

2013 Chevrolet Colorado

Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

Driveline Runout Specifications

Application	Specification	
	Metric	English
Differential Pinion Input Shaft or Flange Pilot	0.05 mm	0.002 in
Torque Tube 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, rubber coupling, or bolt-on U-joint yoke.

2013 Chevrolet Colorado

Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

Special Tools

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

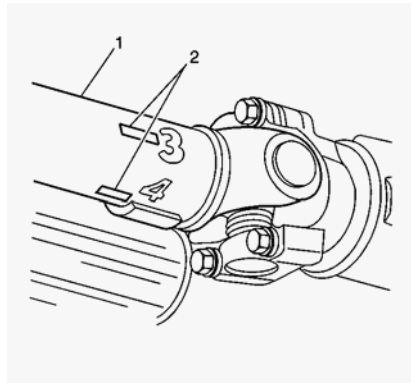
Note: The runout of the propeller shaft to be balanced and the runout of the components that the propeller shaft mates to must be within tolerances before an attempt should be made to perform this procedure.

If EL-38792-A electronic vibration analyzer (EVA) 2 is available, use the following procedure, Adjustment Procedure Using EVA. If the EVA 2 is not available, use the second procedure, Adjustment Procedure Without EVA.

Adjustment Procedure Using EVA

Caution: Do not depress the brake pedal with the brake rotors and/or the brake drums removed, or with the brake calipers repositioned away from the brake rotors, or damage to the brake system may result.

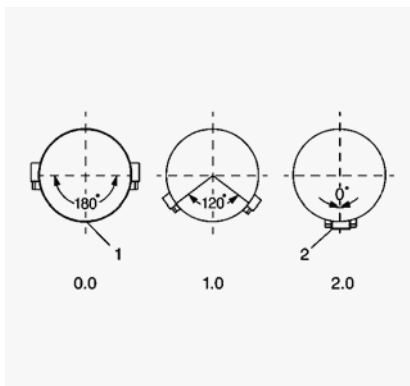
1. Raise and support the vehicle; ensure that the drive axle or axles are supported at ride height – vehicle body supported by suspension components.
2. With the tire and wheel assemblies, and the brake rotors and/or brake drums removed from the drive axle, or axles, start the engine and turn OFF all engine accessories.
3. Place the transmission in forward gear.
4. 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.
5. Turn the engine OFF to slow and stop the rotation of the propeller shaft.



6. 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.
7. 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.
8. 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.
9. 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.
10. Plug the vibration sensor cord into Input A of the EL-38792-A EVA 2. Input B is not used with the strobe function.
11. 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.
Note: Do NOT continue with fine-tuning the balance of a propeller shaft if the dominant frequency displayed is not related to the first-order rotational speed of the propeller shaft.
12. Verify that the dominant frequency displayed on the EL-38792-A EVA 2 matches the recorded frequency of the vibration concern.
13. Record the amplitude reading of the dominant frequency displayed.
14. 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.
15. The EL-38792-A EVA 2 display will show the dominant frequency, the amplitude and the selected filter range.
16. 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.

17. Turn the engine OFF to slow and stop the rotation of the propeller shaft.
18. Install a band-type hose clamp as a weight, with the head of the clamp directly on the light spot.
19. Run the vehicle at the speed which causes the most vibration in the propeller shaft.
20. Using the *EL-38792-25* inductive pickup timing light , or equivalent, observe the positioning of the marks placed on the propeller shaft.
21. 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.
22. 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:
 1. Move the position of the clamp head toward the 6 o'clock position.
 2. Using the *EL-38792-25* inductive pickup timing light , or equivalent, recheck the positioning of the propeller shaft marks.
 3. 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.



23. 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:
 1. Add a second clamp to the propeller shaft, next to the first clamp and with the clamp heads aligned.
 2. Using the *EL-38792-25* inductive pickup timing light , or equivalent, recheck the positioning of the propeller shaft marks.
 3. 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.
 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.
 5. Using the *EL-38792-25* inductive pickup timing light , or equivalent, recheck the positioning of the propeller shaft marks.
 6. 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.
 7. 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:
 1. 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.
 2. 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.
 3. Using the *EL-38792-25* inductive pickup timing light , or equivalent, recheck the positioning of the propeller shaft marks.
 4. 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.
 8. If a third clamp was used on the propeller shaft and sufficient balance could still not be achieved, the propeller shaft requires replacement.
24. 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:
 1. Add a second clamp to the propeller shaft, next to the first clamp and with the clamp heads aligned.
 2. 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.
 3. Using the *EL-38792-25* inductive pickup timing light , or equivalent, recheck the positioning of the propeller shaft marks.
 4. 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.
25. 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.

Adjustment Procedure Without EVA

Caution: Do not depress the brake pedal with the brake rotors and/or the brake drums removed, or with the brake calipers repositioned away from the brake rotors, or damage to the brake system may result.

1. Raise and support the vehicle; ensure that the drive axle, or axles are supported at ride height – vehicle body supported by suspension components.
2. 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.
3. Place the transmission in forward gear.

4. 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.
 5. Carefully hold a piece of chalk up to the end of the propeller shaft in order to just make contact as the shaft rotates.
 6. Turn the engine OFF to slow and stop the rotation of the propeller shaft.
 7. 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.
 - Add a second clamp to the propeller shaft, next to the first clamp and with the clamp heads aligned.
 - 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 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.
 - 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.
 - 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. 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.
 - 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. 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.
 - 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 18.
 - Move the head of the clamp 180 degrees, directly opposite the factory-installed weight.
 - 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, the propeller shaft may require replacement.

2013 Chevrolet Colorado

Submodel: | Engine Type: | Liters:

Fuel Delivery: | Fuel:

Note: This procedure is intended to be used for vehicles where the following conditions are met:

- 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.

1. For solid axles equipped with a leaf spring suspension, inspect the leaf springs, mount bushings, and mounting hardware for excessive wear or damage.
2. 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.
3. For direct-mount axles, inspect any axle mount brackets for damage and inspect the axle mounts and/or bushings for excessive wear or damage.
4. Inspect the structure to which the suspension attaches to ensure no deformities or damage exists.
5. Inspect the propeller shaft support bearing assembly for damaged rubber components, worn bearings, and/or a deformed/cracked bracket.
6. 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.
7. Inspect the structure to which the support bearing assembly attaches to ensure no deformities or damage exists.
8. 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.
9. Inspect the structure to which the transmission or transfer case attaches to ensure no deformities or damage exists.
10. Repair or replace parts as indicated by the inspections.
11. 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.

2013 Chevrolet Colorado

Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

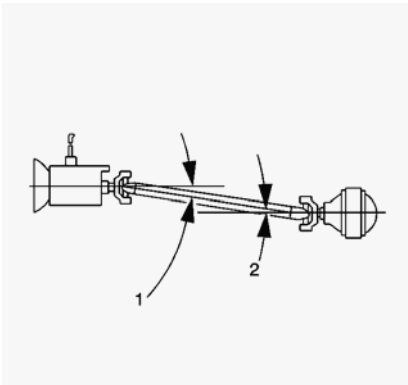
Special Tools

- J-23498-A Driveshaft Inclinator , or equivalent
- J-23498-20 Driveshaft Inclinator Adapter , or equivalent

Note: This measurement procedure is intended to measure U-joints working angles only, not constant velocity (CV) joint or coupler assembly working angles.

Note: This procedure is intended to be used for vehicles where the following conditions are met:

- 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.

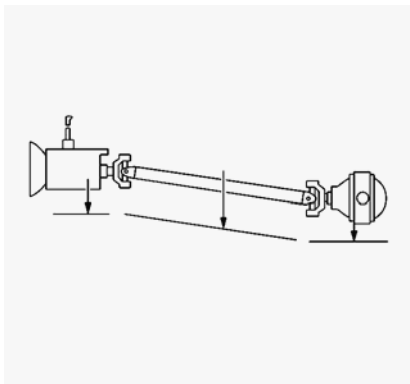


The working angle of a U-joint is formed by the difference between the angles of any 2 shafts that intersect. Propeller shaft systems that have 1 U-joint have 1 working angle; systems with 2 U-joints have 2 working angles, and so on. In a typical 1-piece prop system with 2 U-joints, the working angles are front (1) and rear (2):

- The front working angle (1) is formed by the intersection of the transmission or transfer case output shaft and the prop shaft.
- The rear working angle (2) is formed by the intersection of the prop shaft and the drive axle pinion.

Note: When measuring and evaluating U-joint working angles, observe the following:

- No U-joint working angle should be equal to zero. An angle of 0 degrees will cause premature U-joint wear due to a lack of rotation of the needle bearings in the U-joint.
- No U-joint working angle should exceed 4 degrees.
- Prop systems containing only 1 U-joint: The U-joint working angle should be within the range specified in this procedure.
- Prop systems containing 2 or 3 U-joints: The 2 U-joint angles each formed with the prop shaft that contains 2 welded yokes are designed to cancel each other during operation. These 2 working, or cancelling U-joint angles should be equal to each other within the range specified in this procedure provide effective cancellation of the U-joints.
- Prop systems containing 3 U-joints: The U-joint angle formed by the prop shaft that contains only 1 welded yoke is an odd, or non-cancelled angle. This working angle should be within the range specified in this procedure.
- Always orientate the J-23498-A Driveshaft Inclinator , or equivalent so that it faces the same side of the vehicle for each measurement taken.



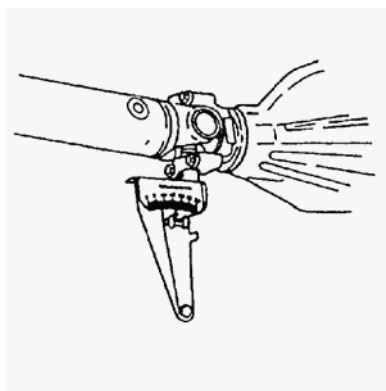
- Be sure to accurately record the measurements taken on a diagram, similar to the one shown.

[Measurement Procedure](#)

Note: If it is necessary to use the J-23498-20 Driveshaft Inclinator Adapter , or equivalent adapter, first verify the accuracy of the J-23498-20 Driveshaft Inclinator Adapter , or equivalent by inspecting the angle of an accessible joint using the J-23498-A Driveshaft Inclinator , or equivalent, then inspecting the same joint angle using the J-23498-20 Driveshaft Inclinator Adapter , or equivalent.

1. For vehicles with solid axles, ensure that the vehicle has a full tank of fuel or the equivalent amount of weight in the correct location to simulate a full tank. The weight of 3.8 L (1 gal) of gasoline is approximately 2.8 kg (6.2 lb).
2. Raise and support the vehicle. On vehicles with solid axles, ensure that the drive axle is supported at ride height—vehicle body supported by suspension components. Suspension travel will not affect driveline angles on vehicles with direct-mounted drive axles. Ensure the wheels are free to rotate. Refer to Lifting and Jacking the Vehicle.
3. For vehicles with 2-piece prop shaft systems, inspect the lateral alignment of the propeller shafts before proceeding:
 1. From underneath the propeller shafts, look down the length of the shafts from front to rear. Inspect the alignment of the shafts to each other.
 2. From underneath the shafts, if the propeller shafts are not aligned to each other in a straight line, then the lateral alignment of the prop shafts needs to be adjusted before proceeding.

The propeller shaft support bearing assembly can be relocated slightly to one side in order to improve the alignment of the shafts. Ensure that you do not create a ground-out condition against the exhaust or any other component.
4. Place the transmission in NEUTRAL.
5. Clean any corrosion or foreign material from the U-joint bearing caps.
6. Remove any of the U-joint bearing cap snap rings that may interfere with the correct placement of the J-23498-A Driveshaft Inclinator , or equivalent .



7. For all prop systems perform the first measurement:
 1. Rotate the prop shaft to align the rear-most yoke flanges vertically.
 2. Install the J-23498-A Driveshaft Inclinator , or equivalent to the lower U-joint bearing cap of the rear-most yoke. This yoke may be part of a prop shaft, torque tube input shaft, or a drive axle pinion shaft. Measure and record the angle of the shaft.
8. For prop systems with 2 or 3 U-joints, perform this additional measurement:

Without rotating the prop, install the J-23498-A Driveshaft Inclinator , or equivalent to the lower U-joint bearing cap of the forward-most, vertically-aligned yoke. This yoke may be part of a prop shaft, transmission output shaft, or a transfer case output shaft. Measure and record the angle of the shaft.
9. For all prop systems perform the second measurement:
 1. Rotate the prop shaft 1/4 turn to vertically align the flanges of the forward yoke that mates to the rear-most yoke.
 2. Install the J-23498-A Driveshaft Inclinator , or equivalent to the lower U-joint bearing cap of the forward mating yoke. This yoke may be part of a prop shaft, transmission output shaft, or a transfer case output shaft. Measure and record the angle of the shaft.
10. For prop systems with 3 U-joints, perform this additional measurement:

Without rotating the prop, install the J-23498-A Driveshaft Inclinator , or equivalent to the lower U-joint bearing cap of the forward-most, vertically-aligned yoke. This yoke may be part of a transmission output shaft, or a transfer case output shaft. Measure and record the angle of the shaft.
11. Remove the J-23498-A Driveshaft Inclinator , or equivalent .
12. Install any U-joint bearing cap snap rings that were removed prior to installing the J-23498-A Driveshaft Inclinator , or equivalent .
13. Calculate the U-joint working angle at each intersection of two shafts.

Subtract the smaller number from the larger to obtain the working angle. For example: If the drive axle pinion has an angle of 16 degrees and the connecting propeller shaft has an angle of 13 degrees, then the working angle of that intersection is 3 degrees.
14. For prop systems with 1 U-joint; compare the working angle to the following specification guideline:

Specification Guideline
Prop systems containing only 1 U-joint: The U-joint working angle should be between 1/2 and 3/4 degrees.
15. For prop systems with 2 or 3 U-joints; compare the difference between the working angles of the cancelling U-joints to the following specification guidelines:

Specification Guideline
Allowable range of difference between cancelling U-joint working angles: 0.25 to 1.0 degrees
16. For prop systems with 3 U-joints; compare the working angle of the odd, or non-cancelled U-joint to the following specification guideline:

Specification Guideline
Prop systems containing 3 U-joints: The odd, or non-cancelled U-joint working angle should be between 1/10 and 1/2 degrees.
17. Any working angle that is not within the specification guidelines requires adjustment.