TIRE AND WHEEL VIBRATION

Tire and wheel imbalance, runout and force variation can cause vehicles to exhibit steering wheel vibration.

VISUAL INSPECTION

Visual inspection of the vehicle is recommended prior to road testing or performing any other procedure. Raise the vehicle on a suitable hoist. (Refer to 04 - Vehicle Quick Reference/Hoisting - Standard Procedure)

Inspect for the following:

- Verify correct (OEM) wheel and tire, as well as correct wheel weights.
- Inspect tires and wheels for damage, mud packing and unusual wear; correct as necessary.
- Check and adjust tire air pressure to the pressure listed on the label attached to the driver's door opening.

ROAD TEST

Road test vehicle on a smooth road for a least five miles to warm tires (remove any flat spots). Lightly place hands on steering wheel at the 10:00 and 2:00 positions while slowly sweeping up and down from 90 to 110 km/h (55 to 70 mph) where legal speed limits allow.

Observe the steering wheel for:

- Visual Nibble (oscillation: clockwise/counterclockwise, usually due to tire imbalance)
- Visual Buzziness (high frequency, rapid vibration up and down)

To rule out vibrations due to brakes or powertrain:

- Lightly apply brakes at speed; if vibration occurs or is enhanced, vibration is likely due to causes other than tire and wheel assemblies.
- Shift transmission into neutral while vibration is occurring; if vibration is eliminated, vibration is likely due to causes other than tire and wheel assemblies.

For brake vibrations, (Refer to 05 - Brakes/Hydraulic/Mechanical/ROTOR, Brake - Diagnosis and Testing) .

For powertrain vibrations, (Refer to 3 - DIFFERENTIAL AND DRIVELINE).

For tire and wheel assembly vibrations, continue with this diagnosis and testing procedure.

TIRE AND WHEEL BALANCE

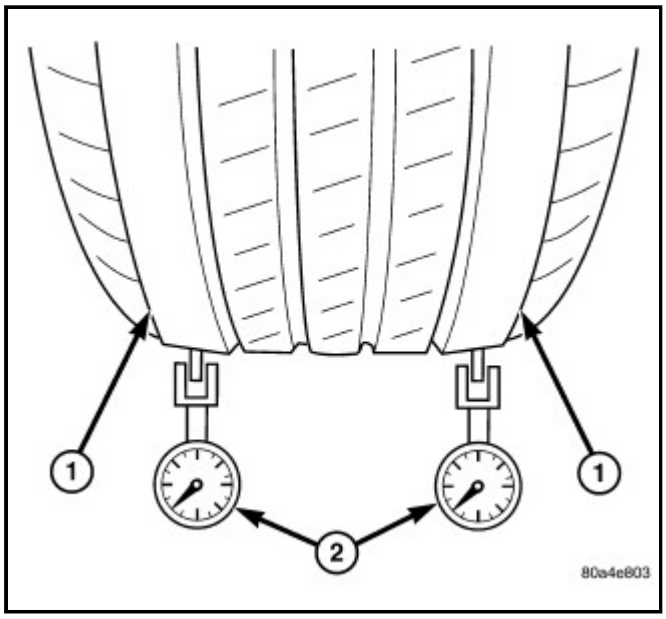
1. Balance the tire and wheel assemblies as necessary following the wheel balancer manufacturer's instructions and using the information listed in Tire And Wheel Balance. (Refer to 22 - Tires and Wheels - Standard Procedure)
2. Road test the vehicle for at least 5 miles, following the format described in Road Test.
3. If the vibration persists, continue with this diagnosis and testing procedure.

TIRE AND WHEEL RUNOUT/MATCH MOUNTING

1. **System Radial Runout.** This on-the-vehicle system check will measure the radial runout including the hub, wheel and tire.
   a. Raise vehicle so tires clear floor. (Refer to 04 - Vehicle Quick Reference/Hoisting - Standard Procedure)
   b. Apply masking tape around the circumference of the tire in the locations to be measured (1). Do not overlap the tape.
   c. Check system runout using Dial Indicator Set, Special Tool C-3339A with 25-W wheel, or equivalent. Place the end of the indicator against each taped area (one at a time) (2) and rotate the tire and wheel. System radial runout should not exceed 0.76 mm (0.030 inch) with no tread “dips” or

“steps.” Tread “dips” and “steps” can be identified by spikes of the dial indicator gauge.

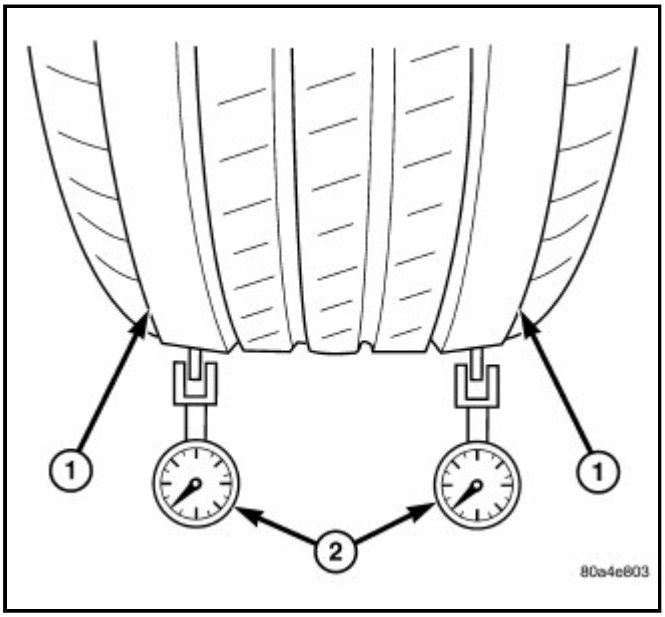
- Tread "dips"; Rapid decrease then increase in dial indicator reading over 101.6 mm (4.0 inch) of tread circumference.
- Tread "steps"; Rapid decrease or increase in dial indicator reading over 101.6 mm (4.0 inch) of tread circumference.



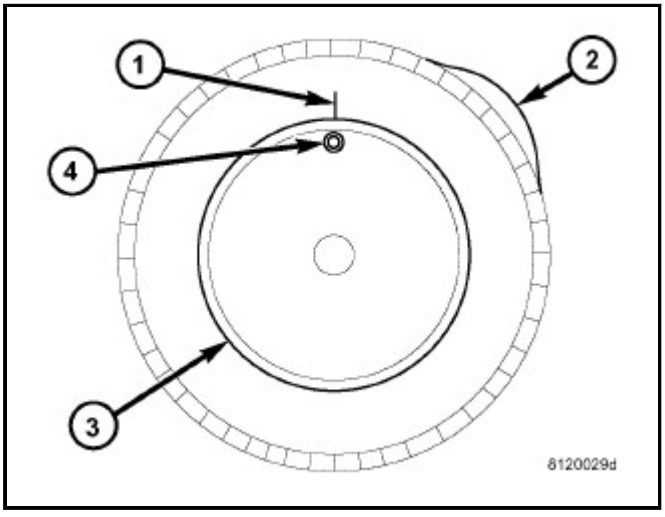
d. If system runout is excessive, re-index the tire and wheel assembly on the hub. Remove assembly from vehicle and install it back on the hub two studs over from original mounting position. If re-indexing the tire and wheel assembly corrects or reduces system runout, check hub runout and repair as necessary (Refer to 05 - Brakes/Hydraulic/Mechanical/ROTOR, Brake - Diagnosis and Testing) .

e. If system runout is still excessive, continue with this diagnosis and testing procedure.

2. **Tire and Wheel Assembly Radial Runout.** This radial runout check is performed with the tire and wheel assembly off the vehicle.
   a. Remove tire and wheel assembly from vehicle and install it on a suitable wheel balancer.
   b. Check system runout using Dial Indicator Set, Special Tool C-3339A with 25-W wheel, or equivalent. Place the end of the indicator against each taped area (one at a time) and rotate the tire and wheel. Radial runout should not exceed 0.76 mm (0.030 inch) with no tread “dips” or “steps.” Tread “dips” and “steps” can be identified by spikes of the dial indicator gauge.



   c. If runout exceeds limits, mark the original location of the tire on the wheel at the valve stem (1)(4). Also, mark the tire and wheel to indicate the original high spot (2) of the assembly and record the runout measurement.



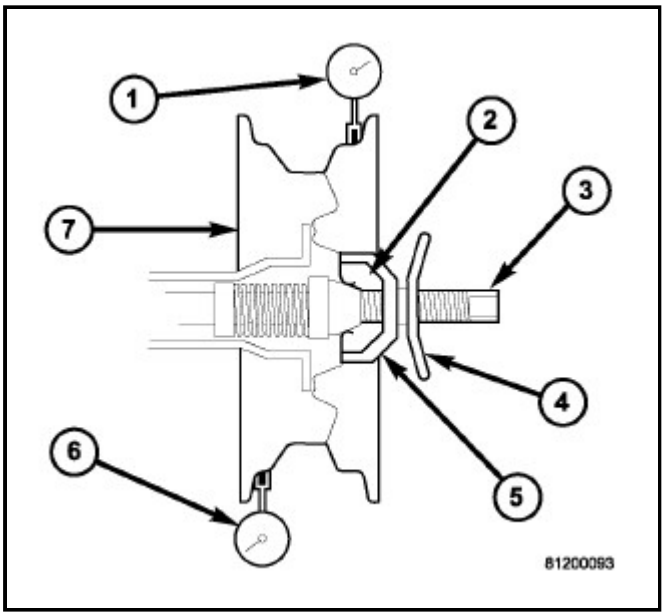
   d. If runout exceeds limits, the tire will need to be dismounted from the wheel to verify wheel vs. tire contribution. Refer to Wheel Runout below.

3. **Lateral Runout.** Lateral runout for the vehicle system as well as the tire and wheel assembly should be less than 0.76 mm (0.030 inch). The same procedure and theory described for radial runout can also be applied to identify and reduce lateral runout.
4. **Wheel Runout.** This runout check is performed as follows:

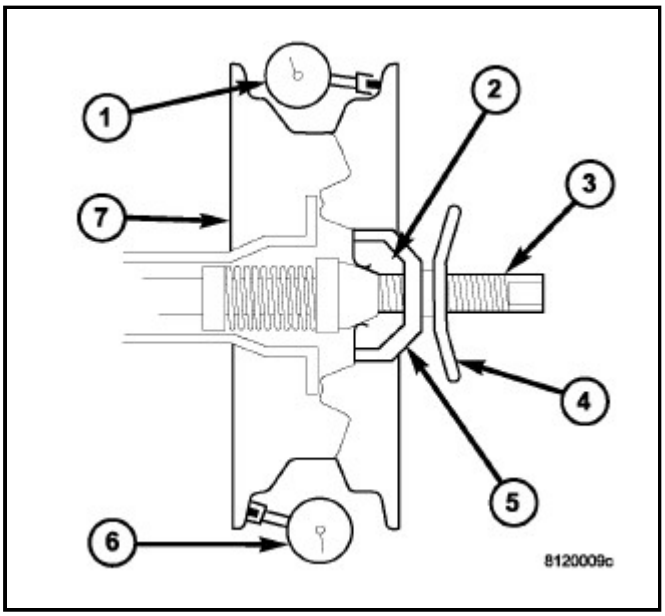
a. Dismount the tire from the wheel.

b. Mount the wheel back on the wheel balancer.

c. Measure radial runout of the wheel at the tire bead seat (1, 6). Runout should not exceed the specification limit listed in the following table. Replace the wheel if it exceeds the limit.



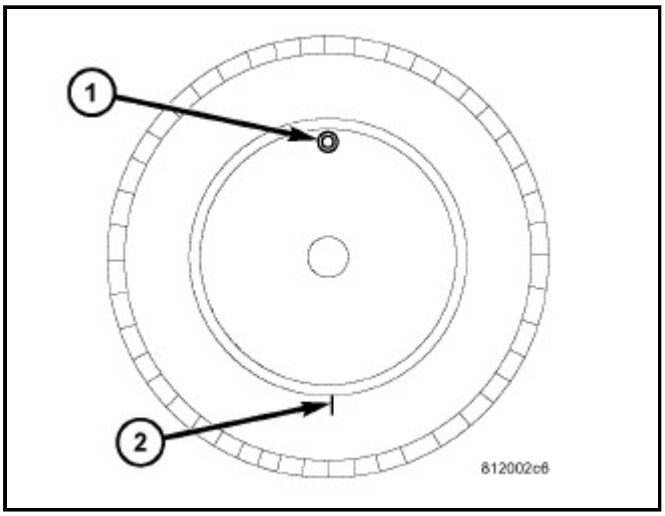
d. Measure lateral runout of the wheel at the tire bead seat (1, 6). Runout should not exceed the specification limit listed in the following table. Replace the wheel if it exceeds the limit.



WHEEL RUNOUT LIMITS

WHEEL TYPE	RADIAL RUNOUT	LATERAL RUNOUT
Aluminum Wheel	0.50 mm (0.020 inch)	0.50 mm (0.020 inch)
Steel Wheel	0.62 mm (0.024 inch)	0.80 mm (0.031 inch)

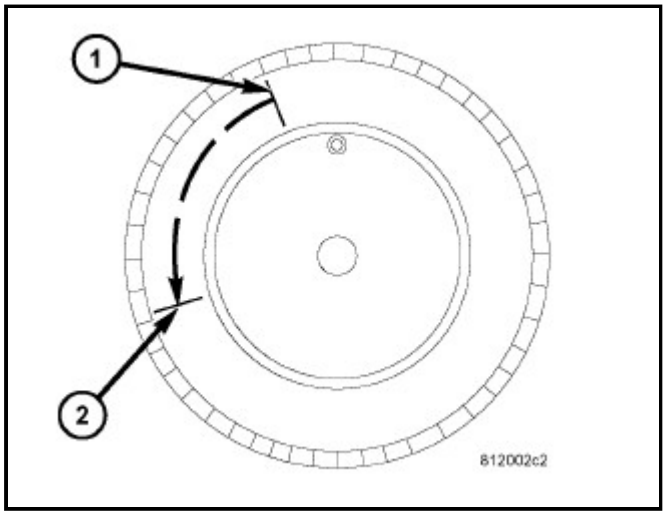
5. **Match Mounting.** If the wheel runout is within specifications, tire and wheel assembly runout can be improved by re-indexing (match mounting) the tire to the wheel as described below.
   a. Remount the tire on the rim 180 degrees from its original location. Ensure the tire bead is properly seated.



b. Re-measure the total runout. Mark the tire at the high spot and record the measurement.

If runout is still excessive, perform the following:

- If the new high spot is within 102 mm (4.0 inch) of the first high spot on the tire, replace the tire.
- If the new high spot is within 102 mm (4.0 inch) of the first high spot on the wheel, the wheel may be out of specification. Refer to Wheel Runout above.
- If the new high spot is NOT within 102 mm (4.0 inch) of either high spot, draw an arrow on the tread from new high spot toward the original (2). Break down the tire and remount it 90 degrees on rim in that direction, then re-measure runout. This will normally reduce the runout to an acceptable amount.



6. Once back together, road test the vehicle for at least 5 miles, following the format described in Road Test. If vibration persists, and all components tested are within specification, the tires may have an excessive radial force condition. Radial force variation can be checked using a wheel balancer capable of measuring radial force variation, such as the Hunter GSP 9700 Vibration Control System (Wheel Balancer) or equivalent. If this equipment is not available, consult with the tire manufacturer.

TIRE AND WHEEL BALANCE

NOTE: Balance equipment must be calibrated and maintained per equipment manufacturer's specifications.

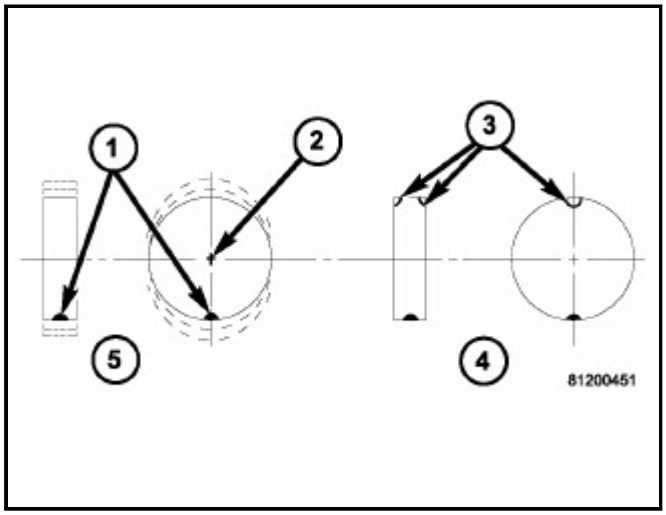
Wheel balancing can be accomplished with either on-vehicle or off-vehicle equipment.

NOTE: If using on-vehicle balancing equipment, on the driving axle, remove the opposite wheel and tire assembly.

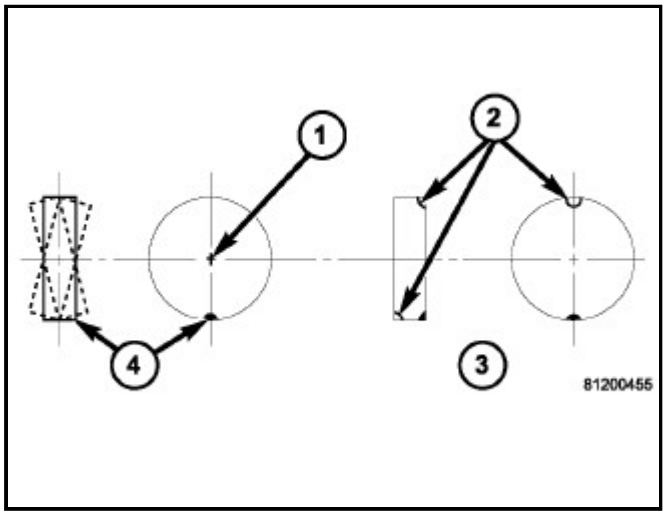
It is recommended that a two-plane dynamic balancer be used when a tire and wheel assembly requires balancing. A static balancer should only be used when a two-plane balancer is not available.

Balance wheel and tire assemblies dynamically and statically to less than 0.25 (¼) ounce.

For static balancing, find the location of the heavy spot causing the imbalance (1). Counter balance the wheel directly opposite the heavy spot. Determine weight required to counterbalance the area of imbalance. Place half of this weight on the **inner** rim flange and the other half on the **outer** rim flange (3) at the predetermined spots.



For dynamic balancing, the balance equipment is designed to indicate the location and amount of weight to be applied to both the inner and outer rim flanges (2).



The aluminum wheels on this vehicle use a different wheel weight than do the steel wheels. Be sure to use the correct wheel weight for the wheel type.

Always verify the Balance. When using off-vehicle equipment, remount the tire and wheel assembly 180 degrees on the balancer spindle and recheck balance. Balance variation from one spot to the other should not be more than 0.125 (⅛) ounce. If variation is more than 0.125 ounce, balancing equipment could be malfunctioning.

If difficult to balance, break down the tire and wheel assembly and check for loose debris inside the tire. Prior to disassembly, mark (index) the tire at the valve stem. Use this mark in order to remount the tire in its original orientation with respect to the wheel.

TIRE AND WHEEL MATCH MOUNTING

Wheels and tires are match mounted at the factory. This means that the high spot of the tire is matched to the low spot on the wheel rim. This technique is used to reduce runout in the wheel and tire assembly. The high spot on the tire is marked with a paint mark or a bright colored adhesive label on the outboard sidewall. The low spot on the wheel is identified with a label on the outside of the rim and a dot or line in the drop well area of the rim (inside where the tire mounts). If the outside label has been removed, the tire will have to be removed to locate the dot or line on the inside of the rim. The tire can then be match mounted to the tire.

Information on match mounting the tire to the wheel can be found in Tire and Wheel Runout/Match Mounting, items (2) through (5), within Diagnosis And Testing - Tire And Wheel Vibration. (Refer to 22 - Tires and Wheels - Diagnosis and Testing)

TIRE AND WHEEL ROTATION

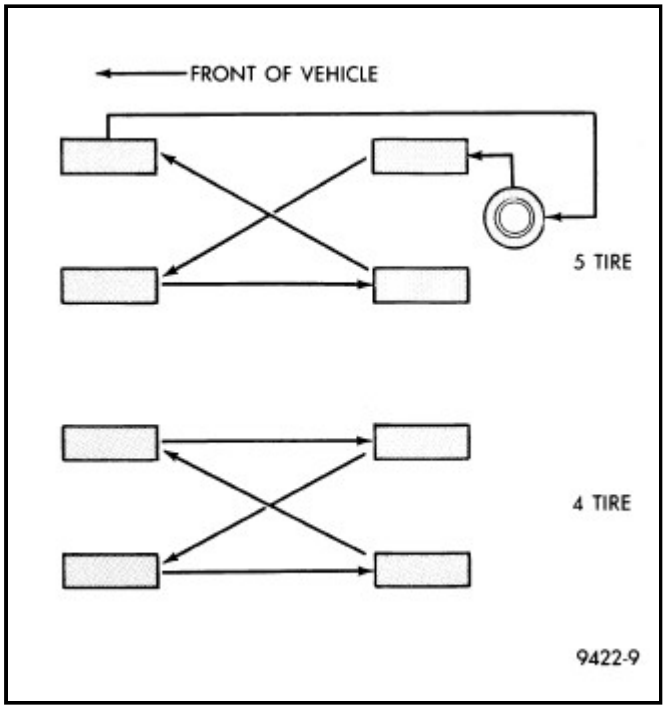
NOTE: Refer to the Owner's Manual for rotation schedules.

NON-DIRECTIONAL TREAD PATTERN TIRES

Tires on the front and rear operate at different loads and perform different steering, driving, and braking functions. For these reasons they wear at unequal rates and tend to develop irregular wear patterns. These effects can be reduced by rotating the tires at regular intervals. The benefits of tire rotation are:

- Increase tread life
- Maintain traction levels
- A smooth, quiet ride

The suggested method of tire rotation is shown in this graphic. Other rotation methods can be used, but they will not provide all the tire longevity benefits.



CAUTION: Only the four-tire rotation may be used on vehicles equipped with tire pressure monitoring (TPM) due to sensors being present in the four road wheels and not in the spare.

NOTE: Only the four-tire rotation method may be used if the vehicle is equipped with a compact or temporary spare tire.

DIRECTIONAL TREAD PATTERN TIRES

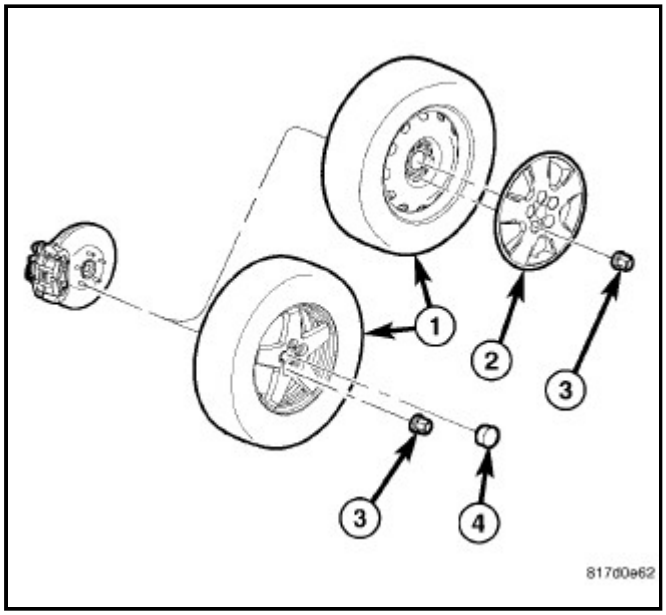
Some vehicles may be fitted with special high-performance tires having a directional tread pattern. These tires are designed to improve traction on wet pavement. To obtain the full benefits of this design, the tires must be installed so that they rotate in the correct direction. This is indicated by arrows on the tire sidewalls.

When being installed, extra care is needed to ensure that this direction of rotation is maintained.

ALUMINUM WHEEL

1. Raise and support the vehicle so that tire and wheel assembly clears ground level. (Refer to 04 - Vehicle Quick Reference/Hoisting - Standard Procedure)
2. If the vehicle is equipped with wheel center caps that cover the wheel nuts, remove the cap with an appropriate removal tool utilizing the notch located between the wheel and the outer edge of the cap. Use care not to damage the wheel coating.

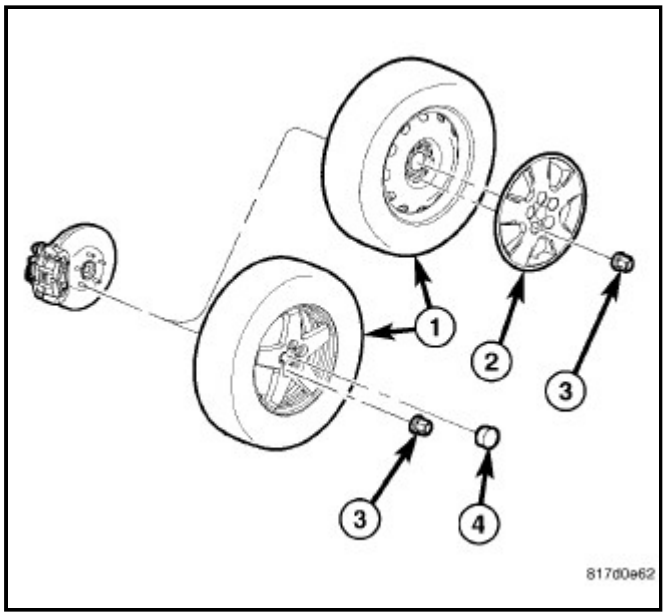
3. Remove five wheel mounting (lug) nuts (3) from studs.
4. Remove tire and wheel assembly (1) from hub.



STEEL WHEEL

1. Raise and support the vehicle so that tire and wheel assembly clears ground level. (Refer to 04 - Vehicle Quick Reference/Hoisting - Standard Procedure)

CAUTION: When removing the bolt-on wheel cover, do not attempt to pry the wheel cover off the wheel. It is held on by the wheel mounting nuts.



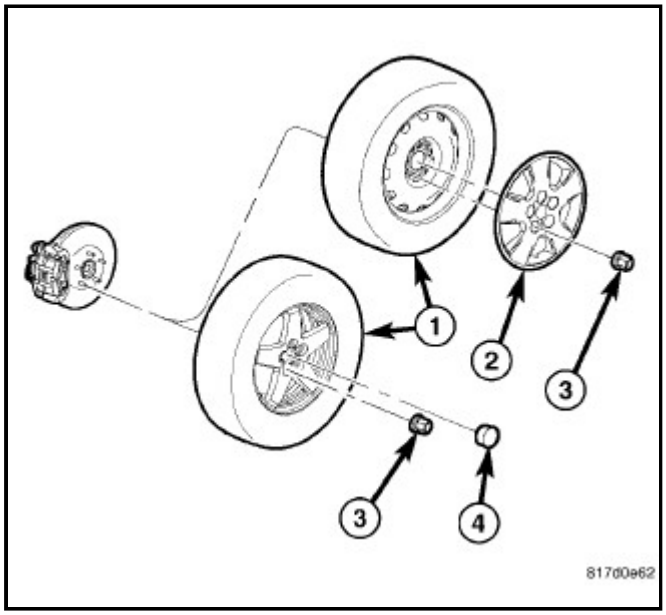
2. Remove the five wheel mounting (lug) nuts (3) from the wheel studs. While removing the nuts, hold the wheel cover (2) in place so it doesn't fall off when the last nut is removed.
3. Remove the wheel cover (2) using care not to let the tire and wheel assembly (1) fall off the vehicle.
4. Remove the tire and wheel assembly (1) from the hub.

ALUMINUM WHEEL

WARNING: **Installing wheels without good metal-to-metal contact with the mounting surface could cause loosening of the wheel mounting (lug) nuts. This could adversely affect the safety and handling of the vehicle.**

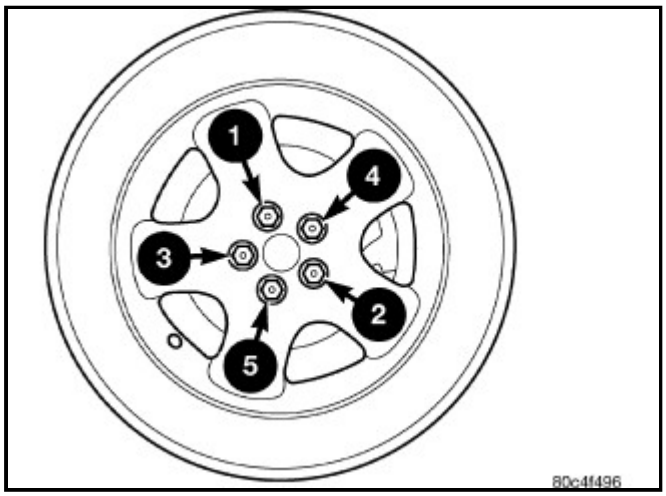
NOTE: **Never use oil or grease on studs or wheel mounting (lug) nuts.**

1. Clean wheel mounting surfaces, removing any build-up of corrosion. It is important to have good metal-to-metal contact between the wheel and vehicle.
2. Position the tire and wheel assembly (1) on the wheel mounting studs using the hub pilot as a guide. Place and hold the wheel flush up against the mounting surface.



NOTE: **Always use the original (OEM) style wheel mounting (lug) nuts. Do not use replacement parts of lesser quality or substitute design.**

3. Install and lightly snug all five wheel mounting (lug) nuts (3) **Do not tighten at this time**.
4. If applicable, install the wheel center cap.
5. Lower the vehicle.
6. Progressively tighten all wheel mounting nuts in the proper sequence shown. Tighten nuts to a final torque of 135 N·m (100 ft. lbs.).



STEEL WHEEL

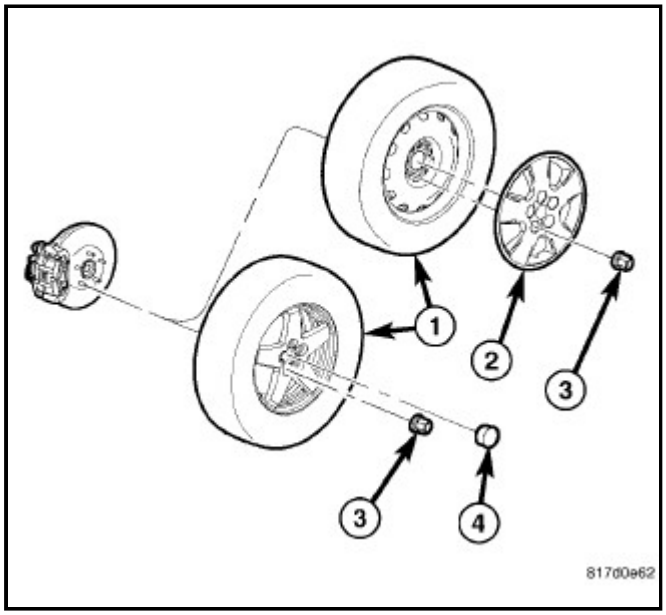
WARNING: **Installing wheels without good metal-to-metal contact with the mounting surface could cause loosening of the wheel mounting (lug) nuts. This could adversely affect the safety and handling of the vehicle.**

NOTE: **Never use oil or grease on studs or wheel mounting (lug) nuts.**

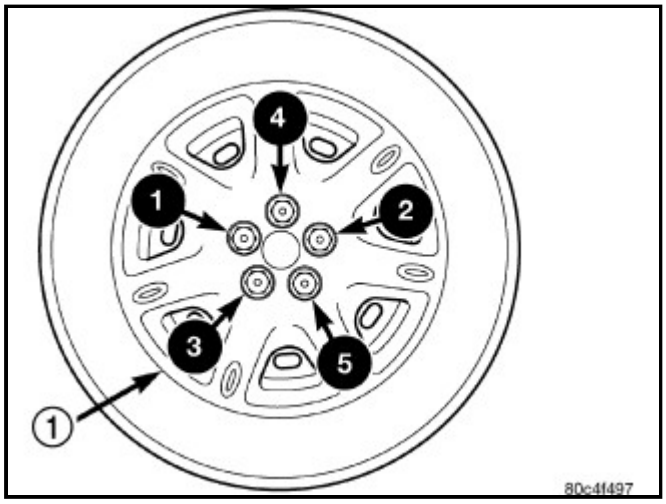
1. Clean the wheel mounting surfaces, removing any build-up of corrosion. It is important to have good metal-to-metal contact between the wheel and vehicle.
2. Position the tire and wheel assembly (1) on the wheel mounting studs using the hub pilot as a guide. Place and hold the wheel flush up against the mounting surface.
3. Align the valve notch in the wheel cover with the valve stem on the wheel and install the wheel cover over the studs.

NOTE: **Always use the original (OEM) style wheel mounting (lug) nuts. Do not use replacement parts of lesser quality or substitute design.**

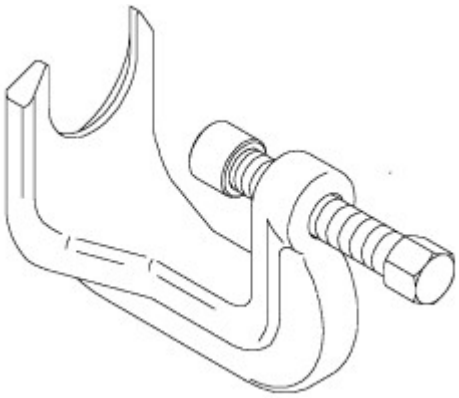
4. Install and lightly snug all five wheel mounting (lug) nuts (3) **Do not tighten at this time**.
5. Lower the vehicle.



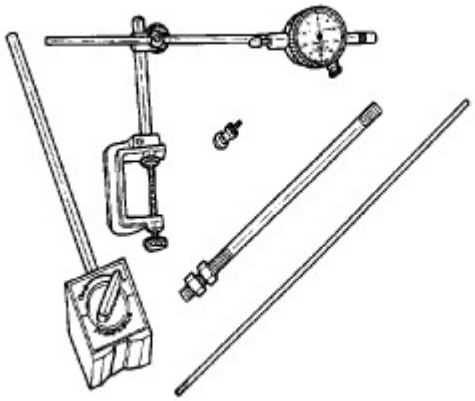
6. Progressively tighten all wheel mounting (lug) nuts in the proper sequence shown. Tighten the nuts to a final torque of 135 N·m (100 ft. lbs.).



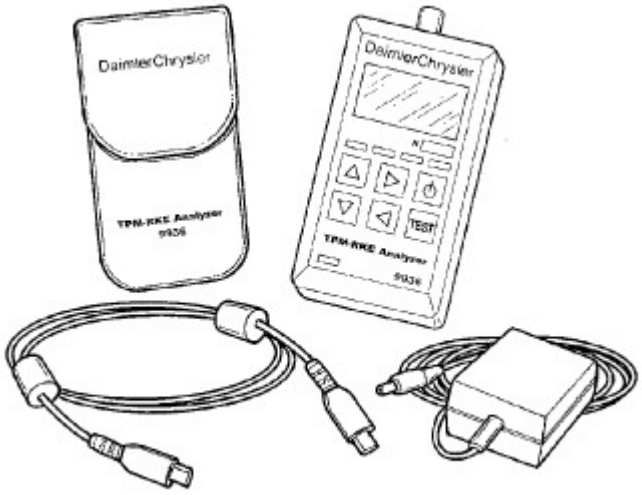
SPECIAL TOOLS



Remover 8677



Dial Indicator C-3339A



TPM-RKE Analyzer 9936

DESCRIPTION

The Tire Pressure Monitoring (TPM) system monitors air pressure in the four road tires (excludes spare). Pressure in the spare tire is not monitored.

A Base TPM system is used on this vehicle. The base system does not specify how many tires are low or where they are located.

The Base TPM system consists of tire pressure monitoring sensors attached to each road wheel through the valve stem mounting hole, a central receiver module (Wireless Ignition Node (WIN)), and an indicator lamp.

The receiver circuit for the TPM system is integrated into the WIN. For non-remote start vehicles, the antenna is internal to the WIN. For factory installed remote start vehicles, the antenna is external to the WIN. The WIN can also include the Remote Keyless Entry (RKE) receiver, Remote Start (if equipped) and the Sentry Key Immobilizer (SKIM) receiver. All receivers share a number of common components. The WIN decodes the RF signals transmitted by each of the vehicle's tire pressure sensors. The decoded information is used to determine if "warning" or "fault" conditions exist within the TPM system.

Upon detection of a warning or fault condition, the WIN will send a request to the module that controls the indicator lamp via the vehicle bus system to illuminate or flash the indicator lamp. Also, upon detection of a warning or fault condition, the electronic display will send a request to sound the "chime".

The WIN will store all warning and fault conditions, placard pressure values and low-pressure threshold values (lamp ON and OFF) in memory that can be accessed through diagnostic communication. If new sensors are introduced to the vehicle, the data stored for the sensor being replaced will be deleted.

The WIN will store all wheel sensor ID's and locations and faults in memory that can be accessed through diagnostic communication. All other data values transmitted from each active wheel sensor (not the spare tire) shall be stored in the WIN memory.

The WIN automatically learns and stores the sensor IDs while driving "within 10 minutes continuously above 15 mph (24 km/h)" after a sensor has been replaced. The learning sequence will initiate when the vehicle has been stopped for more than 20 minutes.

NOTE: A new sensor ID can also be programmed directly into the WIN by using a RKE-TPM Analyzer in conjunction with a Scan Tool. Once the new sensor ID has been programmed, the RKE-TPM Analyzer can be used to update the TPMS by activating the sensor.

OPERATION

The tire pressure monitoring system (TPMS) is designed to operate without loss of function for all OEM tire construction for this vehicle. Sensors, mounted to each road wheel as part of the valve stem, transmit an RF signal indicating their individual pressure to a receiver located in the Wireless Ignition Node (WIN). These transmissions occur approximately once every minute at speeds over 15 mph (24 km/h). For more information on sensors, (Refer to 22 - Tires and Wheels/Tire Pressure Monitoring/SENSOR, Tire Pressure Monitoring (TPM) - Operation).

If the TPM system detects that the tire pressure in any road tire is going low, beyond the Low Pressure (lamp) ON threshold (see placard table below), the TPM system will continuously illuminate an indicator lamp. If a system fault is detected, the indicator lamp will flash on/off for 75 seconds, then remain on solid.

If the WIN detects a warning or fault condition at ignition key "ON" it will wait ten seconds +/- 10 % before sending the first request to illuminate the indicator lamp. This will assure that the display module has concluded its bulb check period. The display module will request a chime once per ignition cycle for each "warning" or "fault" condition detected. A "warning" or "fault" condition will remain enabled until the problem causing the condition is corrected and removed/reset.

The WIN shall continuously monitor for the receipt of tire pressure RF message transmissions from the wheel sensors during both the ignition key "ON" and key "OFF" cycles. The wheel sensor ID’s and the location of each sensor (e.g. Tire 1, Tire 2 etc.) are learned by the WIN from the Front Control Module (FCM) configuration during the initial Manufacturing Plant Process, or during a service procedure, as required.

The TPM System will continue to warn the driver of low tire pressure as long as the condition exists, and will not turn off the indicator lamp until the tire pressure is at or above the Low Pressure (lamp) OFF threshold (see placard table below). The system will automatically update and the TPM indicator lamp will extinguish once the updated tire pressures have been received.

Tire pressure will vary with temperature by about 1 psi (6.9 kPa) for every 12°F (6.5°C). This means that when the outside temperature decreases, the tire pressure will decrease. Tire pressure should always be set based on cold inflation tire pressure (placard pressure). This is defined as the tire pressure after a vehicle has not been driven for more than 3 hours (and in outside ambient temperature). The tire pressure will also increase as the vehicle is driven; this is normal and there should be no adjustment for this increased pressure. For a system fault, the system will return to normal once the WIN receives a valid transmission from that sensor location.

The recommended "Placard Pressure", "Low-pressure Threshold" (Low Pressure ON) and “Hysteresis Pressure” values for the tires installed on the vehicle, are learned by the WIN from the Front Control Module (FCM) configuration during the initial Manufacturing Plant Process, or during a service procedure, as required. The WIN upon learning the placard pressure via the bus (through a matrix within the WIN software) applies the appropriate "Low Pressure Threshold" and "Hysteresis Pressure” values.

To determine the pressure thresholds for a vehicle, refer to the Tire Inflation Pressure (Placard) Label, and then apply the placard pressure to the following table. The Low Pressure OFF Threshold is defined as the Low Pressure ON Threshold plus the Hysteresis Pressure value.

For further information, refer to the Owners Manual or the appropriate diagnostic information.

TPM THRESHOLD PRESSURES

NOTE: To determine the pressure thresholds for a vehicle, refer to the Tire Inflation Pressure (Placard) Label found on the Driver's B-Pillar, then apply the placard pressure to the following table.

Placard Pressure (Cold) (PSI)	Low Pressure ON Threshold (PSI)	Low Pressure OFF Threshold (PSI)
28	22	26
29	23	27
30	24	28
31	25	29
32	25	29

33	26	30
34	27	31
35	28	32
36	29	33
37	29	34
38	30	35
39	31	36
40	32	37
41	33	38
42	34	39
43	35	40
44	36	41
45	36	41
46	37	43
47	38	44
48	38	45
49	39	45
50	40	47
51	41	48
55	44	52
60	48	57
65	52	62
70	56	67
75	60	72
80	64	77

TIRE PRESSURE MONITORING

When diagnosing a tire pressure issue, first check the Tire Pressure Monitoring (TPM) indicator lamp in the instrument cluster during ignition key ON. From the OFF position, turn the key to ON and check the TPM indicator lamp to observe one of the following:

- If after 10 seconds the indicator lamp is illuminating continuously (not flashing), proceed to LOW PRESSURE below.
- If after 10 seconds the indicator lamp flashes on/off for 75 seconds, then remains on solid, there is a system fault detected. Proceed to SYSTEM FAULT below.

LOW PRESSURE

NOTE: Tire pressure may increase from 2 to 6 psi (14 to 41 kPa) during normal driving conditions. Do NOT reduce this normal pressure build up.

NOTE: Tire pressure will vary with temperature by about 1 psi (6.9 kPa) for every 12°F (6.5°C). This means that when the outside temperature decreases, the tire pressure will also decrease. Tire pressure should always be set based on cold inflation tire pressure. For details, (Refer to 22 - Tires and Wheels/Tires - Standard Procedure) .

Check air pressure as necessary in all tires using a known accurate air gauge and adjust to the specification listed on the Tire Inflation Pressure Label (Placard) provided with the vehicle (usually applied to the driver side B-pillar). After adjusting air pressure in a tire on the vehicle, allow approximately two minutes for the message or indicator lamp to go out.

If air pressure in any tire is low, inspect **all** the tires for leaks. A water “dunk tank” or other water test may be used to check for a leak around the sensor as long as any water at the valve core is removed once the procedure is completed. The water can be easily expelled from the core area by pushing in on the core for several seconds, allowing escaping air to drive out any moisture. Reinflate the tire as necessary. Always make sure the original (special) valve stem cap is securely installed to keep moisture out of the sensor.

If the indicator lamp is still ON continuously, refer to the appropriate diagnostic information.

SYSTEM FAULT

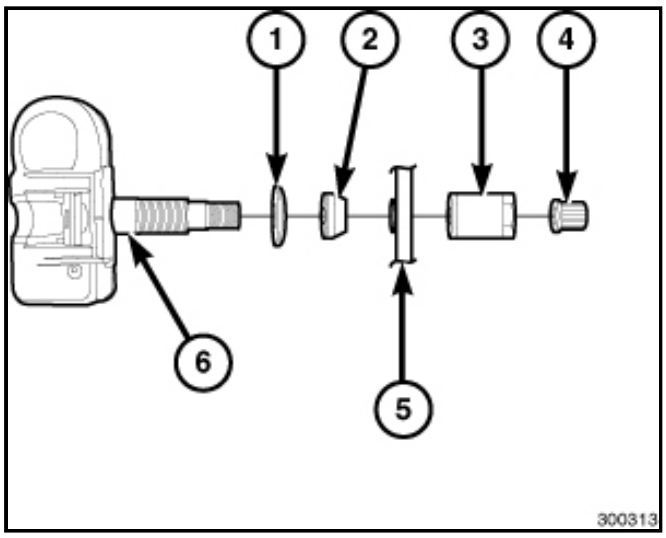
If a system fault is detected, a chime will sound, and the TPM indicator (telltale) lamp will flash for 75 seconds, then remain on solid. For vehicles with the Premium TPM Systems, a “CHECK TPM SYSTEM” message will appear in the Electronic Vehicle Information Center (EVIC), followed by a graphic display. A system fault can occur by many scenarios, including the following:

- Signal interference due to electronic devices or driving next to facilities emitting the same Radio Frequencies as the TPM sensors.
- Installing some form of aftermarket window tinting that affects radio wave signals.
- Accumulation of snow or ice around the wheels or wheel housings.
- Using tire chains on the vehicle.
- Using wheels not equipped with TPM sensors.

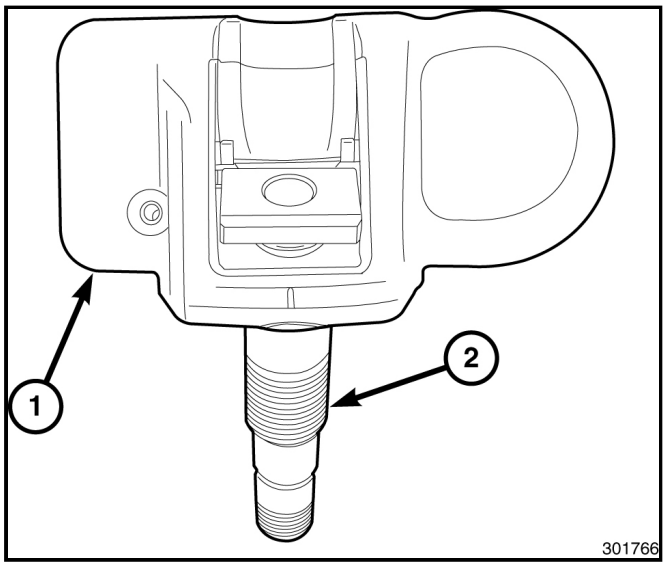
Refer to the appropriate diagnostic information.

DESCRIPTION

On vehicles equipped with Tire Pressure Monitoring (TPM), one tire pressure sensor (6) is mounted to each wheel (5) in place of the traditional tire valve stem. Each sensor has an internal battery that lasts up to 10 years. The battery is not serviceable. At the time of battery failure, the sensor must be replaced.



The TPM system operates on a 433 MHz radio frequency. The 433 MHz sensors (1) can be easily identified by the part number.



CAUTION: Although additional sensors operating at 433 MHz sensors are available and are used in other applications, they are not interchangeable. Always make sure the correct sensor is being used and be sure to replace the sensor with the correct part number.

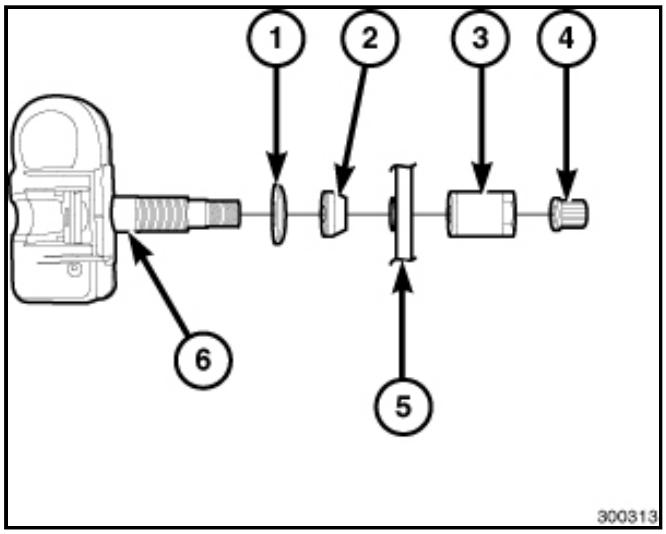
NOTE: Once mounted inside a tire and wheel assembly you are not able to visually see the difference between this sensor and other 315 MHz and 433 MHz sensors. At that point, the TPM/RKE Analyzer 9936, with the Scan Tool may be used to identify the sensor frequency or the tire can be dismounted allowing visual inspection of the sensor body and part number.

The TPM sensors are designed for original style factory wheels. It is not recommended to install a tire pressure sensor in an aftermarket wheel (This could cause sealing and system performance issues). **Do not attempt to install a tire pressure sensor in an aftermarket wheel. If aftermarket wheels are installed and do not contain tire pressure sensors, the system will not function properly and the driver will be continuously notified of a system malfunction.**

The serviceable components of the tire pressure sensor are:

- Sensor-To-Wheel Seal (2) and Metal Washer (1)
- Valve Stem Cap (4)
- Valve Stem Core
- Valve Stem Nut (with pressed-in washer) (3)

NOTE: **Any time a sensor is installed on a wheel, a new Sensor-To-Wheel Seal (2), Metal Washer (1) and Valve Stem Nut (3) must be installed to ensure air tight sealing. A service kit is available.**



The valve stem caps and cores are specifically designed for the tire pressure monitoring sensors. Although similar to standard valve stem caps and cores, they are different. The valve stem cap has a special seal inside to keep moisture and corrosion out. The valve stem core has a special nickel coating to protect from corrosion.

OPERATION

The battery operated tire pressure sensor is both a transmitter and a receiver. The TPM sensor can be forced to transmit by using a special tool such as a TPM-RKE Analyzer. Using a TPM-RKE Analyzer can take up to a minute to force a transmission from a sensor.

NOTE: The TPM-RKE Analyzer will not define the mode.

The TPM sensor can be in one of the following operating modes:

- **OFF MODE** – A new TPM sensor will be in this mode. In this mode the sensor does not transmit periodically on its own. By forcing a transmission from the sensor with the TPM-RKE Analyzer, it will change to the STATIONARY MODE. The sensor will also automatically change from OFF mode to the STATIONARY MODE once it experiences a great increase in pressure (i.e. installation into a wheel/tire assembly and then inflated).
- **WAL MODE** – This is the operating mode the sensor assumes when the vehicle is driven over 15mph (24km/h), but only after the vehicle was previously parked for a duration of 18 minutes or greater. In WAL MODE the sensors transmit every 33 seconds and these transmissions contain left/right information that allows the TPM Module to determine sensor location on the vehicle. WAL MODE lasts for the first 10 minutes of consecutive driving, then NORMAL DRIVE mode ensues.
- **FACTORY MODE**– This is a special case of WAL MODE. If a TPM sensor has just been taken out of OFF MODE, then for the first 3 minutes of the WAL period (10 minutes) the sensors transmit at an accelerated rate of every 10 seconds. After the first 20 drives, then the sensors never again transmit out of FACTORY MODE.
- **NORMAL MODE** – This is the operating mode the sensor assumes after the first 10 minutes of a drive. In NORMAL MODE the sensors transmit every 66 seconds and cease transmitting left/right information.
- **SERVICE MODE**– Once a vehicle stops, the sensors go into SERVICE MODE. After 18 minutes of no driving then the sensors go into the STATIONARY MODE. If the vehicle was stopped for less than 18 minutes and driving resumes, then the sensors go back to the NORMAL MODE.
- **STATIONARY MODE** – When a vehicle has been stopped for more then 18 minutes, then the sensor is forced into STATIONARY MODE. In STATIONARY MODE the sensor never transmits any pressure information. The sensor leaves STATIONARY MODE and enters WAL MODE when the vehicle is driven above 15mph (24km/h).

Each sensor’s (transmitter) broadcast is uniquely coded so that the TPM module can monitor the state of each of the sensors on the four rotating road wheels. The TPM module can automatically learn and store the sensor’s ID while driving “within 20 minutes continuously above 15 mph (24 km/h)” after a sensor has been replaced. The vehicle must be stationary for more then 20 minutes in order to initiate the learning sequence. The TPM module can also learn the sensor's ID using the TPM-RKE Analyzer, Special Tool 9936, with the Scan Tool following the procedure listed in the appropriate diagnostic information.

CAUTION

CAUTION: **The Tire Pressure Monitoring (TPM) system has been optimized for the original equipment tires and wheels. TPM system pressures have been established for the tire size equipped on the vehicle. Undesirable system operation or sensor damage may result when using replacement equipment that is not of the same size, type, or style. Aftermarket wheels can cause sensor damage. Do not use aftermarket tire sealants or balance beads if your vehicle is equipped with TPM, as damage to the sensors may result.**

CAUTION: **Do not attempt to install a tire pressure sensor in an aftermarket wheel. Use tire pressure sensors in original style factory wheels only. If aftermarket wheels are installed, and therefore do not contain tire pressure sensors, the system will not function properly and the driver will be continuously notified of a system malfunction.**

CAUTION: **After inspecting or adjusting the tire pressure always reinstall the valve stem cap. This will prevent moisture and dirt from entering the valve stem, which could damage the Tire Pressure Sensor.**

CAUTION: **Tire pressure sensor valve stem caps and cores are specially designed for the sensors. Due to risk of corrosion, do not use a standard valve stem cap or core in a tire pressure sensor in place of the original equipment style sensor cap and core.**

CAUTION: **Any time a sensor is to be installed in a wheel, it is necessary to install a new sensor-to-wheel seal, metal washer and valve stem nut, to ensure air tight sealing.**

CAUTION: **When installing the valve core, be sure to tighten the core to specifications (Refer to 22 - Tires and Wheels/Wheels - Specifications) . Overtightening by a little as three or four inch pounds can damage the sensor.**

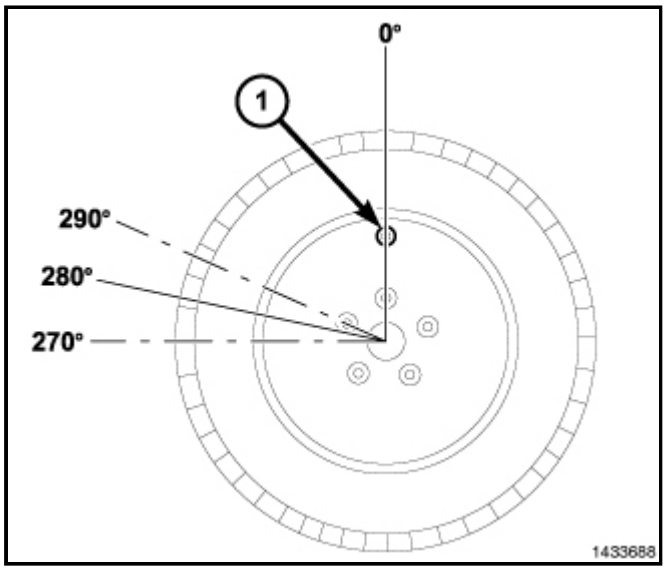
REMOVAL

1. Raise and support vehicle. (Refer to 04 - Vehicle Quick Reference/Hoisting - Standard Procedure)
2. Remove wheel.

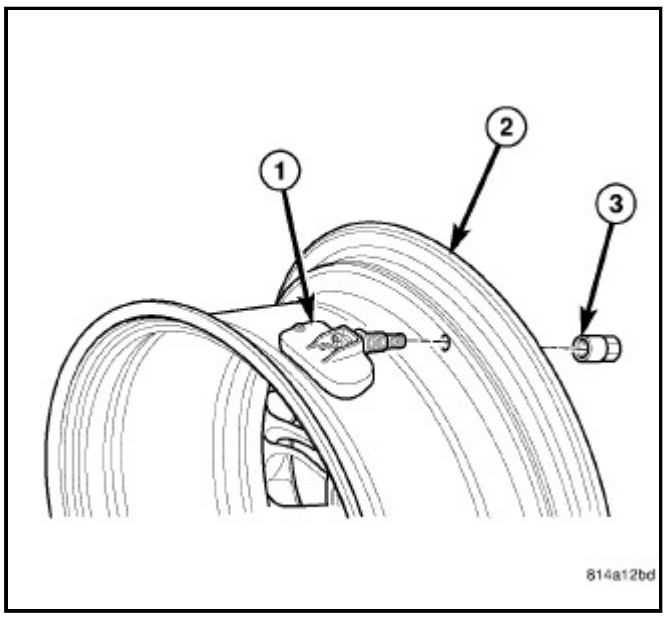
CAUTION: The cap used on this valve stem contains an O-ring seal to prevent contamination and moisture from entering the valve stem. Retain this valve stem cap for reuse. Do not substitute a regular valve stem cap in its place.

CAUTION: The valve stem used on this vehicle is made of aluminum and the core is nickel plated brass. The original valve stem core must be reinstalled and not substituted with a valve stem core made of a different material. This is required to prevent corrosion in the valve stem caused by the different metals.

3. Dismount tire from wheel following tire changer manufacturers instructions while paying special attention to the following to avoid damaging the pressure sensor:
   a. When breaking the tire bead loose from the wheel rim, avoid using the Bead Breaker in the area of the sensor. That includes both outer and inner beads of the tire.
   b. When preparing to dismount the tire from the wheel, carefully insert the mounting/dismounting tool 280° from the valve stem ± 10°, then proceed to dismount the tire from the wheel. Use this process on both outer and inner tire beads.



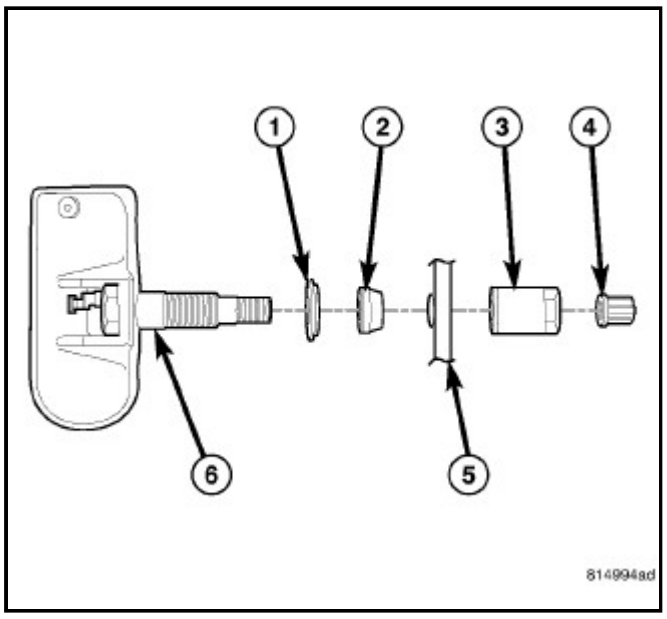
4. Remove sensor nut (3) retaining sensor to wheel. While removing nut, hold pressure against rear of metal valve stem to keep valve stem from pushing rearward, damaging antenna strap.
5. Remove sensor (1) from wheel (2).



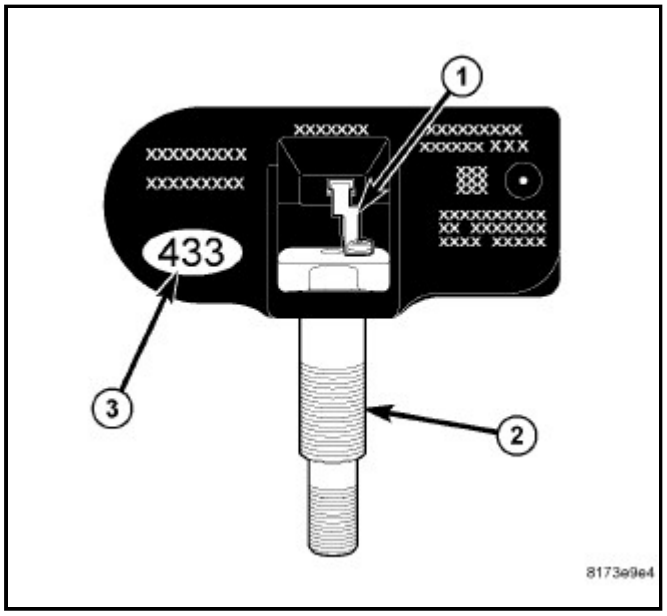
INSTALLATION

NOTE: Before reinstalling an existing tire pressure sensor, replace seal (2) and metal washer (1) at base of sensor valve stem (6) to ensure proper sealing.

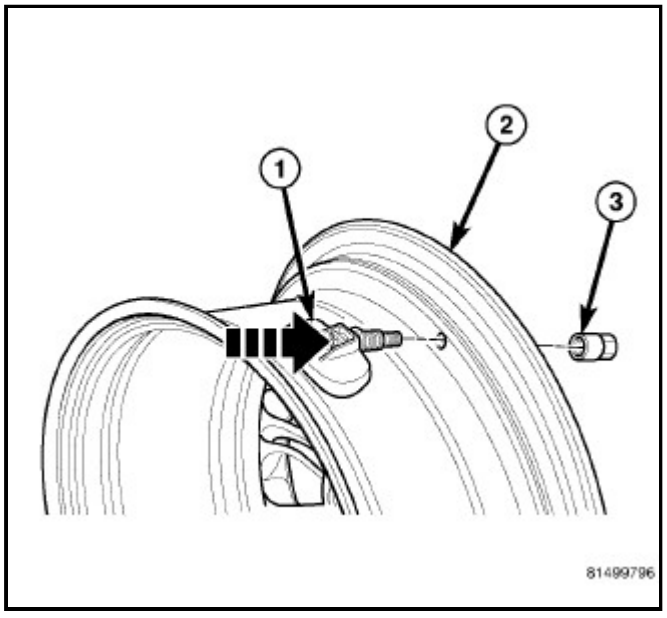
1. Wipe area clean around sensor/valve stem mounting hole in wheel (5). Make sure surface of wheel is not damaged.



CAUTION: To avoid damaging sensor antenna strap (1), hold pressure against rear of metal valve stem (2) while sensor is inserted through wheel mounting hole and nut is installed.



2. Insert sensor (1) through wheel (2) as shown keeping pressure against rear of metal valve stem (See Arrow). Potted side of sensor is to be positioned toward wheel. Do not attempt to mount sensor otherwise, damage may occur.
3. Install sensor nut (with pressed-in washer) (3) by hand.

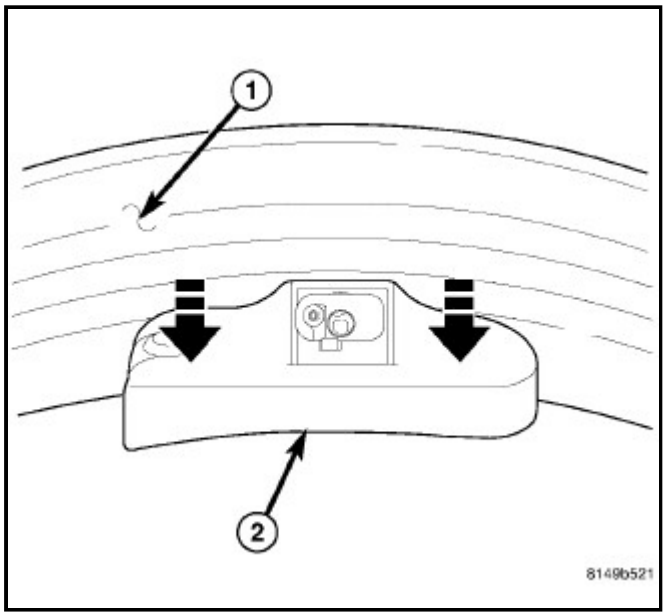


NOTE: Before tightening sensor nut, push downward on sensor housing (2) in an attempt to make it flush with

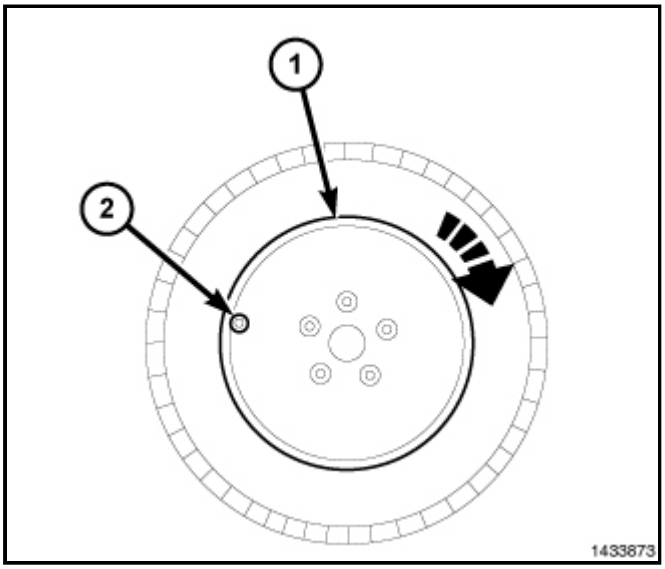
interior contour of wheel (1).

4. While holding sensor in position, tighten sensor nut to 8 N·m (71 in. lbs.).

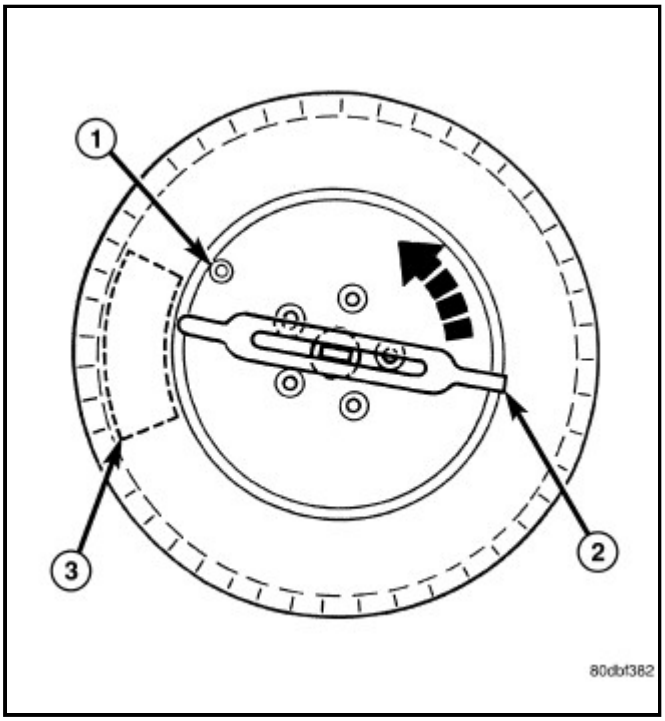
CAUTION: Over-torquing the sensor nut by as little as 12 N·m (106 in. lbs.) may result in sensor separation from the valve stem. Under this condition, the sensor may still function. However, the condition should be corrected immediately.



5. Mount tire on wheel following tire changer manufacturers instructions, paying special attention to the following to avoid damaging tire pressure sensor:
   a. Rotating Wheel Tire Changers - Once the wheel is mounted to the changer, position the sensor valve stem (2) approximately 280° from the head of the changer (located at 1) in a clockwise direction before rotating the wheel (also in a clockwise direction) to mount the tire. Use this procedure on both the outer and inner tire beads.



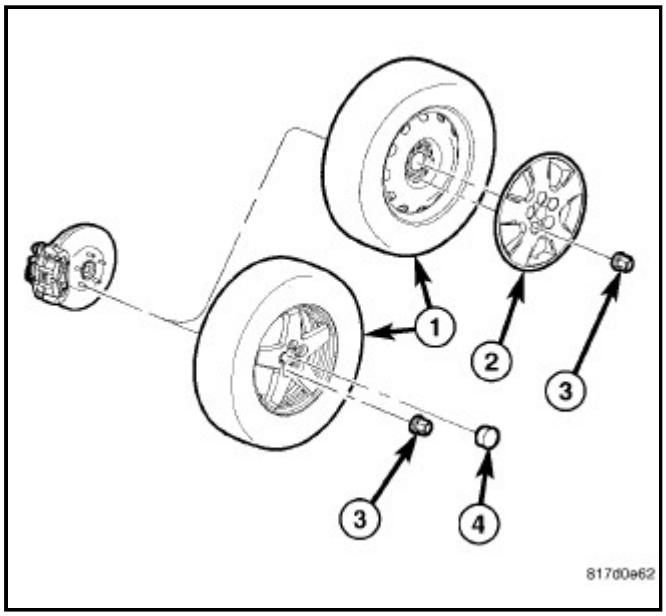
   b. Rotating Tool Tire Changers - Position the wheel on the changer so that the sensor valve stem (1) is located approximately 280° clockwise from the installation end of the mounting/dismounting tool (2) once the tool is mounted for tire installation. Make sure the sensor is clear of the lower bead breaker area (3) to avoid damaging the sensor when the breaker rises. Rotate the tool (2) in a counterclockwise direction to mount the tire. Use this procedure on both the upper and lower tire beads.



6. Adjust air pressure to that listed on Tire Inflation Pressure Label (Placard) provided with vehicle (applied to driver's side B-pillar). Make sure **original style and color** valve stem cap is securely

installed to keep moisture out of sensor.

7. Install tire and wheel assembly (1) on vehicle (Refer to 22 - Tires and Wheels - Installation) . Tighten wheel mounting nuts (3) to 135 N·m (100 ft. lbs.).
8. Lower vehicle.
9. Perform one of the following to make the system learn the new sensor ID.
   a. Use the TPM-RKE Analyzer, Special Tool 9936, with the Scan Tool to program the WIN with the tire pressure sensor ID. This is part of the TPM Diagnostic Verification Test, (Refer to 28 - DTC-Based Diagnostics/NODE, Wireless Ignition (WIN) - Standard Procedure).
   b. Once the vehicle has remained stationary for more than 20 minutes, drive vehicle for a minimum of 10 minutes while maintaining a continuous speed above 15 mph (24 km/h). During this time, the system will learn the new sensor ID. This is part of the TPM Diagnostic Verification Test, (Refer to 28 - DTC-Based Diagnostics/NODE, Wireless Ignition (WIN) - Standard Procedure).



NOTE: If a sensor cannot be trained, refer to appropriate diagnostic information.

TIRE

Tires are designed and engineered for each specific vehicle. They provide the best overall performance for normal operation. The ride and handling characteristics match the vehicle's requirements. With proper care they will give excellent reliability, traction, skid resistance, and tread life.

Driving habits have more effect on tire life than any other factor. Careful drivers will obtain, in most cases, much greater mileage than severe use or careless drivers. A few of the driving habits which will shorten the life of any tire are:

- Rapid acceleration
- Severe application of brakes
- High-speed driving
- Taking turns at excessive speeds
- Striking curbs and other obstacles
- Operating vehicle with over or under inflated tire pressures

Radial ply tires are more prone to irregular tread wear. It is important to follow the tire rotation interval shown in the section on Tire Rotation. This will help to achieve a greater tread-life potential.

TIRE IDENTIFICATION

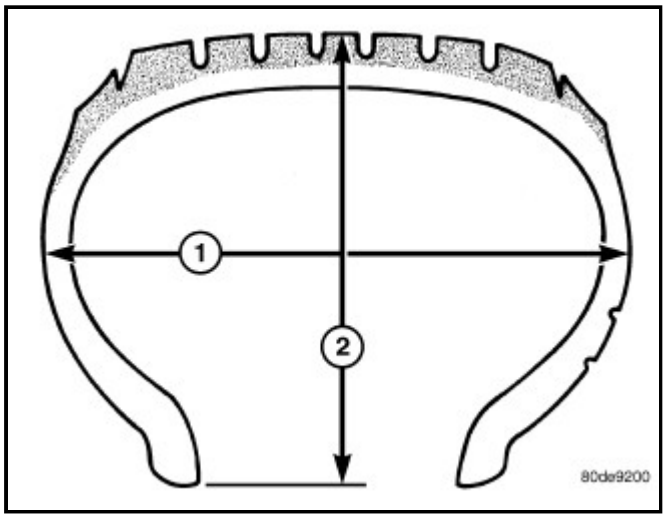
Tire type, size, load index and speed rating are encoded in the letters and numbers imprinted on the side wall of the tire. Refer to the Tire Identification chart to decipher the code. For example purposes, the tire size P225/60 R 16 97 T is used in the chart. An All Season type tire will also have either M + S, M AND S or M - S (indicating mud and snow traction) imprinted on the side wall. An Extra or Light Load marking “XL” or “LL” may also be listed on the sidewall. The absence of an “XL” or “LL” marking infers a standard load tire.

TIRE IDENTIFICATION

P	TIRE TYPE (Not present on all tires) T - Temporary C - Commercial LT - Light Truck	P - Passenger
225	SECTIONAL WIDTH	SHOWN IN MILLIMETERS
60	ASPECT RATIO	SECTIONAL HEIGHT ÷ SECTIONAL WIDTH *
R	CONSTRUCTION TYPE B - BIAS BELTED D - DIAGONAL (BIAS)	R - RADIAL
16	WHEEL DIAMETER	SHOWN IN INCHES
97	LOAD INDEX	**
T	SPEED RATING	**

NOTE: * Height (2) ÷ Width (1) = Aspect Ratio.

NOTE: ** Consult the tire manufacturer regarding any questions on tire specifications or capabilities.



TIRE CHAINS

Refer to the owners manual supplied with the vehicle to determine whether the use of tire chains is permitted on this vehicle.

REPLACEMENT TIRES

WARNING: **Failure to equip the vehicle with tires having adequate speed capability can result in sudden tire failure.**

WARNING: **In order to maintain the speed capability of the vehicle, replacement tires must have speed ratings equal to or higher than those fitted to the vehicle as original equipment. If tires with lower speed ratings are fitted, the vehicle's handling may be affected and the speed capability of the vehicle may be lowered to the maximum speed capability of the replacement tires. To avoid an accident resulting in severe or fatal injury, consult the tire manufacturer in regards to maximum speed ratings.**

It is recommended that tires equivalent to the original equipment tires be used when replacement is needed.

Failure to use equivalent replacement tires may adversely affect the safety and handling of the vehicle.

The original equipment tires provide a proper combination of many characteristics such as:

- Ride
- Noise
- Handling
- Durability
- Tread life
- Traction
- Rolling resistance
- Speed capability

The use of tires smaller than the minimum tire size approved for the vehicle can result in tire overloading and failure.

Use tires that have the approved load rating for the vehicle and never overload them. Failure to equip the vehicle with tires having adequate speed capability can result in sudden tire failure and loss of vehicle control.

The use of oversize tires may cause interference with vehicle components. Under extremes of suspension and steering travel, interference with vehicle components may cause tire damage.

SPARE TIRE

A compact (temporary) spare tire and wheel assembly is standard equipment on this vehicle. A full-size spare is available on some models.

Export vehicles are equipped with the TIREFIT tire repair kit as standard equipment in place of a spare tire. It is to be used to repair small punctures in the tire as necessary. A compact spare tire is optional. For additional information, refer to the Owners Manual.

The compact spare tire is designed for emergency use only. The original tire should be repaired or replaced at the first opportunity, then reinstalled. Do not exceed speeds of 80 km/h (50 mph) when using the compact spare tire. Refer to the Owner's Manual for complete details.

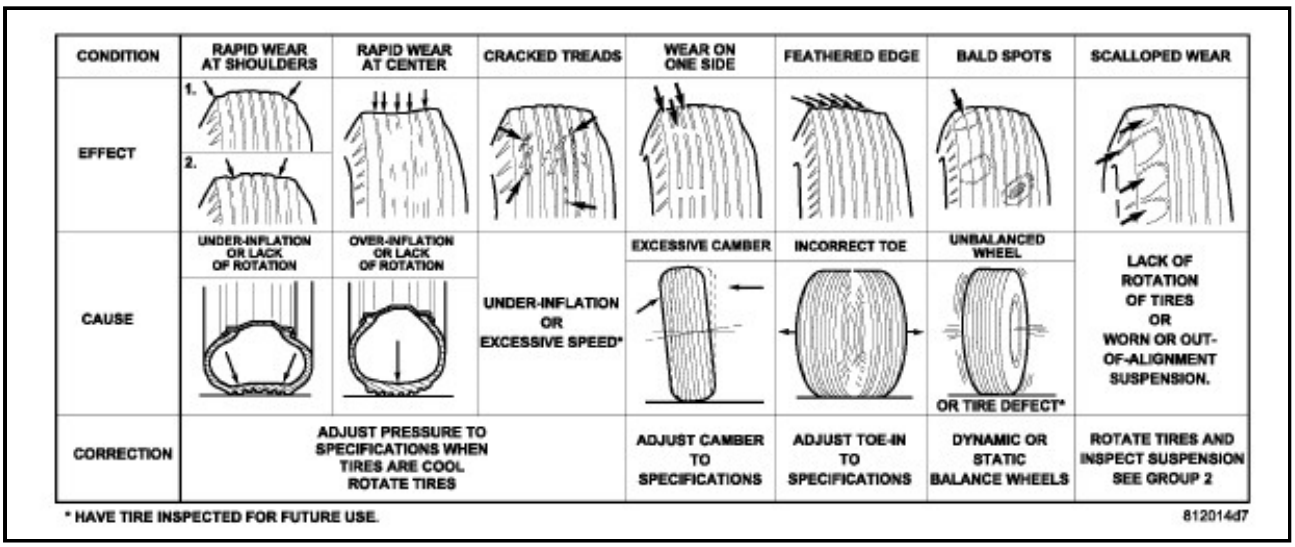
TIRE NOISE

Unusual tire noise can be associated with tire and wheel vibration or irregular tire wear. For vibration issues, (Refer to 22 - Tires and Wheels - Diagnosis and Testing) . For irregular tire wear issues, (Refer to 22 - Tires and Wheels/Tires - Diagnosis and Testing) .

TIRE/VEHICLE LEAD

(Refer to 02 - Front Suspension - Diagnosis and Testing)

TIRE WEAR PATTERNS



Under inflation will cause wear on the shoulders of tire. Over inflation will cause wear at the center of tire.

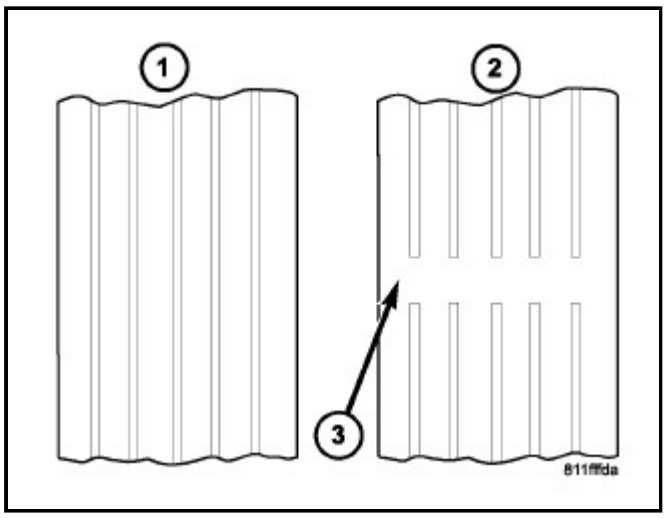
Excessive camber causes the tire to run at an angle to the road. One side of tread is then worn more than the other.

Excessive toe-in or toe-out causes wear on the tread edges and a feathered effect across the tread.

TREAD WEAR INDICATORS

Tread wear indicators are molded into the bottom of the tread grooves. When tread depth is 1.6 mm (1/16 in.), the tread wear indicators will appear as a 13 mm (1/2 in.) band (3).

Tire replacement is necessary when indicators appear in two or more grooves or if localized balding occurs.



TIRE INFLATION PRESSURES

The specified tire pressures have been chosen to provide safe operation, vehicle stability, and a smooth ride. The proper tire pressure specification can be found on the Tire And Loading Information Label provided with the vehicle (usually on the driver's door opening (B-pillar) or rear shutface of driver's door).

A quality air pressure gauge is recommended to check tire air pressure. Tire pressure should be checked cold once per month. Check tire pressure more frequently when the weather temperature varies widely. Tire pressure will decrease when the outdoor temperature drops. After checking the air pressure, replace valve cap finger tight.

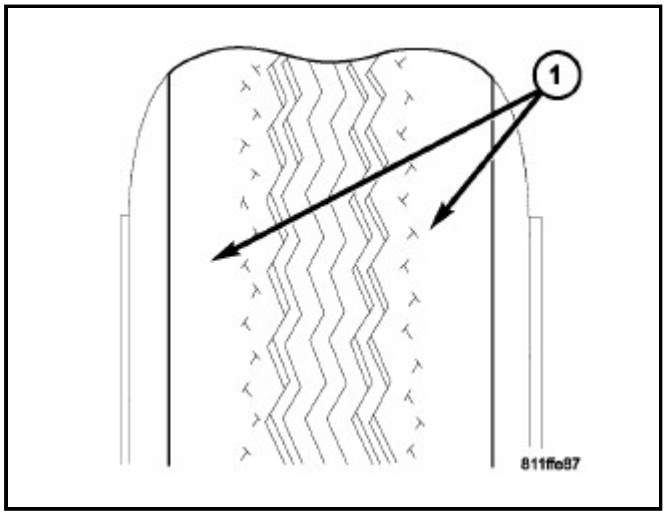
Inflation pressures specified on the Tire Inflation Pressure Label are always the cold inflation pressure of the tire. Cold inflation pressure is obtained after the vehicle has not been operated for at least 3 hours, or the vehicle is driven less than one mile after being inoperative for 3 hours. Tire inflation pressures may increase from 2 to 6 pounds per square inch (psi) during operation. Do not reduce this normal pressure buildup.

Improper inflation can cause:

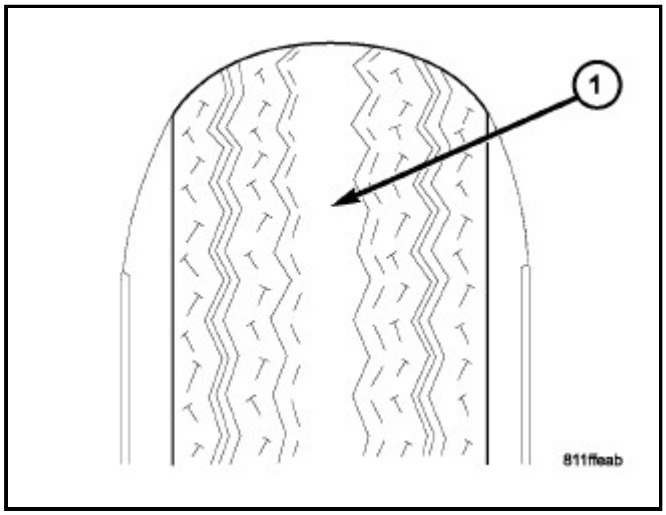
- Uneven wear patterns
- Reduced tread life
- Reduced fuel economy
- Unsatisfactory ride
- The vehicle to drift.

WARNING: Over or Under inflated tires can affect vehicle handling. The tire can fail suddenly, resulting in loss of vehicle control.

Under inflation causes rapid shoulder wear, tire flexing, and can result in tire failure (1).



Over inflation causes rapid center wear and loss of the tire's ability to cushion shocks (1).

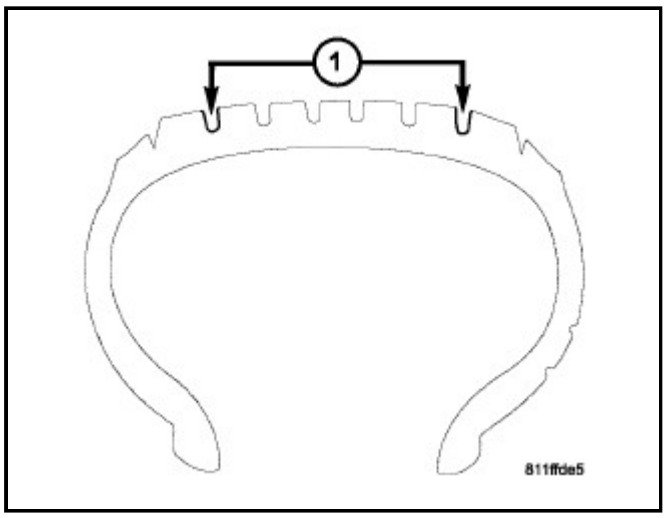


TIRE PRESSURE FOR HIGH SPEED OPERATION

Refer to the vehicle's Owners Manual Package.

TIRE LEAK REPAIRING

For proper repairing, a radial tire must be removed from the wheel. Repairs should only be made if the defect, or puncture, is in the tread area (1). The tire should be replaced if the puncture is located in the sidewall.



Deflate tire completely before attempting to dismount the tire from the wheel. **Use a lubricant such as a mild soap solution when dismounting or mounting tire.** Use tools free of burrs or sharp edges which could damage the tire or wheel rim.

Before mounting tire on wheel, make sure all rust is removed from the rim bead and repaint if necessary.

Install wheel on vehicle, and progressively tighten the five wheel nuts to a torque of 135 N·m (100 ft. lbs.).

TIRE CLEANING

Before delivery of a vehicle, remove the protective coating on the tires with white sidewalls or raised white letters. To remove the protective coating, apply warm water and let it soak for a few minutes. Afterwards, scrub the coating away with a soft bristle brush. Steam cleaning may also be used to remove the coating.

CAUTION: DO NOT use gasoline, mineral oil, oil-based solvent or a wire brush for cleaning.

FASTENER TORQUE

DESCRIPTION	N-m	Ft. Lbs.	In. Lbs.
Spare Tire Winch Mounting Nuts	7	5	62
Spare Tire Winch Mounting Screw	7	5	62

REMOVAL

1. Access and remove the spare tire. Refer to the Owners Manual.
2. Remove the screw and two nuts securing the winch to the body floor pan.
3. Remove the winch from the jack storage compartment carefully extracting the cable and retainer through the access hole.

INSTALLATION

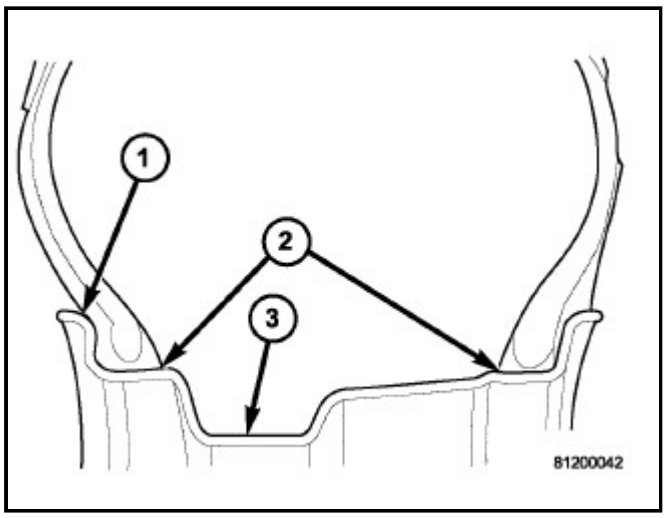
1. Route the winch cable and retainer down through the access hole in the jack storage compartment.
2. Position the spare tire winch on the floor pan, over the mounting studs.
3. Install the screw and two nuts securing the winch to the body floor pan. First, tighten the screw to 7 N·m (62 in. lbs.), then tighten the nuts to 7 N·m (62 in. lbs.).
4. Install the spare tire. Refer to the Owners Manual.

DESCRIPTION

All vehicles use either steel or cast aluminum drop center wheels. The original equipment wheels are designed for proper operation at all loads up to the specified maximum vehicle capacity.

Every wheel has raised sections between the rim flanges (1) and drop well (3) called safety humps (2). In case of air loss, these raised sections help hold the tire in position on the wheel until the vehicle can be brought to a safe stop. When being installed on the wheel, initial inflation of the tire forces the tire bead over these raised sections into place.

The wheel studs and nuts are designed for specific wheel applications and must be replaced with equivalent parts. Do not use replacement parts of lesser quality or of a substitute design. All aluminum and steel wheels have wheel stud nuts with an enlarged nose. This enlarged nose is necessary to ensure proper retention of the wheels.



WHEEL INSPECTION

Inspect wheels for:

- Excessive runout
- Dents, cracks or irregular bends
- Damaged wheel stud (lug) holes
- Air Leaks

NOTE: **Do not attempt to repair a wheel by hammering, heating or welding.**

If a wheel is damaged, an original equipment replacement wheel should be used. When obtaining replacement wheels, they should be equivalent in load carrying capacity. The diameter, width, offset, pilot hole and bolt circle of the wheel should be the same as the original wheel.

WARNING: **Failure to use equivalent replacement wheels may adversely affect the safety and handling of the vehicle.**

WARNING: **Replacement with used wheels is not recommended. The service history of the wheel may have included severe treatment or very high mileage. The rim could fail without warning.**

WARNING: **Chrysler LLC does not recommend that customers use “reconditioned” wheels (wheels that have been damaged and repaired) because they can result in a sudden catastrophic wheel failure which could cause loss of control and result in injury or death. For clarification:**

- **Cosmetic refinishing for the purpose of repairing a superficial flaw is an acceptable procedure providing it is limited to paint or clear coat only, the wheel is not modified in any way, and there is no exposure to paint curing heat over 200 degrees Fahrenheit (93 degrees Celsius).**
- **Damaged wheels are those which have been bent, broken, cracked or sustained some other physical damage which may have compromised the wheel structure.**
- **Repaired indicates that the wheel has been modified through bending, welding, heating, straightening, or material removal to rectify damage.**
- **Re-plating of chrome plated wheels is not an acceptable procedure nor is chrome plating of original equipment painted or polished wheels, as this may alter mechanical properties and affect fatigue life.**

WHEEL AND WHEEL TRIM CARE

All wheels and wheel trim, especially aluminum and chrome plated, should be cleaned regularly using mild soap and water to maintain their luster and to prevent corrosion. Wash them with the same soap solution recommended for the body of the vehicle.

When cleaning extremely dirty wheels, care must be taken in the selection of tire and wheel cleaning chemicals and equipment to prevent damage to the wheels. Mopar® Tire AND Wheel Cleaner, Mopar® Wheel Treatment or Mopar® Chrome Cleaner is recommended. Any of the “DO NOT USE” items listed below can damage wheels and wheel trim.

DO NOT USE:

- Any abrasive cleaner
- Any abrasive cleaning pad (such as steel wool) or abrasive brush
- Any cleaner that contains an acid which can react with and discolor the chrome surface. **Many wheel cleaners contain acids that can harm the wheel surface.**
- Oven cleaner
- A car wash that uses carbide-tipped wheel cleaning brushes or acidic solutions.

SPECIFICATIONS

BASE WHEEL

DESCRIPTION	SPECIFICATION
Wheel Mounting (Lug) Nut Hex Size	19 mm
Wheel Mounting Stud Size	M12 x 1.5 mm

TORQUE

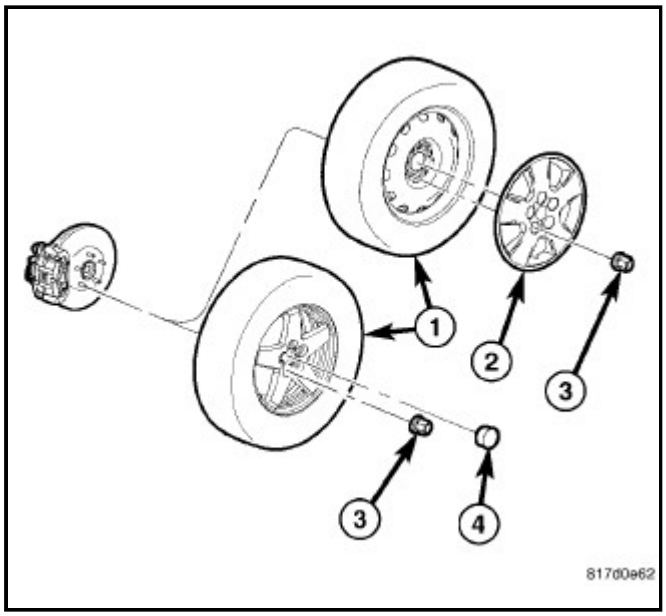
DESCRIPTION	N·m	Ft. Lbs.	In. Lbs.
TPM Sensor Nut	8	—	71
TPM Transponder Mounting Nut	3	—	26
Valve Core	0.5	—	4
Wheel Mounting (Lug) Nut	135	100	—

REMOVAL

1. Raise and support the vehicle so that tire and wheel assembly clears ground level. (Refer to 04 - Vehicle Quick Reference/Hoisting - Standard Procedure)

CAUTION: When removing the bolt-on wheel cover, do not attempt to pry the wheel cover off the wheel. It is held on by the wheel mounting nuts.

2. Remove the five wheel mounting (lug) nuts (3) from the wheel studs. While removing the nuts, hold the wheel cover (2) in place so it doesn't fall off when the last nut is removed.
3. Remove the wheel cover (2) using care not to let the tire and wheel assembly (1) fall off the vehicle.

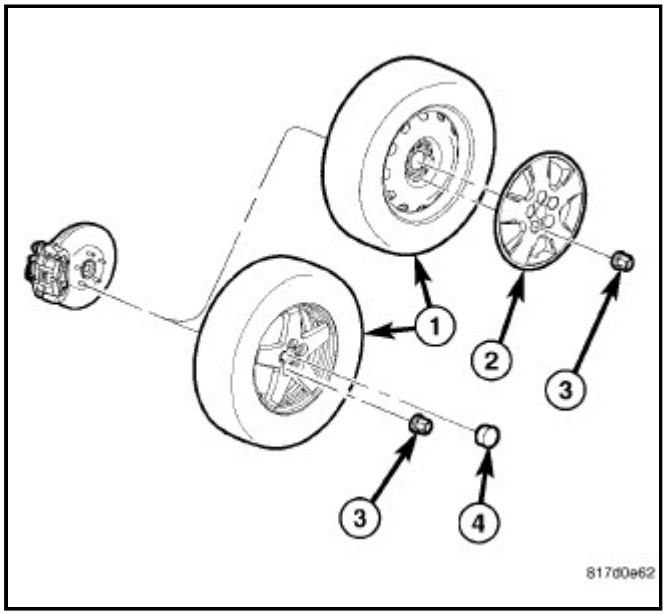


INSTALLATION

WARNING: Installing wheels without good metal-to-metal contact with the mounting surface could cause loosening of the wheel mounting (lug) nuts. This could adversely affect the safety and handling of the vehicle.

NOTE: Never use oil or grease on studs or wheel mounting (lug) nuts.

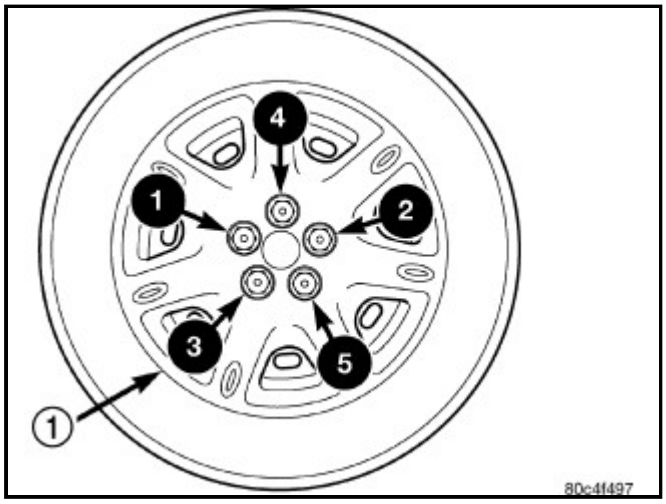
1. With the tire and wheel assembly (1) positioned on the wheel studs without the wheel mounting (lug) nuts installed, align the valve notch in the wheel cover with the valve stem on the wheel and install the wheel cover over the studs.



NOTE: Always use the original (OEM) style wheel mounting (lug) nuts. Do not use replacement parts of lesser quality or substitute design.

2. Install and lightly snug all five wheel mounting (lug) nuts (3) **Do not tighten at this time**.
3. Lower the vehicle.

4. Progressively tighten all wheel mounting (lug) nuts in the proper sequence shown. Tighten the nuts to a final torque of 135 N·m (100 ft. lbs.).



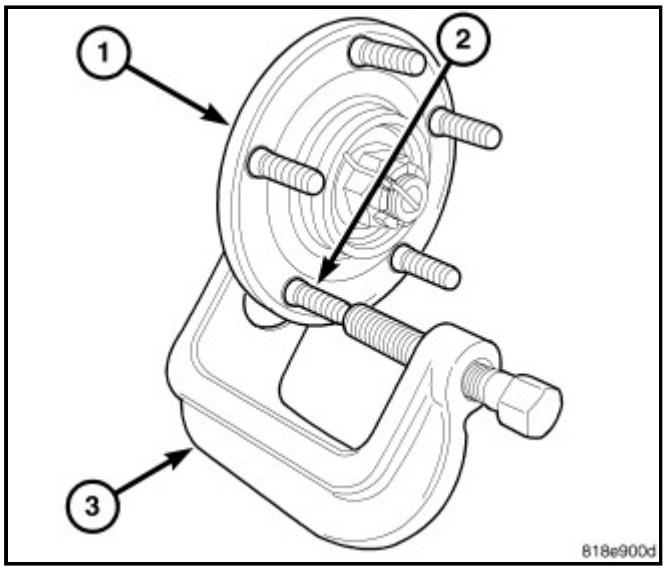
REMOVAL

NOTE: Use the following procedure to remove one of five studs on one wheel hub.

1. Access and remove front brake rotor. (Refer to 05 - Brakes/Hydraulic/Mechanical/ROTOR, Brake - Removal)

CAUTION: Do not hammer wheel mounting studs out of the hub. Damage to the wheel bearing will occur, leading to premature bearing failure.

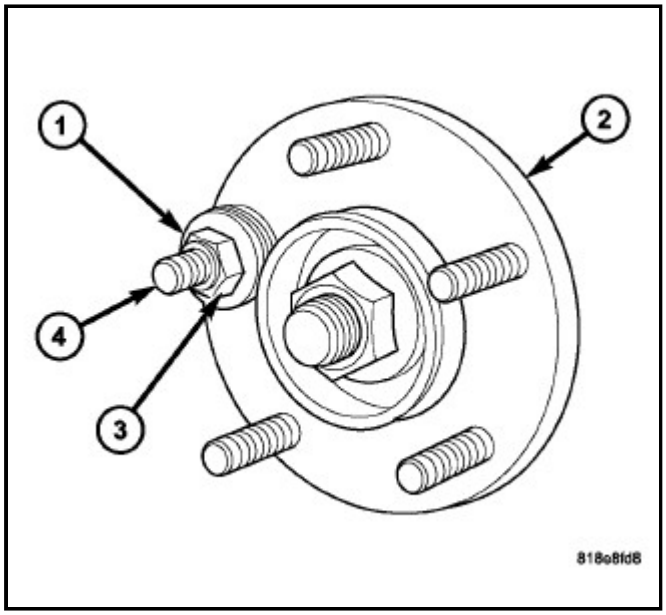
2. Install Remover 8677 (3) on the hub flange (1) and wheel stud (2).
3. Tighten the Remover, pushing the wheel mounting stud out the rear of the hub flange. When the shoulder of the stud is past the flange, remove the Remover from the hub.
4. Remove the stud from the hub flange.



INSTALLATION

NOTE: Use the following procedure to install one of five studs on one wheel hub.

1. Install the NEW wheel mounting stud in the flange of the hub (2) from the rear.
2. Install several washers (1) and a standard wheel mounting (lug) nut (3) on the stud (4). Install the mounting nut so that the flat side of the nut is against the washers to eliminate any binding.
3. Tighten the wheel mounting nut. This will pull the wheel mounting stud into the hub flange. When the head of the stud is fully seated against the rear of the hub flange, remove the wheel mounting nut and washers.



4. Install the brake rotor and all components previously removed to access it. (Refer to 05 - Brakes/Hydraulic/Mechanical/ROTOR, Brake - Installation)

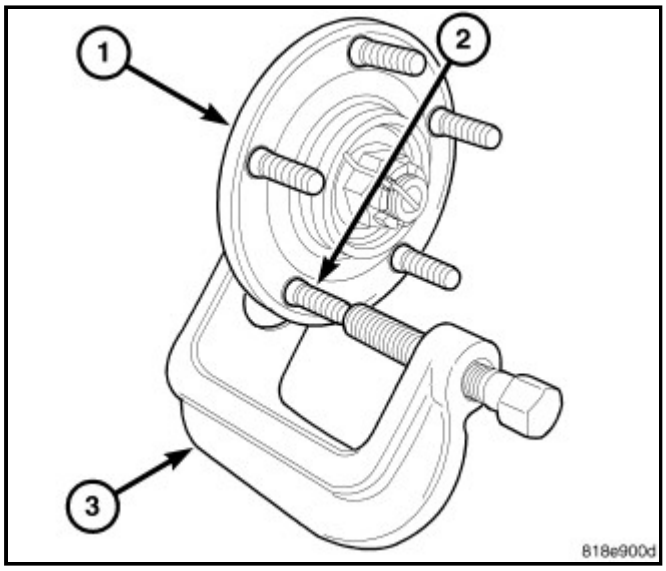
REMOVAL

NOTE: Use the following procedure to remove one of five studs on one wheel hub.

1. Access and remove rear brake rotor. (Refer to 05 - Brakes/Hydraulic/Mechanical/ROTOR, Brake - Removal)

CAUTION: Do not hammer wheel mounting studs out of the hub. Damage to the wheel bearing will occur, leading to premature bearing failure.

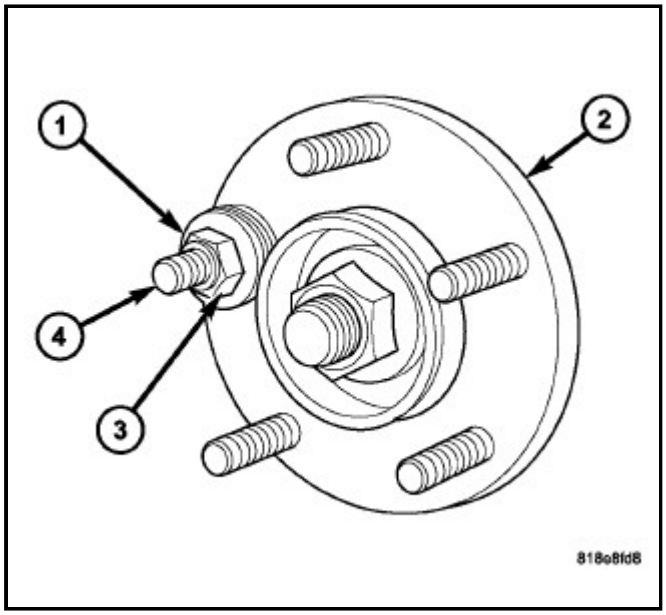
2. Install Remover (3), Special Tool 8677, on the hub flange (1) and wheel stud (2).
3. Tighten the Remover, pushing the wheel mounting stud out the rear of the hub flange. When the shoulder of the stud is past the flange, remove the Remover from the hub.
4. Remove the stud from the hub flange.



INSTALLATION

NOTE: Use the following procedure to install one of five studs on one wheel hub.

1. Install the NEW wheel mounting stud in the flange of the hub (2) from the rear.
2. Install several washers (1) and a standard wheel mounting (lug) nut (3) on the stud (4). Install the mounting nut so that the flat side of the nut is against the washers to eliminate any binding.
3. Tighten the wheel mounting nut. This will pull the wheel mounting stud into the hub flange. When the head of the stud is fully seated against the rear of the hub flange, remove the wheel mounting nut and washers.



4. Install the brake rotor and all components previously removed to access it. (Refer to 05 - Brakes/Hydraulic/Mechanical/ROTOR, Brake - Installation)