



PARK TOOL CO.

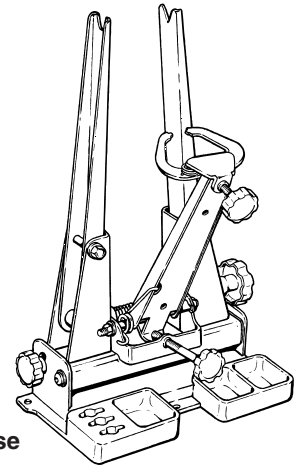
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PROFESSIONAL WHEEL TRUING STAND TS-2

ASSEMBLY

The Park Tool TS-2 Truing Stand is shipped from the factory adjusted and ready for use. The only assembly necessary is to thread the caliper arm adjusting knob and shaft unit into the threaded bushing on the front of the base. A thin layer of grease on the threads will assure smooth operation. The stand may be clamped or bolted to a workbench or clamped in a vise for stability during use. An optional tilting base accessory (TSB-2) is available which allows tilting the stand forward and back for more comfortable use at any bench height.

If treated with care, this Park Tool TS-2 Truing Stand will last for generations. A minimum amount of maintenance and care is required to keep your stand accurate.



Optional TSB-2 Base

SET UP

1. Remove the tire, tube, and rim strip from the wheel to be trued. Remove the quick release skewer or axle nuts and washers from the axle. Rotate the axle to make sure it is not bent and to check for proper cone adjustment. All spacers and locknuts **MUST** be in place and properly adjusted on the axle before placing the wheel in the truing stand.
2. Turn the caliper arm knob (Ref. #17) in several turns until the caliper arm is low enough to clear the rim.
3. Turn the caliper adjusting knob (Ref. #21) in several turns until the calipers spread far enough apart to clear the width of the rim.
4. Turn the upright adjustment knob (Ref. #9) counter-clockwise until the uprights are far enough apart to permit the axle to be placed in the "V" shaped notches in the uprights. Turn the knob clockwise until the uprights just **TOUCH** the locknuts on the axle. This will center the rim on the hub and automatically provide the proper "dish" or offset for the freewheel. It is **NOT** necessary to "clamp" the hub between the uprights by overtightening the knob. Excessive force on the knob may cause the uprights to flex slightly, making the dishing inaccurate.
5. Adjust the caliper and caliper arm knobs (Ref. #21 and #17) until the calipers clear the rim by about 1/8 inch. Rotate the wheel. If the rim hits the calipers at any point in the rotation, adjust the knobs to increase clearance. Begin adjusting spokes to true the wheel. As the wheel becomes more true, move the calipers closer to the rim until the tips of the calipers almost touch the rim.

WHEEL TRUING BASICS

Relax and work slowly and patiently at first. Do not rush the process. Speed will come with experience. Consult an experienced bicycle mechanic if you encounter an unexpected problem or if your efforts are not improving the condition of the wheel.

Thoroughly inspect the wheel and its components before starting the truing process. Remove the tire, tube, and rim strip from the rim and inspect the tire for bits of glass or thorns, and for cuts, tears, scrapes, and worn spots in the tread and sidewall. Inspect the rim for cracks and/or bulges around the holes, as well as for dents and flat spots in the rim's sidewall. Squeeze parallel pairs of spokes, checking for any that are broken, brittle, or loose. Check for spoke nipples that may be rounded, rusted, or corroded. Make sure there are no cracks in the shell of the hub and that the hub is properly adjusted and the axle is not bent. Repair or replace parts as needed.

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Keep in mind that it is not always possible to repair a wheel. If a rim or hub is damaged too much, or if the wheel has multiple broken spokes, replacement of the complete wheel may be necessary.

Place a small drop of penetrating oil into the nipple where it meets the spoke and where the nipple enters the rim. The oil will help reduce friction and binding between the parts. Skip this step if the spokes were treated with a spoke preparation compound when the wheel was built.

Use a spoke wrench properly sized for the spoke nipples you are working with. We recommend the use of Park Tool Professional Quality Spoke Wrenches.

Uniform spoke tension is the key to a strong, reliable, long-lasting wheel. Therefore, creating or maintaining uniform spoke tension should be a primary goal during the wheel truing process. On front wheels, there should be uniform tension among all the spokes in the wheel. On most rear wheels, because of the extra space required by the freewheel, the spokes on the freewheel side of the wheel will necessarily be tighter than the spokes on the non-freewheel side. How should you determine if a wheel has uniform spoke tension? Some mechanics do this by squeezing and comparing parallel pairs of spokes. Others pluck individual spokes and gauge tension by the tone each makes. Still others use a spoke tension meter, a tool that holds a spoke under tension between three points and provides a reading on a scale. Refer to a book specifically covering the topic of bicycle wheels for a discussion of the theory behind each technique.

Lateral Truing (Correcting Side to Side Errors)

Spin the wheel and look for any side to side wobble. Locate the largest wobble. If the rim wobbles to the right, begin correcting the wobble by tightening the nipples on the left side within the area of the wobble 1/4 turn. If one of the spokes within the wobble appears to be loose, tighten it a bit more than the others to create uniform spoke tension. Spin the wheel in the stand, noting the impact of the adjustment.

If the rim still wobbles to the right, loosen the nipples on the right side within the area of the wobble 1/4 turn. Again, spin the wheel in the stand, checking the impact of the adjustment. If necessary, continue tightening the left side nipples 1/4 turn and loosening the right side nipples until the wobble is removed. Reverse the lefts and rights in this procedure when a rim wobbles to the left.

Check the tension of the spokes. If removing a wobble requires so much loosening and tightening of nipples that the spokes on one side are much tighter than the spokes on the opposite side, the rim itself is probably damaged, making even spoke tension impossible. This type of wheel is going to be weak and possibly dangerous. Replacement of the rim and spokes, or the entire wheel may be the best solution.

Radial Truing (Correcting Roundness Errors)

Spin the wheel and look for areas where the rim moves towards the calipers (high spot) or moves away from the calipers (low spot). If the rim has a high spot, it needs to be pulled down. Locate the center of the high spot and tighten the two closest nipples 1/4 turn. Next, radiating outward, tighten one nipple on each side of the two center nipples 1/8 turn and, if needed, one nipple on each side of those nipples 1/8 - 1/16 turn. Check your progress and repeat as needed.

If the rim has a low spot, it needs to be pushed up. Locate the center of the low spot and loosen the two closest nipples 1/4 turn. Then radiating outward, loosen one nipple on each side of the two center nipples 1/8 turn and, if needed, one nipple on each side of those nipples 1/8 - 1/16 turn. Again, check your progress and repeat as needed. Continue removing high spots and low spots until the wheel is round.

Some of the corrections made to the spokes to make the wheel round may have affected the lateral (side to side) truing done previously. Re-true as needed for lateral errors and radial errors until the wheel is both straight and round.

Prestressing the Wheel

After performing each operation, the spokes should be prestressed in order to relieve any spoke windup that may have occurred as the nipples were turned. If the wheel is not prestressed before being ridden, any spoke windup will be relieved as the wheel is ridden. To prestress the wheel, tightly squeeze parallel pairs of spokes all the way around the wheel. This process may cause the wheel to go slightly out of true. If so, re-true as needed. Continue the truing and stressing process until the wheel stays true after being stressed.

MAINTENANCE

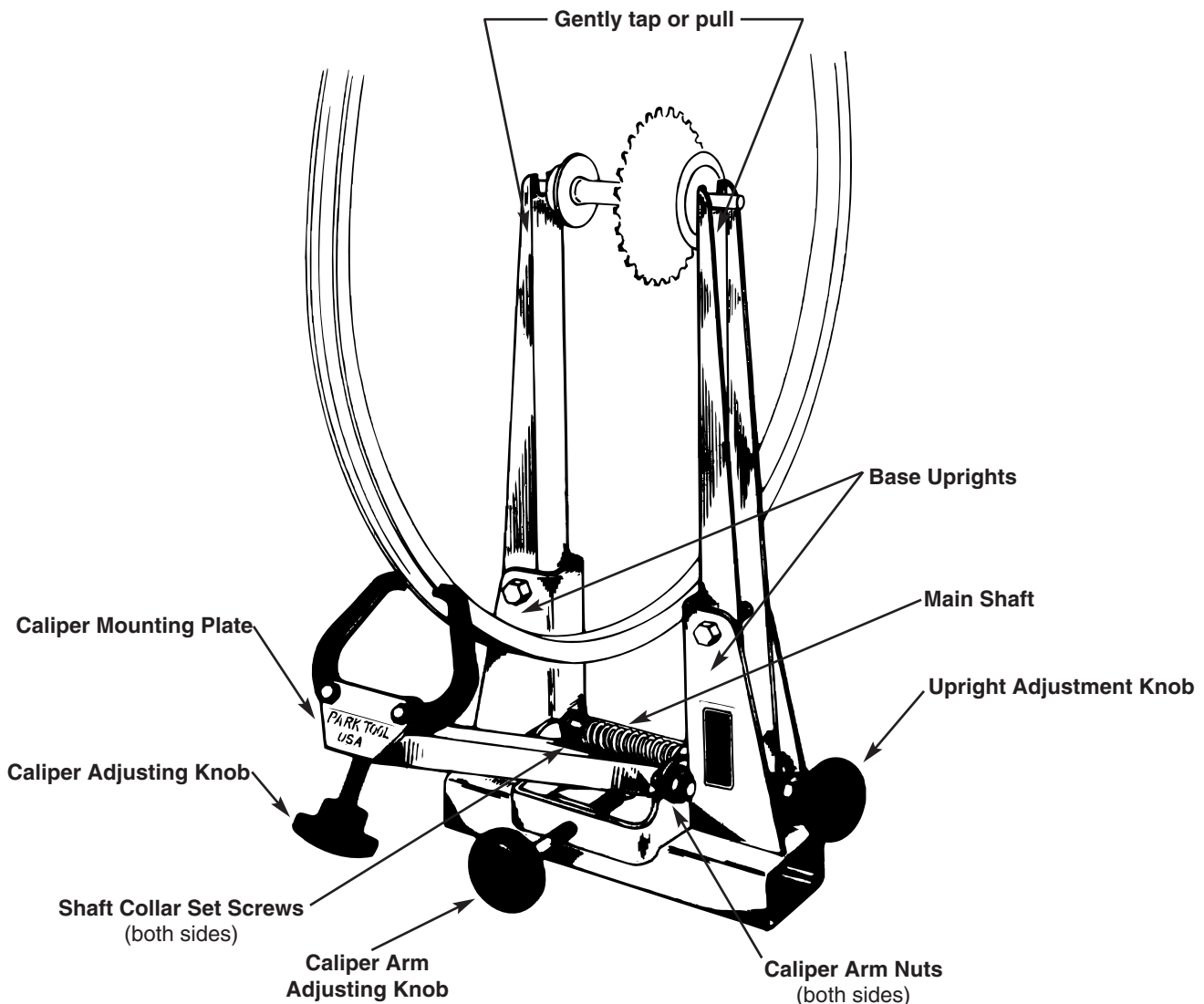
Your TS-2 Truing Stand is lubricated at the factory. Occasional re-lubrication will provide many years of service.

To re-lubricate your TS-2, unscrew the caliper arm adjusting knob and shaft (Ref. #17) and the caliper adjusting knob and shaft (Ref. #21) from the stand. Do not disassemble any other parts. A thin coating of grease should be applied to the threaded portion and the end of each shaft. Reinstall the knob/shafts in the stand. Rotate the upright adjustment knob (Ref. #9) counter-clockwise to spread the uprights to their maximum width. Apply a thin coating of grease to the threads on the main shaft where it runs through the left and right pivot bushings (Ref. #3 and #7). All other pivot points and threads should be lubricated with a spray lubricant.

ADJUSTMENT

The TS-2 is adjusted at the factory to provide accurate centering or “dishing” of the rim between the locknuts of the hub. The most important factor in achieving accurate dishing of the wheel is in the upright adjustment knob (Ref. #9). This knob should be rotated so the “V” shaped notches in the two uprights just TOUCH the locknuts of the hub. It is not necessary to “clamp” the hub between the uprights. Excessive tightening of the knob will cause the uprights to flex, resulting in inaccurate dishing.

While the TS-2 is designed to provide automatic dishing of the wheel, imperfections in the parts of the wheel can lead to erroneous readings in the stand. Slight imperfections in the shape or condition of the axle or locknuts can affect the dish reading, as the imperfection is magnified significantly by the distance from the hub to the rim, where the actual reading is taken. Because of this, for precision work, a dishing tool such as the Park Tool WAG-1 or WAG-3 should be used to verify and make final adjustments. *(Continued on Page 4)*

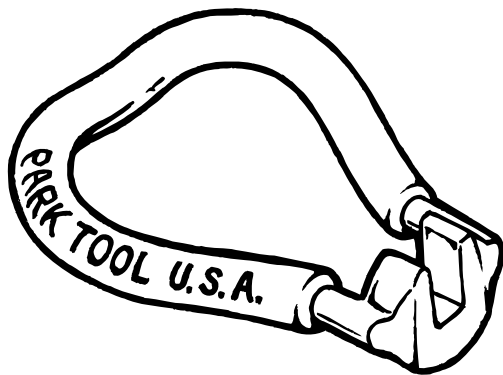


Rough or abusive use or damage in shipping may cause inaccurate dishing. To verify the accuracy of your stand, follow this procedure:

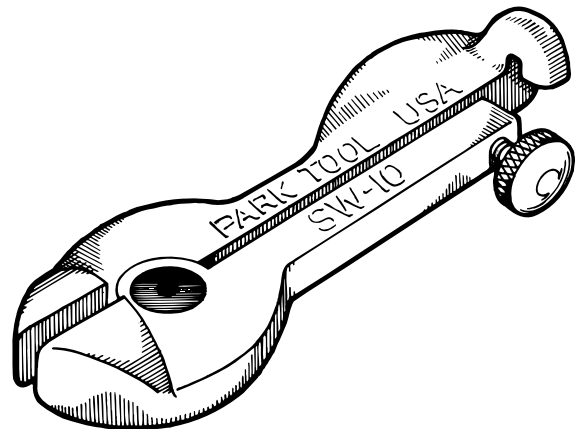
1. Inspect the stand carefully to check for parts that are obviously loose, worn, bent, or otherwise damaged. Tighten, repair, or replace parts as necessary.
2. Sight down the front of the stand. The top edge of the caliper mounting plate must be parallel to the main shaft. If it is not, place a large adjustable wrench across the plate and twist as necessary to bring it into alignment.
3. A perfectly dished wheel is necessary to determine if the wheel is in the center of the stand. Use a wheel alignment gauge such as a Park Tool WAG-1 to confirm the accuracy of the wheel.
4. Place the wheel in the stand and rotate the upright adjustment knob until the uprights just TOUCH the locknuts on the hub. Accurately measure the distance between the outer edge of the rim and the left and right base uprights. The measurement must be the same on both sides. If the measurements are different, loosen the socket head cap screws in the shaft collars on the main shaft. Gently tap or pull the uprights sideways until the measurements are the same on both sides. Retighten the socket head cap screws.
5. After the previous adjustments have been made, rotate the caliper arm adjusting knob to raise the arm until the calipers are close to the rim. Open or close the calipers as necessary using the caliper adjusting knob to check that the rim is centered in the notch formed by the two calipers. If the rim is not centered, loosen the caliper arm nut on one end of the caliper arm pivot shaft and tighten the opposite nut an equal amount. This will shift the entire caliper arm assembly left or right to center the rim between the calipers.

Thank you for choosing the Park Tool Professional Wheel Truing Stand TS-2. We're confident you will get many years of use from it. Remember, wheel truing is easier when you use genuine Park Tool Professional Quality Spoke Wrenches.

Please keep this instruction sheet in a safe place for future reference.



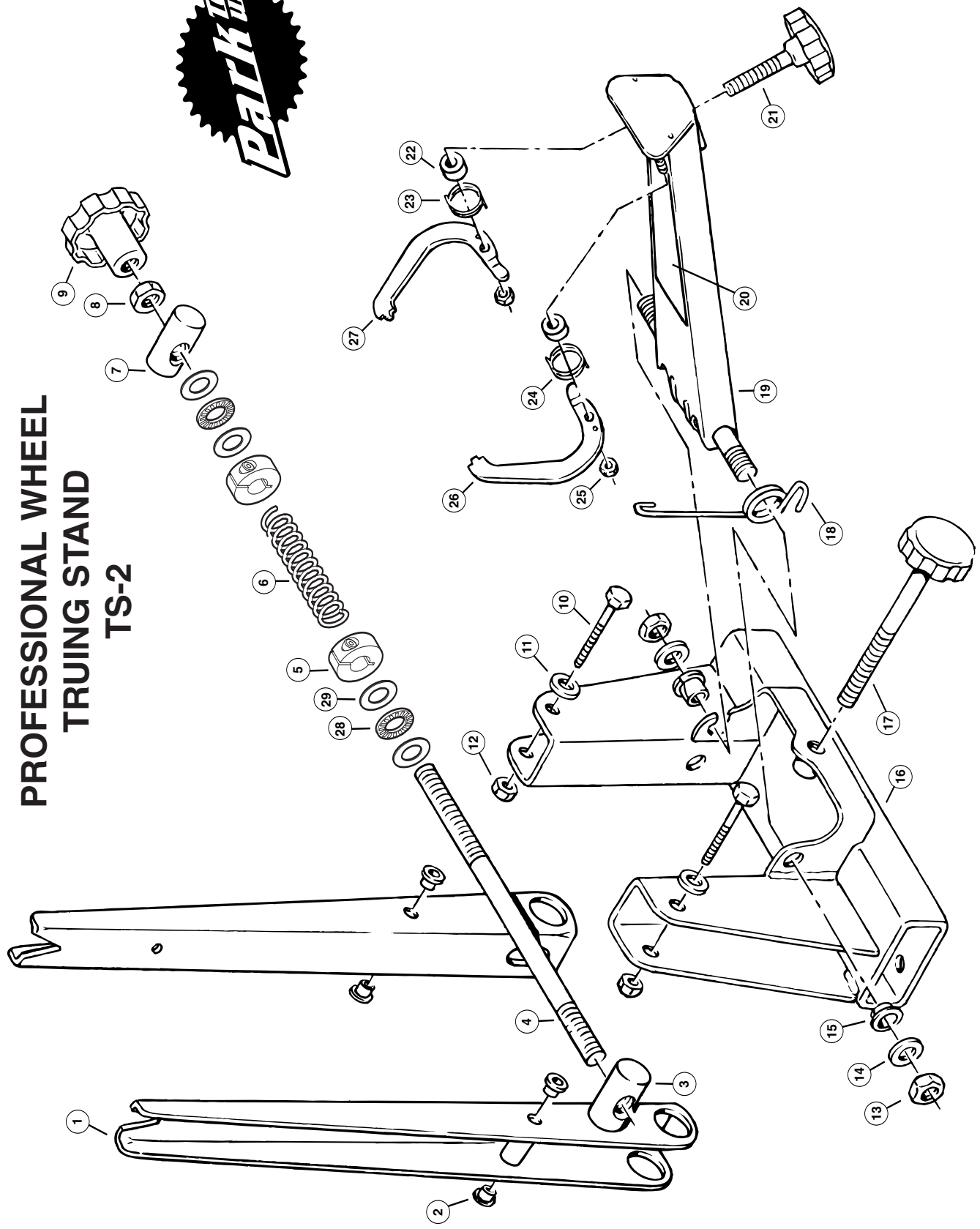
SW-0 to SW-4 Spoke Wrenches
Five sizes to precisely fit all standard nipples.



SW-10 Adjustable Spoke Wrench
Helps remove tight or rounded nipples.



PROFESSIONAL WHEEL TRUING STAND TS-2



REPLACEMENT PARTS LIST FOR PROFESSIONAL WHEEL TRUING STAND TS-2

Ref. No.	Part No.	Description	Qty.
1	201-2	Upright	2
2	232-2	Split Nylon Bushing	4
3	204LS	Left Pivot Bushing	1
4	211S	Main Shaft	1
5	209-2/209	Shaft Adjusting Collar with Hybrid Cap Screw, 8-32 thread	2
6	229	Spring	1
7	204RS	Right Pivot Bushing	1
8	212S	Locknut, 1/2 - 13	1
9	213S	Upright Adjustment Knob	1
10	225-2	Bolt, 3/8 - 24 x 2-1/4"	2
11	231-2	Washer, 3/8" SAE	2
12	230-2	Thin Nylon Locknut, 3/8 - 24	2
13	233-2	Thin Nylon Locknut, 1/2 - 20	2
14	234-2	Washer, 1/2" x 7/8"	2
15	235-2	Split Nylon Bushing (left side)	1
16	235-2R	Split Nylon Bushing (right side)	1
17	214-2	Base	1
18	217S	Caliper Arm Adjusting Knob and Shaft	1
19	206-2	Spring	1
20	207-2	Caliper Arm	1
21	224S	White Background Decal	1
22	228-2R	Caliper Adjusting Knob and Shaft	1
23	222SR	Caliper Spacer Spring	2
24	222SL	Right Spring	1
25	226-2	Left Spring	1
26	219-2L	Thin Nylon Locknut, 1/4 - 20	2
27	219-2R	Left Caliper	1
28	748-1	Right Caliper	1
29	749-1	Needle Bearing	2
30	749-1	Bearing Washer, 1/2" TRA815	4