

Drivetrain - Angle Gear Fluid Leakage

NO: 46-13

DATE: 4-18-2008

MODEL: 5cyl AWD S60 / S80 / V70 / V70 XC/XC70 / XC90

MODEL YEAR: See chart below

CHASSIS: See chart below

SUBJECT:

5 cylinder Angle [gear](#) leakage and resealing

REFERENCE: VIDA

Note! If this is a printed version of a TNN, first check for the latest online version.

Model	Type	Model year	Chassis Range
S60	384	2002 - 2006	315000 - 502866
S80	184	2004 - 2006	335000 - 427792
V70	285	2001 - 2006	000000 - 533030
V70 XC / XC70	295	2001 - 2006	000000 - 209852
XC90	275	2003 - 2006	000000 - 228445

Note! This TNN supersedes the previous TNN 46-13 dated 2-11-2008. Additional seals and labor operation code have been added to the repair and chassis ranges have been updated.

Description:

Oil leakage/moisture from the angle [gear](#) halves can be resolved by resealing the housing and replacing the seals. The angle gear itself does not normally need to be replaced.

There are two reasons an angle [gear](#) should not be resealed and instead should be replaced:

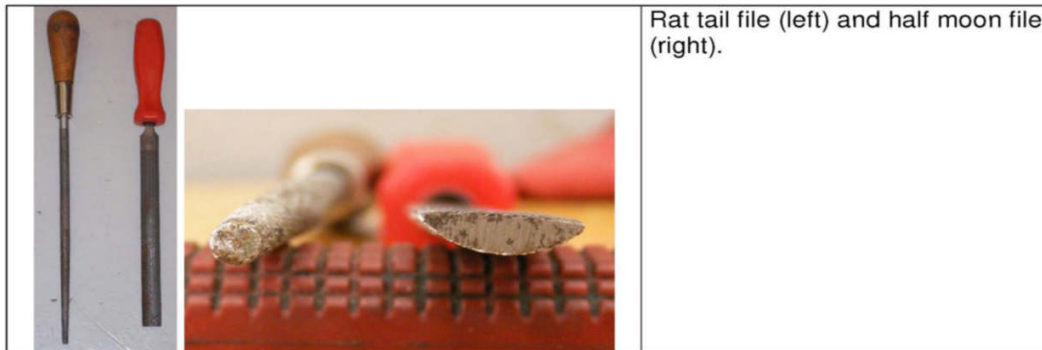
- 1.) There is angle [gear](#) noise/binding while driving.
- 2.) There is angle [gear](#) backlash, bearing damage, or excessive pinion shaft play found during disassembly.

Material	Quantity	Part No.
Flange screw	10	985039
Flange screw	5	987985
3 studs	3	986701
Spacer sleeve, XC90 ch.no -196897 excl 188643, 188659	1	30714142
Spacer sleeve, XC90 ch.no 196988- incl 188643, 188659	1	30748388
Flange screw (ball joint) XC90	1	985878
Sems screw, V70 (01-08)/XC70 (-07) ch.no -278380/ S60 ch.nr -266328/S80 (-06)	1	30776055
Sems screw, V70 (01-08)/XC70 (-07) ch.no 278381-/S60 ch.nr 266329-	1	30741287
Sems nut (ball joint) V70 (01-08)/XC70 (-07)/S60/S80 (-06)	1	31201020
Hex socket screw, propeller shaft	6	988143
Grease, Splines Joint	1	1161748
Chemical gasket	0.1	1161771
Gasket remover	0.1	1161847/1161436
Cleaning agent, Isopropanol	0.3	1161721*
Abrasive cloth	1	9511024**
Sealing ring	1	9183891 (outer diameter 39mm) OR 30684243 (outer diameter 45 mm)
Sealing ring	2	30735126
Drive shaft seal	1	9143885
O-ring	1	977023
Gasket	1	11998
Gear oil	0.65	1161648*
Filter	1	30681138***
Wheel Bearing Grease	0.1	1161689*
Bleeder pipe	1	8689527***
Emory cloth	1	*
Tools	Part number/description	
Adjuster nut/angle gear seal drift	999 5655	
Ring gear shaft seal puller	999 7086	
Ring gear shaft seal drift	999 7087	
Protractor (angle torque gauge)	951 2050	

* Part of the standard for Consumables/Chemicals.

** Items will be used for more than 1 repair.

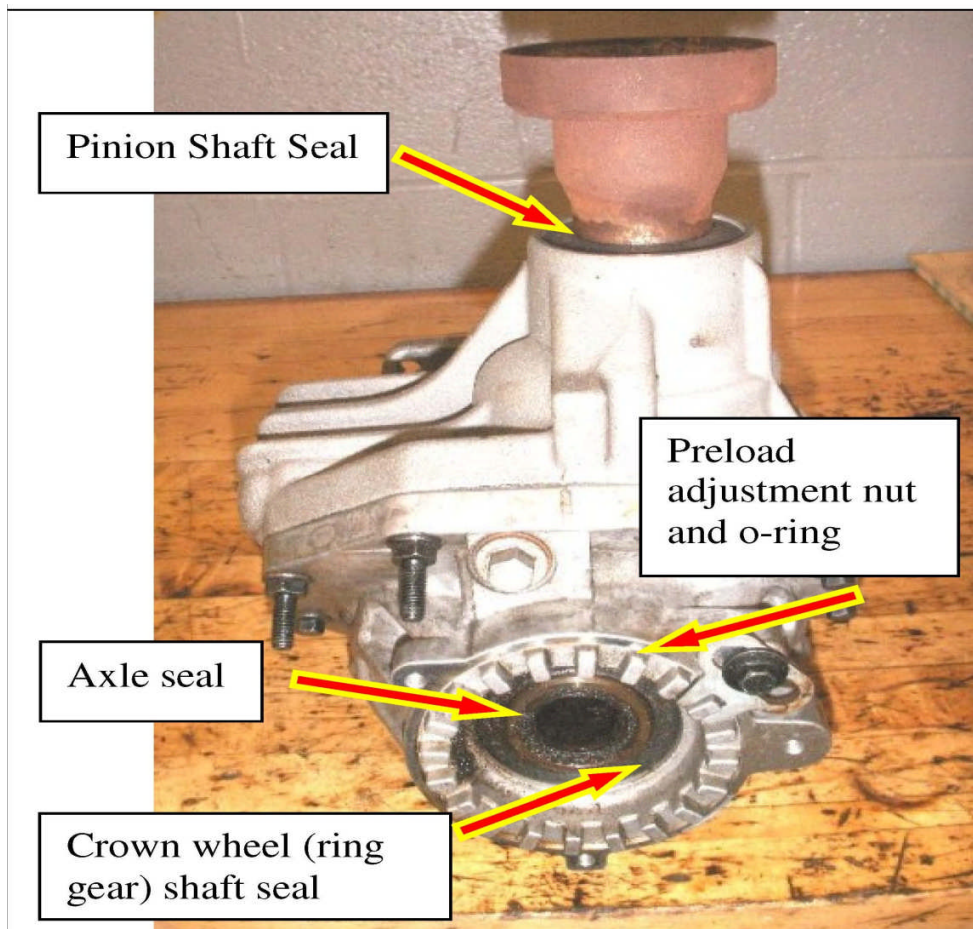
*** The filter and bleeder pipe will only be used if the angle gear does not already have the improved angle gear vent.



Service:

If the leak is only from the angle [gear](#) vent, only replace the vent with the new style vent. If the leak is from the angle gear halves, separate and reseal the angle gear housing according to the following procedure in conjunction with the removal and replacement procedures in VIDA.

1. Remove the angle [gear](#) according to VIDA.
2. Drain the oil from the angle [gear](#).



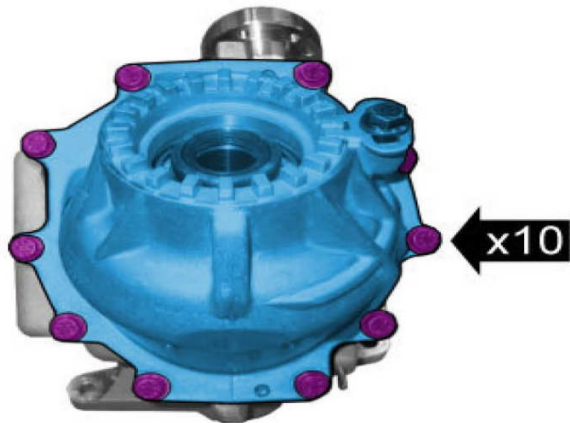
3. Remove the axle seal, right side crown wheel shaft seal, and preload adjustment nut O-ring from the angle [gear](#) according to VIDA under Sealing rings bevel gear, replacing.

Remove the pinion shaft seal according to VIDA under Pinion seal bevel gear, replacing.

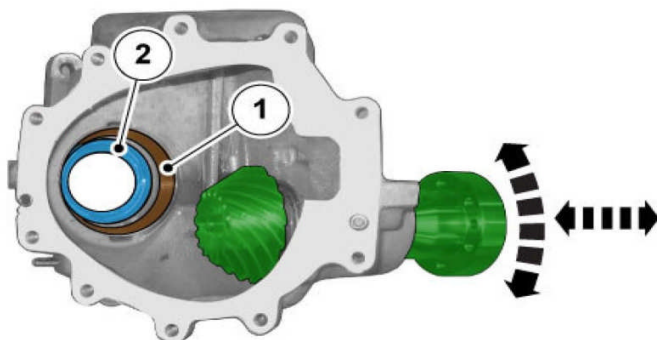
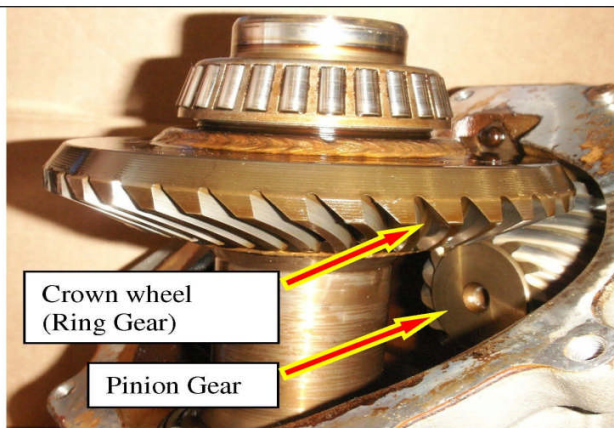
Note! The [ring gear](#) will be referred to as a crown wheel in this document.

Warning! Use protective eyewear.

4. Clean the angle [gear](#) using isopropanol 1161721 around the mating flange. Blow clean with compressed air.



Remove the 10 screws and the cover. Carefully tap the cover using a plastic hammer to release it.

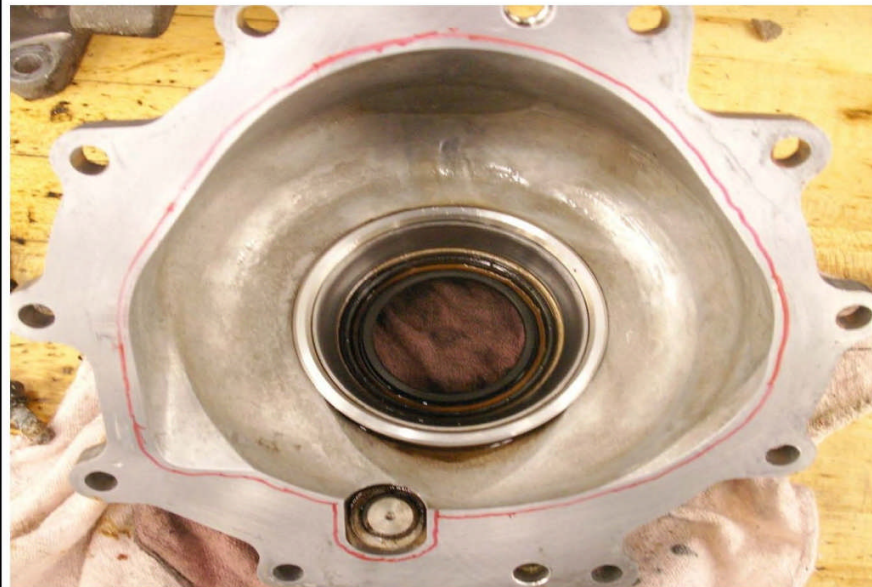
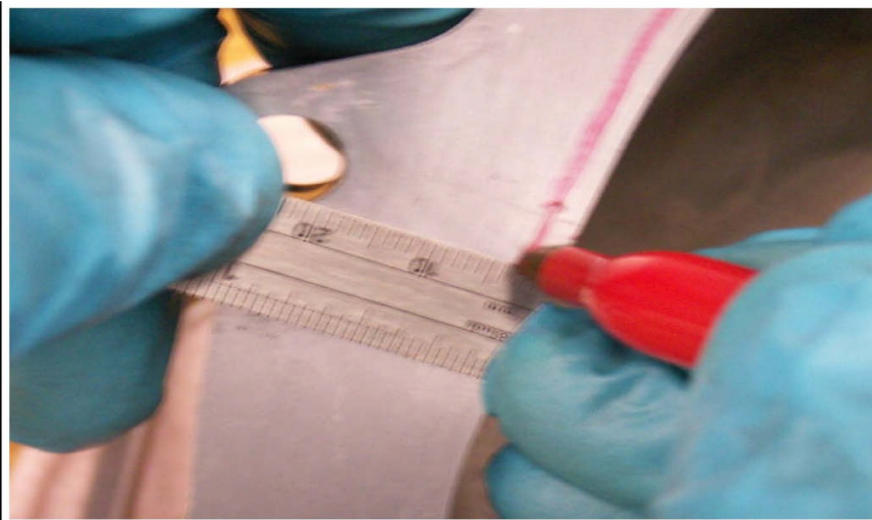


5. Remove the crown wheel.

Check the [pinion gear](#) and crown wheel teeth for abnormal wear or damage. Check pinion shaft for axial play or any kind of binding. Check the bearing races (1) in both halves of the [angle gear](#).

If a bearing race is damaged the pinion shaft has play, there is abnormal [gear](#) wear, or if there is any kind of binding, replace the angle gear.

If OK, remove the left side crown wheel shaft seal (2) according to VIDA under sealing ring, crown wheel shaft, left-hand side, replace and continue with the Step 6 of the resealing method.



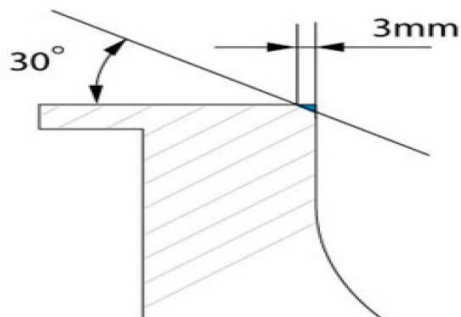
6. Measure 3 mm from the inside of the flange and make a line with a permanent marker.

Note! This procedure can be made easier by making a template which can be reused for several repairs.



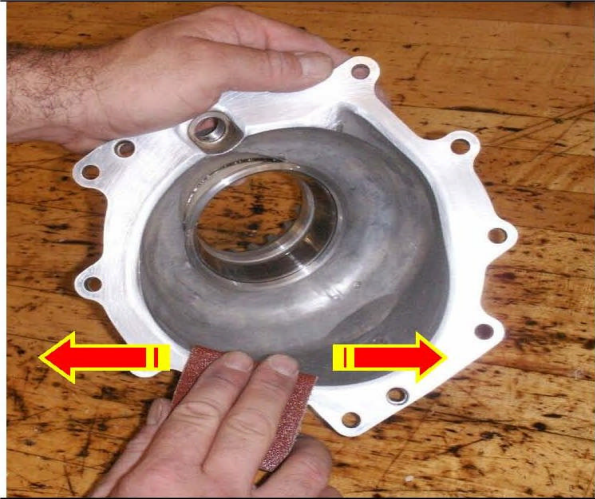
7. **Caution!** Care must be taken to avoid damage to the bearing race while filing. A coffee cup can be used to cover the bearing race.

Warning! Use protective eyewear!



8. File off the inner edge of the cover as illustrated, following the marker line, using a file. The finished product should look like this.

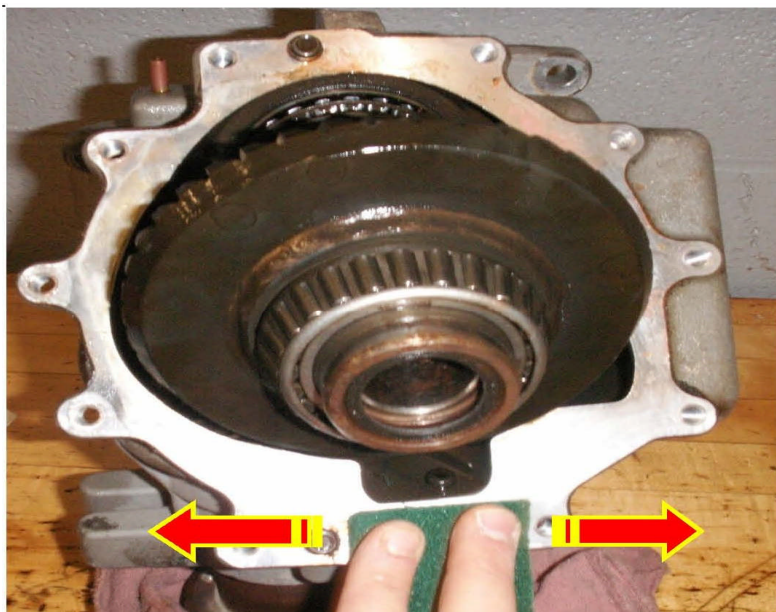
9. After filing, polish the chamfer using a fine emery cloth so that scoring in the chamfer goes along the chamfered edge.



Note! Use the emery cloth radially, along the flange just as the arrows indicate.

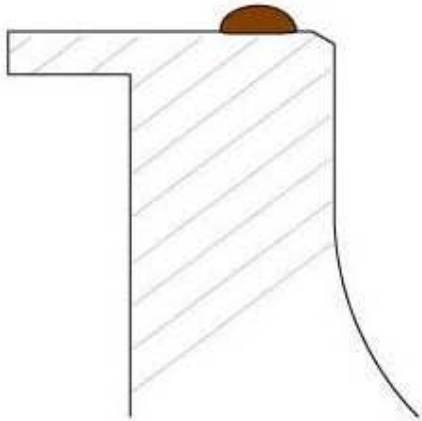
10. Clean out filing swarf.

11. Clean the gasket from both flanges using gasket remover 1161847 and abrasive cloth 9511024. Cleaner H, 1161436 can be used as an alternative.



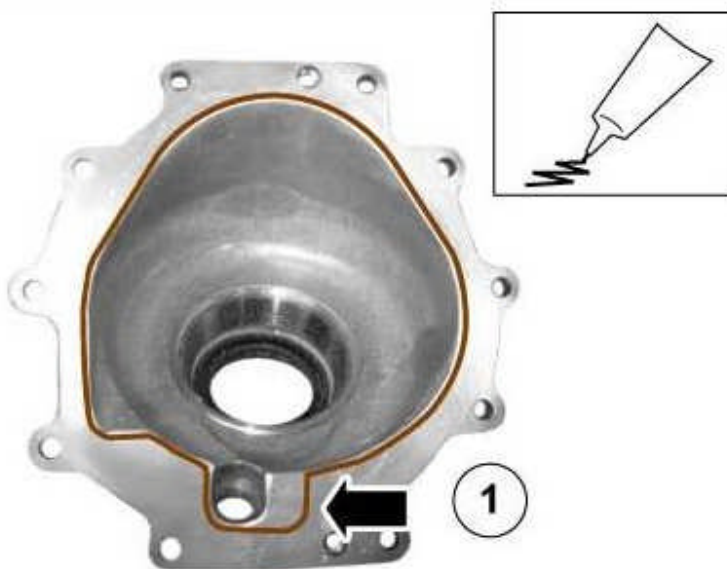
Note! Use the abrasive cloth radially, along the flange.

Clean the flange using isopropanol 1161721. Cleaner H, 1161436 can be used as an alternative.

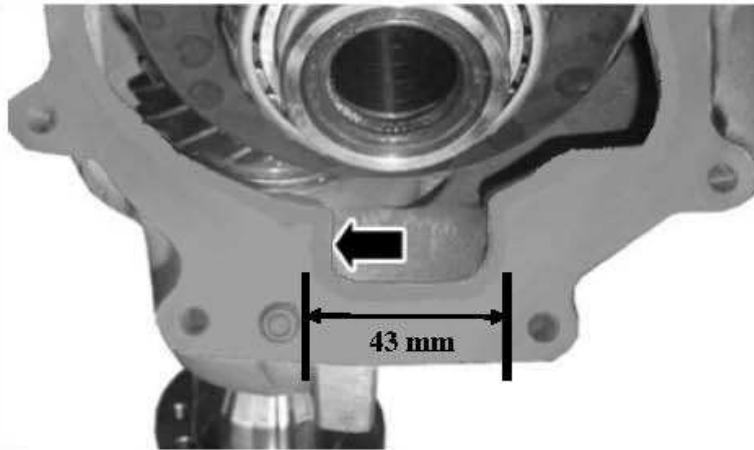


12. Apply a 5mm bead of chemical gasket 1161771 approx. 1 mm from the chamfered edge.

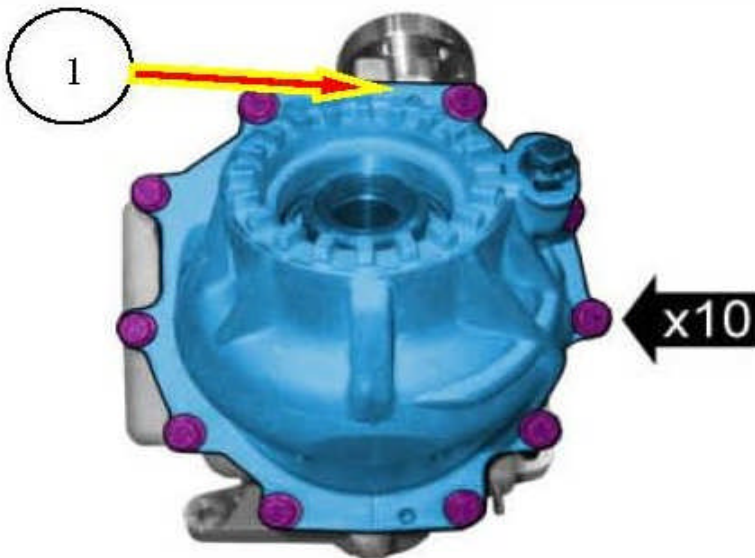
Note! The next few steps should be done within 5 minutes so that the angle [gear](#) halves are torqued together while the sealant is still wet.



Pay close attention to the route of the sealant at **Note 1** in photo. This is for the opening on the opposite half of the angle [gear](#) case.



This is the opening that requires the 43 mm spacing in the silicone
Do not apply sealant to both halves.

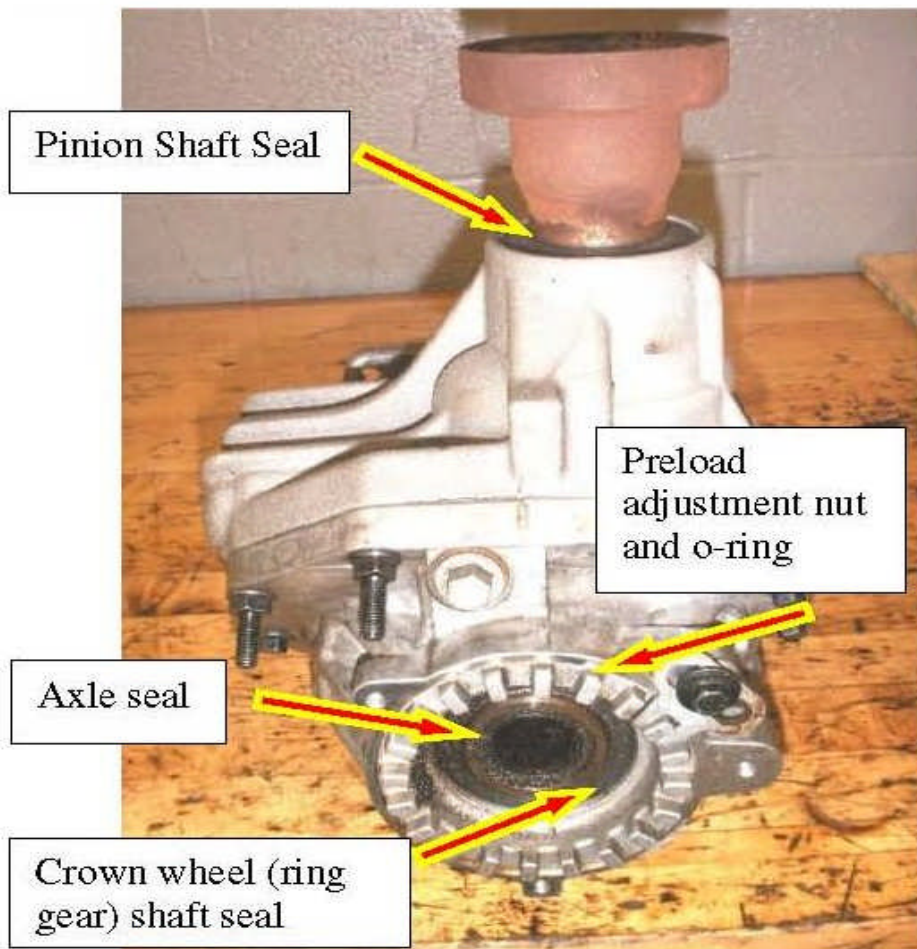


13. In order to aid in installation and to avoid affecting the silicone bead when reassembling the cover, set the cover over the locating pin marked "1" first, then carefully lay the cover down to lay flat on the flange.

Use new screws and tighten the 10 screws crosswise to 18 Nm (13.25 ft lbs).

Then angle tighten the 10 screws crosswise 85°.

Note! Some models may use studs in place of 3 of the screws.



Install the axle seal and preload adjustment nut O-ring from the angle [gear](#) according to VIDA under Sealing rings bevel gear, replacing.

Install the pinion shaft seal according to VIDA under Pinion seal bevel gear, replacing.

Install new left side and right side crown wheel shaft seal according to VIDA under sealing ring, crown wheel shaft, left-hand side, replace.

Note! Be sure to lubricate the sealing ring lips with [wheel bearing](#) grease, P/N 1161689 before installation.



15. If the angle [gear](#) does not have the improved vent in place, as shown, install new bleeder pipe and filter.

Note! Some models may not use a vent.

16. Fill the angle [gear](#) with 0.65L of oil P/N 1161648. Install new drain plug gasket P/N 11998.

17. Install the angle [gear](#) according to VIDA.

Note! New screws must be used to install the angle [gear](#) to the transmission.

WARRANTY CLAIM INFORMATION		
LABOR OP	LABOR DESCRIPTION	LABOR TIME
46907	Bevel Gear Sealing of Parting Flange	3.0 hrs
08001	Angle Gear Cleaning and Preparation	0.3 hrs
08004	Angle Gear Seals Replacement	0.3 hrs

Warranty Claim Information