Rear axle

Repairs and Maintenance

C

Section Group 4 46

Rear axle 1976–

-05-

VOLVO

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Specifications

Specifications

Rearaxle	Metric	US measurements
Rear axle, type	Semi-floating	
Track	1350 mm	53.15"
Final drive		
Type	Hypoid	
Reduction ratio		
Туре 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	0.0032"
Backlash	0.13-0.18 mm	0.005-0.007"
Pre-loading on pinion bearings		
new bearings	250-450 Ncm	21-39 in.lbs.
used bearings	60-110 Ncm	5–10 in.lbs.
Pre-loading on differential bearings	0.13–0.20 mm	0.005-0.008"
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	
15% - 10% use	SAE 80	
$15^{\circ}F = -10^{\circ}C$ use	SAE 80	
Capacity: Type 1030	1.3 liters	1.35 US qts
Туре 1031	1.6 liters	1.7 US qts
Tightening torques	Nm	ft.lbs.
Caps	50-70	35–50
Ring gear: standard bolt heads	70–80	50-58
flanged bolt heads	90–110	65-80
Wheel nuts	100–140	70–100
Flange nuts: 88626 (3/4" UNF)	240-300	175-220
946831 (3/4" UNF)	200-250	145-180
947855 (M20×15)	200-250	145-180



947855

Group 46 Rear axle

Special tools

1801 Standard handle 1845 Press tool 3/4"–16 UNF installing drive flange	
1845 Press tool 3/4"-16 UNF installing drive flange	
installing drive flange	
2261 Dullor	
2201 Fuller	
round drive flange	
2284 Dial gauge holder	
adjusting final drive	
2337 Tool	
removing carrier	
2392 Puller	
rear pinton bearing	
2393 Measuring tool	
2304 Expanding tool	
removing/installing limited slip	
differential	
2395 Drift	
installing rear pinion bearing	
2404 Wrench	
installing front pinion bearing	
(ill. at 1845)	
2483 Puller	
differential carrier bearings	
2520 Work stand	
2522 Fixture	
2595 Adjusting rings	
differential	
2598 Drift	
removing rear pinion bearing outer	
nng (iii. at 1801)	
2599 Drift	
ring and installing differential	
carrier bearings	
2600 Measuring fixture	
for adjusting rings 2595, 2685, 2687	P
2689 and 2840	
2601 Retainer	
for expanding tool 2394 (ill. at 2394)	
2685 Adjusting ring	
pinion	
2686 Press tool	
installing pinion bearing outer rings	1
2709 Extractor	
drive shaft	

2714	Fixture
2779	Socket
2806	removing propeller shaft Drift
2000	installing seal on drive flange
2809	Holder plate and dial gauge
2838	Press tool
	removing/installing drive shaft bearing and snap ring
2840	Adjusting ring
2841	Wrench
	for adjusting rings 2840, 2685 and 2689 (ill. at 2685)
2842	Sleeve
	installing rear pinion bearing outer ring (ill. at 2395)
2843	Drift
	ring (ill. at 1801)
2844	Puller rear pinion bearing (ill, at 2392)
2845	Press tool
	installing pinion bearing outer rings (ill. at 2686)
2846	Socket
2917	Extractor
43.55	brake pads
4112	Drift installing differential carrier bearings
5009	Drift
5010	Ring
	installing bearing and snap ring on drive shaft (ill. at 2838)
5069	Puller Pinion seal
5149	Wrench installing/removing drive flange
5156	Press tool installing drive flange (ill. at 1845)
5157	Wrench for adjusting ring (ill. at 2685)
5214	Ring
5015	(for tool 5215/5216)
5215	pinion bearing (1030 axle)
5216	Puller
	pinion bearing (1031 axle)

Special tools



outer ring 2843 Drift

removing rear pinion bearing outer ring



- 1845 Press tool 3/4"–16 UNF installing drive flange
- 2404 Wrench installing front pinion bearing 5156 Press tool
 - installing drive flange



2261 Puller round drive flange



2284 Dial gauge holder adjusting final drive 2393 Measuring tool adjusting pinion



2337 **Tool** removing carrier



 5215 Puller (1030) new rear pinion bearing
 5216 Puller (1031) new rear pinion bearing
 5214 Ring new



2394 Expanding tool removing/installing limited slip differential 2601 Holder

for expanding tool 2394



 24533
 2395 Drift installing rear pinion bearing
 2842 Sleeve

installing rear pinion bearing outer ring



2483 Puller differential carrier bearings

Special tools



128 829 2520 Work stand 2522 Fixture



2595 Adjusting rings differential



removing front pinion bearing outer ring and installing differential carrier bearings

2686

2845



101 796

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



- 107 192
 2685 Adjusting ring pinion
 2840 Adjusting ring pinion height
 2841 Wrench for adjusting rings 2840, 2685
- and 2689 5157 Wrench
 - for adjusting ring

 102 376
 2686 Press tool installing pinion bearing outer rings
 2845 Press tool installing pinion bearing outer rings



2709 Extractor drive shaft



2714 Fixture removing/installing rear axle



2779 Socket removing propeller shaft
2846 Socket removing propeller shaft

Special tools



installing seal on drive flange



2809 Holder plate and dial gauge



 103 176
 2838 Press tool removing/installing drive shaft bearing and snap ring
 5010 Ring installing bearing and snap ring

on drive shaft

2917

2917 Extractor brake pads

103 031

2806 Drift



4112 **Drift** installing differential carrier bearings



5009 **Drift** installing drive shaft inner seal



5069 **Puller** pinion seal



128 808 5149 Wrench installing/removing drive flange

Group 46 Rear Axle



Rearaxle

Spare Parts Illustration



Group 46 Rear axle

Spare Parts Illustration



129 342

Description

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.



108 159

Drive shaft journaling

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.



129 339

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

> Group 46 Rear axle

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.



- 1 Differential carrier, smaller section
- 2 Discs internal teeth
- 3 Differential side gear retainer
- 4 Differential pinion gear
- 5 Spider
- 6 Differential carrier, larger section
- 7 Differential side gear
- 8 Discs, external, teeth



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.

On-vehicle repairs - Limited slip differential -

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.

A2

A1



Jack up the vehicle

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

A3

Place tool over wheel studs

A4

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.

128 802

On vehicle repairs – End float of axle shaft –

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.

Jack up vehicle and remove wheel.

Remove brake pads. Use puller 2917 if necessary.



Install measuring equipment.

- 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

B1

B2

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.

On-vehicle repairs – Pinion seal –

Replacing pinion seal (on vehicle)

2779 2846

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.

C4

C1

C2

C3

Remove seal. Use extractor 5069. Also remove protecting shield.

On vehicle repairs – Pinion seal –





2

128 807

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

C6

C5

Install flange. Use tool 1845 or 5156. Torques:

nut 88626 (3/4" UNF): 240–300 Nm = 175–220 ft.lbs.

nut **946831** (3/4" UNF): **200–250 Nm** = 150–185 ft.lbs.

nut **947855** (M20 x 1.5): **200–250 Nm** = 150–185 ft.lbs.

C7

Reconnect drive shaft. Use tool 2779 or 2846.

> Group 46 Rear axle

On-vehicle repairs – Axle shaft –

Replacing axle shaft bearing and seal



Preparations.

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

D2

D1

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.

D3

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.

D4

Remove parking brake shoes

Unhook and remove the springs using brake spring pliers.

128 815

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.

D6

D5



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**.

D8

D7

Remove inner seal. Use tool 2337.

D9



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.

On-vehicle repairs - Axle shaft -



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.

D12

D10

D11



Clean the interor of the rear axle tube.

D13

Install inner seal. Use tools 5009 and 1801.

D14

128 817

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

Group 46 Rear axle

On-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.

D16

D15



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

D17



Install brake discs.

Install discs and secure with two Phillips head screws.

D18



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 -



128 813

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

D19

D20

D21

Install collision guard. USA models.

Install wheels. Torque: **120** \pm **20** Nm = 87 \pm 9 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).



E4

E5



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.

Remove track rod (Panhard rod).

129 329

129 328



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.

E7

E6

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.

E9



Remove parking brake shoes.

Unhook and remove the springs using brake spring pliers.

128 815

Removing rear axle

E10





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.

E11

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

E12

Detach parking brake cables from rear axle.

- 1. Screw
- 2. Cable
- Plastic tube (only remove if the rear axle is to be replaced).

E13

Disconnect the reaction rods at the rear axle.

Removing rear axle



A

F1

F2

Disassembling rear axle



Place rear axle and fixture 2522 on work stand 2520.

Bottom of final drive housing toward stand and pinion down.





Remove axle shafts.

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

128 830

128 831



Remove differential housing cover.

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

F4

F3

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.

Group 46 Rear axle



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.

118 781





Remove flange. Use tool 2261.

F8

F7

F5

F6





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.

F10



2014

Remove pinion bearing.

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

F11

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.

F12



101 793

24 532

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

F14

F13



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.

F15



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.

120 827

Disassembling differential - With limited slip -

F16

F17

108 163

120 454

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.

Differential with limited slip

F18



128 836

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.

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.



110 742



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.

F20

F21

F22

F19

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

Disassembling differential - Cleaning, inspection -



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.



129 332

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

129 333

129 334

129 335

Assembling differential

The utmost cleanliness must be observed when assembling the final drive. Dirt in a tapered roller bearing can result in entirely incorrect measurements. Bearings 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 Two nuts Four washers 1/2"x3-1/2" (M12x90) 1/2" (M12) 1-3/8"x1/8" (34x3 mm)

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

G2

G1

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.

G3

Compress.

Tighten the nuts to compress the thrust washers.

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Assembling differential – Without limited slip –

G4

Install small differential gears and thrust washers.

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

Remove bolt tools.

G6

G5



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

G7

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.

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.

G8

G9

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: 70–80 Nm = 50–58 ft.lbs. Flanged bolt head: 90–110 Nm = 65–80 ft.lbs.



129 337



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: 60-75 Nm = 44-55 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	1030	1031	
Adjusting ring	2685	2840	
Wrench	2841	2841	
or	(5157)	(5157)	

G11

G10



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.

G12

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			
mm	inches	mm	inches
0.20	0.0079	0.31	0.0122
0.21	0.0083	0.32	0.0126
0.22	0.0087	0.33	0.0130
0.23	0.0091	0.34	0.0134
0.24	0.0094	0.35	0.0138
0.25	0.0098	0.36	0.0142
0.26	0.0102	0.37	0.0146
0.27	0.0106	0.38	0.0150
0.28	0.0110	0.39	0.0154
0.29	0.0114	0.40	0.0157
0.30	0.0118		

Group 46 Rear axle



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.

G14

G13

129.38

2284

ZEROING LOCATION

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.





2393

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.

Group 46

36





Use micrometer. NOTE:

Use tools:

NOTE:

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

Install rear pinion bearing on pinion

First time a rear pinion bearing is removed, there is a spacer washer under the rear pinion bearing

- 0.02 mm = 0.0008"

+ 0.05 mm = 0.002"

2395 for Type 1030 2842 for Type 1031 G18

G19

G17



2686 2845

102 374



Install pinion bearing rings

inner ring. It must NOT be reinstalled.

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

G20

Install pinion

Position pinion. Install three shims 0.75 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.



Install pinion nut

Remove tool 1845. Let wrench 2404 remain in place.

Install pinion nut. Torque to 250 Nm = 185 ft.lbs.

G22

G23

G21



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.

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

Position pinion. Install shim pack determined for front pinion bearing. Install 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.



Install pinion nut

Remove tool 1845. Let wrench 2404 remain in place. Install washer and nut. Torque nut to:

250 Nm = 185 ft.lbs.

G26

G25



Check pinion bearing preload Use torque gauge. Correct preload:

New bearings: 250-450 Ncm = 21-39 in.lbs. 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"

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.

H3



128 845



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.

101 796

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

H8

H7

H6





H9



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.

H10



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.

H12

H13

H14

H11



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.

128 848





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).		H15
Install nut		H16
Nut 88626 (3/4" UNF) = 175–220 ft.lbs.	240–300 Nm	
Nut 946831 (3/4" UNF) = 145–185 ft.lbs.	200–250 Nm	
Nut 947855 (M20 x 1.5) = 145–185 ft.lbs.	200–250 Nm	

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.

5040

Also install the brackets for the stabilizer bar rear attachments.



I1

12

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.

T4

Remove the fixture

Group 46 Rear axle

2714

44

128 825

128 827

Installing rear axle



Attach reaction rods Do not tighten.

I6

15



Attach parking brake cables at the rear axle 1. Screw 2. Cable

3. Plastic tube

128 822



Connect drive shaft to flange Use socket 2779 or 2846.

<u></u>18

17



Connect parking brake cables

Installing rear axle



Install parking brake shoes



Install brake discs Install screws retaining brake discs.

128 814



Install brake calipers

I12

19

I10

I11



Connect brake lines

Attach brackets and clamps securing the brake lines.

Hook on retaining springs of parking brake cables to the upper clamps.

T13

Reconnect the ventilation hose to the rear axle

Group 46 Rear axle



I15

I16



Install collision guards



Install the track rod (Panhard rod)

129 329



Install the stabilizer bar

129 328

I17

Rear End Torque.

Lower and rock the car before tightening. Use Torque Specs Chart.



Provide and	Nm	ft. Ibs.
A Body attachment B Rear axle attachment	85 85	62 62
Track rod (Panhard rod): C Rear axle attachment D Body attachment	60 85	44 62
Rear spring: E Upper attachment F Lower attachment	45 19	32 14
Shock absorber: G Upper attachment H Lower attachment	85 85	62 62
Trailing arm: I Body attachment F Rear attachment (= spring lower attachment)	115 19	85 14
Stabilizer: J Front attachment (= shock absorber) K Rear attachment	85 45	62 32
Wheels: L Nuts, tightened criss-cross	115	85



VOLVO SUPPORTS VOLUNTARY MECHANIC CERTIFICATION BY THE N.I.A.S.E.

(U.S.A. Only)



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