

Technical data

Wheel suspension	independent wheel suspension with control arms and spring struts
Suspension	one round torsion bar per wheel, longitudinal
Torsion bar	Ø 18.8 mm
Height adjustment - at DIN curb weight	Page 44 - 1
Shock absorbers	double-action hydraulic shock absorber struts
Manufacturer	Bilstein - different configuration from Mod. 89 onwards
Anti-roll bar	Ø 18 mm - from Model 77 onward Ø 20 mm from Model 85 onward Ø 22 mm

TORQUE SPECIFICATIONS FOR FRONT AXLE

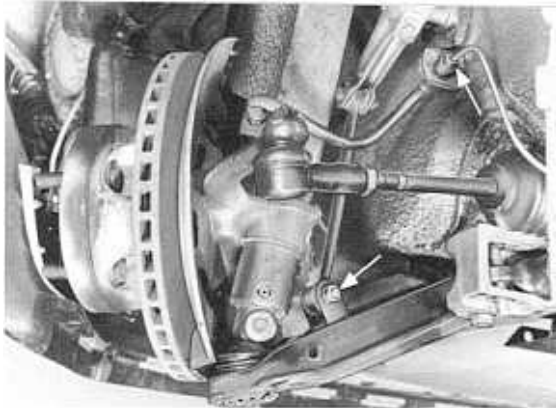
Location	Designation	Threads	Class	Torque	
				Nm	ft lb
Support bearing to strut	Nut	M 14 x 1.5	8	80	58
Support bearing to body	Capscrew	M 10	8.8	47	34
Carrier to body	Bolt	M 12 x 1.5	8.8	90	65
Carrier strut guard to body	Bolt	M 10	8.8	47	34
Stabilizer and suspension	Bolt	M 8	8.8	25	18
Guard	Bolt	M 8	8.8	25	18
Stabilizer to carrier strut	Bolt	M 8	8.8	25	18
Carrier strut, guard and stabilizer to body	Capscrew	M 10	8.8	47	34
Carrier strut and guard to carrier	Nut	M 10	8	28	20
Control arm to body	Bolt	M 10	8.8	47	34
Ball joint to control arm	Slotted nut	M 45 x 1.5	8.8	250	181
Nut on stub axle	Capscrew	M 7	10.9	15	11
Ball joint to strut	Uni stop nut	M 8	8	22	16
Brake disc to wheel hub	Nut	M 8	8.8	23	17
Cover for brake disc	Bolt	M 8	8.8	10	7
Caliper to stub axle	Bolt Capscrew	M 12 x 1.5	8.8	70	51
Brake line	Coupling	M 10 x 1		12	9
Wheel to wheel hub	Nut	M 14 x 1.5		130	94

REMOVING AND INSTALLING FRONT AXLE

Removing

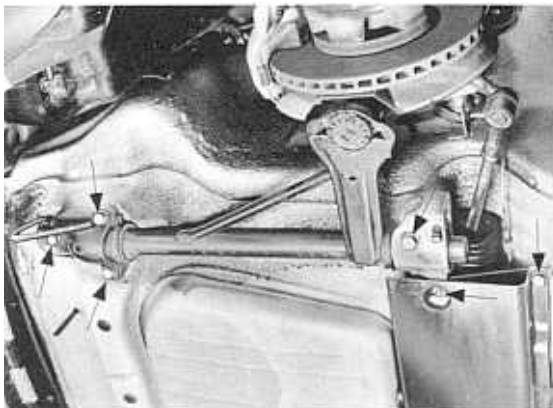
1. Disconnect brake hose at brake line after first depressing brake pedal somewhat with pedal strut to prevent brake fluid from escaping.

2. Unscrew stabilizer at suspension.



3. Remove guard.

4. Unscrew mounting screws at carrier and control arms.

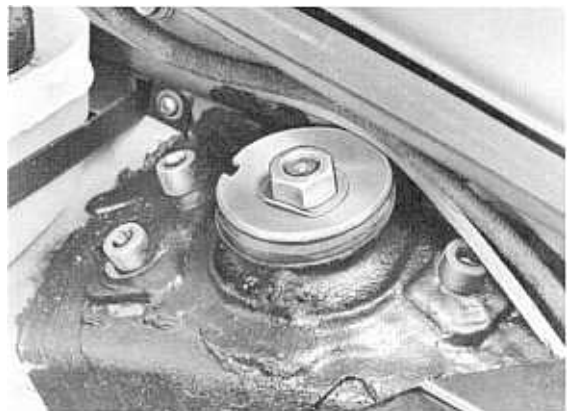


5. Place jack underneath carrier.

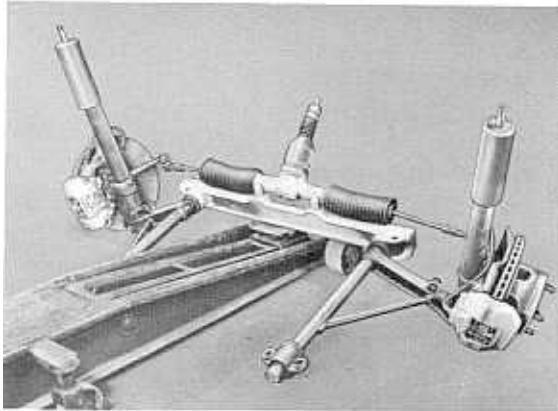
6. Detach steering shaft at steering shaft holder and lift joint off of steering shaft. Dismantle steering shaft holders.



7. Unscrew shock absorber hex nuts.



8. Lower complete front axle assembly.



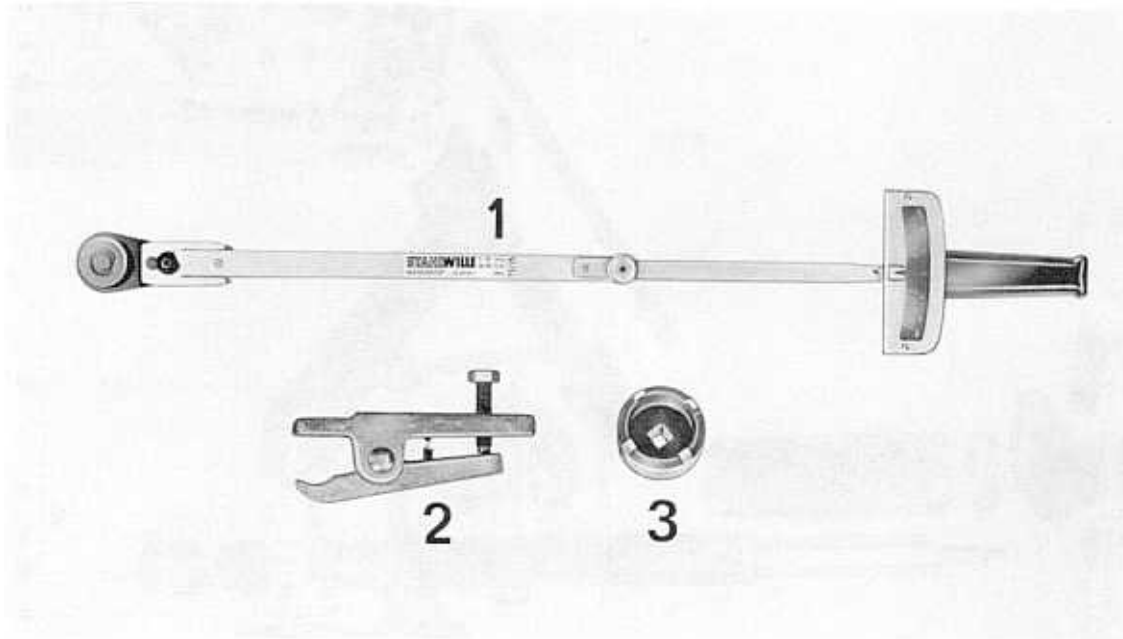
Note

Do not turn the steering wheel quickly from lock to lock when the car is raised, to prevent the cup from popping off at the steering gear or tie rod (air compensation).

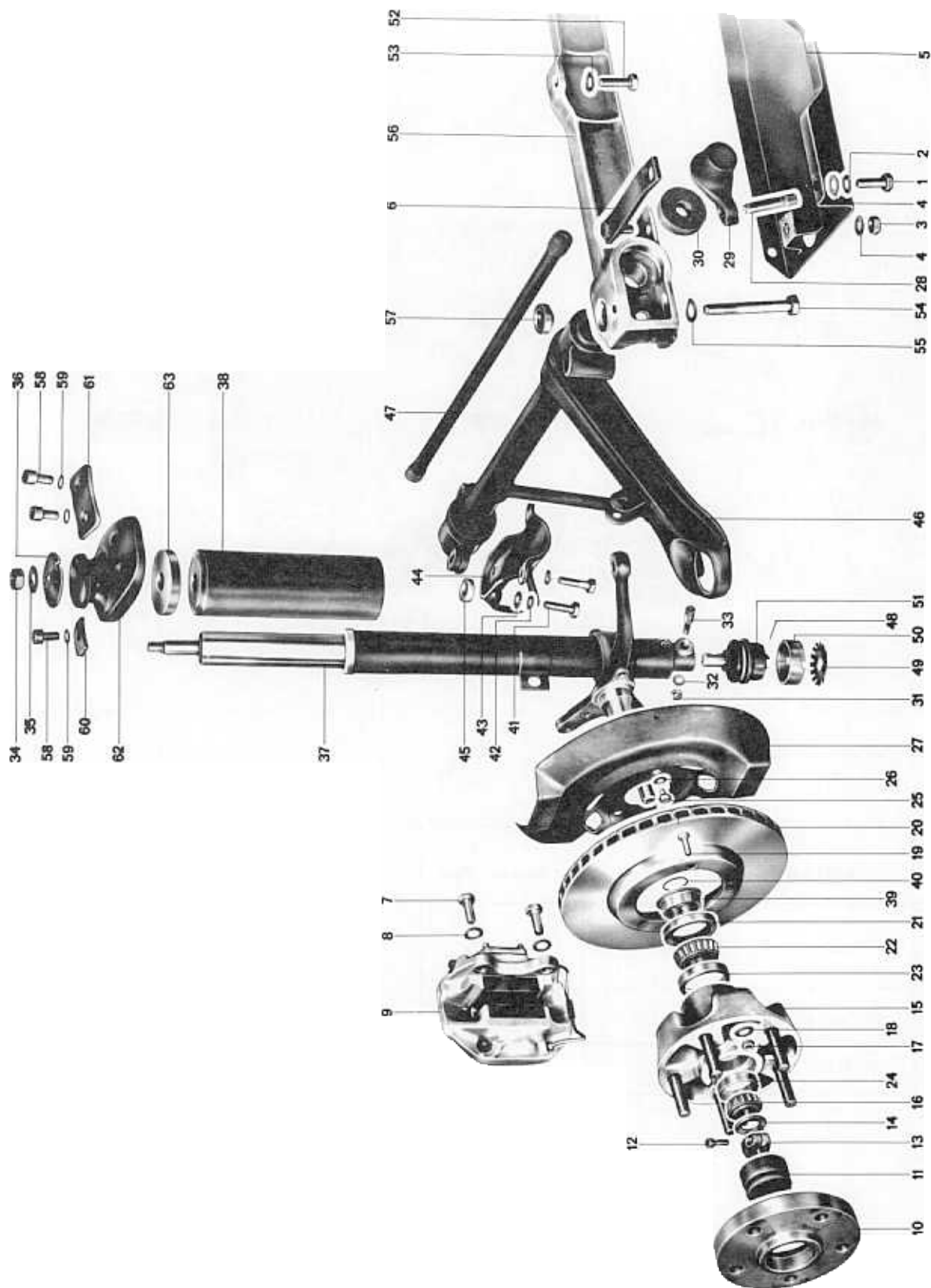
Installing

1. Raise complete front axle assembly.
2. Secure top of shock absorbers to body.
3. Secure bottom of front axle to body (carrier and control arms).
4. Connect brake hoses.
5. Bleed brakes.
6. Torque all mounting screws to specifications.

TOOLS



No.	Description	Special Tool	Remarks
1	Torque wrench		Commercial item, up to 36 mkg (261 ftlbs)
2	Tie rod remover		Commercial item
3	Wrench	P 280 b	



No.	Designation	Amt.	Notes		Remarks
			Removing	Installing	
1	Capscrew M 10	2		Torque to specifications	
2	Washer	2		Replace, if necessary	
3	Hex nut, self-locking	2		Torque to specifications	
4	Washer	4			
5	Guard	1			
6	Strut	2			
7	Hex hd screw	2		Torque to specifications	
8	Washer	2		Replace, if necessary	
9	Caliper	1			
10	Spacer	1			
11	Cap	1			
12	Capscrew	1		Torque to specifications	
13	Clamping nut	1			
14	Tab disc	1		Must just barely turn with screwdriver	
15	Wheel hub	1		Clean, check for wear, fill hub with ca. 60 g multi-purpose lubricant	
16	Taper roller bearing	1		Clean, check and lubricate. If necessary, replace.	
17	Hex nut M 8	5		Torque to specifications.	

No.	Designation	Amt.	Notes		Remarks
			Removing	Installing	
18	Washer	5		Replace, if necessary	
19	Hex head screw	5			
20	Brake disc	1		Check for wear and damage	
21	Radial seal	1		Replace, if necessary. Press in until seal is flush with hub.	
22	Taper roller bearing	1		Clean, check for wear and lubricate. Replace, if necessary.	
23	Outer race	1	Heat hub and press off race	Heat hub and install race	
24	Outer race	1	Heat hub and press off race	Heat hub and install race	
25	Hex hd screw	3		Torque to specifications	
26	Lockwasher	3		Replace, if necessary	
27	Guard	1			
28	Control screw	2		Lubricate with MoS ₂ . Readjust height	
29	Adjusting lever	2			
30	OWA gasket	2		Replace, if necessary	
31	Uni stop nut MS	1		Torque to specifications. Replace, if necessary	
32	Washer	1			

No.	Description	Amt.	Notes		Remarks
			Removing	Installing	
33	Threaded pin	1	Drive out	Install with lubricant. Position it correctly. Replace!	
34	Hex nut	1		Torque to specifications	
35	Lockplate	1		Replace, tab faces up.	
36	Support disc	1			
37	Strut	1		Check, replace if necessary	
38	Guard	1			
39	Spacer	1		Heat and install to stop	
40	Seal	1			
41	Hex hd screw M 10	3		Torque to specifications	
42	Lockwasher	2		Replace if necessary	
43	Washer	1			
44	Guard	1			
45	Spacer	1			
46	Control arm	1		Check	
47	Torsion bar	1		Check for damage, replacing if necessary. Note mark for installation. Lubricate	
48	Cotter pin	1		Replace	
49	Lockplate	1		Replace, if necessary	

No.	Description	Amt.	Notes		Remarks
			Removing	Installing	
50	Nut	1	Loosen with P 280 b	Torque to specifications. Lubricate threads	
51	Ball joint	1		Check, replacing if necessary	
52	Hex hd screw M 10	2		Torque to specifications	
53	Washer	2		Replace, if necessary	
54	Hex hd screw M 10	2		Torque to specifications	
55	Washer	2		Replace, if necessary	
56	Carrier	1		Check for damage	
57	Adaptor	2			
58	Capscrew	3		Torque to specifications	
59	Lockwasher	3		Replace, if necessary	
60	Single-hole pressure plate	1	Mark for reuse		
61	Double-hole pressure plate	1	Mark for reuse		
62	Support with rubber bearing	1		Check, replacing if necessary	
63	Spacer	1			

Technical data

Wheel suspension	independent wheel suspension with semi-trailing arms
Suspension	one round torsion bar per wheel, transverse
Torsion rod	Ø 26 mm - up to the end of Mod. 88 Ø 27 mm - from Mod. 89 onward*
Height adjustment - at DIN curb weight	Page 44 - 2
Adjustment of spring strut angle	Page 44 - 2
Shock absorber	double-action hydraulic shock absorbers
Manufacturer	Bilstein - different configuration from Mod. 89 onward
Anti-roll bar	Ø 18 mm - up to the end of Mod. 84 Ø 20 mm - from Mod. 85 to end of Mod. 88 Ø 18 mm - from Mod. 89 onward**

* Splines also modified in conjunction with new transverse rear axle tube

Angle also modified because of new transverse rear axle tube

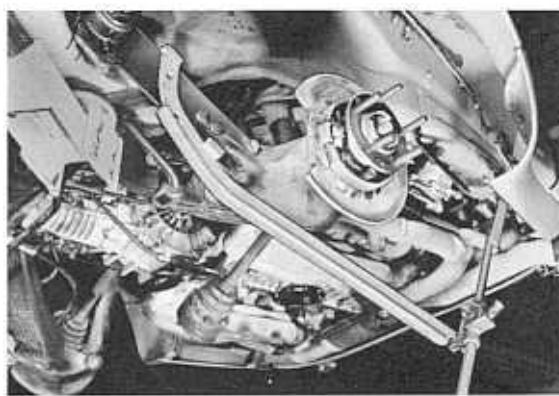
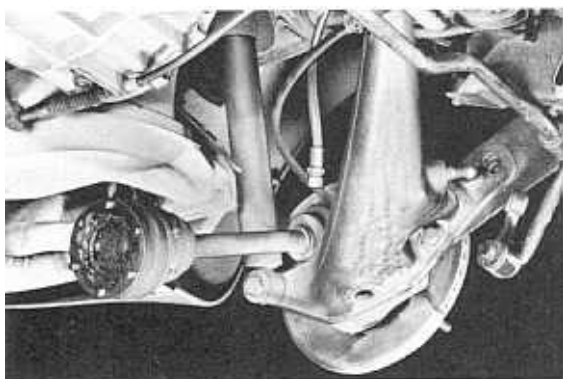
TORQUE SPECIFICATIONS FOR REAR AXLE

Location	Designation	Threads	Class	Torque	
				kpm	ft. lbs.
Cover to body	Bolt	M 10	8,8	4,7	34
Trailing arm to cross tube	Nut	M 14 x 1,5	10	6,0	43
Strut to trailing arm	Excenter	M 12 x 1,5	8,8	6,0	43
Strut to trailing arm	Bolt	M 12 x 1,5	10,9	9,5	69
Caliper to trailing arm	Bolt/capscrew	M 12 x 1,5	8,8	6,0	43
Shock absorber to trailing arm	Bolt	M 14 x 1,5	8,8	12,5	90
Shock absorber to body	Nut	M 10 x 1	8	2,5	18
Brake line	Coupling	M 10 x 1		1,4	10
Stabilizer to body	Bolt	M 8	8,8	2,5	18
Propeller shaft flange	Capscrew	M 10	12,9	8,3	60
Guard and brake backplate to trailing arm	Bolt	M 8	8,8	2,5	18
Wheel to wheel hub	Nut	M 14 x 1,5		13	94
Wheel hub to drive shaft	Castle nut	M 20 x 1,5	10,9	30-32	217-231
Brake disc to wheel hub	Ctsk screw	M 6	8,8	0,5	4
Stabilizer to suspension	Nut	M 12 x 1,5	8/8,8	8,5	61
Stabilizer suspension to trailing arm	Bolt	M 12 x 1,5	8,8	8,5	61
Adjusting lever to strut	Bolt	M 16 x 1,5	10,9	24,5	177
Adjusting lever to strut	Eccentric bolt	M 16 x 1,5	10,9	24,5	177

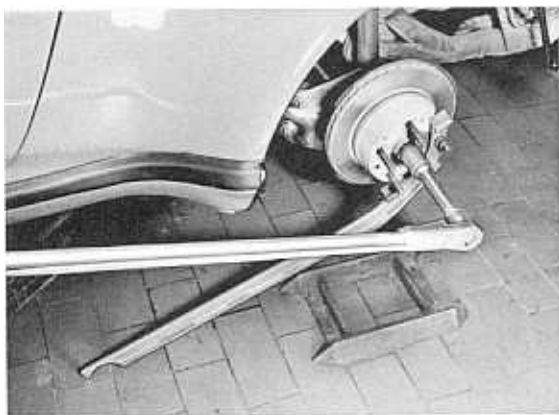
REMOVING AND INSTALLING REAR AXLE

Removing

1. Lift car.
2. Detach brake line at caliper and rear axle trailing arm. First depress brake pedal somewhat with pedal strut to prevent the brake fluid from escaping out of the reservoir.
3. Disconnect stabilizer at rear axle trailing arm.
4. Detach drive shaft at transmission flange.
6. Remove brake disc.
7. Lift rear axle strut with special tool P 289. Detach shock absorber at rear axle trailing arm.



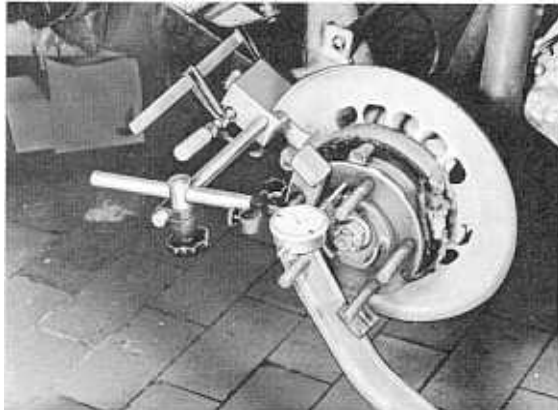
5. Remove drive shaft castle nut cotter pin and unscrew nut.
8. Remove special tool P 289. Pull out drive shaft with joint toward inside of car.
9. Remove cotter pin and castle nut at parking brake cable. Pull out parking brake cable on inside of car.
10. Detach rear axle trailing arm at cross tube and strut. Remove rear axle trailing arm.



Installing

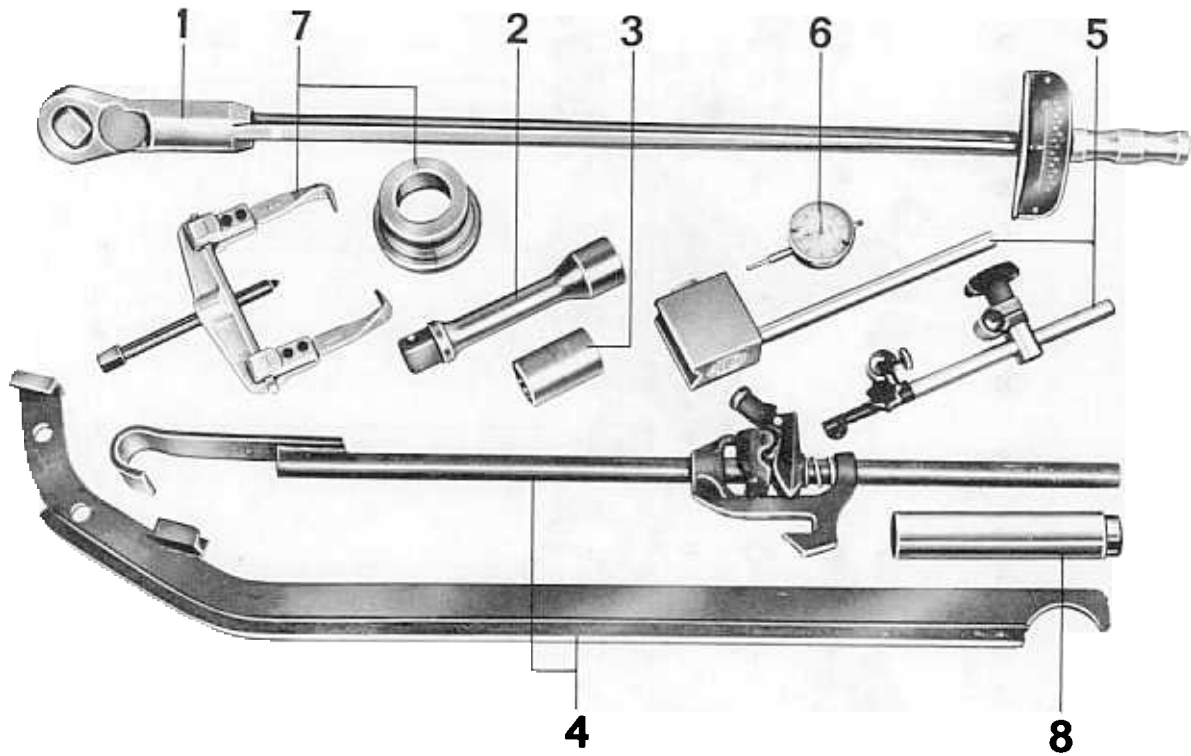
Slide in drive shaft through rear wheel hub before securing the shock absorber.

2. Install spacer and parking brake cable.
3. Torque axle nuts to specifications.
4. Check axial play of wheel bearings.
Max. wheel bearing play is 5/100 mm.
Adjust play if necessary.

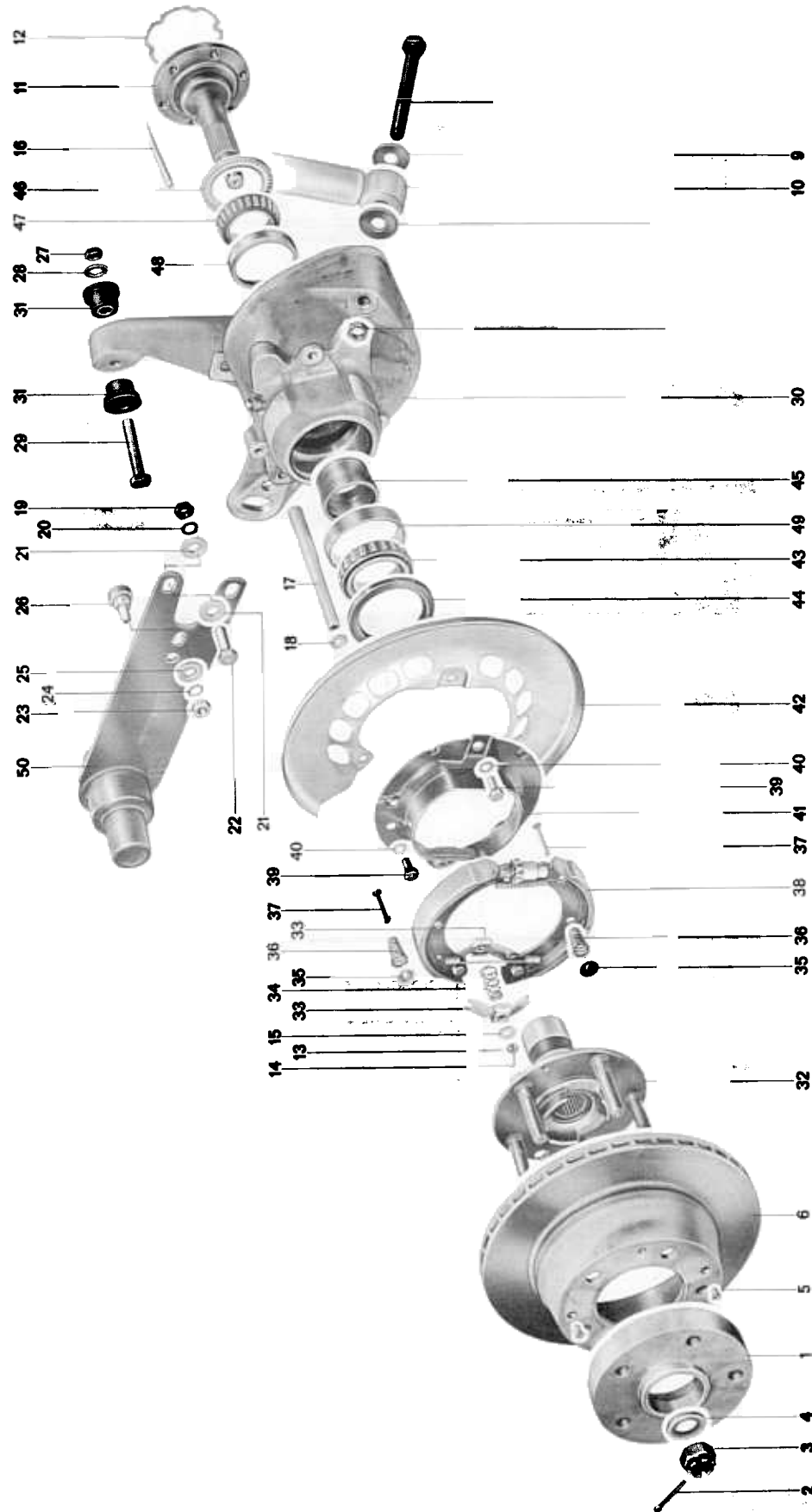


5. Lock castle nut.
6. Install brake disc, adjust parking brakes and bleed brakes.
7. Torque all screws and bolts to specifications.

TOOLS



No.	Description	Special Tool	Remarks
1	Torque wrench		Commercial item, up to 750 Nm (75 kpm)
2	Extention		Commercial item
3	Hexagon socket SW 30		Commercial item
4	Strut retractor	P 289	Check tool, see page 42 - 8
5	Dial gauge holder with magnetic column		Commercial item
6	Dial gauge		Commercial item
7	Extractor with grip ring		Commercial item
8	Removal mandrel	P 297 a	



No.	Description	Amt.	Notes		Remarks
			Removing	Installing	
1	Spacer	1			
2	Cotter pin	1		Replace, if necessary	
3	Castle nut	1		Torque to specifications	
4	Washer	1			
5	Screw M 6	2		Torque to specifications	
6	Brake disc	1		Check for wear	
7	Hex nut M 14 x 1.5 self-locking	1		Torque to specifications	
8	Hex hd screw	1			
9	Washer	2			
10	Vibration damp.	1			
11	Drive shaft	1	Pull out on inside of car		
12	Gasket	1		Paste to drive shaft	
13	Cotter pin	1		Replace	
14	Castle nut M 6	1		Screw on parking brake cable until cotter pin hole aligns	
15	Washer	1			
16	Parking brake cable	1		Pull out on inside of car	
17	Spacer	1		Install correctly, large pipe dia. faces in.	
18	Washer	1			

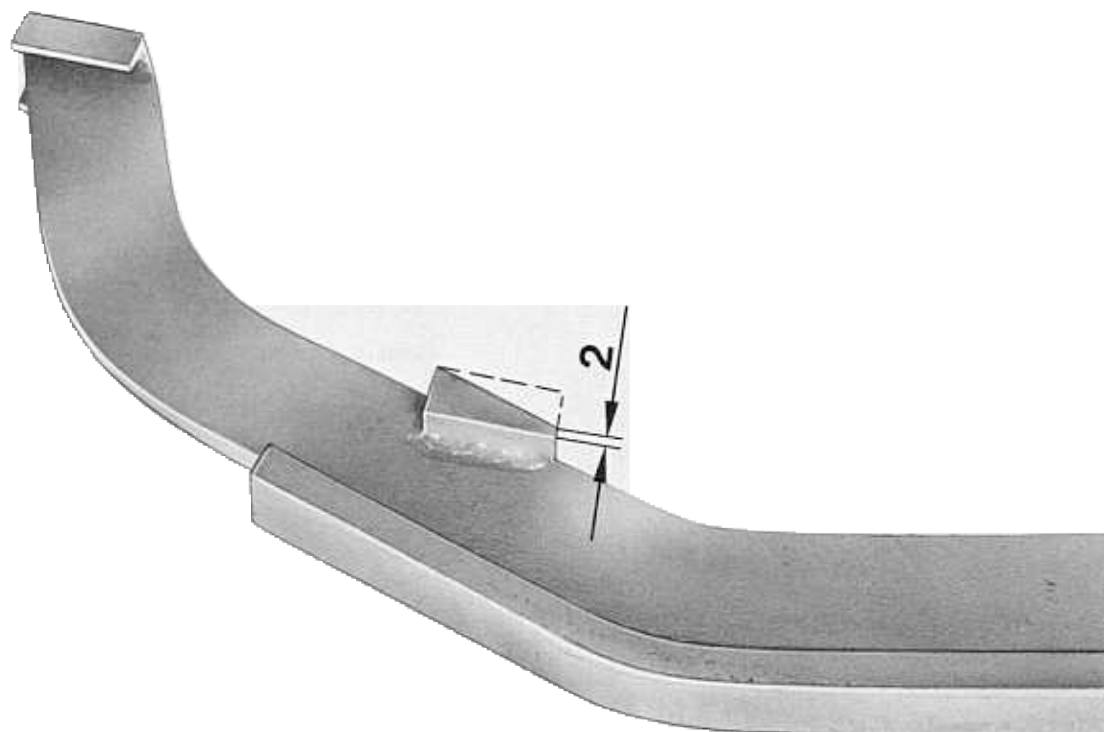
No.	Description	Qty.	Note When:		Special Instructions
			Removing	Installing	
19	Nut M 12 x 1.5	2		Torque: 120 Nm	page 42 - 11
20	Lockwasher	2			page 42 - 11
21	Washer	4			
22	Bolt	2			page 42 - 11
23	Nut M 12 x 1.5	2		Torque: 85 Nm	page 42 - 11/12
24	Lockwasher	2			page 42 - 11/12
25	Washer	1		only with camber excenter	
26	Camber excenter	1	Mark position for reinstallation		page 42 - 11/12
—	Toe excenter	1			
27	Self-locking nut M 14 x 1.5	1			page 42 - 10
28	Washer	1			
29	Bolt	1			page 42 - 10
30	Trailing arm	1			page 42 - 10/12
31	Flange block	2		Press in to stop	
32	Wheel hub	1	Drive out with P 297 a	Press into outer wheel bearing	
33	Spreader	2		Install correctly	
34	Spring	1			
35	Spring retainer	2		Install correctly	
36	Spring	2			
37	Pin	2		Check for correct fit in spring retainer	
38	Brake shoes with adjuster	1			

No.	Description	Qty.	Note When:		Special Instructions
			Removing	Installing	
39	Bolt	3		Torque: 25 Nm	
40	Lockwasher	3		Replace if necessary	
41	Brake backplate	1			
42	Guard	1			
43	Taper roller bearing, outer	1		Check, lubricate taper rollers with multiple purpose grease	
44	Shaft seal	1		Press in to stop	
45	Spacer	1		Install in correct position	
46	Shaft seal	1		Press in to stop	
47	Taper roller bearing, inner	1		Check, lubricate taper rollers. Drive on hub until bearing rests on spacer.	
48	Outer bearing race	1	Heat arm and drive out	Heat arm and drive in with suitable mandrel	
49	Outer bearing race	1	Heat arm and drive out	Heat arm and drive in with suitable mandrel	
50	Strut	1		Strut angle specified on page 42 - 01 and 44 - 1	Two-piece rear axle strut since 1977 models for correction of car height and wheel load difference with an excenter bolt. Struts adjusted in plant that entire range for higher adjusting is available.

MACHINING STRUT RETRACTOR P 289

Various modifications have been made on the rear axle of 911/911 Turbo cars since the beginning of production.

Consequently the holder on P 289 must be adapted to the present state. If tool is not changed, the light alloy rear axle trailing arms could be damaged when clamping the tool between spring strut and trailing arm to tighten the mounting bolts.

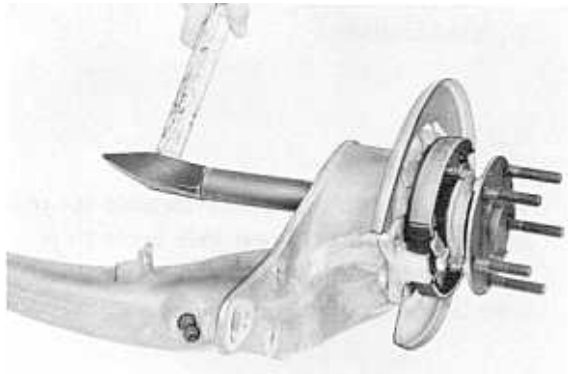


Holder shape before machining

DISMANTLING AND ASSEMBLING INSTRUCTIONS

Disassembling

1. Drive out rear wheel hub with special tool P 297 a.



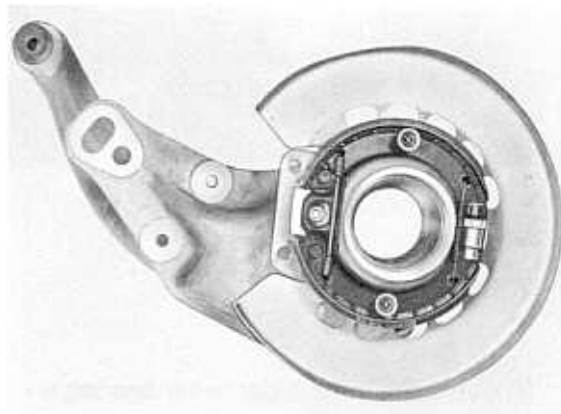
2. Pull wheel bearings off of rear wheel hub. Use extractor with grip ring. Only grab hold of bearing at rollers.



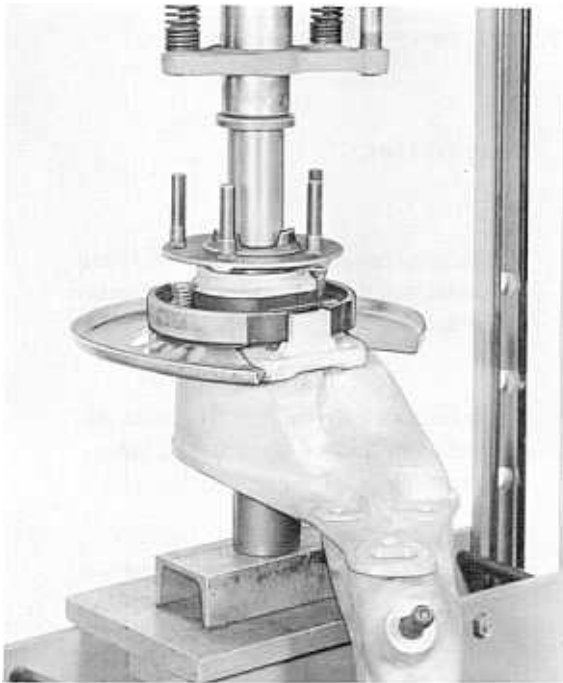
3. Heat trailing arm (heating plate, oven). Drive outer bearing races out of trailing arm.

Assembling

1. Heat trailing arm. Insert outer bearing races and drive in with an appropriate mandrel.
2. Install parking brake with anchor and guard on trailing arm. Install inner cross spring.

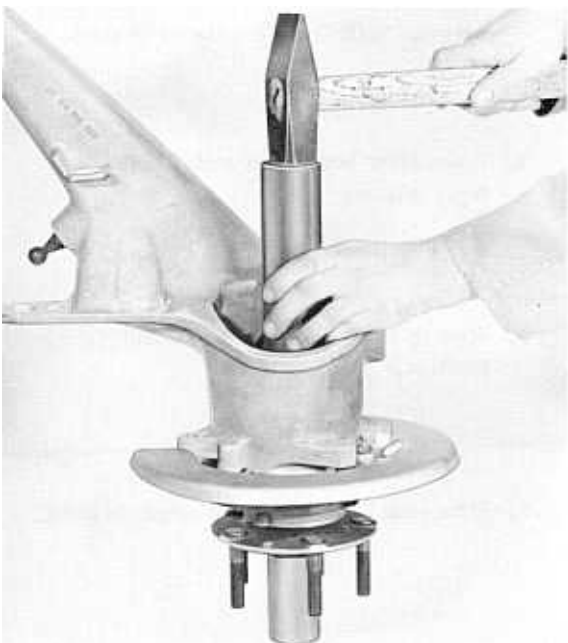


3. Lubricate bearing surfaces of trailing arm with a multi-purpose lubricant (fill space between both bearing surfaces in arm).
4. Place outer bearing in arm. Lubricate taper rollers.
5. Press in outer shaft seal to correct position.
6. Press wheel hub into outer wheel bearing.



7. Install spacer.

8. Lubricate inner taper roller bearing and drive it onto the wheel hub until bearing rests on spacer.



9. Bolt rear axle trailing arm on body (refer to information note for point 11). Slide in propeller shaft with drive shaft.

10. Adjust rear wheel bearings.

11. Adjust parking brake. Bleed brakes. Torque all screws and bolts to specifications.

Note :

The bolting and tightening torques for rear axle trailing arms to rear axle cross tube and rear axle trailing arms to spring struts have been changed.

Rear Axle Trailing Arm to Rear Axle Cross Tube

Tightening torque increased from 60 to 100 Nm. This requires the use of a higher self-locking nut (12 mm instead of 9 mm, length of threads now 80 mm instead of 75 mm).

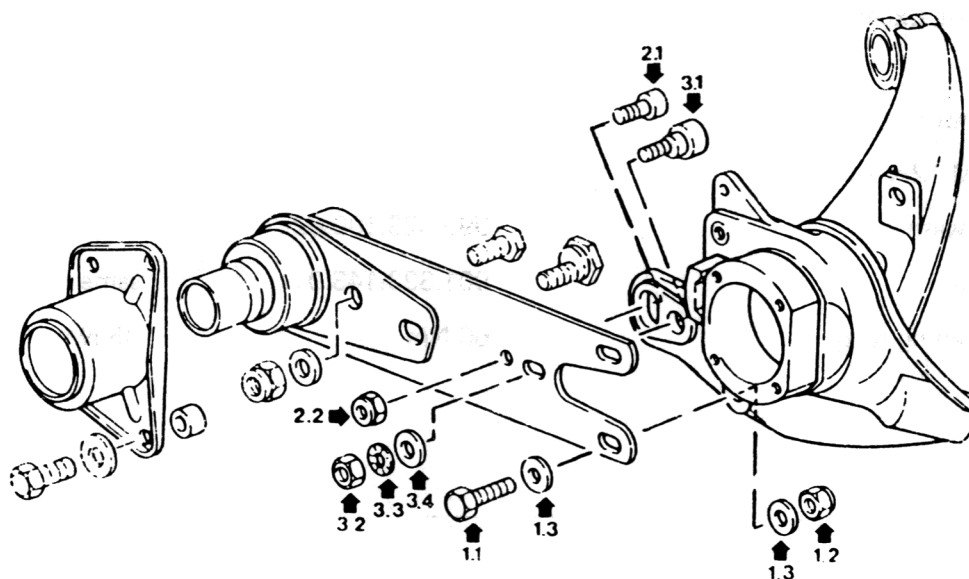
Mount parts with the 12 mm high nut and 80 mm long bolt.

There is not sufficient space for this in 911 Sportomatic models. In this case the increased tightening torque may also be applied on the 9 mm high nuts. However, tightening the 9 mm high nut with a torque of 100 Nm (10.0 kpm) is only permissible once, so that these nuts must always be replaced after loosening or removing.

Rear Axle Trailing Arm to Spring Strut

Self-locking nuts are used instead of hexagon nuts with lockwashers (Schnorr) on rear axle trailing arm/spring strut connections and toe excenters beginning with December of 1983. The tightening torque value was also increased. The new bolts and self-locking nuts can be installed retroactively. The higher torque value is applicable to old and new version bolting. It is recommended to replace removed self-locking nuts.

Survey of Changes



Rear Axle Trailing Arm – Spring Strut

	Old	New
1.1 Bolt	900.083.019.08 (M 12 x 1.5 x 35)	900.083.025.08 (M 12 x 1.5 x 40)
1.2 Nut M 12 x 1.5	900.076.035.02 (hex. nut)	900.910.085.02 (self-locking nut)
Lockwasher	999.523.109.02	none
1.3 Washer (bolt head and nut ends)	901.333.143.01	same
Tightening torque	90 Nm	120 Nm

2. Toe Excenter

	Old	New
2.1 Excenter	901.333.133.05	same
2.2 Nut M 12 x 1.5	900.076.035.02 (hexagon nut)	900.910.085.02 (self-locking nut)
Lockwasher	999.523.109.02	none
Tightening torque	60 Nm	85 Nm

3. Camber Excenter

	Old	New
3.1 Excenter	901.333.133.04	same
3.2 Nut M 12 x 1.5	900.078.017.02	same
3.3 Lockwasher	999.523.109.02	same
3.4 Washer	901.333.143.01	same
Tightening torque	60 Nm	85 Nm



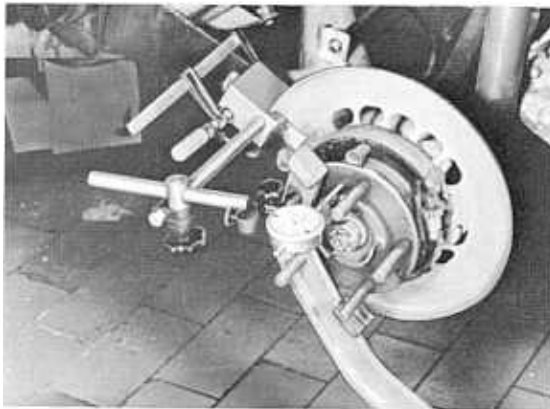
ADJUSTING REAR WHEEL BEARINGS

The spacer between both rear wheel bearings is designed to be shortened in length permanently when tightening the castle nut more than a certain torque (normally more than 300 Nm / 217 ft.lbs.)

1. Tighten castle nut to 20 kpm (145 ft. lbs.). Check axial play (specification: more than 5/100 mm). Replace spacer, if length had already been shortened (axial play less than 5/100 mm).

Note

Dial gauge holder must be mounted on trailing arm or spring strut.



2. Tighten castle nut to 30 kpm (217 ft. lbs.). Re-check axial play.

3. Continue turning nuts until an axial play of 4/100 to 1/100 mm is reached (while turning the torque could rise up to 45 kpm/325 ft. lbs.).

Note

Check play several times while tightening and also observe the cotter pin hole.

4. Insert cotter pin. Loosen nut when nut is offset to cotter pin hole. Tighten nut to specified torque (30 to 32 kpm/217 to 231 ft. lbs.) and then tighten further until nut can be locked.

5. Check axial play. Play must not exceed 5/100 mm. Repeat adjusting procedures from point 3, if play is greater.

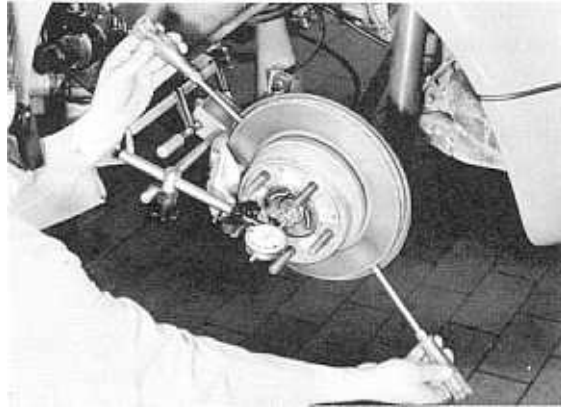
Note

No axial play can be accepted, if a wheel bearing friction force of max. 1.5 kp (3.2 lbs.) is not exceeded with cotter pin inserted and tightening torque of at least 32 kpm (231 ft. lbs.) (adjustment of axial play and possibly further tightening to next cotter pin hole).

CHECKING WHEEL BEARING PLAY

1. Remove wheel and take off brake liners.
2. Secure dial gauge holder with dial gauge to rear axle trailing arm or strut.
3. Check axial play.

Adjust play if it is more than 0.05 mm
(see page 42 - 13).



Technical Data (Model 75)**R i m s a n d T i r e s**

Rims	Forged aluminum
Standard tires — front wheels rear wheels	185/70 VR 15 on 7" aluminum rim 215/60 VR 15 on 8" aluminum rim
Cold tire inflation — front rear	2.0 bar 2.5 bar
Special tires — front wheels rear wheels	205/50 VR 15 on 7" aluminum rim 225/50 VR 15 on 8" aluminum rim
Cold tire inflation — front rear	2.0 bar 2.5 bar
Winter tires — front and rear	See page 44 - 05
Cold tire inflation	Same as standard tires
Spare wheel *	Collapsible tire on 5 1/2 J 15 steel rim, compressor supplied

* When using special tires together with a limited slip differential, the collapsible tire (spare wheel) can only be used on front axle wheels.

Technical Data (Model 76)

Rims and Tires	Turbo	Turbo Carrera (USA)
Rims	Forged aluminum	Forged aluminum
Standard tires Front wheels Rear wheels	205/50 VR 15 on 7" rims 225/50 VR 15 on 8" rims	185/70 VR 15 on 7" rims 215/60 VR 15 on 8" rims
Special tires Front wheels Rear wheels	185/70 VR 15 on 7" rims 215/60 VR 15 on 8" rims	— —
Tire inflation pressure (cold) Front wheels Rear wheels	2.0 bar 2.5 bar	2.0 bar 2.5 bar
Winter tires (front + rear)	See page 44 - 05	
Tire inflation pressure (cold)	Same as for standard tires	
Spare wheel *	Collapsible tire on 5 1/2 J x 15 steel rim, incl. compressor	
* When using standard tires 50 % in conjunction with a limited slip differential, the collapsible tire wheel can only be used on the front axle wheels.		Not applicable in the USA.

Technical Data (Model 77)

Rims and Tires	Turbo and Turbo Carrera (USA)
Rims	Forged aluminum
Standard tires	
Front wheels	205/55 VR 16 on 7" rims
Rear wheels	225/50 VR 16 on 8" rims
Special tires	
Front wheels	185/70 VR 15 on 7" rims
Rear wheels	215/60 VR 15 on 8" rims
Cold tire inflation pressure	
Front wheels	2.0 bar
Rear wheels	2.5 bar
Winter tires	
Front	) See page 44 - 05
Rear	
Front and rear	
Cold tire inflation pressure	Same as for standard tires
Spare wheel	Collapsible tire on 5 1/2 J x 15 steel rim Compressor supplied 2.2 bar inflation pressure

Technical data (Model 78 onward)**Wheels and tires**

Wheels	Forged alloy
Tires: front axle	205/55 VR* 16 on 7 J x 16 rim
Rear axle	225/50 VR* 16 on 8 J x 16 rim Model 86 onwards 245/45 VR* 16 on 9 J x 16 rim
Spare wheel	Folded tire 165/15 on 5 1/2 x 15 rim Compressor provided

Tire pressure - cold tires

Turbo		Turbo - USA, Japan, Canada
Front	** 2.0 bar	** 2.0 bar
Rear	3.0 bar	2.5 bar or 3.0 bar ***
Folded tire	2.5 bar or 2.2 bar ****	2.5 bar or 2.2 bar****

Winter tires Page 44 - 05

- * ZR from current Model year 1989 onwards. Refer to Technical Information, Group 4 for notes on replacement, also for vehicles prior to Mod. 78.

2.5 on the front axle for 911 turbo with tuned engine (243 kW) and for 911 Carrera/911 Turbo lowered versions - with or without tuned engine.

- *** The tire pressure is determined by the code on the tire specifying the max. permitted tire pressure.

"Max. press. 36 psi" = 2.5 bar

"Max. press. 44 psi" = 3.0 bar

Max. press. 44 psi" = 3.0 bar are the only tires fitted to vehicles from Model 86 onwards.

- **** 165 - 15 4 PR 83 P tires - 2.2 bar
165 - 15 8 PR 89 P tires - 2.5 bar

Technical data

Winter tires*

Observe tachometer assignment if 50 series summer tires, 15 inch version were fitted (Model 76 and Model 75 with special tires).

Tires**	Rims - possible and recommended sizes. Recommended sizes in bold print.		
195/65 R 15 M + S 91 T front and rear	6 J x 15 H2 front and 7 J x 15 H2 rear		
195/65 R 15 M + S 91 T front 215/60 R 15 M + S 93 T rear	6 J x 15 H2 front 7 J x 15 H2 rear	or	7 J x 15 H2 front 8 J x 15 H2 rear
205/55 R 16 M + S 88 T front and rear	6 J x 16 H2 front and 7 J x 16 H2 rear	or	7 J x 16 H2 front and 8 J x 16 H2 rear
205/55 R 16 M + S 88 T front 225/50 R 16 M + S 92 T rear	6 J x 16 H2 front 7 J x 16 H2 rear	or	7 J x 16 H2 front 8 J x 16 H2 rear
Tire pressure - cold tires: (bar)	Turbo 3.0 l front 2.0 bar rear 2.5 bar	Turbo 3.3 l (Mod. 78 onward) 2.0 bar 3.0 bar	

- * Refer to the Technical Information (TI), Group 4 for notes and recommendations with respect to winter tires and snow chains, as well as approved disk wheels (rims).
Only forged alloy disk wheels or the explicitly approved cast wheels may be installed.

The only M + S tires of version H which may be used are those specified in the recommendation (TI).

The technically permitted maximum speed for winter tires is indicated by the figure (speed index) after the dimension code:

Q = Max. 160 km/h
 T = Max. 190 km/h
 H = Max. 210 km/h

Specifications for alignment

The following values apply to a car at curb weight as per DIN 70020 (full fuel tank, with spare wheel and tools).

(Values in brackets: for turbo Carrera USA, turbo Canada, Japan up to end of Model 82 only.

The specifications are the same as those for rest of the world vehicles from Model 83 onward).

	Specification and tolerance	max. difference between left and right
Front axle		
Height adjustment:		
Wheel center over center of torsion bar	94 mm $\pm$ 5 mm* (85 mm $\pm$ 5 mm)*	5 mm
Toe - unpressed	+ 15' $\pm$ 5'	
Toe difference angle at 20° lock	0° to + 30' (0° to - 50' electronic axle measuring unit)	only influenced by replacisng steering arms
Front wheel chamber with wheels straight	0° $\pm$ 10' (+ 30' $\pm$ 10')	10'
Caster	6° 5' $\pm$ 15'	30'

* The height specifications only apply to new vehicles. Run-in vehicles may be up to 10 mm lower, i.e. the tolerance may be up to 15 mm lower. This must, however, be the same for both axles.

The following values apply to a car at curb weight as per DIN 70020 (with full fuel tank, spare wheel and tools).

(Values in brackets: for turbo Carrera USA, turbo Canada, Japan up to end of Model 82 only.
The specifications correspond to those of rest of world vehicles from Model 83 onward.

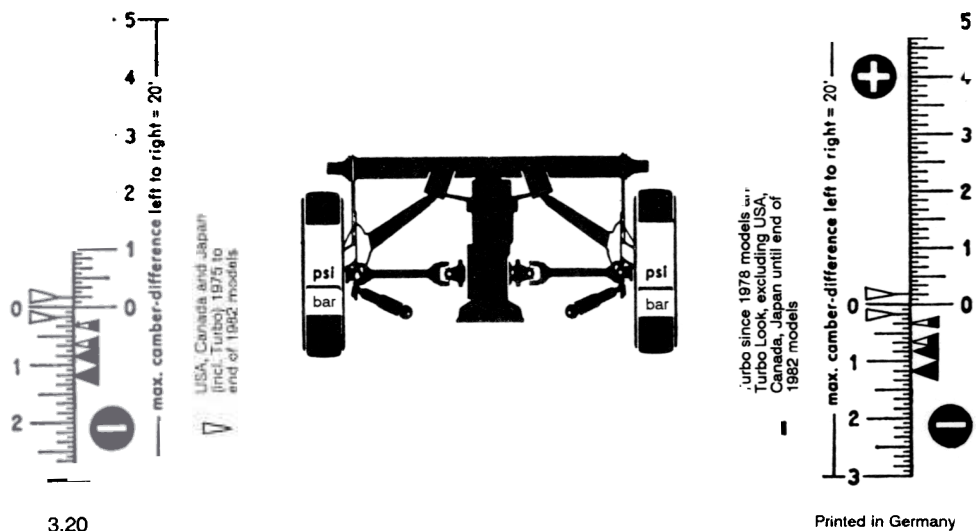
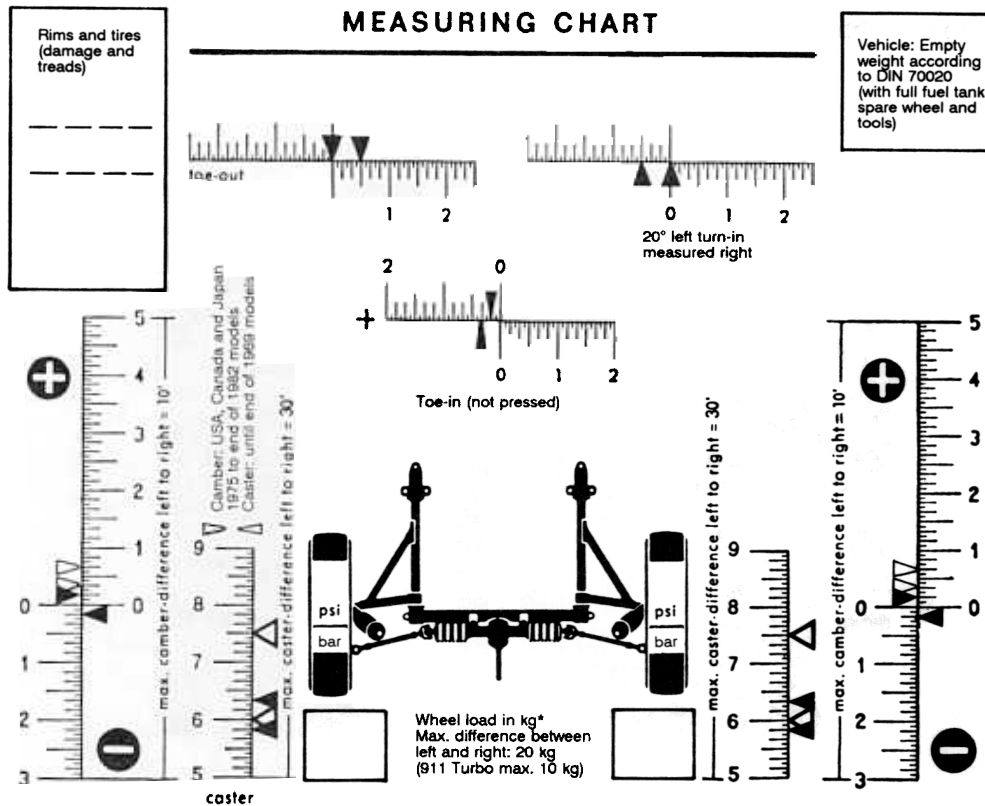
		Specification and tolerance	max. difference between left and right
Rear axle			
Height setting			
Center of transverse tube via center of rear wheel		12 mm $\pm$ 5 mm* (37 mm $\pm$ 5 mm)*	8 mm
Spring strut setting ** Angle of spring strut			
Turbo 3.0 Torsion bar $\varnothing$ 26 mm (up to end of Mod. 77)		31° (34°)	0.5°
Turbo 3.3 Torsion bar $\varnothing$ 26 mm (from Model 78 to end of Mod. 88)		33° (37°)	0.5°
Torsion rod $\varnothing$ 27 mm (Mod. 89 onward)		32°	0.5°
Toe per wheel		+ 10' + 10'	10'
Camber	Up to end of Mod. 77	- 50 $\pm$ 10' (0° $\pm$ 10')	20'
	Mod. 78 onward (Turbo 3.3)	- 30' $\pm$ 10' (0° $\pm$ 10')	20'

* The height settings only apply to new vehicles. Run-in vehicles may be up to 10 mm lower, i.e. a tolerance may be up to 15 mm lower. This must, however, be the same for both axles.

** 1° Alteration of the spring strut angle corresponds to approx. 7 - 9 mm alteration in vehicle height.

Sample test card

Name: _____ Vehicle: All Porsche Types 911
 Vehicle Ident. No.: _____ License plate No: _____ miles/km: _____
 Date: _____ measured by: _____

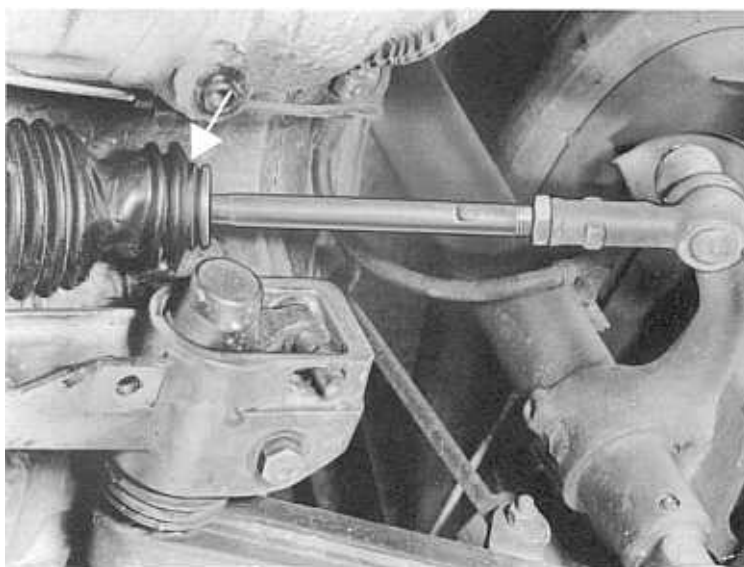


Notes on alignment

Because of the type of seal installed between steering gear and tie rods, the rubber boot becomes twisted when adjusting the toe and may be damaged.

To prevent this, pull the rubber boot away from the recess in the tie rod.

Always replace the rubber boot when adjustment has been completed.



TECHNICAL DATA FOR TURBO 3.3 – SINCE 1978 MODELS

Description	Remarks Specifications	Wear Limit
Service brake (foot-operated)	Hydraulic dual circuit brakes with front/rear wheel brake circuit division (black/white), brake booster, inboard vented and perforated brake discs with calipers on all four wheels. Each brake caliper is fitted with four pistons. Push rod brake circuit belongs to rear wheels.	
Tandem brake master cylinder		
Bore dia.	23.81 mm	
Stroke	18/14 mm	
Brake pedal to brake booster ratio	5.14	
Brake booster diameter	8 inches *	
Boosting factor	2.25	
Since 1985 models	3.0	
Play at brake pedal with bled brakes and stopped engine	at least 10 mm	
Piston dia. in caliper	front 38 mm rear 30 mm	
Brake disc dia.	front 304 mm rear 309 mm	
Effective brake disc dia.	front 247 mm rear 251 mm	
Pad area of each front wheel	94 cm ²	
Pad area of each rear wheel	94 cm ²	
Total pad area	376 cm ²	
Pad thickness	front 13 mm rear 13 mm	2 mm 2 mm
New brake disc thickness	front 32 mm rear 28 mm	

* The internal ratio (boosting factor) in the brake booster has been changed: formerly 2.25, since 1985 models 3.0. Code since 1985 models: label showing 3.0 ratio. It is possible to install the modified brake booster in older models (beginning with 1978).

Description	Remarks Specifications	Wear Limit
Min. brake disc thickness after machining *	front 30.6 mm rear 26.6 mm	30 mm 26 mm
Thickness tolerance	max. 0.02 mm	
Brake disc lateral runout	max. 0.05 mm	
Installed brake disc lateral runout	max. 0.1 mm	
Peak-to-valley surface finish of brake discs after machining	max. 0.006 mm	
Parking brake (hand-operated)	Drum brakes with mechanical action on both rear wheels	
Brake drum dia.	180 mm	181 mm
Brake shoe width	25 mm	
Liner area per wheel	85 cm ²	
Liner thickness	4.5 mm	2 mm

* Brake disc must only be machined symmetrically, i. e. uniformly on both sides.
Deburr vent holes after machining.

TORQUE SPECIFICATIONS FOR MECHANICAL BRAKE PARTS

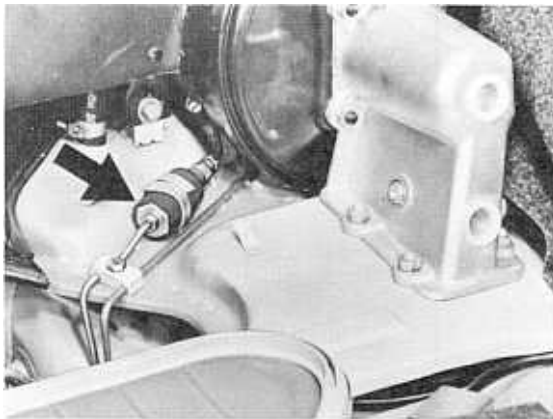
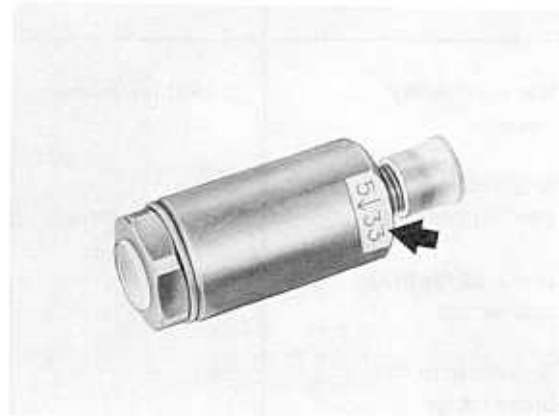
Location	Description	Threads	Class	Torque Nm (ft lb)
Nut on steering knuckle	Socket hd. screw	M 7	10.9	15 (11)
Brake caliper to steering knuckle	Bolt, Socket hd. screw	M 12x1.5	8.8	70 (51)
Brake flange/brake disc to hub	Bolt	M 8	8.8	23 (17)
Brake disc to brake flange	Bolt	M 6	8.8	10 (7)
Splash shield to steering knuckle	Bolt	M 8	8.8	10 (7)
Splash shield and brake backing plate to control arm	Socket hd. screw	M 8	8.8	25 (18)
Brake disc to wheel hub	Flat hd. screw	M 6	8.8	5 (3.6)
Brake caliper to control arm	Bolt, Socket hd. screw	M 12x1.5	8.8	60 (43)
Wheel to wheel hub	Wheel nut	M 14x1.5		130 (94)

INFORMATION ON BRAKES OF 911 CARRERA TURBO-LOOK

The 911 Carrera in Turbo-Look has the brake system of the Turbo 3.3.

However, the rear wheel brake circuit has a brake force regulator as in the 911 Carrera. The brake force regulator is located on the luggage compartment floor immediately behind the brake master cylinder.

It is bolted on the brake master cylinder of RHD cars.



The second number next to the switching pressure (separated by an arrow showing the direction of flow) indicates the reducing factor.

5 means a reducing factor of 0.46.

Brake force regulators with the code "3" (reducing factor = 0.3) must never be used.

Brake force regulator switching pressure = 33 bar. The switching pressure was changed to 55 bar with the 1985 models. The brake force regulator with a 55 bar switching pressure can also be installed in Turbo-Look cars before 1985 models. The switching pressure is stamped on the brake force regulator.



CHECKING THICKNESS OF BRAKE PADS

Cars without Brake Pad Wear Indicator

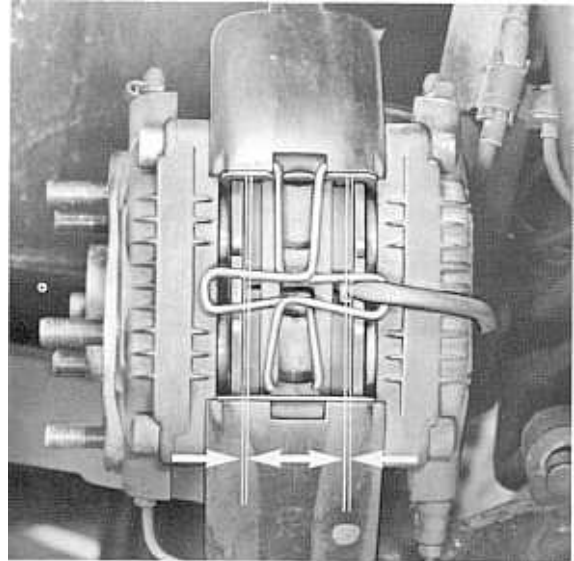
Brake pads must be replaced when thickness of 2 mm is reached.

Cars with Brake Pad Wear Indicator (since 1984 Models)

All brake pads of one axle must be replaced when the brake pad wear indicator lamp comes on and, however, not later than after reaching a thickness of 2 mm. If brake pad wear is indicated by the lamp, the warning contact (sensor with lead and plug) must also be replaced. The warning contact need not be replaced, if brake pads are replaced at latest when reaching a thickness of 2.5 mm.

Warning contacts with ground cores of leads must be replaced. Replacements, however, are not necessary when only the plastic part of the warning contact is ground.

2. Visually inspect brake pads for wear.



The wear limit is reached when the pads have a remaining thickness of 2 mm.

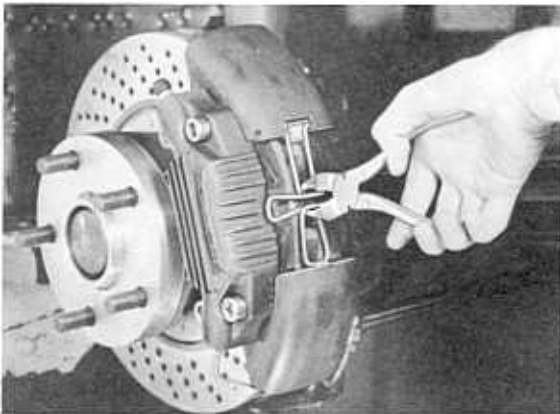
1. Remove wheels to check brake pad thickness.

REMOVING AND INSTALLING BRAKE PADS – TURBO 3.3, BEGINNING WITH 1978 MODELS

Removing

If brake pads are supposed to be reused, mark them when removing. It is not permissible to shift pads from outside to inside or vice versa and from right to left wheel or vice versa, because this could cause uneven braking effect.

1. Compress spreader spring at center and remove from holding tab.



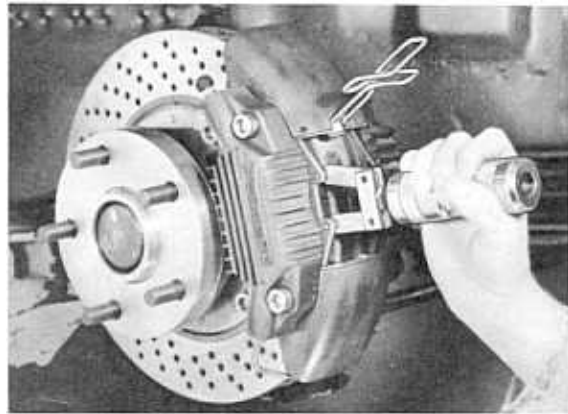
2. Pull warning contact out of pad plate in cars with a brake pad wear indicator. This is done by pulling brake pad out of brake pad recess slightly or disengaging lead in clip on brake line.

Note :

Replace warning contacts, if the lead's core is ground through or ground. The warning contact is still usable, if only the plastic part of the warning contact has signs of grinding.



3. Pull out brake pads with a suitable tool, e. g. Hazet 1966 - 2 impact puller with 4 mm pin diameter.

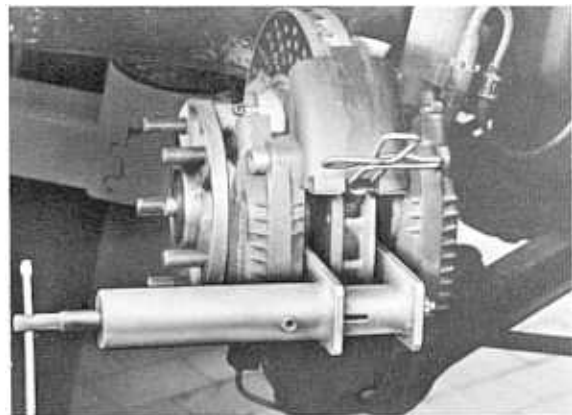


Installing

Note :

Replace brake pads, which show deep cracks, are loose on the brake pad plates or are splattered with oil. In this case, too, it is necessary to replace all four pads of one axle.

1. Push back piston to initial position with piston setback tool.



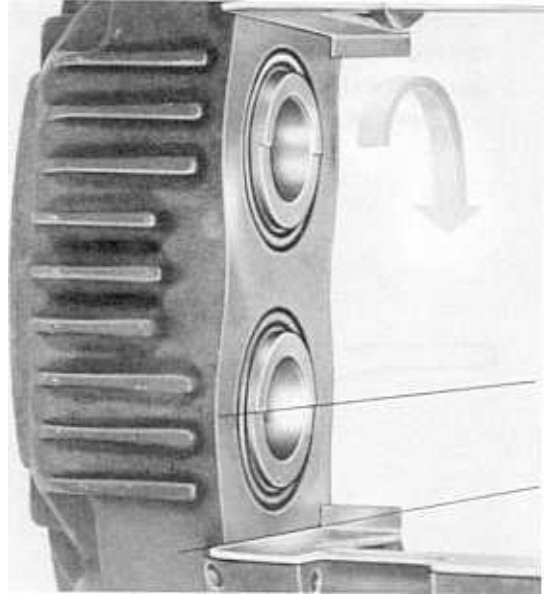
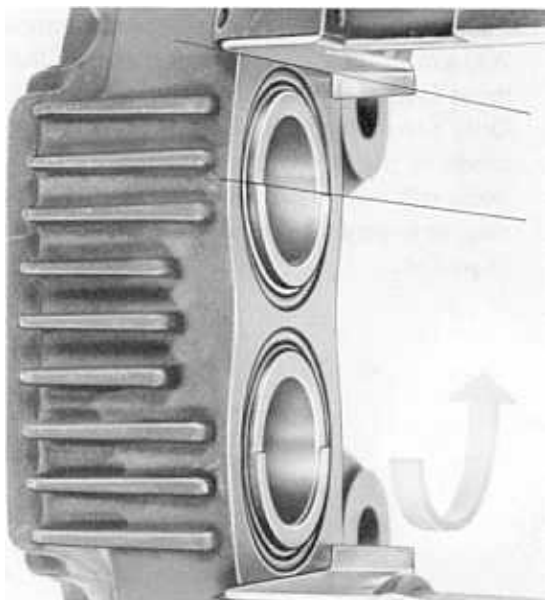
Note

To prevent brake fluid from spilling, draw off some of brake fluid from tank before pushing back piston. This requires a syringe used exclusively with brake fluids. Brake fluid is poisonous and therefore must not be drawn out through a hose by mouth.

2. Clean seat and guide surface of brake pads in caliper with gasoline or a cylindrical brush. Never use solutions containing mineral oils or sharp edged metal tools.

Brake pad recess play: 0.4 to 0.6 mm.

3. Check position of piston. Edges of shoulder on piston must be parallel to guide surface of brake pad. The shoulder (setback surface) must face down on rear axle and up on front axle (toward brake disc inlet).

Rear Axle**Front Axle**

4. Install brake pads. Guarantee a play of 0.4 to 0.6 mm for brake pads in recess by pertinent steps, if necessary (replacement of spring plates *, cleaning guide surfaces on brake pads, replacement of brake pads).

Note

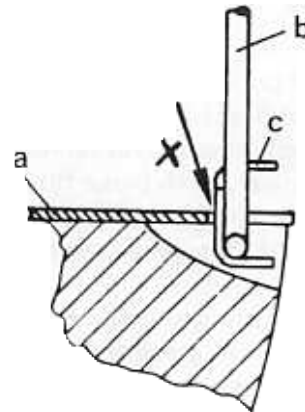
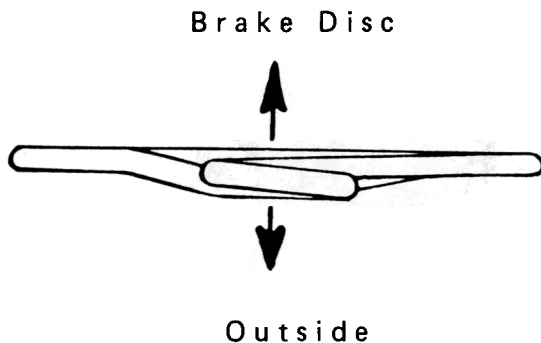
Apply a light coat of grease on seats and guide surfaces to prevent seizure of brake pads in brake calipers due to corrosion. Use Optimoly HT (Cu Paste) or Plastilube (Schillings, Postfach 1703, 7080 Aalen).

5. Press warning contact into inner pad plate of cars with a brake pad wear indicator.

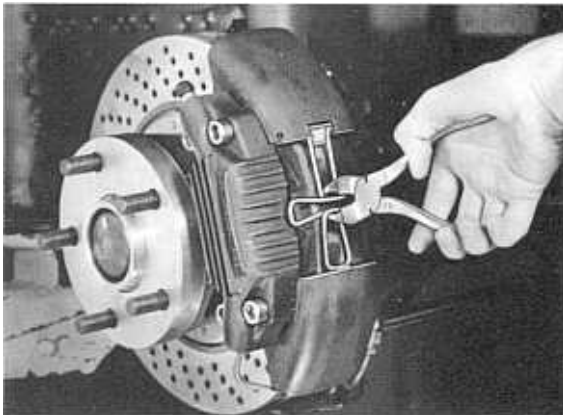
* Also refer to Group 47.

6. Lubricate engaging eyes of spreader spring in bridge with Optimoly HT or Plastilube.

Install new spreader spring that its flat side faces brake disc. If installed incorrectly, proper fit of brake pads cannot be guaranteed. In addition, high spot at center of cross would scrape on brake disc.



a = Spring plate
b = Spreader spring
c = Lockplate



8. Depress brake pedal of stopped car firmly several times, to move brake pads into their normal operating position. Then check brake fluid level in tank, adding brake fluid if necessary.

Breaking in Brake Pads

Factory new brake pads will require about 200 km of operation before reaching their most favorable friction and wear values. Only then will the pads have adapted themselves to the brake discs and the squeaking noise will now disappear. Try to avoid full stop emergency braking during the breaking in period.

7. In 1978 models, which are equipped with initial version spring plates *, the lockplate must still move in the recess after engagement of the spreader spring. This guarantees gap X between the lockplate and spring plate and deformation of the spreader spring is not possible.

* Also refer to Group 47.

MODIFIED FRONT WHEEL BRAKES FOR 3.3 LITER TURBO

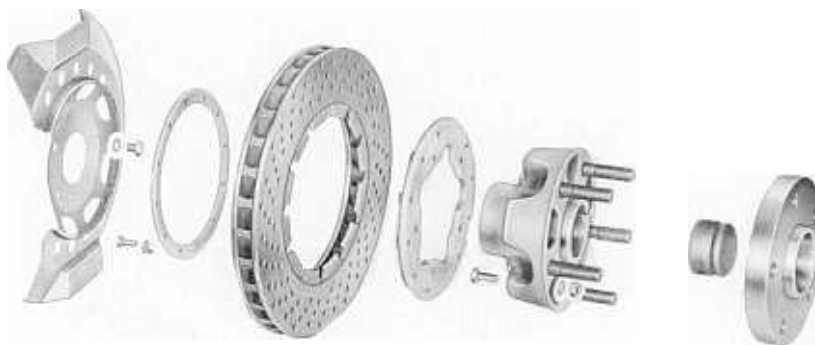
The front wheel brake disc/hub connection is changed since the production of 1981 models. The flange and ring connection has been changed to a brake disc shell connection as on the 911/3.0 ltr. Turbo.

By designing the new brake discs with a shell the total distance (brake disc - hub) is 21 mm longer. Consequently the installation of 21 mm spacers is omitted. It is not permitted to additionally install spacers with the wheel hub.

Conversion to new brake discs/wheel hubs is only permitted on both sides simultaneously for 3.3 liters cars before 1981 models.

Removing grease caps is different due to the modified hubs.

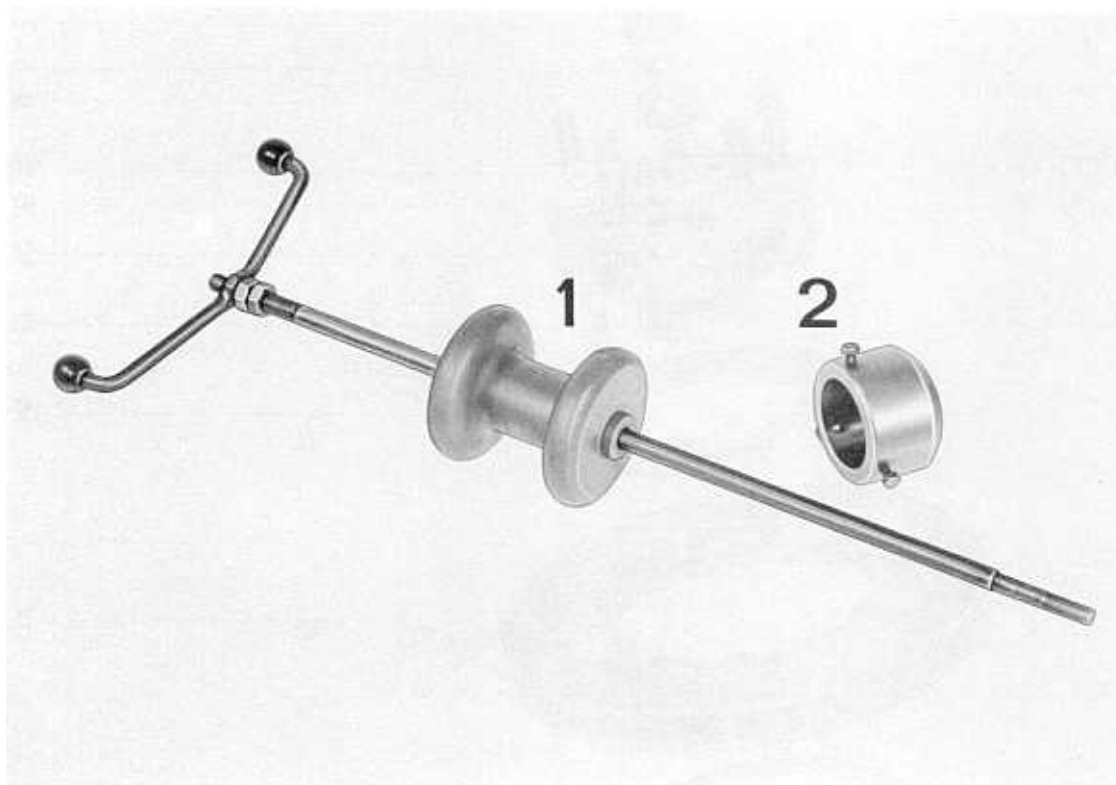
Old Version



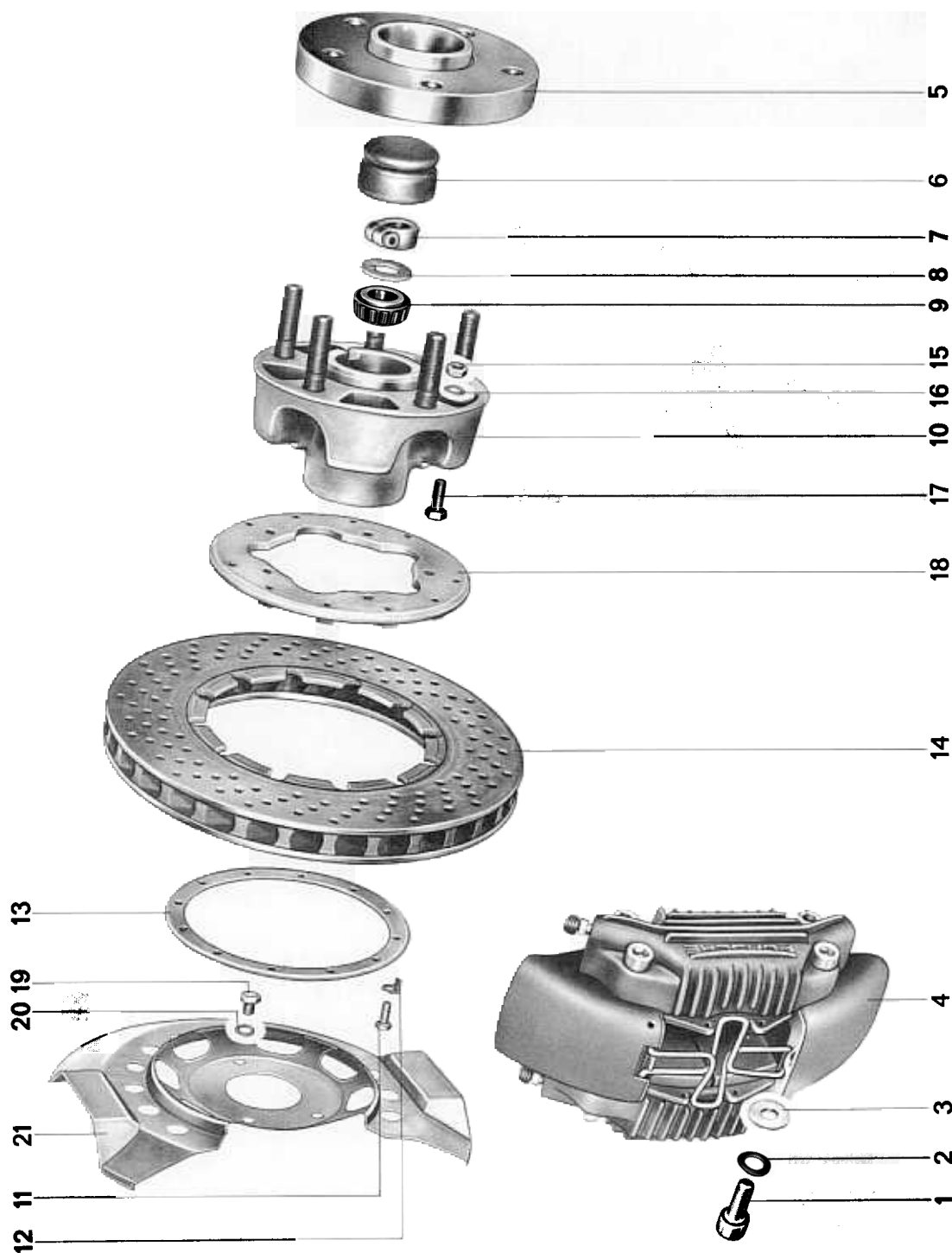
New Version



TOOLS



No.	Description	Special Tool	Remarks
1	Slide hammer	VW 771	
2	Puller	9165	Only required up to end of 1980 models



Note

The front wheel brake applicable up to end of 1980 models is shown. From 1981 models the brake disc/wheel hub connection is changed (see page 46 - 4).

No.	Description	Qty.	Note When:		Special Instructions
			Removing	Installing	
1	Bolt	2		Torque: 70 Nm	
2	Washer	2		Replace, if necessary	
3	Spacer	2		Between caliper and steering knuckle	
4	Brake caliper	1			
5	Spacer	1		Less width than on rear axle (21 mm)	Only version up to end of 1980 models
6	Hub cap	1	See text		Different versions
7	Nut with socket screw	1		Adjust wheel bearing play. Torque socket screw to 15 Nm	
8	Pressure disc	1			
9	Wheel bearing, outer	1		Check, replacing if necessary	
10	Wheel hub	1			2 versions
11	Screw	12		Install screws and tighten uniformly. Torque: 10 Nm	Only version up to end of 1980 models
12	Lockplate	12		Replace	
13	Ring	1			
14	Brake disc	1		Check for wear and damage. If applicable, mark for reinstallation	2 versions

No.	Description	Qty.	Note When:		Special Instructions
			Removing	Installing	
15	Nut	5		Torque: 23 Nm	Only version up to end of 1980 models
16	Washer	5		Replace, if necessary	
17	Bolt	5			
18	Brake flange	1			
19	Screw	3		Torque: 10 Nm	Page 46 - 10 Point 1
20	Washer	3		Replace, if necessary	
21	Guard	1		Machine or replace, if necessary	

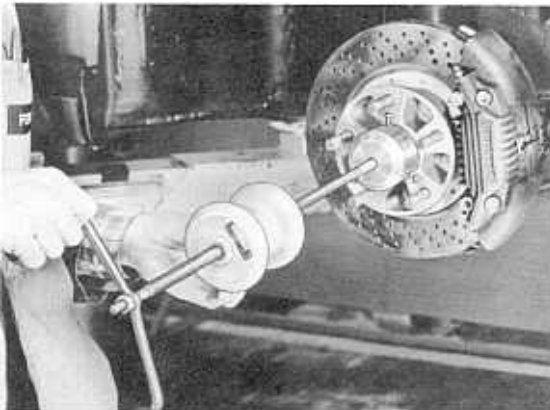
DISASSEMBLING AND ASSEMBLING FRONT WHEEL BRAKES

Disassembling

1. Unscrew and plug brake line to prevent brake fluid from flowing out of reservoir. Unscrew brake caliper.
2. Remove spacer (cars up to end of 1980 model year), but do not use sharp edged tools. Burrs could cause wheels to have lateral runout.
3. Remove grease cap according to version.

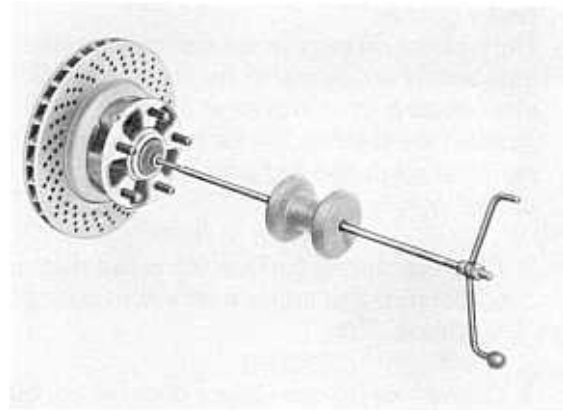
Version A

Up to end of 1980 model year. Knock out grease cap with special Tool VW 771 used in conjunction with 9165.



Version B

Grease caps with welded tapped adapters are installed since Chassis No. 93 Z BS 000094 (October, 1980). These caps can be knocked out with special tool VW 771, without puller 9165.



Version C

The first 1981 model cars (up to above mentioned chassis number) still had grease caps without the tapped adapter. These caps have been ground to the smallest possible diameter at the pressing-in point to reduce the pressing force.

They can be removed with a screwdriver.

4. Unscrew adjusting nut for wheel bearings.
Remove wheel hub with brake disc.
5. Separate brake disc and wheel hub.

DISASSEMBLING AND ASSEMBLING FRONT WHEEL BRAKES

Disassembling

1. Check condition of all parts and replace, if necessary.

Note:

Bridges of brake calipers have cast bosses since 1984 models and this has changed the brake guards.

Only brake calipers or caliper bridges with cast bosses are available for replacements after depletion of stocks in older models. In this case the new brake guard must also be installed or the old guard changed accordingly (cut off).

2. Clean centering surface for brake disc on wheel hub and apply a very thin coat of Optimoly TA.
3. Conversion to new brake discs/wheel hubs on 3.3 liter cars before 1981 model is only permitted simultaneously on both sides.
4. Brake discs must not be mounted on the wrong side, since inboard vent bores arranged evolvently.
Identification: evolvent shape and part number.

Part number is located on the brake disc.

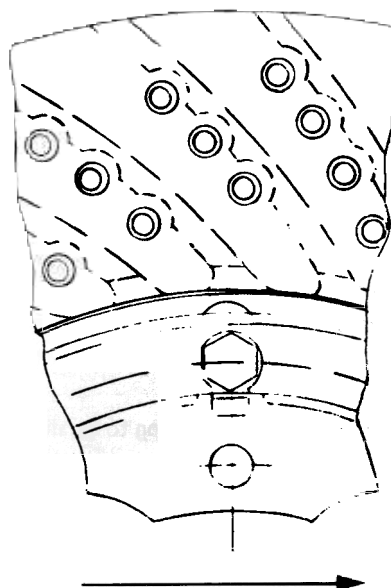
Spare part for left side
— 3rd group number uneven

Spare part for right side
— 3rd group number even

Examples:

Left brake disc part no.: 930 351 047 00
or 930 351 047 01

Right brake disc
part no.: 930 351 048 00
or: 930 351 048 01

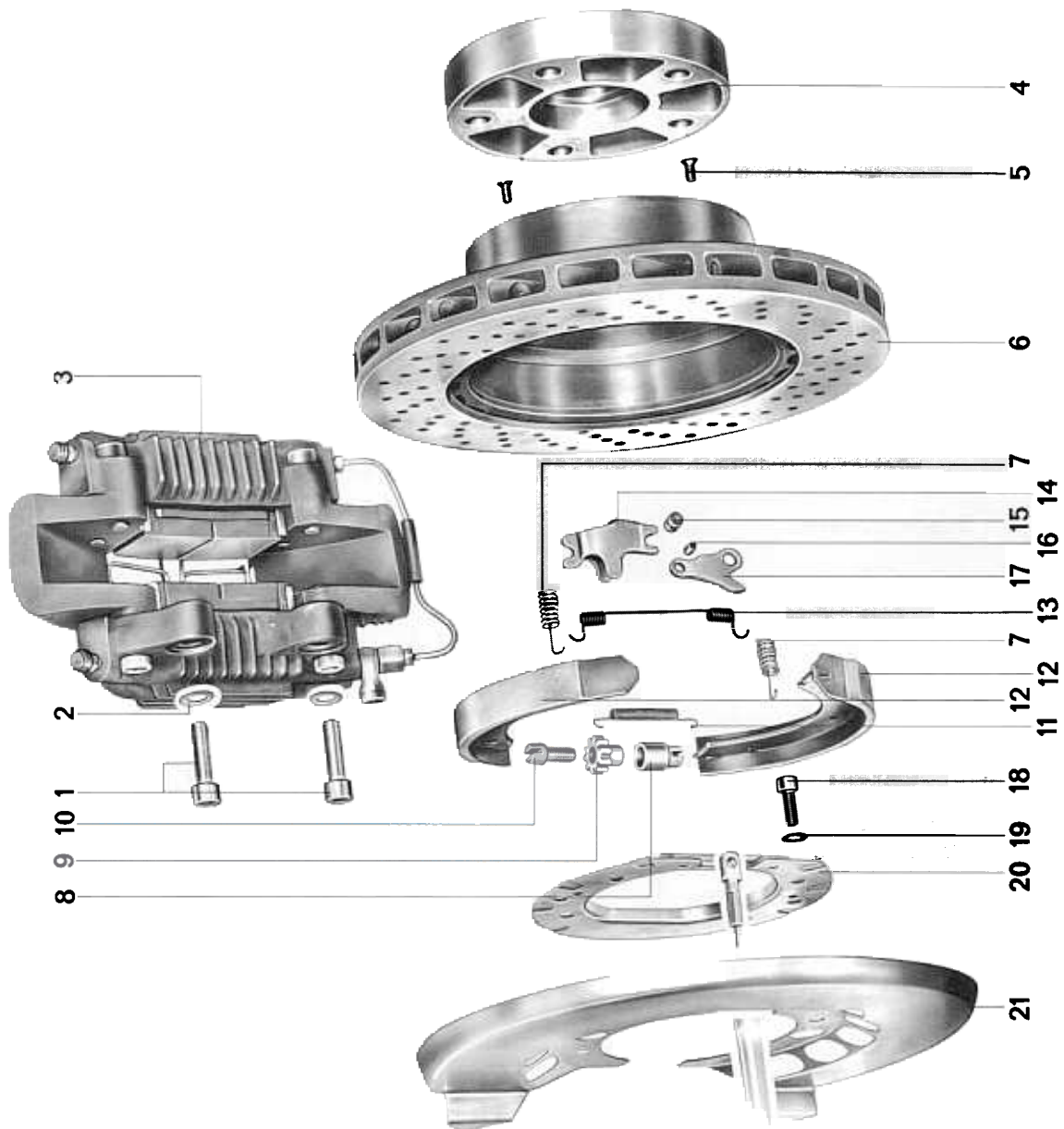


Forward Direction

5. Note torque specifications. Install taper roller bearings with a multi-purpose grease.
6. Adjust wheel bearing play that finger pressure applied to a screwdriver is just adequate to move pressure disc. Do not support screwdriver on hub. To adjust, first tighten nut slightly to keep bearings from seizing.
Drive in hub cap of version C with a piece of pipe to avoid damaging the threads.



7. Make sure brake hose is positioned correctly, when screwing on brake line. Bleed brakes.

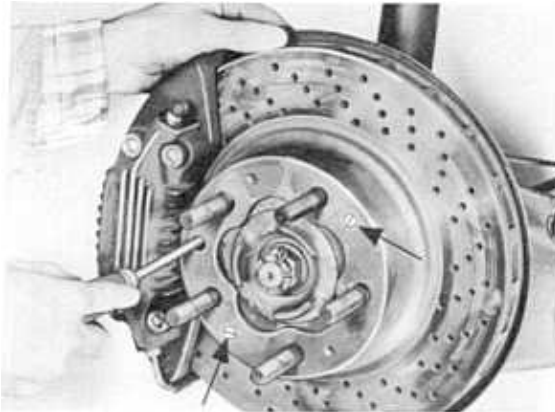


No.	Description	Qty.	Note When:		Special Instructions
			Removing	Installing	
1	Screw	2		Torque: 60 Nm	
2	Washer	2		Replace, if necessary	
3	Brake caliper	1			
4	Spacer	1		Wider than on front axle (28 mm)	
5	Screw	2			
6	Brake disc	1	Set back brake	Check for wear and damage	
7	Spring	2		Hooks must be in holes provided in brake backplate	
8	Support sleeve	1			
9	Adjusting nut	1			
10	Adjusting screw	1			
11	Return spring	1			
12	Brake shoe	2		Replace, if necessary. Wear limit: 2 mm	
13	Return spring	1			
14	Pressure bar	1			
15	Pivot pin	1		Lubricate lightly	
16	Pin	1		Lubricate lightly	
17	Operating lever	1			
18	Screw	4		Torque: 25 Nm	
19	Washer	4			
20	Brake backplate	1			
21	Guard	1		Machine or replace, if necessary	Page 46 - 13 (assembling)

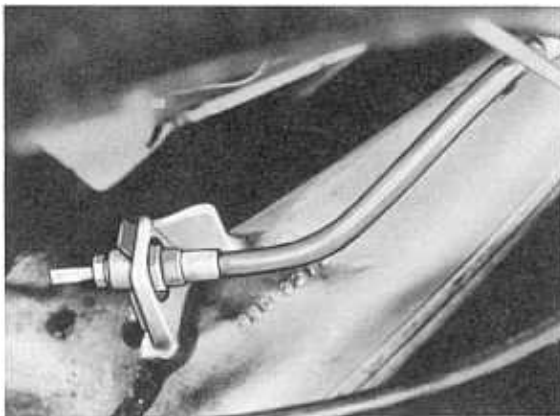
DISASSEMBLING AND ASSEMBLING REAR WHEEL BRAKES

Disassembling

1. Remove spacer. Do not use sharp edged tools. Burrs could cause wheel to have lateral runout.
2. Turn parking brake adjuster in loosening direction. Unscrew two countersunk screws.

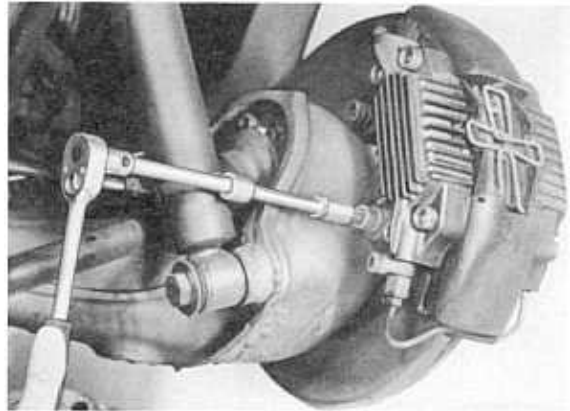


3. Unscrew brake line from brake hose. To prevent brake fluid tank from draining, screw a shortened, plugged piece of brake line in brake hose.



4. Press out brake line holding clip from rear control arm.

5. Unscrew brake caliper and remove brake disc. If a tight fitting brake disc cannot be removed even after applying light knocks with a plastic hammer, screw hexagon head bolts in two 8 mm diameter threads of brake disc uniformly to press off the disc.



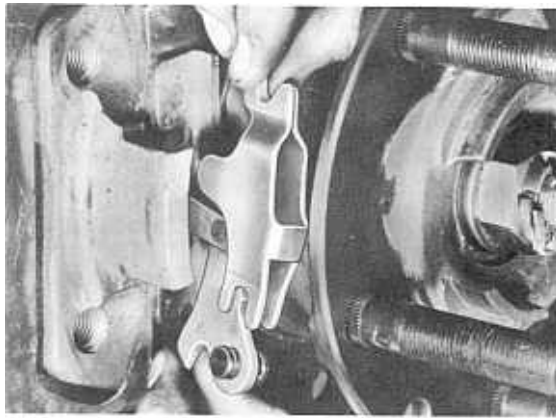
Assembling

Note :

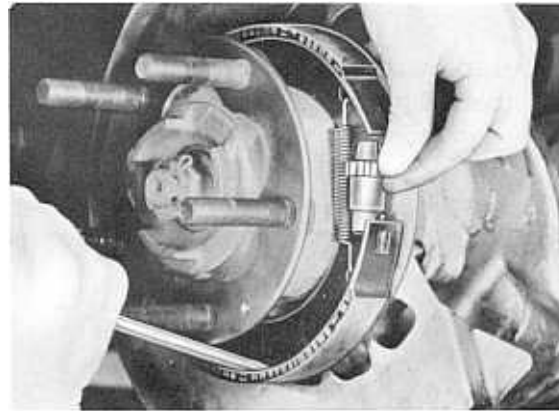
Bridges of brake calipers have cast bosses since 1984 models and therefore the guards have also been changed. Only brake calipers or caliper bridges with cast bosses will be available for replacements after depletion of stocks in older models. In this case the new brake guard must also be used or the old guard changed accordingly (cut off).

1. Lubricate adjuster, pin of expander lever and sliding surfaces of parking brake shoes slightly.

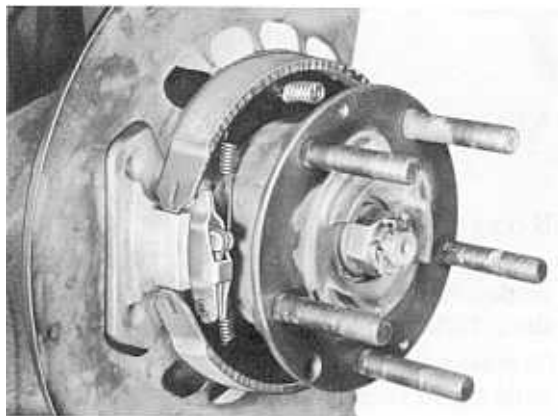
2. Assemble spreader lever.



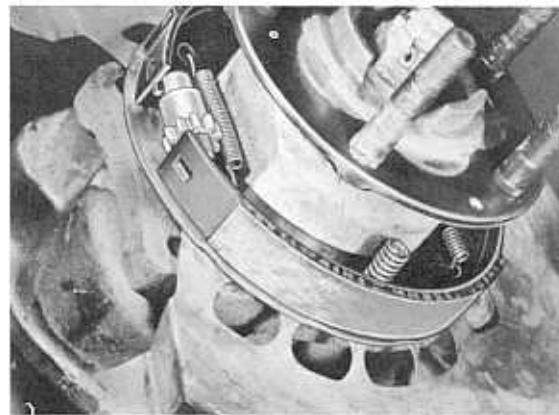
4. Press down lower parking brake shoes with a screwdriver. Install assembled adjuster. Mount lower spring.



3. Install front (long) return spring with parking brake shoes on brake backing plate. Install rear return spring and upper spring.



5. Check parking brake shoes, adjuster, return springs and springs for proper position, correcting if necessary.



Note

Make sure that hooks of springs are positioned in holes provided in brake backing plate.

6. Clean brake disc centering surface on wheel hub and apply a very thin coat of Optimoly HT.

8. Adjust parking brake. Bleed service brakes.

Assemble brake disc and brake caliper. Tighten bolts to specified torque. Do not mix up left and right side discs, since inboard vent passages have an evolute shape.

Identification: evolute shape and part number.

Part number is located on brake disc.

Spare part for left side

- 3rd group number uneven

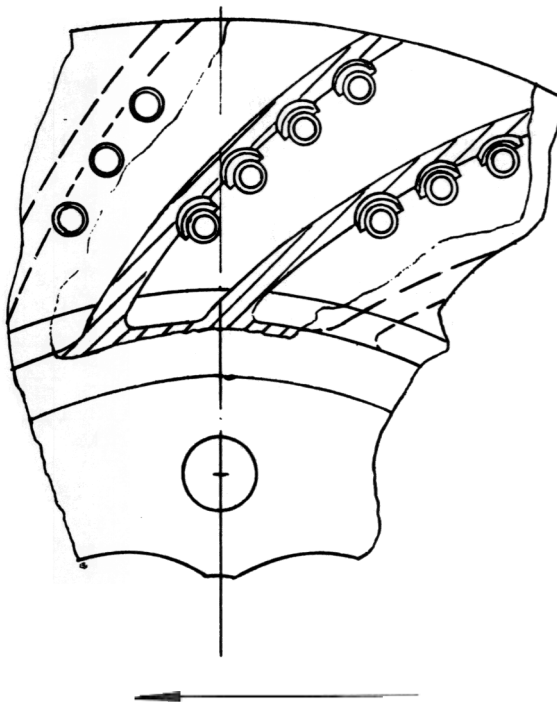
Spare part right side

- 3rd group number even

Exemple:

Brake disc, left Part No. 930 352 045 00

Brake disc, right Part No. 930 352 046 00

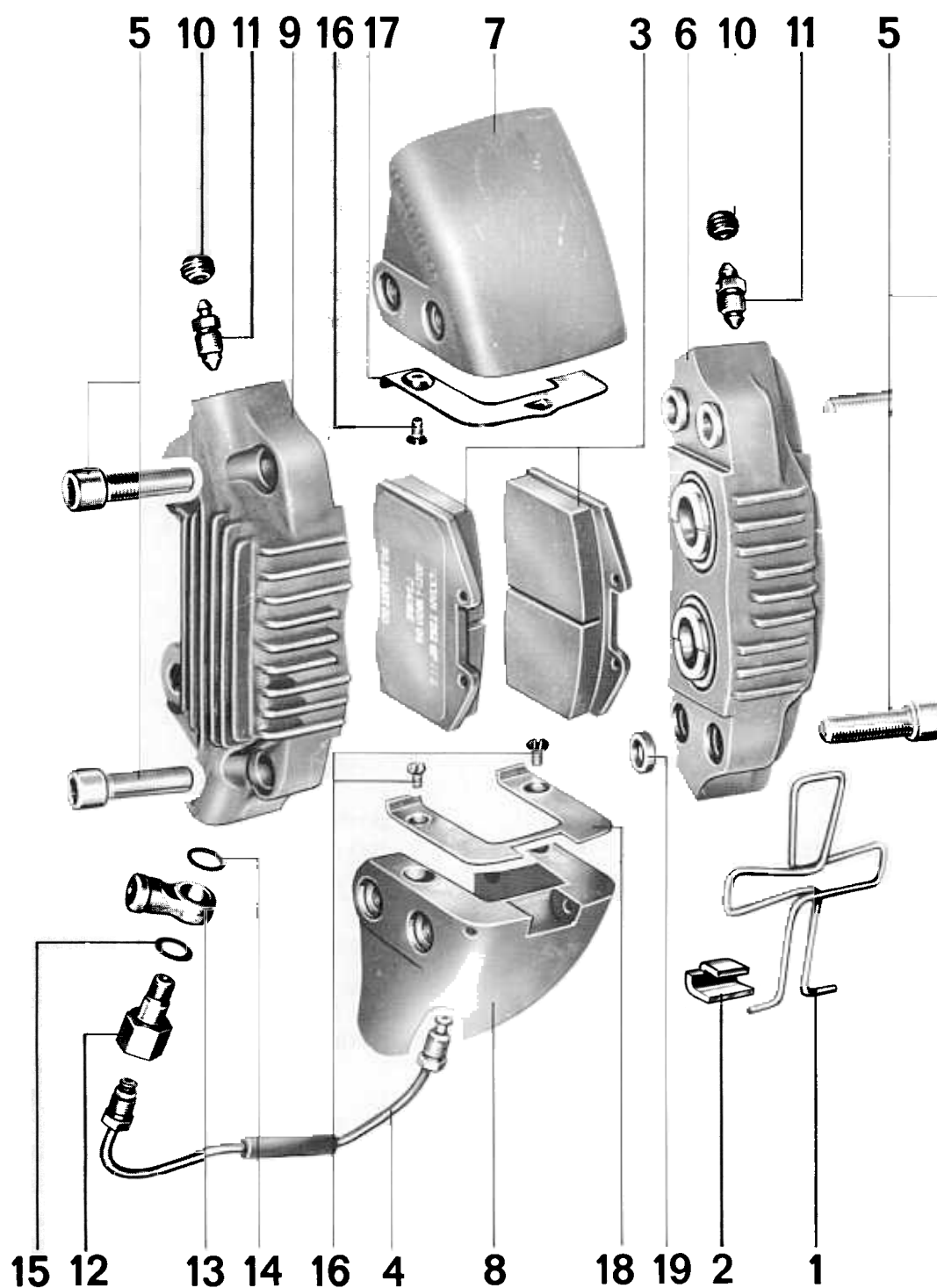


Forward Direction

TORQUE SPECIFICATIONS FOR HYDRAULIC BRAKE PARTS

Location	Description	Threads	Class	Torque mkg (ft lb)
Master cylinder to vacuum booster	Nut	M 8	8	2.5 (18)
Stop light switch to master cylinder	Stop light switch	M 10x1		1.5 + 0.4 (11 + 2.9)
Brake booster unit to base	Nut	M 8	8	2.5 (18)
Brake fluid reservoir	Bolt	M 6	8.8	0.2 (1.5)
Fork and pivot to operating rod	Nut	M 10	8	3.5 (25)
Brake booster to luggage compartment floor plate	Nut	M 8	8	2.5 (18)
Brace to base	Bolt	M 10	8.8	4.6 (33)
Brake lines to master cylinder, hoses and calipers	Coupling	M 10x1		1.2 (9)
Distributor to rear axle cross tube	Bolt	M 6	8.8	0.6 (4)
Bleeder screws on brake calipers	Bleeder screw	M 10x1		0.8 - 1.1 (5.8 - 8)
Brake caliper half to bridge	Socket head bolt	M 12x1.5	8.8	6.0 (43)
Spring plate to bridge	Flat head screw	M 5		0.4 (2.9)
Adapter to brake caliper	Hollow bolt	M 10x1		1.6 (12)

Location	Description	Threads	Material	Tightening Torque Nm (ftlb)	
Brake force regulator to connector or ring adapter	Hollow union bolt	M 10 x 1	5.6	14	(10)
Ring adapter to brake master cylinder		M 10 x 1		16	(12)

**Note:**

Blow-up view shows brake caliper of rear axle with 30 mm diameter piston (front axle piston diameter: 38 mm) and retaining tab of cross spring facing up. On brake caliper of front axle retaining tab is down, i. e. front bridges with spring plates are reversed.

Disassembling and Assembling Brake Caliper Sections — page 47 - 7.

No.	Description	Qty.	Note When:		Special Instructions
			Removing	Installing	
1	Cross spring	1		Replace if necessary. Position correctly (flat side faces brake disc).	Not applicable if openings of spring plate (no. 18) take over cross spring funct.
2	Lockplate	1		Lockplate must still move after cross spring has engaged, to exclude deformation of the cross spring.	
3	Brake pad	2	Mark for reinstallation later if applicable.	Check, replacing if necessary. Wear limit 2 mm.	
4	Connecting line	1		Down	
5	Screw	8		Torque: 60 Nm (43 ft. lbs.)	
6	Brake caliper half, outer (marked with Porsche)	1			
7	Bridge without opening			Bottom on front axle, top on rear axle	Page 47 - 5
8	Bridge with opening	1			Page 47 - 5
9	Brake caliper half, inner (with mounting eyes)	1		New version (without no. 12 - 15), can be installed retroactively.	
10	Dust cap	2			
11	Bleeder screw	2		Up	
12	Hollow union bolt	1		Torque: 16 Nm (12 ft. lbs.)	))) omitted since Dec. 1984
13	Ring connector	1			)
14	Seal	1		Replace	)

No.	Description	Qty.	Note When :		Special Instructions
			Removing	Installing	
15	Seal	1		Replace	Omitted since Dec. 1984
16	Screw	4	Heat to approx. 150° C	Install with Loctite No. 270.	
17	Spring plate with retainer	1	Heat screws to approx. 150°C.	Assemble with correct bridge. Lock screws with Loctite No. 270.	Page 47 - 5
18	Spring plate with openings	1	Heat screws to approx. 150°C.	Assemble with correct bridge (openings for cross spring). Lock screws with Loctite No. 270.	Use lockplate (no. 2), if there are no openings to service as a cross spring lock, see page 47 - 5.
19	Spacer (dowel sleeve)	8		Do not drive into brake caliper sections against stop. About one half each should be in the brake caliper section and bridge.	

DISASSEMBLING AND ASSEMBLING BRAKE CALIPERS

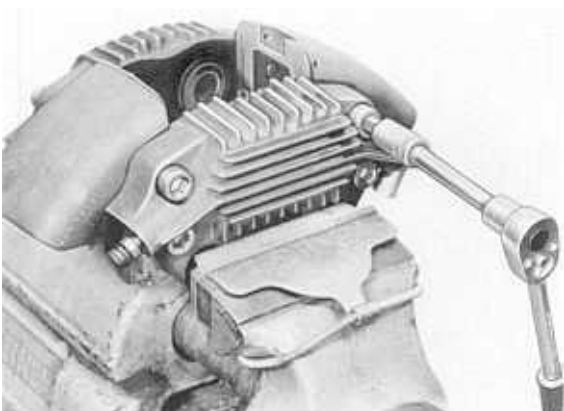
Disassembling

1. Clamp caliper in a vise with soft jaws and detach connecting line.
3. Drive off brake caliper halves from bridge by applying knocks from a plastic hammer alternately.



2. Unscrew bolts holding halves of brake caliper.

4. Countersunk screws of spring plate are locked in bridge with Loctite 270. To unscrew, heat screws to approx. 150 °C. This is necessary to prevent stripping threads in bridge.



Assembling

1. After replacing or loosening, lock counter-sunk screws for spring plate with Loctite 270.
Install spring plate with retaining tab on bridge without opening.

Note

Following changes have been made on spring plates since the beginning of standard production.

A lockplate for protection of the cross spring is required on spring plates with opening in initial version.

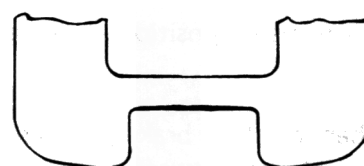
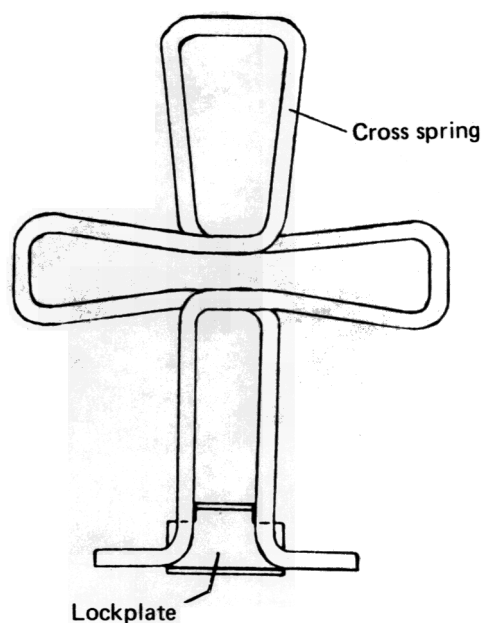
In the modified version a spring plate with pertinent openings protects the cross spring.

A conversion is only possible with conformance with point 4 on page 47 - 4 and use of correct spring plate (see note below).

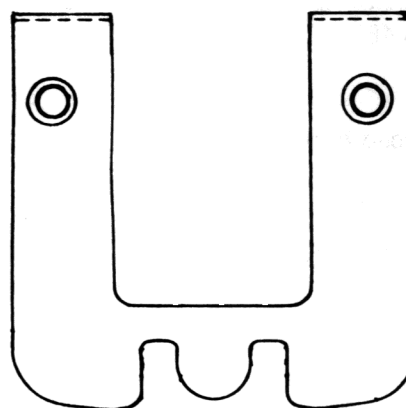
The countersink to take the mounting screws is larger for all spring plates since 1984 models and therefore the bridges had to be changed, too.

Spring plates with larger countersinks (present version 12.8 – 0.2 mm diameter; was 11.5 + 0.5 mm) cannot be used on old bridges.

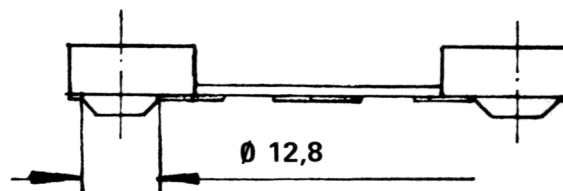
Initial Version



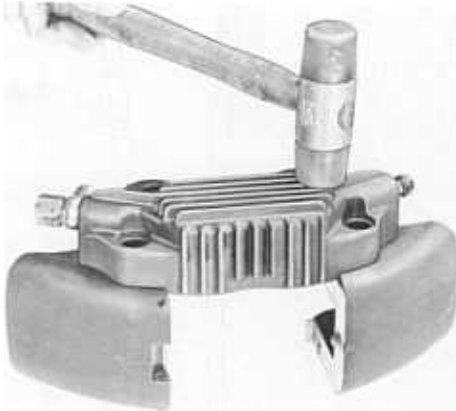
Modified Version



Spring Plates with Larger Countersink



2. Assemble brake caliper.



3. Replace seals on hollow bolt and adapter.

4. Check piston position — see page 46 - 3

5. When installing brake pads, check for correct play between pad and recess, correct position of cross spring and clearance of lockplate in case of initial version spring plates (see pages 46 - 2 to 46 - 4).

6. Bleed brakes.

**Note:**

The blow-up view shows the outer front axle brake caliper half.

Piston diameter on front axle = 38 mm.

Piston diameter on rear axle = 30 mm.

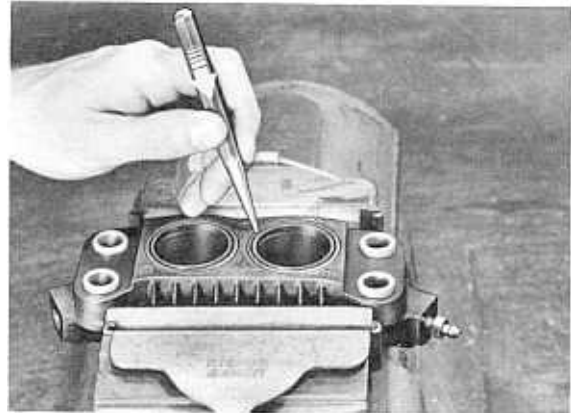
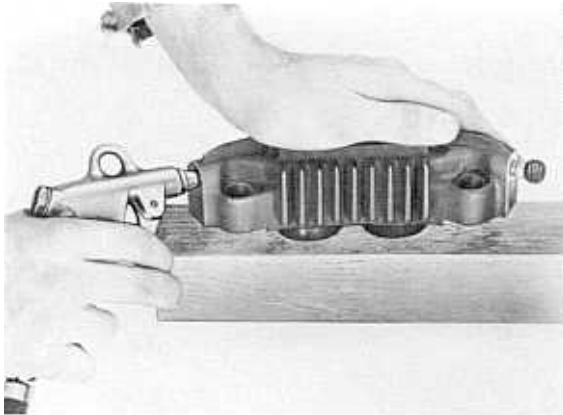
Mount piston and bleeder valve in correct position, depending on installation of brake caliper half on right or left side (setback surface on face of piston faces brake disc inlet/bleeder valve faces up).

No.	Description	Qty.	Note When:		Special Instructions
			Removing	Installing	
1	Piston	2	Press out of brake caliper half with compressed air. Use wood base — danger of injury!	Use brake cylinder paste. Check piston position (position of machined piston face) already while pressing in — page 46 - 3	
2	Dirt scraping ring	2	See page 47 - 9	Replace. Position correctly — see page 47 - 10	
3	Seal	2	Lift out with a plastic rod	Replace. Coat with brake cylinder paste.	
4	Brake caliper half	1			See pages 47 - 9 and 47 - 10 under "cleaning and inspecting"

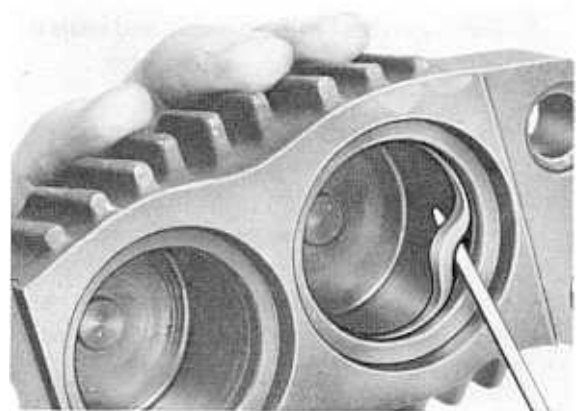
DISASSEMBLING AND ASSEMBLING BRAKE CALIPERS

Disassembling

1. Place brake caliper section on a wooden board with the piston facing down and press out piston with compressed air.



4. Lift out seals with a plastic rod.



2. Clamp brake caliper section in a vise with the cylinder bores facing up. Use a vise with soft jaws.

Note :

Make sure surface of brake caliper section is not damaged and consequently the corrosion inhibiting coat is not injured.

3. Remove dirt scraping ring by deforming the support ring of the dirt scraping ring all around with a suitable tool (e. g. thin punch) to such an extent, that the scraping ring can be removed. Be careful not to damage seat surfaces.

Cleaning and inspecting

1. Clean all parts with alcohol and dry with compressed air. Never use rags, since even minute particles of lint would lead to leakage.
2. Inspect connection threads and spacer sleeves (dowel sleeves) for damage as well as cylinder bores and pistons for scoring and corrosion.

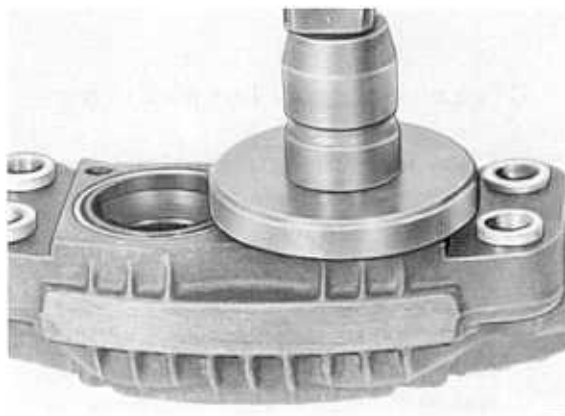
Note :

Machining cylinder bores and pistons is not approved. Replace pistons or complete brake caliper section, as applicable.

3. If the brake caliper section is in good condition, check whether connecting bore between the cylinder bores is plugged. Clean bores with compressed air.
4. Clean new seals and scraping rings with alcohol and dry with compressed air.

Assembling

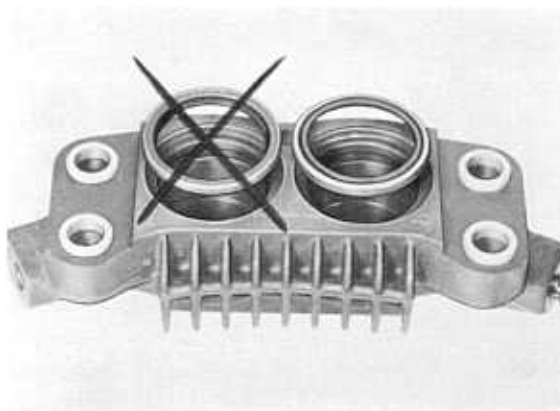
1. Give cylinder bores, pistons and seals a thin coat of brake cylinder paste.
2. Place seals in grooves of cylinder bores.
3. Mount dirt scraping rings in correct position with a suitable pressure pad. Drive in dirt scraping rings at least so far, that they do not protrude beyond the machined surface of the brake caliper section.



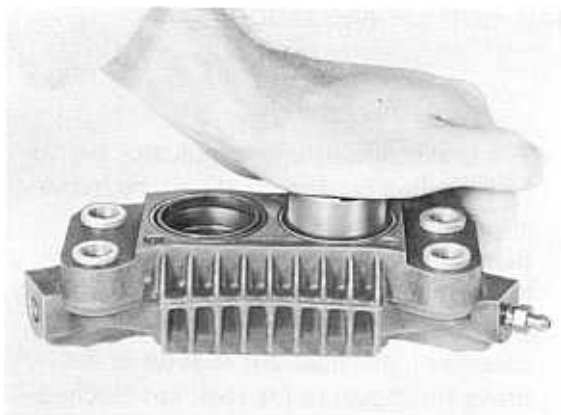
Note :

Mount dirt scraping ring in brake caliper section that the ring's printed part number faces in.

The sealing lip then faces out (in contradiction to the normal position of a radial shaft seal) and prevents the entry of dirt and water.



4. Press in piston by hand slowly. Check position of the milled surface on the piston's face during this step (see page 46 - 3). If it is necessary to turn the piston after installation in the brake caliper section, a suitable tool (e. g. ATE piston turning pliers) must be used.



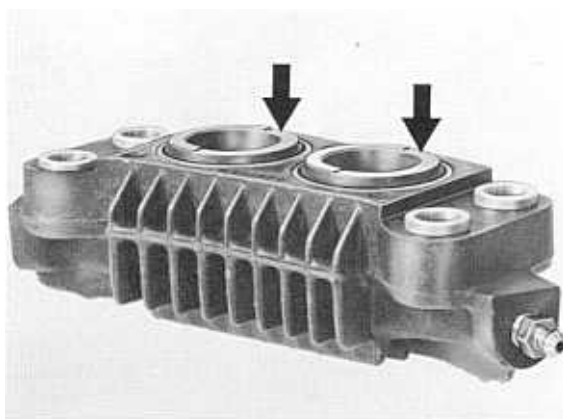
7. Check for leaks (high pressure test) with a pressure tester.

High Pressure Test

Produce a pressure of 50 to 100 bar in the braking system with a pedal prop. The produced pressure must not drop by more than 10 % during the testing time of 10 minutes with a constantly applied pedal force.

Note :

A brake force regulator is integrated in the rear axle brake circuit of cars with Turbo Look. When connecting a pressure tester on the rear axle brake circuit of these cars, the produced pressure must not exceed 70 bar.



5. Assemble brake caliper (see page 47 - 1).
6. Recheck piston position in car after installation of the brake caliper.
Install brake pads.
Bleed brakes.

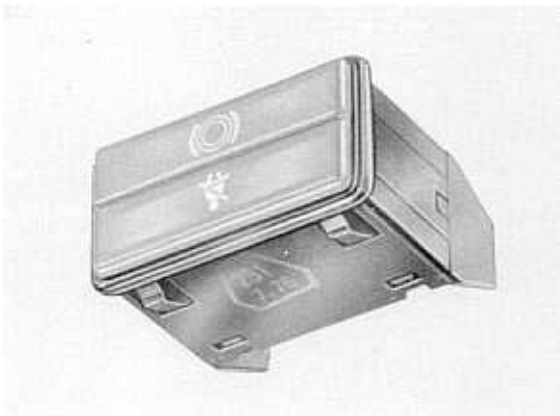
BRAKE CIRCUIT FAILURE INDICATOR (UNTIL END OF 1983 MODELS)

Each of both brake circuits has a brake light switch on the brake master cylinder, which also functions as a brake warning switch in cars up to the end of 1983 models.



The brake circuit failure indicator has to be cancelled by disconnecting the battery after repairing the brake system. Beginning with 1984 models it is no longer necessary to disconnect the battery, since the brake indicator lamp (triple chamber light) goes out as soon as the brake fluid level in the tank has reached the minimum level.

An indicator lamp (bottom part of a double chamber light) installed in the instrument panel comes on when a brake circuit fails.



SPECIFICATIONS

Steering

Steering wheel

Steering ratio in center
steering wheel angle to
wheel angle

Turning circle dia.

Track circle dia.

Non of steering wheel turns
from lock to lockFriction torque of steering
- measured on flange of
steering gear without
connected tie rods

Rack-and-pinion

380 mm (14.961") dia.,
lattice steering wheel
with impact pad

17.78 : 1

10.8 m (35.4 feet)

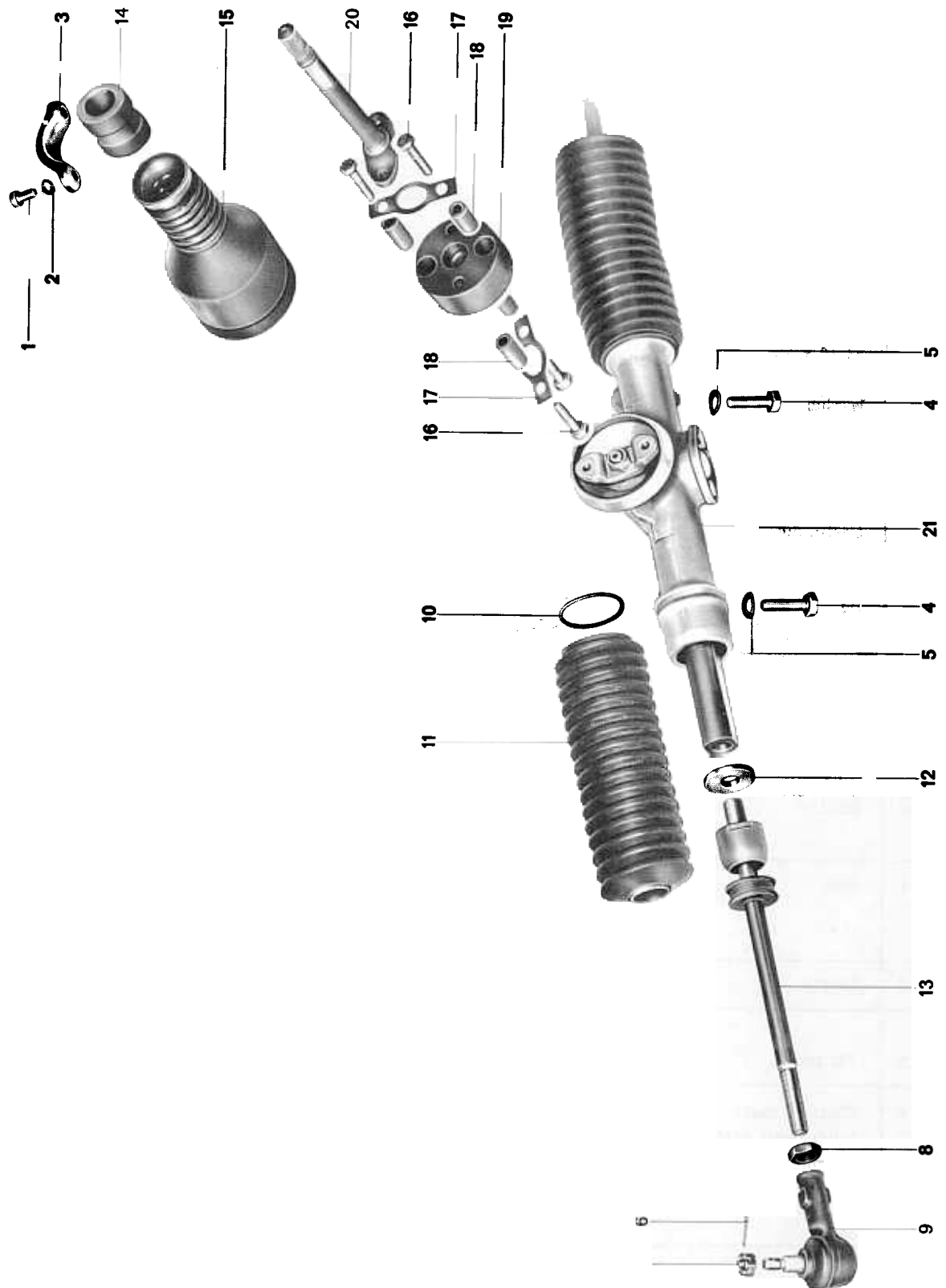
10.35 m (33.9 feet)

approx. 3.0

0.8 to 1.4 Nm/8 to 14 kpcm/
7 to 12 in. lbs.

TORQUE SPECIFICATIONS FOR STEERING

Location	Designation	Threads	Material	Torque	
				Nm	ft lbs
Steering gear	Bolt	M 10	8.8	47	34
Tie rod to rack	Ball socket	M 16 x 1.5	C35K	150	108
Ball socket to steering arm	Castle nut	M 10 x 1	8	45	33
Ball socket to tie rod (lock nut)	Nut	M 14 x 1.5	04	45	33
Steering coupling to steering shaft	Bolt	M 8	8.8	25	18
Steering shaft to steering gear	Bolt	M 8	8.8	25	18
Steering shaft mount	Screw	M 8	8.8	25	18
Universal joint to steering shaft (lubricated with Optimoly HT)	Bolt	M 8	8.8	20	14
Coupling flange to drive pinion (self-locking)	Nut	M 10	8	45	33
Case cover to steering gear	Bolt	M 8	8.8	15	11
Steering wheel	Nut	M 18 x 1.5	8	50	36
Centering screw to steering lock	Stud	M 8	10.9	2 - 3	1.4 - 2.2
Lock nut on centering screw	Nut	M 8	8	18	13



No.	Designation	Amt.	Notes		Remarks
			Removing	Installing	
1	Capscrew	2		Torque to specifications	
2	Lockwasher	2		Replace, if necessary	
3	Cover	1		Must fit on steering shaft bearings correctly	
4	Hex hd screw M 10 x 35	2		Torque to specifications	
5	Washer	2		Replace, if necessary	
6	Cotter pin 2 x 25	2		Replace	
7	Castle nut M 10 x 1	2		Torque to specifications	
8	Hex nut M 14 x 1.5	2		Torque to specifications	
9	Ball joint	2		Check, replacing if necessary. Check seal for tight fit and damage.	Ball joint must show frictional torque when moving. Replace if it has axial play or no frictional torque.
10	Holder	2		Replace, if necessary	
11	Seal	2		Check for damage, replacing if necessary	
12	Spacer	2			
13	Tie rod	2		Torque to specifications	
14	Steering shaft holder with rubber bearing	1		Check, replacing if necessary	
15	Seal	1		Install correctly	

No.	Designation	Amt.	Notes		Remarks
			Removing	Installing	
16	Hex hd screw M 8 x 42	4		Torque to specifications	
17	Lockplate	2		Replace	
18	Stop	4			
19	Steering coupling	1		Visual inspection, replacing if necessary	
20	Steering shaft	1			
21	Steering gear	1		Check frictional torque, replacing or repairing if necessary	

DISASSEMBLING AND ASSEMBLING INSTRUCTIONS

Assembling

1. Clamp steering box in a vise with protective jaws for the rack.
2. Screw tie rod with spacer in rack and tighten to specified torque.
Machine open end socket for torque wrench for this purpose.

Note

Omitting hex nut has made the former instructions for tie rod ball joint adjustments invalid. Only the spacer is available for replacements.

