

Index

High pressure hose

- replacing 48.9a

Steering column

- removing/installing 48.3
- repairing 48.2

Steering column switches

- removing 48.7

Steering damper

- ★ ■ for Quattro 20V 48.8a

Steering gear

- adjusting 48.15
- assembly 48.8
- hydraulic lines, installing 48.9
- repairing 48.10

Steering lock housing/lock cylinder

- removing 48.6

Steering (short rack) assembly

- adjusting 48.19
- preparation/installing 48.16

Steering system

- checking for restrictions 48.15

Tie rods

- installing 48.8

Airbag system

- components 48.37, 48.40
- checking spiral spring 48.42
- ★ ■ disposal 48.38a, 48.43
- removing/installing 48.41
- safety measures 48.38

Hydraulic fluid

- replacing 48.24

Hydraulic oil reservoir

- repairing 48.21

Hydraulic pump

- checking pressure 48.23
- repairing 48.22, 48.28
- resealing 48.30
- v-belt, adjusting 48.23

Steering (short rack) assembly

- preparation/installing 48.20

Steering system

- bleeding 48.25
- checking for leaks 48.23
- troubleshooting 48.26

Airbag system

- testing 48.44

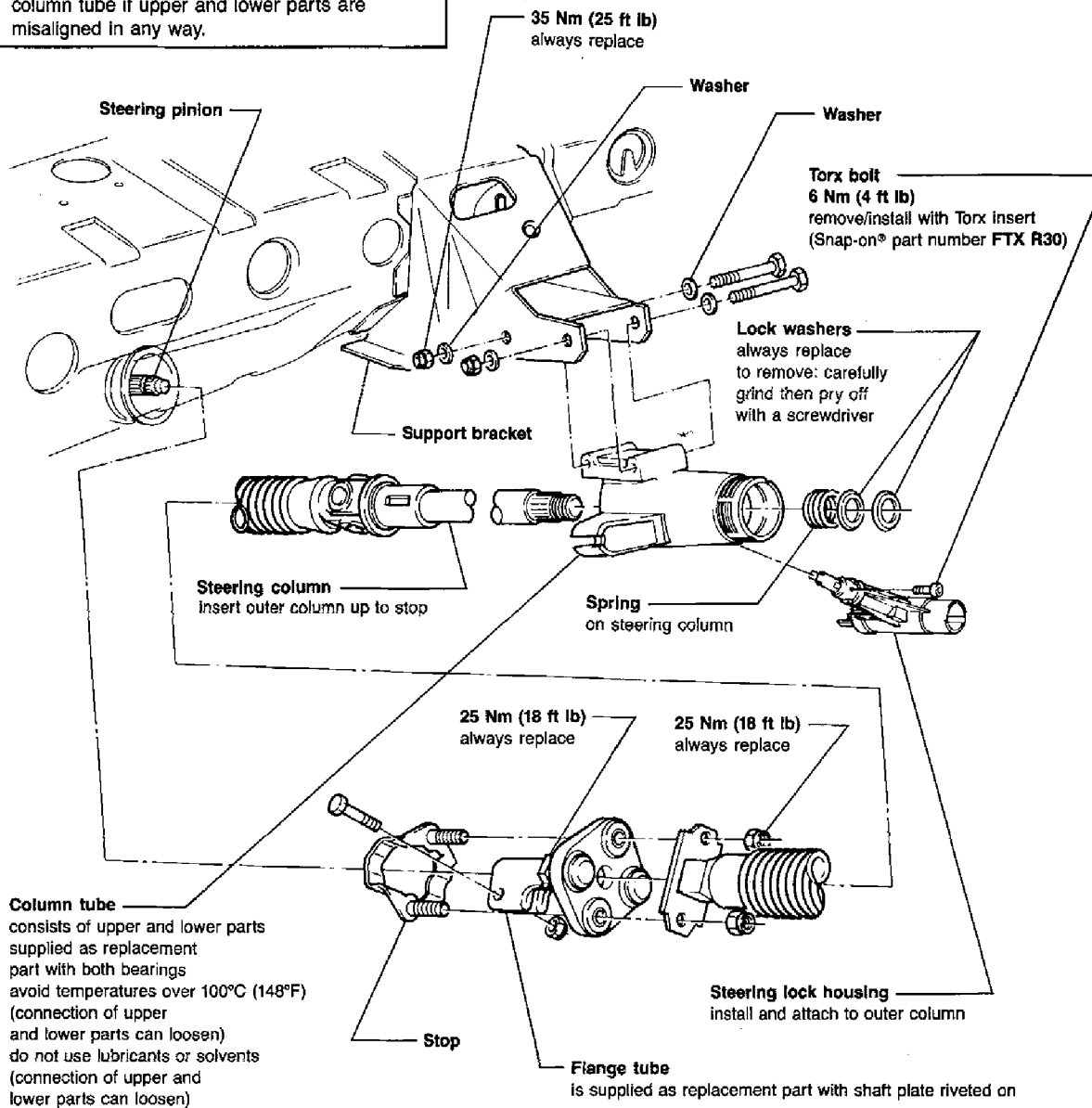
Airbag unit

- disposal 48.43

★ **NEW INFORMATION** since last filming

CAUTION

When repairing accident damage, replace column tube if upper and lower parts are misaligned in any way.



CAUTION

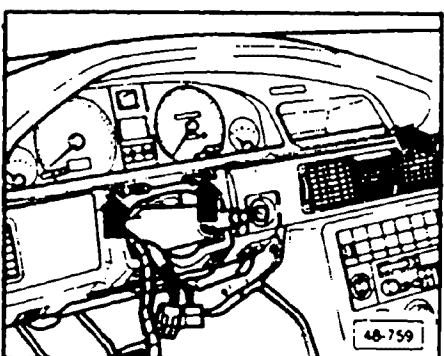
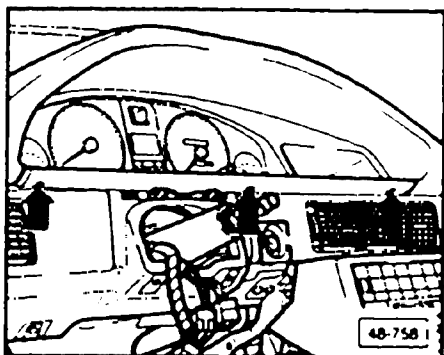
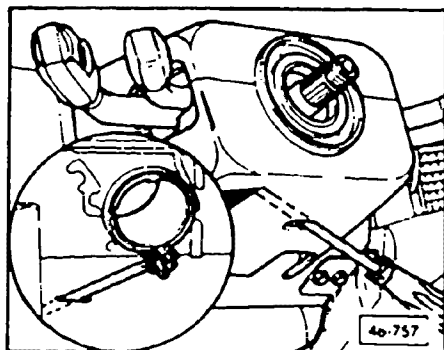
Washers are pre-tensioned.
Be careful of flying sparks when grinding. If necessary, cover instrument panel and windshield.

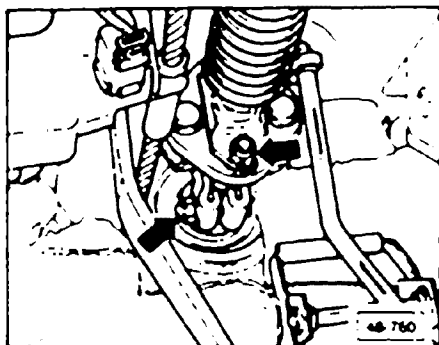
48-771

Steering column and column tube, removing/installing

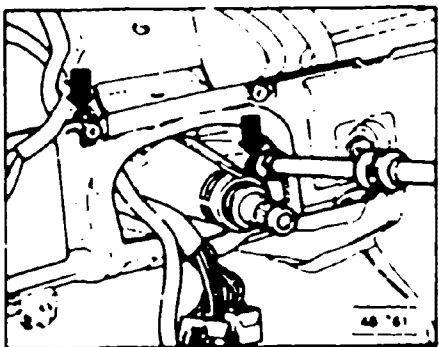
Removing

- disconnect battery ground strap
- remove instrument lower left panel trim
- remove left footwell vent
- remove steering wheel
- remove steering column switch with trim
- remove cover trim strip for instrument panel insert (**arrows**)
- remove instrument panel insert (**arrows**)
- disconnect wiring connector at ignition lock





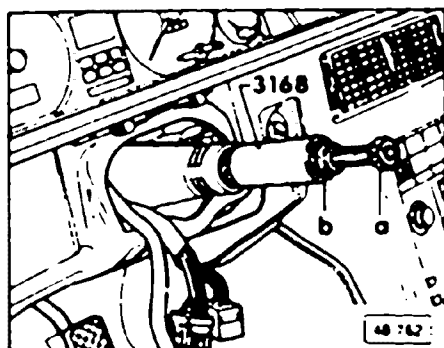
- remove locking bolt
- remove flange tube



- remove Torx bolt
- remove bolts from support bracket
- push down column tube with steering column lock housing
- pull out and remove steering column lock housing from column tube
- carefully take out steering column with column tube through top of instrument panel

Installing

- install steering column in column tube
- carefully insert steering column with column tube into top of instrument panel
- install steering column lock housing in column tube
- insert column tube in support bracket
- install bolts in support bracket and column tube
- install Torx bolt
- insert ignition key in steering wheel lock
- unlock steering column lock so that steering column can be turned as required
- install flange tube with stop
- install locking bolt
- fasten stop, flange tube and steering column together
- tighten locking bolt on steering pinion
- center column tube by moving it up or down in support mounting, so that lock cylinder of steering wheel lock is in middle of instrument panel opening



- install left footwell vent
- install wiring connector on ignition lock
- install instrument panel insert
- install cover trim strip for instrument panel insert
- install spring on steering column
- install new lock washers

- thread special tool with spindle **a** onto the steering column up to stop (nut **b** screwed down)

- hold up spindle **a**. Tighten hex nut **b** until spring coils are compressed against each other

CAUTION

Do not press springs too far or hearing damage could result

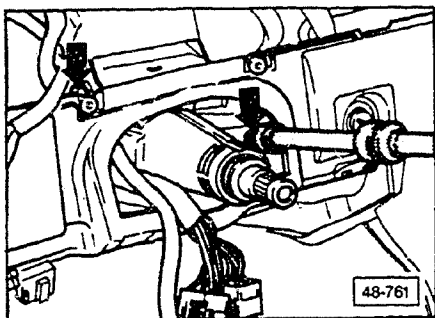
- loosen nut **b**
- remove spindle **a** from the steering column

- install steering column switch
- install steering wheel
- attach battery ground strap
- check function of steering column switch
- install lower left instrument panel trim

Note

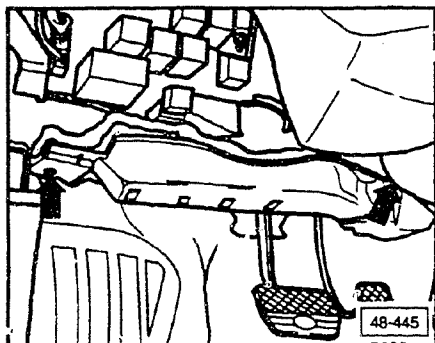
Steering wheel spoke must be horizontal when wheels are in straight ahead position

Steering lock housing/lock cylinder, removing/installing

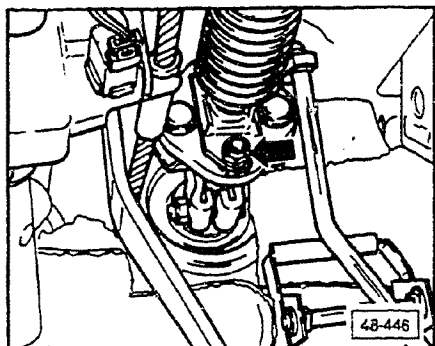


- remove battery ground strap from battery
- remove steering wheel
- remove steering column switch

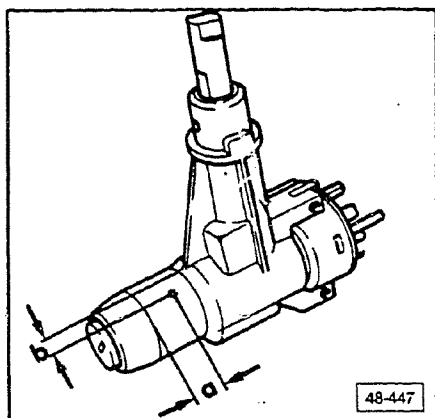
- remove connector from ignition switch
- remove Torx screw (**right arrow**)
- remove column tube mounting bolts from bracket



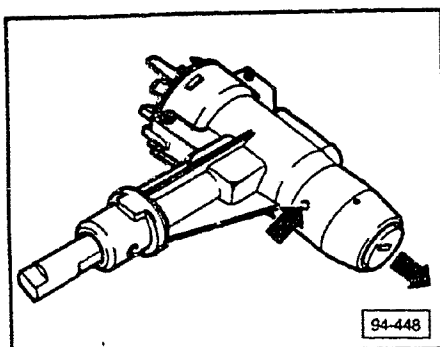
- remove trim under left side instrument panel
- remove footwell outlet (**arrows**)



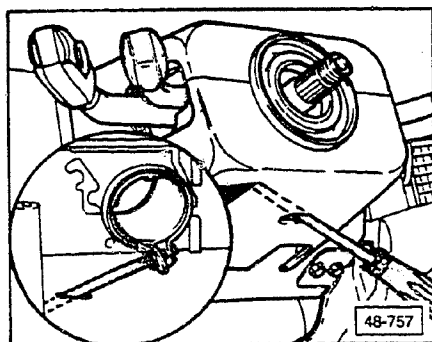
- remove flange tube (**arrow**)
- press down column tube with steering column
- remove steering lock housing



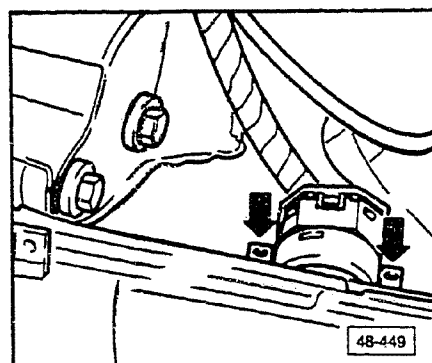
- drill one 3.0 mm diameter hole in steering lock housing
- a = 12.5 mm
- b = 8.0 mm



- remove lock cylinder by pressing in check spring (**arrow**) with a drift
- when installing, push lock cylinder into steering housing until check spring engages



- remove battery ground strap from battery
- remove steering wheel
- loosen clamp on steering column switch and remove switch



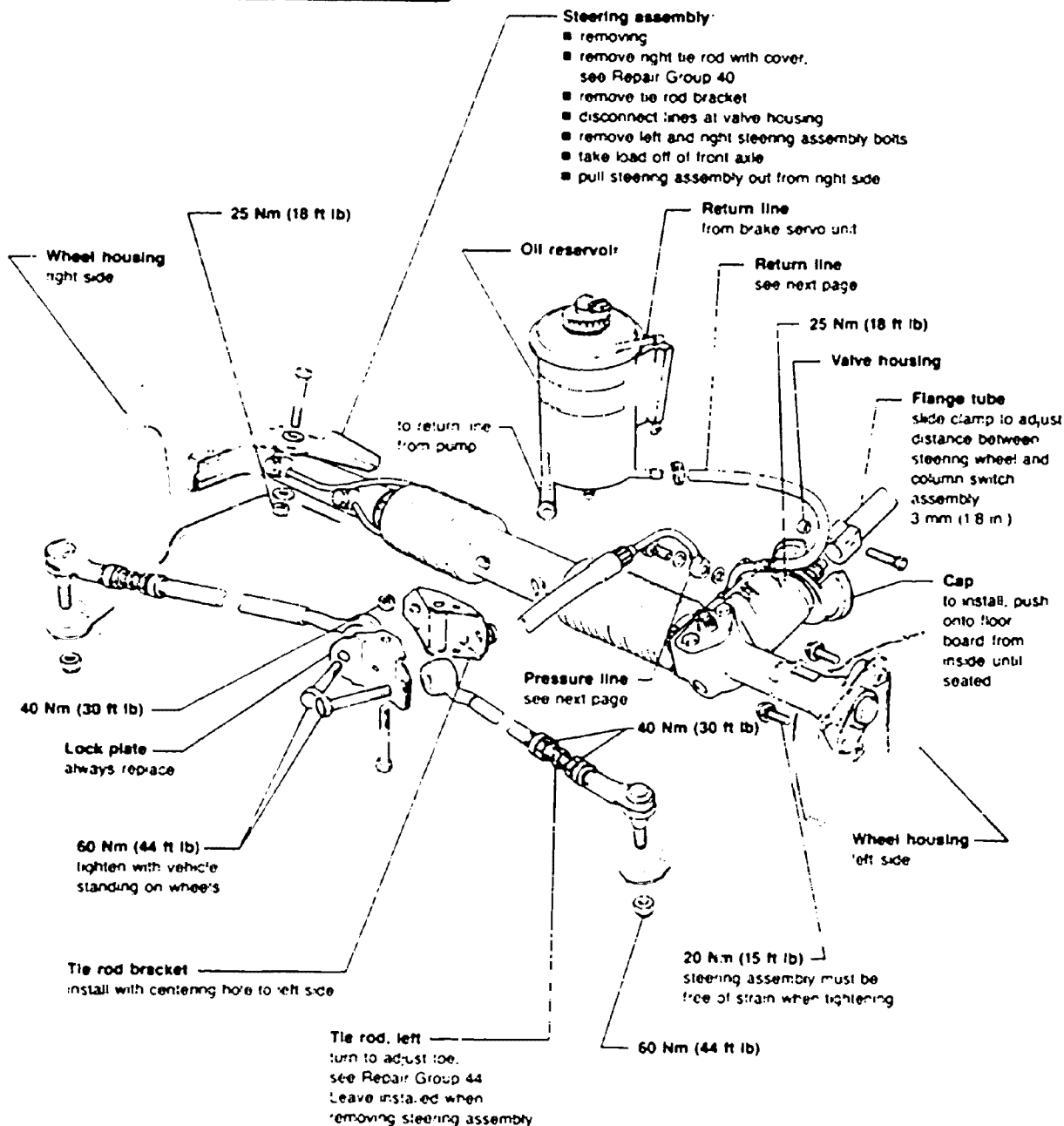
- remove instrument cluster (see Repair Group 70)
- remove connector from ignition switch
- remove sealing paint on switch mounting bolts and remove bolts (**arrows**)
- remove ignition switch

CAUTION

After installing ignition switch, reapply sealing paint to mounting bolts.

CAUTION

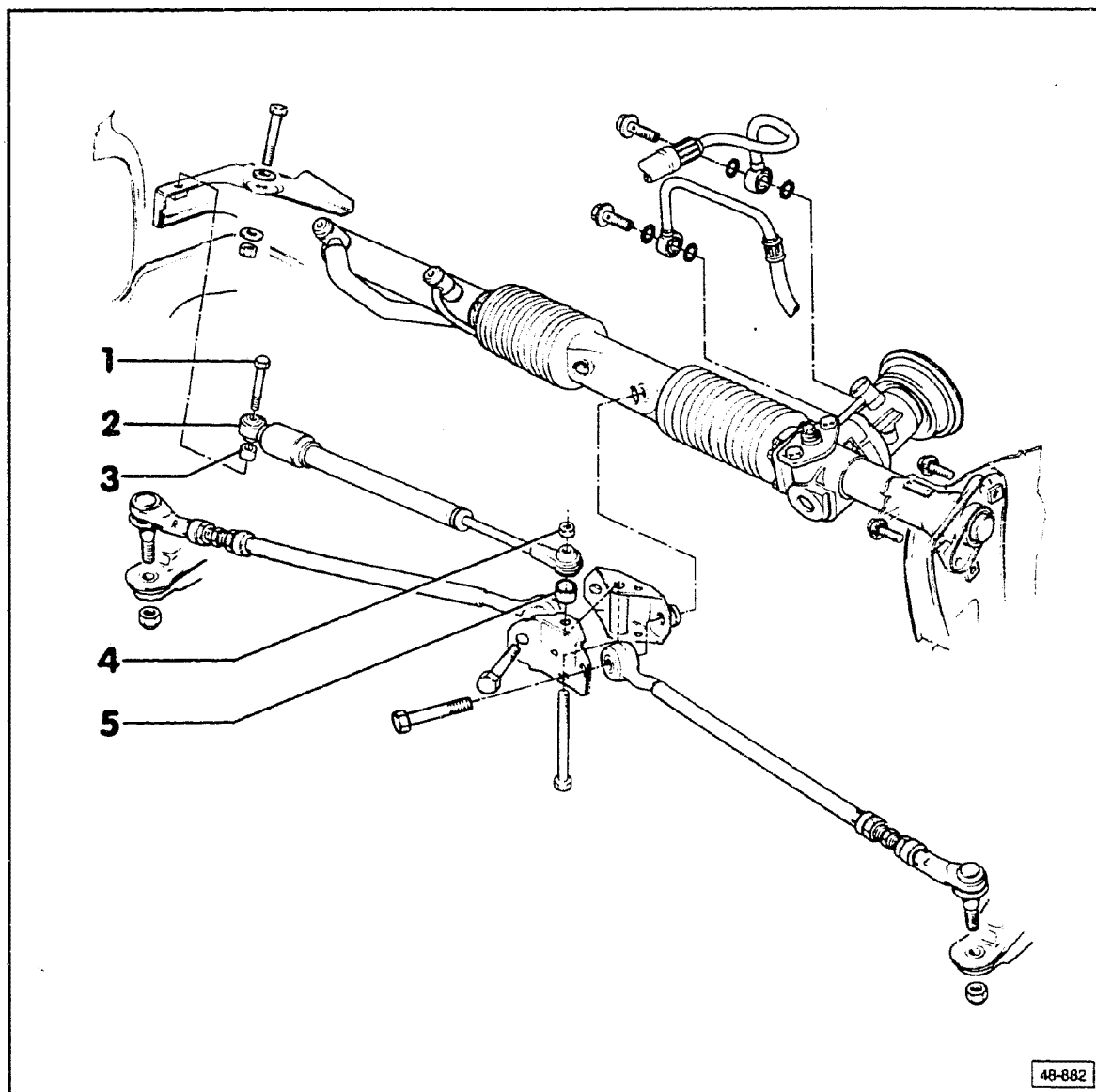
Reservoir must be filled with hydraulic oil Part Number G 002 000



Note

See page 48.8a for Quattro 20V steering damper.

48-435



1 — 40 Nm (30 ft lb)

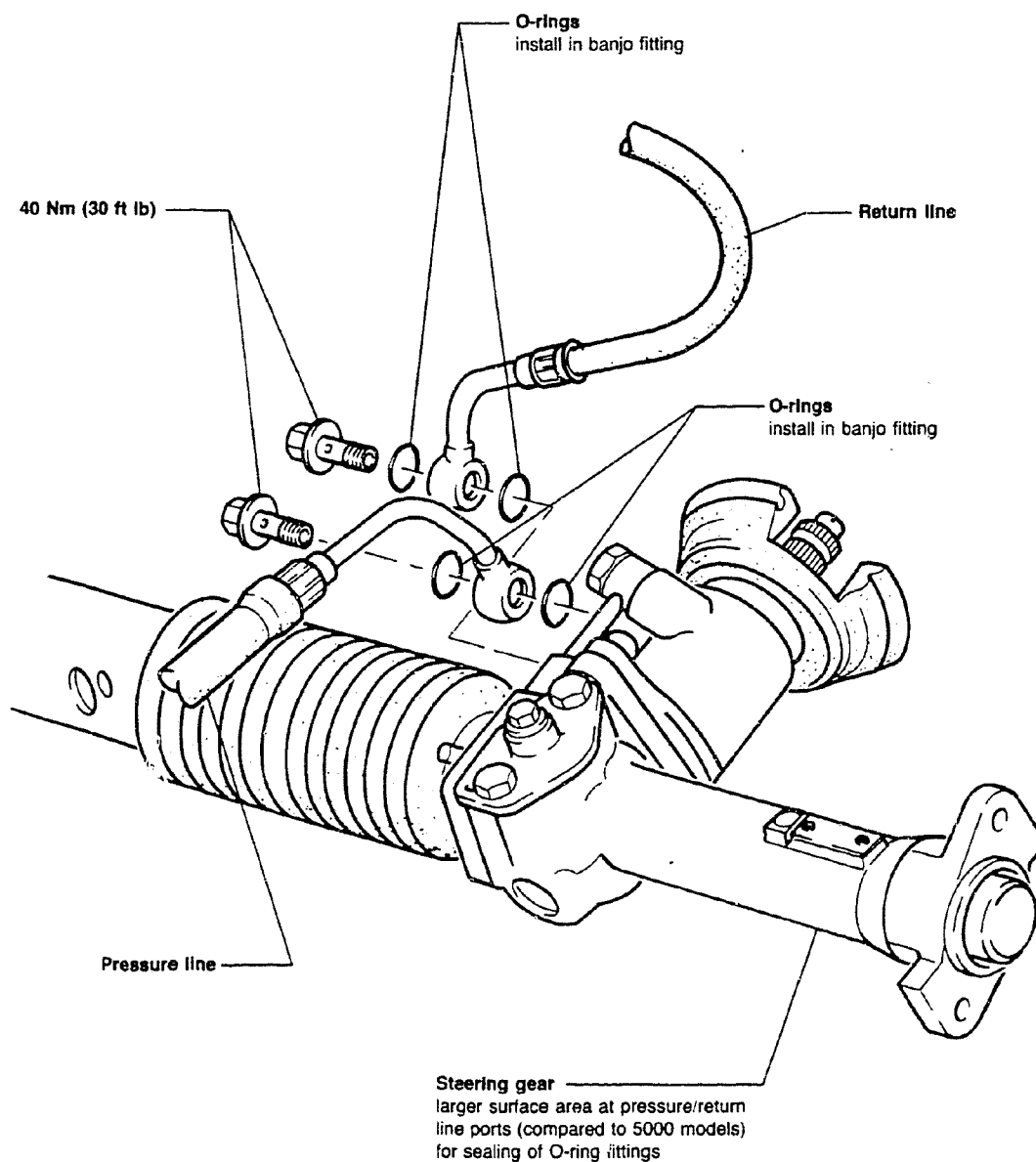
2 — Steering damper

- can be replaced with steering gear installed
- checking: remove bolt 1 and move piston rod through total stroke, rod must move evenly without jerking (compare with new damper held in same position)
- if functioning properly, slight traces of hydraulic oil are acceptable

3 — Spacer bushing

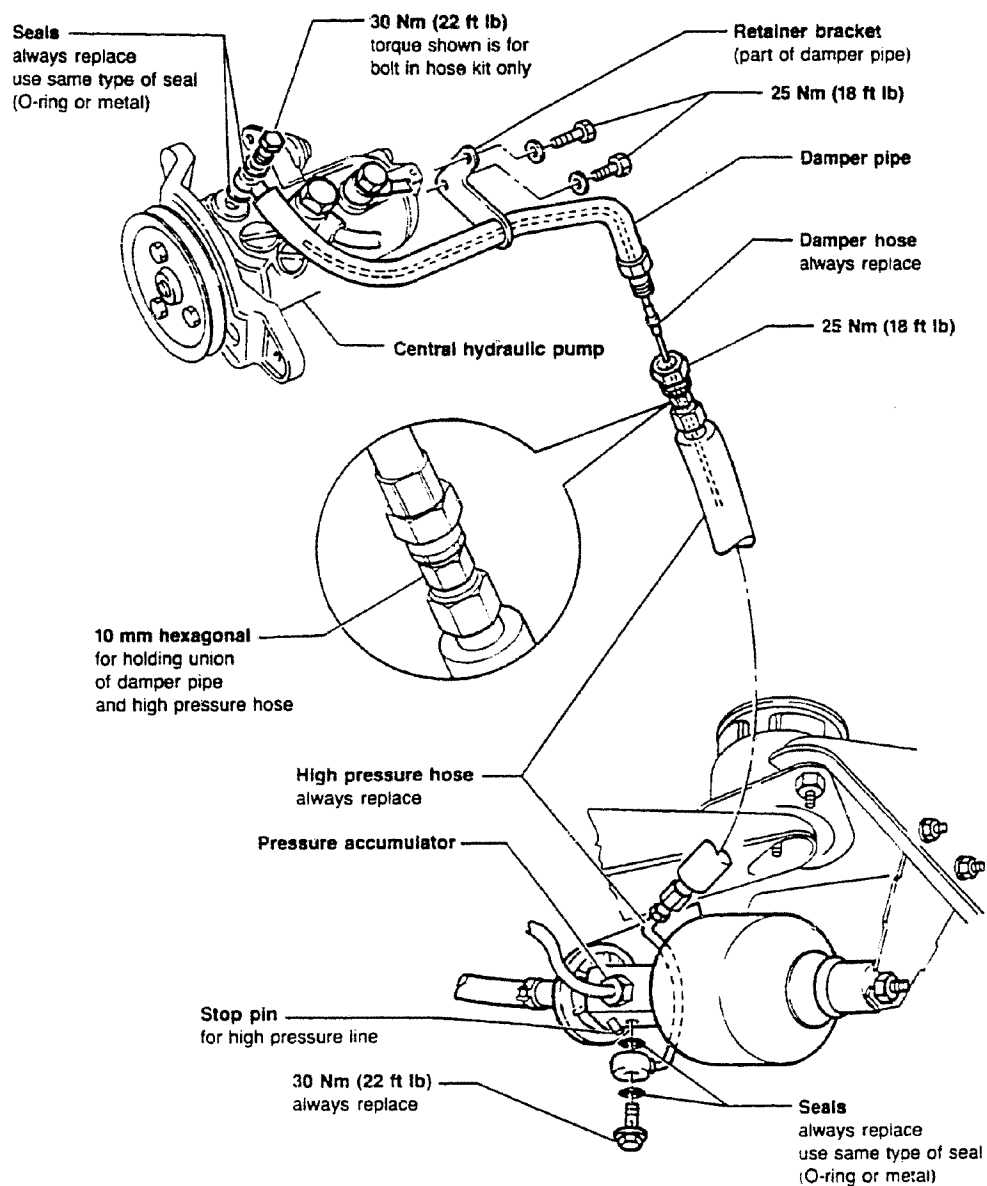
4 — 40 Nm (30 ft lb)

5 — Spacer bushing



48-766

Steering



47-738

CAUTION

Keep all components clean during installation.

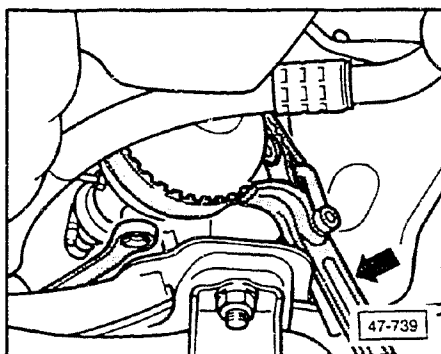
High pressure steering hose (to accumulator), replacing

Before removing a defective high pressure hose, check the routing of the hose to determine if it has been kinked, twisted or installed incorrectly.

- check if pressure accumulator is twisted out of position
- check engine mounts and engine rubber stop for damage and replace if necessary
- check if high pressure hose has been twisted at coupling with damper pipe due to incorrect installation
- check that metal line at end of high pressure hose contacts stop pin on pressure accumulator
- check if damper pipe is bent (can be recognized by bent retainer bracket)

CAUTION

Before removing hose, release residual pressure in pressure accumulator by pumping brake pedal firmly at least 20 times.



Removing

- on vehicles with cooling fan for injectors, release two retainer straps, separate connector and remove fan motor
- remove banjo bolt from hydraulic pump at connection to accumulator. Seal connection on damper pipe with a plug
- remove bolts in damper pipe retaining bracket and seal threaded connection in central hydraulic pump with a plug
- hold pressure accumulator with an oil filter wrench (**arrow**) while removing banjo bolt from accumulator

CAUTION

Hydraulic fluid will escape.

Note

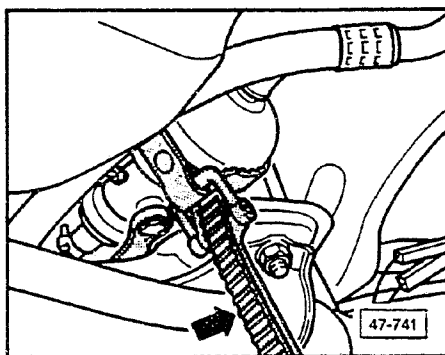
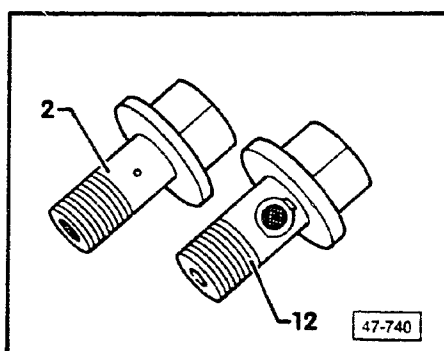
The oil filter wrench will keep the accumulator from being turned out of position when loosening the banjo bolt.

Steering

- seal threaded connection on accumulator with a plug
- remove high pressure hose and damper pipe from top of engine compartment
- loosen union of high pressure hose and damper pipe
- remove damper hose from damper pipe

Installing

- remove plugs from high pressure hose and pressure accumulator
- clean seal contact surface on pressure accumulator thoroughly
- feed high pressure hose into engine compartment from underneath



CAUTION

DO NOT interchange banjo bolts 2 and 12.

2 = damper pipe to central hydraulic pump

12 = high pressure hose to accumulator

- connect high pressure hose to pressure accumulator with **new** banjo bolt 12 and **new** seals. Hold accumulator with oil filter wrench when tightening bolt

Note

The metal connection on the damper hose must make contact with the stop pin on the accumulator.

When tightening the connection, the banjo bolt must be in a vertical position.

- carefully insert **new** damper hose into **new** damper pipe
- thread union together by hand but **DO NOT** tighten
- remove plug from central hydraulic pump and clean seal contact surface thoroughly
- remove plug from damper pipe

CAUTION

DO NOT install O-ring seals in place of metal seals or vice versa.

DO NOT kink high pressure hose when installing.

CAUTION

DO NOT install O-ring seals in place of metal seals or vice versa.

CAUTION

DO NOT twist high pressure hose when tightening connection.

- connect damper pipe to central hydraulic pump with **new** banjo bolt and **new** seals. Hand tighten only
- fasten damper pipe to pump with mounting bolts at retaining bracket
- tighten banjo bolt
- tighten union while holding 10 mm hexagonal with a wrench
- clean hydraulic fluid off all parts

Checking

- check hydraulic fluid level in reservoir; top up with hydraulic fluid **G 002 000** if necessary
- swivel central hydraulic pump towards upper stop on tensioner. Replace V-belt if pump contacts upper stop with belt installed
- run engine at idle and check for leaks at all connections
- install injector fan motor

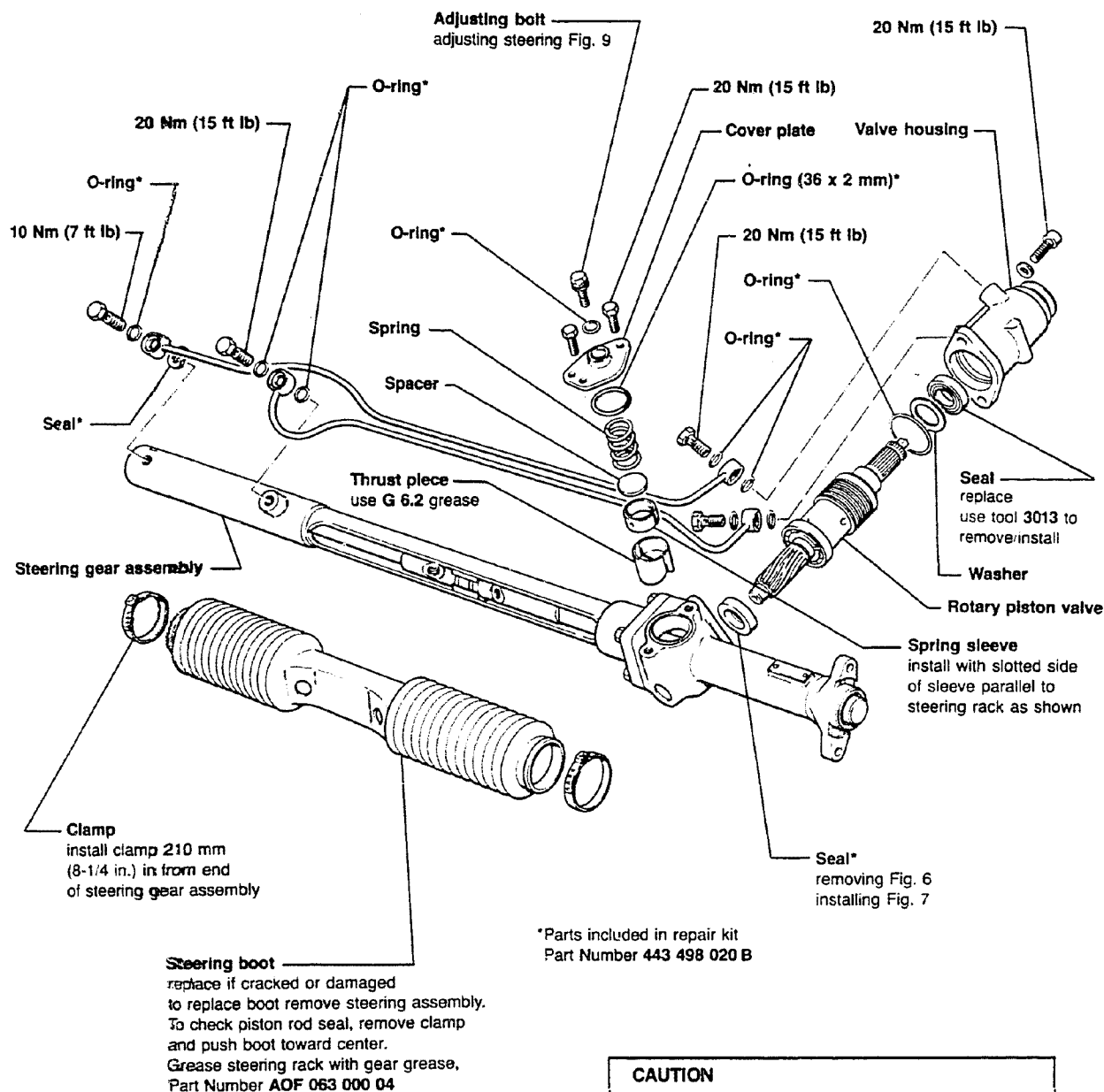
Steering

CAUTION

Work on clean work bench. Keep all parts clean

Note

Before disassembling steering gear, always check output pressure and system pressure.



Note

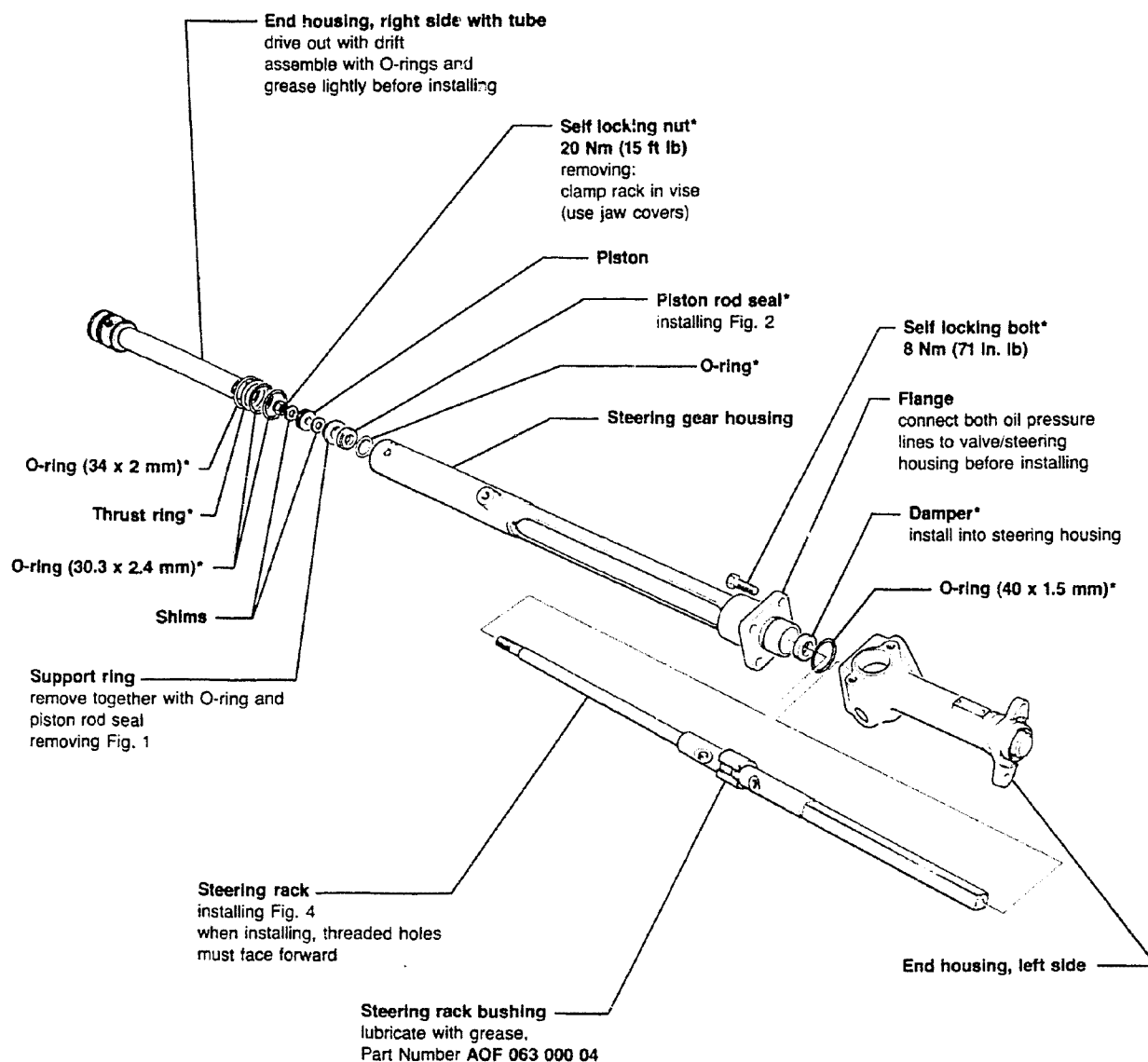
The steering gear can also be repaired using a remanufactured short rack assembly. See Steering rack assembly, preparation/installing.

CAUTION

Always replace self locking nuts.

Do not attempt to weld or straighten steering parts.

48-463



*Parts included in repair kit
Part Number 443 498 020 B

Note

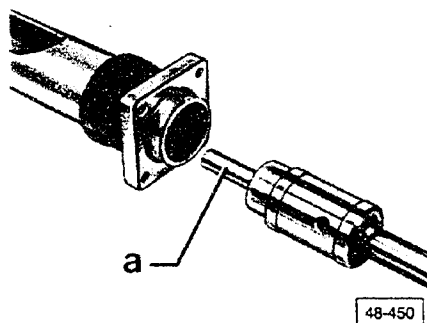
The steering gear can also be repaired
using remanufactured short rack assembly.
See Steering rack assembly, preparation/
installing.

48-465

Steering gear, repairing

Disassembling

- clamp steering gear assembly in vise (use jaw covers) at end housing
- remove hydraulic lines from steering gear assembly
- remove clamps and slide boot off
- using a drift inserted in steering gear mounting hole, drive end tube out of housing as far as possible
- pull end tube completely out of housing
- loosen two mounting bolts for cover plate to release some tension on gear
- remove self-locking nut on end of steering rack piston rod
- remove valve housing from end housing by removing bolts and tapping valve housing with plastic hammer
- remove cover plate, spring and spacer from end housing (thrust washer and sleeve can be removed also)
- remove bolts holding steering gear housing to end housing and take off end housing
- tilt steering gear housing and remove piston, piston seal and shims
- remove rack from housing by pulling firmly on toothed portion

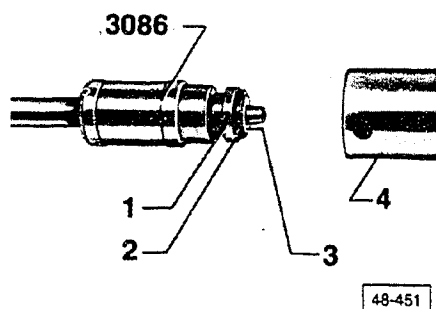


► Fig. 1 Supporting ring, removing

- insert punch (part of tool 3086) into end of tool so longer end **a** is out
- stand housing on end on a block of wood, insert tool 3086 and tap lightly on end of tool with a hammer to remove supporting ring and piston rod seal

Note

The end tube, steering gear housing, steering rack and end housing must all be thoroughly cleaned before reassembly.



► Fig. 2 Piston rod seal, installing

Assembling

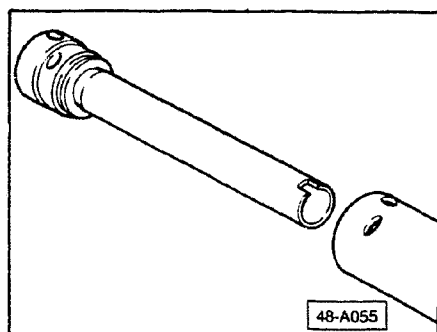
- lightly grease the steering rack, the steering rack bushing and the inner portion of steering gear housing in area of rack bushing
 - grease, Part Number AOF 063 000 04
- lightly oil the end tube O-rings

- insert punch into end of tool so shorter end is out

Note

Install the piston rod seal together with the O-ring and supporting ring.

- push supporting ring 1 with large diameter toward steering housing, over tool
- slide O-ring 2 onto piston rod seal
- push piston rod seal 3 with metal cage toward steering housing, over tool
- using a hammer, drive piston rod seal and supporting ring into steering housing 4 until seated

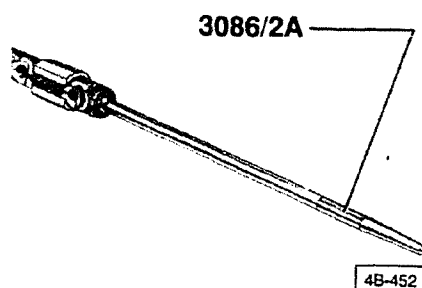


► Fig. 3 End tube, installing to hold piston rod seal while installing rack

Note

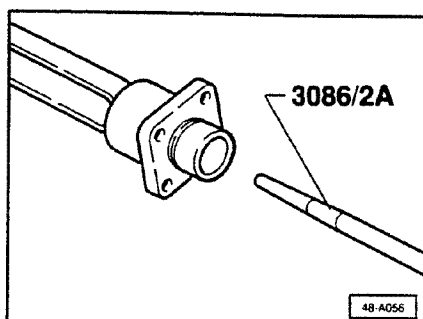
Check piston rod for damage before installing rack.

- install end tube without O-rings so holes line up with holes in steering housing
- hold end tube in housing with a bolt or rod through holes



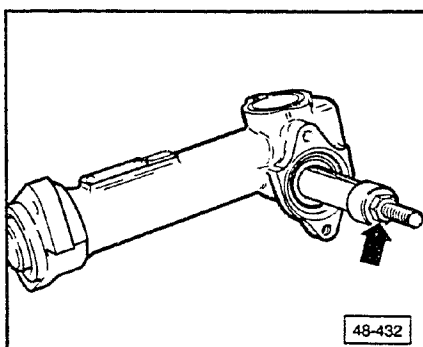
► Fig. 4 Steering rack, installing

- attach mounting sleeve, tool 3086/2A steering rack and lubricate with hydraulic oil



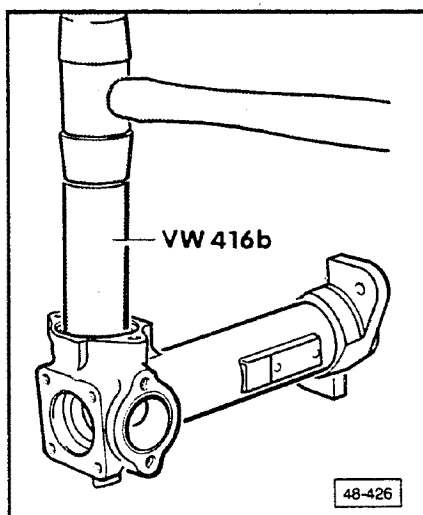
► Fig. 5 Steering rack, installing

- guide steering rack with mounting sleeve into housing
- tap end of rack with plastic hammer to install
- remove end tube and mounting sleeve 3086/2A



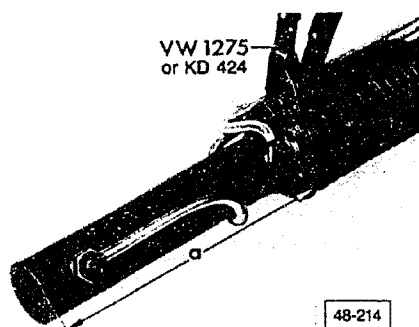
► Fig. 6 End housing oil seal/O-ring, removing

- use a suitable extractor (arrow) or pry out end housing oil seal and O-ring



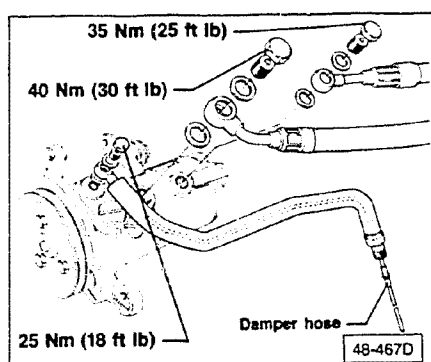
► Fig. 7 End housing oil seal, installing

- replace end housing O-ring and drive in seal until seated
- install end housing onto steering gear housing but do not torque bolts
- slide piston, piston seal and shims onto piston rod and install but do not tighten nut
- install valve housing and ensure that teeth of gears mesh. Torque bolts to **20 Nm (15 ft lb)**
- torque piston rod nut to **20 Nm (15 ft lb)**
- install O-rings on end tube and install with holes lined up with holes on steering gear housing
- slide boot onto steering gear assembly but do not clamp
- install hydraulic lines and leave bolts loose (turn steering gear housing to line up holes)
- tighten housing to end housing bolts evenly and torque to **8 Nm (71 in. lb)**
- torque bolts for hydraulic lines (see page 48.9 for torque specifications)



► Fig. 8 Steering boot clamp, installing

- install spacer, spring and cover plate (install sleeve and thrust washer if removed)
- a = 210 mm (8-1/4 in.)
- install clamps for boot
- adjust steering gear after installing in vehicle



Hydraulic steering system, checking for restrictions

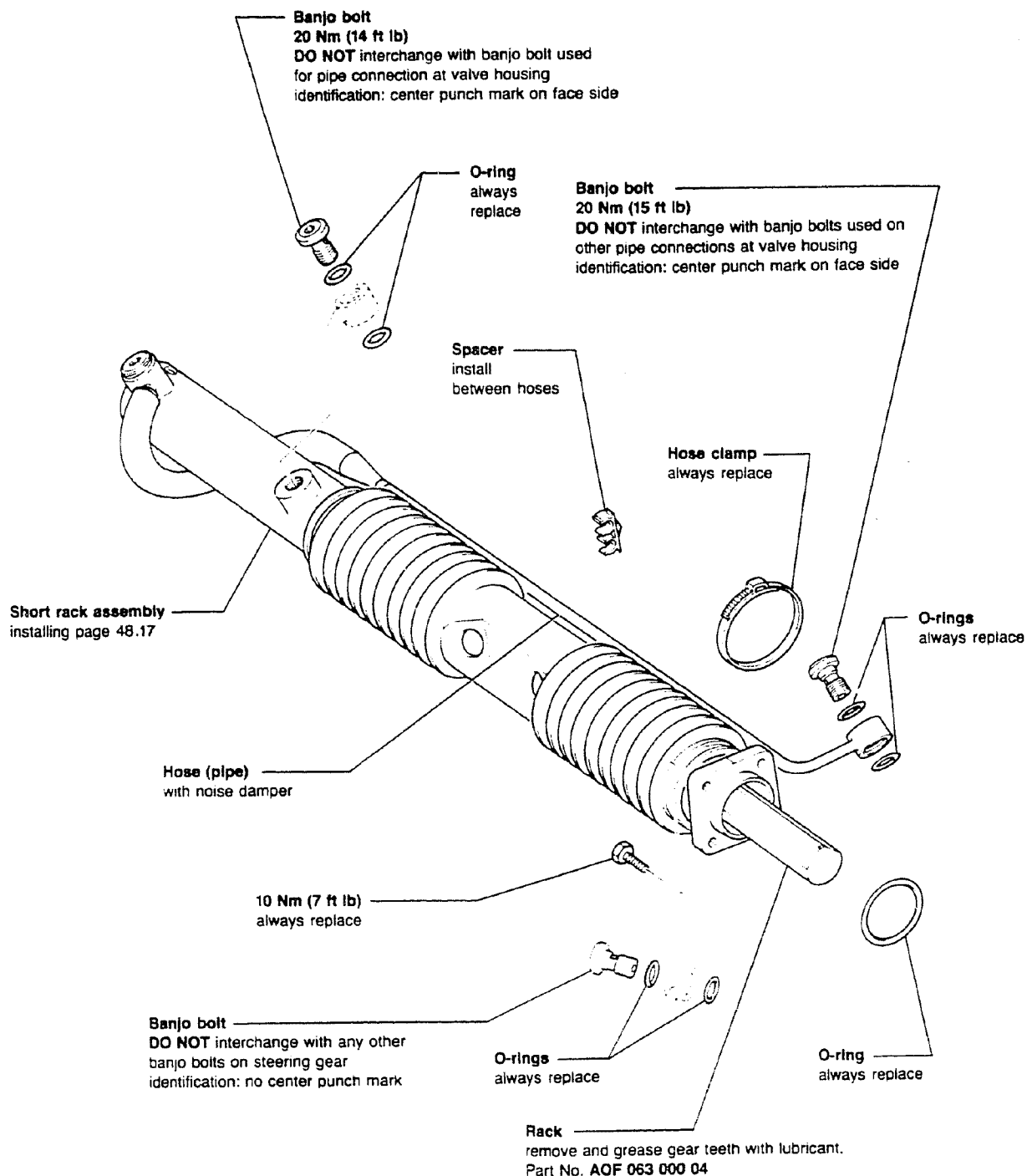
- remove hydraulic line fittings at pump and inspect banjo bolts for dirt and metal particles
- separate pump to accumulator line at fitting (arrow) and check if damper hose is missing or restricted
- reassemble fittings and if necessary, add hydraulic fluid to reservoir

CAUTION

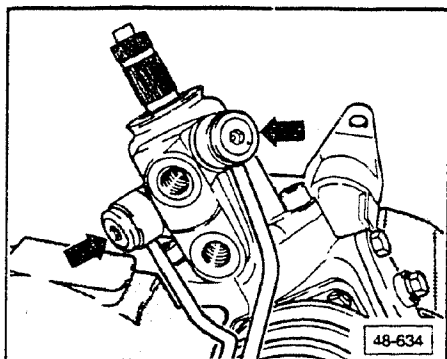
DO NOT clean banjo bolts, only replace them.

CAUTION

Use only hydraulic fluid, Part Number G 002 000.

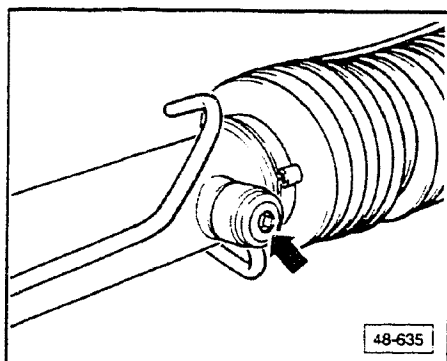


48-632

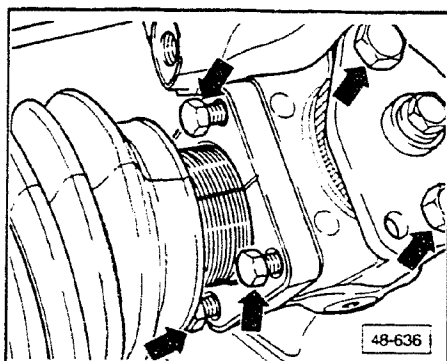


Steering rack ("short rack") assembly, preparation/installing

- clamp removed steering gear assembly in vise
- remove banjo bolts on valve housing (arrows)

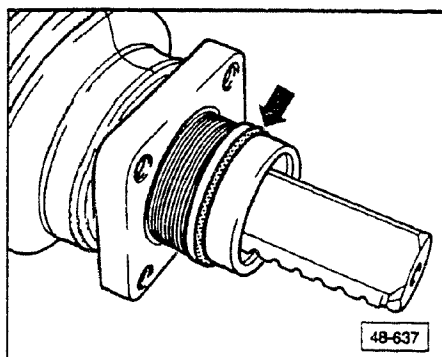


- remove banjo bolt from rack housing (arrow)

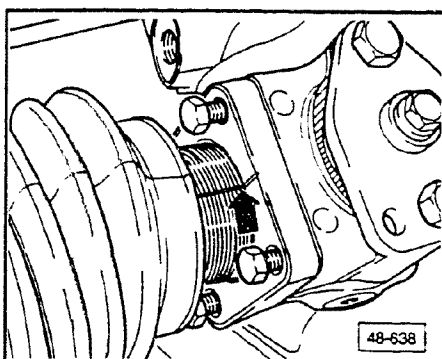


- loosen hose clamp
- push boot back slightly
- loosen flange mounting bolts (left arrows)
- loosen mounting bolts for cover approximately 5.0 mm (right arrows)
- push out rack housing tube by turning pinion

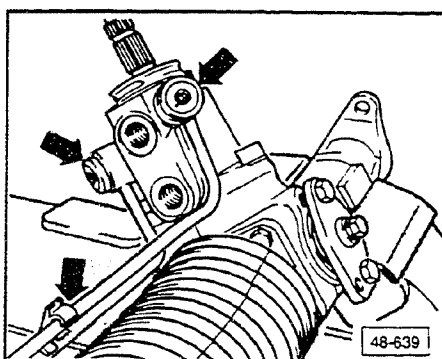
Steering



- grease gear teeth on new rack with lubricant, Part No. **AOF 063 000 04**
- install o-ring onto tube (**arrow**)



- push short rack assembly into housing until rack gear meshes with pinion
- rotate pinion as necessary to install four new flange bolts loosely
- rotate tube so marking on flange and tube are aligned (**arrow**)
- tighten flange bolts to 8 Nm (71 in lb)



- install both pipes with enclosed banjo bolts/o-rings on valve housing and rack tube (**top arrows**)
- install spacer (**lower arrow**)

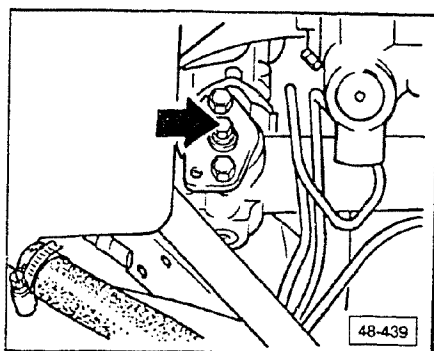
CAUTION

Note the exact location of pipes (with and without noise damper) and banjo bolts (with and without center punch marks) shown on page 48.16 and **DO NOT** interchange.

- install boot and new hose clamp
- tighten cover bolts gradually, alternating between sides until specified torque of 20 Nm (15 ft lb) is reached
- adjust steering play if necessary (see next page)

Steering play, adjusting

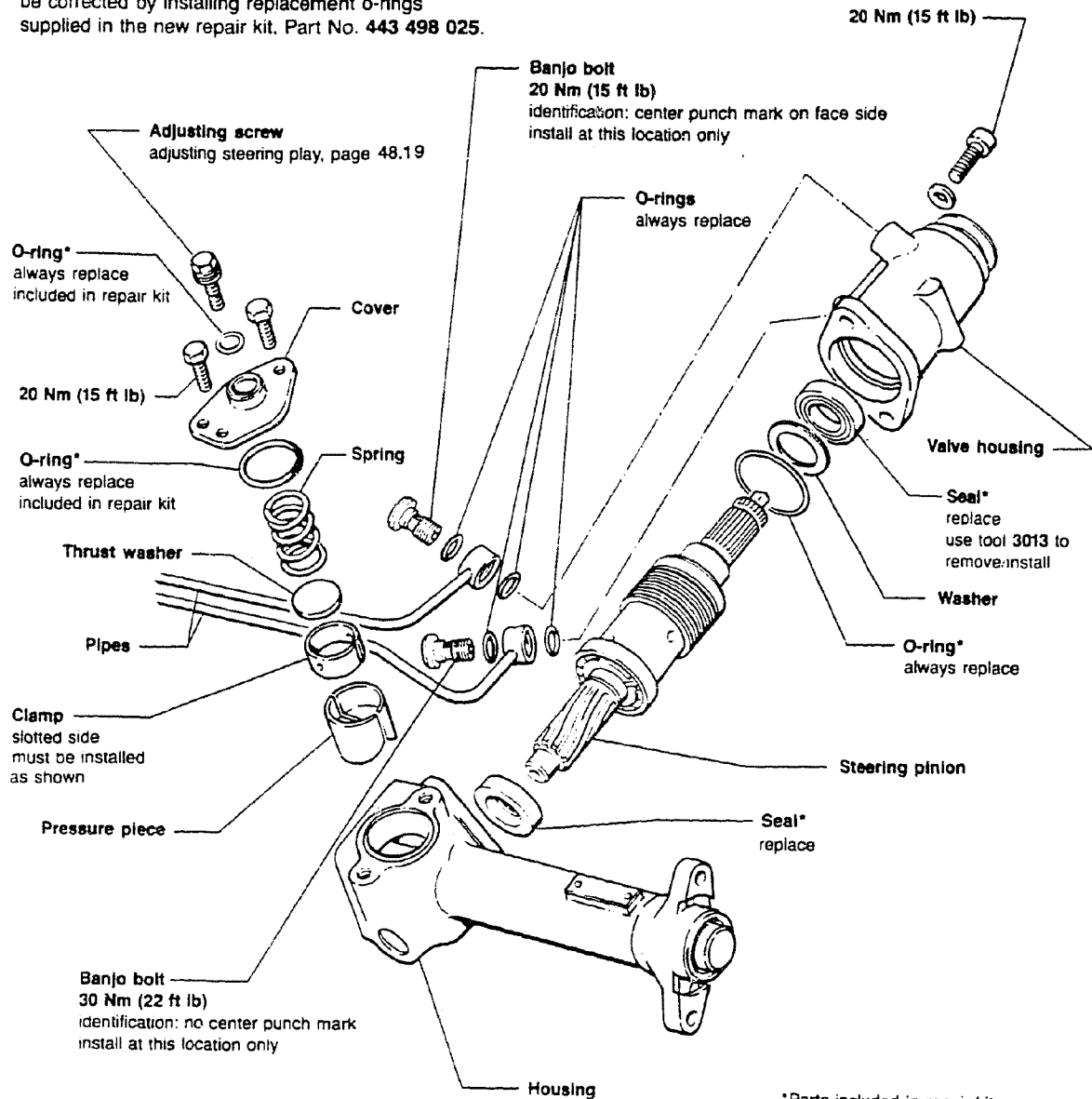
Two mechanics are necessary to do the following adjustment. Adjust the steering play with the engine off and the vehicle on the ground. The wheels must be in the straight-ahead position.



- move steering wheel back and forth approximately 30° from center position and listen for rattling and popping noises from steering gear
- second mechanic must turn adjusting screw (**arrow**) clockwise until rattling and popping noises are not heard inside vehicle
- then turn in adjusting screw an additional 45° (1/8 turn)
- conduct test drive and readjust if necessary
 - if steering does not return to straight-ahead on its own, turn adjusting screw back (loosen) approximately 15°
- conduct test drive

Note

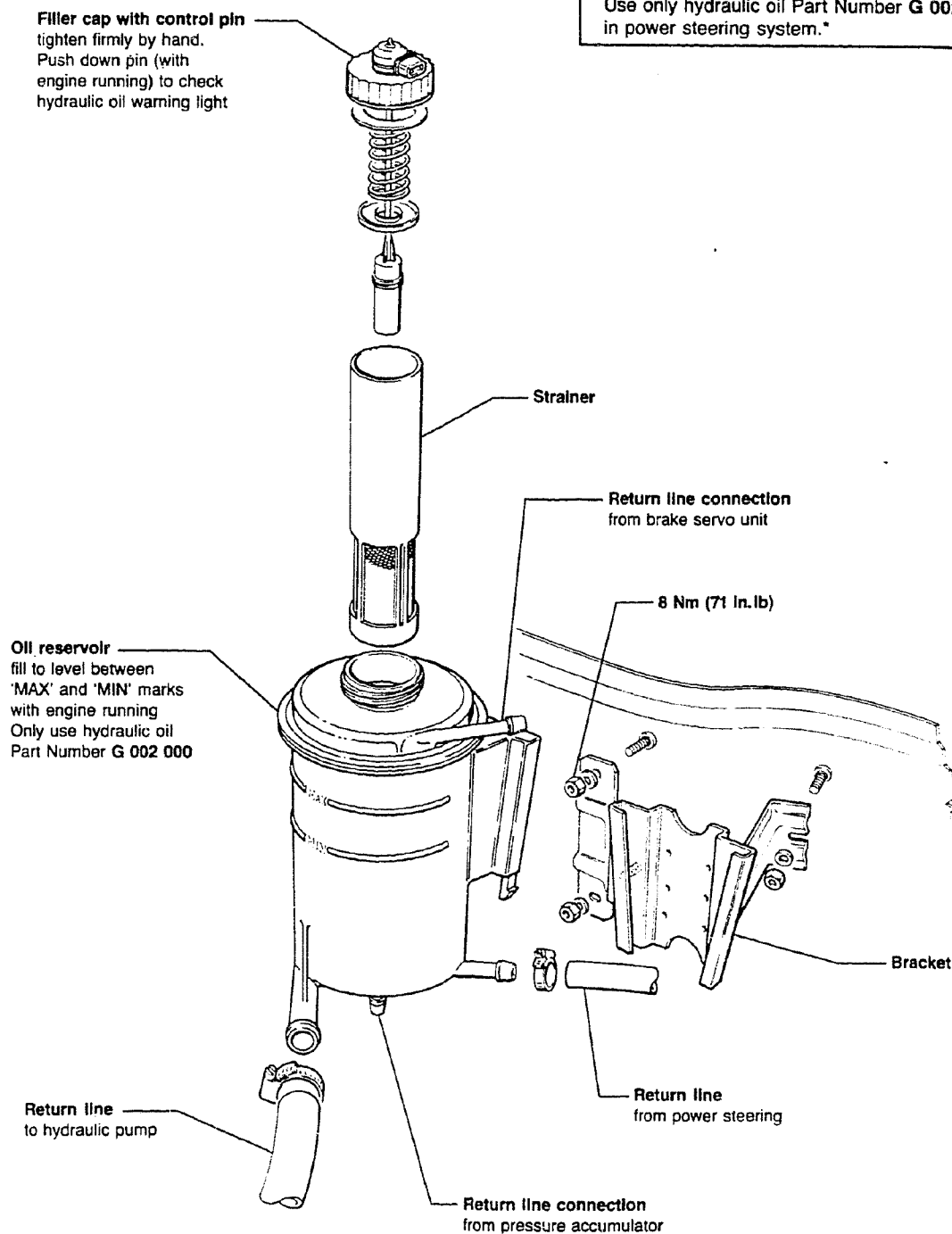
Leaking which occurs at the valve housing must be corrected by installing replacement o-rings supplied in the new repair kit, Part No. 443 498 025.



*Parts included in repair kit
Part Number 443 498 025

CAUTION

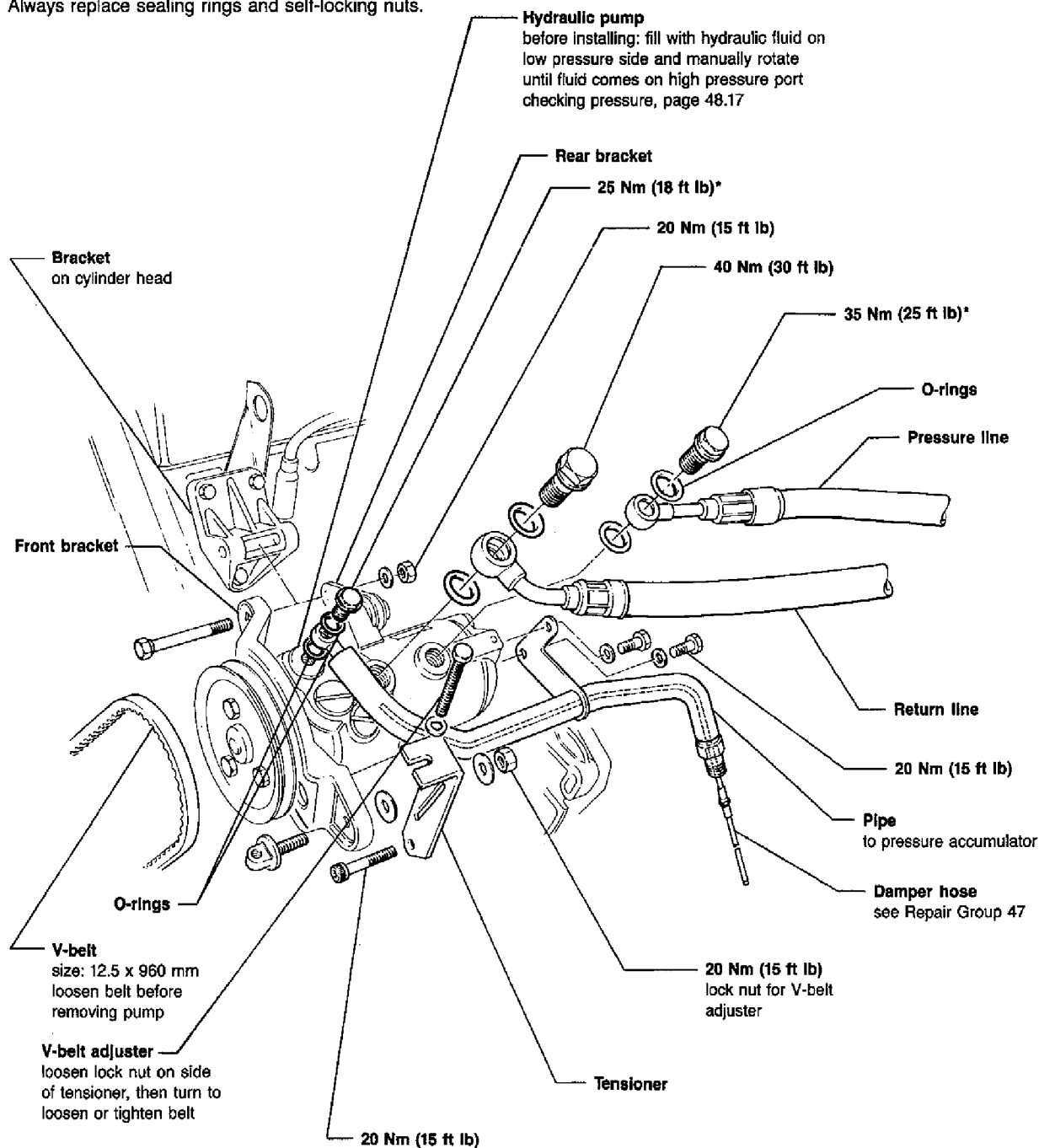
Use only hydraulic oil Part Number G 002 000 in power steering system.*



48-443

Note

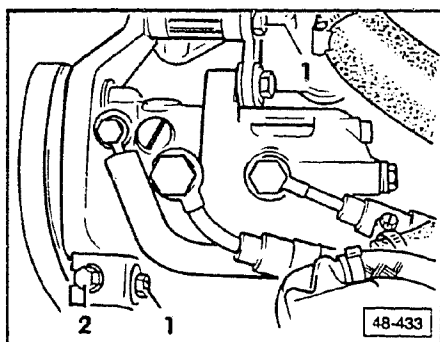
Always replace sealing rings and self-locking nuts.



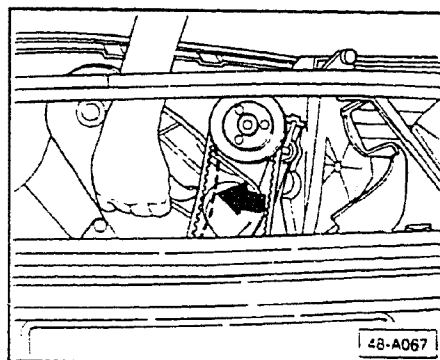
CAUTION

Use metal sealing rings (as used on 5000 model pump fittings) when attaching pressure gauge, VW 1441, to pump.

48-467



► **Fig. 1 V-belt, adjusting**
 ■ loosen nuts 1
 ■ turn adjuster bolt 2



- belt is correctly adjusted when center of belt can be depressed 10 mm (3/8 in.) (arrow)

Note

The grille has been deleted for illustration purposes only.

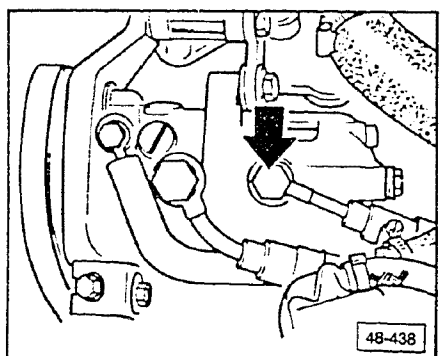
- tighten nuts 1 (see illustration 48-433)

Steering system, checking for leaks (engine running)

CAUTION

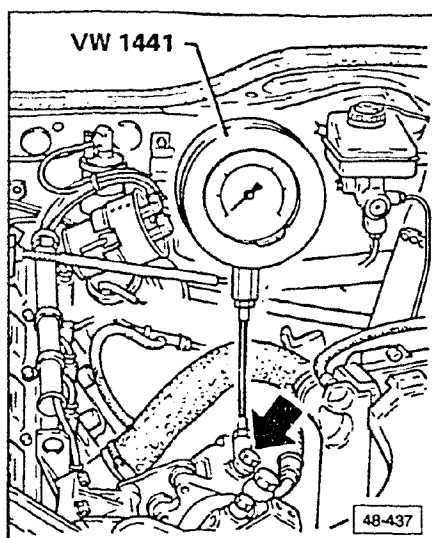
If hydraulic oil level is too low, always check power steering system for leaks.

- turn steering wheel to full lock on each side and hold in position
- in this position, carry out the following visual checks for leaks:
 - 1st — rotary piston valve
 - 2nd — steering rack seal or seal in left end housing (remove clamp and push boot toward center)
 - 3rd — central hydraulic pump
 - 4th — pipe and hose connections



Power steering pump pressure, checking

- disconnect pressure hose from hydraulic pump (arrow)



- attach pressure gauge VW 1441 to hydraulic pump (arrow)
- let engine idle and check pressure
 - 145-165 bar (2103-2393 psi)

Note

Do not exceed 10 seconds for pressure test.

- if spec's are not reached, replace pressure relief valve in hydraulic pump
- repeat pressure test
 - if spec's are not reached, replace hydraulic pump

Note

Remove pressure relief valve (if replaced previously) from defective pump.

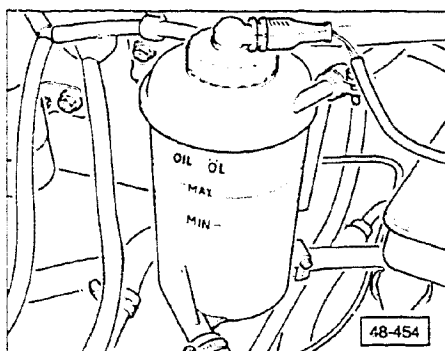
Hydraulic fluid, replacing

CAUTION

When steering components and connecting lines are replaced, always fill steering system with hydraulic oil and bleed system. Do not reuse hydraulic oil which has been drained. Always clean filter when steering components are replaced and when changing hydraulic oil.

CAUTION

Do not allow reservoir to be sucked dry.



- fill hydraulic oil up to "MAX" mark
- take load off front axle
- turn steering wheel from full lock to opposite lock several times, engine **not** running
- top up hydraulic oil to "MAX" mark
- start engine and watch oil level
- keep adding hydraulic oil until fluid level remains constant at "MAX" mark

Note

No air bubbles should appear in reservoir when turning steering wheel.

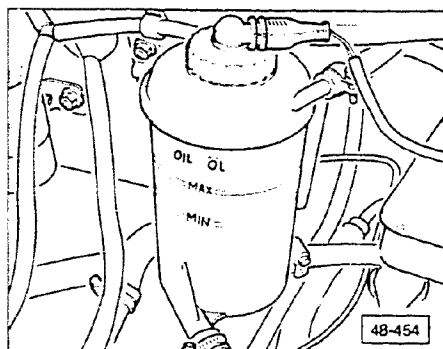
Steering system, bleeding

- take load off front axle
- run engine
- watch hydraulic fluid level in reservoir until it drops and holds constant level
- turn steering wheel (lock to lock) several times quickly

Note

Do not use more force on steering wheel than necessary to turn steering wheel.

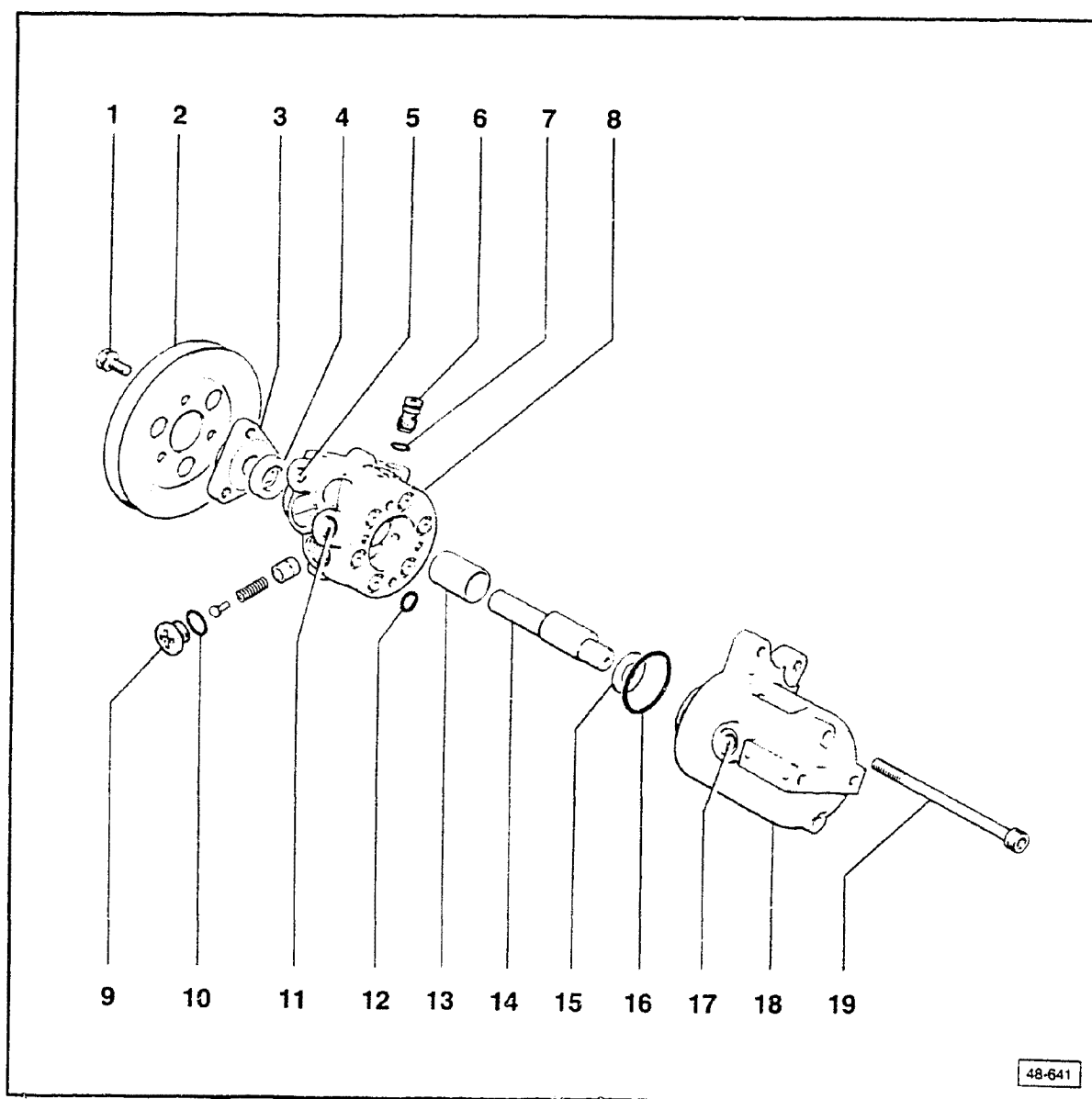
- add more hydraulic fluid if fluid level continues to drop below "MAX" marking
- make sure no bubbles appear in reservoir when steering wheel is turned



Power steering — troubleshooting

Fault	Possible cause	Check	Remedy
Warning light for central hydraulic system is flashing (Low hydraulic oil level in reservoir)	Air trapped in hydraulic system has escaped during driving	Visual check of hydraulic oil level in reservoir	Top up hydraulic oil in reservoir to "Max" mark
	Leaks in steering gear, at pipe unions or at pump	Visual check of steering gear and hydraulic pump	Tighten pipe unions, replace O-rings, seal in pump or pipes/hoses
	Seal in valve housing leaking on steering column side	Visual check of steering spindle/valve housing on inner side of floorboard	Replace seal and O-ring
Warning light for central hydraulic system flashing again (hydraulic oil level in reservoir has to be topped up a second time without any leaks being visible)	Leaking steering rack Seal in left hand end housing is leaking	Loosen hose clamp of boot and push boot towards middle of vehicle. If oil loss is heavy, hydraulic oil will be present in steering gear housing or boot	Install rebuilt steering gear
Warning light for central hydraulic system flashes (hydraulic oil level and brake fluid level are OK)	Oil sieve in reservoir is plugged	Check sieve for deposits	Clean sieve and if necessary, replace reservoir
	Float for warning light defective	Check cap on reservoir	Replace cap if necessary
	Pressure switch on brake servo defective	Check switch on servo	Replace switch if necessary
Warning light for central hydraulic pump flashes after engine started and goes out after a few seconds	Brake servo leaking	Check servo for leaks	Replace brake servo if necessary
	Check valve in accumulator leaking	Check accumulator check valve	Replace check valve if necessary
Reservoir fluid runs over	Seals in hydraulic pump leaking	Check fluid for foaming	Repair or replace hydraulic pump

Fault	Possible cause	Check	Remedy
Steering is heavy	V-belt is too loose	Check V-belt tension	Tighten belt, replace if necessary
	Pump pressure is too low	Check pump pressure	If pump pressure is OK: Repair or replace steering gear If pump pressure not OK: Replace pump
Power steering makes a rattling or knocking noise	Excessive play between pressure plate and steering rack	Check steering gear adjustment	Adjust steering gear according to instructions in Repair Manual
Noise at idle or steering wheel vibrations when stopped	V-belt defective or tension incorrect	Check V-belt	Tighten belt, replace if necessary
	Hydraulic pump defective		Replace hydraulic pump



1 — 20 Nm (15 ft lb)

2 — V-belt pulley

3 — Flange
install with shoulder toward pulley

4 — Seal*

5 — Connection for pressure line to pressure accumulator

6 — Check valve
15 Nm (11 ft lb)

7 — Seal*
always replace

8 — Pump housing, front

9 — Cap
50 Nm (37 ft lb)
available separately as replacement part (with seal) if leaking

10 — Seal*
always replace

11 — Connection for suction hose

12 — Seal*
always replace

13 — Bushing
check for out-of-roundness

14 — Pump shaft
install, with bushing, in front pump housing
check for scoring

15 — Washer

16 — Seal*
always replace

17 — Connection for pressure line to steering gear

18 — Pump housing, rear
do not remove pressure
relief valve in housing

19 — 35 Nm (26 ft lb)

Parts marked with an asterisk (*) are supplied in repair kit, Part No. **026 198 049 B**, and are to be replaced during repairs.

CAUTION

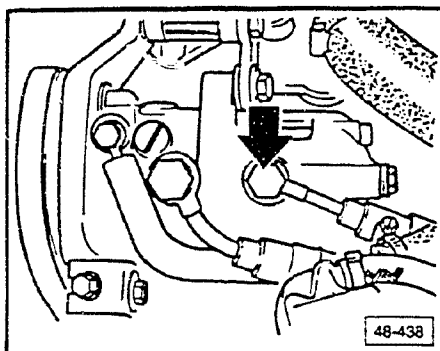
If metal filings are found in the hydraulic pump that could damage bearings, replace the hydraulic pump.

CAUTION

Failure to prime the pump after repairs may cause damage due to dry running.

CAUTION

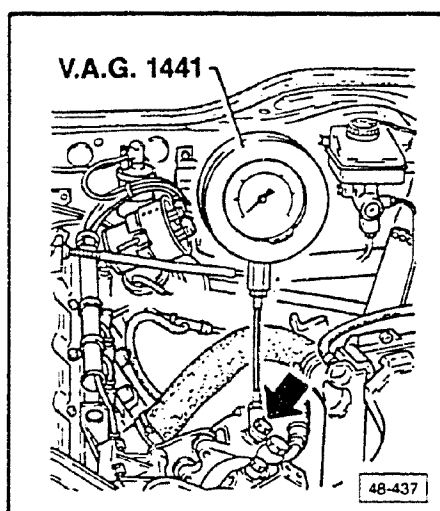
If pump seals are leaking, check pump pressure before replacing seals.



Hydraulic pump, resealing

Before resealing the hydraulic pump, check the pump pressure.

- disconnect pressure hose from hydraulic pump (**arrow**)

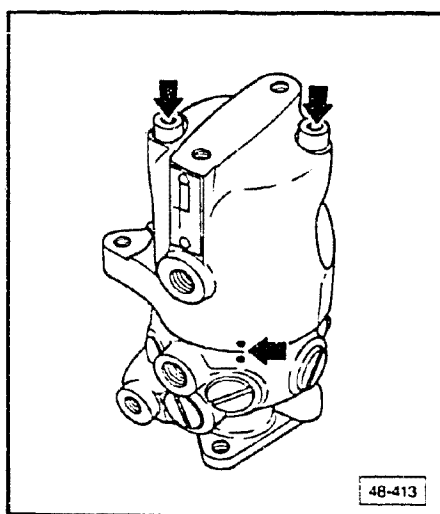


- connect pressure gauge **VW 1441** to hydraulic pump at pressure hose port (**arrow**)
- start engine and let idle
- check pressure
 - 145-165 bar (2103-2393 psi)

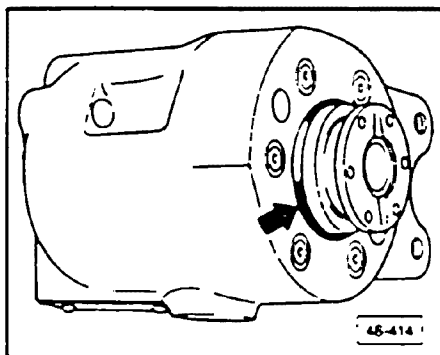
Note

Do not exceed 10 seconds for the pressure check.

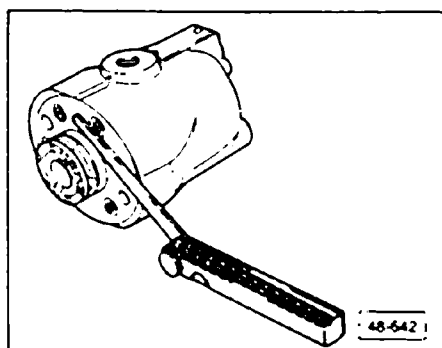
- replace hydraulic pump if results are not within specifications
- proceed with pump resealing procedure if results are within specifications



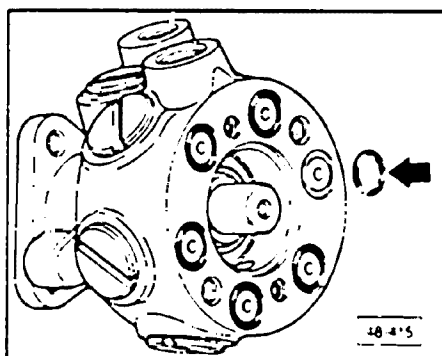
- remove pump from vehicle
- mark position of both pump housings with punch (**lower arrow**)
- remove bolts (**upper arrows**), separate pump housings and remove washer



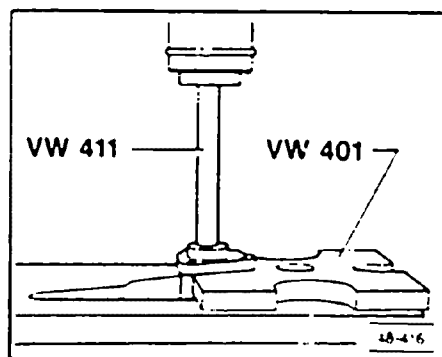
- remove O-ring (arrow)



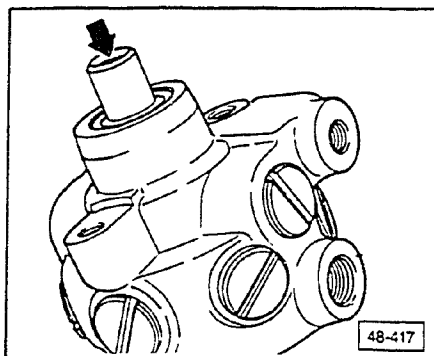
- check for gap between pressure relief valve retainer and pump housing
 - replace pump if gap larger than 0.5 mm (0.019 in.)



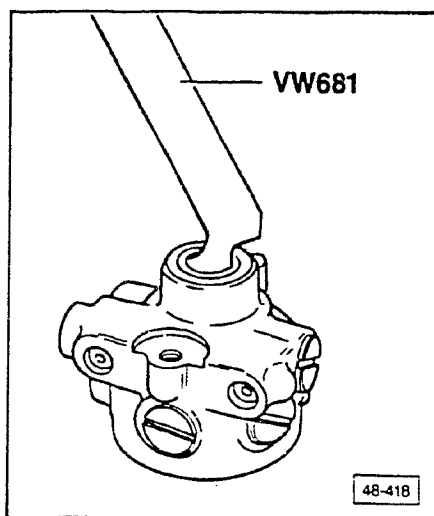
- remove O-rings (arrow)



- press triangular flange off pump shaft



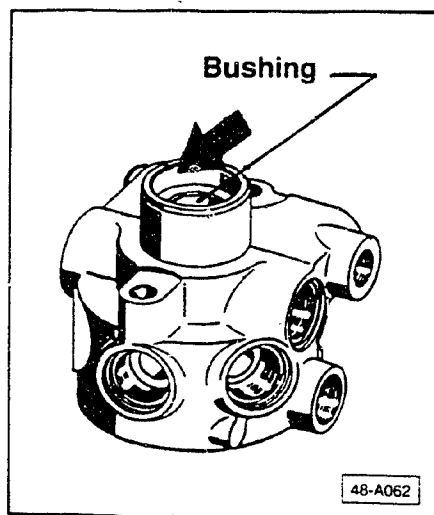
- remove pump shaft and bushing from pump housing with plastic mallet
- check pump shaft/cam and bushing for scoring and uneven wear
 - replace pump if shaft is scored



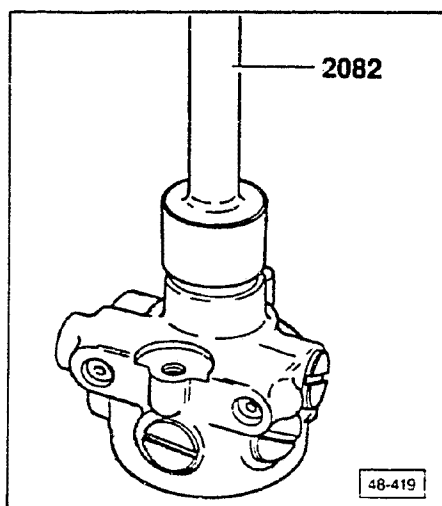
- pry seal out of pump housing

CAUTION

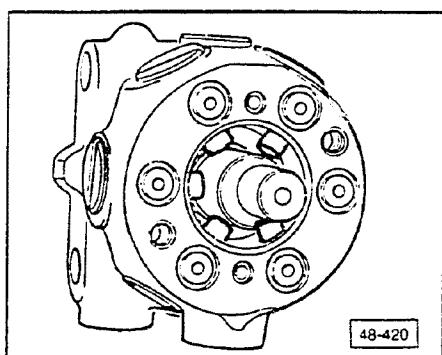
Do not scratch inside of pump housing when removing seal.



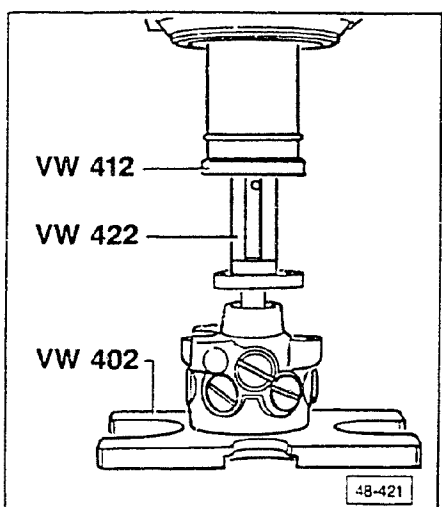
- check pump housing (**arrow**) and bushing at end of housing for damage or uneven wear
 - replace pump if housing is damaged or if scoring is evident in bushing or if bushing is out of round
- clean pump housings, pump shaft and bushing and air dry



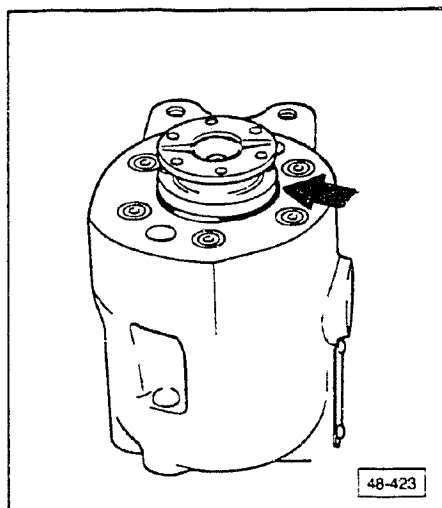
- press seal in (lettering pointing outward) until seated
- coat seal between sealing lips with multi-purpose grease



- lightly oil pump shaft and bushing with hydraulic oil, Part No. **G 002 000**
- slide bushing onto pump shaft
- align washer in pump housing to shaft bore
- insert pump shaft/bushing into housing while pushing pistons back to allow shaft and bushing to slide into housing at same time



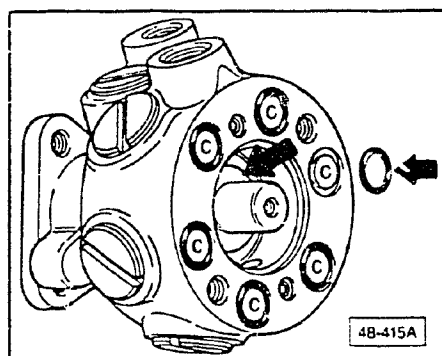
- press triangular flange on pump shaft (shoulder of flange toward tool) until flush with end of shaft



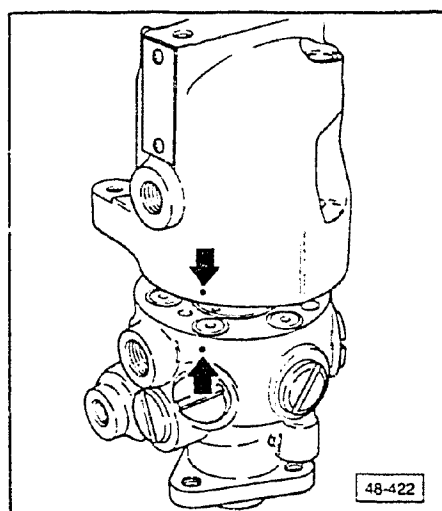
CAUTION

Coat all O-ring seals with hydraulic oil, Part No. G 002 000, before installing.

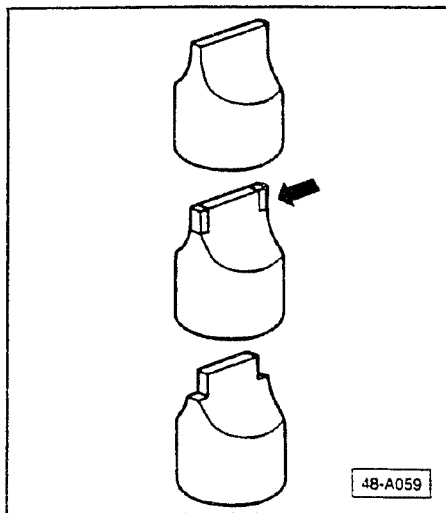
- install new O-ring over pressure relief valve retainer (arrow)



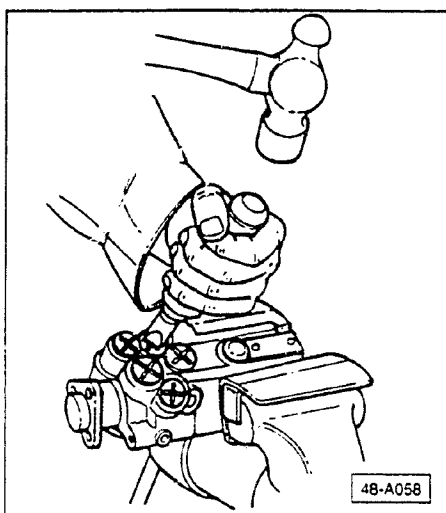
- install six new O-rings (arrow)
- slide washer onto pump shaft (arrow)



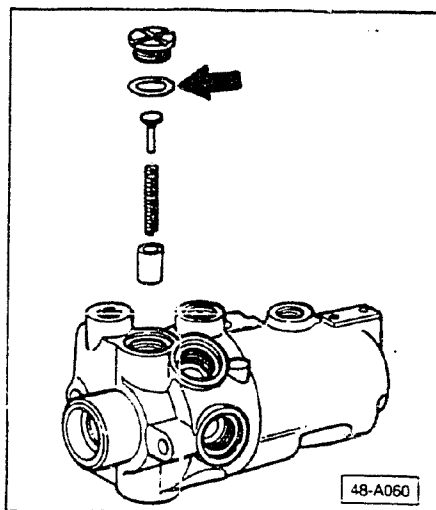
- align previously made marks on pump housings
- install bolts and tighten
 - tightening torque = 35 Nm (26 ft lb)



- modify a 3/4 inch, 1/2 inch drive drag link socket (locally obtainable) by grinding 1.0 mm off each side (arrow)



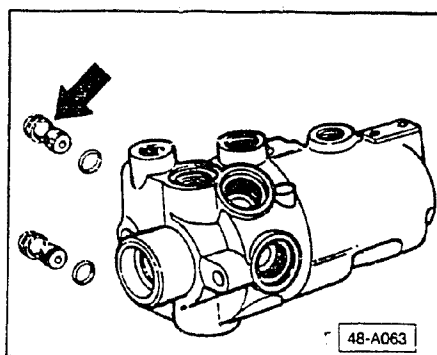
- mount pump in vise (use jaw covers)
- loosen piston caps using hand impact driver and modified drag link socket



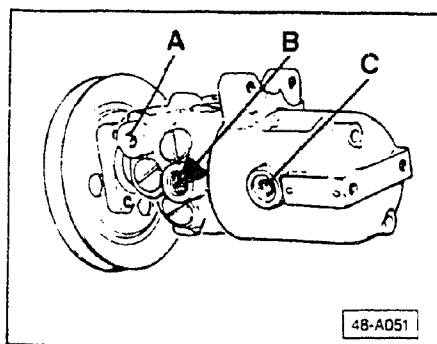
- remove caps and seals one at a time and replace cap seals (arrow)
 - quantity: 8
- tighten caps to 50 Nm (37 ft lb)

Note

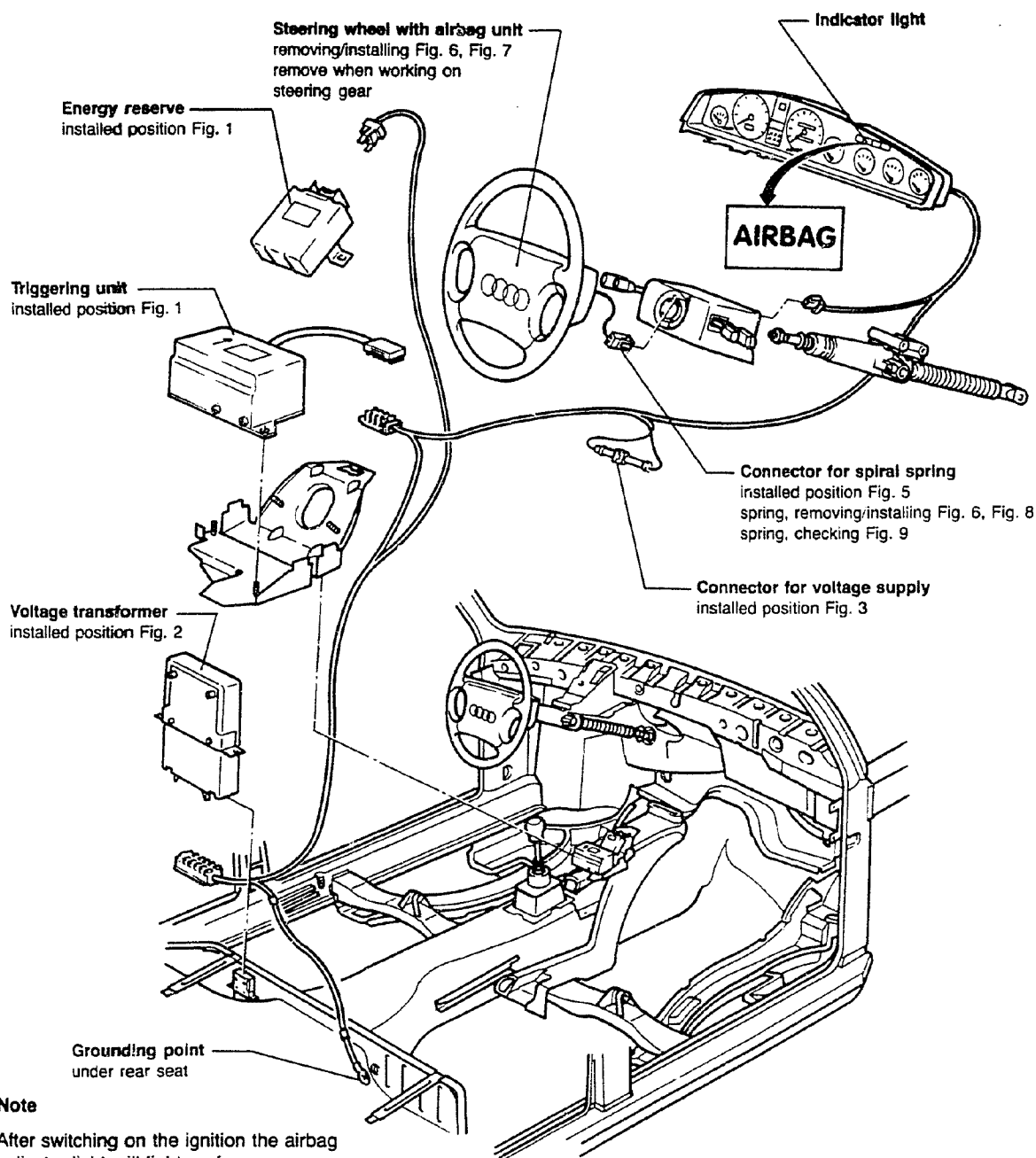
Damaged caps can be replaced separately using Part No. 026 145 541.



- remove two check valves for brake hydraulic portion of pump (arrow)
- replace O-rings on check valves and reinstall in housing
- tighten check valves to 15 Nm (11 ft lb)



- pour as much hydraulic fluid, Part No. G 002 000, as possible into outlet port A and rear chamber C
- fill suction chamber B with hydraulic fluid
- rotate pump manually through four or five complete revolutions while holding thumb over port A
- continue rotating pump slowly until pressure is felt and fluid is seen being pumped from port C
- install pump in vehicle



Note

After switching on the ignition the airbag indicator light will light up for approximately 10 seconds.

When the indicator light goes out, the system is functional.

Use the airbag tester **VW 1619** if indicator light does not go out, or if indicator light does not come on (check bulb first).

CAUTION

Always disconnect the battery whenever doing any electric welding on the vehicle.

96-497

Note

Airbag system information which previously appeared in this Repair Group has now been moved to Repair Group 68, Body Accessories – Interior.

CAUTION

Testing, assembly and repair work on the airbag system must only be conducted by trained Service Department personnel.

Always observe the following safety measures when working on the airbag system:

- Testing of the airbag system is never conducted with a test light or voltmeter. Use the special airbag tester **VW 1619** and test the system only in an installed condition.
- Airbag system components must not be opened or repaired. Always use new parts.
- The airbag unit has an expiration date. The date can be found on a sticker behind the sun visor. After ten years the airbag unit must be replaced. For safety reasons all other component parts of the airbag system must also be replaced at this time.
- If the airbag unit or triggering unit has been dropped from a height of 0.5 meters (20 in.) or more, do not install the component into a vehicle.
- Always replace airbag system components which have been mechanically damaged (bubbles, cracks, etc.).
- Disconnect the negative battery cable and cover the battery terminal during all work on the airbag system. Also separate the terminal connector for the power supply behind the center console.
- Do not leave airbag unit unattended if work is interrupted. Assemble unit as soon as it is removed from storage.
- Always place a removed airbag unit so the horn pad is facing upwards.
- The airbag unit must not be exposed to grease or cleaned with any type of cleaning agent.

(continued on next page)

CAUTION

- do not expose airbag units to temperatures above 100°C (212°F) even for brief periods while handling them during the repair process. Keep the airbag unit clear of heat sources such as heating plates, soldering irons, heat lamps, welding equipment and the like
- if the airbag has been deployed during an accident, replace the triggering unit, the airbag, and the spiral spring. Check all other components for damage and replace if necessary
- the storage, transportation and disposal of airbag units are subject to the laws for flammable solids

Disposal of airbag and triggering units

- active airbag gas generators: Remove an active (unit which has not been deployed) airbag gas generator carefully from the vehicle, and return to the Warranty Parts Test Center for proper disposal. **DO NOT deploy in vehicle**
- deployed airbag gas generators do not have to be disposed of as a "hazardous waste" but can be disposed of with other trash, although it is recommended that for conservation reasons it be sent out with automotive metal scrap for recycling
- triggering units contain a mercury switch and must be disposed of in an approved manner

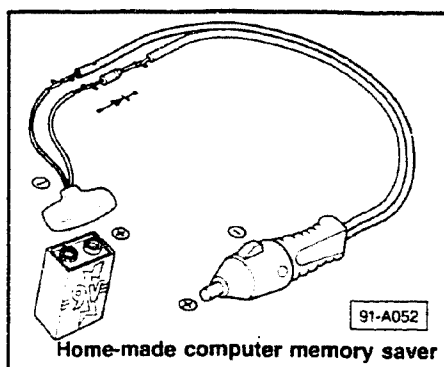
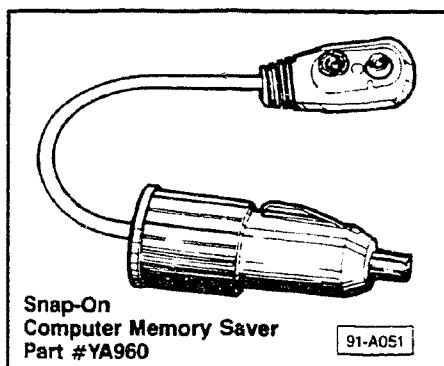
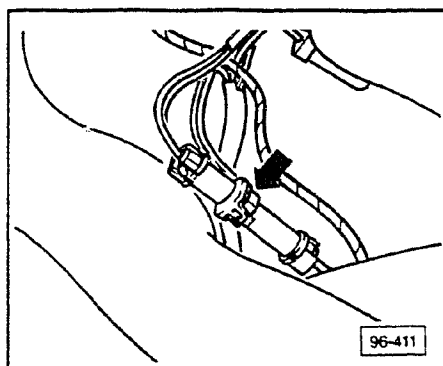
Computer memory saver, installing

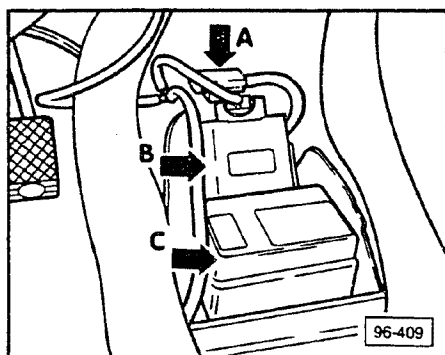
The computer memory saver tool is used on vehicles with theft protected radios to prevent the radio from electronically locking when battery power is disconnected. Using the tool eliminates the need to re-activate (code) the radio after reconnecting battery power. See Service Circular, Tools — Equipment dated April 27, 1988.

WARNING

ALWAYS separate airbag power supply connector before using computer memory saver. Failure to do so may result in accidental activation of the airbag.

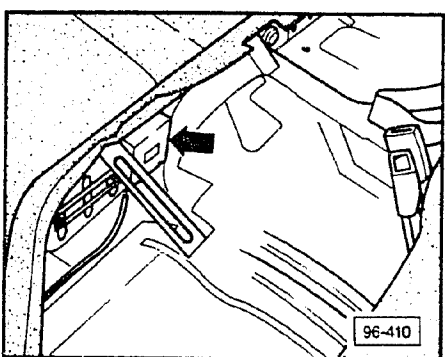
- disconnect airbag power supply connector (arrow)
 - located behind center console
- install computer memory saver into cigarette lighter
- disconnect battery





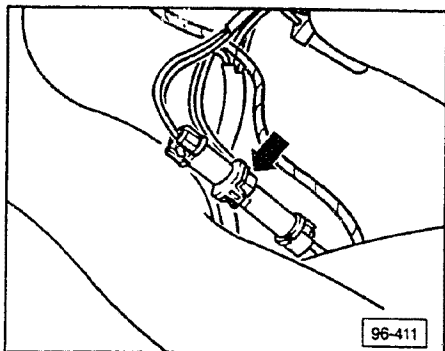
► Fig. 1 10-pole connector/triggering unit/energy reserve, installed position

- A — connector
- B — energy reserve
 - torque mounting nuts to 6 Nm (53 in. lb)
- C — triggering unit
 - torque mounting nuts to 6 Nm (53 in. lb)



► Fig. 2 Voltage transformer, installed position (arrow)

- torque mounting bolts to 6 Nm (53 in. lb)

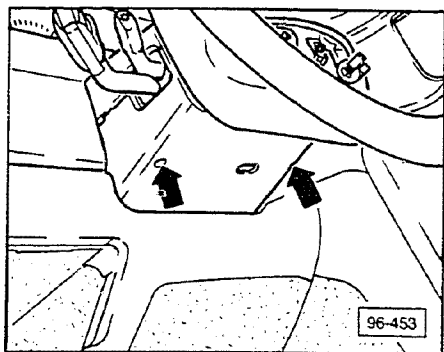


► Fig. 3 Connector for power supply, installed position

- remove side trim from center console

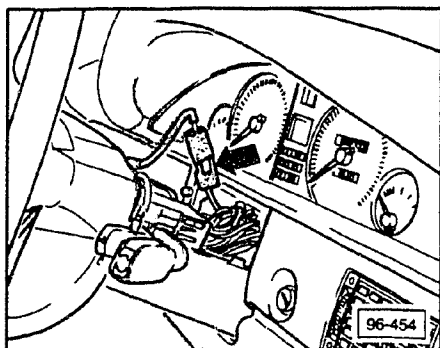
CAUTION

When removing parts of the airbag system (e.g., steering wheel), this connector must be separated.



► Fig. 4 Steering column switch trim, removing

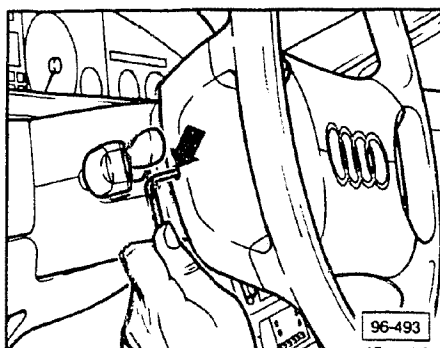
- remove screws for trim (arrows)
- remove upper part of trim



► Fig. 5 Connector for spiral spring, installed position

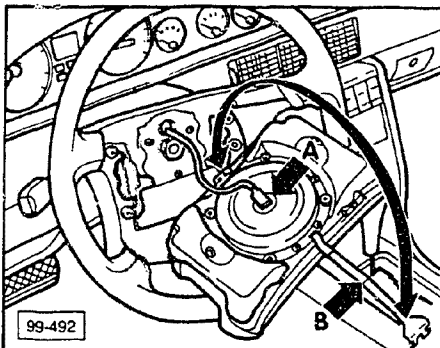
Note

Separate connector before removing steering wheel.



► Fig. 6 Airbag unit, removing/installing

- remove mounting bolts with Torx handle (arrow)
- when installing, torque bolts to 6 Nm (53 in. lb)

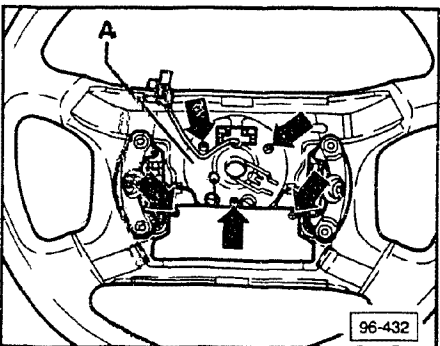


► Fig. 7 Steering wheel with airbag unit, removing/installing

- unhook airbag unit
- lift up safety clamp B
- remove wiring at terminal A
- remove steering wheel nut to remove steering wheel

CAUTION

Always remove/install the steering wheel with the front wheels in the straight ahead position.



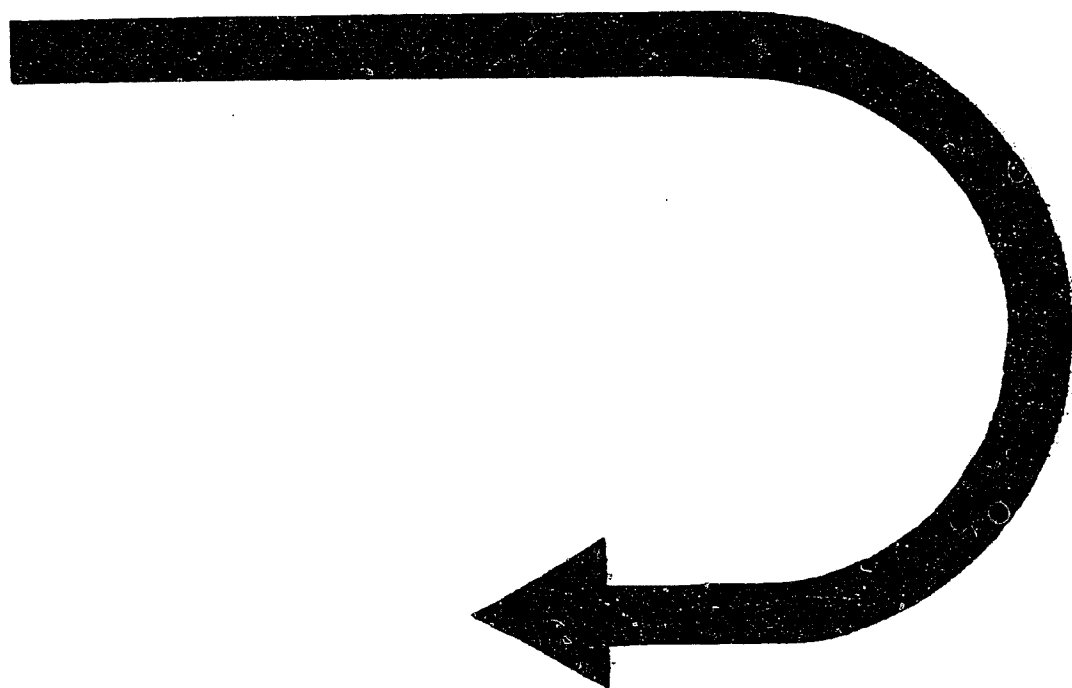
► Fig. 8 Spiral spring, removing/installing

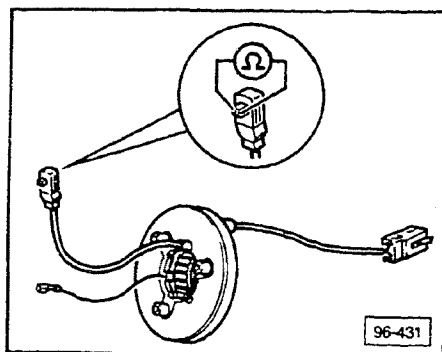
- remove screws (arrows)
- separate wiring connector
- remove spiral spring from back
 - wheels must be in straight-ahead position when removing/installing spring

Note

Do not twist spiral spring after removing it.

CONTINUED IN THE
BEGINNING OF NEXT ROW





► Fig. 9 Spiral spring, checking

- attach multimeter to terminal for airbag unit
 - 0-1 Ω
- replace spiral spring if specified value is not attained

Note

The spiral spring must only be checked after it has been disconnected and removed.

Disposal of active airbag unit

Active airbag gas generators present a potential danger. The units are classified as "Hazardous Materials" and must be disposed of in accordance with applicable regulations.

Remove an active (unit which has not been deployed) airbag gas generator carefully from the vehicle, and return to the Warranty Parts Test Center for proper disposal. For removal instructions, refer to Section 48 and 68 of the applicable Repair Manuals.

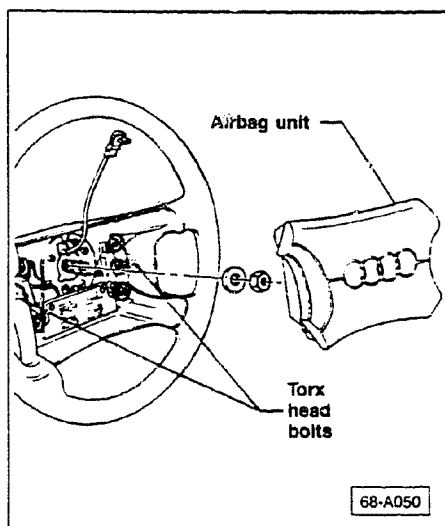
In situations where the airbag unit cannot be safely removed from the vehicle, contact your DSM.

Shipment of active airbag gas generators must be in accordance with 49 CFR 107.113 and 107.105 of the Department of Transportation (DOT) Hazardous Materials Regulations. In addition, a copy of the DOT exemption must be attached to the unit being shipped.

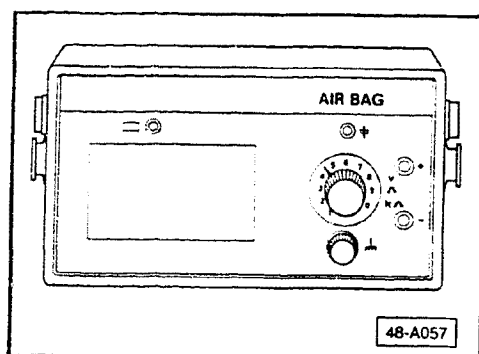
Note

A copy of the Department of Transportation (DOT) exemption is included with the replacement airbag unit supplied to the dealer from the Parts Depot. If exemption paper is missing, contact the Parts Depot.

Always use original box for shipping airbag unit to the Warranty Parts Testing Center.



Airbag system, testing



Test conditions:

- airbag warning light OK
- disconnect battery
- remove center console trim on right side
- separate 10-pole connector for triggering unit
- connect airbag tester 1619 to wiring harness (triggering unit remains disconnected)
- connect battery
- test in sequence using following chart:

Switch position on tester	Test	Actuation	Specified result	Possible causes of deviation from specified result
1	voltage supply	ignition ON	tester light ☐ : ON Airbag warning light: ON tester display: battery voltage	battery charge NOT OK wiring defective
2	voltage transformer	ignition ON	tester light ☐ : ON tester display: 11-13	wiring, voltage transformer, or energy reserve unit defective
3	resistor, ignition circuit	ignition ON turn steering wheel to left and right stops	tester light ☐ : ON tester display: 2.15-3.4	spiral spring defective wiring defective
3	short circuit	ignition: ON push button	tester light ☐ : ON tester display: EE-E	wiring defective
4 and 5	not used			
6	check energy reserve charge	ignition: ON	tester light : ON display: greater than 9.0	wiring defective energy reserve defective
7	check energy reserve	ignition: ON	tester light : ON then goes out display: greater than 7.0 after light goes out	energy reserve defective
8-10	not used			

after testing:

- disconnect battery
- disconnect tester 1619
- reconnect 10-pole connector for triggering unit
- connect battery