SERVICE BULLETIN

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ROAD WHEEL BALANCING WITH HUNTER ROAD FORCE® GSP9700 TIRE BALANCER

This bulletin has been amended. The publication date has been revised to include the latest models and model years. No other changes have been made. Please discard previous versions of this bulletin.

APPLIED VEHICLES: All Nissan

SERVICE INFORMATION

The most common cause of vehicle vibration at highway speeds is tire/wheel assembly (or road wheel) forces. There are three primary contributors that affect tire/wheel assembly vibration:

- Imbalance
- Radial run-out
- **Tire Road Force Variation (RFV, or Radial Force Variation)**

The Hunter Road Force® GSP9700 tire balancer (GSP9700) has the capability to measure tire Road Force Variation (RFV).

When measuring RFV, it is important to look at both the RH1 and RH2 values.

This bulletin will instruct you how to:

- Prepare the tire/wheel assemblies for balancing on your GSP9700
- Measure and display RH1 and RH2
- Determine if the tire/wheel assemblies are within specified limits

Road Force Variation

Radial Force Variation (RFV) is a measurement term. Tire RFV is a measure of the variation (up and down) of the load action on the spindle, the force applied to the suspension as the tire turns. This measures the tire's uniformity under load.

The primary measures for RFV are: 1st harmonic, once per revolution, or **RH1**, and 2nd harmonic, twice per revolution, or **RH2**.

Tire/wheel assembly uniformity can only be measured under load.

The GSP9700 measures uniformity by using a load roller. The load roller simulates a load on a tire similar to when it is mounted on a vehicle and driven on the road.

Most road wheel vibration issues are due to road force variation of RH1 or RH2. Of the two, RH1 is more common.

RH1 vibration causes the road wheel to hop/bump once per revolution. This creates a vibration similar to an imbalance condition.

RH1 can cause steering wheel shimmy or shake, and/or body vibration.

RH1 may be caused by:

- Imbalance
- Radial run-out
- Tire uniformity, or RFV

RH2 can be the primary cause of vibration, although it is not as common as RH1.

RH2 vibration occurs twice per revolution and may be caused by:

- Radial run-out of tire and/or wheel (i.e., oval or egg shaped)
- Tire uniformity

Preparing Tire/Wheel Assemblies before Measuring Uniformity (RFV)

1. Check (and adjust as necessary) all tire pressures.
2. Warm up the tires by driving the vehicle a minimum of 15 minutes at highway speeds.
    - This will remove any temporary flat spots prior to testing (refer to NTB11-027).
3. Verify the incident after performing the 15 minute warm-up.
4. If the incident is verified, check uniformity of all tire/wheel assemblies.

Mounting a Tire/Wheel Assembly to a GSP9700

Follow all applicable instructions in the manufacturer's operator's manual.

Make sure to:

- Use the correct collet and flange plate (refer to NTB11-044)
- Check for and remove debris on all road wheels
- Perform a centering check (to make sure the road wheel is mounted properly on the balancer)

Measuring Tire/Wheel Assembly Uniformity (RFV)

NOTE: For details regarding measurement of RFV, refer to the manufacturer's operator's manual.

1. Once properly mounted, spin the tire/wheel assembly.

2. Without measuring Rim Run-out:
   a. Using the menu shift key, navigate to and select "Show Runout & ForceMatching" (see Figure 1).

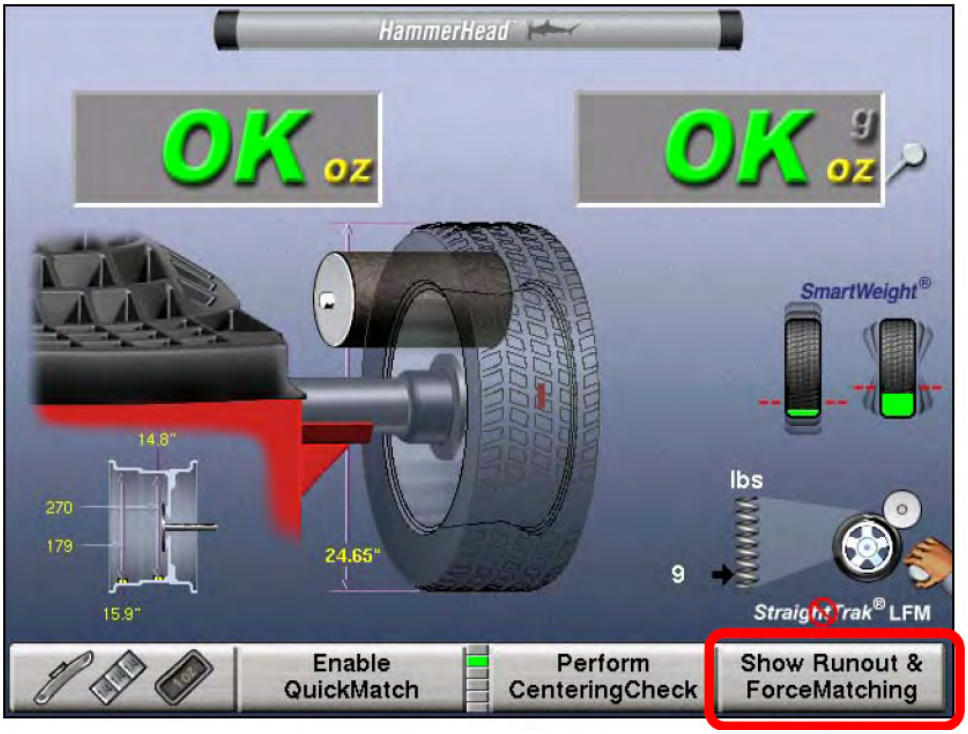

Figure 1

   b. From the “Current Runout & Road Force” screen below, select “Show Details” (see Figure 2).

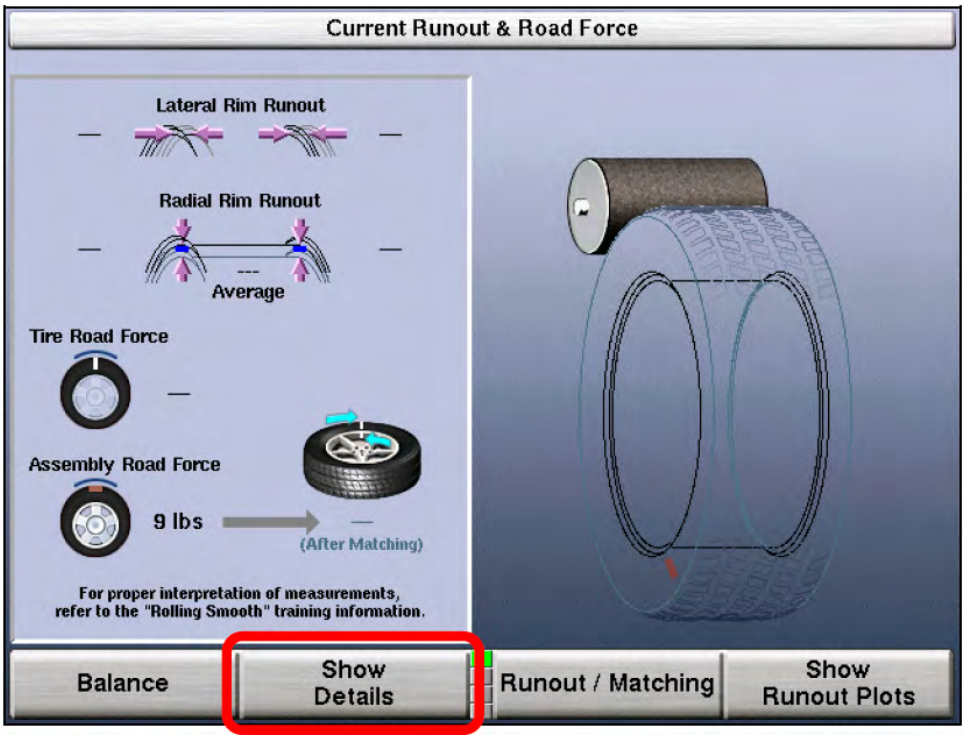

Figure 2

c. “Assembly Road Force” will display (see Figure 3).

- See value for “R2H” (RH2).

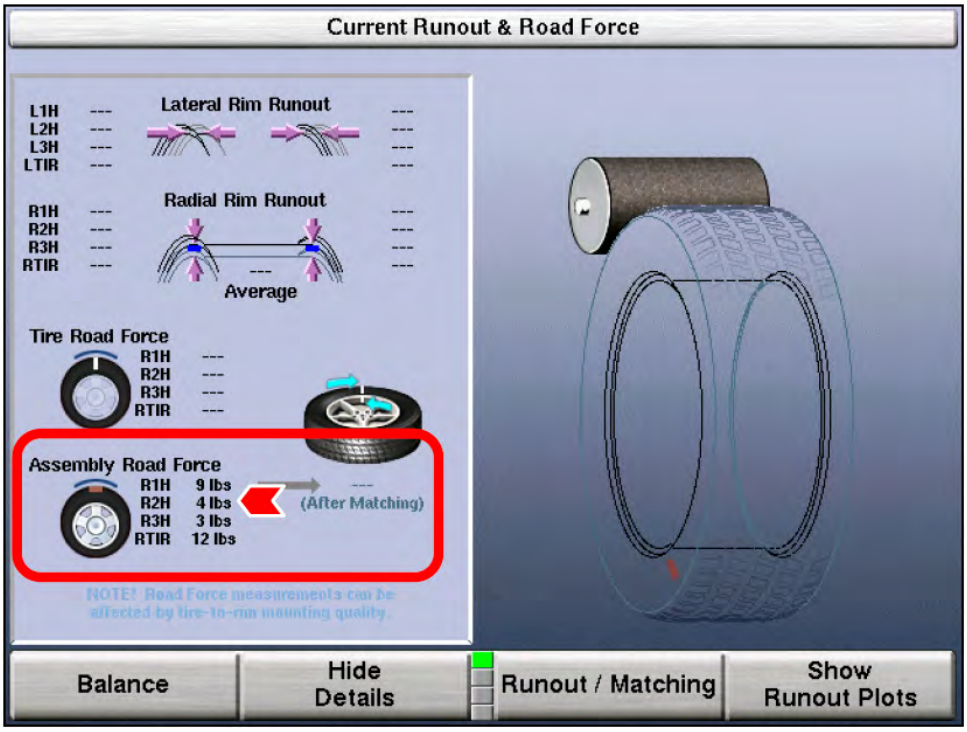

Figure 3

RH1 Above Limit

If RH1 is above the applied limit shown in the table below, perform the following.

1. Mark the tire at the high spot of RFV, and then at the same location on the wheel (see Figure 4).
   - This will be the reference point to the original indexed location.
2. Deflate the tire, and then break down both beads from the wheel.
3. Rotate the tire 180 degrees on the rim.
4. Seat both beads (refer to NTB11-029), and then inflate the tire to its specified pressure.
5. Measure RFV again.
6. Mark the second high spot of RFV.
   a. If the second tire mark is within 4 inches of the first tire mark and RFV is still over the guidelines listed below, the root cause is most likely the tire.
   b. If the second tire mark is within 4 inches of the mark on the wheel and RFV is still over the guidelines, the root cause is most likely the wheel.
   c. If the second tire mark is still over the guidelines and did not locate where stated in 6a or 6b:
      - Runout can likely be improved by rotating the tire and its second mark another 90 degrees in the direction of the first mark.

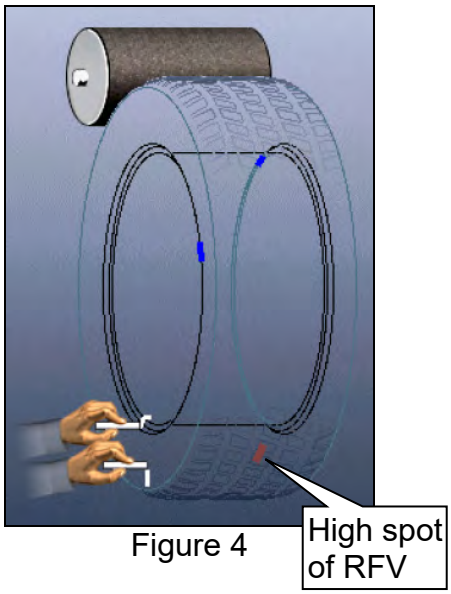

Figure 4

RH2 Above Limit

If RH2 is above the applied limit shown in the table below, replace the tire.

Example of typical RH value settings (Some Vehicles May Require Lower Settings)

Refer to NTB11-054 for further details.

TIRE TYPE	VEHICLE DESCRIPTION	RH1	RH2
P-Metric, passenger car	Passenger car and small SUV/crossover	88 N (9 kg, **20 lbs**)	74 N (7.5 kg, **16.5 lbs**)
P-Metric, light truck	Mid-Large SUV and light duty truck, including NV200	118 N (12 kg, **26.5 lbs**)	96 N (9.5 kg, **21.5 lbs**)
LT, light truck	LCV and Titan XD	212 N (21.6 kg, **47.5 lbs**)	176 N (18 kg, **39.5 lbs**)