Index

Technical Data

Note

For locations of transmission identification codes, see Repair Group 00.

Transmission code letters	KAU	
date of manufacture from to	07.87	
Automatic transmission	089	
Torque converter code letter	Y	
Valve body code letters	FVB	
date of manufacture from to	07.87	
Forward clutch number of splined plates	inner 4	outer 3
Direct/reverse clutch* number of springs	24	
number of splined plates	inner 4	outer 4
1st/reverse gear clutch number of splined plates	inner 4	outer 4
2nd gear brake band first tighten, then loosen	2-1/2 turns	
Application to engine	2.0 liter CIS-motronic 108 BHP SAE net	
Final drive ratio	39:12 = 3.250	
Gear ratios 1st gear 2nd gear 3rd gear Reverse	2.71 1.50 1.00 2.43	
ATF cooler	supply flow 5-row	

*Direct/reverse clutch is 140 mm diameter

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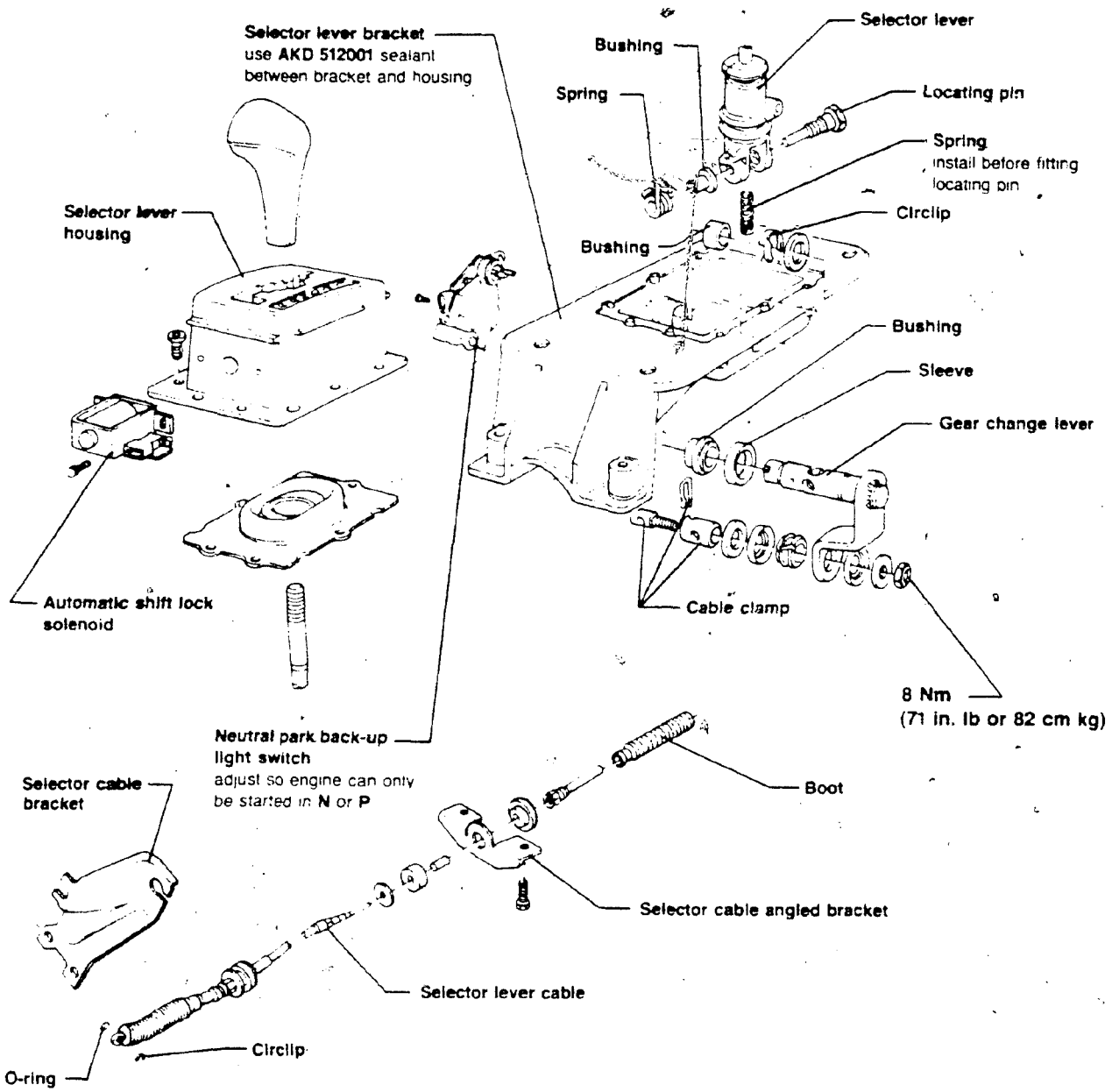
Selector lever/cable, servicing

WARNING

Before working on engine that is running, always place selector lever in P and apply parking brake.

CAUTION

Disconnect battery ground strap **before** starting to work on any part of electrical system.



CAUTION

Foot brake must be applied before selector lever can be moved out of P

37-695

Selector lever cable, installing

CAUTION

Do **NOT** bend or kink.
Lubricate ends before installing.

- tighten cable at selector cable bracket to 15 Nm (12 ft lb)
- fit cable into cable clamp **before** installing angled bracket

Selector lever cable, adjusting

- place selector lever in **P**
- loosen cable clamp nut
- move gear change lever to **P** (toward rear to stop)
- tighten cable clamp nut to 8 Nm (71 in. lb or 82 cm kg)

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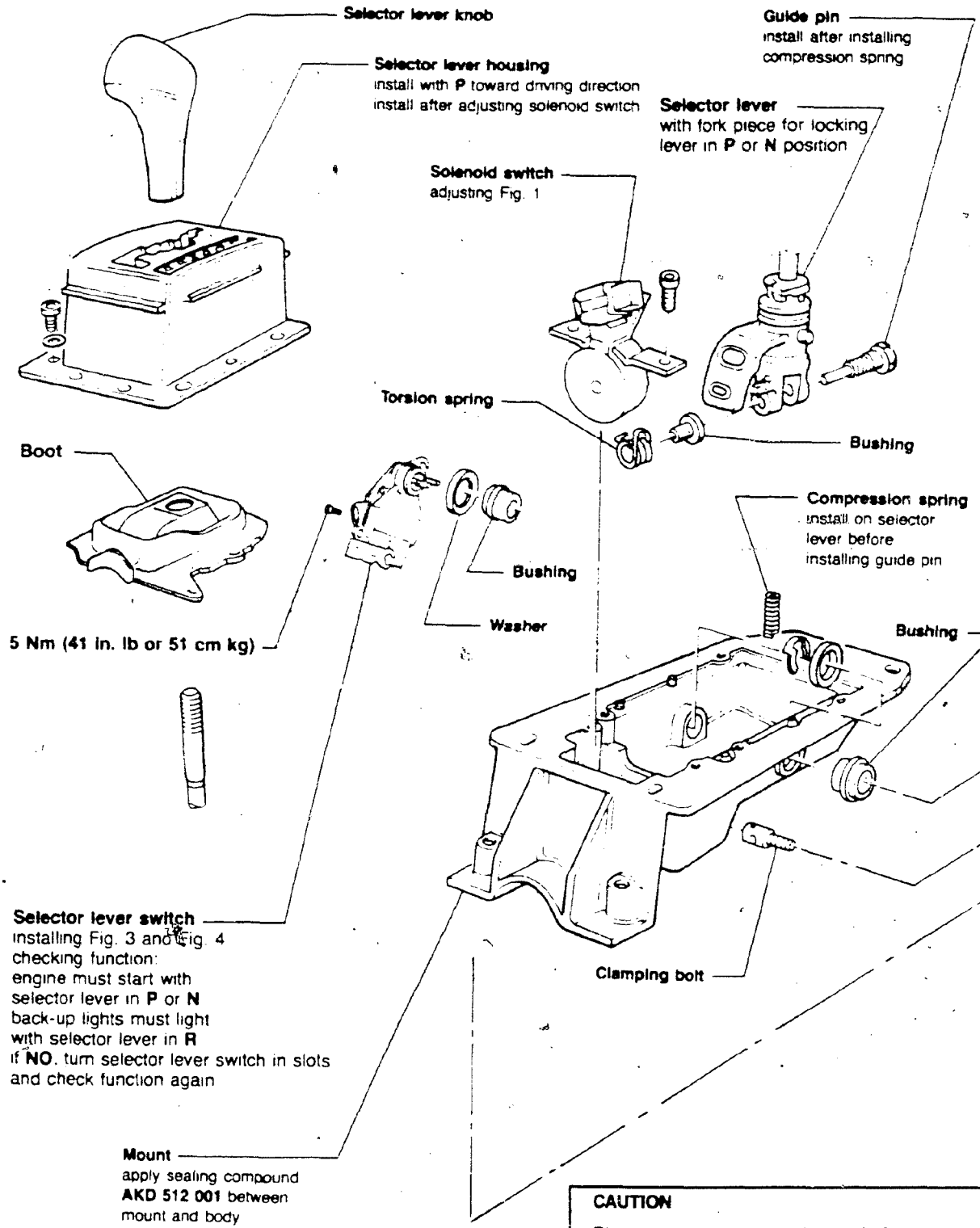
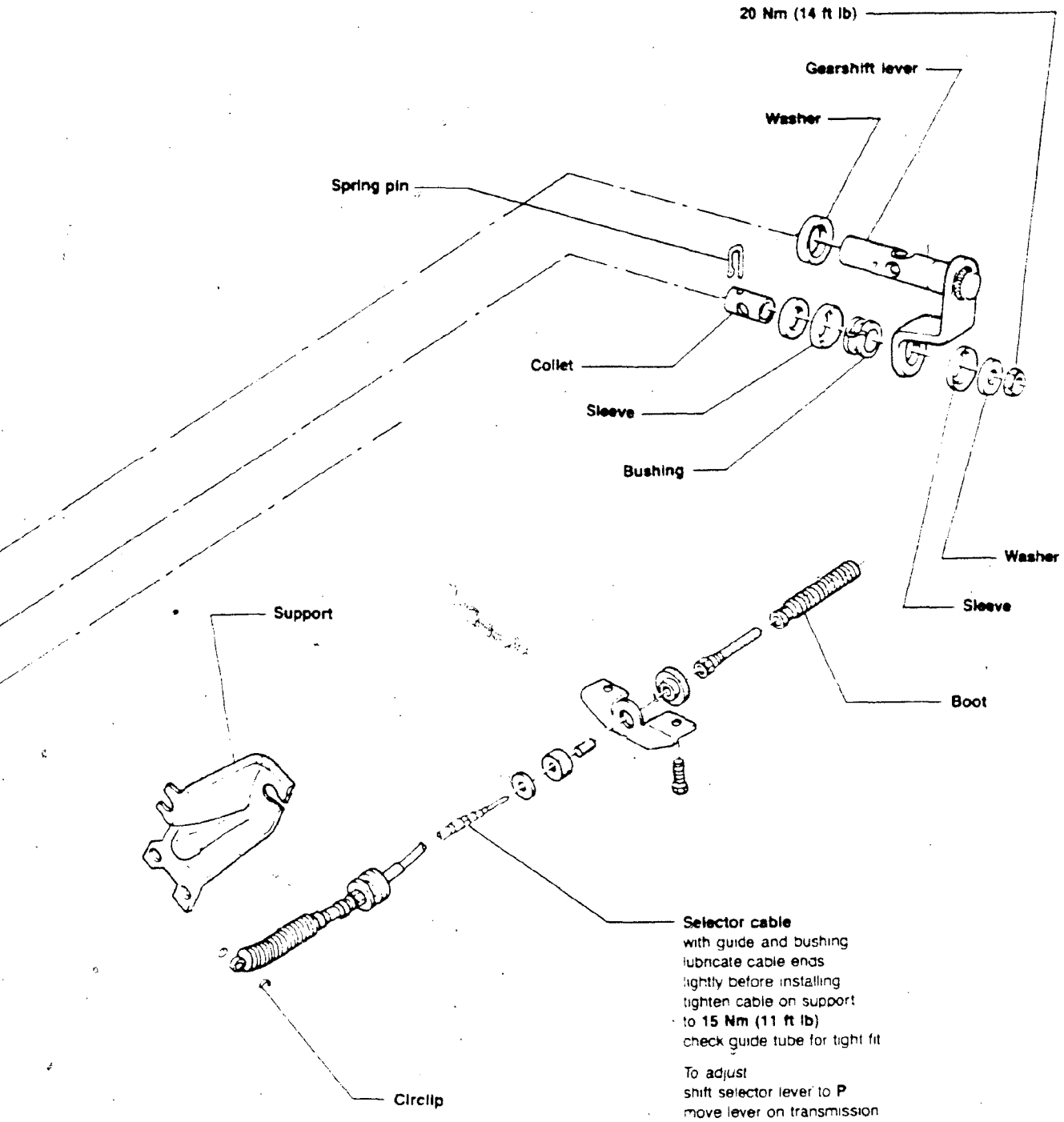
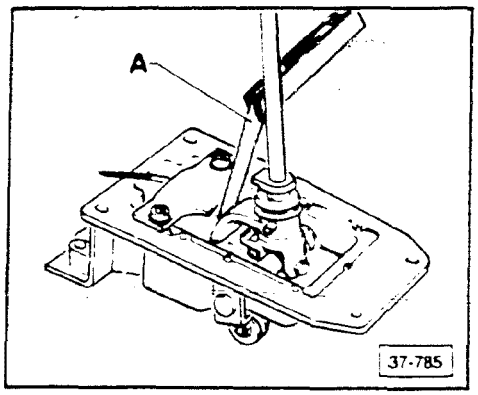


CAUTION

Disconnect battery ground strap before working on any part of electrical system.

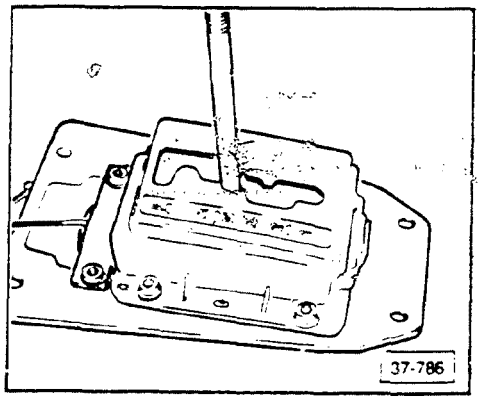
37-A024


20 Nm (14 ft lb)
Gearshift lever
Washer
Spring pin
Collet
Sleeve
Bushing
Washer
Sleeve
Support
Boot
Selector cable
with guide and bushing
lubricate cable ends
lightly before installing
tighten cable on support
to 15 Nm (11 ft lb)
check guide tube for tight fit
To adjust
shift selector lever to P
move lever on transmission
to P (to stop toward rear)
tighten cable clamp nut
to 20 Nm (14 ft lb)
Circlip
37-A025



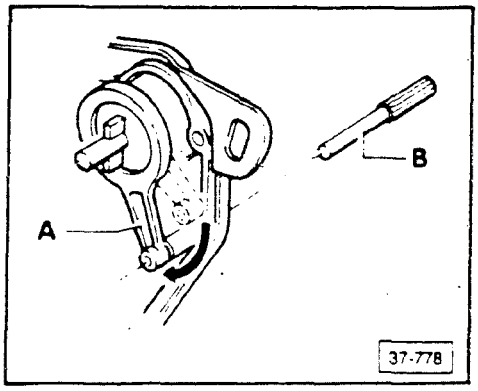
▶ **Fig. 1 Solenoid switch, adjusting**

- place gage **A**, 0.8 mm thick, between selector lever and solenoid switch
- push solenoid switch against gauge and tighten



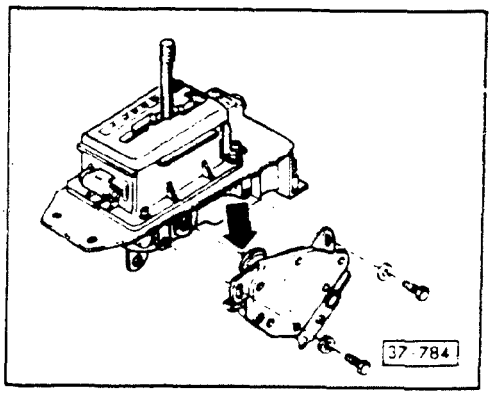
▶ **Fig. 2 Gearshift lever bracket to shift lever, adjusting**

- after installing solenoid switch, center lower bore of fork piece and supply voltage to switch
  - solenoid pin locks fork piece
- install gearshift lever housing so selector lever is in position **N** relative to housing



▶ **Fig. 3 Selector lever switch, installing**

- install lever **A** with pin or drill bit. **B** = 4.0 mm diameter, through housing bore



▶ **Fig. 4 Selector lever switch, installing**

- shift selector lever to position **N**
- install selector lever switch so mount (**arrow**) locks into lever shaft
- tighten mounting bolts to 5 Nm (44 in. lb or 51 cm kg)
- remove pin or drill bit

Note

After installing the lever switch, check for correct functioning.

Automatic shift lock II, checking function

- shift selector lever to **P** and turn ignition **ON**
  - brake pedal not depressed
    = selector lever locked; cannot be shifted out of **P**
  - brake pedal depressed
    = selector lever can be shifted out of **P** position
- shift selector lever to **N** and turn ignition **ON**
  - brake pedal not depressed
    = selector lever locked; cannot be shifted out of **N**
  - brake pedal depressed
    = selector lever can be shifted out of **N**

Note

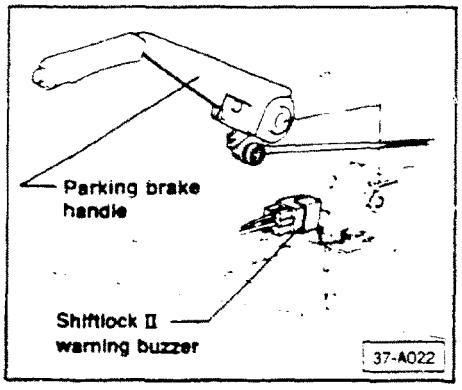
At speeds over 5 km/h (3.7 mph) and when shifting to **N**, the selector lever must not lock. The lever must allow shifting to a driving position without depressing the brake pedal.

At speeds under 5 km/h (3.7 mph) and when shifting to **N**, the selector lever must not lock until after one (1) second has elapsed. The selector lever then cannot be shifted until the brake pedal is depressed.

Shiftlock II, troubleshooting 1989 model year

Test requirements

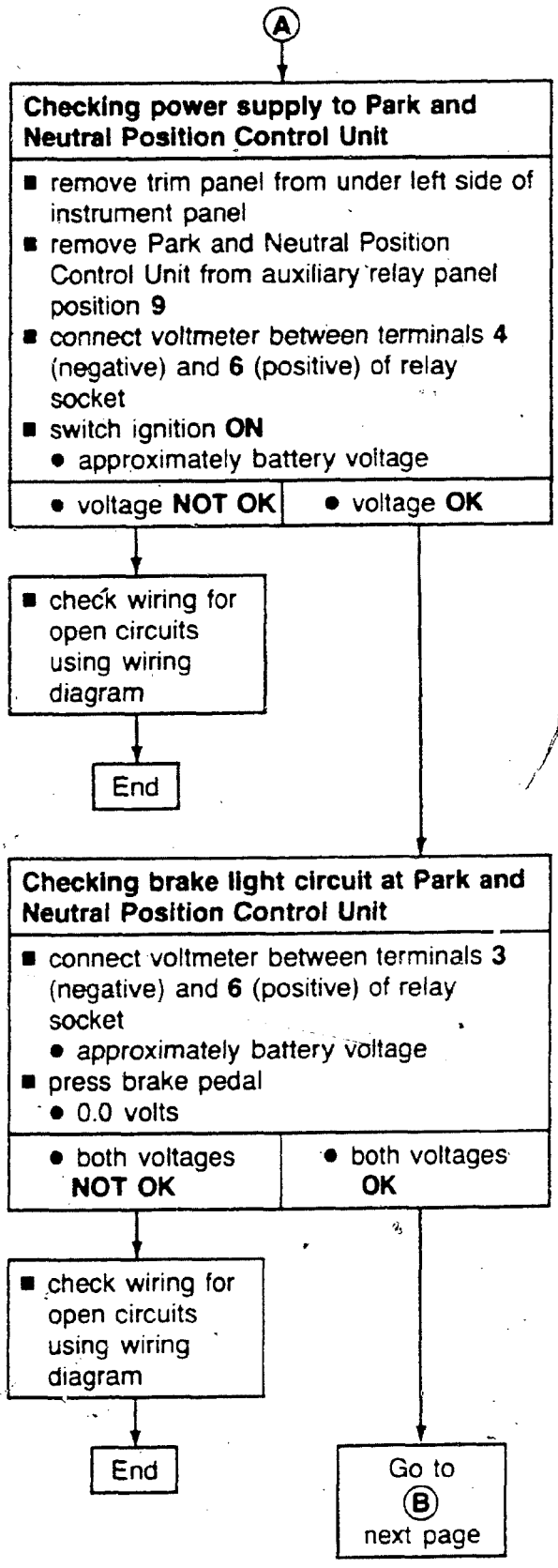
- fuse **S12 OK**
- brake lights **OK**
- interior light delay control unit **OK**
- gear selector lever properly adjusted

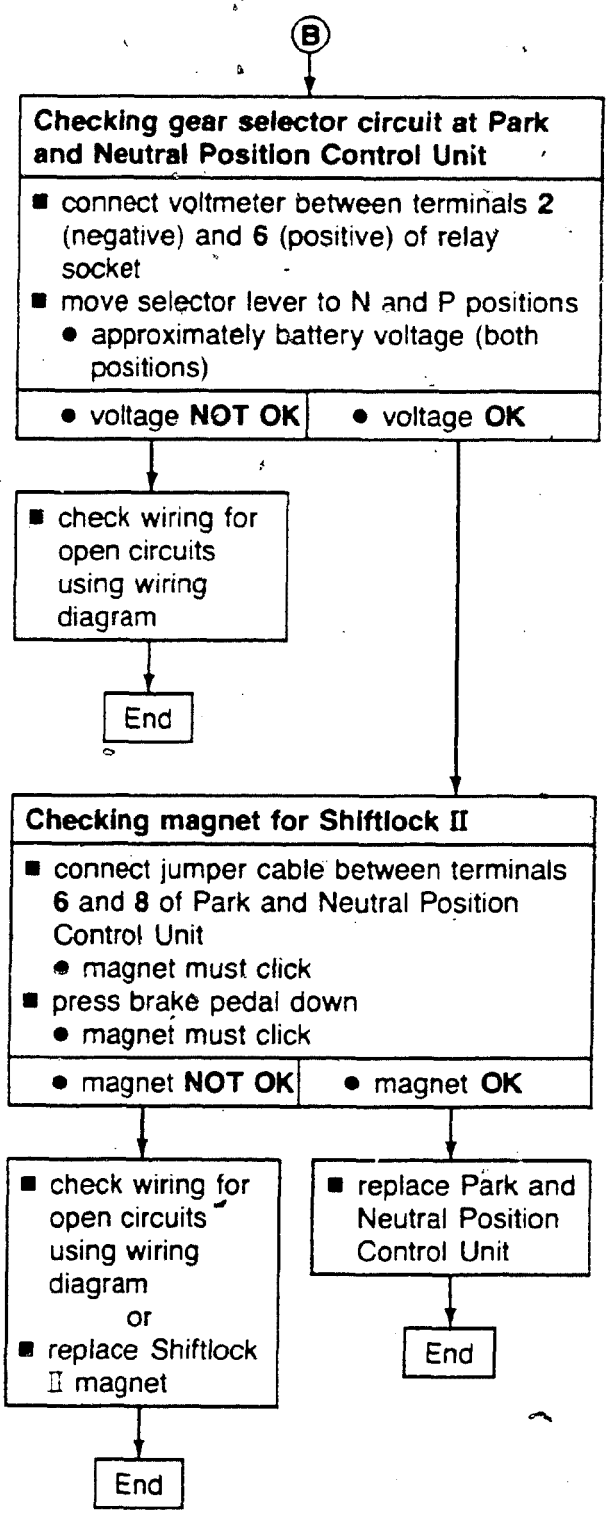


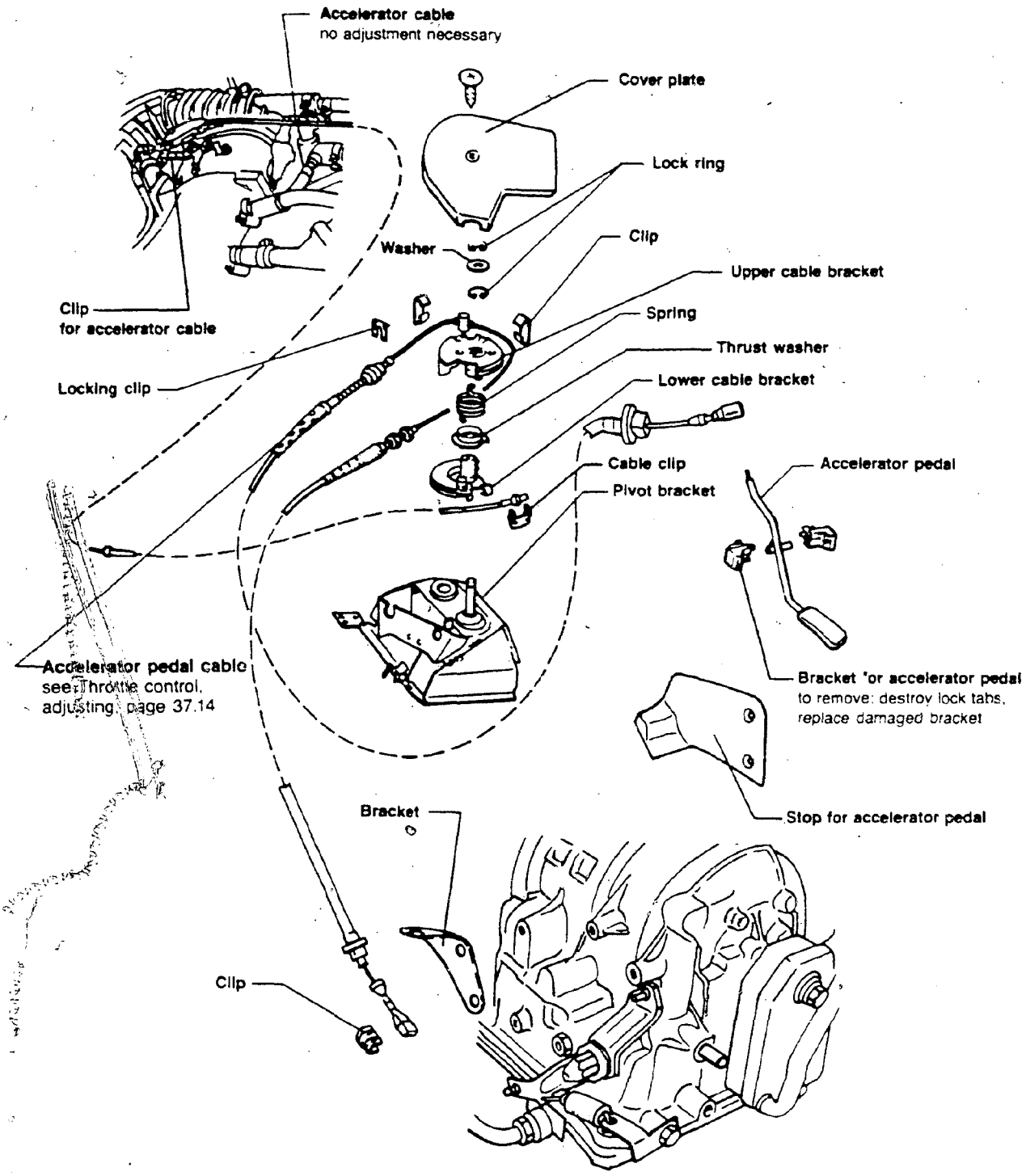
Checking Shiftlock II warning buzzer

- move selector lever to R, N, D, 2 or 1 position
- open driver's door

warning buzzer does **NOT** sound	warning buzzer sounds
check wiring for open circuits using wiring diagram or replace warning buzzer → End	Go to Ⓐ next page


A
Checking power supply to Park and Neutral Position Control Unit
■ remove trim panel from under left side of instrument panel
■ remove Park and Neutral Position Control Unit from auxiliary relay panel position 9
■ connect voltmeter between terminals 4 (negative) and 6 (positive) of relay socket
■ switch ignition ON
• approximately battery voltage
• voltage NOT OK
• voltage OK
■ check wiring for open circuits using wiring diagram
End
Checking brake light circuit at Park and Neutral Position Control Unit
■ connect voltmeter between terminals 3 (negative) and 6 (positive) of relay socket
• approximately battery voltage
■ press brake pedal
• 0.0 volts
• both voltages NOT OK
• both voltages OK
■ check wiring for open circuits using wiring diagram
End
Go to
B
next page

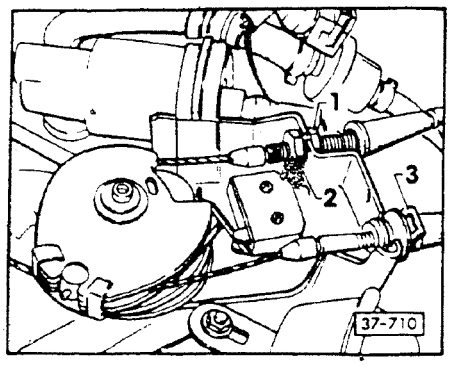

B
Checking gear selector circuit at Park and Neutral Position Control Unit
■ connect voltmeter between terminals 2 (negative) and 6 (positive) of relay socket
■ move selector lever to N and P positions
● approximately battery voltage (both positions)
● voltage NOT OK
● voltage OK
■ check wiring for open circuits using wiring diagram
End
Checking magnet for Shiftlock II
■ connect jumper cable between terminals 6 and 8 of Park and Neutral Position Control Unit
● magnet must click
■ press brake pedal down
● magnet must click
● magnet NOT OK
● magnet OK
■ check wiring for open circuits using wiring diagram
or
■ replace Shiftlock II magnet
■ replace Park and Neutral Position Control Unit
End
End



Note

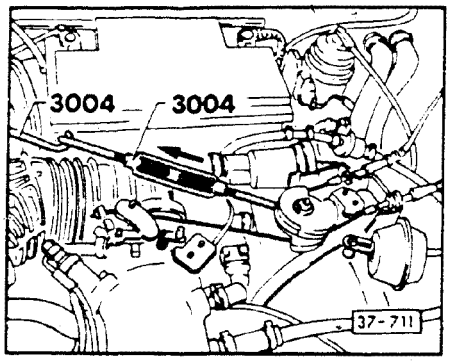
The cable brackets are pre-assembled with the torsion spring and thrust washer prior to installation.

37-709



Throttle control, adjusting

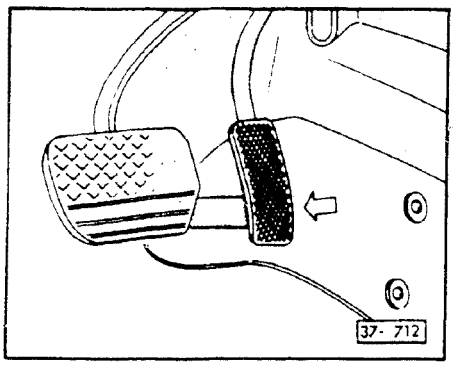
- remove covering for throttle control
- loosen nuts **1** and **2** and remove locking clip **3**
- turn throttle cable brackets to stop (full throttle) position and hold



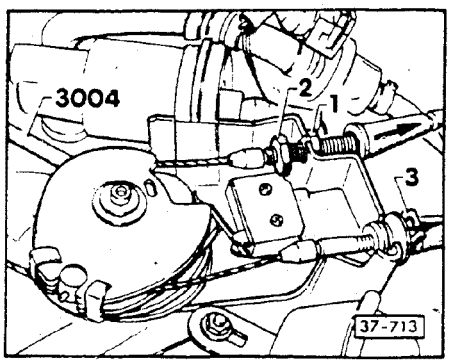
Note

Tool **3004** (two turnbuckles) can be used to hold the throttle cable brackets at full throttle.

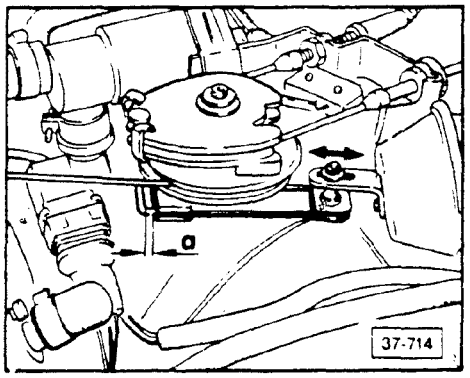
If tool **3004** is unavailable, use two turnbuckles (locally obtainable) of an appropriate size. Hook one end on the lever of the lower cable bracket and the other on the lower end of the hood gas strut.



- insert a spacer 17 mm (11/16 in.) thick between accelerator pedal and pedal stop
- push accelerator pedal down to contact spacer and hold (two mechanics required)



- pull accelerator pedal cable in direction of arrow and install locking clip **3**
- pull cable to transmission in direction of arrow until pressure against spring for transmission kickdown position is felt
- turn nut **1** against bracket and tighten nut **2**
- remove tool **3004** (turnbuckles)



Adjustment, checking

Throttle lever must rest against idle stop when accelerator pedal is released.

- press accelerator pedal to full throttle position (not kickdown)
  - the pressure point for full throttle position of the accelerator pedal must be approximately 15 to 20 mm (5/8 to 13/16 in.) away from the pedal stop
- press accelerator pedal to pedal stop (kickdown)
  - transmission operating lever must contact kickdown stop
  - spring between cable brackets must be stressed

For vehicles with cruise control:

- adjust coupling rod by moving ball end
  a = 1.0 to 1.5 mm (0.039 to 0.059 in.)

For vehicles with A/C

The switch for A/C must not switch on at full throttle but only with the throttle in the kickdown position.

- approximately 2.0 mm (3/16 in.) between switch and cable bracket at full throttle (not kickdown)

Automatic transmission, removing

- remove battery
- remove upper engine/transmission bolts
- disconnect transmission ground strap

- disconnect speedometer connector
- install engine support **10-222A**
- raise vehicle

- remove bolts for front engine stop
- remove front exhaust pipe
- remove torque converter cover plate

- remove torque converter bolts (3 bolts)
- disconnect ATF cooler hoses at rear of engine, under battery box
- remove right side splash shield

- disconnect axle shafts at final drive
- disconnect ATF filler pipe
- remove selector cable bracket and disconnect selector cable at transmission

- release plastic clips from seat belt cables
- disconnect accelerator cable from transmission operating lever
- remove cross brace at rear of transmission

- raise transmission with hoist **VAG 1383** and remove transmission mount bolts
- lower hoist **VAG 1383** and raise engine with engine support (transmission will tilt slightly for easier removal)
- remove remaining engine/transmission bolts

- separate left ball joint/wheel bearing housing and pull axle shaft outward
- separate transmission from engine
- lower transmission carefully while holding torque converter to prevent it falling

Automatic transmission, installing

Proceed in reverse order of removing and note the following:

- align and tighten transmission mounts last
  - accelerator linkage adjustment, checking, page 37.15
  - selector cable, checking, page 37.4

Tightening torques

Flex plate to crankshaft	45 Nm (33 ft lb)
Axle shaft to drive flange	45 Nm (33 ft lb)
Torque converter bolts	30 Nm (22 ft lb)
Trans to engine bolts	55 Nm (41 ft lb)

Shift points, checking

Check the shift points if the transmission shifts into the next gear too early or too late.

Drive the vehicle in all gear ranges under all possible road conditions. Do not road test if there is obvious mechanical damage.

Note

When checking shift points, note that speedometer readings may vary due to permissible manufacturing tolerances.

- note shift points and compare to chart
  - shifts must be smooth and take place quickly without lag in power transmission
- listen for any sign of engine speedup between shifts which indicates slipping brake bands or clutches
- after road testing, check transmission for fluid leaks

Note

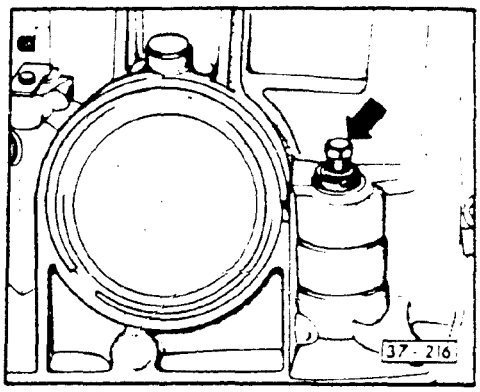
If shift points are incorrect or transmission does not kick down, check throttle control pedal cable adjustments.

089 trans. code letters KAU

Shift points in mph (km/h)		
Shift	**Full throttle**	**Kickdown**
1-2	22-35 (35-57)	42-50 (67-80)
2-3	55-68 (89-110)	75-82 (121-133)
3-2	34-52 (55-84)	65-71 (104-114)
2-1	14-19 (23-30)	30-38 (48-61)

Main pressure, checking

Check main pressure only if defect cannot be found during other checks.



- attach gauge with 0-10 bar (0-145 psi) scale to connection (**arrow**)

Selector lever position	Accelerator pedal position	Main pressure bar (psi)
D	idle speed*	2.90-3.00 (42-44)
Test condition: accelerate to 50 km/h (31 mph), release accelerator pedal (idle speed) and check pressure on gauge		

- measure three different main pressures

Selector lever position	Accelerator pedal position	Main pressure bar (psi)
D	full throttle*	6.30-6.40 (91-93)

*perform these tests on a dynamometer

Selector lever position	Accelerator pedal position	Main pressure bar (psi)
R	idle speed	9.00-10.00 (131-145)
Test condition: vehicle stationary		

- if specified values are not reached, check for the following faults (next page):

CAUTION
QUATTRO TRANSMISSIONS

When checking performance, only use dynamometer designed to brake all four wheels at the same time.

Fault	Remedy
oil pump defective	check pump for wear; replace if necessary
throttle control not properly adjusted	adjust throttle control
sticking control valve	disassemble and clean valve body; check valves for free movement

Torque converter code	Stall speed range in RPM
Y	2810-3060

CAUTION

Do not continue stall speed test longer than time required to read tachometer. Maximum stall speed test time is 5 seconds. Wait at least 20 seconds before repeating test.

Stall speed, checking

- Check stall speed only if vehicle exhibits poor performance or poor acceleration. Before measuring stall speed, check that the correct torque converter is installed.

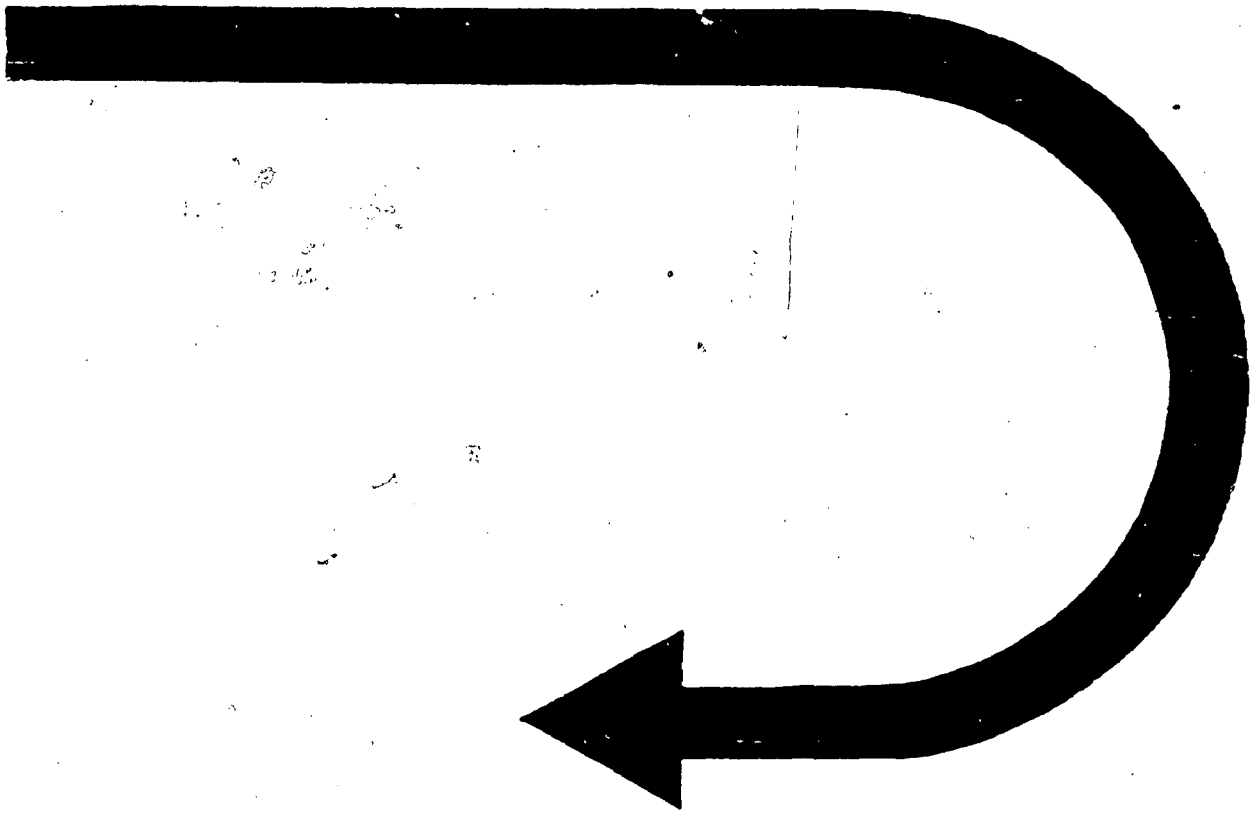
Note

The stall speed is lower with increasing height above sea level (approximately 125 RPM per 3000 feet).

- connect tachometer, VW 1367
- engage parking brake
- start and warm engine
- hold foot brake firmly, put selector lever in D and depress accelerator briefly to full throttle
- check that engine runs within stall speed range

CONTINUED IN THE

BEGINNING OF NEXT ROW



Technical data

Note

For locations of transmission identification codes, see Repair Group 00.

Transmission code letters	RBP	
date of manufacture from to	10 88	
Automatic Trans. Type No.	087	
Torque converter code letter	Q	
Valve body code letters	FNB	
date of manufacture from to	10 88	
Forward clutch number of splined plates	inner 5	outer 4
Direct/reverse clutch number of springs	24	
number of splined plates	inner 4	outer 4
1st/reverse gear clutch number of splined plates	inner 4	outer 4
2nd gear brake band first tighten, then loosen:	2-1 2 turns	
Application to engine	2.3 Liter 130 BHP SAE net	
Final drive ratio	37:12 = 3.08	
Gear ratios 1st gear 2nd gear 3rd gear Reverse	2.71 1.50 1.00 2.43	
ATF cooler	supply flow 5-row	

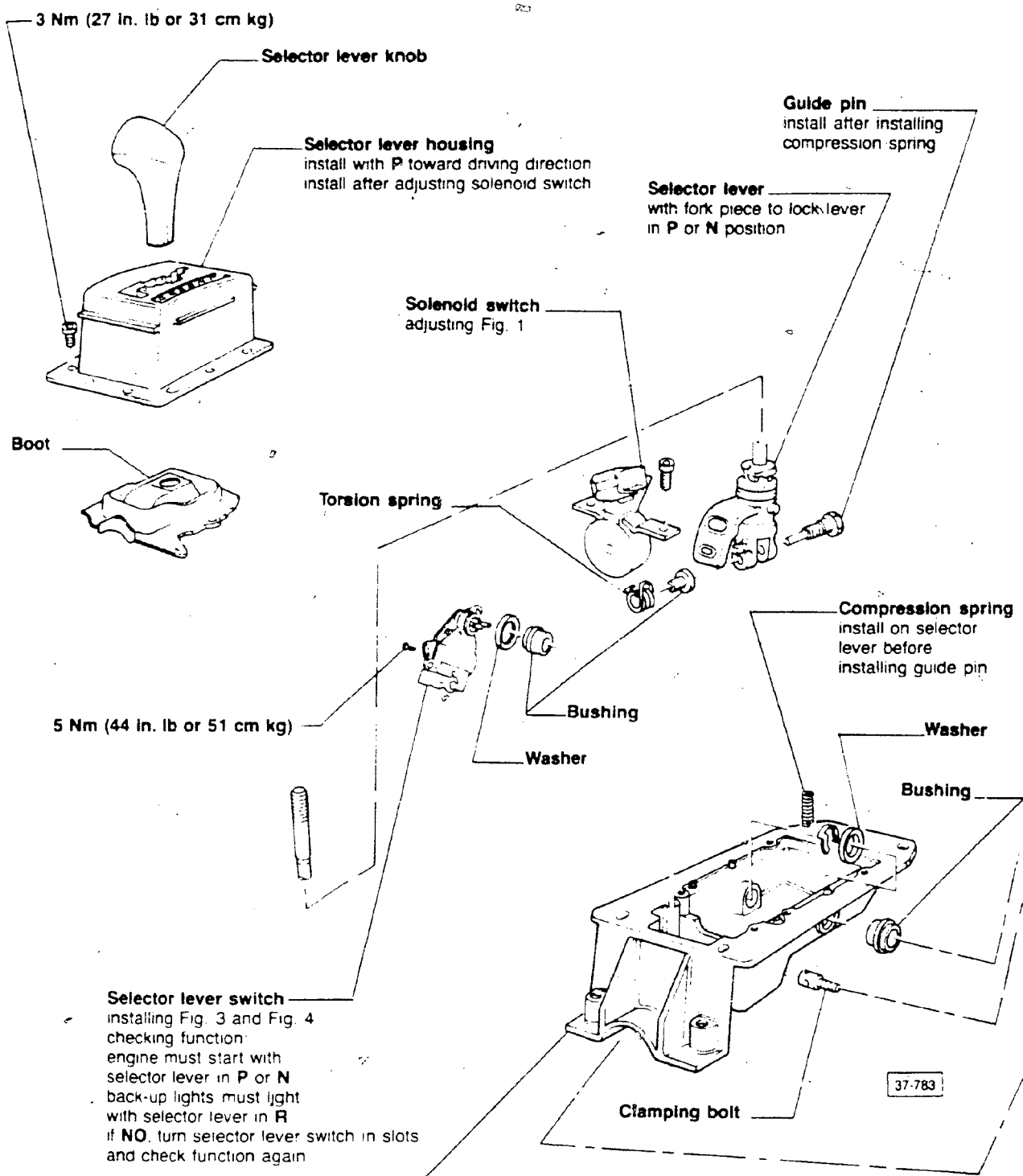
Lubricant capacities

Transmission

Capacities	Transmission	Automatic transmission
Dry fill Refill Lubricant	6 Liters (6.35 qt) approximately 3 liters (3.17 qt) ATF-Dexron	087

Final drive

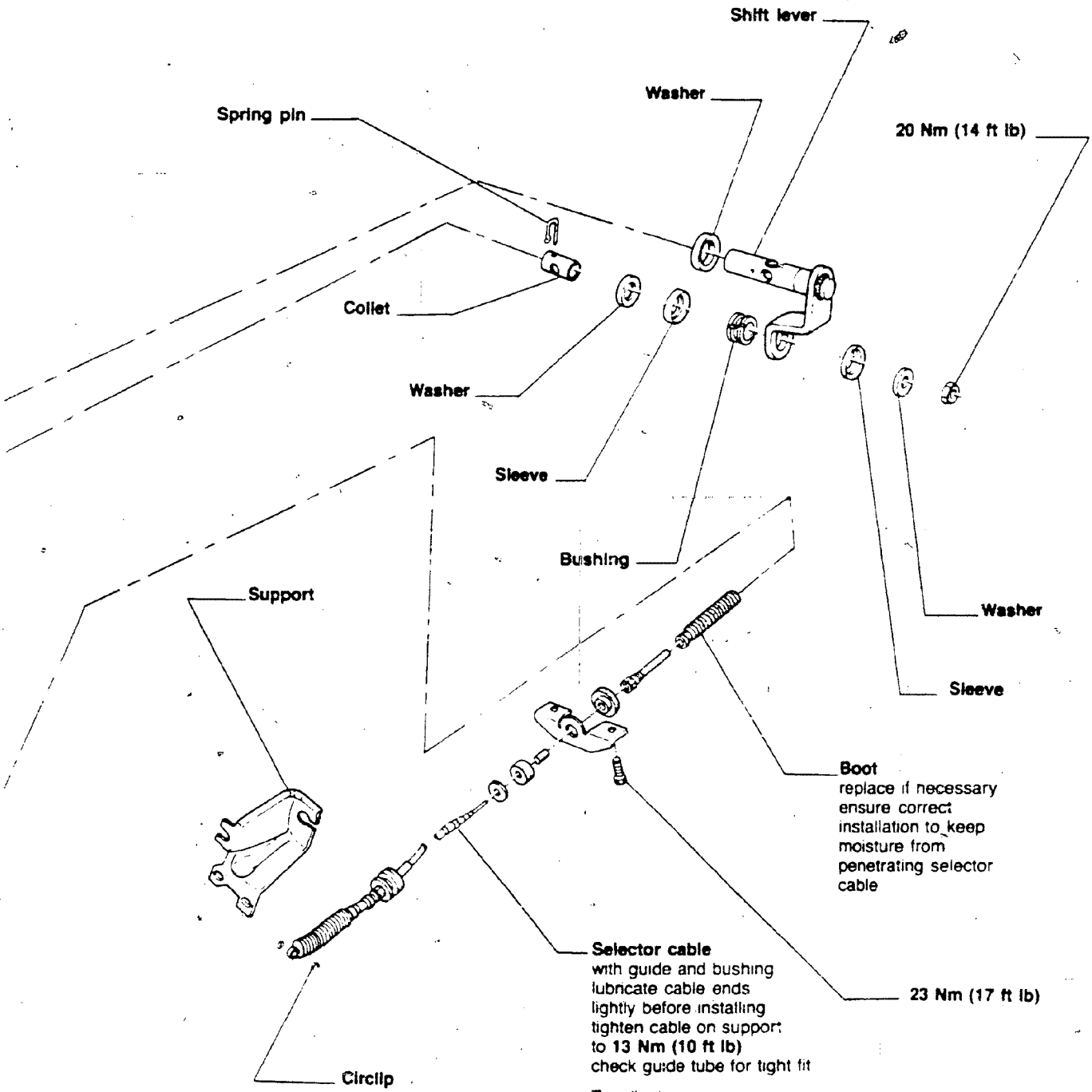
Capacities	Final drive	Automatic transmission
Dry fill Refill Lubricant	1 liter (1.06 qt) filled for service life, no refill hypoid transmission oil GL5 (SAE 90 Mil-L 2105 B)	087

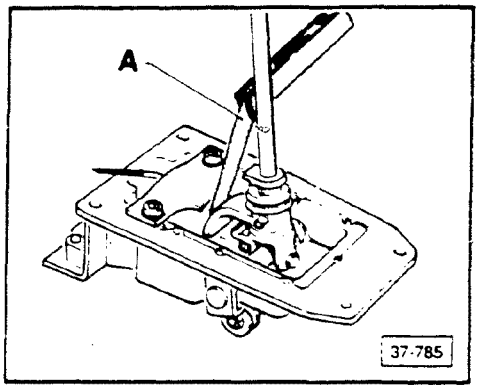


CAUTION

Disconnect battery ground strap before working on any part of electrical system.

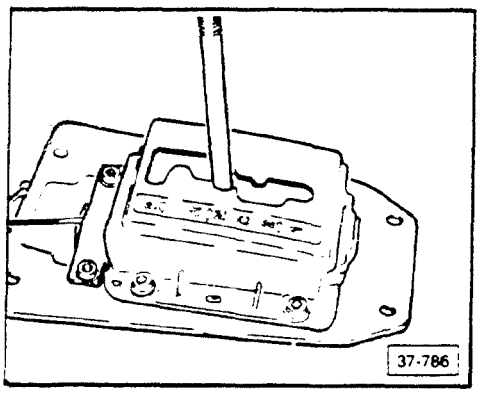
37-A026


Shift lever
Washer
Spring pin
20 Nm (14 ft lb)
Collet
Washer
Sleeve
Bushing
Support
Washer
Sleeve
Boot
replace if necessary
ensure correct
installation to keep
moisture from
penetrating selector
cable
Selector cable
with guide and bushing
lubricate cable ends
lightly before installing
tighten cable on support
to 13 Nm (10 ft lb)
check guide tube for tight fit
23 Nm (17 ft lb)
Circlip
To adjust:
shift selector lever to P
move lever on transmission
to P (to stop toward rear)
tighten cable clamp nut
to 20 Nm (14 ft lb)
37-A027



▶ **Fig. 1 Solenoid switch, adjusting**

- place gauge **A**, 1.0 mm thick, between selector lever and solenoid switch
- with selector lever in **R** position, push solenoid switch against gauge and tighten to 10 Nm (7 ft lb)



▶ **Fig. 2 Selector lever housing to shift lever, adjusting**

- after installing solenoid switch, center lower bore of fork piece and supply voltage to switch
  - solenoid pin locks fork piece
- install gearshift lever housing so selector lever is in position **N** relative to housing
  - selector lever must have same amount of travel from **N** to **D** and **N** to **R**

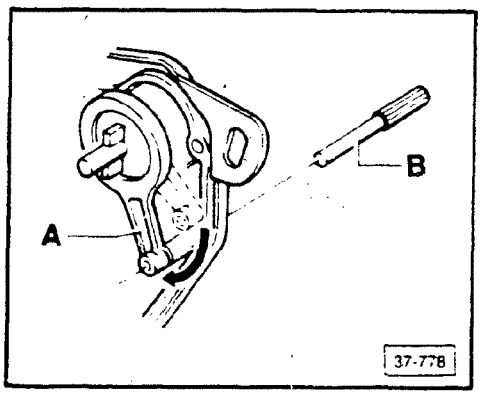


Fig. 3 Selector lever switch, installing

▶

- install lever **A** with pin or drill bit, **B** = 4.0 mm diameter, through housing bore

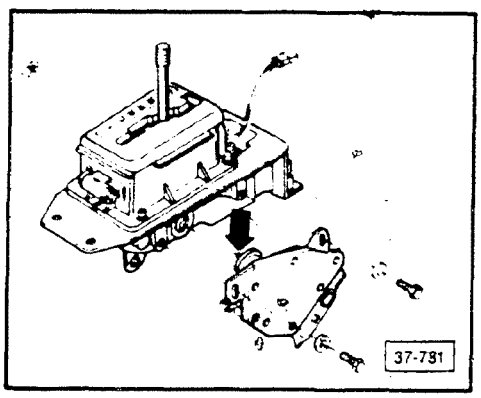


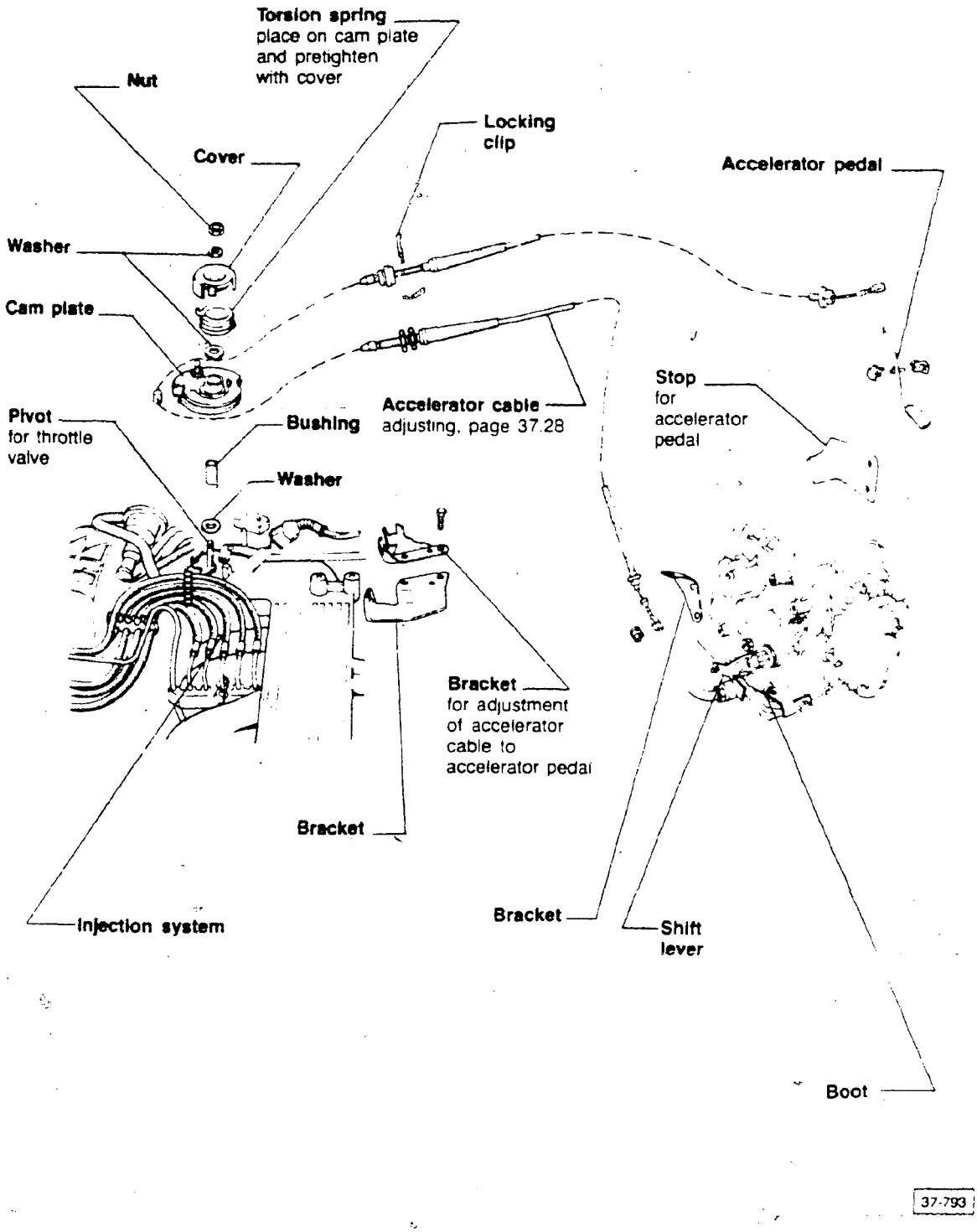
Fig. 4 Selector lever switch, installing

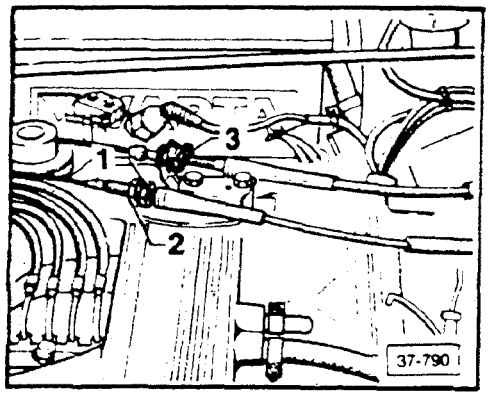
▶

- shift selector lever to position **N**
- install selector lever switch so mount (**arrow**) locks into lever shaft
- tighten mounting bolts to 5 Nm (44 in. lb or 51 cm kg)
- remove pin or drill bit

Note

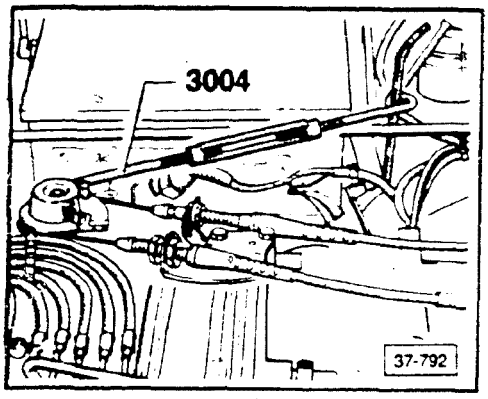
After installing the lever switch, check for correct functioning.


Torsion spring
place on cam plate
and pretighten
with cover
Nut
Cover
Locking
clip
Accelerator pedal
Washer
Cam plate
Stop
for
accelerator
pedal
Accelerator cable
adjusting, page 37.28
Pivot
for throttle
valve
Bushing
Washer
Bracket
for adjustment
of accelerator
cable to
accelerator pedal
Bracket
Injection system
Bracket
Shift
lever
Boot
37-793



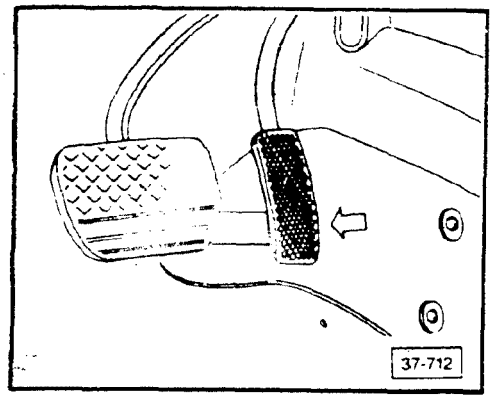
Throttle control, adjusting

- remove covering for throttle control
- loosen nuts **1** and **2** and remove locking clip **3**
- turn throttle cable brackets to stop (full throttle) position and hold

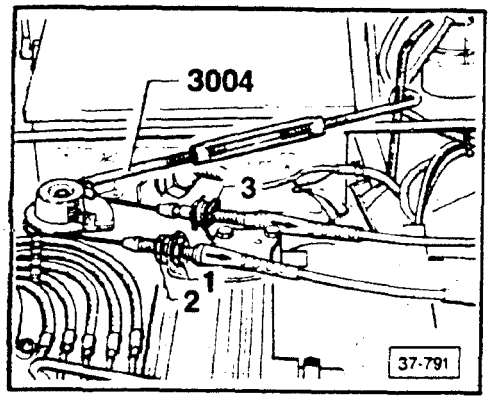


Note

Tool **3004** (two turnbuckles) can be used to hold the throttle cable brackets at full throttle. If tool **3004** is unavailable, use two turnbuckles (locally obtainable) of an appropriate size. Hook one end on the lever of the lower cable bracket and the other on the lower end of the hood gas strut.



- insert a spacer 17 mm (11/16 in.) thick between accelerator pedal and pedal stop
- push accelerator pedal down to contact spacer and hold (two mechanics required)



- pull accelerator pedal cable in direction of arrow and install locking clip **3**
- pull cable to transmission in direction of arrow until pressure against spring for transmission kickdown position is felt
- turn nut **1** against bracket and tighten nut **2**
- remove tool **3004** (turnbuckles)

Adjustment, checking

Throttle lever must rest against idle stop when accelerator pedal is released.

- press accelerator pedal to full throttle position (not kickdown)
  - the pressure point for full throttle position of the accelerator pedal must be approx. 15 to 20 mm (5/8 to 13/16 in.) away from the pedal stop
- press accelerator pedal to pedal stop (kickdown)
  - transmission operating lever must contact kickdown stop
  - spring between cable brackets must be stressed

Transmission, removing/installing

Removing

- disconnect battery ground strap
- remove upper engine transmission bolts
- disconnect transmission ground strap
- separate connections for speedometer and oxygen sensor
- install engine support **10-222 A**
- clamp off coolant hoses between engine and transmission

- raise vehicle
- remove engine cover and mounting support
- remove front engine support bolts

- remove front exhaust pipe
- remove starter
- remove 3 torque converter bolts (4 bolts on turbo vehicles)

- remove torque converter cover plate
- remove hose clamps on ATF cooler

- remove coolant hose from pipe
- remove cover plates for transmission mount and drive shaft
- remove axle shafts from transmission and tie up
- remove selector lever cable support and disconnect cable from transmission

- vehicles with seat belt tensioning system, remove cable guide

- disconnect accelerator rod
- disconnect accelerator cable and remove from transmission support
- remove both transmission supports from transmission mount
- raise transmission with hoist
- remove right and left transmission supports

- lower hoist and raise engine with engine support
  - this will slightly tilt the transmission, making it easier to remove

- remove remaining lower engine transmission bolts
- loosen ATF filler tube
- separate transmission from engine
- push right shaft toward front
- remove transmission carefully and secure torque converter from falling out

Installing

Proceed in reverse order of removing and note the following:

- install torque converter before installing transmission
- place converter carefully on one-way clutch support
  - do not tilt or misalign converter
- while pushing torque converter into place, turn converter back and forth to engage splines of pump shaft
  - torque converter must be seated up to stop on one-way clutch support
- install transmission
- check accelerator operation adjustment
- check selector lever cable, page 37.25

Tightening torques

Axle shaft to flange	80 Nm (59 ft lb)
Torque converter bolts	30 Nm (22 ft lb)
Transmission to engine	55 Nm (41 ft lb)

Shift points, checking

Check the shift points if the transmission shifts into the next gear too early or too late.

Drive the vehicle in all gear ranges under all possible road conditions. Do not road test if there is obvious mechanical damage.

Note

When checking shift points, note that speedometer readings may vary due to permissible manufacturing tolerances.

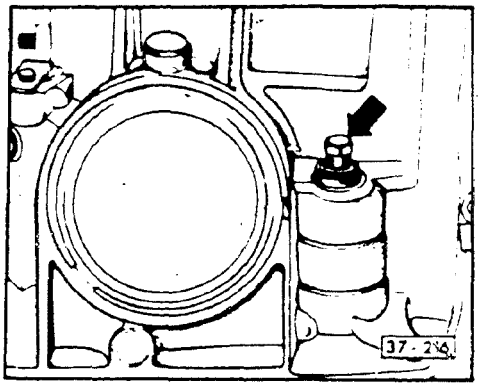
- note shift points and compare to chart
  - shifts must be smooth and take place quickly without lag in power transmission
- listen for any sign of engine speedup between shifts which indicates slipping brake bands or clutches
- after road testing, check transmission for fluid leaks

Note

If shift points are incorrect or transmission does not kick down, check throttle control pedal cable adjustments.

087 trans. code letters RBP

Shift points in mph (km/h)		
Shift	**Full throttle**	**Kickdown**
1-2	21-32 (34-51)	47-52 (75-83)
2-3	53-66 (86-107)	81-88 (131-141)
3-2	38-52 (61-84)	77-85 (124-136)
2-1	13-17 (21-28)	37-42 (60-68)



Main pressure, checking

Check main pressure only if defect cannot be found during other checks.

- attach gauge with 0-10 bar (0-145 psi) scale to connection (**arrow**)

Selector lever position	Accelerator pedal position	Main pressure bar (psi)
D	idle speed*	2.90-3.00 (42-44)
Test condition: accelerate to 50 km h (31 mph), release accelerator pedal (idle speed) and check pressure on gauge		

- measure three different main pressures

Selector lever position	Accelerator pedal position	Main pressure bar (psi)
D	full throttle*	6.80-6.90 (99-100)

*perform these tests on a dynamometer

Selector lever position	Accelerator pedal position	Main pressure bar (psi)
R	idle speed	9.00-10.00 (131-145)
Test condition: vehicle stationary		

- if specified values are not reached, check for the following faults (next page):

Fault	Remedy
oil pump defective	check pump for wear; replace if necessary
throttle control not properly adjusted	adjust throttle control
sticking control valve	disassemble and clean valve body; check valves for free movement

Torque converter code	Stall speed range in RPM
Q	2710-2960

CAUTION

Do not continue stall speed test longer than time required to read tachometer. Maximum stall speed test time is 5 seconds. Wait at least 20 seconds before repeating test.

Stall speed, checking

- Check stall speed only if vehicle exhibits poor performance or poor acceleration. Before measuring stall speed, check that the correct torque converter is installed.

Note

The stall speed is lower with increasing height above sea level (approximately 125 RPM per 3000 feet).

- connect tachometer, VW 1367
- engage parking brake
- start and warm engine
- hold foot brake firmly, put selector lever in **D** and depress accelerator briefly to full throttle
- check that engine runs within stall speed range