Component Procedures: Drive/Propeller Shaft

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Driveline Working Angles Adjustment (Article 12663)

- Vehicle trim heights are within specification guidelines.
- The vehicle exhibits no signs of aftermarket modifications that may affect driveline working angles.
- The vehicle exhibits no signs of accident damage which may affect the position of the drive axle , or axles, the propeller shaft support bearing, if equipped, or the transmission or transfer case , if equipped.

Drive axle wind-up may cause a launch shudder condition even when all of the driveline working angles are within specifications. Drive axle wind-up occurs when heavy torque during acceleration causes the pinion nose to pivot upward. Excessively worn or damaged axle mounting components and/or overloading or unevenly loading the vehicle may contribute to a launch shudder condition.

- For solid axles equipped with a leaf spring suspension, inspect the leaf springs, mount bushings, and mounting hardware for excessive wear or damage.
- For solid axles equipped with a non-leaf spring suspension, inspect the suspension links and link mounts and/or bushings for excessive wear or damage.
- For direct-mount axles, inspect any axle mount brackets for damage and inspect the axle mounts and/or bushings for excessive wear or damage.
- Inspect the structure to which the suspension attaches to ensure no deformities or damage exists.
- Inspect the propeller shaft support bearing assembly for damaged rubber components, worn bearings, and/or a deformed/cracked bracket.
- Inspect the propeller shaft support bearing assembly and mounting bracket, if equipped, for loose or missing shims. Reinstall correctly or replace any shims as necessary to ensure proper alignment of the support bearing assembly.
- Inspect the structure to which the support bearing assembly attaches to ensure no deformities or damage exists.
- Inspect any transmission or transfer case mount bracket or brackets for damage and inspect the mount or mounts for excessive wear, damage, and/or deformities.
- Inspect the structure to which the transmission or transfer case attaches to ensure no deformities or damage exists.
- Repair or replace parts as indicated by the inspections.
- If excessively worn or damaged parts were repaired or replaced, re-measure the driveline working angles and road test the vehicle to ensure proper operation of the driveline system.

Parts and Labor (itype_189)

Parts

Qualifier	Part #	Name	Price	Note
Rear Axle > Drive Shaft > Ma?	92244724	Drive Shaft	561.54	
Rear Axle > Drive Shaft > Au?	92237000	Drive Shaft	0.00	

Labor

Operation	Qualifier Path	Skill	Std Hrs	Wty Hrs
Remove & Replace	Rear Axle > Propeller Shaft > Drive Shaft, R&R	B	1.3	1.1

Propeller Shaft (Article 10796)

The propeller shaft is a two piece tube supported by a sealed for life centre bearing and non-servicable universal joint. It has a rubber coupling at each end joining the propeller shaft to the transmission and the differential . All propeller shafts are fixed to the rubber couplings by 3 bolts and 3 torque prevailing nuts which are discarded when removed. Torque prevailing nuts have a low friction coating to ensure no damage to the coupling when assembled, correct nuts must be used. The rubber couplings are then mounted to the differential with 3 bolts and the transmission with 3 bolts and 3 torque prevailing nuts which are also discarded when removed. The centre bearing assembly is fixed to the body with 2 bolts. The two-piece propeller shaft is used to transmit power from the transmission to the differential. The centre bearing and rubber couplings are used to support and connect the propeller shaft and decrease vibration, noise and harshness.

Driveline System Balance Adjustment (Article 12662)

Special Tools
- CH-51450-NVH - Oscilloscope Diagnostic Kit (w/NVH) or

- EL-38792-A - Electronic Vibration Analyzer (EVA) 2
- EL-38792-20 - 20-Foot Timing Light Power Cord Extension
- EL-38792-25 - Inductive Pickup Timing Light, or equivalent
- EL-38792-27 - 6-Foot EVA Power Cord Extension

For equivalent regional tools, refer to Special Tools and Equipment .

This procedure is designed to fine-tune the balance of a propeller shaft while it is mounted in the vehicle. Small amounts of residual imbalance which could be present in other related driveline system components could be compensated for as a result of performing this procedure. The end result of properly fine-tuning a propeller shaft balance may be either a significant reduction or an elimination of a vibration disturbance that is related to the first-order rotation of a propeller shaft.

Fine-tuning the balance of a propeller shaft can aid in achieving a more balanced total driveline system.

If the CH-51450-NVH - Oscilloscope Diagnostic Kit (w/NVH) is available, use the following procedure, Adjustment Procedure Using Oscilloscope. If the Oscilloscope is not available but the EVA 2 is available, use the second procedure, Adjustment Procedure Using EVA. If neither the Oscilloscope nor the EVA 2 is available, use the third procedure, Adjustment Procedure Without Oscilloscope or EVA.

Adjustment Procedure Using Oscilloscope

The balance procedure is integrated into the CH-51450-NVH - Oscilloscope Diagnostic Kit (w/NVH) in its Driveline Balancing utility. There are two methods for balancing:

- Hose Clamp Method
- Pinion Flange Method (vehicles with rubber couplers on the propeller shaft)

The following is an overview of the two driveline balancing methods.

Hose Clamp Method

- Raise and support the vehicle; ensure that the drive axle or axles are supported at ride height – vehicle body supported by suspension components. Lifting and Jacking the Vehicle
- Connect the Oscilloscope to the USB port of the computer using the blue USB cable, CH-51450-M1106.
- Connect the Accelerometer CH-51450-TA183 to the NVH Interface CH-51450-TA148.
- Connect the NVH Interface to Channel B of the Oscilloscope using the CH-51450-TA098 BNC to BNC cable.
- Mount the Accelerometer (1) to a suitable surface on the vehicle differential . If the differential case is non-ferrous, a steel washer can be glued on the differential case in order to secure the magnetic Accelerometer. Click for full-size image
- Connect the Optical Sensor CH-51450-TA186 (1) to the Optical Sensor Interface CH-51450-TA185 (2). Click for full-size image
- Connect the Optical Sensor Interface to Channel D of the Oscilloscope using the CH-51450-TA098 BNC to BNB cable.
- Mount the Magnetic Mounting Fixture CH-51450-TA187 (1) to a suitable surface on the vehicle underbody. Click for full-size image
- Place a ½ inch strip of reflective tape to the propeller shaft.
- Focus the laser (2) on the reflective tape.
- Install 2 hose clamps side by side to the propeller shaft near the differential, on an area clear of any factory balance weights.
- Mark the excess band on the hose clamps.
- Remove the hose clamps and trim the excess from the hose clamp bands.
- Enter the weight of the hose clamp, in grams, into the balancing software.
- To determine the weight of the hose clamp, use the following:
- Cut the screw body off of the clamp, even with end of the screw.
- Weigh the screw body on a gram scale (14 g is typical).
- Measure the circumference of the propeller shaft near the hose clamps using the supplied ruler and enter that figure, in millimeters, into the balancing software.
- Alternatively, enter the diameter, in millimeters, of the propeller shaft into the balancing software.
- Before beginning the test, inspect for the following:
- The vehicle is properly supported. Lifting and Jacking the Vehicle
- Remove any rocks or debris embedded in the tire treads.
- Secure all test leads clear of rotating components.
- Disable the ABS and traction control, if equipped.
- Turn OFF the A/C, and any other accessories.
- Determine a suitable propeller shaft speed.
- Start the engine.
- Place the transmission in the highest forward gear.
- Run the engine to highway speed, typically 104-112 km/h (65-70 mph).
- When the RPM can be held stable for longer than 3 seconds, the balancing software will capture and enter the

propeller shaft speed.
- Alternatively, click the Edit Manually check box and enter the desired propeller shaft speed.
- Place the transmission in NEUTRAL.
- Turn OFF the engine.
- Begin the propeller shaft balancing.
Initial Run
- Place the first clamp on the propeller shaft near the differential.
- Clearly mark the location of the clamp as reference for all remaining measurements.
- Label the mark (1) as 0 mm.
- Measure the distance specified by the software and place the second clamp next to the first clamp.
- Press the green Initial Run button to start the test.
- Accelerate the engine until the required speed is reached.
- The RPM graph will highlight green when the RPM is within the specified range, and data will only be gathered while within this range.
- When the Complete % bar graph is filled, place the transmission in NEUTRAL and turn OFF the engine.
- Perform the first calibration run.
Calibration Run 1
- Place both hose clamps at the 0 mm label.
- Press the green Calibration Run 1 button.
- Perform the second calibration run.
Calibration Run 2
- Measuring in the direction of forward propeller shaft rotation, mark the point as indicated on the balancing software.
- Place both hose clamps at this mark.
- Press the green Calibration Run 2 button.
- Perform the third calibration run.
Calibration Run 3
- Measuring from the 0 mm mark in the direction of forward propeller shaft rotation, mark the point as indicated on the balancing software.
- Press the green Calibration Run 3 button.
- Perform the final propeller shaft balancing.
Final Balance
- Measure and mark the locations as indicated on the balancing software.
- Place the hose clamps at these locations.
- Press the green Verification button.
- The software will display the final imbalance.
- If the imbalance exceeds the minimum requirement, the software will recommend removing the rear tire and wheel assemblies and, after securing the brake rotors or brake drums, restarting the test.
Pinion Flange Method
- Mount the Accelerometer (1) to a suitable surface near the front of the differential. If the surface is non-ferrous, a steel washer can be glued to the surface in order to secure the magnetic Accelerometer. Click for full-size image
- Connect the NVH Interface to Channel D of the Oscilloscope using the CH-51450-TA098 BNC to BNC cable.
- Focus the laser on the reflective tape.
- Enter the diameter, in millimeters, of the pinion flange into the balancing software. Driveline Component Specifications
- Alternatively, measure the circumference of the pinion flange bolt circle and enter that figure, in millimeters, into the balancing software.
- Enter the number of pinion flange bolts into the balancing software. Click for full-size image
- Number the pinion flange bolts and/or studs (1) in the direction of propeller shaft rotation.
- Begin balancing the propeller shaft.
- Press the green Initial Run button to start the test. An initial measurement of the propeller shaft will be taken.
- Place 4.5 g of weight at location 1 by stacking 3 of the balancing weights (1.5 g each). The weights may be affixed to the front or the rear of the pinion flange.
- Remove the balancing weights from location 1.
- Install the balancing weights at location 3.
- Remove the balancing weights from location 3.
- Install the balancing weights at location 5.
- Remove the balancing weights from location 5.

- Install the balancing washers to the location(s) indicated by the balancing software.
- When the Complete % bar graph is filled, place the transmission in NEUTRAL and turn OFF the engine..
- If the imbalance exceeds the minimum requirement, the software will recommend removing the rear tire and wheel assemblies and, after securing the brake rotors or brake drums, and restarting the test.
- If the test is to be restarted, remove all of the balancing weights.
- The test can then be restarted by either of the following methods:
- Press the Initial Run button to restart the test.
- Press the Balancing button to enter the test through the setup wizard.

Adjustment Procedure Using EVA

- With the tire and wheel assemblies, and the brake rotors and/or brake drums removed from the drive axle, or axles, start the engine and turn OFF all engine accessories.
- Place the transmission in forward gear.
- Run the vehicle at the speed which causes the most vibration in the propeller shaft; observe which end of the propeller shaft exhibits the greatest amount of vibration disturbance.
- Turn the engine OFF to slow and stop the rotation of the propeller shaft.
- Mark the circumference of the propeller shaft (1) to be balanced at four points 90 degrees apart (2), nearest the end that exhibited the greatest amount of vibration. Number the marks 1–4. Click for full-size image
- Install the EL-38792-A - EVA 2 , the EL-38792-27 - 6-foot EVA power cord extension , the EL-38792-25 - inductive pickup timing light , or equivalent, and the EL-38792-20 - 20-foot extension to the vehicle.
- Connect the clip of the EL-38792-25 - inductive pickup timing light , or equivalent, onto the trigger wire of the EL-38792-A - EVA 2 .
- Mount the EL-38792-A - EVA 2 vibration sensor to the bottom of the driveline component nearest to the end of the propeller shaft that exhibited the greatest amount of vibration. Ensure that the side of the sensor marked UP faces upward and that the sensor is positioned as close to horizontal as possible.
- Plug the vibration sensor cord into Input A of the EL-38792-A - EVA 2 . Input B is not used with the strobe function.
- Run the vehicle at the speed which causes the most vibration in the propeller shaft; observe the frequency readings displayed on the EL-38792-A - EVA 2 .
- Verify that the dominant frequency displayed on the EL-38792-A - EVA 2 matches the recorded frequency of the vibration concern.
- Record the amplitude reading of the dominant frequency displayed.
- Using the strobe function of the EL-38792-A - EVA 2 , select the correct filter range to use for the balance adjustment, so that the dominant frequency would be near the middle of the filter range. Use the full range filter only as a last resort if one of the specific range filters will not cover the frequency adequately.
- The EL-38792-A - EVA 2 display will show the dominant frequency, the amplitude and the selected filter range.
- Aim the EL-38792-25 - inductive pickup timing light , or equivalent, at the marks placed on the propeller shaft. When activated, the strobe effect will appear to freeze the marks placed on the rotating propeller shaft. Record which of the numbered marks appears to be at the bottom of the propeller shaft, or the 6 o'clock position. This position identifies the light spot of the propeller shaft.
- Install a band-type hose clamp as a weight, with the head of the clamp directly on the light spot.
- Run the vehicle at the speed which causes the most vibration in the propeller shaft.
- Using the EL-38792-25 - inductive pickup timing light , or equivalent, observe the positioning of the marks placed on the propeller shaft.
- If the marks on the propeller shaft now appear to move erratically, compare the current amplitude of the vibration frequency to the original amplitude recorded previously. If the amplitude has decreased from the amplitude recorded, the balance achieved may be sufficient and the vehicle should be road tested to determine the effect on the vibration concern.
- If the clamp head over the original light spot, is now near the top of the propeller shaft, within 180 degrees – near or below the 12 o'clock position – of the original position at the bottom of the propeller shaft – 6 o'clock position – the position of the weight needs adjusting. Perform the following steps:
- Move the position of the clamp head toward the 6 o'clock position.
- Using the EL-38792-25 - inductive pickup timing light , or equivalent, recheck the positioning of the propeller shaft marks.
- If necessary, continue to move the position of the clamp head toward the 6 o'clock position and recheck progress until an improvement in balance is achieved.
- If the clamp head over the original light spot, is still positioned at the bottom of the propeller shaft – 6 o'clock position – additional weight is required. Perform the following steps: Click for full-size image
- Add a second clamp to the propeller shaft, next to the first clamp and with the clamp heads aligned.

- If the clamp heads over the original light spot, are now 90–180 degrees – at or above the 9 o'clock or the 3 o'clock positions – from the original position at the bottom of the propeller shaft – 6 o'clock position (1) – less total weight is required. Proceed to step 23.4.
- Move the position of the clamp heads an equal distance on either side of the light spot between 1 and 120 degrees apart from each other to reduce the total amount of weight in relation to the light spot.
- If necessary, continue to move the position of the clamp heads an equal distance on either side of the light spot to a maximum of 120 degrees apart from each other, until the greatest improvement to balance is achieved.
- If improvement has been made to the balance of the propeller shaft, but the balance is still not satisfactory, still more total weight may be required. Perform the following steps:
- Add a third clamp to the propeller shaft, next to the first and second clamps and with the clamp head directly (2) on the light spot.
- Move the position of the first and second clamp heads an equal distance on either side of the light spot between 1 and 120 degrees apart from each other to arrive at a total amount of weight greater than two weights, but less than three weights in relation to the light spot.
- If necessary, continue to move the position of the first and second clamp heads an equal distance on either side of the light spot to a maximum of 120 degrees apart from each other, until the greatest improvement to balance is achieved.
- If a third clamp was used on the propeller shaft and sufficient balance could still not be achieved, the propeller shaft requires replacement.
- If the clamp head over the original light spot is now 90–180 degrees – at or above the 9 o'clock or the 3 o'clock positions – from the original position at the bottom of the propeller shaft – 6 o'clock position – less total weight is required. Perform the following steps:
- Move the position of the clamp heads an equal distance on either side of the light spot between 120 and 180 degrees apart from each other to reduce the total amount of weight in relation to the light spot.
- If necessary, continue to move the position of the clamp heads an equal distance on either side of the light spot to a maximum of 180 degrees apart from each other, but not less than 120 degrees apart, until the greatest improvement to balance is achieved.

Adjustment Procedure Without Oscilloscope or EVA

- Raise and support the vehicle; ensure that the drive axle, or axles are supported at ride height – vehicle body supported by suspension components.
- With the tire and wheel assemblies, and the brake rotors and/or brake drums removed from the drive axle or axles, start the engine and turn OFF all engine accessories.
- Carefully hold a piece of chalk up to the end of the propeller shaft in order to just make contact as the shaft rotates.
- Observe the location of the chalk mark on the propeller shaft.
- If the chalk mark circles the entire propeller shaft after the first attempt, remove the mark from the shaft and repeat steps 2 through 7; touch the chalk more gently to the propeller shaft.
- If the chalk mark circles the entire propeller shaft after the second attempt, runout of the propeller shaft may not be the cause of the disturbance. Proceed to step 16.
- If the chalk mark is only on a small portion of the propeller shaft, the mark identifies the heavy spot of the propeller shaft. The heavy spot of the propeller shaft will deflect downward during rotation. Place a small mark on the shaft 180 degrees, directly opposite the heavy spot, and identify the mark as the light spot. Proceed to step 8.
- Install a band-type hose clamp to the propeller shaft as a weight, with the head of the clamp directly on the light spot, or 180 degrees, directly opposite the heavy spot.
- Observe the amount of disturbance to the propeller shaft.
- If the amount of disturbance to the propeller shaft appears to be significantly reduced, the balance achieved may be sufficient and the vehicle should be road tested to determine the effect on the vibration concern. The head of the clamp can be moved very slightly, if necessary to refine the balance achieved.
- If the amount of disturbance to the propeller shaft appears to be almost unchanged or even increased, proceed to step 10.
- If the amount of disturbance to the propeller shaft appears to be significantly reduced, the balance achieved may be sufficient and the vehicle should be road tested to determine the effect on the vibration concern. The head of the clamps can be moved very slightly an equal distance apart on either side of the light spot, or moved slightly while still aligned, if necessary to refine the balance achieved.
- If the amount of disturbance to the propeller shaft appears to be almost unchanged or even increased, proceed to step 12.
- If the amount of disturbance to the propeller shaft appears to be significantly reduced, the balance achieved may be sufficient and the vehicle should be road tested to determine the effect on the vibration concern. If necessary, continue to move the position of the clamp heads an equal distance on either side of

the light spot to a maximum of 120 degrees apart from each other, until the greatest amount of reduction in the vibration disturbance is achieved.
- If the amount of disturbance to the propeller shaft appears to be almost unchanged or even increased, proceed to step 14.
- Add a third clamp to the propeller shaft, next to the first and second clamps and with the head of the clamp directly on the light spot.
- If the amount of disturbance to the propeller shaft appears to be significantly reduced, the balance achieved may be sufficient and the vehicle should be road tested to determine the effect on the vibration concern. If necessary, continue to move the position of the first and second clamp heads an equal distance on either side of the light spot to a maximum of 120 degrees apart from each other, until the greatest amount of reduction in the vibration disturbance is achieved.
- If the amount of disturbance to the propeller shaft appears to be almost unchanged or even increased after a third clamp was used on the propeller shaft, the propeller shaft likely requires replacement.
- If the heavy spot of the propeller shaft could not be identified, install a band-type hose clamp to the propeller shaft as a weight, with the head of the clamp directly in-line with an existing factory-installed weight.
- If the amount of disturbance to the propeller shaft appears to be almost unchanged or even increased, proceed to step 18.
- Move the head of the clamp 180 degrees, directly opposite the factory-installed weight.
- If the amount of disturbance to the propeller shaft appears to be almost unchanged or even increased, the propeller shaft may require replacement.

Propeller Shaft Phasing Correction (Article 12664)

One Piece Propeller Shaft Phasing Correction
An out of phase single-piece propeller shaft is very unusual. If the phasing inspection procedure revealed that prop shaft is not phased correctly, the welded yokes are in the wrong position, or the shaft is damaged due to twisting and the propeller shaft requires replacement to restore proper cancellation of the U-joints.
Multiple-Piece Propeller Shaft Phasing Correction
- If the phasing inspection procedure revealed that a prop shaft is not phased correctly to the mating slip yoke , the end yoke is welded on in the wrong position, the slip yoke is mis-aligned to the stub shaft, or the shaft is damaged due to twisting.
- If the shaft if visibly damaged, it requires replacement.
- If the shaft exhibits no visual physical defects or damage, perform the following:
- Remove the slip yoke from the stub shaft to determine if it is possible to reinstall the slip yoke in a different position on the stub shaft.
- If the stub shaft is keyed to ensure proper alignment of the stub shaft and the slip yoke, then the propeller shafts require replacement to restore proper cancellation of the U-joints.
- If the stub shaft is not keyed, attempt to re-align the front shaft and slip yoke to each other. Repeat the inspection procedure to confirm the results.
- If proper phasing cannot be obtained, the propeller shaft requires replacement to restore proper cancellation of the U-joints.

Two-Piece Propeller Shaft Replacement (Article 10809)

Removal Procedure
- Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
- Remove the exhaust heat shield. Refer to Exhaust Muffler Intermediate Heat Shield Replacement .
- Reference the rear propeller shaft couple to the rear drive flange (1) by placing a reference line from the coupler to the flange to maintain assembly balance. Click for full-size image
- Reference the front propeller shaft couple to the transmission output flange (1) by placing a reference line from the coupler to the flange to maintain assembly balance. Click for full-size image
- Remove the bolts (2) and nuts (1) from the propeller shaft to the transmission output flange. Click for full-size image
- Support the propeller shaft with a set of suitable jack stand.
- Remove and discard the bolts (1) from the propeller shaft to the drive pinion flange. Click for full-size image
- Remove the propeller shaft support bearing bolts (1). Click for full-size image
- Remove the propeller shaft (1) from the vehicle. Click for full-size image
Installation Procedure
- Install NEW the propeller shaft coupler nuts (1) and tighten to 91 Nm (67 lb ft). Click for full-size image

- Apply a small amount of clean lubricant on the pilot shaft on the transmission drive flange and the differential drive flange.
- Align the reference marks (1) on the propeller shaft and the transmission drive flange. Click for full-size image
- Install the propeller shaft (1) to transmission drive flange.
- Install the propeller shaft bolts (2). Click for full-size image
- Install the NEW propeller shaft nuts (1) and tighten bolts to 97 Nm (72 lb ft).
- Align the reference marks (1) on the propeller shaft to the rear differential drive flange. Click for full-size image
- Install the NEW propeller shaft bolts (1) to the rear differential drive flange to tighten to 115 Nm (85 lb ft). Click for full-size image
- Install the center support bearing bolts (1) and tighten to 22 Nm (16 lb ft). Click for full-size image
- Install the exhaust heat shield. Refer to Exhaust Muffler Intermediate Heat Shield Replacement .
- Remove the support and lower the vehicle.

Two-Piece Propeller Shaft Replacement (Article 10810)

Removal Procedure
- Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
- Remove the exhaust heat shield. Refer to Exhaust Muffler Intermediate Heat Shield Replacement .
- Reference the rear propeller shaft couple to the rear drive flange (1) by placing a reference line from the coupler to the flange to maintain assembly balance. Click for full-size image
- Reference the front propeller shaft couple to the transmission output flange (1) by placing a reference line from the coupler to the flange to maintain assembly balance. Click for full-size image
- Remove the bolts (2) and nuts (1) from the propeller shaft to the transmission output flange. Click for full-size image
- Support the propeller shaft with a set of suitable jack stand.
- Remove and discard the bolts (1) from the propeller shaft to the drive pinion flange. Click for full-size image
- Remove the propeller shaft support bearing bolts (1). Click for full-size image
- Remove the propeller shaft (1) from the vehicle. Click for full-size image

Installation Procedure
- Apply a small amount of clean lubricant on the pilot shaft on the transmission drive flange and the differential drive flange.
- Align the reference marks (1) on the propeller shaft and the transmission drive flange. Click for full-size image
- Install the propeller shaft (1) to transmission drive flange.
- Install the propeller shaft bolts (2). Click for full-size image
- Install the NEW propeller shaft nuts (1) and tighten the bolts (2) to 135 Nm (100 lb ft).
- Align the reference marks (1) on the propeller shaft to the rear differential drive flange. Click for full-size image
- Install the NEW propeller shaft bolts (1) to the rear differential drive flange to tighten to 160 Nm (118 lb ft). Click for full-size image
- Install the center support bearing bolts (1) and tighten to 22 Nm (16 lb ft). Click for full-size image
- Install the exhaust heat shield. Refer to Exhaust Muffler Intermediate Heat Shield Replacement .
- Remove the support and lower the vehicle.

Two-Piece Propeller Shaft Replacement (250 MM Axle) (Article 10811)

Removal Procedure
- Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
- Remove the exhaust heat shield. Refer to Exhaust Muffler Intermediate Heat Shield Replacement .
- Reference the rear propeller shaft couple to the rear drive flange (1). Click for full-size image
- Reference the front propeller shaft couple to the transmission output flange (1). Click for full-size image
- Remove the bolts (2) and nuts (1) from the propeller shaft to the transmission output flange. Click for full-size image
- Support the propeller shaft with a suitable jack stand.
- Remove and discard the bolts (1) from the propeller shaft to the drive pinion flange. Click for full-size image
- Remove the propeller shaft support bearing bolts (1). Click for full-size image
- Remove the propeller shaft (1) from the vehicle. Click for full-size image

Installation Procedure
- Apply a small amount of clean lubricant on the pilot shaft on the transmission drive flange and the differential drive flange.
- Align the reference marks (1) on the propeller shaft and the transmission drive flange. Click for full-size image
- Install the propeller shaft (1) to transmission drive flange.
- Install the propeller shaft bolts (2). Click for full-size image
- Install the NEW propeller shaft nuts (1) and tighten the bolts (2) to 135 Nm (100 lb ft).
- Align the reference marks (1) on the propeller shaft to the rear differential drive flange. Click for full-size image
- Install the NEW propeller shaft bolts (1) to the rear differential drive flange to tighten to 160 Nm (118 lb ft). Click for full-size image
- Install the center support bearing bolts (1) and tighten to 22 Nm (16 lb ft). Click for full-size image
- Remove the support and lower the vehicle.

Front Propeller Shaft Coupling Replacement (Article 10804)

Callout Component Name
Preliminary Procedure Remove the two-piece propeller shaft . Two-Piece Propeller Shaft Replacement
Preliminary Procedure
- Remove the two-piece propeller shaft . Two-Piece Propeller Shaft Replacement
1 Propeller Shaft Coupling Nut (3x) Caution: Refer to Fastener Caution . Tighten 91 Nm (67 lb ft)
91 Nm (67 lb ft)
2 Propeller Shaft Coupling Washer (3x)
3 Propeller Shaft Coupling Procedure Perform the Driveline System Balance Adjustment procedure. Driveline System Balance Adjustment
4 Propeller Shaft Coupling Bolt (3x)

Rear Propeller Shaft Coupling Replacement (Article 10808)

Callout Component Name
Preliminary Procedure Remove the two-piece propeller shaft . Two-Piece Propeller Shaft Replacement
Preliminary Procedure
- Remove the two-piece propeller shaft . Two-Piece Propeller Shaft Replacement
1 Propeller Shaft Nut (3x) Caution: Refer to Fastener Caution . Tighten 91 Nm (67 lb ft)
91 Nm (67 lb ft)
2 Propeller Shaft Washer (3x)
3 Propeller Shaft Rear Coupling Procedure Perform the Driveline System Balance Adjustment procedure. Driveline System Balance Adjustment
4 Propeller Shaft Bolt (3x)

Propeller Shaft - Fastener Specifications (Article 10813)

Application Specification
Metric English
Propeller Shaft Center Bearing Bolts 22 Nm 16 lb ft
Propeller Shaft Nuts to Couplings (195/218 mm Axles) 91 Nm 67 lb ft
Propeller Shaft Bolts to Differential Drive Flange (195/218 mm Axles) 115 Nm 85 lb ft
Propeller Shaft Bolts to Differential Drive Flange (250 mm Axle) 160 Nm 118 lb ft
Propeller Shaft Nuts to Transmission Output Flange (195/218 mm Axles) 97 Nm 72 lb ft
Propeller Shaft Nuts to Transmission Output Flange (250 mm Axle) 135 Nm 100 lb ft

Propeller Shaft Runout Specifications (Article 12673)

Application Front Runout Center Runout Rear Runout Stub Shaft Runout
Metric English Metric English Metric English Metric English
1 Piece Propeller Shaft – Guideline 0.75 mm 0.030 in 0.75 mm 0.030 in 0.75 mm 0.030 in — —
1 Piece Aluminum Graphite Propeller Shaft – Guideline 0.75 mm 0.030 in — — 0.75 mm 0.030 in — —
2 Piece System Front Propeller Shaft with Slip Yoke – Guideline 0.75 mm 0.030 in 0.75 mm 0.030 in 0.75 mm 0.030 in — —
2 Piece System Front Propeller Shaft with Stub Shaft – Guideline 0.75 mm 0.030 in 0.75 mm 0.030 in — — 0.13 mm 0.005 in
2 Piece System Rear Propeller Shaft with Slip Yoke – Guideline 0.75 mm 0.030 in 0.75 mm 0.030 in 0.75 mm 0.030

in — —
2 Piece System Rear Propeller Shaft with Stub Shaft – Guideline — — 0.75 mm 0.030 in 0.75 mm 0.030 in 0.13 mm 0.005 in
These guidelines apply only to propeller systems with 2 or 3 U-joints.

Driveline Runout Specifications (Article 12672)

Application Specification
Metric English
Differential Pinion Input Shaft or Flange Pilot 0.05 mm 0.002 in
Differential Input Flange 0.20 mm 0.008 in
Transmission or Transfer Case Output Flange 0.20 mm 0.008 in
These guidelines apply only to propeller shaft systems with a constant velocity (CV) joint, or bolt-on U-joint yoke.

All Technical Service Bulletins (itype_100)

Tsbs
- Clunk Noise After Shifting From Reverse To Drive Or Drive To Reverse And Then Accelerating (PIP4554M, 2016/05/04)

Symptoms - Propeller Shaft (Article 10802)

Before beginning diagnosis, review the system Description and Operation in order to familiarise yourself with the system function. Refer to Propeller Shaft Description and Operation .
Classifying the Symptom
Propeller Shaft symptoms can usually be classified into the following categories:
- Noises.
- Vibrations.

Visual/Physical Inspection
- Inspect the system for aftermarket devices which could affect the operation of the propeller shaft.
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Symptom List
Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:
- Universal Joint Noise .
- Ping, Snap, or Click Noise .
- Knock or Clunk Noise .
- Scraping Noise .
- Squeak Noise .

Universal Joint Noise (Article 10803)

Problem Action
One or more of the universal joints are worn or damaged. Replace the propeller shaft assembly. Refer to Two-Piece Propeller Shaft Replacement .
One or more of the universal joints have lost lubricant. Replace the propeller shaft assembly. Refer to Two-Piece Propeller Shaft Replacement .
Rubber coupling bolts loose at transmission or axle flange . Tighten the bolts to specifications. Refer to Fastener Specifications .
Rubber couple are excessively worn or damaged transmission or rear drive axle flange. Replace the propeller shaft assembly. Refer to Two-Piece Propeller Shaft Replacement .
Bolts loose at propeller shaft flange and coupling. Tighten the bolts to specifications. Refer to Fastener Specifications .

Ping, Snap, or Click Noise (Article 10798)

Checks Action
DEFINITION: A ping, snap or click is usually heard on initial load after the transmission is in gear, either in forward or reverse.
The propeller shaft yoke or the differential pinion nut is loose. Tighten the rubber coupling to propeller shaft yoke retaining bolt and nuts and/or the pinion nut to specified torque. Refer to Two-Piece Propeller Shaft Replacement .
The rubber coupling is damaged. Replace the propeller shaft assembly. Refer to Two-Piece Propeller Shaft

Replacement .
The rubber coupling to propeller shaft retaining bolts and nuts are loose. Tighten the bolts to specifications. Refer to Two-Piece Propeller Shaft Replacement .
The center bearing is damaged. Replace the center bearing. Refer to Propeller Shaft Center Support Bearing Replacement .
The universal joint is worn or damaged. Replace the propeller shaft assembly. Refer to Two-Piece Propeller Shaft Replacement .

Knock or Clunk Noise (Article 10797)

Checks Action
DEFINITION: Knocking or clunking noise occurs when operating the vehicle in high gear or coasting in neutral at 16 km/h (10 mph).
The universal joint is worn or damaged. Replace the propeller shaft assembly. Refer to Two-Piece Propeller Shaft Replacement .
The rubber front or rear coupling is damaged or worn. Replace the propeller shaft assembly. Refer to Two-Piece Propeller Shaft Replacement .
The rubber couplings to propeller shaft retaining bolts and nuts are loose. Tighten the bolts to specifications. Refer to Fastener Specifications .
The center bearing is damaged. Replace the center support bearing. Refer to Propeller Shaft Center Support Bearing Replacement .
The side gear in the differential is worn or oversize. Replace the differential case and/or the side gears. Refer to Differential Replacement .

Scraping Noise (Article 10799)

Checks Action
DEFINITION: A scraping noise occurs when driving the vehicle at various speeds.
The heat shield, exhaust or other part is touching the propeller shaft . Correct the interference as necessary.
The pinion flange slinger or the center bearing is rubbing. Correct the interference as necessary.

Squeak Noise (Article 10801)

Checks Action
DEFINITION: When driving the vehicle at various speeds a squeaking sound occurs.
The universal joint is worn or damaged. Replace the complete propeller shaft . Refer to Two-Piece Propeller Shaft Replacement .

Shudder on Acceleration at Low Speed (Article 10800)

Checks Action
DEFINITION: When the vehicle is accelerating at low speed a shudder occurs.
The center bearing rubber cushion is worn or damaged. Replace the center bearing. Refer to Propeller Shaft Center Support Bearing Replacement .
The universal joint is worn, damaged or too stiff. Replace the propeller shaft assembly. Refer to Two-Piece Propeller Shaft Replacement .
The rubber couplings to propeller shaft retaining nuts and bolts are loose. Tighten the rubber couplings to propeller shaft retaining nuts and bolts to specifications. Refer to Fastener Specifications .
The angle across the universal joints is too high. Determine the cause of the excessive driveline angle. Check engine and transmission mount s, centre bearing mounting bracket, subframe and differential mounts.

Vibration Diagnosis and Correction (Article 12606)

Non Standards
- Propeller Shaft Runout Measurement (12617)
- Driveline Working Angles Measurement (12607)
- Propeller Shaft Phasing Inspection (12616)

Propeller Shaft - Special Tools (Article 10812)

Illustration Tool Number/ Description
Click for full-size image DT 22912-B J 22912-B Bearing Remover
Click for full-size image DT 36614 J 36614 Slinger Installer
Click for full-size image DT 46496 Bearing Installer

Click for full-size image J 45342-1 Bearing Installer

Noise (itype_156)

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