brake or wheel components.** Wilwood offers universal brake flex line hose kits (sold separately). For domestic (3/8-24 IF) chassis fittings, order:

P/N 220-7056 for the 14 inch length domestic, 3/8-24 IF

P/N 220-7699 for the 16 inch length domestic, 3/8-24 IF

P/N 220-8307 for the 18 inch length domestic, 3/8-24 IF

P/N 220-11238 for the 20 inch length domestic, 3/8-24 IF

Hose kits include hoses, fitting, etc., all in one package for this application.

• **NOTE:** Wilwood hose kits are designed for use in many different vehicle applications and it is the installer's responsibility to properly route and provide adequate clearance and retention



Completed Assembly

Assembly Instructions (Continued)

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.

•CAUTION: 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. It is the installer's responsibility to ensure that all fittings and hoses are the correct size and length, properly seal, and that they will not be subject to crimping, strain and abrasion from vibration or interference with suspension components, brake rotor or wheel.

STEP 14 Bleed the brake system, referring to the '**Additional Information and Recommendations**' below for proper bleeding

instructions. Check system for leaks after bleeding.

STEP 15 Install the wheel and torque the lug nuts to manufacturer's specifications.

•CAUTION: 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 an interval relative to the usage of vehicle.

STEP 16 Bed-in the brake pads per the procedure on page 9.

Balancing the Brake Bias on 4 Wheel Disc Vehicles

•OE Style or Single Mount Race Pedal with Tandem Outlet Master Cylinder:

Front to rear caliper piston sizes, rotor diameters, and pad compounds must be initially configured to provide the correct range of vehicle bias when using a single bore / tandem outlet master cylinder. If excessive rear brake bias is experienced, an inline adjustable proportioning valve can be used to decrease the rear line pressure to help bring the vehicle into balance. If excessive front brake bias is experienced, first consideration should be given to increasing the rear brake bias to bring the vehicle into overall balance.

•Race Pedal with Dual Master Cylinders and Balance Bar:

Master cylinders must be sized to match the calipers and allow the pedal balance bar to operate near the center of its travel. If it is not possible to fine tune the bias within the adjustable range of the balance bar, then consideration must be given to changing a master cylinder bore size or some other aspect of the brake system to bring the car into balance. Larger bore master cylinders will generate less pressure while decreasing pedal travel. Smaller bores master cylinders will generate higher line pressures with an increase in pedal travel.

Additional Information and Recommendations

Fill and bleed the new system with Wilwood Hi-Temp° 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.

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 two pound 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 fluid leaks. Correct the leaks (if applicable) and then bleed the system again.

Additional Information and Recommendations (Continued)

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) will 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.

• On some models of disc brake spindles there are “ears” where the OEM calipers were mounted and these “ears” interfere with the assembly of the Wilwood disc brake kit. If it becomes necessary to remove these “ears”, remove as little as possible being careful not to cut away any of the mounting holes that may be required to bolt on the caliper mounting bracket.

• 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

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.

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