Daytona
AUTOMOTIVE EQUIPMENT
CANADIAN OWNED AND OPERATED
SINCE 1999

LIMITED 5 YEAR WARRANTY

IDENTIFYING MECHANICAL MOUNTING REPEATABILITY ERRORS ON WHEEL BALANCERS

Chasing weights, changing weight angles, changing weight amounts, and changes in run out and force variation may all be produced by incorrect mounting or worn/damaged adaptors. Balancers cannot identify mechanical mounting errors caused by incorrect mounting methods or worn/damaged mounting adaptors. Correct mounting MUST be verified by the technician, including identifying the on-vehicle mounting method. Adaptors must be inspected for excessive wear and should be cleaned regularly to prevent dirt from affecting the balancer results.

If mechanical mounting errors do not seem to be evident calibration can be performed – refer to procedures in manual.

TO TEST ELECTRONIC AND HARDWARE REPEATABILITY:

- ✓ Mount an assembly on the spindle shaft
- ✓ Input the weight location dimensions using standard clip-on weight locations
- ✓ Measure and record the non-rounded amount of imbalance on each weight plane
- ✓ Repeat this procedure four times without removing the wheel to verify the balancer can repeat measurements within 0.05 ounce (per plane). If it does not repeat the measurements, check the wheel for debris or water in the tire

TO TEST MECHANICAL MOUNTING REPEATABILITY:

- ✓ With the assembly mounted on the spindle shaft, perform a balance spin
- ✓ Record the non-rounded weight amounts for the inner and outer planes. (Do not apply weights)
- ✓ When the data is recorded, loosen the wing nut and using the foot pedal to lock the spindle in position, rotate the wheel 90 degrees clockwise. Perform another balance spin. Record the non-rounded weight amounts for the inner and outer planes
- ✓ Repeat the above steps twice more so measurements are taken at 0, 90, 180, and 270 degrees. The weight amount from the highest to lowest recorded number should not vary by more than 0.15 ounce for smaller passenger car wheels (per plane), 0.30 ounce for SUV wheels (per plane), and 0.75 ounce for larger truck wheels (per plane). If recorded readings change by more than this, repeat the measurements at 0, 90, 180, and 270 degrees again

DATA ANALYSIS:

Note: Larger rim/tire assemblies may experience more variation in data than smaller assemblies. This should be considered when comparing data.

Do not check repeatability using ALU mode because it is "hyper-sensitive" in comparison to clip-on weight placement. In ALU mode the diameters are smaller and the planes are closer together compared to standard clip weight balance, therefore any change in re-centering will be amplified compared to when clip-on weight planes are dialed-in.

For example, a wheel that needs 0.25 or 0.50 oz. weights in ALU mode may show zeroes in clip-on weight mode. You can also get cases where dynamic imbalance on standard is small, such as 1 oz., and it jumps to 4 or more oz. in ALU if the planes are close enough together. All balancers will do this….and that's why most balancers have such a hard time hitting zero on the first spin.

If the imbalance amounts change and the readings from the first sample data and the second sample data are NOT the same for 0, 90, 180, and 270 degrees, the assembly is not being mounted correctly. Refer to "*Mounting the Wheel on the Spindle Shaft"* for proper mounting techniques.

If ALL readings change, BUT the readings from the first sample data and the second sample data are the same for 0, 90, 180, and 270 degrees, the hub/shaft assembly is out of position. Use a dial indicator to check for run out on the hub face and on the shaft. Run out on the hub face should not exceed 0.0015". Run out on the shaft should not exceed 0.0015". If run out exceeds these limits, remove the threaded hub/shaft assembly and inspect for any debris or nicks on the tapered mounting surfaces only, spindle and hub assembly must be replaced.

BALANCER MOUNTING METHODS

MOUNTING THE WHEEL ON THE VEHICLE

Since today's vehicles are more sensitive to road feel, it is critical to be aware of how the wheel mounts on the vehicle. Acceptable ride quality depends on accurately mounting the wheel on the vehicle hub. Step torqueing lug nuts in a star pattern should be followed on every installation.

If the wheel is not placed on the vehicle using the same centerline that was used on the balancer, the wheel balance, run out, and force variation will not be duplicated.

Improper wheel centering is a huge problem when the hub bore of the wheel does not 'slip fit' onto the hub of the vehicle. Extra caution should be used when mounting these types of wheels after servicing on the balancer. This is especially prevalent on lower cost aftermarket wheels. In many cases, a tire and/or wheel is blamed for creating unacceptable vibration when in fact it was merely mounted on the vehicle improperly.

MOUNTING THE WHEEL ON THE SPINDLE SHAFT

Since today's vehicle designs are lighter and more sensitive to road feel, it is critical to achieve the best balance. Proper balance requires that the tire/wheel assembly be centered on the balancer. Most balancers will balance the tire/wheel assembly to zero, even with the tire/wheel assembly mounted off center. The main objective of the balancer operator is to center the wheel on the balancer using the best available method. Mounting the wheel off-centre on the balancer creates incorrect measurements of imbalance and run out conditions.

MOUNTING WHEELS WITH CONES

The majority of wheels are mounted with a cone to center them on the balancer's shaft. Cones are manufactured with different tapers. The taper and the fit of the cone make a significant difference in accurate centering. Cones having a low taper fit the hub bore and guide the wheel for better centering during the mounting process.

Most wheels benefit with the cone mounted from the backside. This method is referred to as back cone mounting.

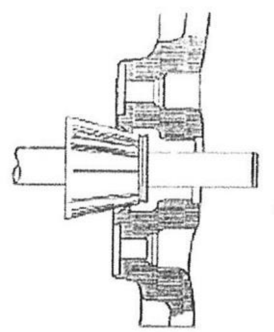
CHECK FOR:

- ✓ Correct mounting cone/adaptor for this wheel design
- ✓ Wheel defect such as metal burr interfering with the cone/adaptor
- ✓ Dirt or debris interfering with the cone/adaptor

BACK CONE MOUNTING PROCEDURE

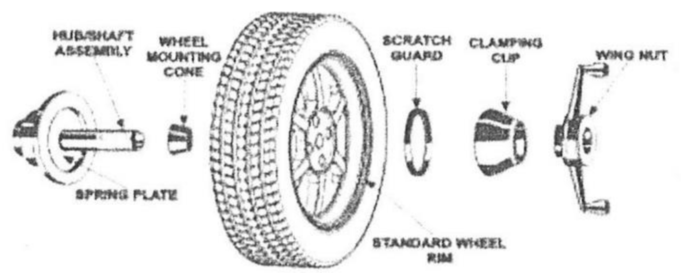
Select the proper wheel-mounting cone by placing it in the center bore of the wheel to be balanced.

Select the cone that contacts the wheel nearest the center of the cone.



Place the wheel-mounting cone on the spindle against the spring plate. Mount the wheel with the inner rim facing the balancer and centered on the cone.

Install the clamping cup and wing nut on the spindle shaft against the wheel and secure the entire assembly by firmly tightening the wing nut. Depress the foot pedal to hold the spindle in place (if available). Slowly roll the wheel toward you during the initial tightening of the wing nut. This helps the wheel to roll up the taper of the cone as opposed to forcing it to slide up the cone.



Back cone mounting (shown using scratch guard)

The scratch guard may be installed on the clamping cup to protect aluminum rims from being marred, but should not be used on steel wheels.

FRONT CONE MOUNTING PROCEDURE

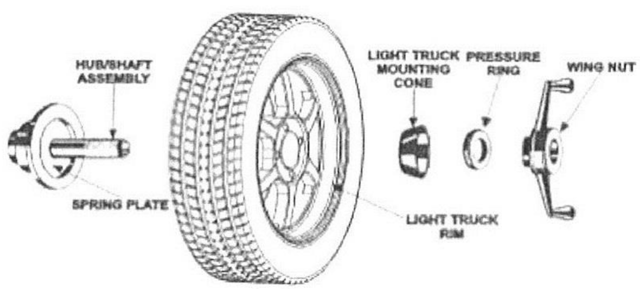
This procedure utilized a tapered cone inserted from the front side of the wheel instead of the backside as previously described.

Select the proper wheel-mounting cone by placing it in the center bore of the wheel to be balanced. Choose the cone that contacts the wheel nearest the center of the cone.

Mount the wheel with the inner rim facing the balancer. Place the wheel-mounting cone on the spindle with the small end of the cone facing the front of the wheel.

Install the wing nut and pressure ring assembly onto the spindle shaft against the wheel and secure the entire assembly by firmly tightening the wing nut.

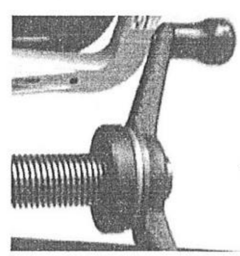
Heavy wheel centering may benefit by pulling the tire away from the hub face at top dead center while tightening the wing nut. This helps the wheel to overcome gravity against the hub or spacer.



PRESSURE RING

The pressure ring should be used to prevent the wing nut from directly contacting an adaptor or a cone.

It may also be used in place of a pressure cup if space is limited between the wheel and the end of the spindle.



TIRE TECH INFORMATION/GENERAL TIRE INFORMATION

1. The definition of balance is the uniform distribution of mass about an axis of rotation, where the center of gravity is in the same location as the center of rotation.

2. One of the limitations of balancing tire and wheel assemblies off a vehicle is that repeatability can be an issue. In other words, you may not get the same results when you attempt to rebalance a wheel that has already been balanced. What has changed? It is not the tire or rim. What has changed is the geometry of the tire and wheel on the balancer.

3. Weights on the wheel have an inherent problem due to the tire/rim geometry. Since the imbalance is normally out at the tire tread surface, and has more effect on balance than an equal weight located at the rim radius.

4. Wheel balancers operate at a smaller radius than a wheel, making it progressively less effective as the tire diameter increase for a given wheel diameter.

5. Match mounting tires on wheels is also a process where a tire's installed position on the wheel is specifically selected to help minimize the final combination's force variation and/or imbalance.

6. Tires used off-road are notoriously hard to balance and keep balanced. They are big, they have large tread blocks (subject to "chunking").

7. "Lug-centric" wheels are notoriously hard to balance on common "hub-centric" balancers and are found with many different rim manufacturers. Toyota also locates the wheel on the hub, via the rim studs. (i.e. lug-centric) and a special lug centric adaptor should be used to properly balance the wheel.

8. According to Tru-Balance, wheel-centering products bypass the hub pilot and actually center the wheel to the wheel studs using the 12, 4, and 8 o'clock positions, resulting in less weight value change during reposition of wheel to hub mounting on wheel balancing machines.

9. The way that a wheel is mounted on a balancer will not only affect the accuracy of the balance job itself but also the repeatability of the balancing results.

10. You can select different methods of wheel mounting according to practice to have wheel spin straight as possible.
    POSITIVE positioning is featured with simple quick operation with suitable cone and nut on the outside of rim, commonly used with steel rims and aluminum alloy rims with small deformation.
    NEGATIVE positioning is used when deformation is noticed with the spin of the wheel. Adopt this method of positioning to guarantee the accurate positioning of the rim inner hole and main shaft. Especially the thick ALU. Negative positioning is with the suitable cone on the inside of the rim and the bowl and nut on the outside.