Rear axle

Repairs and Maintenance

VOLVO
Contents

Specifications ...................................................... 1
Special tools ....................................................... 2

Spare parts illustrations
Rear axle assembly ............................................... 6
Differential ......................................................... 7
Limited slip differential .......................................... 8

Descriptions
Rear axle .......................................................... 9
Differential ...................................................... 10
Limited slip differential ........................................ 11

Service procedures
On vehicle repairs
– Checking limited slip differential ......................... A1–A4 12
– Checking end float of axle shaft bearing .............. B1–B3 13
– Replacing pinion seal ........................................ C1–C7 14
– Replacing axle shaft bearing and seal ................ D1–D21 16

Removing rear axle .............................................. E1–E17 21

Disassembling rear axle ......................................... F1–F13 25
– Differential without limited slip ......................... F14–F17 28
– Differential with limited slip ............................. F18–F22 29
– Cleaning, inspection .......................................... F23 30

Assembling differential .......................................... G1–G7 32
– Differential without limited slip ......................... G8–G9 34
– Differential with limited slip ............................. G10–G27 35

Installing differential ............................................ H1–H20 40
Installing rear axle ............................................... I1–I17 44
# Specifications

## Rear axle

<table>
<thead>
<tr>
<th>Metric</th>
<th>US measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semi-floating</td>
<td>53.15&quot;</td>
</tr>
</tbody>
</table>

### Track
- Rear axle, type: 1350 mm

## Final drive

- **Type**: Hypoid
- **Reduction ratio**
  - Type 1030: 3.73:1, 3.91:1, 4.10:1
  - Type 1031: 3.54:1, 3.73:1
- **Warp, ring gear**: max. 0.08 mm
- **Backlash**: 0.13—0.18 mm

### Pre-loading on pinion bearings
- **New bearings**: 250—450 Ncm
- **Used bearings**: 60—110 Ncm

### Pre-loading on differential bearings
- **New bearings**: 0.13—0.20 mm
- **Used bearings**: 0.0032"—0.007"

## Lubricant

- **Quality, standard differential**: API GL-5 (Mil L-2105-B)
- **Limited slip differential**: API GL-5 (Mil L-2105-B) with additive for limited slip differential
- **Viscosity normal operating conditions**
  - SAE 90
  - SAE 80
- **Capacity**: Type 1030: 1.3 liters, 1.35 US qts
  - Type 1031: 1.6 liters, 1.7 US qts

## Tightening torques

<table>
<thead>
<tr>
<th>Nm</th>
<th>ft.lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>50—70</td>
<td>35—50</td>
</tr>
<tr>
<td>70—80</td>
<td>50—58</td>
</tr>
<tr>
<td>90—110</td>
<td>65—80</td>
</tr>
<tr>
<td>100—140</td>
<td>70—100</td>
</tr>
<tr>
<td>240—300</td>
<td>175—220</td>
</tr>
<tr>
<td>200—250</td>
<td>145—180</td>
</tr>
</tbody>
</table>

- **Ring gear: standard bolt heads**
- **Flanged bolt heads**
- **Wheel nuts**
- **Flange nuts: 88626 (3/4" UNF)**
- **946831 (3/4" UNF)**
- **947855 (M20x15)**
Special tools

1801  **Standard handle**
1845  **Press tool 3/4"-16 UNF**
2261  **Puller**
2284  **Dial gauge holder**
2337  **Tool**
2392  **Puller**
2393  **Measuring tool**
2394  **Expanding tool**
2395  **Drift**
2404  **Wrench**
2483  **Puller**
2520  **Work stand**
2522  **Fixture**
2595  **Adjusting rings**
2598  **Drift**
2599  **Drift**
2600  **Measuring fixture**
2601  **Retainer**
2685  **Adjusting ring**
2686  **Press tool**
2709  **Extractor**
2714  **Fixture**
2779  **Socket**
2806  **Drift**
2809  **Holder**
2838  **Press tool**
2840  **Adjusting ring**
2841  **Wrench**
2842  **Sleeve**
2843  **Drift**
2844  **Puller**
2845  **Press tool**
2846  **Socket**
2917  **Extractor**
4112  **Drift**
5009  **Drift**
5010  **Ring**
5069  **Puller**
5149  **Wrench**
5156  **Press tool**
5157  **Wrench**
5214  **Ring**
5215  **Puller**
5216  **Puller**

**Group 46**

**Rear axle**
Special tools

1801 Standard handle
2598 Drift
removing rear pinion bearing outer ring
2843 Drift
removing rear pinion bearing outer ring
128 840 Press tool 3/4"-16 UNF
installing drive flange
2404 Wrench
installing front pinion bearing
5156 Press tool
installing drive flange
118 761 Tool
removing carrier
2337 Tool
removing carrier
2393 Measuring tool
adjusting pinion
2264 Dial gauge holder
adjusting final drive
2394 Expanding tool
removing/installing limited slip differential
2601 Holder
for expanding tool 2394
1845 Press tool 3/4"-16 UNF
installing drive flange
2404 Wrench
installing front pinion bearing
5156 Press tool
installing drive flange
2395 Drift
installing rear pinion bearing
2842 Sleeve
installing rear pinion bearing outer ring
5215 Puller (1030) new
rear pinion bearing
5216 Puller (1031) new
rear pinion bearing
5214 Ring new
2483 Puller
differential carrier bearings

Group 46
Rear axle
Special tools

**Work stand**
- 2520

**Fixture**
- 2522

**Fixtures**
- 2595 Adjusting rings differential
- 2685 Adjusting ring pinion
- 2840 Adjusting ring pinion height
- 2841 Wrench for adjusting rings 2840, 2685 and 2689
- 5157 Wrench for adjusting ring

**Drift**
- 2599 removing front pinion bearing outer ring and installing differential carrier bearings

**Measuring fixture**
- 2600 for adjusting rings 2595, 2685, 2687, 2689 and 2840

**Extractor**
- 2709 drive shaft

**Fixture**
- 2714 removing/installing rear axle

**Press tool**
- 2686 installing pinion bearing outer rings
- 2845 Press tool installing pinion bearing outer rings

**Socket**
- 2779 removing propeller shaft
- 2846 Socket removing propeller shaft
2806 **Drift**
installing seal on drive flange

2809 **Holder**
plate and dial gauge

2838 **Press tool**
removing/installing drive shaft bearing and snap ring

5010 **Ring**
installing bearing and snap ring on drive shaft

2917 **Extractor**
brake pads

4112 **Drift**
installing differential carrier bearings

5009 **Drift**
installing drive shaft inner seal

5069 **Puller**
pinion seal

5149 **Wrench**
installing/removing drive flange

**Group 46**
**Rear Axle**
Limited slip differential

Group 46
Rear Axle
Description, rear axle

Rear suspension
1. Shock absorber
2. Trailing arm
3. Reaction rod
4. Track rod
5. Stabilizer

The rear axle is connected to the body by two trailing arms (2). Longitudinal forces are transferred by two reaction rods (3) and transversal forces by a track rod (Panhard rod) (4). Trailing arms, reaction rods and track rod are attached to body and rear axle by replaceable rubber bushings. Most vehicles (not wagons), are equipped with a rear stabilizer (5) fitted between the trailing arms.

The outer ends of the drive shafts are journaled in taper roller bearings. Bearing clearance is not adjustable and is determined by bearing design, see Fig. left. Oil seals are provided on the outside of the drive shaft bearings.
The final drive is of the hypoid type, which means that the drive pinion lies below the center of the ring gear. It consists of pinion, ring gear and differential gear. Gear backlash and differential carrier bearing tension are adjusted by shims inside the differential carrier bearings. Differential carrier and ring gear assembly are journaled in the final drive housing by two taper roller bearings. The ring gear is attached to the differential carrier by bolts. The differential gears in the differential carrier consist of two bevel pinions on a trunnion and two side gears in which drive shafts are carried by internal splines. The differential gears are journaled so that they can rotate and permit the drive shafts to rotate at different speeds when the car is being driven in curves. There is a thrust washer under each of the differential gears. The pinion bearings are taper roller bearings. The axial location of the pinion relative to the ring gear is adjusted by shims under the outer race of the rear pinion bearings.
Limited slip differential
("Differential brake", "anti-spin")

Except for the differential assembly, the design is the same as for standard differential.

Two shafts make up the spider for the differential pinion gears. On the side where it is against the differential carrier, each shaft has a V-shaped bevel. The differential carrier is correspondingly designed. When power from the engine starts to drive the vehicle, the shafts (A) glide up the bevelled recess in the differential carrier. This compresses the friction plates behind the differential side gears so that the differential assembly brakes. The bevel angle on the differential carrier is designed and chosen in such a way that the differential gears are not entirely locked, but max. 75% of engine torque can be transmitted to a drive shaft.

Group 46
Rear axle
On-vehicle repairs

Checking limited slip differential

Fabricate tool
As shown in illustration out of 3/16" steel stock.
Special tool 2709 can be used after necessary modifications.

Jack up the vehicle
At one of the rear wheels. Block the other. Place gear lever in neutral. Release parking brake. Remove the wheel.

Place tool over wheel studs

Check torque
The friction torque of the limited slip differential should be:

- minimum 55 Nm = 40 ft.lbs
- maximum 150 Nm = 110 ft.lbs

Note the torque reading when the wheel rotates (rotational friction). If torque reading is below minimum, replace discs.
Checking end float on axle shaft bearing

The end float for the axle shafts cannot be adjusted. However, it may be necessary to determine whether the end float is within acceptable limits.

**B1**

**Jack up vehicle and remove wheel.**

**Remove brake pads.**

Use puller 2917 if necessary.

**B2**

**Install measuring equipment.**

a. Use tool 2809 to clamp an iron plate against the brake caliper’s boss.

b. Use a dab of grease to place a steel ball in the center hole of the axle shaft.

c. Place the stand for the dial gauge on the iron plate. Place the dial gauge measuring point (which must have a flat surface) against the steel ball.

**B3**

**Measure end float.**

The end float should be 0.01–0.35 mm = 0.004–0.014".

To obtain total end float, the axle shaft must be rotated at least one revolution in both directions.

**NOTE:**

Prior to installation, bearings for the axle shafts have considerably greater clearance. It is reduced at installation.

Repeat procedure for other axle shaft.
Replacing pinion seal (on vehicle)

**Disconnect drive shaft at pinion**
Use socket 2779 or 2846.
Check condition of pinion and bearings. If found to be loose, the final drive is to be removed and overhauled.

**Remove flange nut.**
Use wrench 5149.

**Remove flange.**
Use puller 2261.

**Remove seal.**
Use extractor 5069.
Also remove protecting shield.
Install new seal
Use drift 2806.
Pack the new seal spring with grease. Otherwise the spring might jump out of position during installation. Also grease the seal lips.
Illustration:
1 = seal
2 = spring with layer of grease

Install flange.
Use tool 1845 or 5156.
Torques:
nut 947855 (M20 x 1.5): 200–250 Nm = 150–185 ft.lbs.

Reconnect drive shaft.
Use tool 2779 or 2846.
Replacing axle shaft bearing and seal

Preparations.
Jack up vehicle. Remove rear wheel.
USA Models: remove collision guard.

Remove brake parts.
Detach brake line and bracket from rear axle.
Remove brake caliper. Hang it out of way with a length of steel wire to prevent damage to brake pipe.

Remove brake discs.
Parking brake must be in the full release position. Remove the two Phillips head screws and lift off the brake discs. Tap on the inside of the disc with a plastic hammer or similar tool if necessary.

Remove parking brake shoes
Unhook and remove the springs using brake spring pliers.
On-vehicle repairs
— Axle shaft —

**Disconnect parking brake cables.**
Press out the lock pin securing the brake cables to the levers. Use 3mm punch if the pin does not fall out.

**Free bearing retainers.**
Remove four bolts (hex 15mm) to free bearing retainers.

**Remove axle shafts.**
Pull axle shafts out of rear axle assembly using puller tool 2709.

**Remove inner seal.**
Use tool 2337.

**Removing circlip, bearing and bearing retainer plate.**
a. Place tool 2838 in a vise. Fix shaft in tool.
b. Adjust tool so that jaws come between bearing and seal. The seal MUST NOT come between tool and bearing.
c. Press off circlip and bearing.
d. Open tool. Remove parts.
e. Discard circlip. It MUST NOT be reused.
Prepare bearing and seals for installation.
The new bearing should be completely filled with high quality wheel bearing grease. Press in grease from one side until grease comes out on the other.
Also grease the new seals. Fill the space between the lips with grease.

Installing bearing retainer, bearing and circlip.
Use tool 5010 to press on the bearing.

Clean the interior of the rear axle tube.

Install inner seal.
Use tools 5009 and 1801.

Install axle shaft.
Install screws for bearing retainer.
Torque: 30–50 Nm = 22–36 ft.lbs.
Install brake shoe retaining springs.
Qn-vehicle repairs
- Axle shaft -

Attach brake cables to levers.
Lubricate all joints and shoe contact surfaces with heat resistant graphite grease.
Press in pin securing brake cables to levers.

Install parking brake shoes.
Inspect brake lining. Reference appropriate manual for detailed procedures as necessary.

Install brake discs.
Install discs and secure with two Phillips head screws.

Adjust parking brake.
Loosen cable at parking brake lever to remove any tension on cables.
The adjusting screw is accessible through ash tray housing.
Use 17 mm socket and extension. Adjust so that brake is fully applied between 2-3 notches of brake lever movement.
On vehicle repairs
- Axle shaft -

**Install brake caliper.**
Attach brake line and bracket to rear axle.
Use new screws for brake caliper.

**Install collision guard.**
USA models.

**Install wheels.**
Torque: $120 \pm 20 \text{ Nm} = 87 \pm 9 \text{ ft.lbs.}$
Removing rear axle

E1

Raise vehicle on lift and remove rear wheels.
With exhaust pipe below the rear axle, remove intermediate exhaust pipe from front to rear muffler.

E2

Trailing arm front ends.
Loosen the retaining bolts slightly (to allow the trailing arms to rotate freely at the front ends when removing the rear axle).

E3

Remove stabilizer bar.
Remove rear retaining bolts (hex 19mm) on each side of bar.
Remove front bolts (hex 17mm) on each side and let stabilizer bar down.

E4

Remove track rod (Panhard rod).

E5

Remove collision guards.
On rear axle.
Disconnect the ventilation hose.
Remove clamps holding brake pipes.
Disconnect the brake pipes from rear axle and secure out of way to prevent damage to pipes.

Remove brake calipers.
Remove two bolts (hex 17mm) and free the brake calipers (left and right).
Remove brake line clamp to allow some freedom of movement for the caliper.
Hook the brake calipers to their respective springs to prevent the brake lines from becoming distorted.

Remove brake discs.
Parking brake must be in the full release position.
Remove the two Phillips head screws and lift off the brake discs. Tap on the inside of the disc with a plastic hammer or similar tool if necessary.

Remove parking brake shoes.
Unhook and remove the springs using brake spring pliers.
Disconnect parking brake cables.
Press out the lock pin securing the brake cables to the levers. Use 3 mm punch if the pin does not fall out.

Disconnect drive shaft from pinion flange.
Use tool 2779 or 2846.

Detach parking brake cables from rear axle.
1. Screw
2. Cable
3. Plastic tube (only remove if the rear axle is to be replaced).

Disconnect the reaction rods at the rear axle.
Removing rear axle

Place fixture 2714 under rear axle.
The rear axle boss should rest on the fixture loop.

Disconnect the rear shock absorbers at the upper attachments.
Install spring compressor 5040 on the springs. Compress the springs until the shock absorbers can be detached. Then remove the spring compressor.

Remove the screws holding the rear axle to the trailing arms.

Remove the rear axle.
Disassembling rear axle

**F1**

Place rear axle and fixture 2522 on work stand 2520.
Bottom of final drive housing toward stand and pinion down.

**F2**

Remove axle shafts.

a. Use tool 2709 to pull out axle shafts.
b. Use tool 2337 to remove inner seals.

**F3**

Remove differential housing cover.
Remove ten screws (hex 13 mm) to free cover.
Remove cover.

**F4**

Bearing caps.
Check that bearing caps are marked for proper alignment with carrier. If marks are missing or difficult to see, mark both sides to ensure correct reinstallation.
Remove four screws (hex 16 mm) to free bearing caps.
Install tool 2394.  
Place tool 2394 with retainers 2601 on housing.  
Align pins on tool with holes in housing. Screw retainer bolts into housing.  
Tighten the tensioning screw until tool fits securely in holes. Then tighten screw slowly until the differential assembly can be removed.  
DO NOT exceed 3 1/2 turns on the screw.

Remove differential assembly.  
Use tool 2337.  
Release tension on tool 2394 to prevent carrier distortion. Then remove tool 2394.  
Turn the rear axle and drain the oil.

Remove flange nut.  
Use wrench 5149 and suitable socket.

Remove flange.  
Use tool 2261.
Remove pinion.
Use a plastic hammer to knock out the pinion. To prevent damage, hold the pinion with one hand as it is driven out.

Remove pinion bearing.
Use standard handle 1801 and 2599 to remove front pinion bearing, washer and seal.

If necessary:
Remove rear pinion bearing outer ring.
Rear axle type 1030: use standard handle 1801 and tool 2598.
Rear axle type 1031: use standard handle 1801 and tool 2843.

If necessary:
Remove rear pinion bearing.
Rear axle type 1030: use tool 5215
Rear axle type 1031: use tool 5216 and tool 5214.
See next page for instructions on how to apply the tool. (Superseded tool illustrated).
Disassembling differential
— Without limited slip —

1. Push puller over rollers and press down the lock ring.
2. Tighten puller screws until rollers are flush with edge of inner race and puller.
3. Drive out lock ring.

### Differential without limited slip

**Remove differential carrier bearing.**
Use tool 2483. Care should be taken not to damage shim pack. Put it aside with removed bearing.

1. Place puller over bearing on ring gear side of carrier. Make certain that groove in tool catches on rollers. Press lock ring down on tool.
2. Tighten puller until bearing is off carrier.
3. Use a hammer to knock out the lock ring.
Repeat for other bearing. Record position of bearings and shims to facilitate installation on new carrier.

**Remove ring gear.**
Place differential assembly in vise with protected jaws.
Remove lock plate (A) for ring gear screws.
Remove ten ring gear retaining screws (hex 17 mm) to free ring gear.
If ring gear is tight, thread screws in part way. Tap screws to push ring gear off.
Discard the screws. New screws MUST be used when assembling.
Remove differential gear shaft.
Drive out lock pin. Drive out differential gear shaft.

Remove differential gears.
Place the differential assembly on stub drive shaft. Roll out the small differential gears. Lift out the large differential gears.

Remove differential carrier bearings.
Use tool 2483. Care should be taken not to damage shim pack. Put it aside with removed bearing.

1. Place puller over bearing on ring gear side of carrier. Make certain that groove in tool catches on rollers. Press lock ring down on tool.
2. Tighten puller until bearing is off carrier.
3. Use a hammer to knock out the lock ring.
Repeat for other bearing. Record position of bearings and shims to facilitate installation on new carrier.
Disassembling differential
- Cleaning, inspection -

Mark position of parts.
Draw line-up marks on differential gear shafts and differential carrier so that parts are installed in the same position when reassembled.

Remove bolts.
Remove the bolts which hold the differential carrier together.
NOTE: Rear axle type 1030 has bolts with left-hand threads.

Lift off differential carrier. Lift out differential gear plates.

Remove ring gear.
Remove bolts. Lift out ring gear.
Discard old bolts. New ones must be used when reassembling.

Cleaning, inspection of parts.
Clean all parts thoroughly.
Check all bearing races and bearings. Races, rollers or roller retainers must not be scratched or damaged. Replace as necessary.
Check pinion and ring gear for tooth damage. Most common damage is from seizing gear teeth, see illustration. Damages are caused by contaminated or low quality oil, incorrect tooth flank clearance or faulty tooth contact.

Gear seizure
Check the differential gears for tooth damage. If any gear is damaged, the complete set of four matched gears must be replaced. Washers for the differential gears (flat or thrust) should be replaced. For the large differential side gears only thrust washers, P/N 1232436-4, are used.

Check the drive flange section which goes into the seal. Replace if worn or scored.

The pinion nut loses its self-locking capacity after being removed a couple of times. Replace as necessary.

All seals should be replaced any time the differential is disassembled.

Check the rear axle carrier for cracks. Check brackets for trailing arms and track rod for broken welds and/or damages.
Assembling differential
— Without limited slip

The utmost cleanliness must be observed when assembling the final drive. Dirt in a tapered roller bearing can result in entirely incorrect measurements.

Bearing must be oiled and rotated several times under load before measuring bearing clearance or preload.

Differential without limited slip

Construct tool.
Bolts, nuts and washers according to the following listing are recommended to help install the differential gears.

- Two bolts: 1/2"x3-1/2" (M12x90)
- Two nuts: 1/2" (M12)
- Four washers: 1-3/8"x1/8" (34x3 mm)

Cut two washers as shown so that they can be fitted over the bolts.

Fit thrust washers and large differential gears.
Place one washer and nut on each bolt.
Push in the bolt with the head first.
Install the slotted washer.

Compress.
Tighten the nuts to compress the thrust washers.

Group 46
Rear axle
Assembling differential
– Without limited slip –

Install small differential gears and thrust washers.
Roll in small differential gears and thrust washers as an assembly.

Remove bolt tools.

Install differential gear shaft.
Install shaft and lock pin. Punch to lock the lock pin.

Reassemble differential.
Install ring gear on carrier assembly. Make sure contact surfaces are free of burrs.
Use new bolts. The bolts are tightened to yield limit and cannot be reused.
Use alternate side pattern for tightening bolts.
Torque to:
Standard bolt head: 70–80 Nm = 50–58 ft.lbs.
Flanged bolt head: 90–110 Nm = 65–80 ft.lbs.

Operations G8 and G9 contain special assembly instructions for limited slip differential.
Common installation instructions continue with op. G10.
Assembling differential
- Limited slip diff. -

**Differential with limited slip**

**Inspecting**
Before inspecting, wash all parts thoroughly in solvent. Then check the parts carefully for wear, cracks or other damage. Faulty parts should be replaced. If any of the discs require replacement because of abnormal wear, all the discs should be replaced at the same time.

**Reassemble differential**
Install ring gear on carrier assembly. Make sure contact surfaces are clean and free of burrs.
Use new bolts and lock fluid. The bolts are tightened to yield limits and cannot be reused.
Use alternate side tightening pattern.
Torque to:
Standard bolt head: \( 70 \pm 80 \text{ Nm} = 50 \pm 58 \text{ ft.lbs.} \)
Flanged bolt head: \( 90 \pm 110 \text{ Nm} = 65 \pm 80 \text{ ft.lbs.} \)

---

1. Bolt
2. Differential housing
3. Disc, 1.5 mm = 0.06"
4. Flat discs
5. Dished disc, 2.4 mm = 0.1"
6. Flat disc, 2.4 mm = 0.1"
7. Hub
8. Large differential gears
9. Shafts
10. Small differential gears

---

**Install shafts, gears and discs**
Lubricate each part before installation.
Place the discs and other parts in the order shown in illustration in the ring gear half of the differential housing.
Align the discs and fit the smaller half of the differential carrier.
Install the bolts. Torque to:
\( 60 \pm 75 \text{ Nm} = 44 \pm 55 \text{ ft.lbs.} \)
Installing pinion

Install tools on pinion
Use extremely fine emery cloth to clean the pinion shoulder.
Install adjusting ring and wrench. Make sure the locking screw of the adjusting ring is in open position.

Final drive
Adjusting ring
Wrench
2685
2840
2841
2841
or
(5157) (5157)

Position pinion in carrier
Screw (1) on the adjusting ring (2) must face the large part of the carrier.
Make sure the pin on the adjusting ring is in the carrier recess.

Measurement A
The pinion must have a set distance (A) to the ring gear center line. Due to tolerances in the manufacturing, there are deviations from the set distance. These deviations are indicated on the pinion. The deviation is always plus and in hundredths of a millimeter. The plus sign is omitted.

Conversion table, millimeters to inches

<table>
<thead>
<tr>
<th>mm</th>
<th>inches</th>
<th>mm</th>
<th>inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.20</td>
<td>0.0079</td>
<td>0.31</td>
<td>0.0122</td>
</tr>
<tr>
<td>0.21</td>
<td>0.0083</td>
<td>0.32</td>
<td>0.0126</td>
</tr>
<tr>
<td>0.22</td>
<td>0.0087</td>
<td>0.33</td>
<td>0.0130</td>
</tr>
<tr>
<td>0.23</td>
<td>0.0091</td>
<td>0.34</td>
<td>0.0134</td>
</tr>
<tr>
<td>0.24</td>
<td>0.0094</td>
<td>0.35</td>
<td>0.0138</td>
</tr>
<tr>
<td>0.25</td>
<td>0.0098</td>
<td>0.36</td>
<td>0.0142</td>
</tr>
<tr>
<td>0.26</td>
<td>0.0102</td>
<td>0.37</td>
<td>0.0146</td>
</tr>
<tr>
<td>0.27</td>
<td>0.0106</td>
<td>0.38</td>
<td>0.0150</td>
</tr>
<tr>
<td>0.28</td>
<td>0.0110</td>
<td>0.39</td>
<td>0.0154</td>
</tr>
<tr>
<td>0.29</td>
<td>0.0114</td>
<td>0.40</td>
<td>0.0157</td>
</tr>
</tbody>
</table>
Assembling rear axle
– Pinion –

Checking pinion location
Use:
– dial indicator
– indicator retainer 2284
– measuring tool 2393
Measuring tool 2393 consists of two parts: a pinion gauge and an adjuster fixture.

Align measuring tools
Locate the indicator retainer so that the dial indicator tip touches the adjuster fixture.

Measure distance to pinion gauge
Move the indicator retainer so that the dial indicator tip touches the pinion gauge.
The pinion gauge should reflect the figure indicated on the pinion. For example: if the pinion is marked 0.33, the pinion gauge should lie 0.33 mm below the adjuster fixture.
Adjust by turning the wrench of the pinion until the dial indicator shows correct reading.
Use the locking screw to lock the wrench. Remove measuring tools and pinion.

Shim thickness, rear pinion bearing
Position rear pinion bearing assembly (3) in measuring fixture 2600. Install plate, spring and nut (flat side up). Rotate plate and bearing assembly back and forth several times so that the rollers assume correct positions.
Position adjusting ring (1) in the measuring fixture. Use retainer 2284 and dial indicator (2).
Position the dial indicator tip against the adjusting ring (1) and set to zero. Then change the tip location to the bearing outer ring. The dial indicator now shows required thickness of shims.
Remove bearing and measuring fixture 2600.
Assembling rear axle
- Pinion -

Measure shim thickness
Use micrometer.
NOTE:
It is very difficult to obtain absolutely correct shim thickness. Following deviations are permitted:

- $0.02 \text{ mm } = 0.0008"$
+ $0.05 \text{ mm } = 0.002"$

Install rear pinion bearing on pinion
Use tools:
2395 for Type 1030
2842 for Type 1031
NOTE:
First time a rear pinion bearing is removed, there is a spacer washer under the rear pinion bearing inner ring. It must NOT be reinstalled.

Install pinion bearing rings
Position shim just determined for rear pinion bearing.
Install outer rings for pinion rear and front bearings.
Use tools:
2686 for Type 1030
2845 for Type 1031

Install pinion
Position pinion. Install three shims $0.75 \text{ mm } = 0.03"$ thick and front pinion bearing.
Install wrench 2404 and press tool 1845 (alt. 5156) on pinion front end. Press in pinion.
NOTE:
If using a nut runner, press the pinion forward so that it does not hit the bearing races with impact force.
Assembling rear axle
- Pinion -

G21

Install pinion nut
Remove tool 1845. Let wrench 2404 remain in place.
Install pinion nut. Torque to 250 Nm = 185 ft.lbs.

G22

Shim thickness, front pinion bearing
Install pinion gauge, dial indicator retainer and dial indicator. Pull down the pinion while turning back and forth at the same time. Zero the dial indicator.
Press the pinion up while turning back and forth. Read the dial indicator.

G23

Adjust shim pack thickness
Tap the pinion to remove it.
New bearings:
- remove shims according to dial indicator reading PLUS 0.09 mm = 0.0035".
Previously used bearing:
- remove shims according to dial indicator reading PLUS 0.07 mm = 0.0028".

G24

Install pinion
Install wrench 2404 and press tool 1845 (alt. 5156) on pinion front end. Press in pinion.
NOTE:
If using a nut runner, press the pinion forward so that it does not hit the bearing races with impact force.
Assembling rear axle
– Pinion –

Install pinion nut
Remove tool 1845. Let wrench 2404 remain in place.
Install washer and nut. Torque nut to:
250 Nm = 185 ft.lbs.

Check pinion bearing preload
Use torque gauge. Correct preload:
Used bearings: 60–110 Ncm = 5–10 in.lbs.

Check pinion location
Use dial indicator, retainer 2284 and measuring tool 2393.
Zero-set the dial indicator against the adjuster fixture.
Shift the dial indicator to the pinion gauge and check the pinion bearing.
Pinion location must not deviate from correct position more than:
– 0.02 mm = 0.0008”
+ 0.05 mm = 0.002”

Group 46
Rear axle
Assembling rear axle
- Installing differential -

Installing differential

Install adjusting rings
Oil adjusting rings 2595. Install on differential.
Black-oxidized adjusting ring on ring gear side.

H2

Oil bearing seats in rear axle.
Position differential and adjusting rings assembly in rear axle.

Adjust backlash
Adjust the adjusting rings apart until the differential is held firmly but not preloaded.
Position the dial indicator. Set the tip approx. 3 mm = 1/8" from the end of a ring gear tooth.
Hold the pinion and move the ring gear back and forth. Note the backlash. Allowed backlash is 0.12–0.18 mm = 0.005–0.007", but should be set as near 0.15 mm = 0.006" as possible.
Adjust by turning both adjusting rings in the same direction.

H4

After correct backlash is obtained
Lock the adjusting rings in position.
Remove differential and adjusting rings assembly.

Determine shim thickness
NOTE:
Always remember the side on which bearings and shims are to be installed.
Position the centering plate on measuring fixture 2600. Position a bearing (3) in the measuring fixture. Install plate, spring and nut (flat side up). Rotate plate and bearing assembly back and forth several times so that the rollers assume correct position.
Position adjusting ring (1) on measuring fixture. Install retainer 2284 and dial indicator (2).
Position the dial indicator tip against the adjusting ring (1) and set to zero. Then change the tip location to the bearing. Note the dial indicator reading.
Assembling rear axle

Installing differential

**Measure shim thickness**
Use micrometer. Total shim thickness should be noted value **PLUS 0.07 mm = 0.0028″**.

**Repeat procedure for other side**

**Install bearing opposite ring gear**
Install determined shim pack. Use drift 4112 when pressing on the bearing.

**Install bearing, ring gear side**
Install lock plate (A) for ring gear bolts, determined shim pack and bearing.
Use drift 4112 to press on the bearing.
Use drift 2599 on the bearing opposite side to prevent damages.

**Install differential assembly**
Use retainers 2601 to position expanding tool 2394 on rear axle housing. Expand tool until it fits securely in holes in housing. Then tighten the screw an additional 3–3.5 turns.
Position differential with bearing outer rings in rear axle housing.
Remove expanding tool 2394.
Assembling rear axle

Installing differential

Install bearing caps
Check markings. Torque bolts to 50–70 Nm = 35–50 ft.lbs.

Check backlash
Allowed backlash is 0.12–0.18 mm = 0.005–0.007" but should be as near 0.15 mm = 0.006" as possible.
Remove wrench 2402.

Install oil slinger

Install new oil seal
Pack spring of new oil seal with grease. Otherwise the coil may jump out of position during installation. Grease sealing lips.
1. Oil seal
2. Spring with grease
Use drift 2806 to install the oil seal.

Install pinion flange
Use press tool 1845 (or 5156).

Install nut
Torques:
Nut 88626 (3/4" UNF) 240–300 Nm = 175–220 ft.lbs.
Nut 946831 (3/4" UNF) 200–250 Nm = 145–185 ft.lbs.
Nut 947855 (M20 x 1.5) 200–250 Nm = 145–185 ft.lbs.
Assembling rear axle
- Installing differential -

H17

Install gasket and cover

H18

Install drive shaft seals
Use drift 5009 and handle 1801.
NOTE:
Fill space between sealing lips with grease.
Also fill space between roller retainer and bearing inner ring with grease.

H19

Install drive shafts
Torque bolts for bearing retainer to 30-50 Nm
= 22-40 ft.lbs.

H20

Fill with correct lubricant
Capacity:
1030: 1.3 liters = 1.35 US qts.
1031: 1.6 liters = 1.7 US qts.
Final drive oil SAE 90, API GL-5 (MIL L-2105B or C).
Installing rear axle

Prepare installation
Position rear axle in fixture 2714. Position fixture and rear axle under vehicle.

Attach trailing arms
Install the bolts finger tight.
Also install the brackets for the stabilizer bar rear attachments.

Attach the rear shock absorbers at the upper attachments
Install spring compressors 5040 and compress the springs so that the shock absorbers can be installed.
Make sure the wires holding the brake calipers do not become involved.
Remove the spring compressors.

Remove the fixture
**Installing rear axle**

---

**Attach reaction rods**
Do not tighten.

---

**Attach parking brake cables at the rear axle**
1. Screw
2. Cable
3. Plastic tube

---

**Connect drive shaft to flange**
Use socket 2779 or 2846.

---

**Connect parking brake cables**
Installing rear axle

1. Install parking brake shoes

2. Install brake discs
   - Install screws retaining brake discs.

3. Install brake calipers

4. Connect brake lines
   - Attach brackets and clamps securing the brake lines.
   - Hook on retaining springs of parking brake cables to the upper clamps.

5. Reconnect the ventilation hose to the rear axle
Installing rear axle

1. Install collision guards

2. Install the track rod (Panhard rod)

3. Install the stabilizer bar

Rear End Torque.
Lower and rock the car before tightening. Use Torque Specs Chart.
### Rear end torques

<table>
<thead>
<tr>
<th>Component</th>
<th>Nm</th>
<th>ft. lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reaction rod:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A Body attachment</td>
<td>85</td>
<td>62</td>
</tr>
<tr>
<td>B Rear axle attachment</td>
<td>85</td>
<td>62</td>
</tr>
<tr>
<td><strong>Track rod (Panhard rod):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C Rear axle attachment</td>
<td>60</td>
<td>44</td>
</tr>
<tr>
<td>D Body attachment</td>
<td>85</td>
<td>62</td>
</tr>
<tr>
<td><strong>Rear spring:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E Upper attachment</td>
<td>45</td>
<td>32</td>
</tr>
<tr>
<td>F Lower attachment</td>
<td>19</td>
<td>14</td>
</tr>
<tr>
<td><strong>Shock absorber:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G Upper attachment</td>
<td>85</td>
<td>62</td>
</tr>
<tr>
<td>H Lower attachment</td>
<td>85</td>
<td>62</td>
</tr>
<tr>
<td><strong>Trailing arm:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I Body attachment</td>
<td>115</td>
<td>85</td>
</tr>
<tr>
<td>F Rear attachment (= spring lower attachment)</td>
<td>19</td>
<td>14</td>
</tr>
<tr>
<td><strong>Stabilizer:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J Front attachment (= shock absorber)</td>
<td>85</td>
<td>62</td>
</tr>
<tr>
<td>K Rear attachment</td>
<td>45</td>
<td>32</td>
</tr>
<tr>
<td><strong>Wheels:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L Nuts, tightened criss-cross</td>
<td>115</td>
<td>85</td>
</tr>
</tbody>
</table>
VOLVO SUPPORTS VOLUNTARY MECHANIC CERTIFICATION BY THE N.I.A.S.E.
(U.S.A. Only)