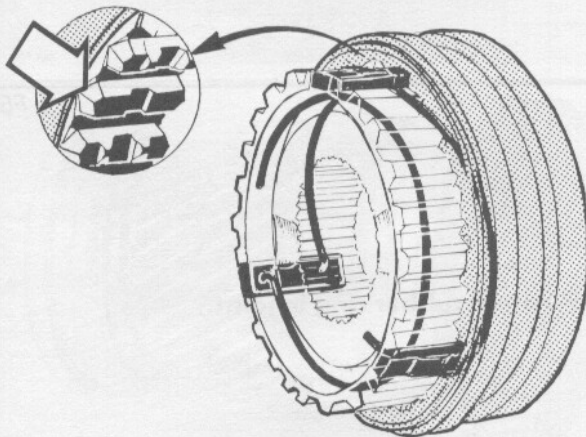


## Assembling transmission M 45

### Special tools:

- 1801 Standard handle**  
**2412 Drift**, installing input shaft bearing  
**2831 Press tool**, installing main shaft bearing  
**2852 Adapter**, installing gear and synchro ring  
**2867 Drift**, installing bell housing seal  
**2986 Drift**, installing intermediate shaft bearings  
**5064 Drift**, installing rear cover seal  
**5065 Drift**, installing seal on shift selector rail  
**5149 Wrench**, removing/installing drive flange nut  
**5177 Puller**, intermediate shaft bearings, aluminum housing  
**5180 Drift**, intermediate shaft bearings, aluminum housing



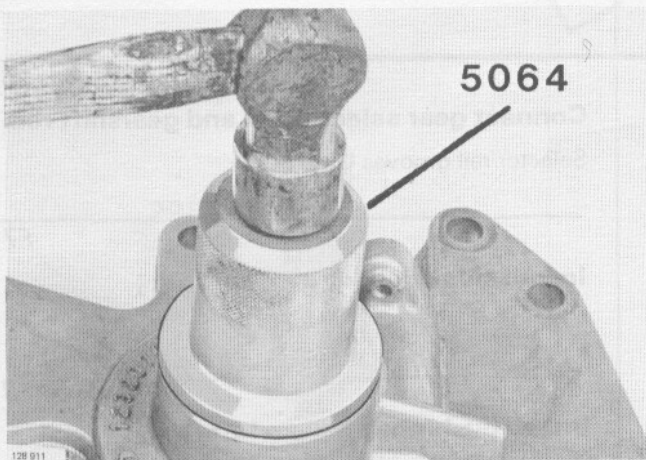
130 017

F1

### Connect 1-2 and 3-4 synchro hubs.

Position hub in sleeve so that hub slots align chamfered teeth in sleeve. Insert dogs (three) and lock them with springs.

NOTE: With curved lock ring, align springs to let free ends press against synchro ring.

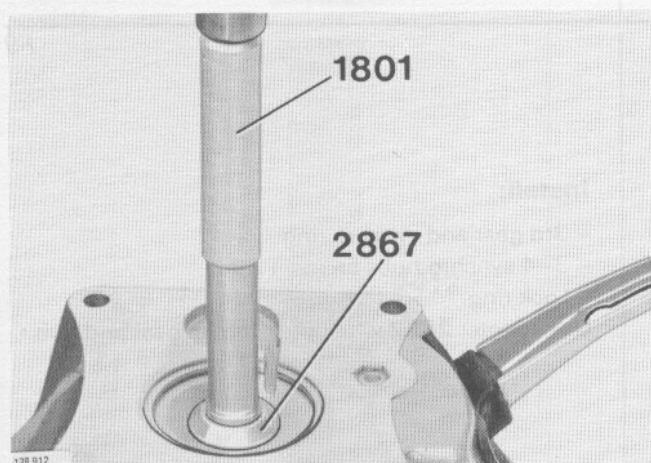


128 911

F2

### Install rear cover seal.

Use drift **5064**.

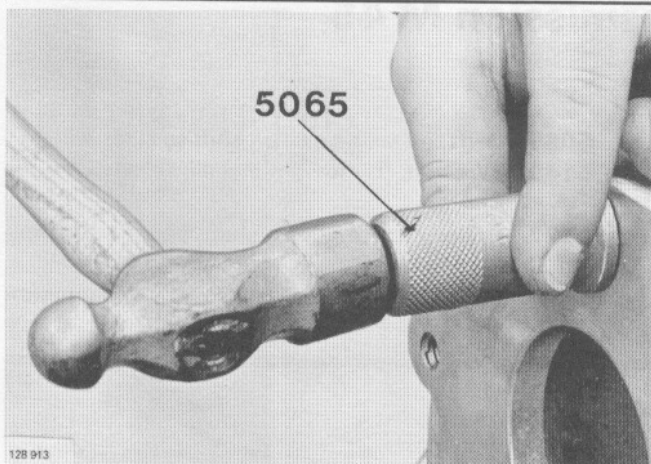


128 912

F3

### Install bell housing seal.

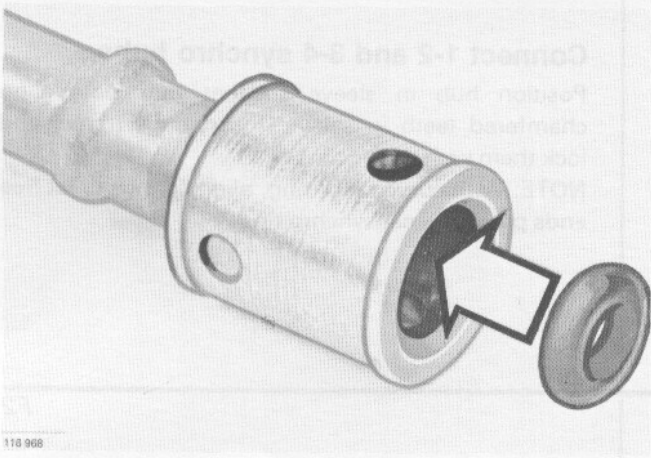
Use drift **2867** and standard handle **1801**.



F4

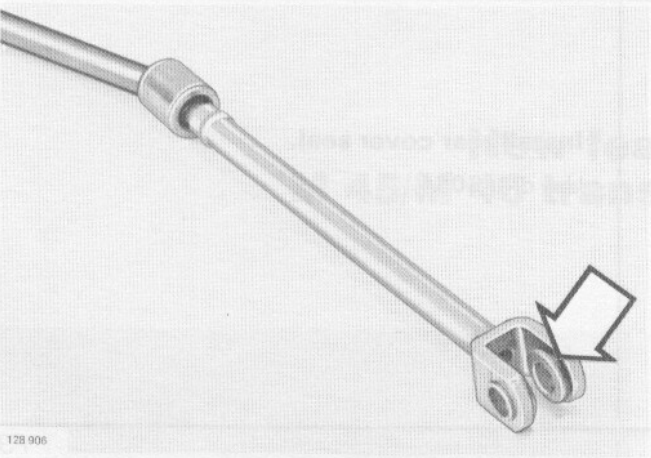
**Install seal for selector rail.**

Drift **5065**.



F5

**Position rubber ring in joint.**



F6

**Connect gear selector rail and gearshift rod.**

Selector rail grooves UP.

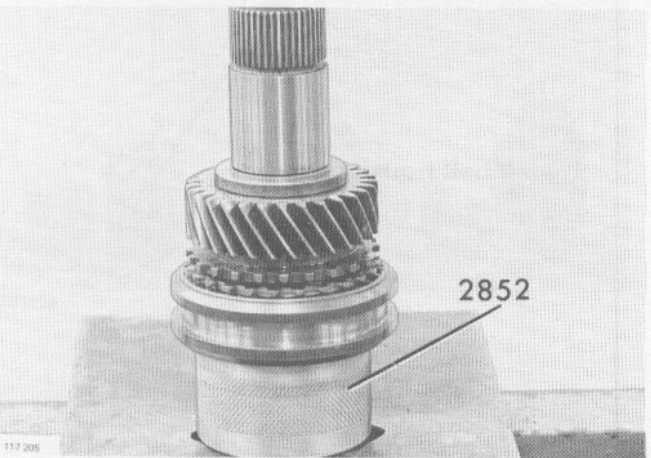
F7

**Install sleeve on joint.**

F8

**Install bushings on gearshift rod.**

Use grease to retain rubber ring on one side.

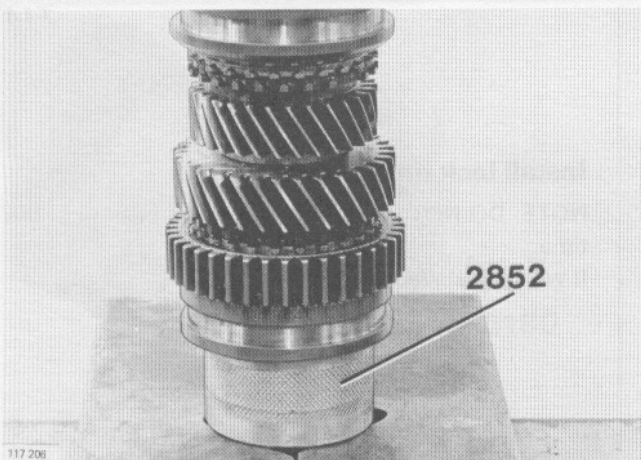


F9

**Install:**

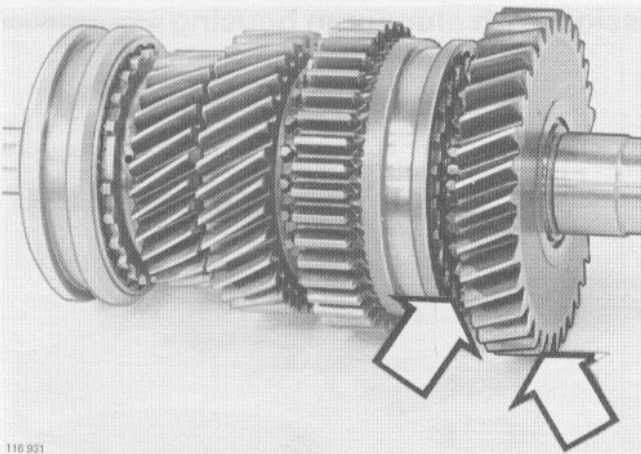
- 3rd gear and synchro ring.
  - 3–4 synchro hubs on main shaft.
  - Lock ring.
- Use adapter **2852** when pressing on gear and hub.

F10

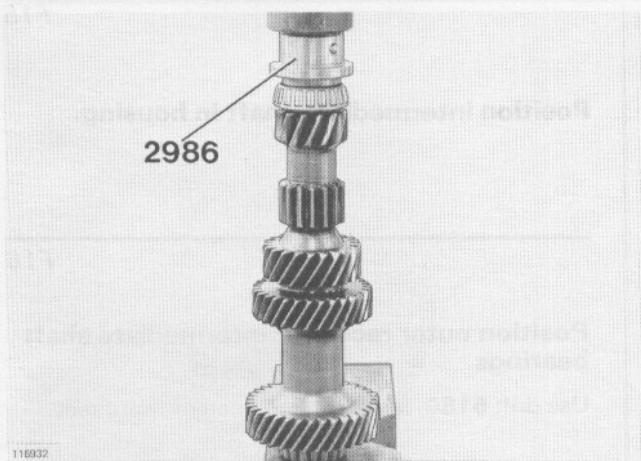
**Install:**

- 2nd gear and synchro hub.
  - 1–2 synchro hub on main shaft.
  - Lock ring.
- Use adapter **2852** when pressing on gear and hub.

F11

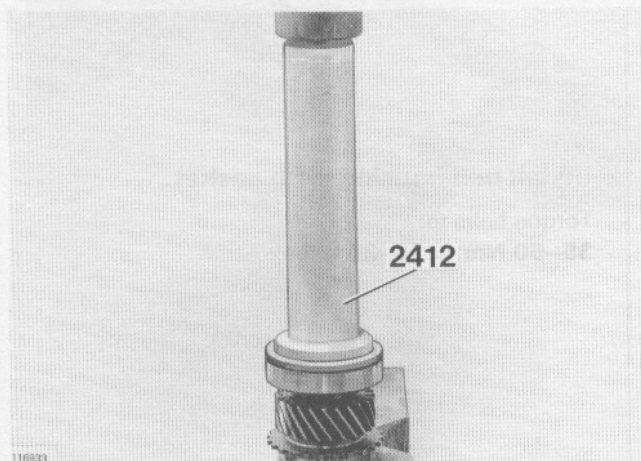
**Install 1st gear and synchro ring on main shaft.**

F12

**Install two intermediate shaft bearings.**

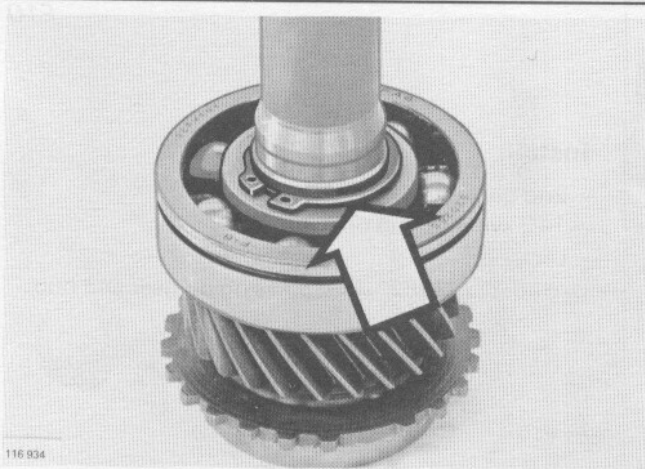
- Use drift **2986** to press on bearings.  
 NOTE: Intermediate shaft small end bearing is different for diesel applications.  
 Use correct type bearing.

F13

**Install bearing on input shaft.**

- Use drift **2412** to press on bearing.

F14



**Install lock ring on input shaft.**

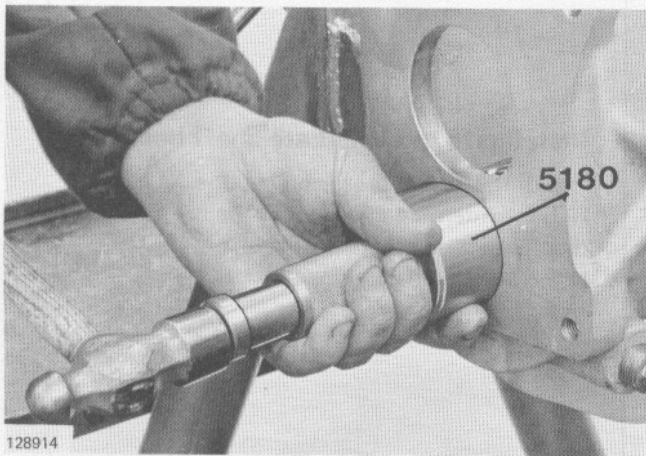
NOTE: DO NOT install spacer ring on bearing at this time.

It will be installed later on.

**Special instructions for transmission with aluminum housing**

Prior to further assembly, intermediate shaft pre-tension should be determined. Follow operations F15–F24.

F15



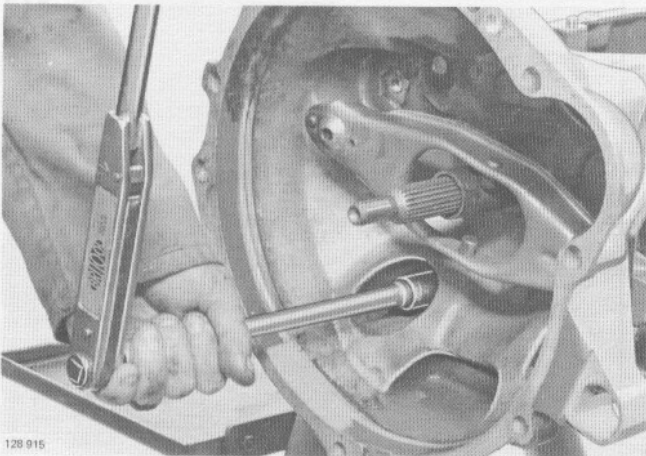
**Position intermediate shaft in housing.**

F16

**Position outer races for intermediate shaft bearings.**

Use drift **5180**, large outer diameter toward race.

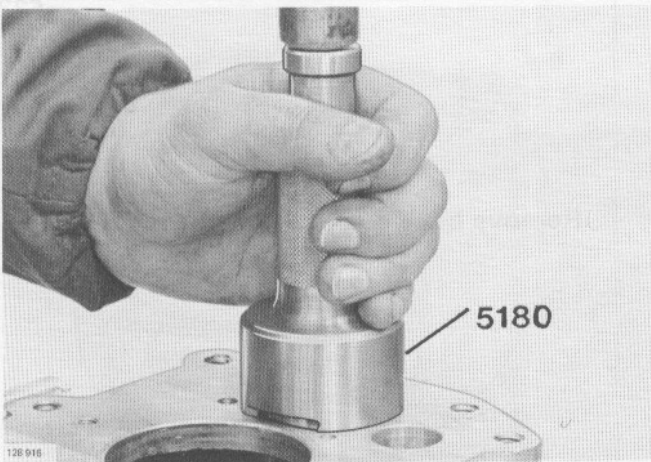
F17



**Install bell housing with gasket.**

Torque bolts to:

**35–50 Nm = 25–35 ft.lbs.**



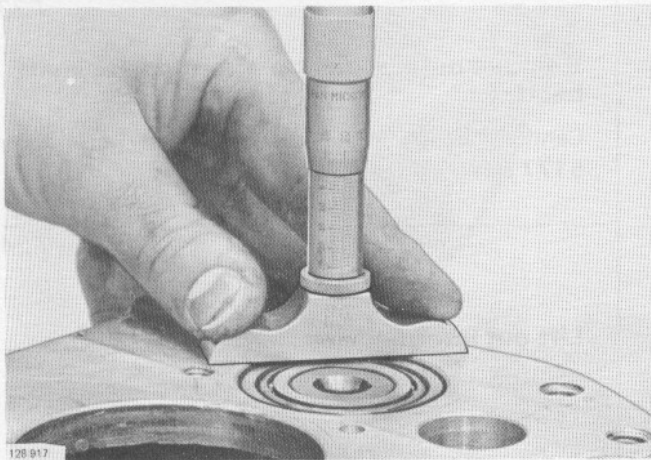
F18

**Turn transmission to vertical position.**

F19

**Eliminate clearance in intermediate shaft bearings.**

Use drift **5180**, small diameter toward rear race. Hold drift rigidly and knock in race with light taps. Repeat while rotating shaft, until all clearance is gone and shaft runs somewhat sluggish.



F20

**Measure distance between intermediate shaft bearing outer race and rear surface of housing.**

Use depth gauge and note reading.

F21

**Determine thickness of shims for intermediate shaft.**

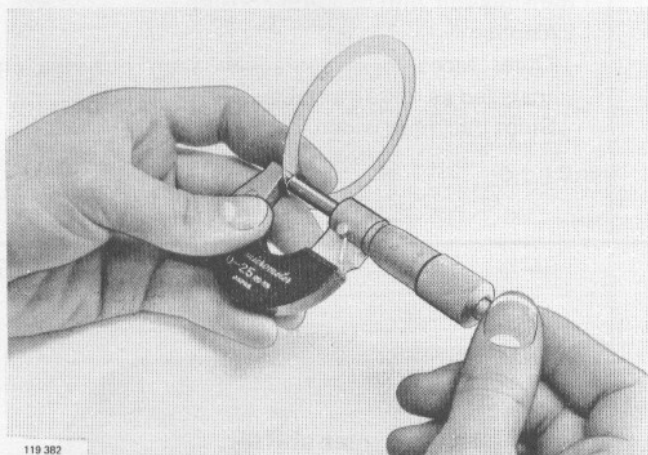
Shaft pre-tension should be 0.03–0.08 mm. Gasket thickness 0.25 mm (metric only).

Example:

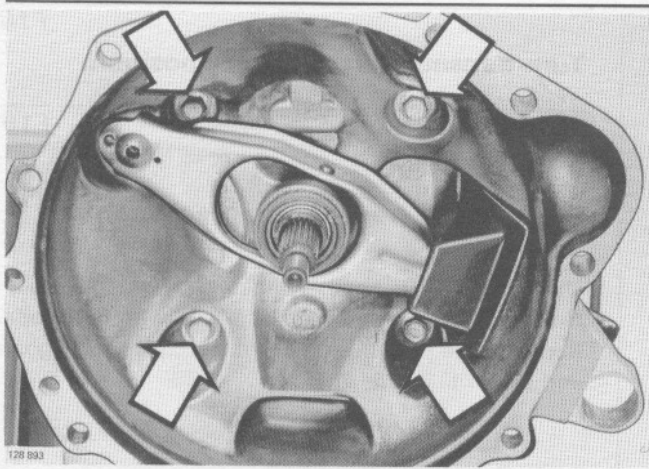
Distance, race—surface	1.51	
Gasket	+0.25	
	<hr/>	
	1.76	1.76
Pre-tension	+0.03 to	+0.08
	<hr/>	
Shim thickness	1.79 to	1.84

Choose **1.80 mm** shim thickness.

Shims available: 0.05 mm  
0.10 mm  
0.15 mm  
0.35 mm  
0.50 mm  
0.70 mm  
1.00 mm

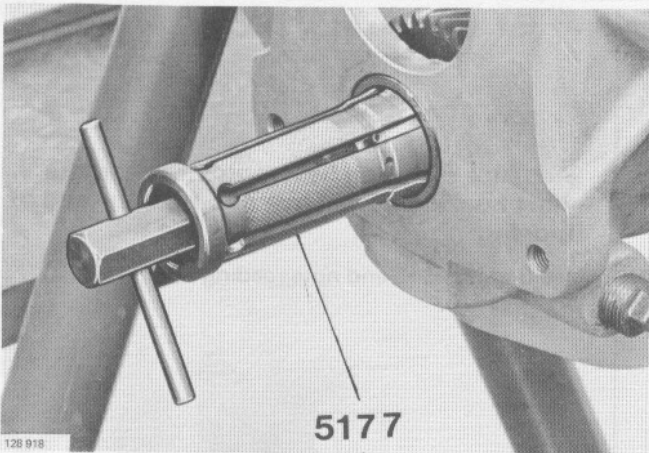


119 382



F22

**Remove bell housing and gasket.**



F23

**Remove outer races for intermediate shaft bearings.**

Carefully knock intermediate shaft in until puller 5177 can grip races.

F24

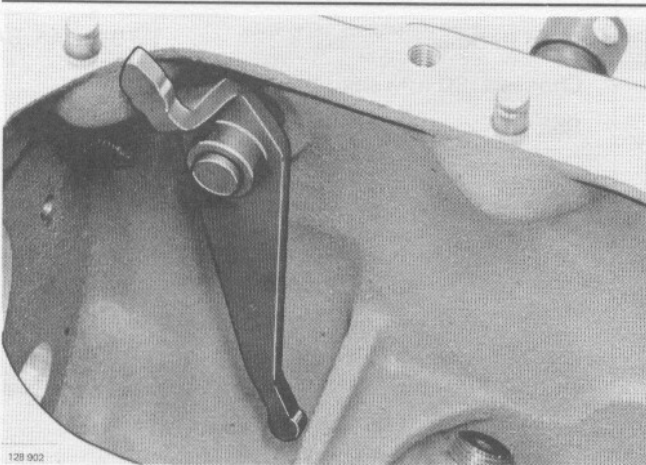
**Lift out intermediate shaft.**

**— End of special instructions for transmissions with aluminum housing —**

Continue assembly, using same operations as for transmission with cast iron housing.

Exception:

- Outer races for intermediate shaft bearings are installed as described above.
- Shim thickness is determined.

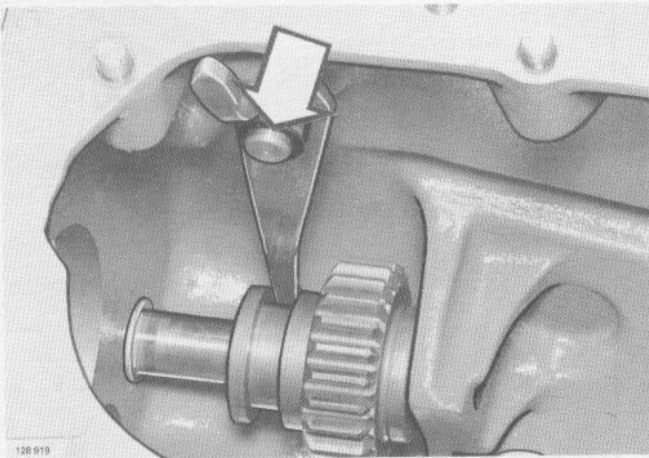


F25

**Install reverse gear shifter.**

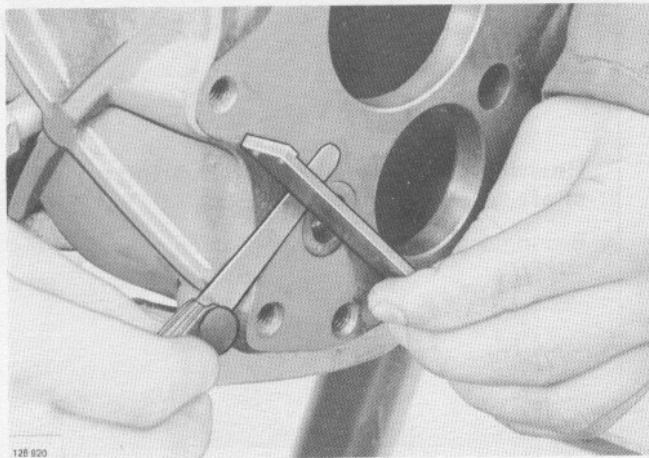
Install lock ring.

F26



**Install reverse gear and shaft.**

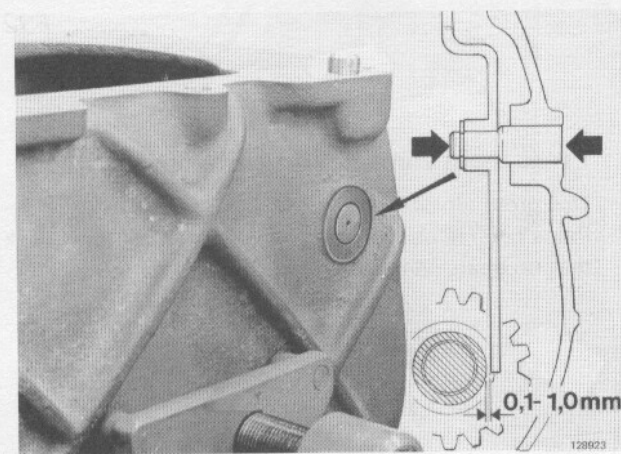
F27



**Check and adjust reverse gear shaft position.**

Shaft end should be minimum 0.05 mm = 0.002'' under housing face.

F28

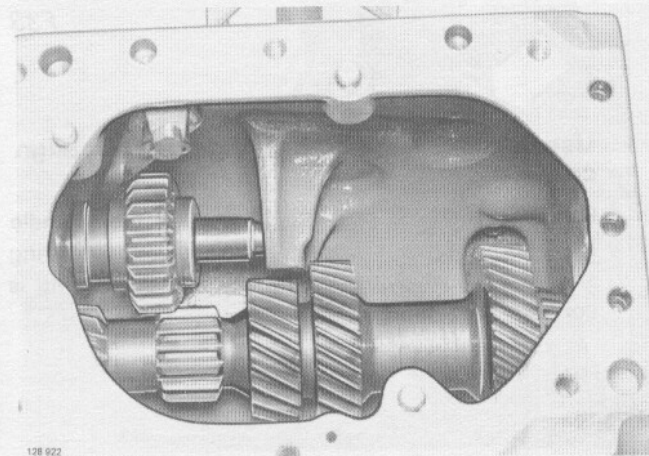


**Important!**

**Adjust clearance between reverse gear and shift fork.**

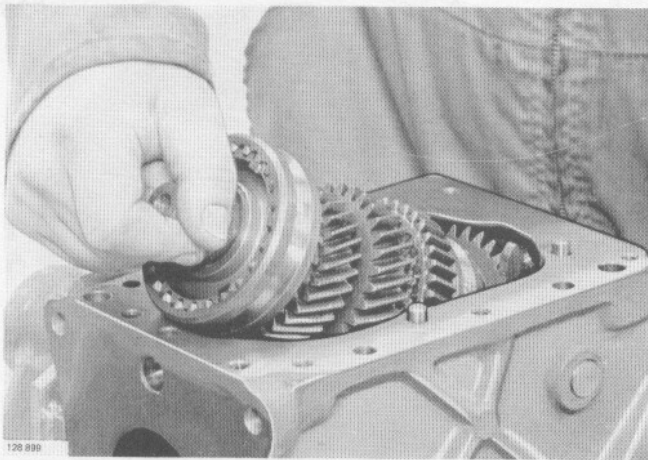
Correct clearance is 0.1–1.0 mm = 0.004–0.04''. Adjust by knocking shift fork pivot pin axially with a punch.

F29



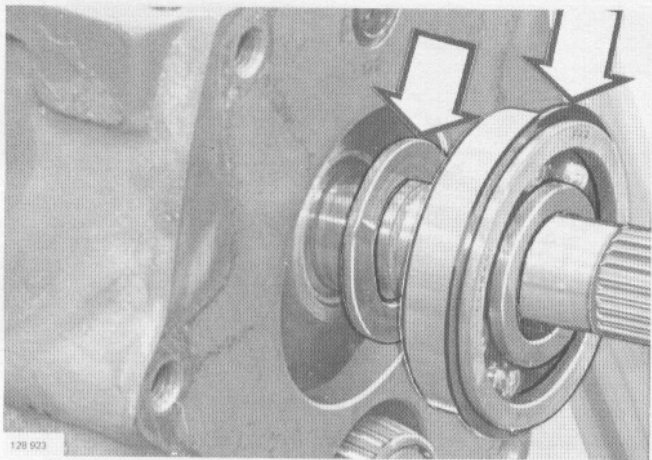
**Position intermediate shaft in housing.**

Position on bottom of housing.



F30

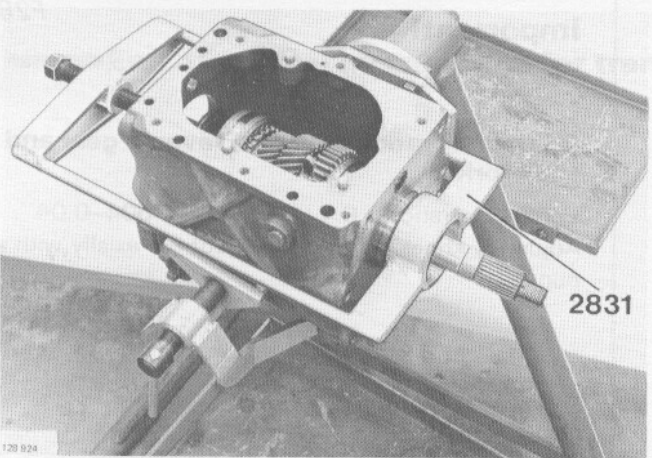
**Position main shaft in housing.**



F31

**Position thrust washer and bearing on main shaft.**

Bearing should be fitted with positioning ring.

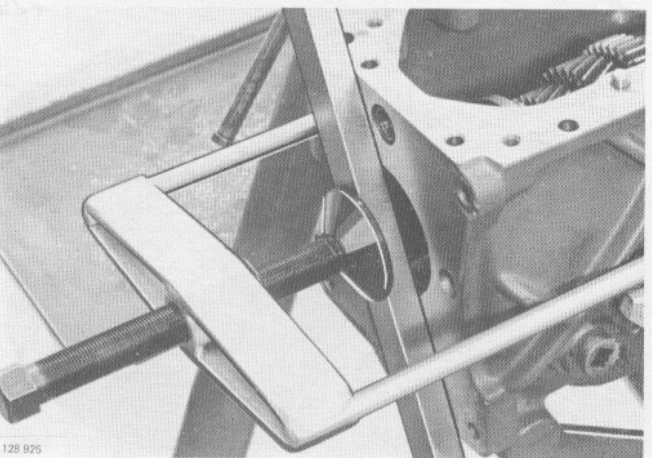


F32

**Press main shaft bearing into position.**

Use press tool **2831**.

Press reverse gear toward transmission center. Check that no gears coincide and become damaged.



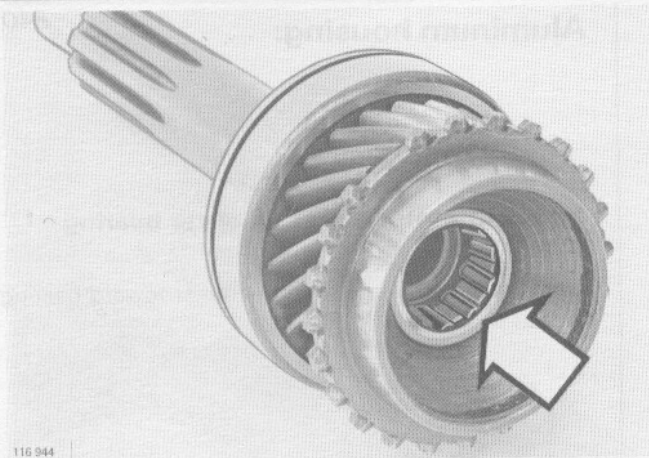
F33

**Use spacer for tool if bearing does not align correctly.**

Spacer should be positioned between tool spindle and housing front end. Bearing positioning ring should be flush with housing face when bearing is correctly positioned.

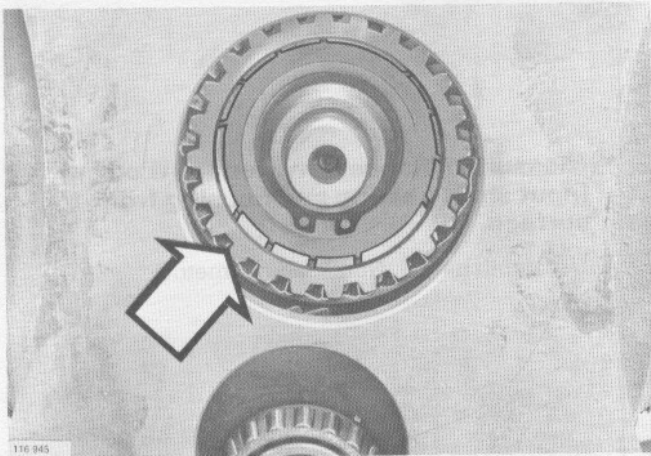


F34



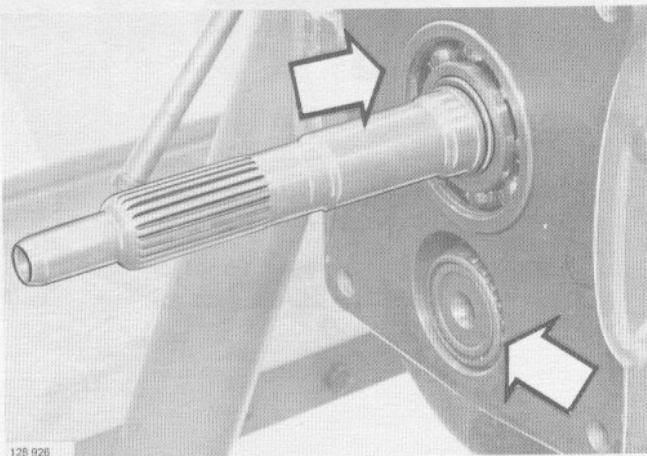
**Grease and install input shaft roller bearing.**

F35



**Position 4th gear synchro ring in synchro hub.**

F36



**Attach input shaft to main shaft.**

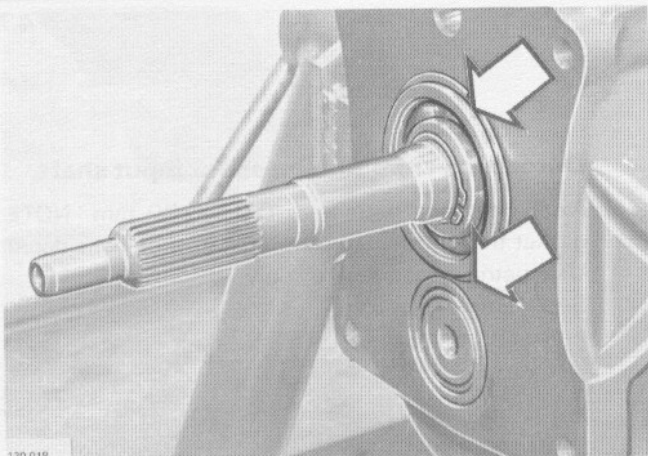
Push shaft in all the way.

F37

**Lift up intermediate shaft.**

Position shaft so bearings are correctly positioned in housing.

F38



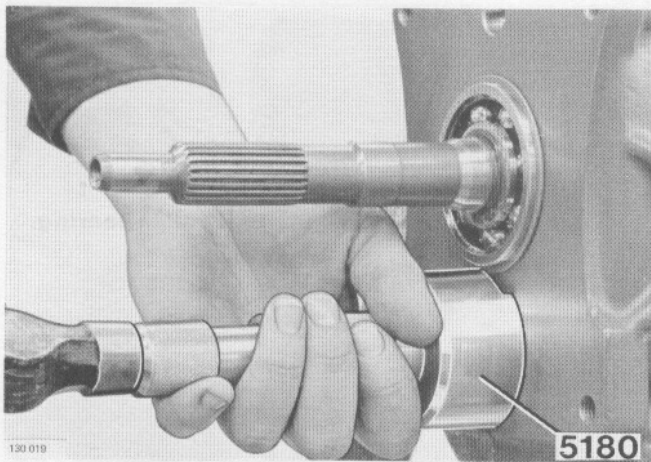
**Pull out input shaft so that spacer ring can be positioned on bearing.**

Then push in shaft again. Spacer ring should lie against housing.

F39

**Cast iron housing:**

**Install intermediate shaft outer bearing races.**

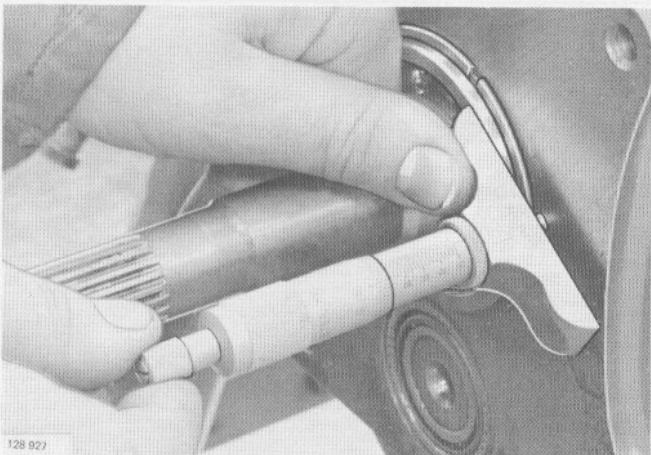


**Aluminum housing:**

F40

**Install intermediate shaft outer bearing races.**

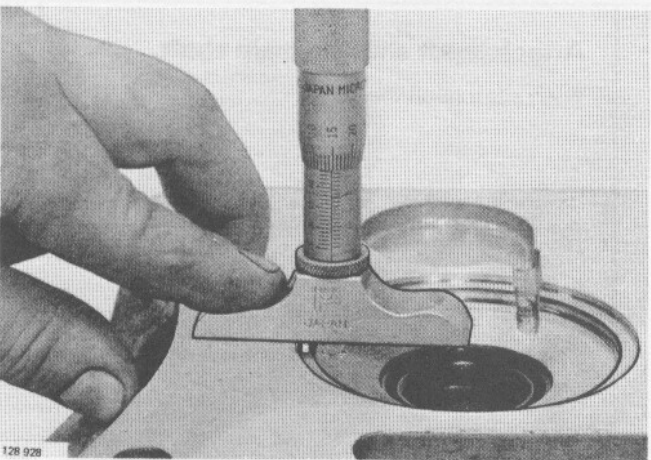
Use drift **5180**, large outer diameter toward bearing races.



F41

**Measure distance between front end of input shaft bearing and housing front surface.**

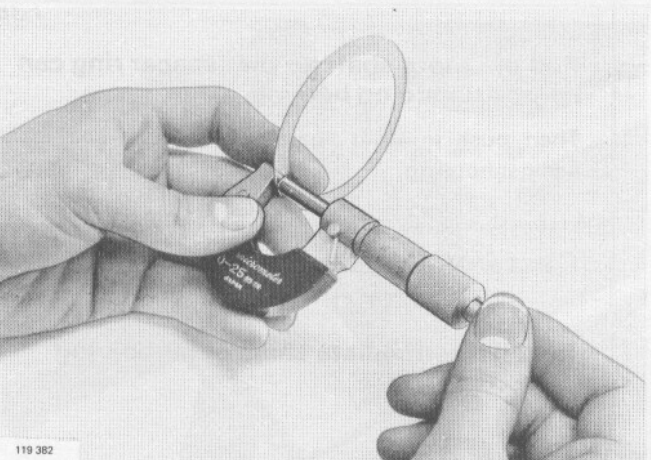
Use depth gauge. Note reading (metric).



F42

**Measure distance between bell housing surface and bearing seat bottom.**

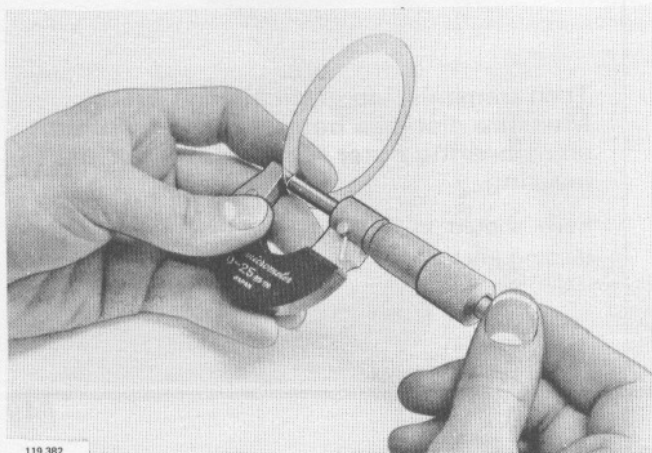
Use depth gauge. Note reading (metric).



F43

**Determine shim thickness for input shaft.**

Axial clearance permitted: 0.01–0.20 mm. NOTE: gasket thickness 0.25 mm must also be considered. Use metric measurements only. See example next page.



Example:

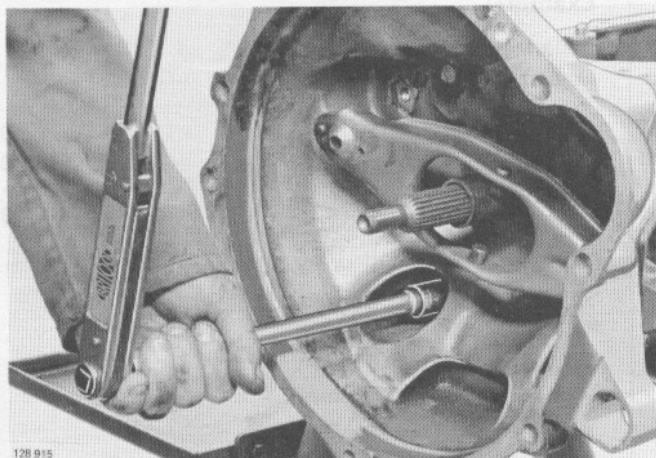
Distance, flywheel housing to bearing bottom	5.60	
Gasket thickness	+0.25	
	<hr/>	
	5.75	
Distance, bearing to housing	-4.71	
	<hr/>	
	1.04	1.04
Clearance permitted	-0.01 to	-0.15
	<hr/>	
Shim thickness, mm	1.03 to	0.89
Choose shim 0.90 mm.		
Shims available:	0.60 mm	
	0.75 mm	
	0.90 mm	
	1.00 mm	

F44

**Attach bell housing.**

Use grease on gasket and shim to keep in place.  
Torque: **35–50 Nm = 25–35 ft.lbs.**

F45



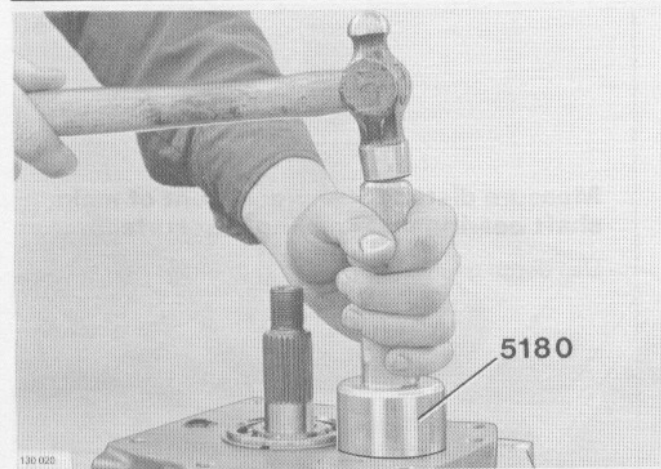
**Aluminum housing:  
Install clutch fork.**

Including spacer.

F46

**Install throw-out bearing.**

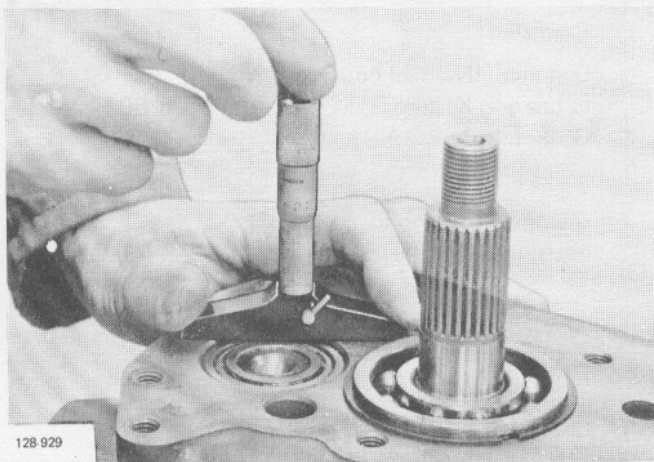
F47



**Aluminum housing:**

**Turn transmission to vertical position. Make sure intermediate shaft bearings have no clearance.**

Use drift **5180** with small diameter toward rear bearing race. Hold tool rigidly and knock on race with light knocks. Repeat while rotating shaft until all clearance is gone and shaft runs somewhat sluggish.

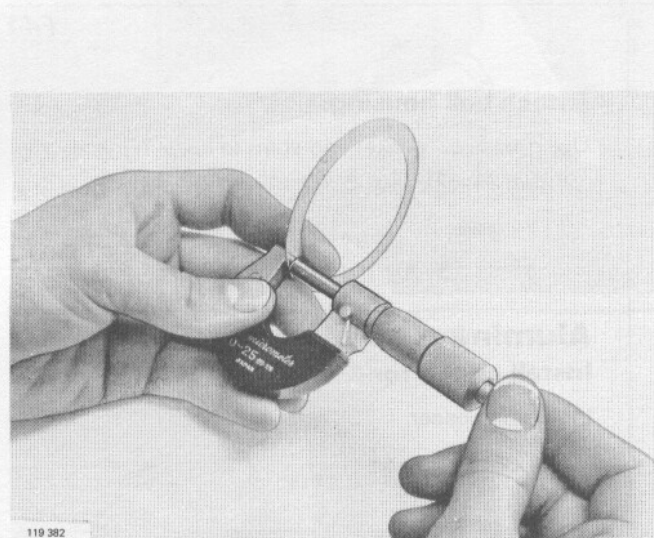


**Cast iron housing:**

F48

**Turn transmission vertical position. Measure distance between intermediate shaft bearing outer race and rear surface of housing.**

Race should butt rollers. Use depth gauge. Note reading (metric).



**Determine thickness of shims for intermediate shaft.**

F49

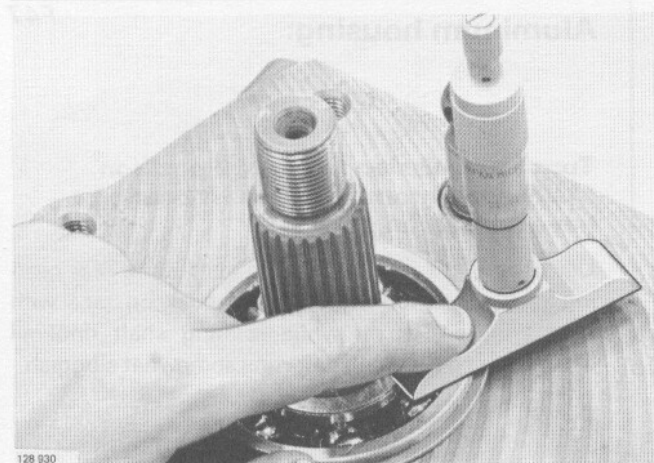
Axial clearance permitted: 0.025–0.10 mm. Gasket thickness: 0.25. Metric only.

**Example:**

Distance, race to surface	1.43	
Gasket	+0.25	
	<hr/>	
	1.680	1.680
Clearance permitted	<hr/>	<hr/>
	-0.025 to 0.100	-0.025 to 0.100
Shim thickness	<hr/>	<hr/>
	1.655 to 1.580	

Choose 1.65 mm (alt. 1.60 mm).

- Shims available:
- 0.05 mm
  - 0.10 mm
  - 0.15 mm
  - 0.35 mm
  - 0.50 mm
  - 0.70 mm
  - 1.00 mm

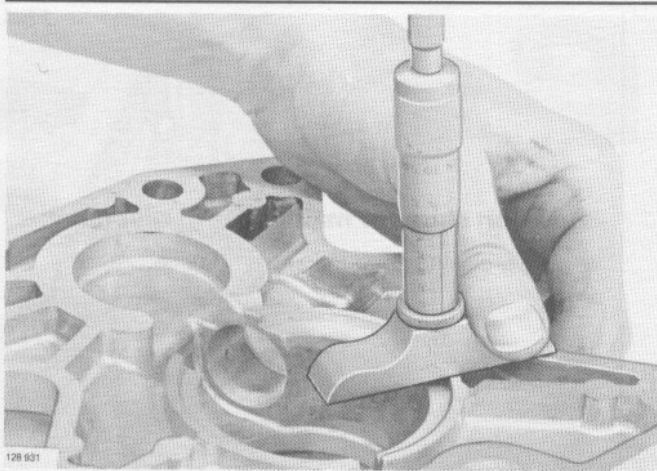


**Measure distance between front of main shaft bearing and housing rear surface.**

F50

Use depth gauge. Note reading (metric).

F51

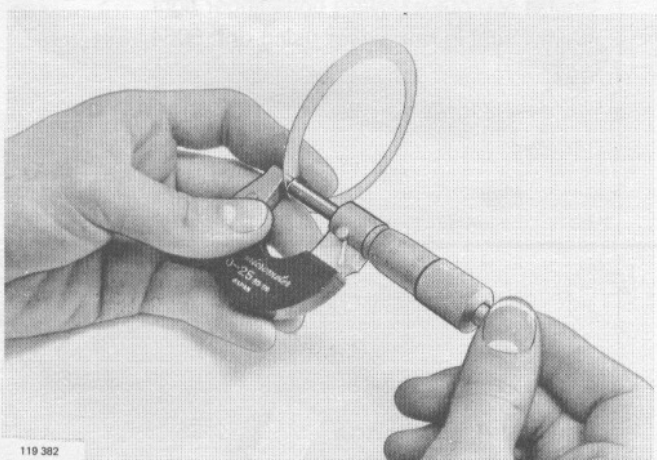


128 931

**Measure distance between rear cover surface and bearing seat bottom.**

Use depth gauge. Note reading (metric).

F52



119 382

**Determine shim thickness for main shaft.**

Axial clearance permitted: 0.01–0.20 mm. Gasket thickness: 0.25 mm.

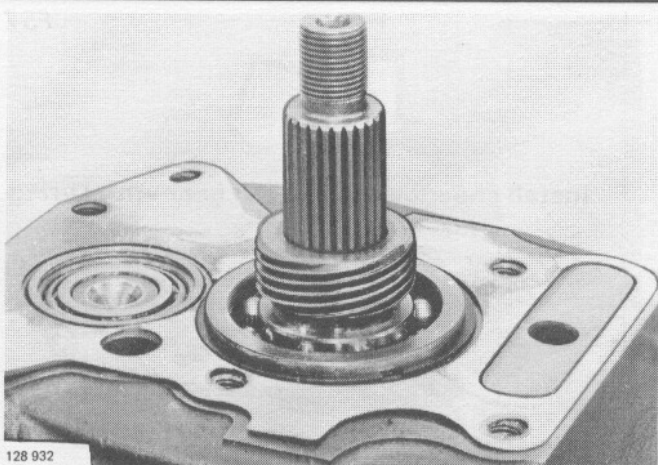
**Example:**

Distance, cover to bearing bottom	5.50
Gasket	+0.25
	<hr/>
Distance, bearing to housing	–4.71
	<hr/>
	1.04
Clearance permitted	–0.01 to –0.20
	<hr/>
Shim thickness	1.03 to 0.84

Choose shim 0.90 mm

Shims available: 0.60 mm  
0.75 mm  
0.90 mm  
1.00 mm

F53

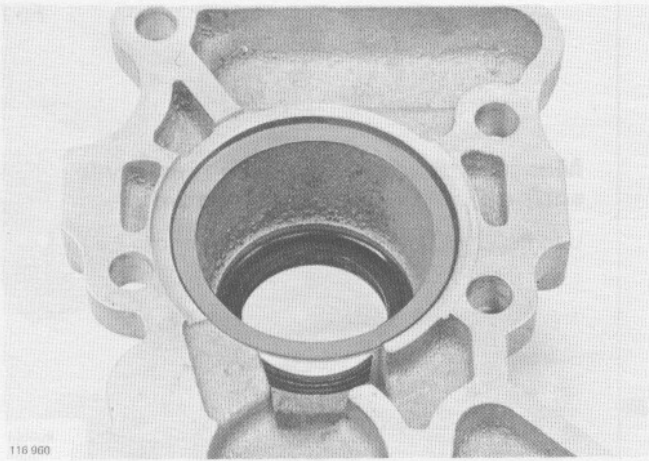


128 932

**Install speedometer drive gear, gasket and shim pack for intermediate shaft.**

Speedometer gear flange toward bearing.  
Shim pack determined:

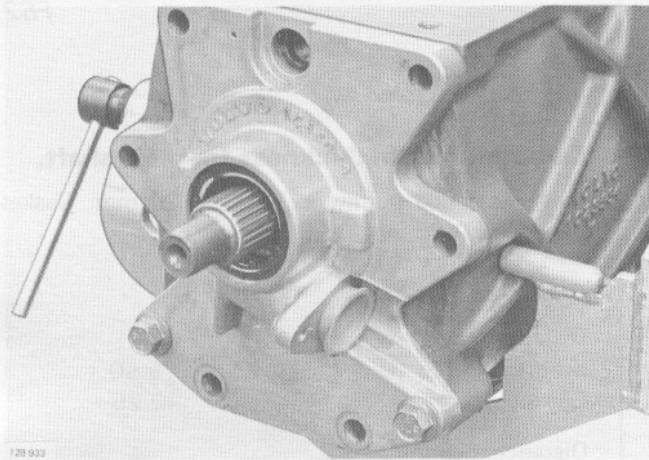
- Op. F15–F24 for transmissions with aluminum housing.
- Op. F48–F49 for transmissions with cast iron housing.



F54

**Position shim for main shaft in rear cover.**

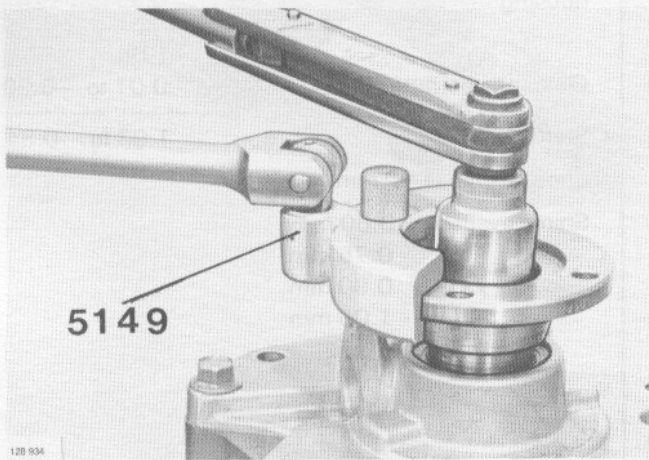
Apply grease to shim to keep it in place.



F55

**Install rear cover.**

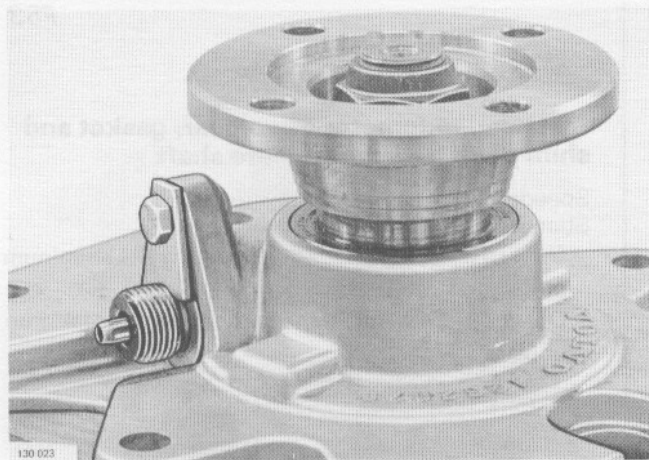
Install two outer (lower) bolts finger tight.  
Install seal in rear cover using drift 5064.



F56

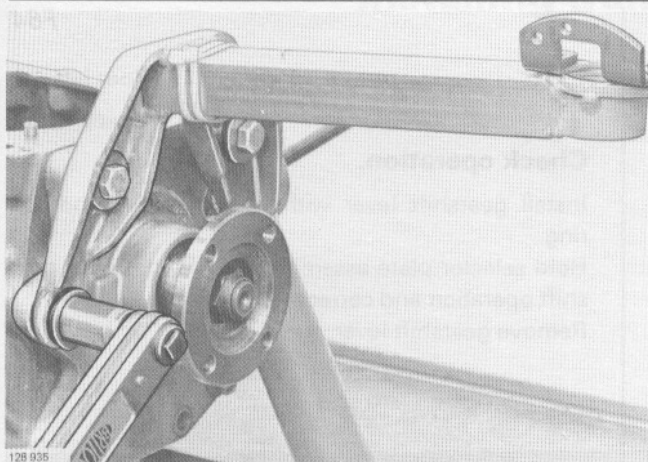
**Install drive flange**

Use wrench **5149** to hold.  
Torque nut to: **90–110 Nm = 65–80 ft.lbs.**



F57

**Install speedometer driven gear with O-ring**



F58

**Install gearshift carrier.**

Note sequence: bolt – washer – spacer – washer.

Torque bolts to:

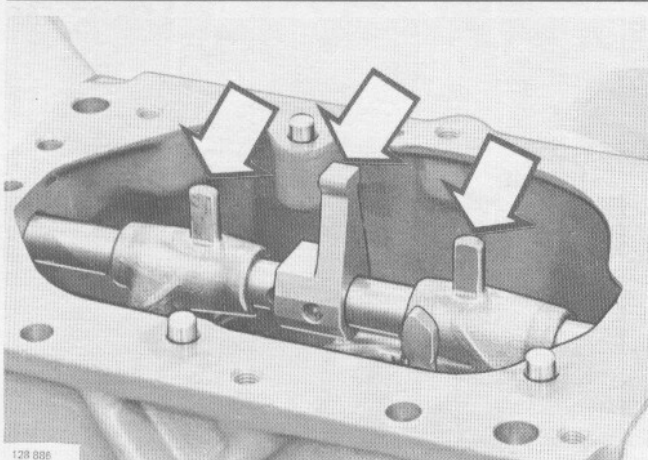
**35–50 Nm = 25–35 ft.lbs.**

F59

**Install two inner (lower) bolts for rear cover.**

Torque four lower bolts to:

**35–50 Nm = 25–35 ft.lbs.**



F60

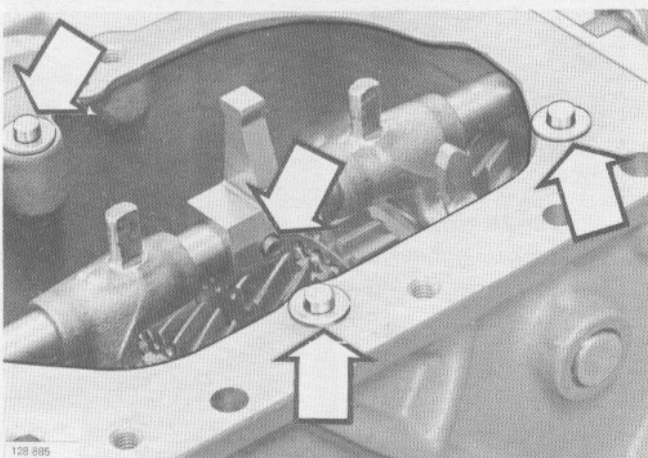
**Install shift forks.**

Make sure lugs position correctly.

F61

**Install shifter and gear selector rail.**

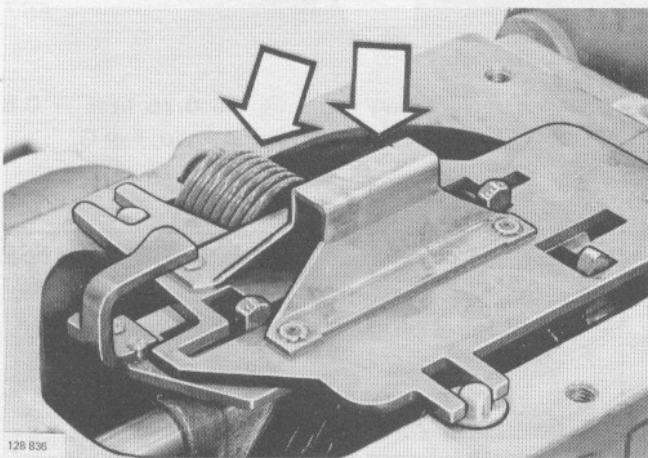
Shifter boss forward.



F62

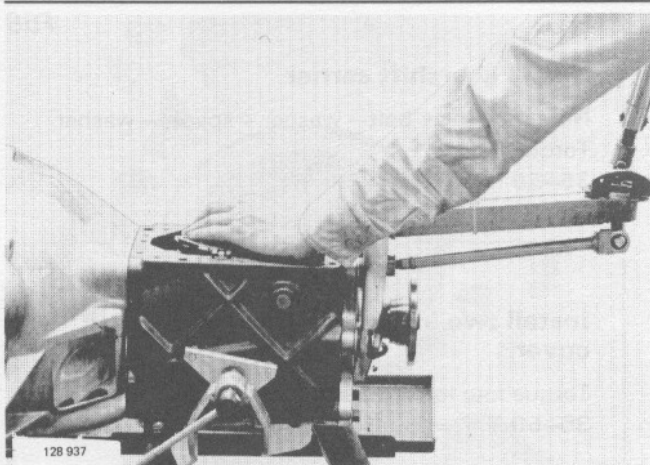
**Install:**

- Lock pin for shifter.
- Glide washers for selector plate assembly.



F63

**Install selector plate assembly and return spring.**



128 937

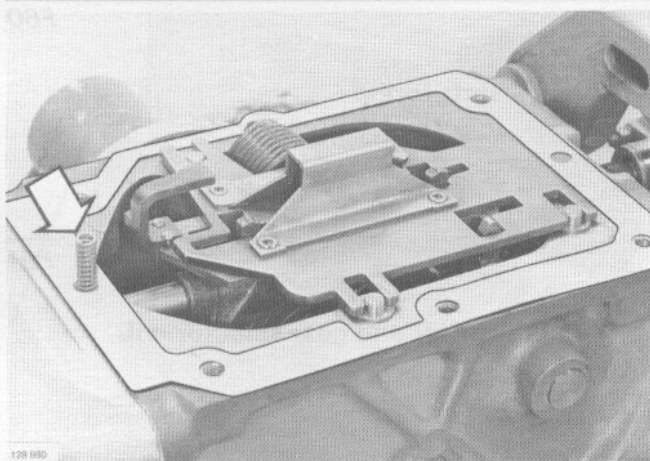
F64

**Check operation.**

Install gearshift lever without lock screw and lock ring.

Hold selector plate assembly with palm. Check gearshift operation and correct as necessary.

Remove gearshift lever.

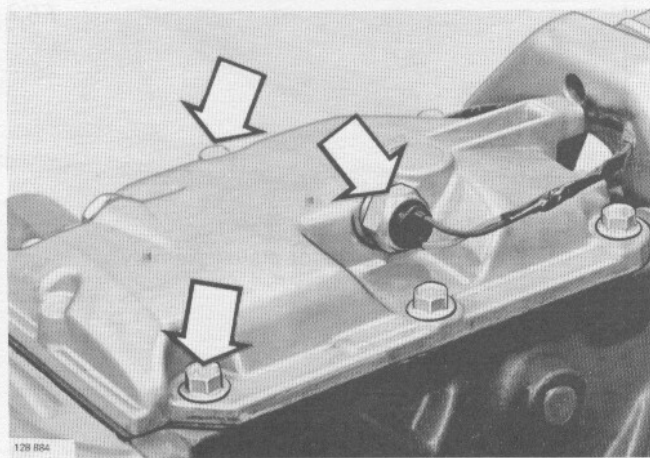


128 980

F65

**Install:**

- Detent ball and spring.
- New top cover gasket.

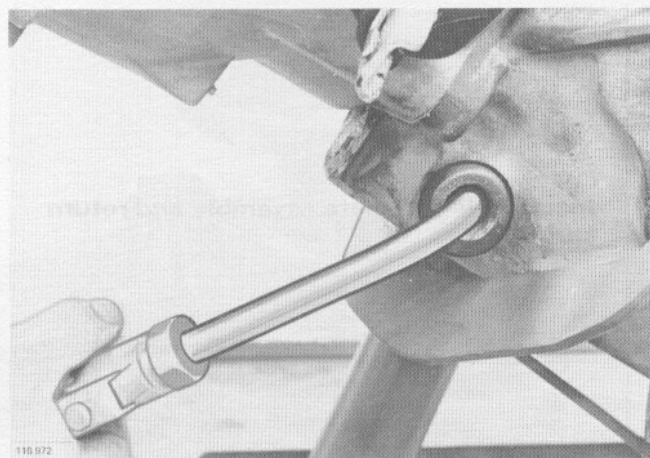


128 854

F66

**Install:**

- Top cover. Torque bolts to:  
**15–25 Nm = 11–18 ft.lbs.**
- Back-up light switch.
- Sound deadening material on gearshift carrier.



118 972

F67

**Fill oil.**

Lower transmission rear end. Fill **0.75 liter = 0.8 US qt** of Automatic Transmission Fluid, F or G.

F68

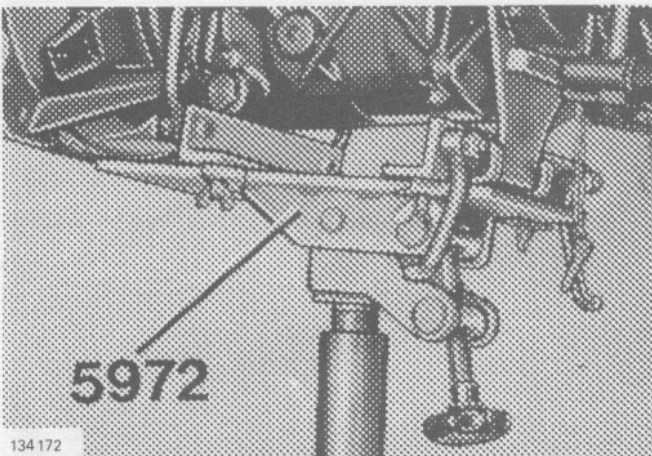
**Install level plug.**



## Installing transmission M 45

### Special tools:

5972 Fixture

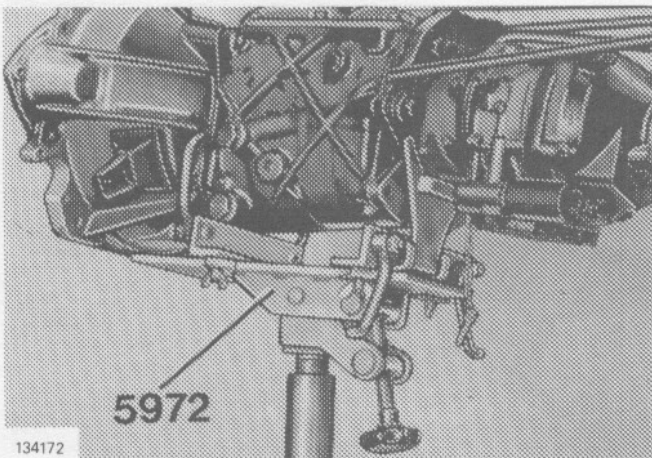


134172

G1

### Position transmission and fixture 5972 assembly on lifting device.

Fixture in front position to secure transmission rigidly on fixture.



134172

G2

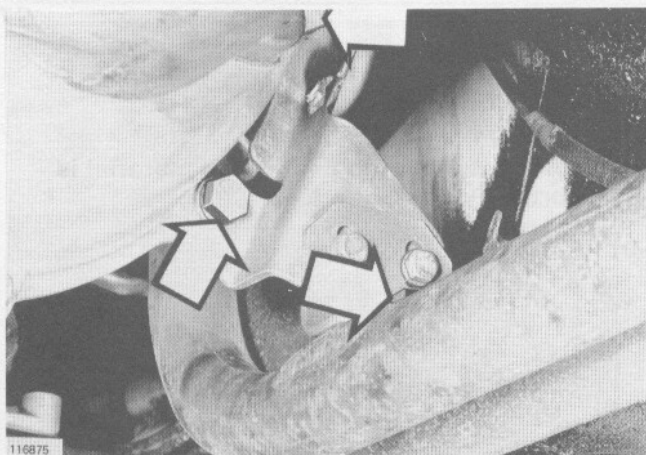
### Install transmission.

Check that throw-out bearing is correctly positioned in fork.

Raise transmission. Turn transmission to free it from propeller shaft tunnel when pushing it in from rear.

Install two lower bolts at bell housing.

Remove fixture and lifting device.

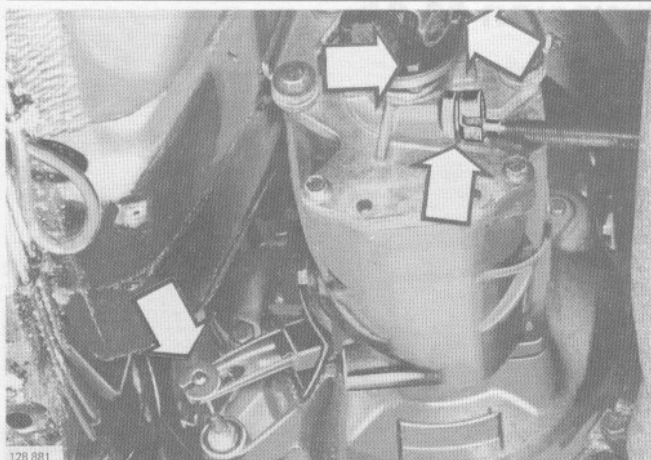


116875

G3

### Install:

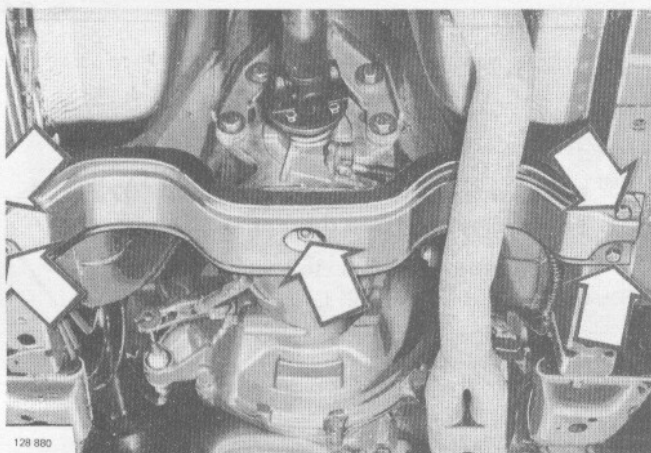
- Starter motor and tighten retaining bolts.
- Front exhaust pipe bracket. Two bolts at bell housing, one nut at exhaust pipe.
- Remaining bolts for bell housing.
- Rubber rings for front muffler.



G4

**Install:**

- Clutch cable to bell housing and clutch fork.
- Propeller shaft to transmission drive flange.
- Speedometer cable.



G5

**Install:**

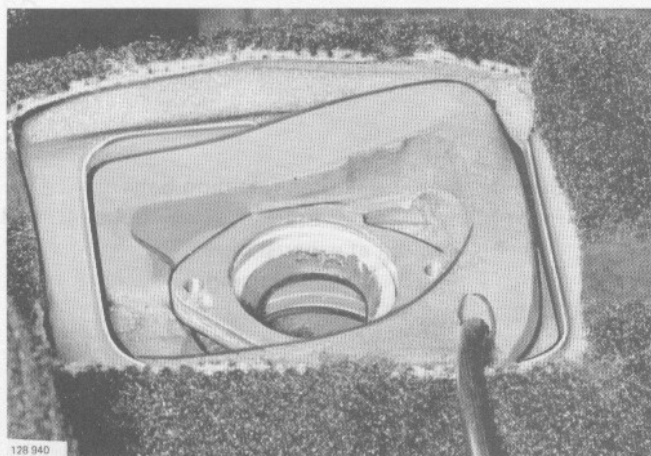
- Cross-member with rubber cushion and bracket.
- Clutch fork return spring.



G6

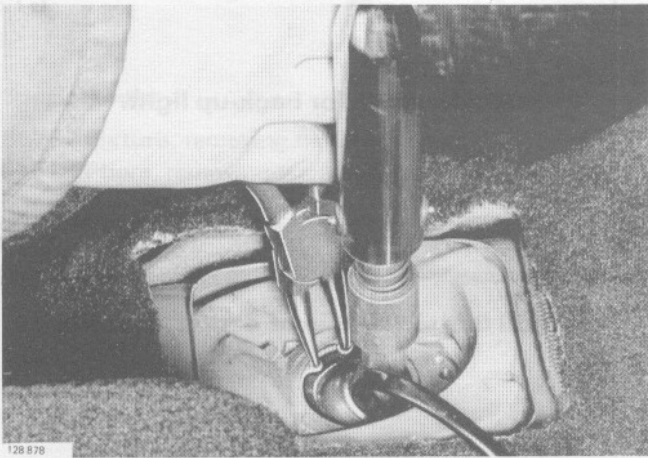
**Inside vehicle:**

**Install rubber ring and plastic bushing.**



G7

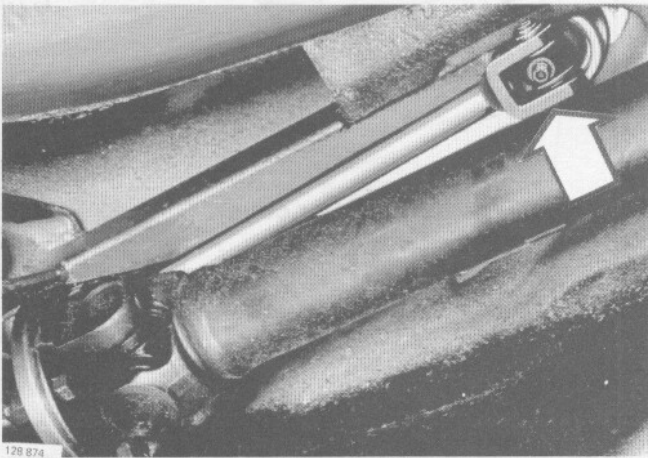
**Check that sound deadening material is correctly positioned.**



G8

**Install gearshift lever.**

Install retaining ring.

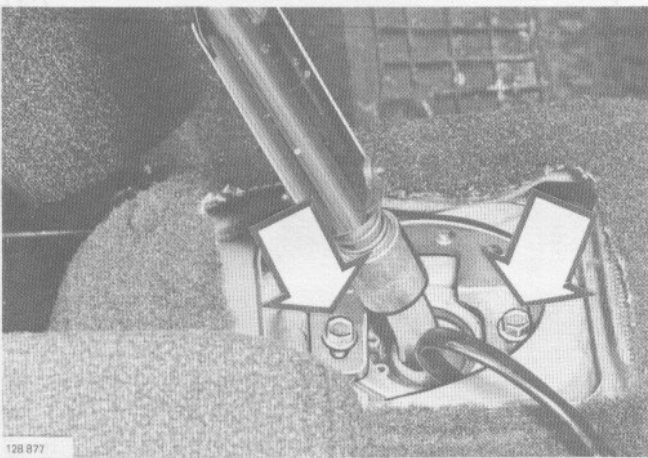


G9

**From under vehicle:**

**Attach gearshift rod to gearshift lever.**

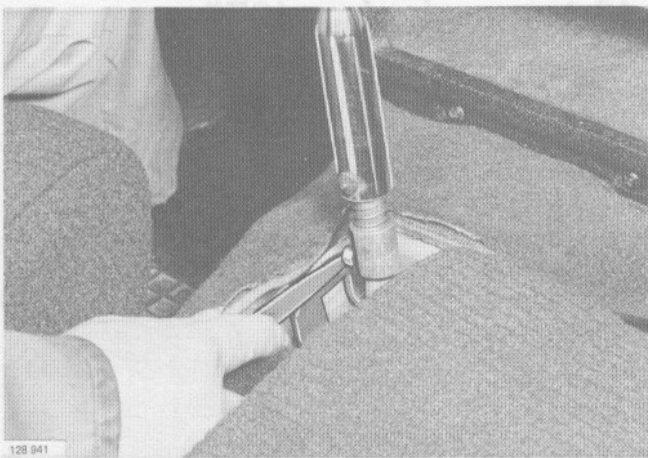
Push pivot pin onto position and install locking screw.



G10

**Install reverse detent plate.**

Disconnect gearshift lever from gearshift rod.  
 Turn detent lock from the left to remove pivot pin.

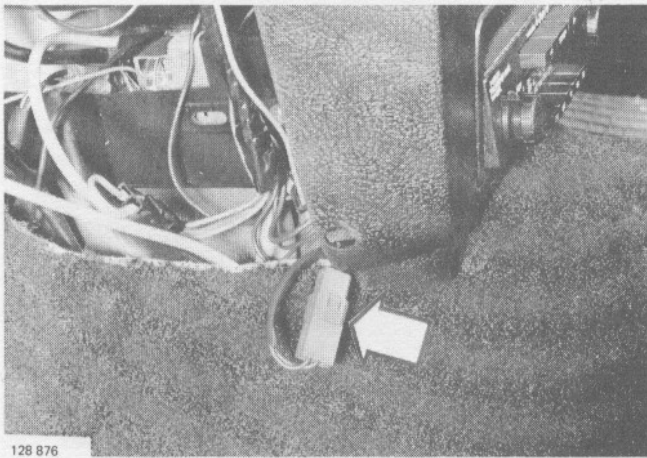


G11

**Adjust clearance for reverse gear detent.**

Engage 1st gear and adjust clearance between detent plate and gear shift lever.

Correct clearance: **0.5–1.5 mm = 0.020–0.060"**.  
 Engage 2nd gear and recheck clearance.

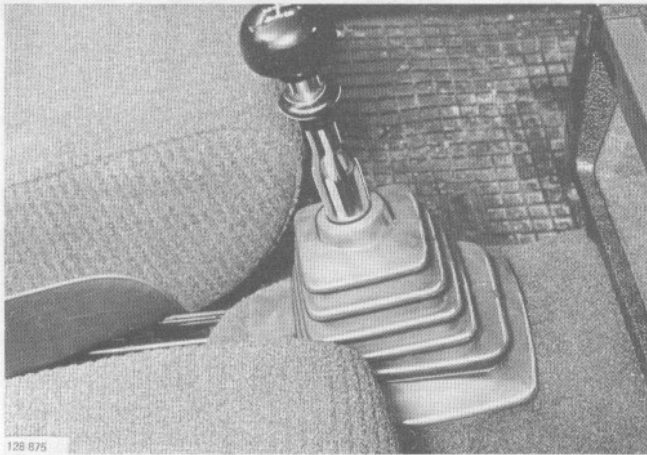


G12

**Install connector for back-up light.**

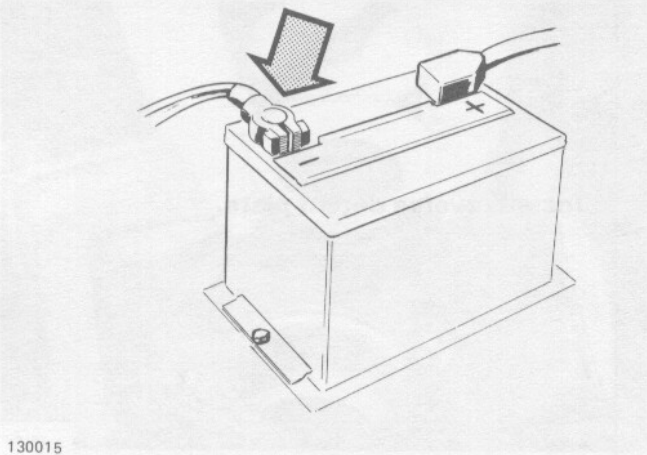
G13

**Install left side panel of center console.**



G14

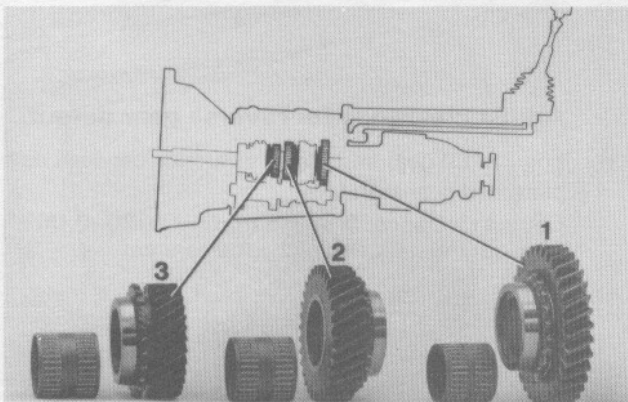
**Install gearshift lever cover.**



G15

**Reconnect battery ground cable.**

### New features of M 45/M 46 transmission 1979—



#### **Manual transmission.**

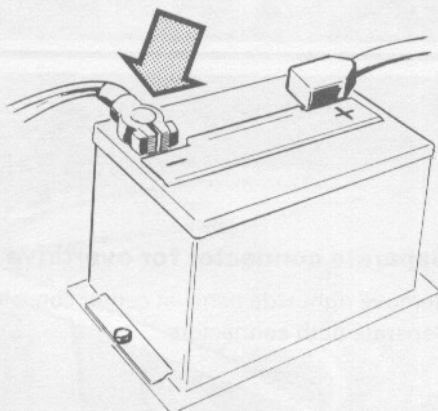
Manual transmissions have been equipped with needle bearings for first, second and third gear. This does not affect the repair methods for manual transmission.

## Removing transmission M 46

### Special tools:

**5972 Fixture**, removing transmission

**5181 Pliers**, removing pin on gearshift lever



130015

### Important!

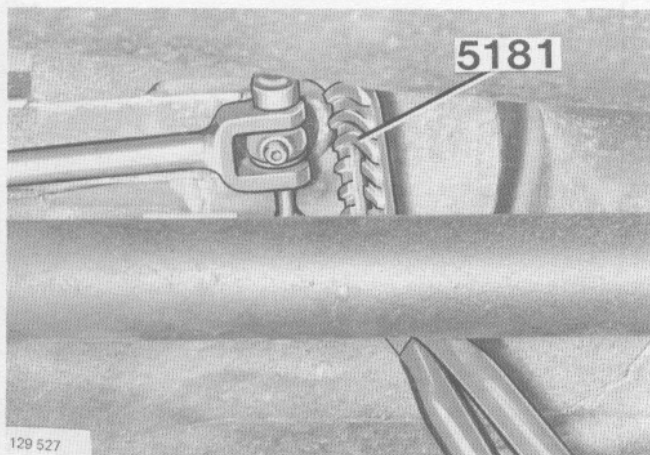
H1

#### Release overdrive.

- Raise rear wheels from ground.
- Start engine and engage 4th gear.
- Engage overdrive.
- Depress clutch pedal and stop engine.

H2

#### Disconnect battery ground cable.



129 527

H3

#### From under vehicle:

#### Disconnect gearshift lever from gearshift rod.

Remove lock bolt. Use pliers **5181** to remove pivot pin.

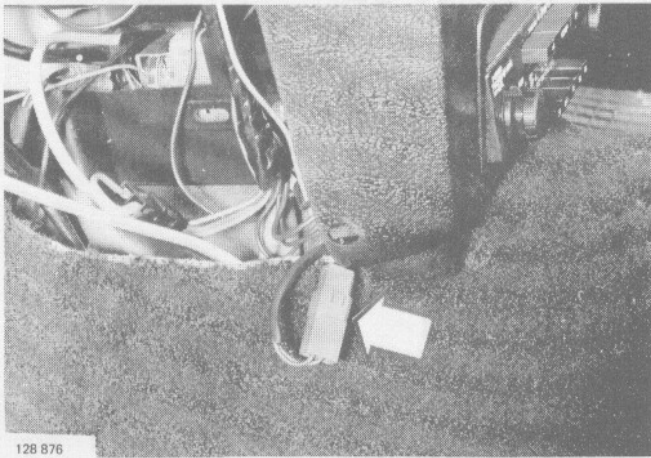


128 843

H4

#### Inside vehicle:

#### Disconnect gearshift lever cover from floor.



H5

**Inside vehicle:**

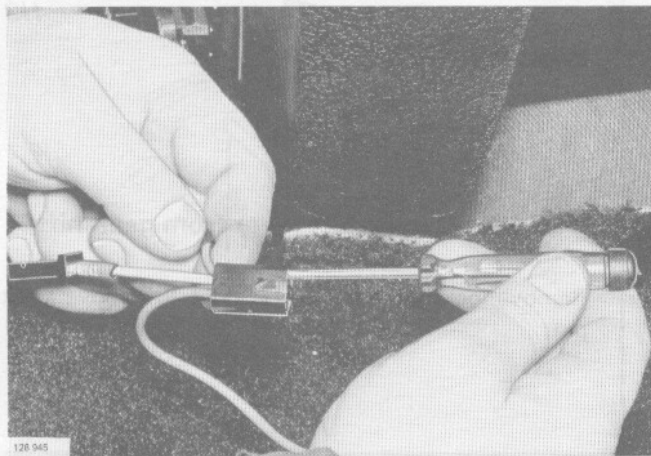
- Remove left side panel at center console.
- Separate connector.



H6

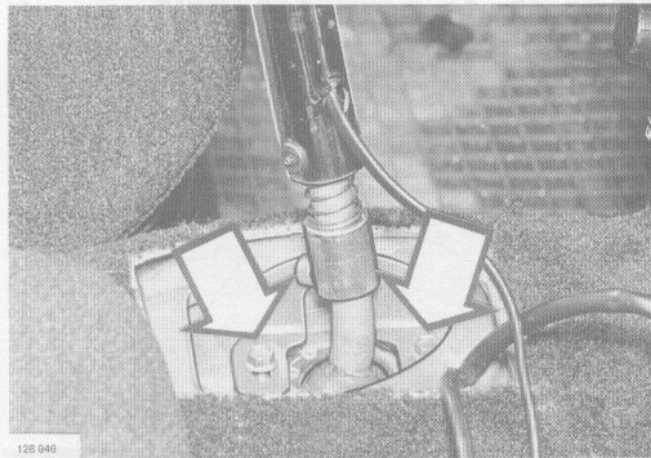
**Separate connector for overdrive.**

- Remove right side panel at center console.
- Separate both connectors.



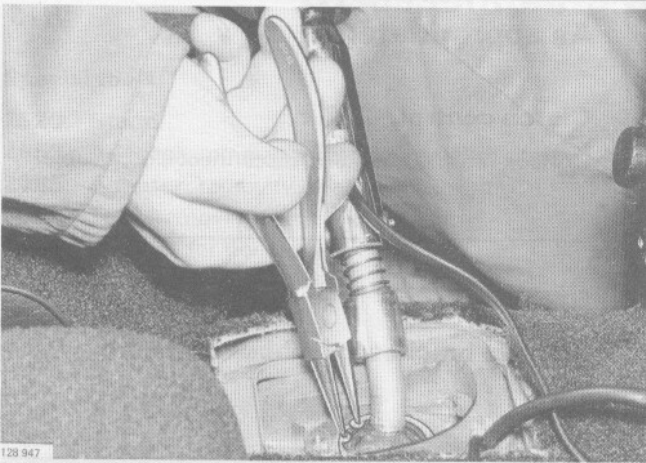
H7

**Remove red and yellow wire from connector.**



H8

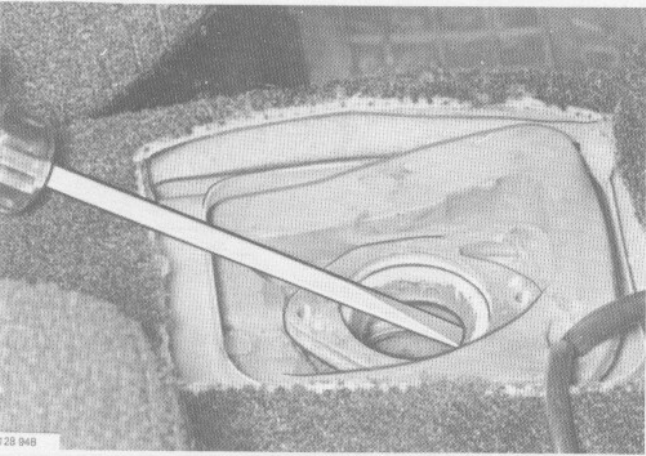
**Remove reverse detent plate.**



H9

**Remove gearshift lever.**

Remove lock ring to free gearshift lever.



H10

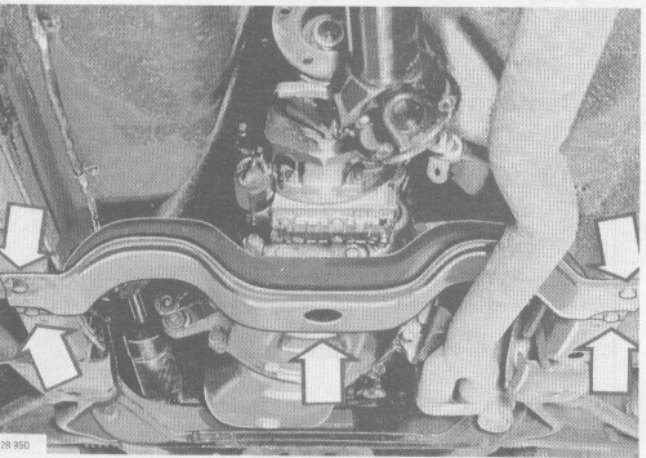
**Remove plastic bushing and rubber ring.**



H11

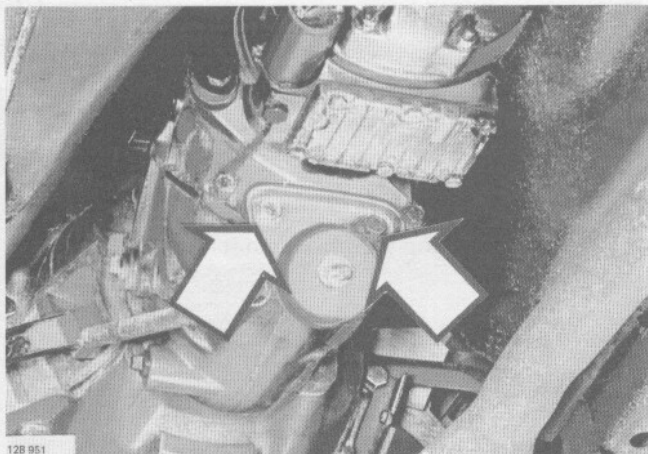
**From under vehicle:**

- Disconnect speedometer cable from drive gear.
- Disconnect propeller shaft from drive flange.



H12

**Remove cross-member assembly.**



**As appropriate:**

H13

**Clutch control.**

Unhook return spring and disconnect clutch cable.

---

H14

**Remove bracket for rubber cushion.**



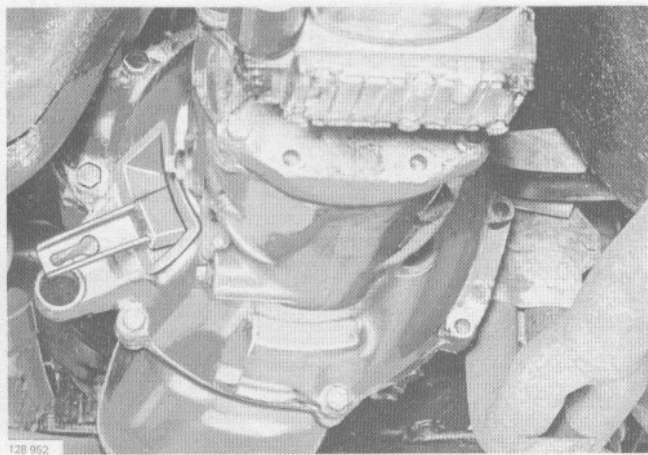
**Remove front exhaust pipe attachment.**

Remove bolts at bell housing. Remove nut at exhaust pipes.

---

H16

**Unhook rubber rings for front muffler.**



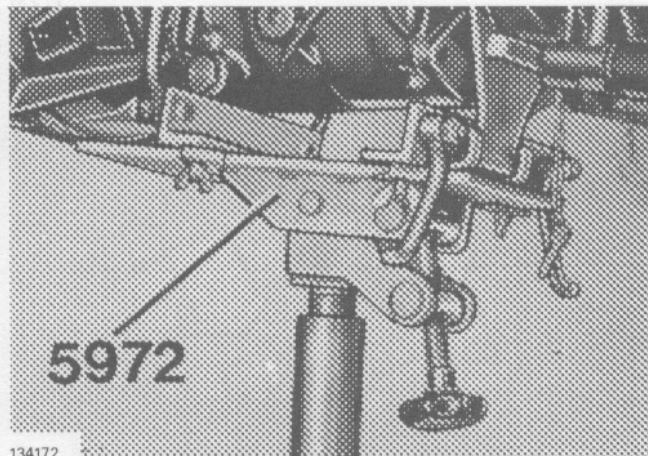
**Begin separating bell housing from engine.**

H17

---

H18

**Pull out starter motor until free from bell housing.**



**Remove transmission.**

H19

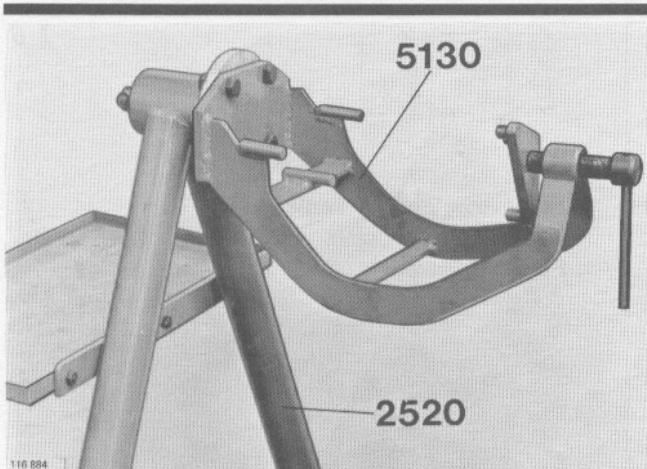
- Position fixture **5972**, attached to lifting device, under transmission. Fixture in rear position. Tighten attachment bolts to hold transmission rigidly.
- Remove two lower bolts at bell housing.
- Lower transmission. Turn transmission to free it from propeller shaft tunnel while pulling it rearward.



## Disassembling transmission M 46

### Special tools:

- 2520 Stand**  
**2853 Adapter**, removing gear and synchro ring  
**2985 Adapter**, removing main shaft bearing  
**5058 Tool**, removing main shaft bearing  
**5130 Fixture**, for transmission  
**5131 Puller**, removing intermediate shaft bearing  
**5147 Tool**, removing main shaft bearing  
**5148 Tool**, removing main shaft bearing  
**5177 Puller**, intermediate shaft bearings, aluminum housing



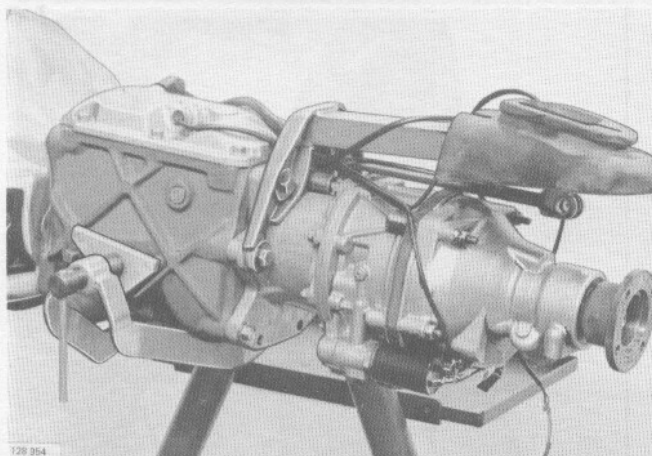
I 1

### Attach fixture 5130.

Use four bolts to attach to stand 2520.

#### NOTE:

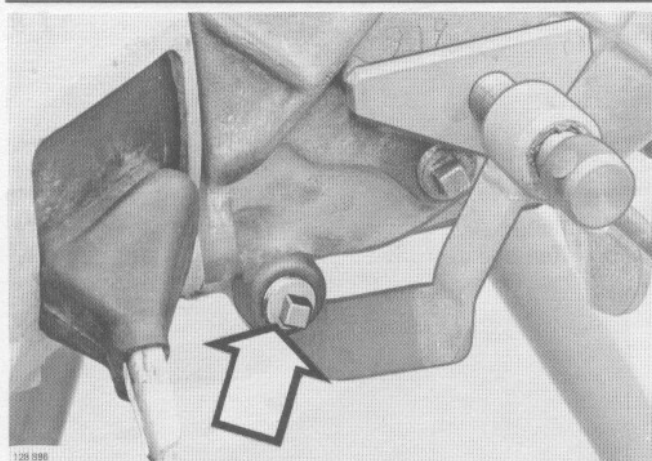
Modified type fixture 5130 must be used. See "Modification of fixture 5130" at end of Special Tool section.



I 2

### Install transmission to fixture.

Make sure all mating surfaces align when tightening holding bolt.

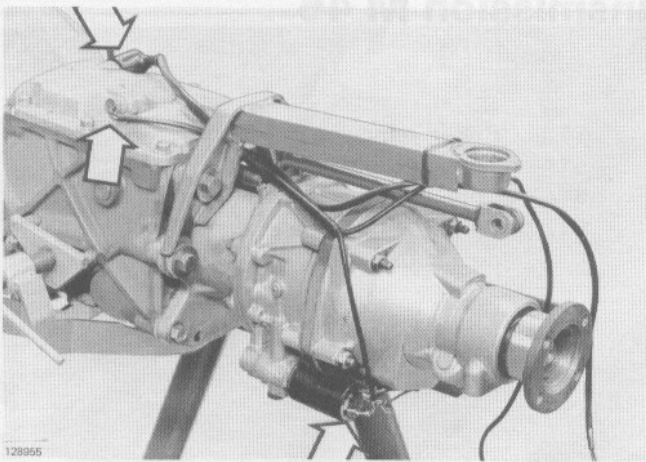


I 3

### Remove sound deadening material from gearshift carrier.

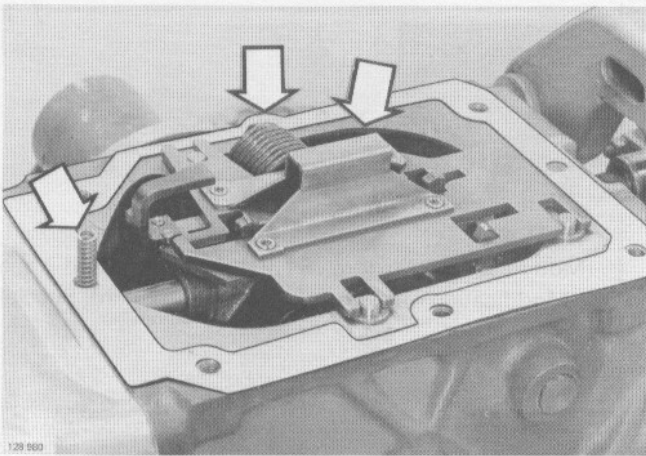
I 4

### Remove drain plug and drain oil.



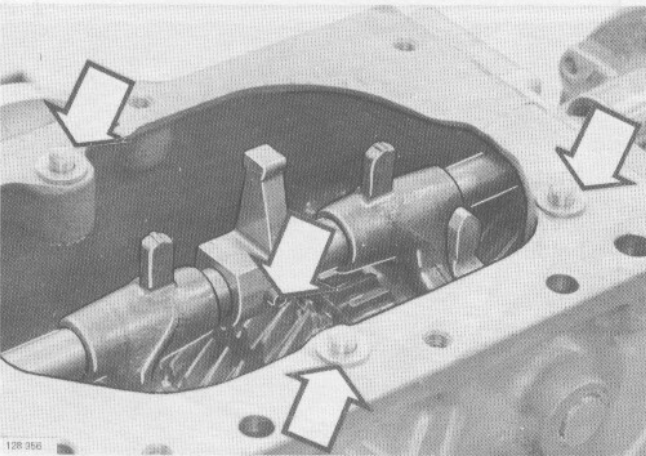
I 5

- Disconnect wires at overdrive solenoid.
- Remove back-up light switch.
- Remove overdrive switch.
- Remove transmission top cover.



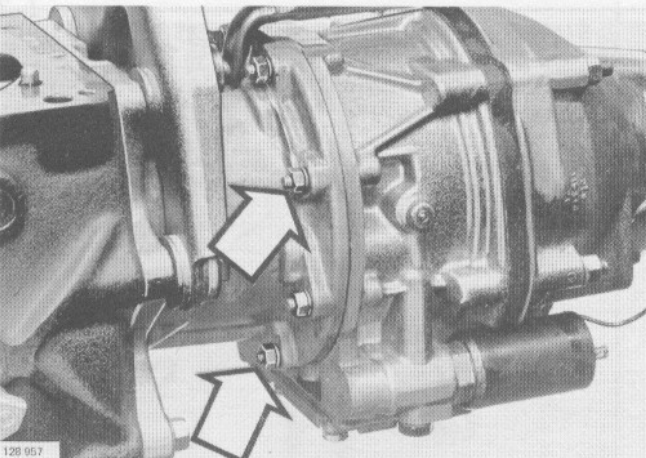
I 6

- Remove detent ball and spring.
- Remove selector plate assembly and return spring.
- Remove gasket.



I 7

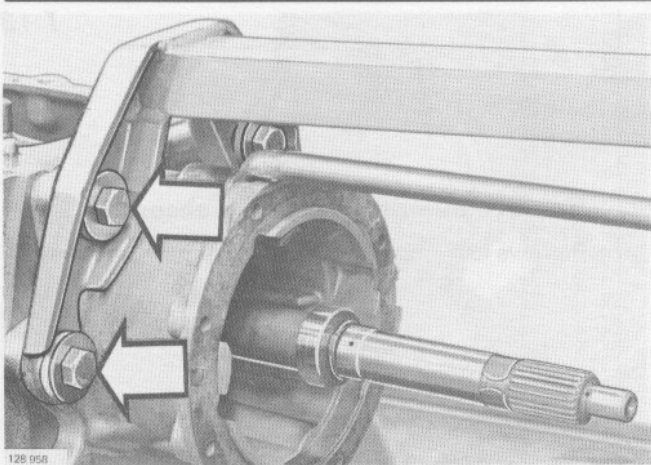
- Remove glide washers for selector plate assembly.
- Remove lock pin for shifter.



I 8

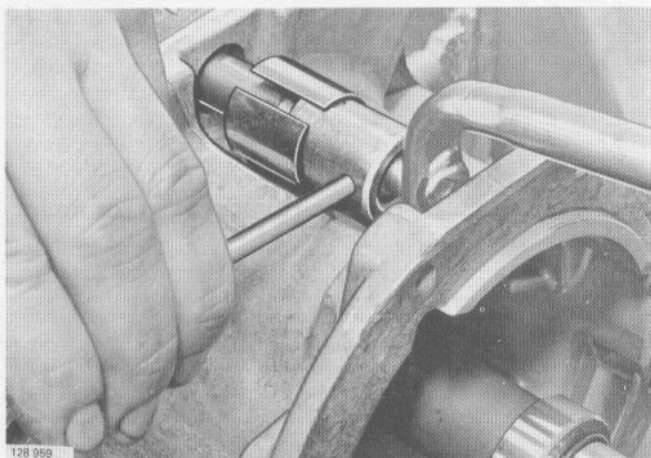
- Remove nuts retaining overdrive to intermediate flange.
- Remove overdrive.

I 9



**Remove gearshift carrier assembly.**

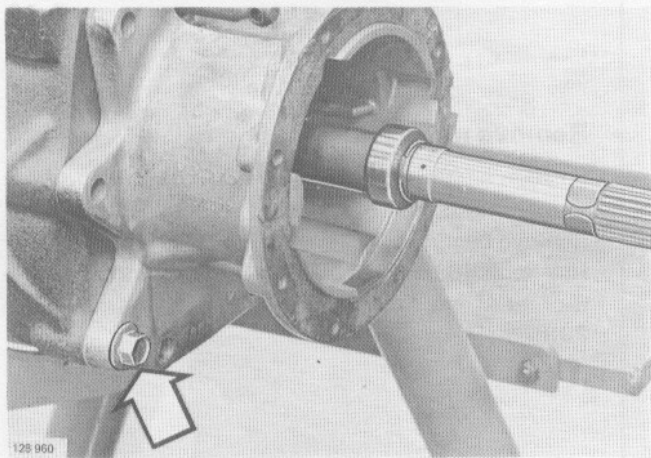
I 10



**Remove.**

- Remove sleeve for gearshift rod joint.
  - Remove gearshift rod.
- First knock out rear pin. Then turn rod and knock out front pin.

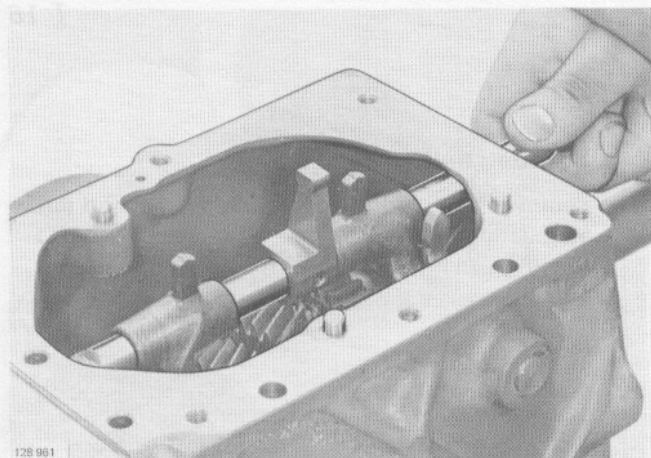
I 11



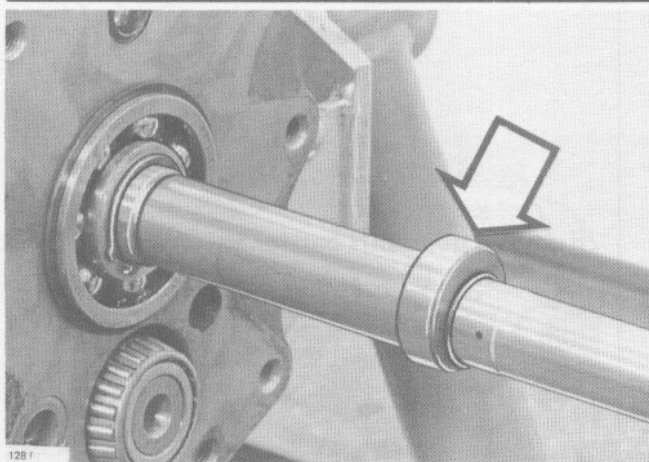
**Remove intermediate housing.**

Remove gasket and shims.

I 12



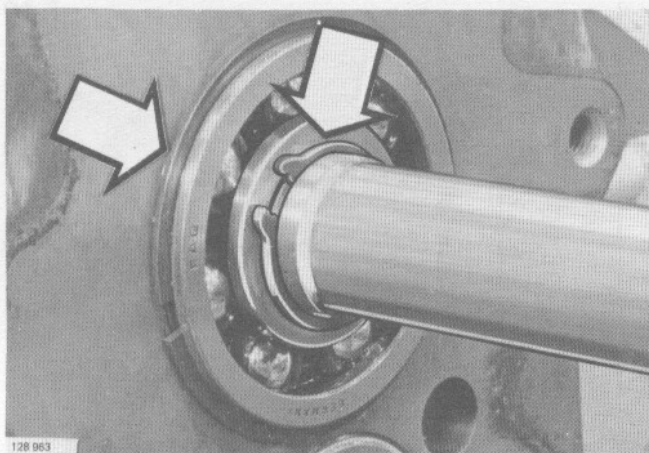
- Remove gear selector rail.
- Remove shifter and shift forks.



I 13

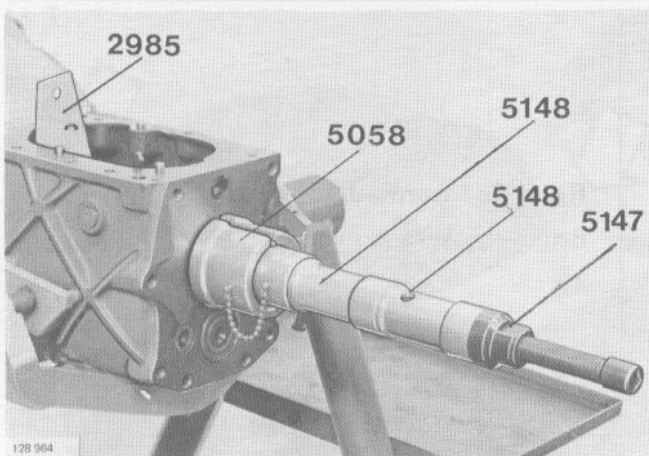
**Remove overdrive oil pump eccentric.**

Remove lock ring and pull off eccentric. Catch key.



I 14

**Remove lock ring and spacer ring for main shaft bearing.**



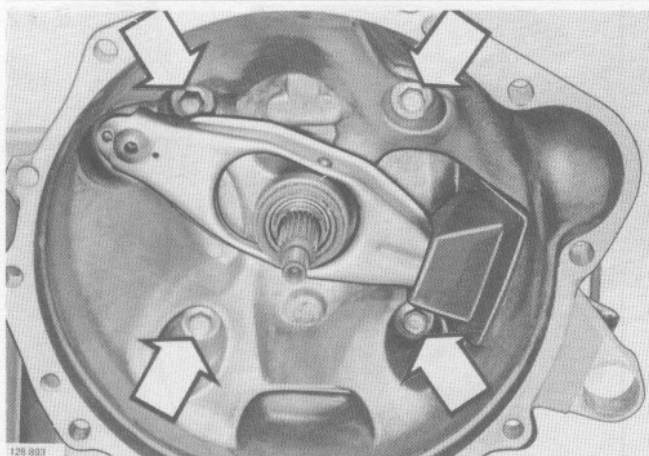
I 15

**Remove main shaft bearing.**

Position adapter **2985** between input shaft and front synchro ring.

Remove bearing spacer ring.

Use tool **5085** + **5148** (2) and **5147** to remove bearing. Remove bearing thrust washer. Let adapter **2985** remain in place.



I 16

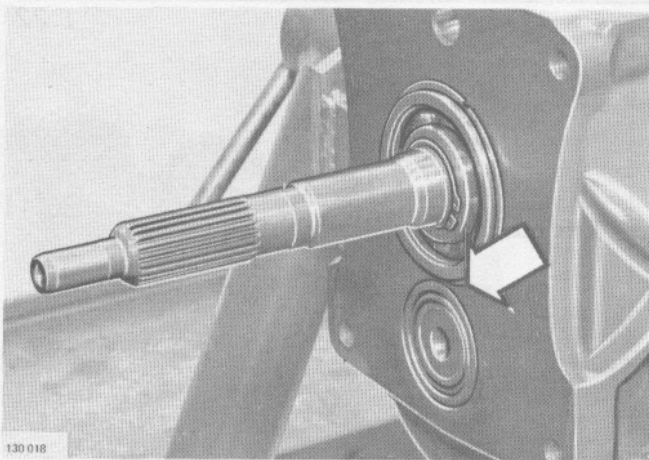
**Remove bell housing.**

Remove clutch fork. Catch spacer washer and throw-out bearing.

Remove bell housing, using 8 mm inhex wrench.

Remove gasket and shims.

I 17

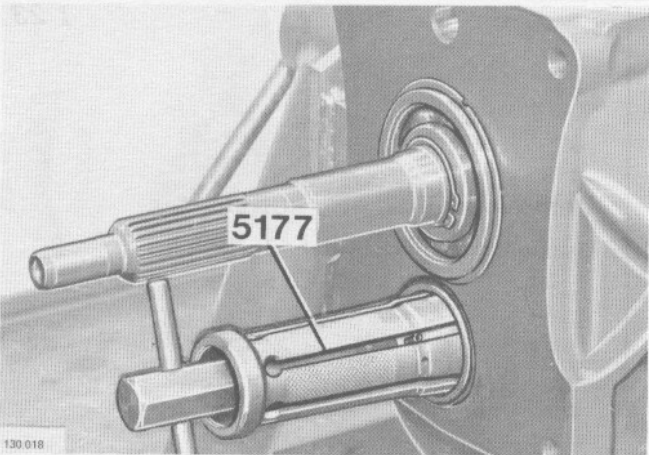


**Cast iron housing:**

**Remove outer races for intermediate shaft bearings.**

First knock intermediate shaft back until rear outer race comes free. Then knock shaft forward until front outer race can be removed.

I 18

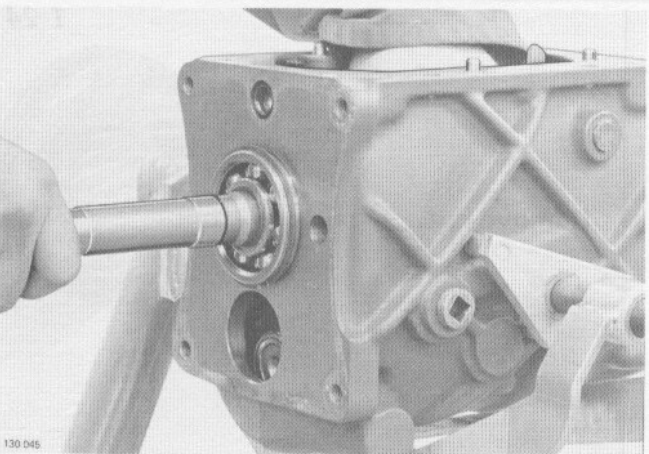


**Aluminum housing:**

**Remove outer races for intermediate shaft bearings.**

Carefully knock intermediate shaft until puller 5177 can grip races.

I 19

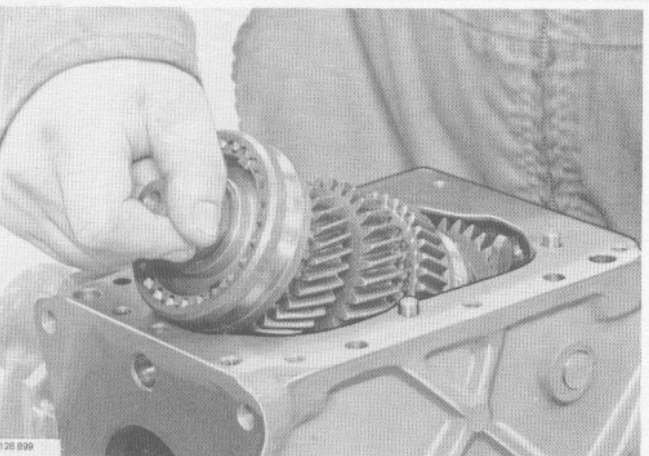


**Pull out input shaft.**

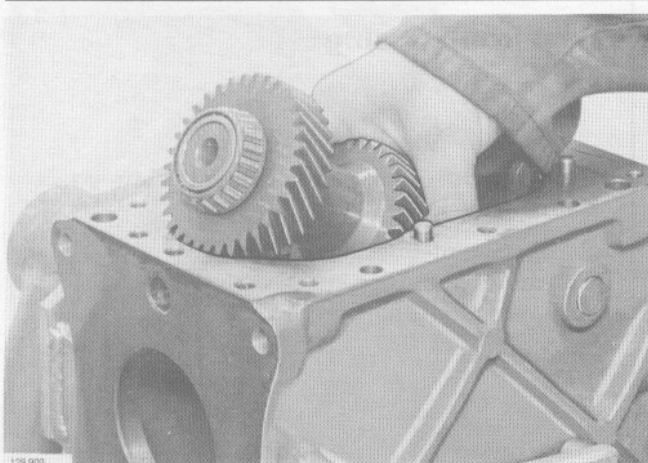
I 20

**Remove 4th gear synchro ring.**

I 21

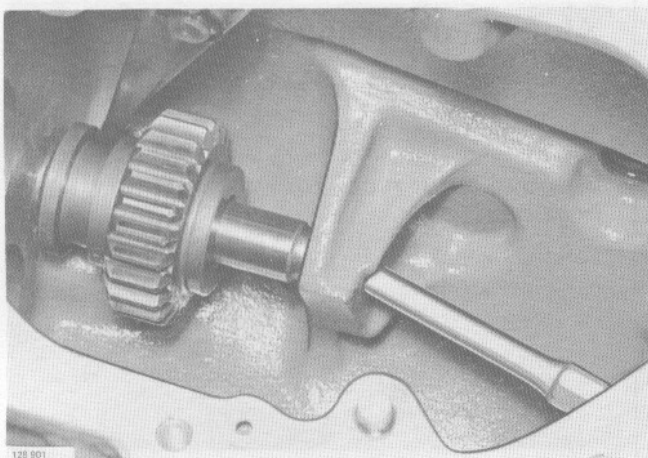


**Lift out main shaft**



I 22

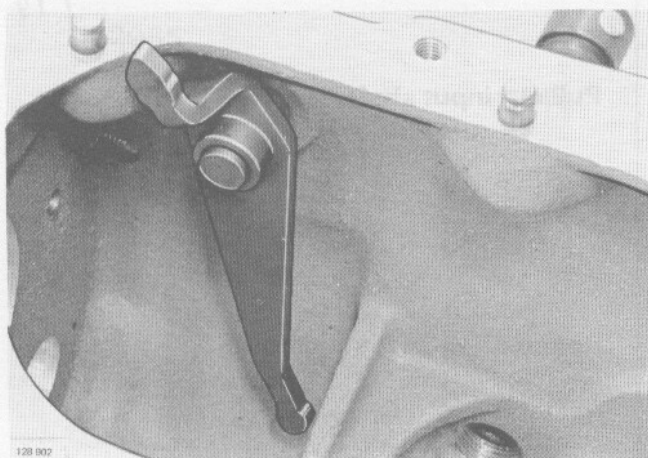
**Lift out intermediate shaft.**



I 23

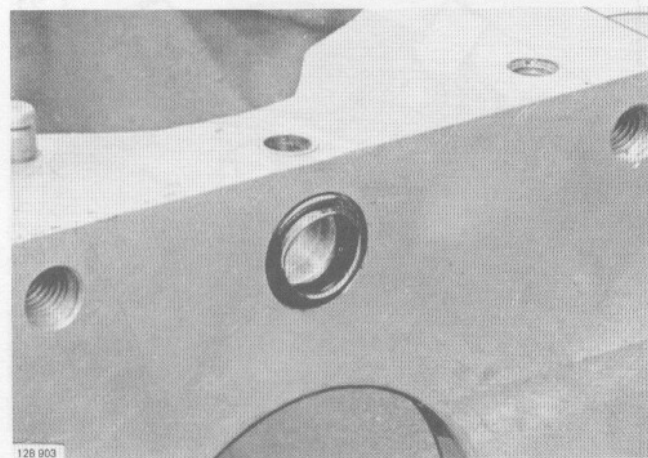
**Remove reverse gear and shaft.**

Use punch to knock shaft back.



I 24

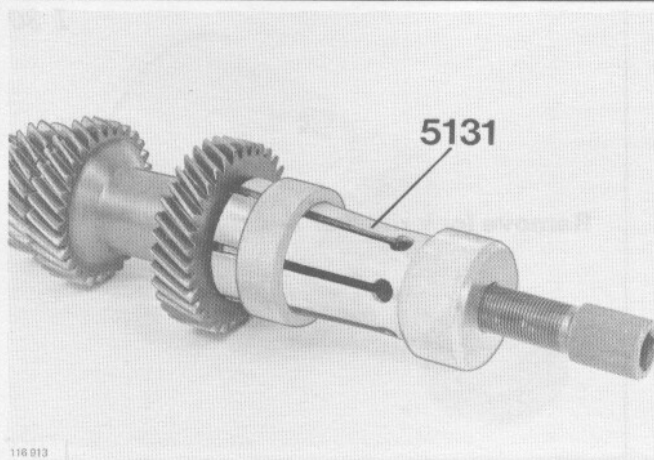
**Remove reverse gear shift fork.**



I 25

**Remove seal for selector rail.**

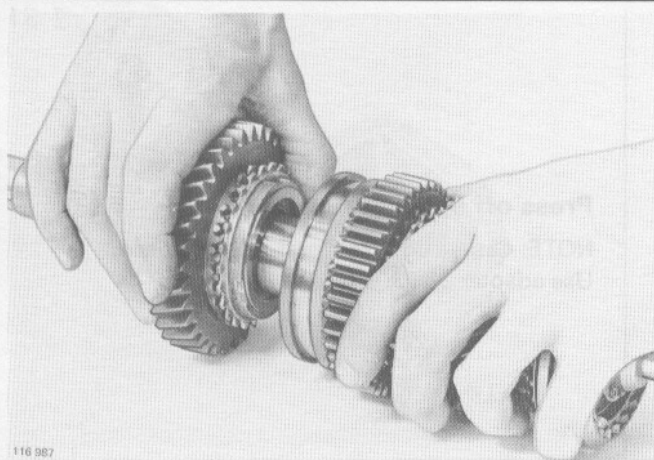
I 26



**Remove intermediate shaft bearings.**

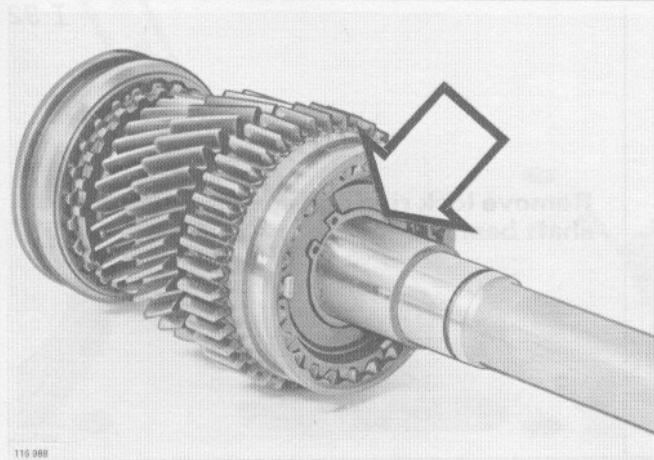
Use puller **5131**.

I 27



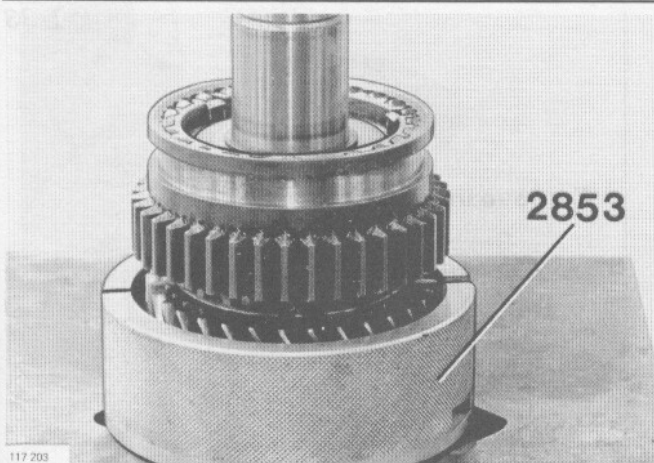
**Remove 1st gear and synchro ring from main shaft.**

I 28



**Remove lock ring for 1–2 synchro hub.**

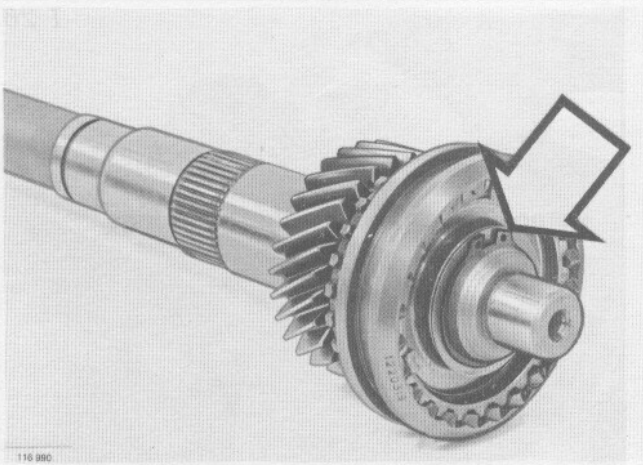
I 29



**Press off synchro hub and gear.**

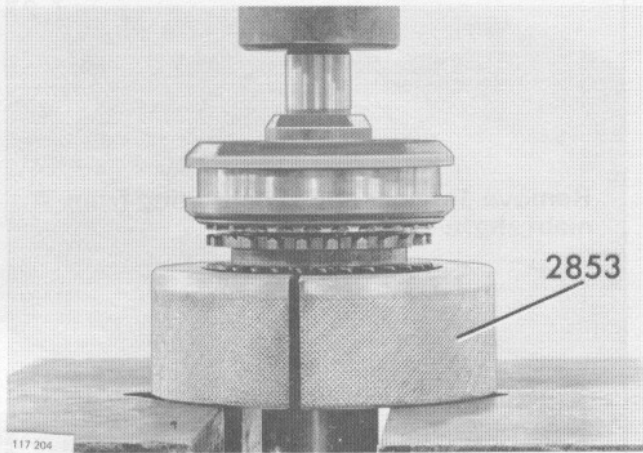
NOTE: Can be tight so a press may be needed.  
Use adapter **2853**.

I 30



Remove lock ring for 3-4 synchro hub.

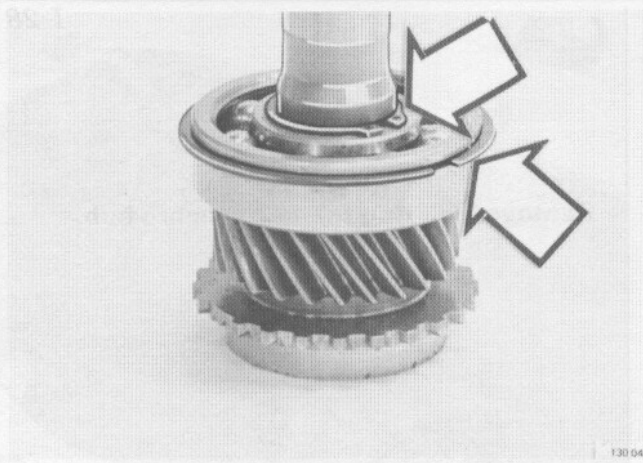
I 31



Press off synchro hub and gear.

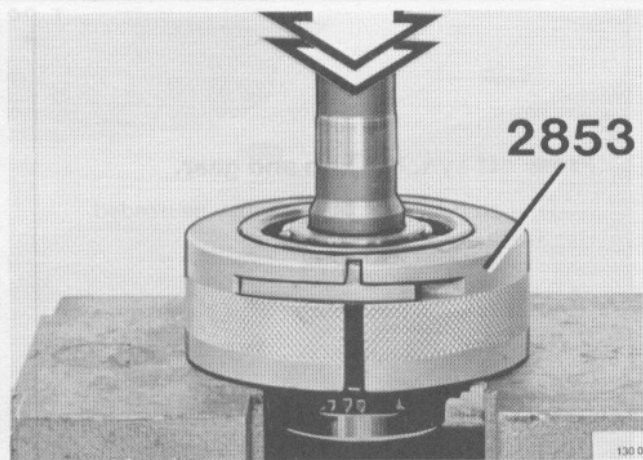
NOTE: Can be tight so a press may be used.  
Use adapter **2853**.

I 32



Remove lock ring and spacer ring for input shaft bearing.

I 33



Remove input shaft bearing.

NOTE: Can be tight so a press may be needed.  
Use adapter **2853**, small hole UP under bearing.

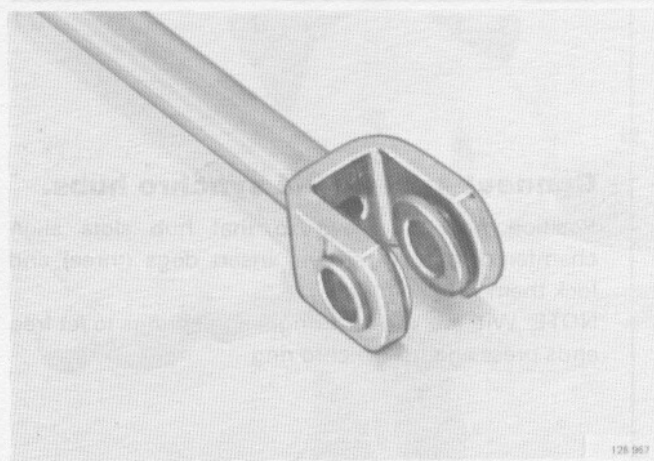


I 34



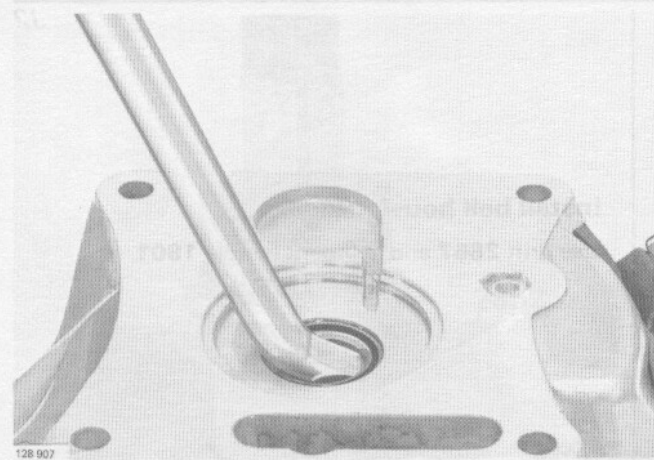
**Remove rubber ring from gearshift rod joint.**

I 35



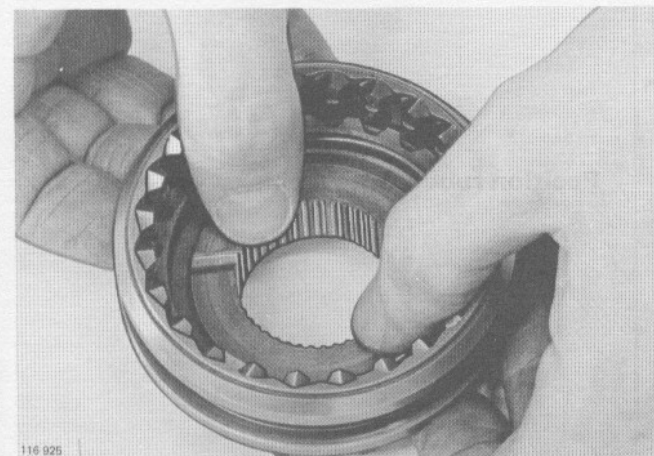
**Remove gearshift rod bushings.**

I 36



**Remove bell housing seal.**

I 37



**Disconnect two synchro hubs.**

Push hubs out of sleeves.

I 38

**Cleaning – checking.**

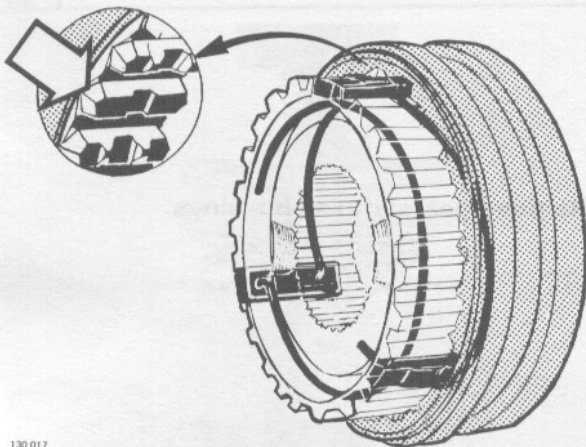
Clean all parts in solvent. Blow clean with compressed air.

Carefully check all parts. Replace worn or damaged parts. Replace gaskets and seals.

## Assembling transmission M 46

### Special tools:

- 1801 Standard handle**
- 2412 Drift**, installing input shaft bearing
- 2831 Press tool**, installing main shaft bearing
- 2852 Adapter**, installing gear and synchro ring
- 2867 Drift**, installing bell housing seal
- 2986 Drift**, installing intermediate shaft bearings
- 5065 Drift**, installing seal on shift selector rail
- 5177 Puller**, intermediate shaft bearings, aluminum housing
- 5180 Drift**, intermediate shaft bearings, aluminum housing

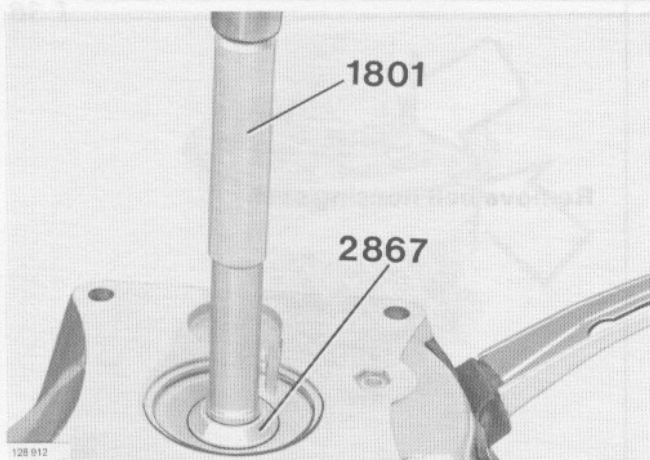


J1

### Connect 1-2 and 3-4 synchro hubs.

Position hub in sleeve so that hub slots align chamfered teeth in sleeve. Insert dogs (three) and lock them with springs.

NOTE: With curved lock ring, align springs to let free ends press against synchro ring.



J2

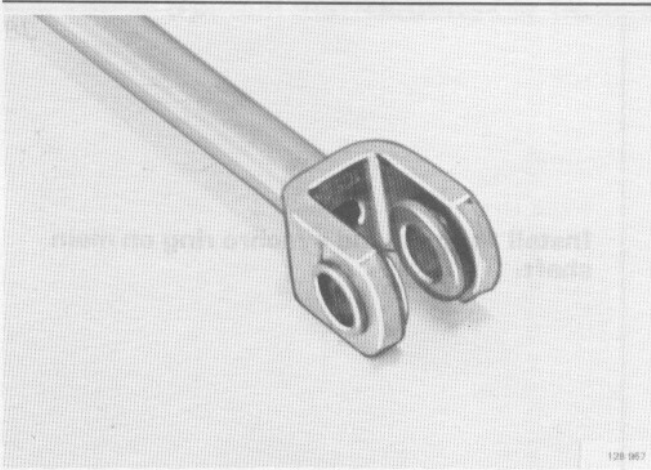
### Install bell housing seal.

Use drift **2867** and standard handle **1801**.



J3

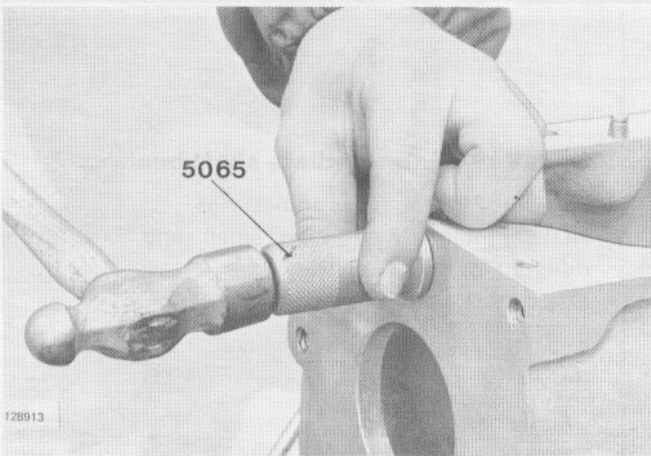
### Position rubber ring in joint.



J4

**Install bushings on gearshift rod.**

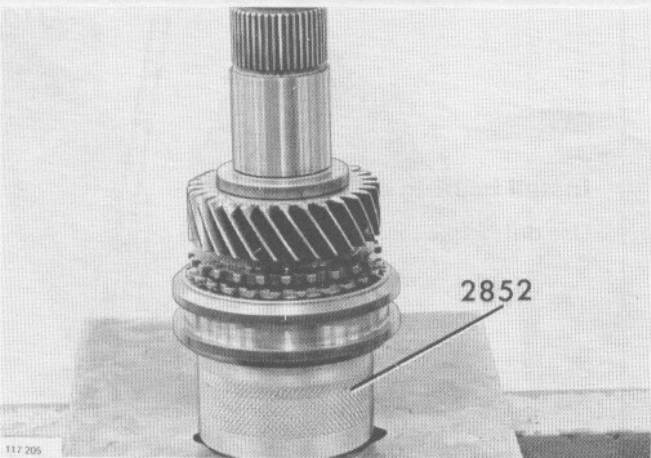
Use grease to retain rubber ring on right side.



J5

**Install seal for selector rail.**

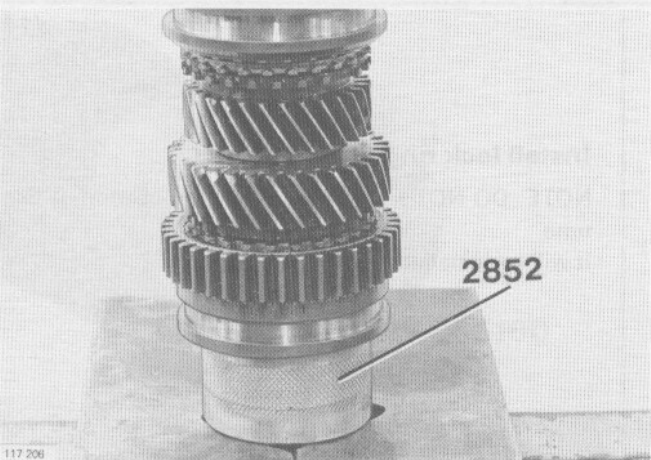
Drift 5065.



J6

**Install:**

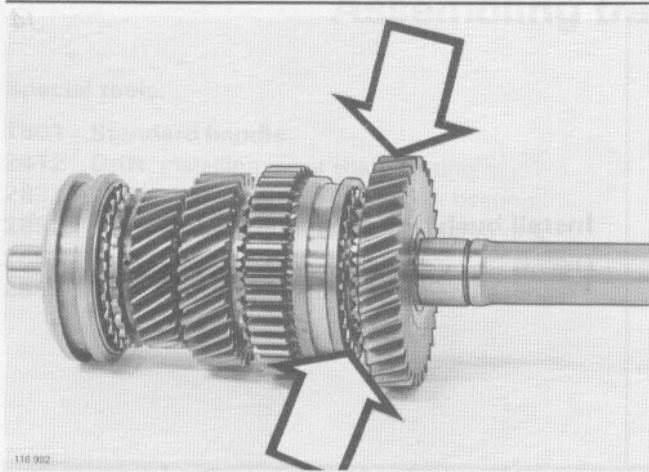
- 3rd gear and synchro ring.
  - 3-4 synchro hubs on main shaft.
  - Lock ring.
- Use adapter **2852** when pressing on gear and hub.



J7

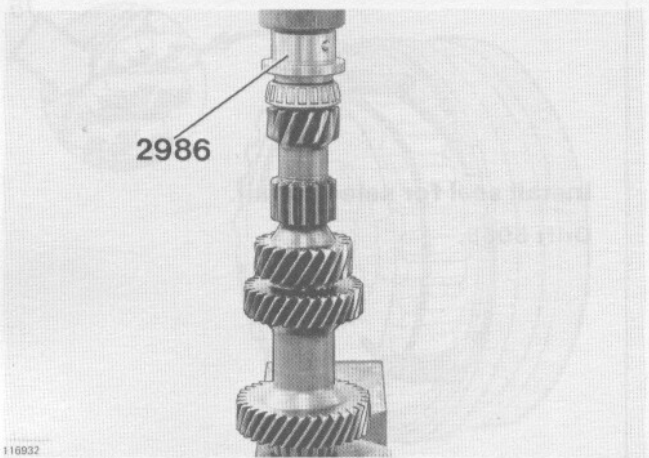
**Install:**

- 2nd gear and synchro hub.
  - 1-2 synchro hub on main shaft.
  - Lock ring.
- Use adapter **2852** when pressing on gear and hub.



J8

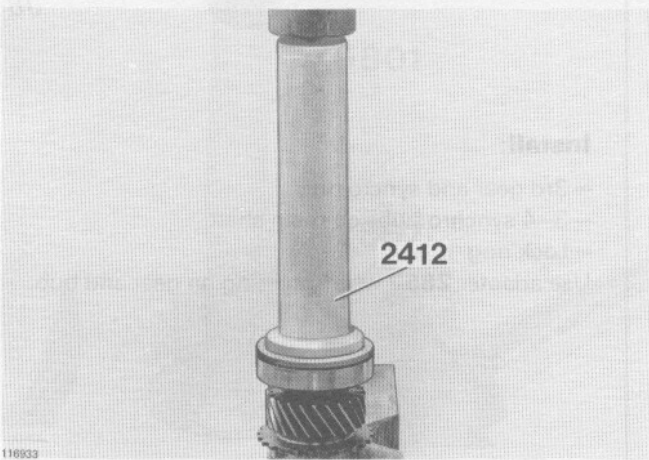
**Install 1st gear and synchro ring on main shaft.**



J9

**Install two intermediate shaft bearings.**

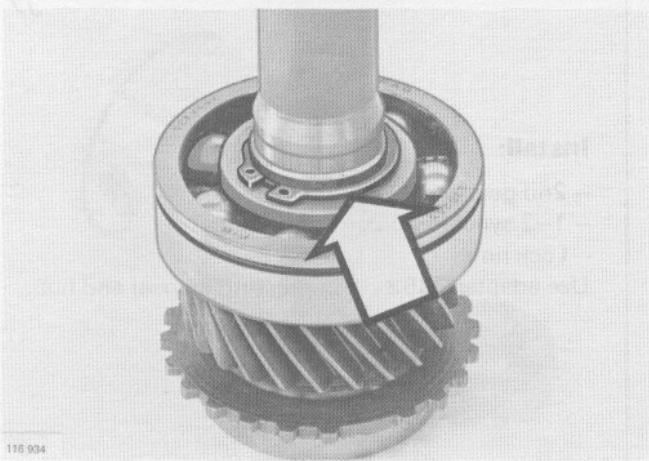
Use drift **2986** to press on bearings.  
NOTE: Intermediate shaft small end bearing is different for diesel applications.  
Use correct type bearings.



J10

**Install bearing on input shaft.**

Use drift 2412 to press on bearing.



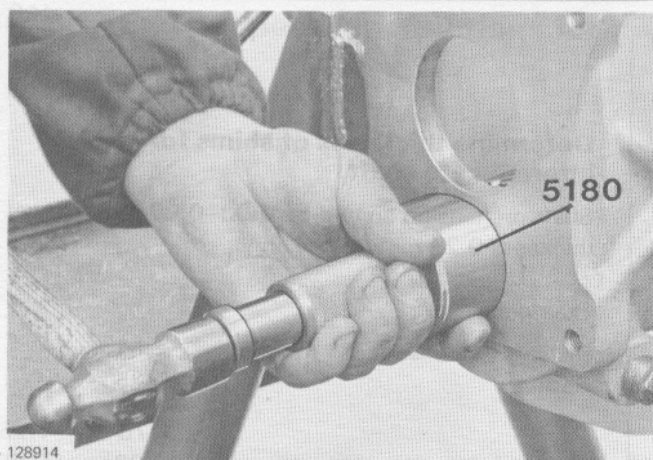
J11

**Install lock ring on input shaft.**

NOTE: DO NOT install spacer ring on bearing at this time.  
It will be installed later on.

## Special instructions for transmissions with aluminum housing

Prior to further assembly, intermediate shaft pre-tension should be determined. Follow operations J12–J21.



128914

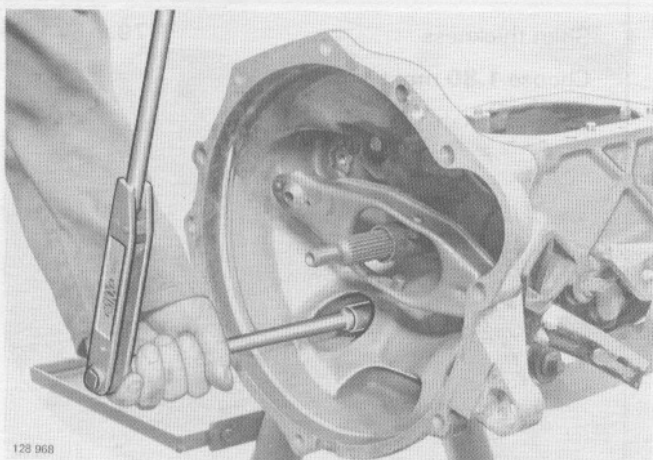
J12

**Position intermediate shaft in housing.**

J13

**Position outer races for intermediate shaft bearings.**

Use drift **5180**, large outer diameter toward race.



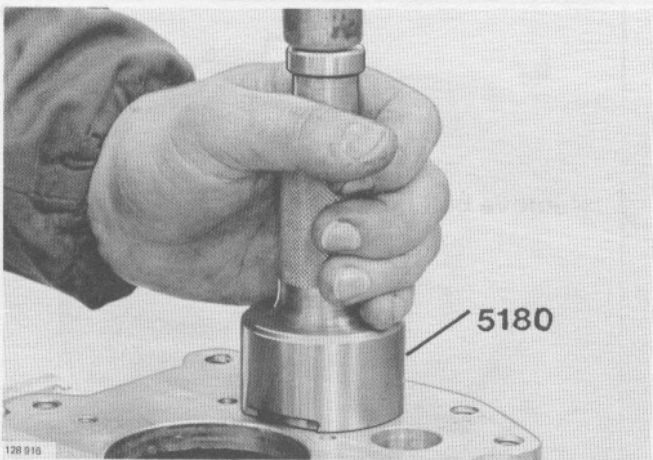
128 968

J14

**Install bell housing with gasket.**

Torque bolts to:

**35–50 Nm = 25–35 ft.lbs.**



128 918

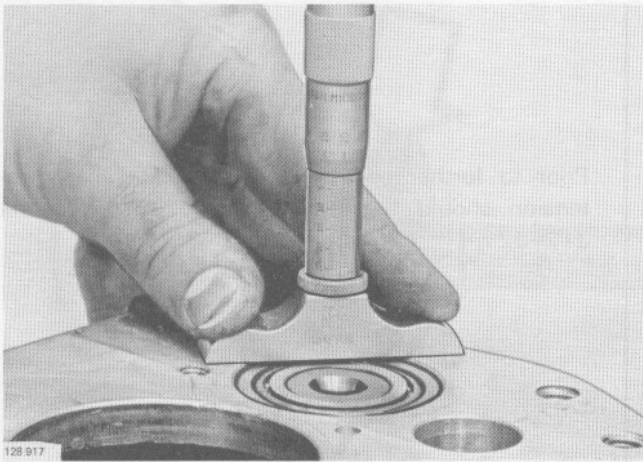
J15

**Turn transmission to vertical position.**

J16

**Eliminate clearance in intermediate shaft bearings.**

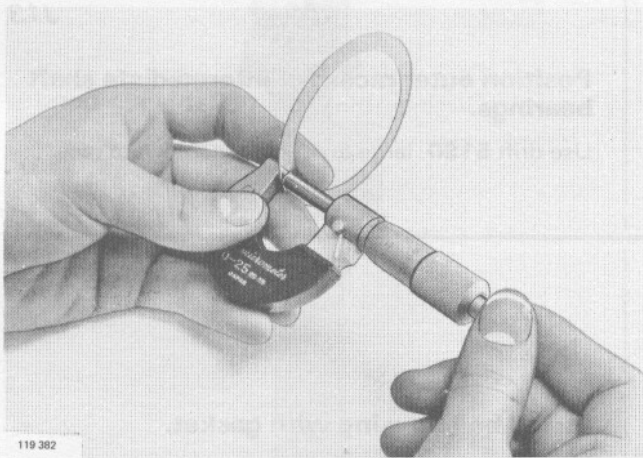
Use drift **5180**, small diameter toward rear race. Hold drift rigidly and knock race with light taps. Repeat while rotating shaft, until all clearance is gone and shaft runs somewhat sluggish.



J17

**Measure distance between intermediate shaft bearing outer race and rear surface of housing.**

Use depth gauge and note reading.



J18

**Determine thickness of shims for intermediate shaft.**

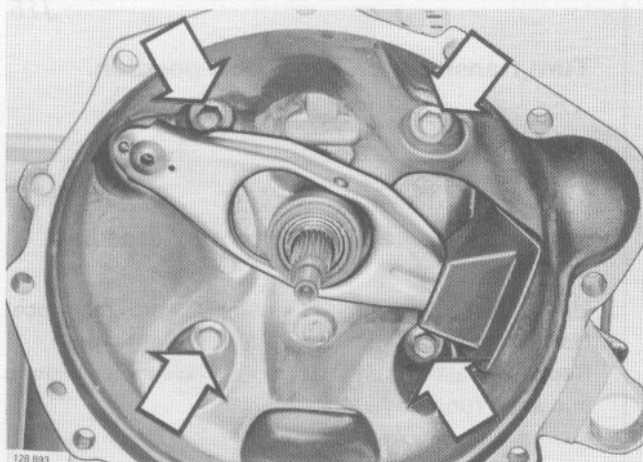
Shaft pre-tension should be 0.03–0.08 mm. Gasket thickness 0.25 mm (metric only).

Example:

Distance, race–surface	1.51	
Gasket	+0.25	
	<hr/>	
	1.76	1.76
Pre-tension	+0.03 to	+0.08
	<hr/>	<hr/>
Shim thickness	1.79 to	1.84

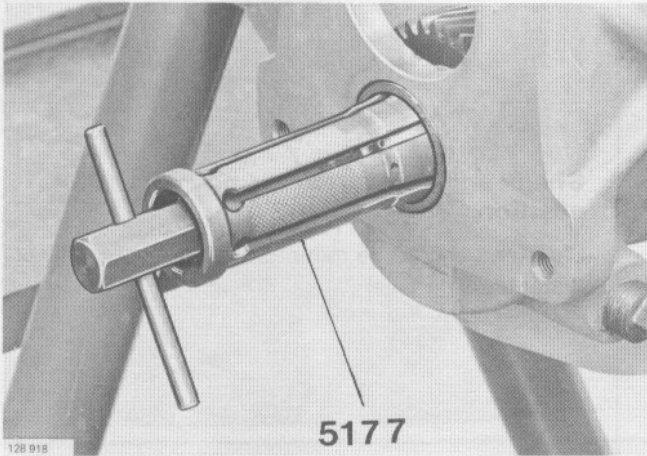
Choose **1.80 mm** shim thickness.

- Shims available:
- 0.05 mm
  - 0.10 mm
  - 0.15 mm
  - 0.35 mm
  - 0.50 mm
  - 0.70 mm
  - 1.00 mm



J19

**Remove bell housing and gasket.**



J20

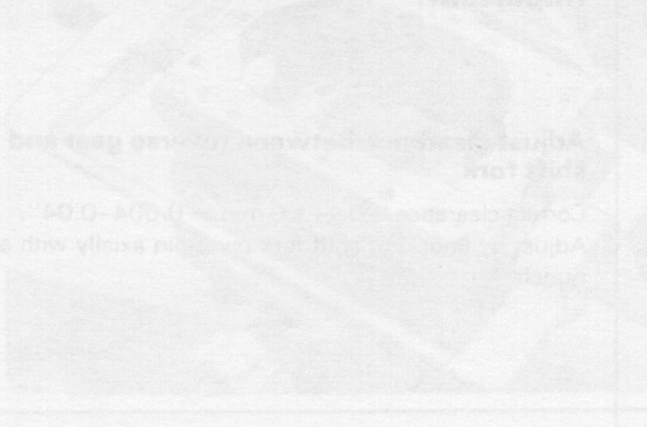
**Remove outer races for intermediate shaft bearings.**

Carefully knock intermediate shaft until puller **5177** can grip races.

J21

**Lift out intermediate shaft.**

**End of special instructions for transmissions with aluminum housing**

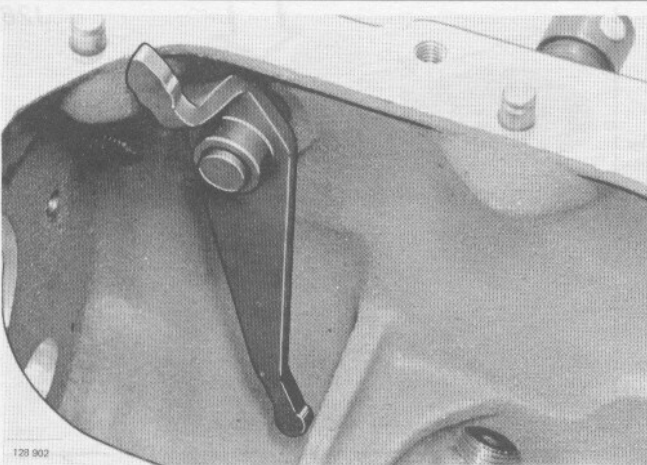


Proceed with assembly, using same operations as for transmission with cast iron housing.

Exception:

- Outer races for intermediate shaft bearings are installed as described above.
- Shim thickness is determined.

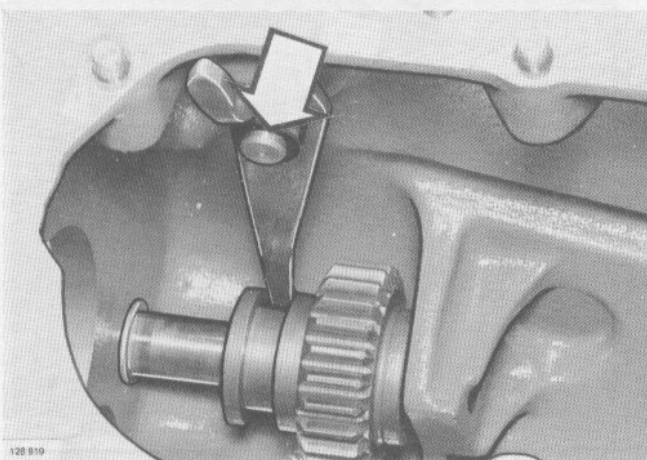
J22



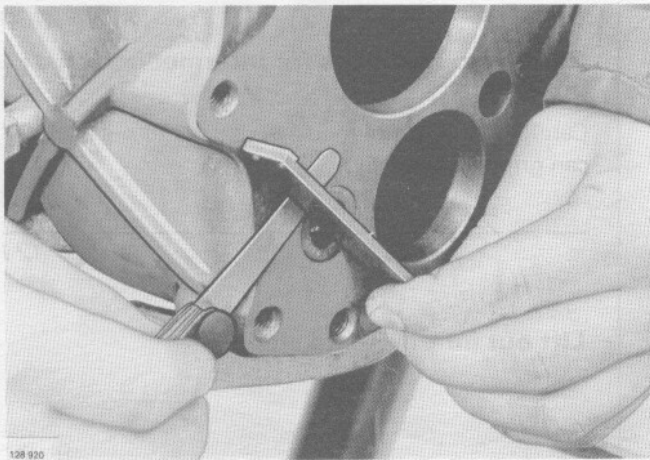
**Install reverse gear shifter.**

Install lock ring.

J23



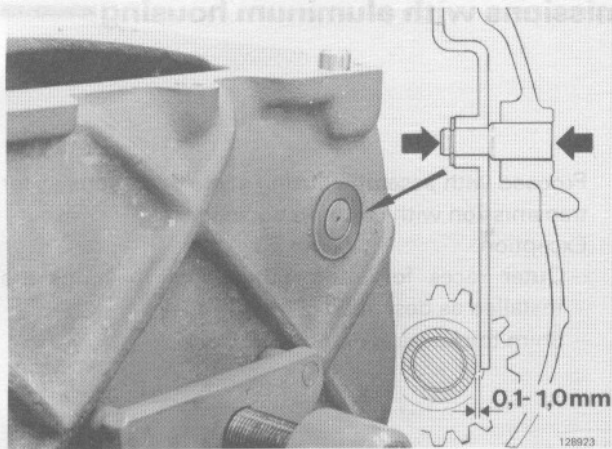
**Install reverse gear and shaft.**



J24

**Check and adjust reverse gear shaft position.**

Shaft end should be minimum 0.05 mm = 0.002'' under housing face.

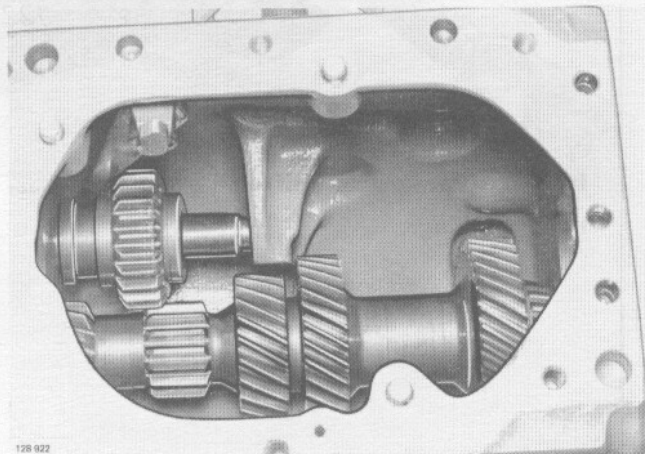


J25

**Important!**

**Adjust clearance between reverse gear and shift fork.**

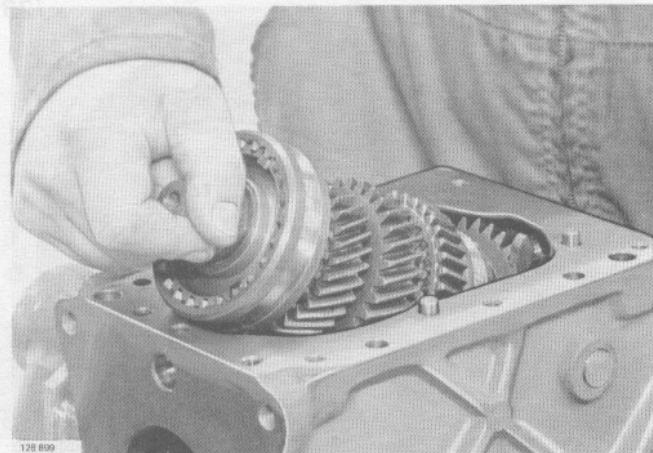
Correct clearance is 0.1–1.0 mm = 0.004–0.04''. Adjust by knocking shift fork pivot pin axially with a punch.



J26

**Position intermediate shaft in housing.**

Position on bottom of housing.

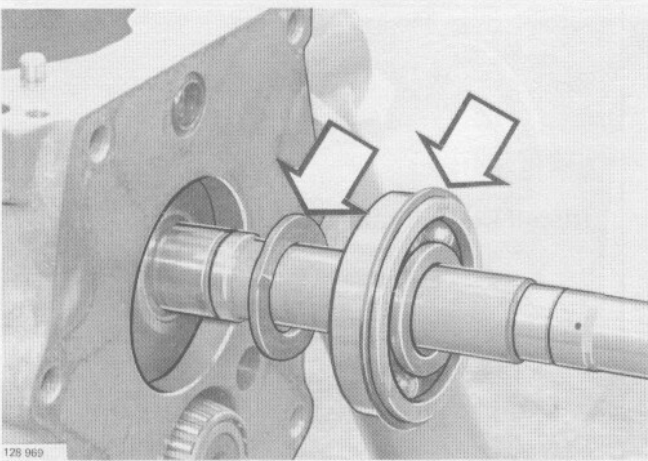


J27

**Position main shaft in housing.**



J28

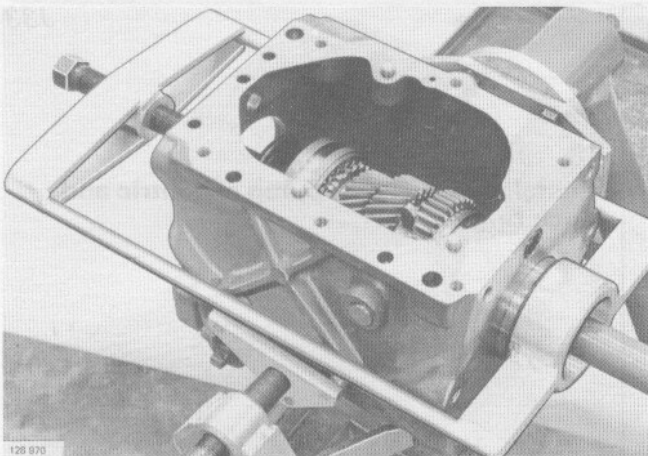


128 969

**Position thrust washer and bearing on main shaft.**

Bearing should be fitted with positioning ring.

J29



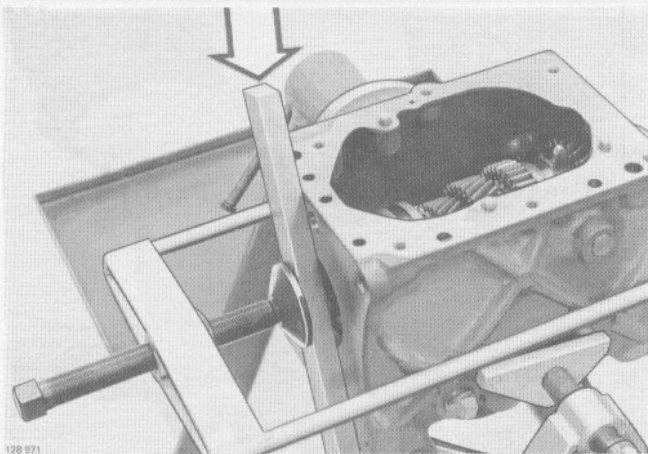
128 970

**Press main shaft bearing into position.**

Use press tool **2831**.

Press reverse gear toward transmission center. Check that no gears coincide and become damaged.

J30

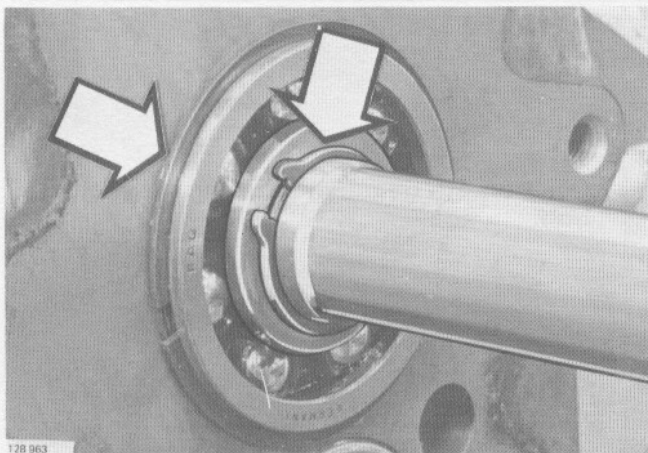


128 971

**Use spacer for tool if bearing does not align correctly.**

Spacer should be positioned between tool spindle and housing front end. Bearing positioning ring should be flush with housing face when bearing is correctly positioned.

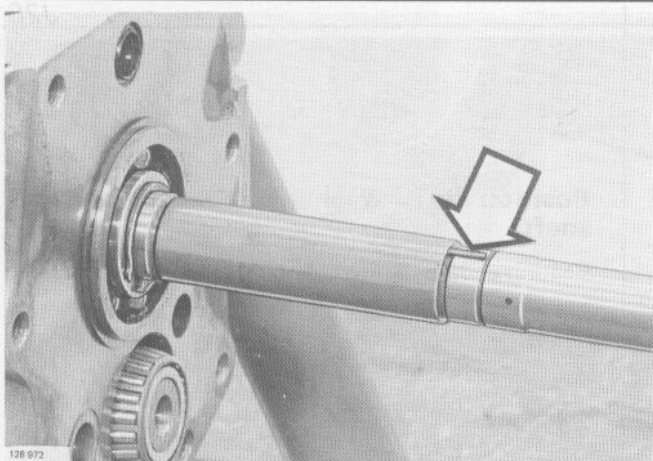
J31



128 963

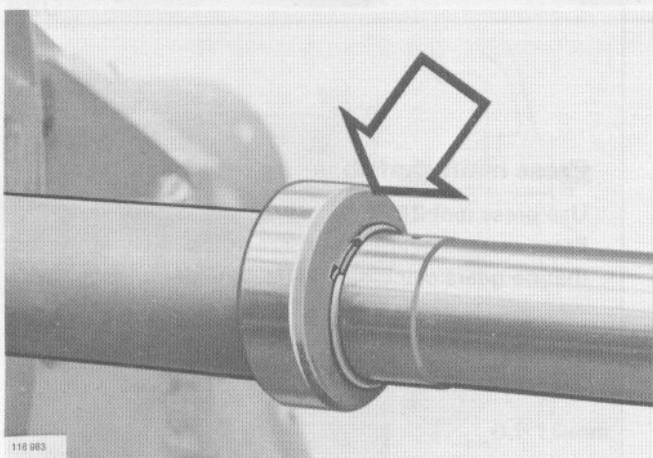
**Install lock ring for main shaft bearing.**

J32



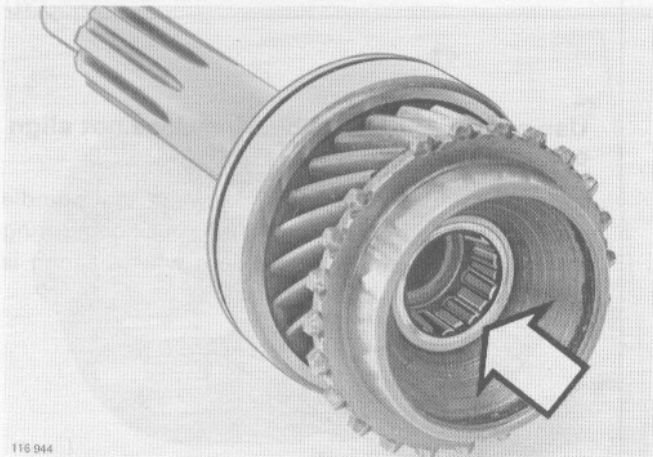
Install key in main shaft keyway.

J33



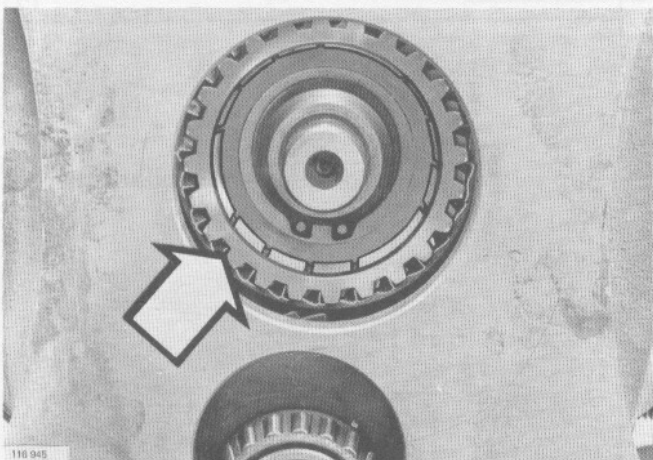
Install overdrive oil pump eccentric and lock ring.

J34

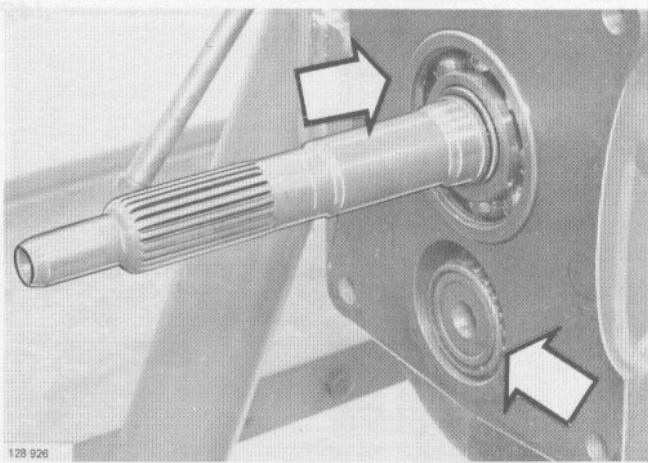


Grease and install roller bearing in input shaft.

J35



Position 4th gear synchro ring in synchro hub.



J36

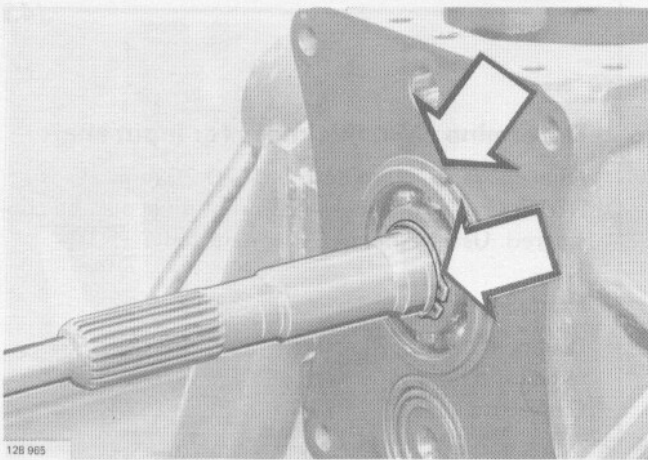
**Attach input shaft to main shaft.**

Push in shaft all the way.

J37

**Lift up intermediate shaft.**

Position shaft so that bearings are correctly positioned in housing.



J38

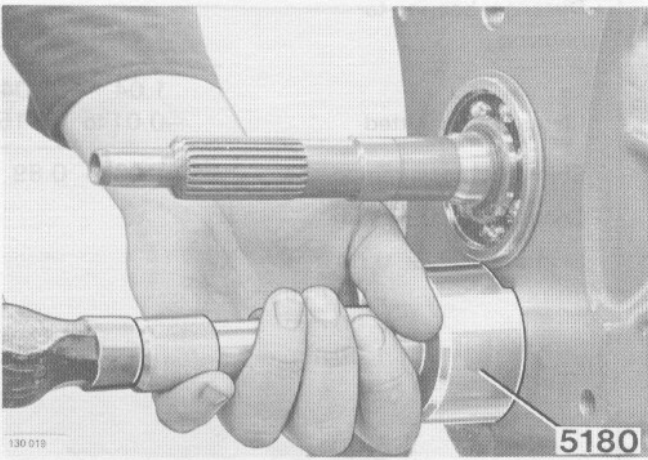
**Pull out input shaft so that spacer ring can be positioned on bearing.**

Then push in shaft again. Spacer ring should lie against housing.

**Cast iron housing:**

J39

**Install outer races for intermediate shaft bearings.**

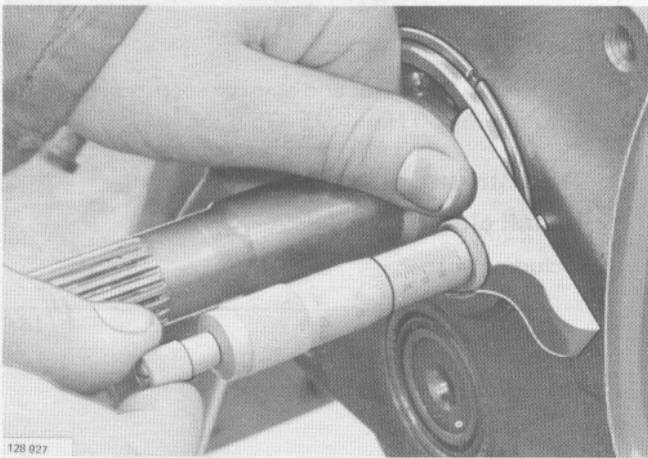


J40

**Aluminum housing:**

**Install intermediate shaft outer bearing races.**

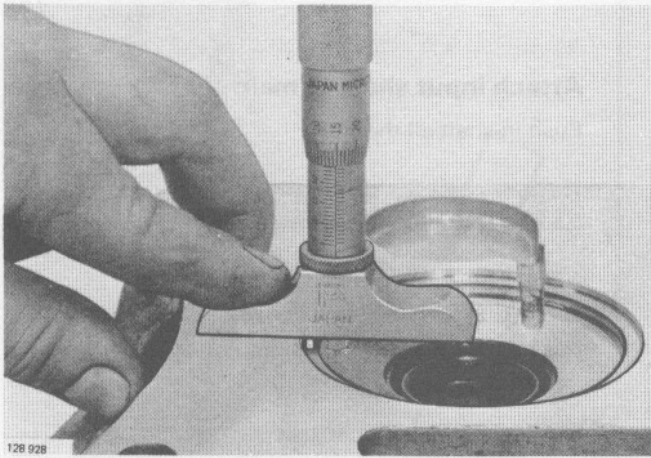
Use drift **5180**, large outer diameter toward bearing races.



J41

**Measure distance between front end of input shaft bearing and housing front surface.**

Use depth gauge. Note reading (metric).

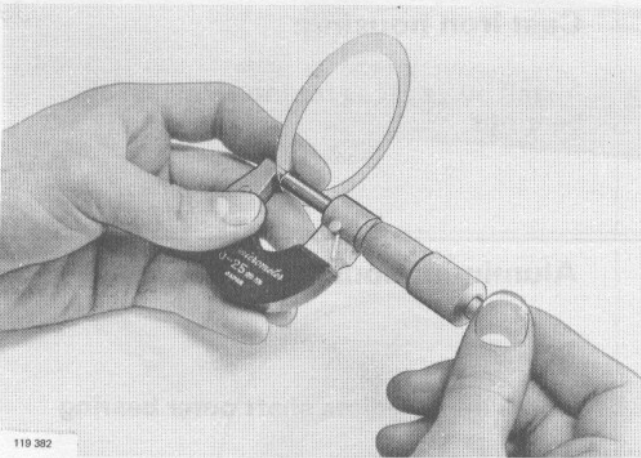


J42

**Measure distance between bell housing surface and bearing seat bottom.**

Use depth gauge. Note reading (metric).

128 928



J43

**Determine shim thickness for input shaft.**

Axial clearance permitted: 0.01–0.20 mm.

NOTE: Gasket thickness 0.25 mm must also be considered. Use metric measurements only.

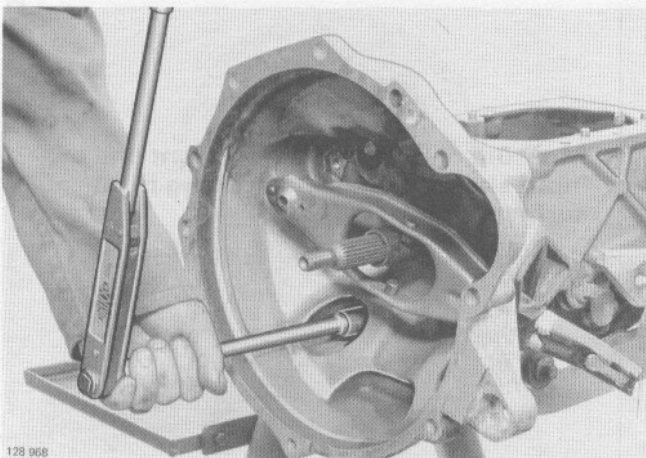
Example:

Distance, flywheel housing to bearing bottom	5.60	
Gasket thickness	+0.25	
	<hr/>	
	5.75	
Distance, bearing to housing	-4.71	
	<hr/>	
	1.04	1.04
Clearance permitted	-0.01 to	-0.15
	<hr/>	
Shim thickness, mm	1.03 to	0.89

Choose shim 0.90 mm.

- Shims available:
- 0.60 mm
  - 0.75 mm
  - 0.90 mm
  - 1.00 mm

119 382



J44

**Install bell housing.**

Use grease on gasket and shim to keep in place.  
Torque: 35–50 Nm = 25–35 ft.lbs.

128 968

**Aluminum housing:**

J45

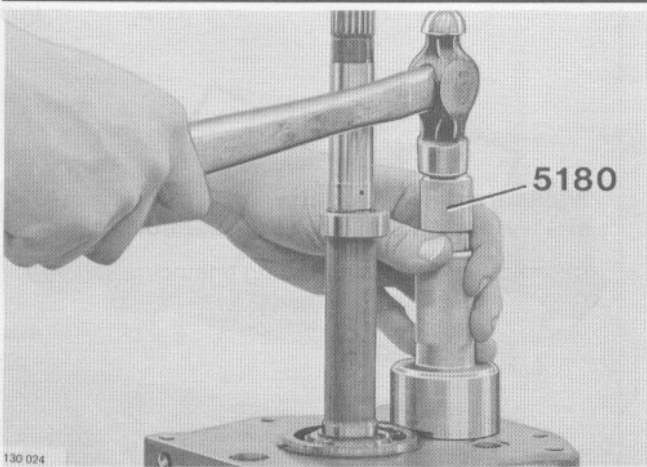
**Install clutch fork.**

Including spacer.

J46

**Install throw-out bearing.**

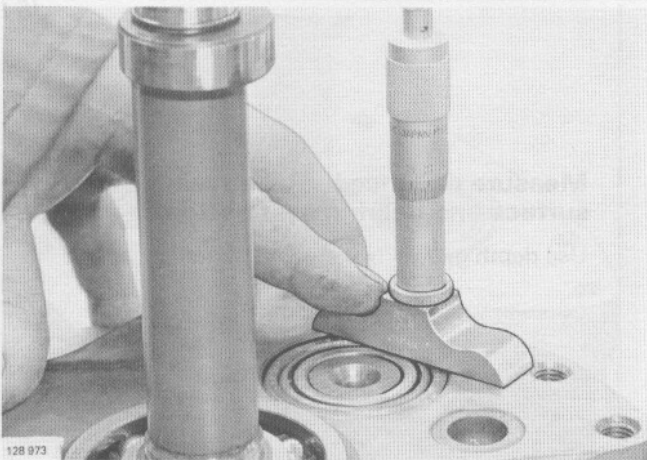
J47

**Aluminum housing:**

**Turn transmission to vertical position. Make sure intermediate shaft bearings have no clearance.**

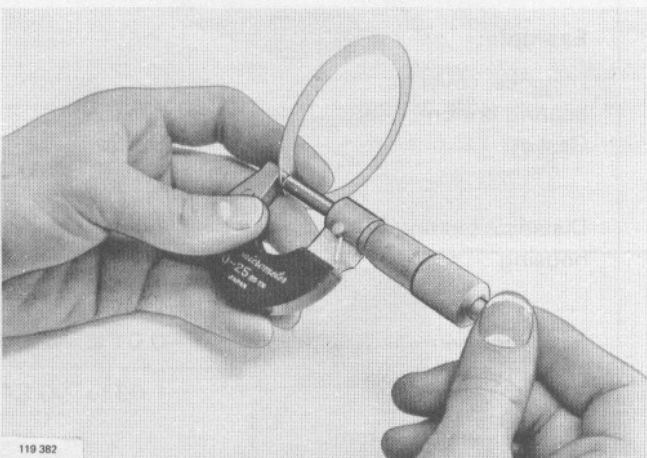
Use drift **5180** with small diameter toward rear bearing race. Hold tool rigidly and knock on race with light taps. Repeat while rotating shaft until all clearance is gone and shaft runs somewhat sluggish.

J48

**Cast iron housing:**

**Turn transmission to vertical position. Measure distance between intermediate shaft bearing outer race and rear surface of housing.** Race should butt rollers. Use depth gauge. Note reading (metric).

J49

**Determine thickness of shims for intermediate shaft.**

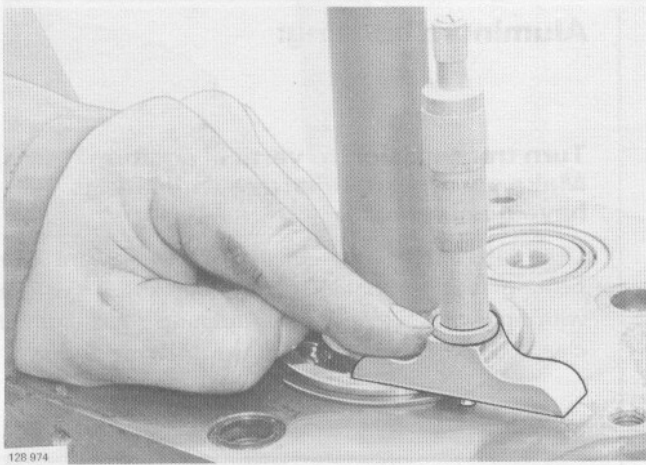
Axial clearance permitted: 0.025–0.10 mm. Gasket thickness: 0.25 mm. Metric only.

**Example:**

Distance, race to surface	1.43	
Gasket	+0.25	
	<hr/>	
	1.680	1.680
Clearance permitted	–0.025	0.100
	<hr/>	
Shim thickness		1.655 to 1.580

Choose 1.65 mm (alt. 1.60 mm).

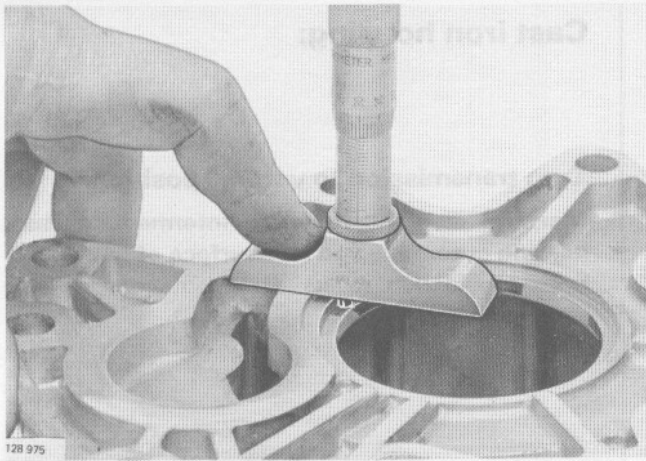
Shims available: 0.05 mm  
0.10 mm  
0.15 mm  
0.35 mm  
0.50 mm  
0.70 mm  
1.00 mm



J50

**Measure distance between front of main shaft bearing and housing rear surface.**

Use depth gauge. Note reading (metric).



J51

**Measure distance between rear cover surface and bearing seat bottom.**

Use depth gauge. Note reading (metric).

J52

**Determine shim thickness for main shaft.**

Axial clearance permitted: 0.01–0.20 mm. Gasket thickness: 0.25 mm.

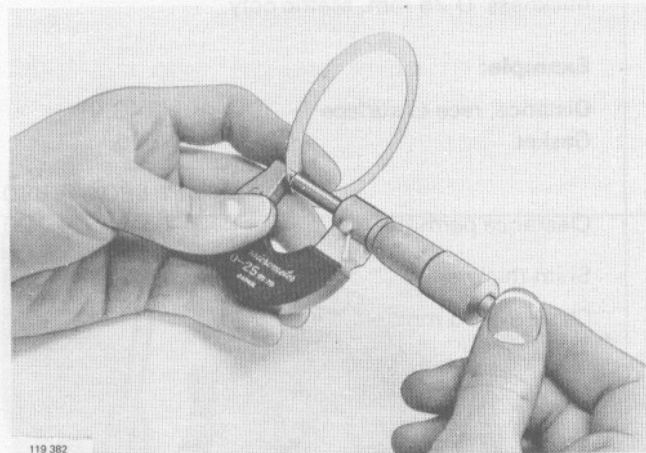
**Example:**

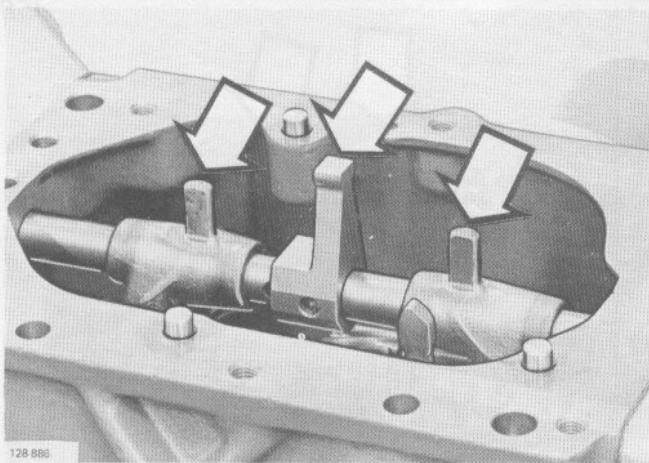
Distance, cover to bearing bottom	5.50	
Gasket	+0.25	
	<hr style="width: 50px; margin-left: auto; margin-right: 0;"/>	
	5.75	
Distance, bearing to housing	-4.71	
	<hr style="width: 50px; margin-left: auto; margin-right: 0;"/>	
	1.04	1.04
Clearance permitted	-0.01 to	<hr style="width: 50px; margin-left: auto; margin-right: 0;"/>
	-0.20	
Shim thickness	1.03 to	0.84

Choose shim 0.90 mm

- Shims available: 0.60 mm
- 0.75 mm
- 0.90 mm
- 1.00 mm

J48





J53

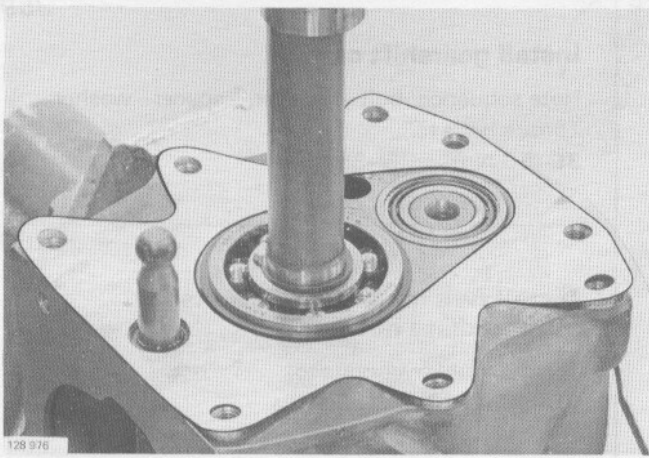
**Install shift forks.**

Make sure lugs position correctly.

J54

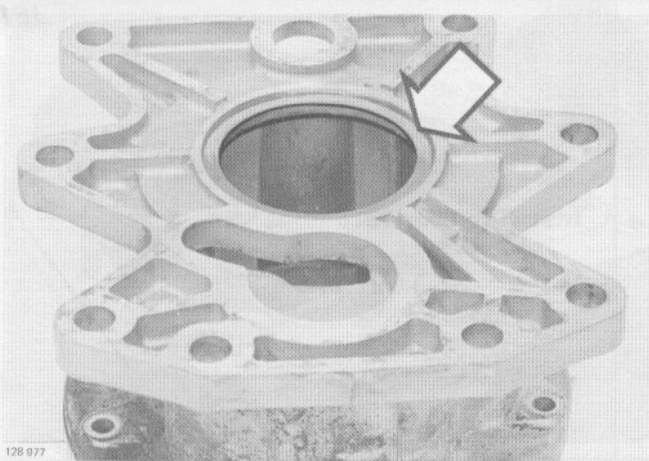
**Install shifter and gear selector rail.**

Shifter boss forward.



J55

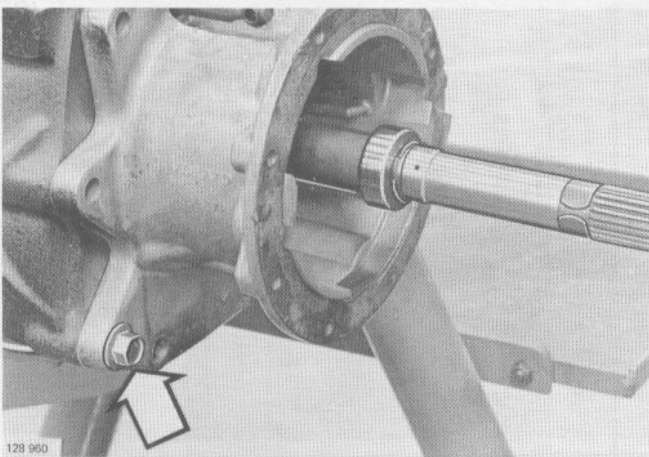
**Position gasket and shim pack for intermediate shaft.**



J56

**Position main shaft shim pack in intermediate housing.**

Apply grease to shim to keep in place.

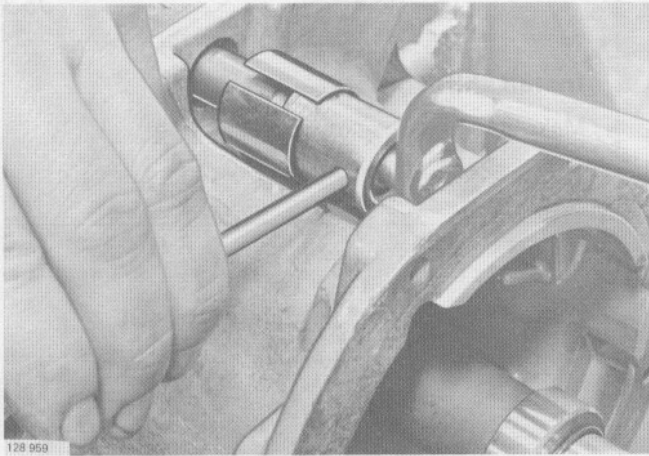


J57

**Install intermediate housing.**

Install two outer (lower) bolts finger tight.

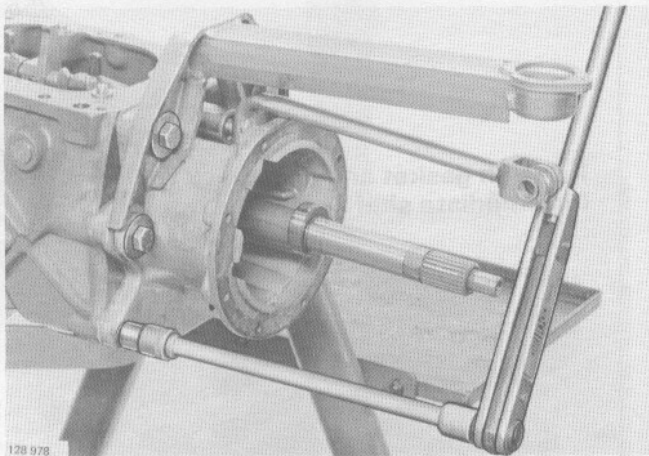
J58



**Install gearshift rod.**

Install sleeve on joint.

J59



**Install gearshift carrier.**

Note sequence: bolt – washer – spacer – washer

Torque bolts to:

**35–50 Nm = 25–35 ft.lbs.**

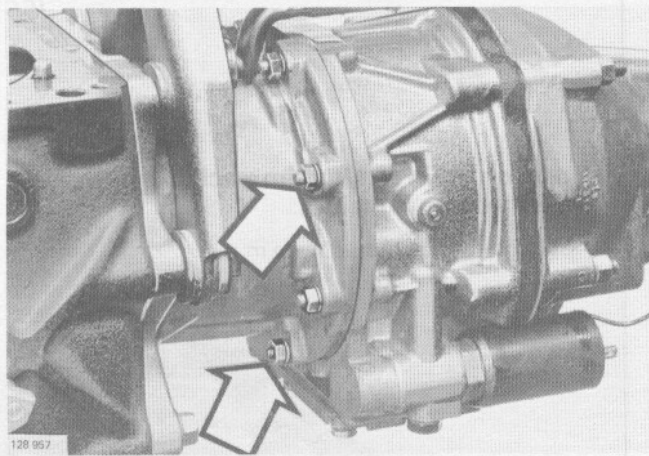
J60

**Install two inner (lower) bolts for intermediate housing.**

Torque four lower bolts to:

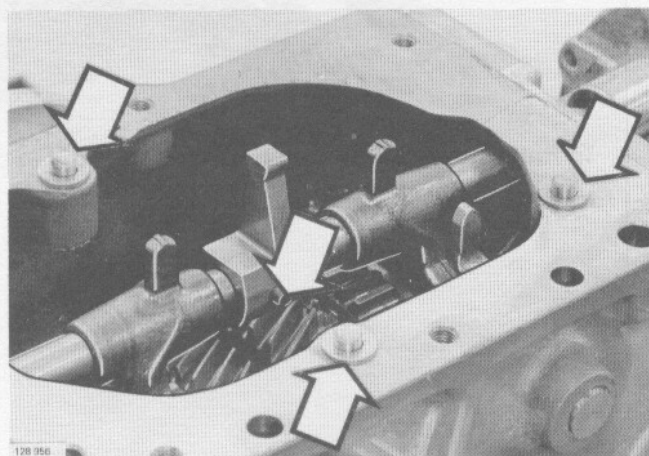
**35–50 Nm = 25–35 ft.lbs.**

J61



**Install overdrive.**

J62

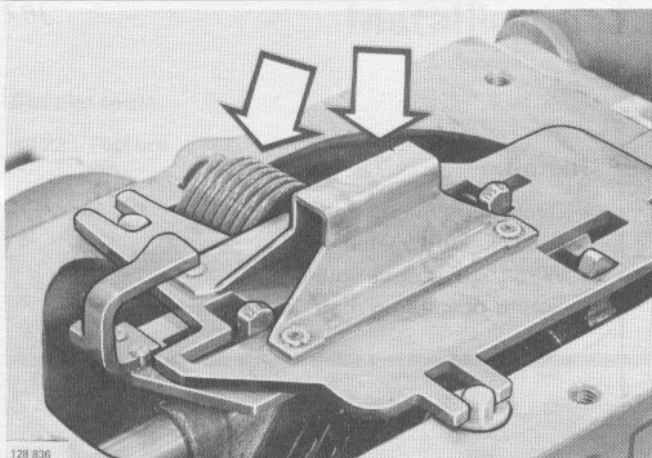


**Install:**

- Lock pin for shifter.
- Glide washers for selector plate assembly.



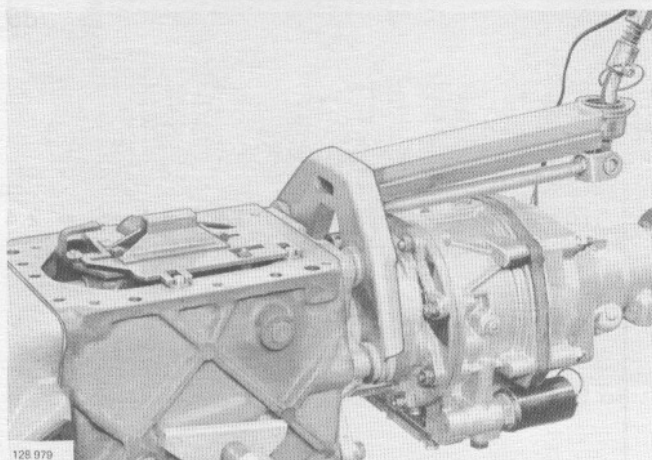
J63



128 836

**Install selector plate assembly and return spring.**

J64



128 979

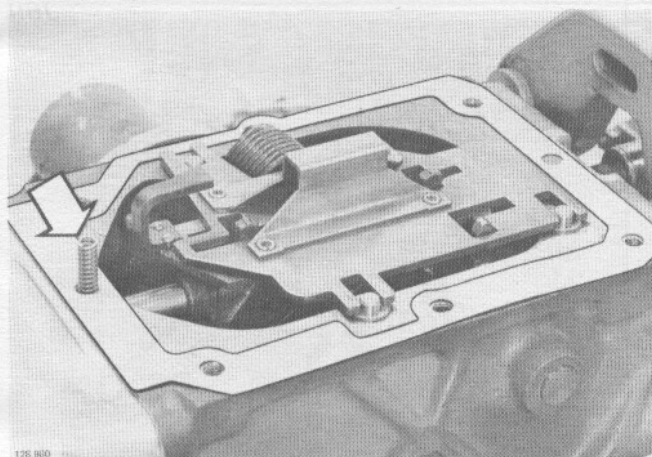
**Check operation.**

Install gearshift lever without lock screw and lock ring.

Hold selector plate assembly with palm. Check gearshift operation, correct as necessary.

Remove gearshift lever.

J65

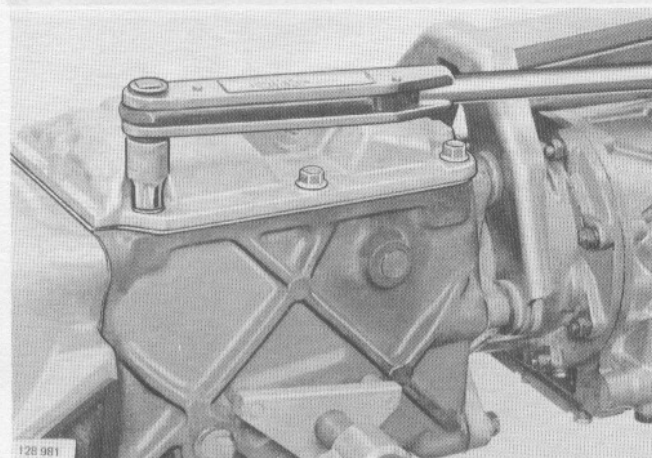


128 900

**Install:**

- Detent ball and spring.
- New top cover gasket.

J66

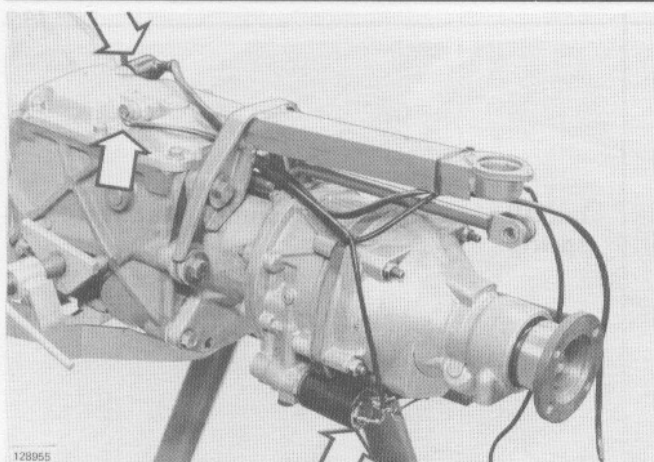


128 981

**Install top cover.**

Torque bolts to:

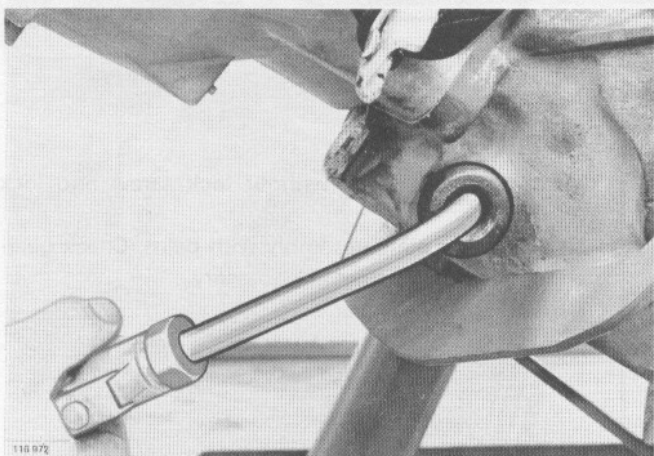
15–25 Nm = 11–18 ft.lbs.



J67

**Install:**

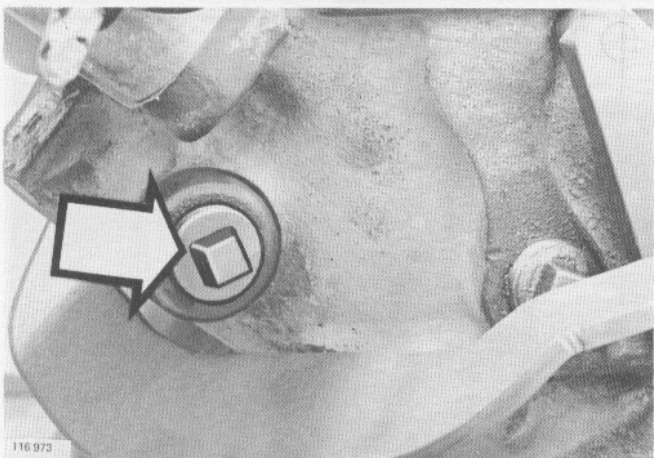
- Overdrive switch.
- Back-up light switch.
- Wires at overdrive solenoid.
- Sound deadening material on gearshift carrier.



J68

**Fill oil.**

Lower transmission rear and. Fill **2.3 liters** = 2.4 US qts of Automatic Transmission Fluid, F or G.



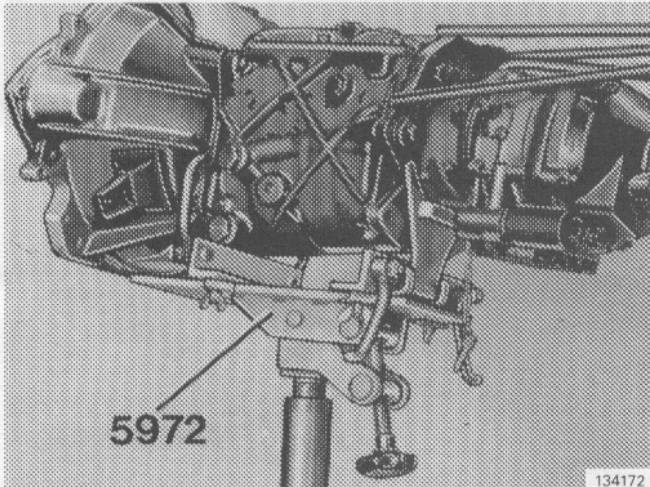
J69

Install level plug.

## Installing transmission M 46

### Special tools:

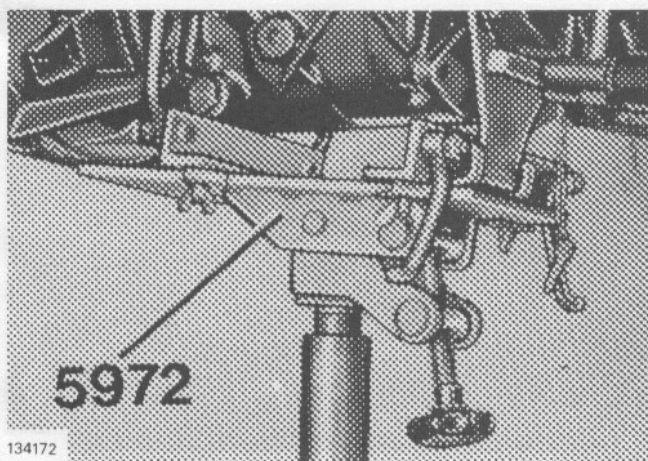
5972 Fixture



K1

### Position transmission and fixture 5972 assembly on lifting device.

Fixture in rear position to secure transmission rigidly on fixture.



134172

K2

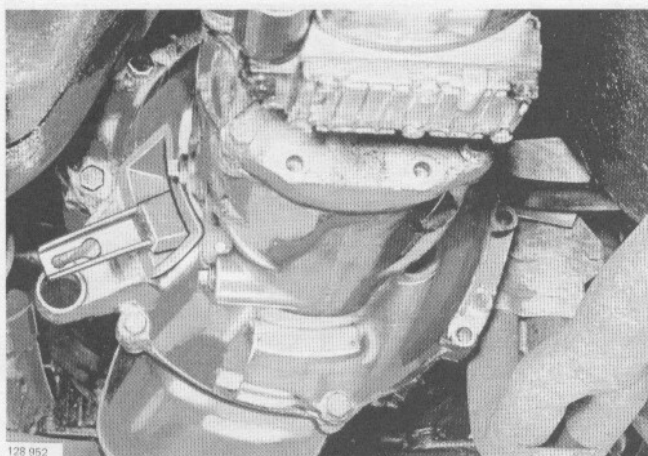
### Install transmission.

Check that throw-out bearing is correctly positioned in fork.

Raise transmission. Turn transmission to be free from propeller shaft when pushing it in from rear.

Install two lower bolts at bell housing.

Remove fixture and lifting device.

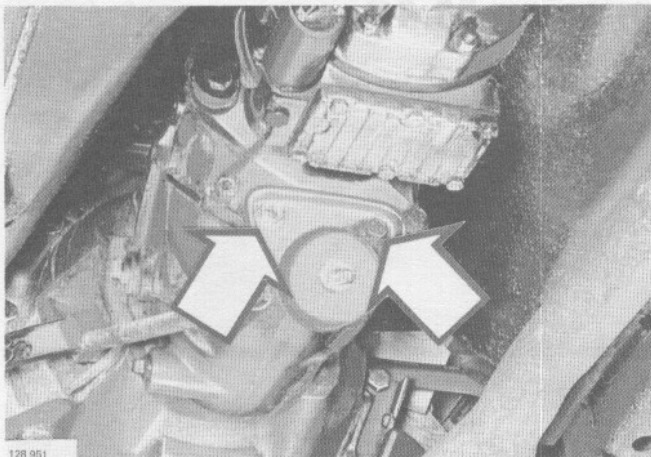


128 952

K3

### Install:

- Starter motor and tighten retaining bolts.
- Front exhaust pipe bracket. Two bolts at bell housing, one nut at exhaust pipe.
- Remaining bolts for bell housing.
- Rubber rings for front muffler.



**As appropriate:**

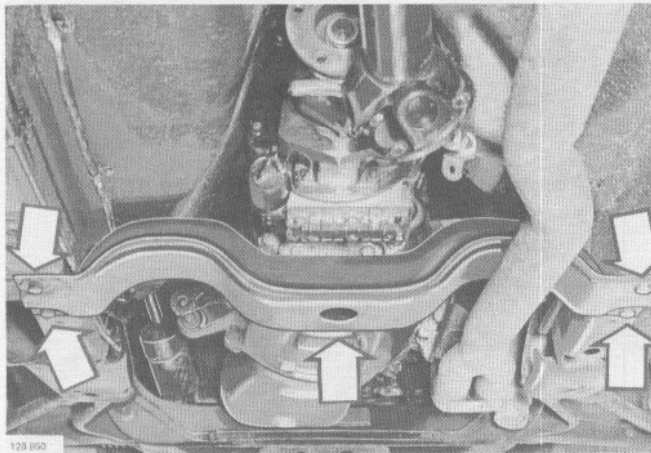
K4

**Attach clutch cable.**

Hook on return spring.

K5

**Install bracket for rubber cushion.**



K6

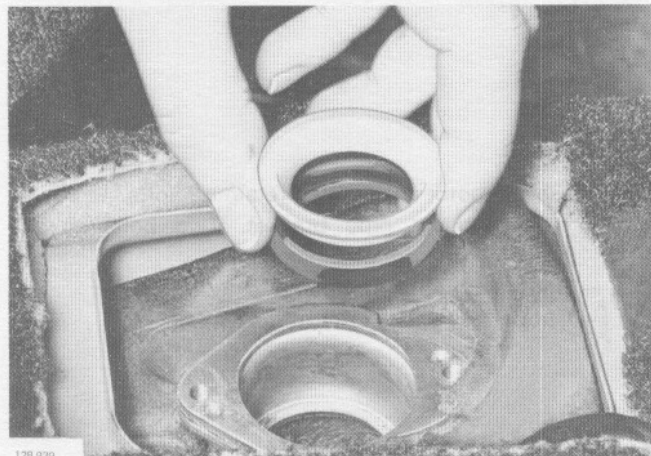
**Install cross-member assembly.**



K7

**Install:**

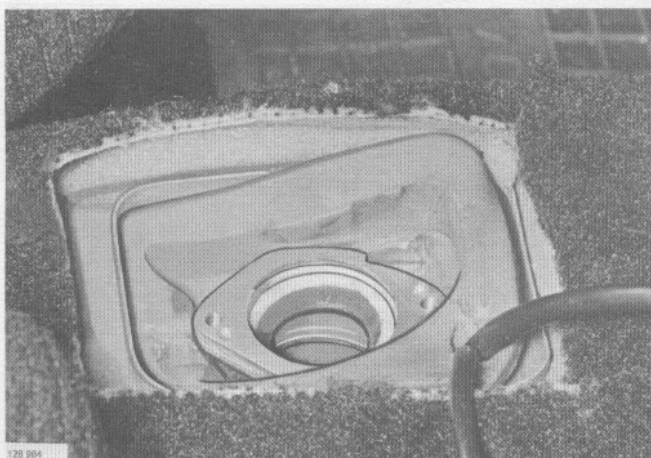
- Propeller shaft to transmission drive flange.
- Speedometer cable.



K8

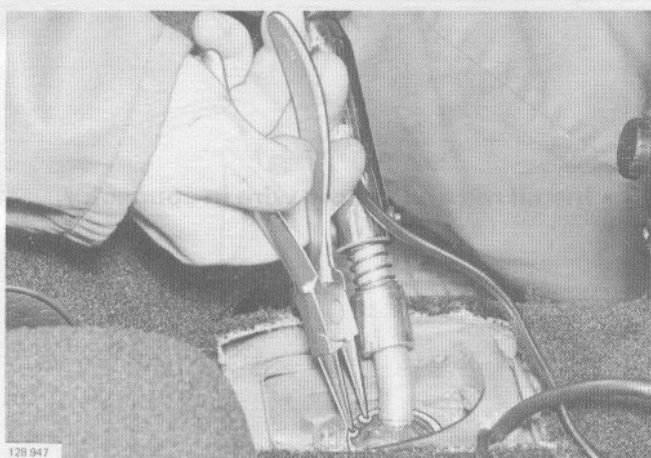
**Inside vehicle:**

**Install rubber ring and plastic bushing.**



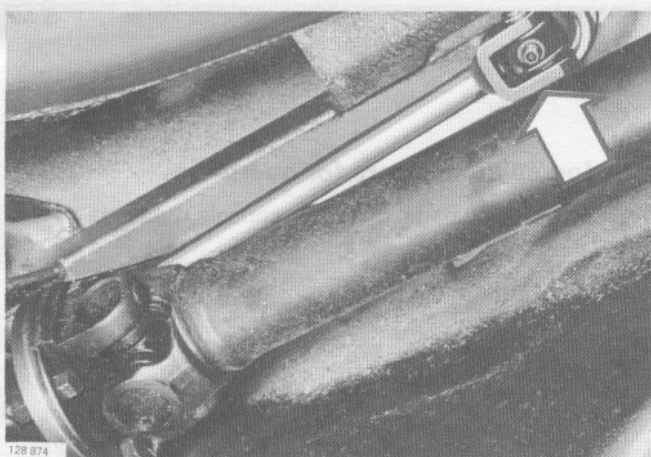
K9

**Check that sound deadening material is correctly positioned.**



K10

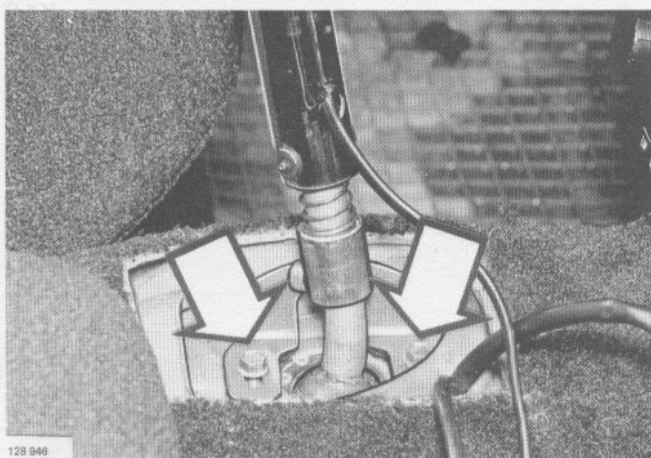
**Install gearshift lever.**  
Install retaining ring.



K11

**From under vehicle:**

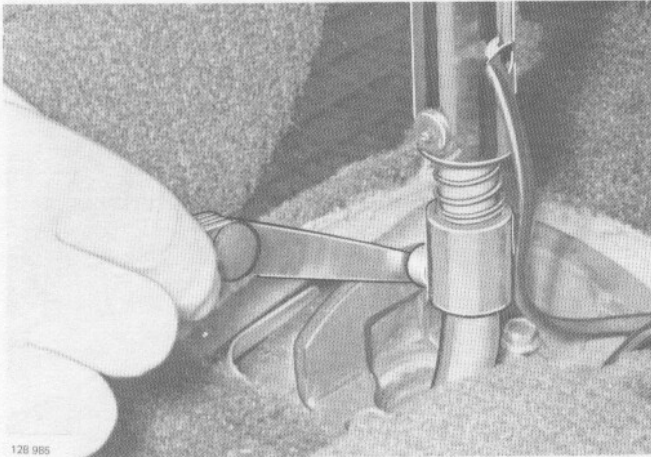
**Attach gearshift rod to gearshift lever.**  
Push pivot pin into position and install locking screw.



K12

**Install reverse detent plate.**

K13

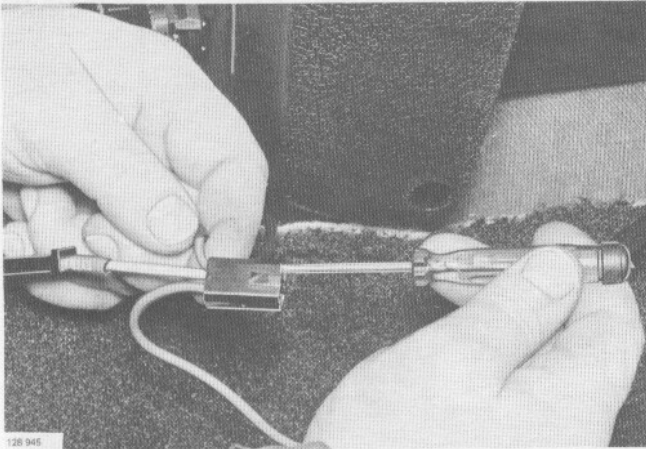


**Adjust clearance for reverse gear detent.**

Engage 1st gear and adjust clearance between detent plate and gear shift lever.

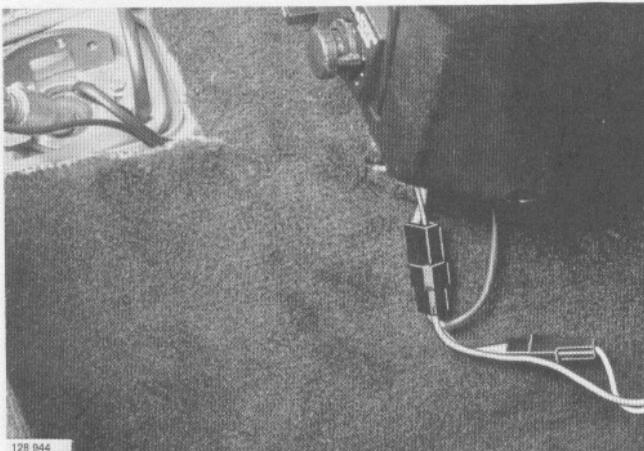
Correct clearance: **0.5–1.5 mm = 0.020–0.060"**.  
Then engage 2nd gear and recheck clearance.

K14



**Install red and yellow wire in connector.**

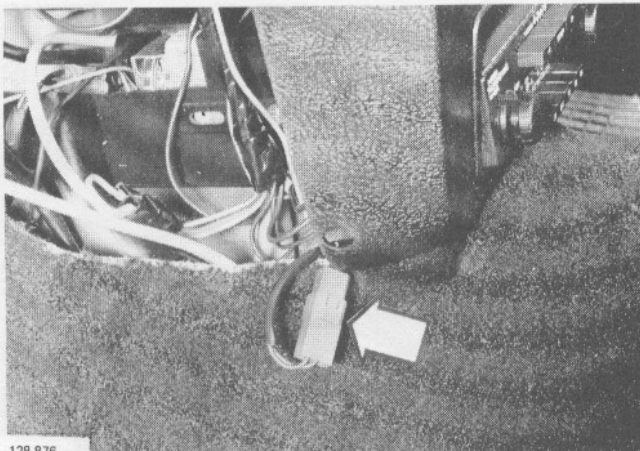
K15



**Install connectors for overdrive.**

Then install panel on center console right side.

K16



**Install connector for back-up light.**

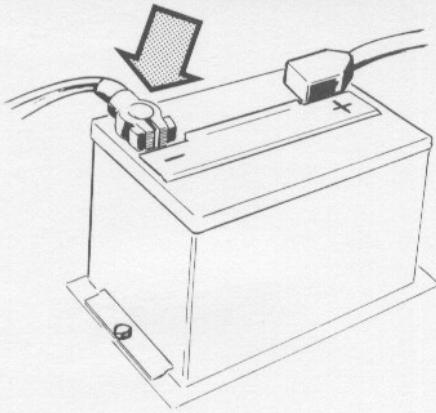
Then install panel on center console left side.

K17



**Install gearshift lever cover.**

K18

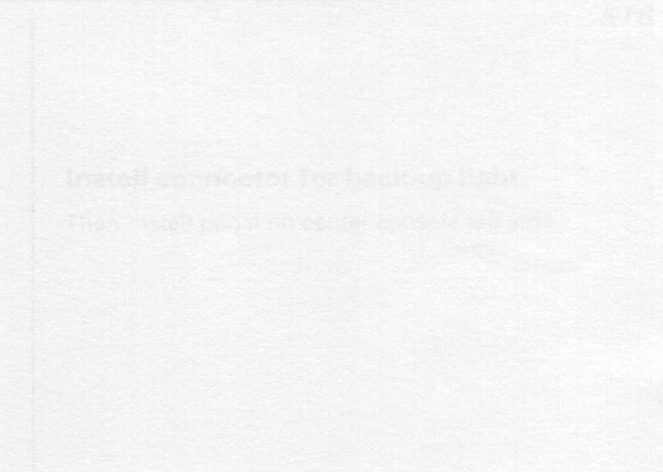
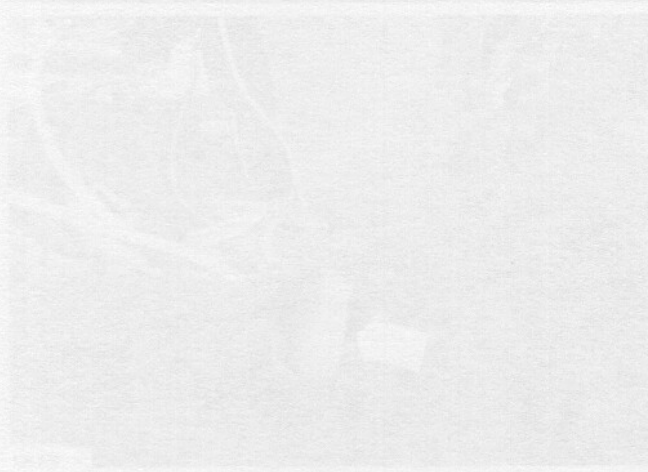
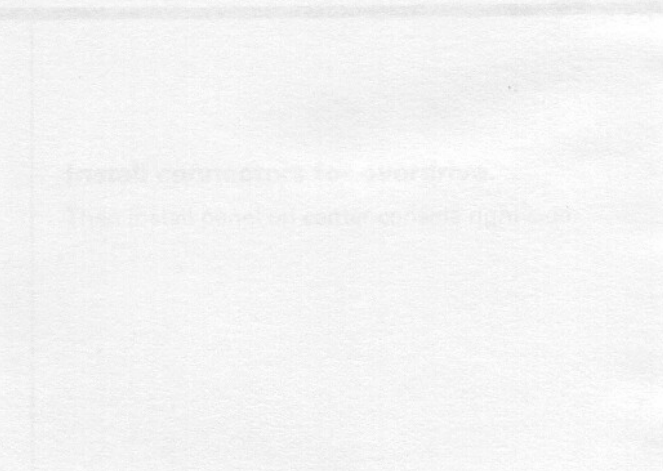
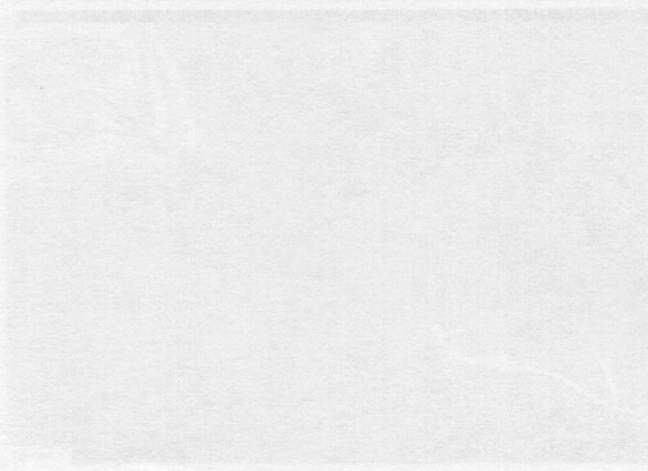
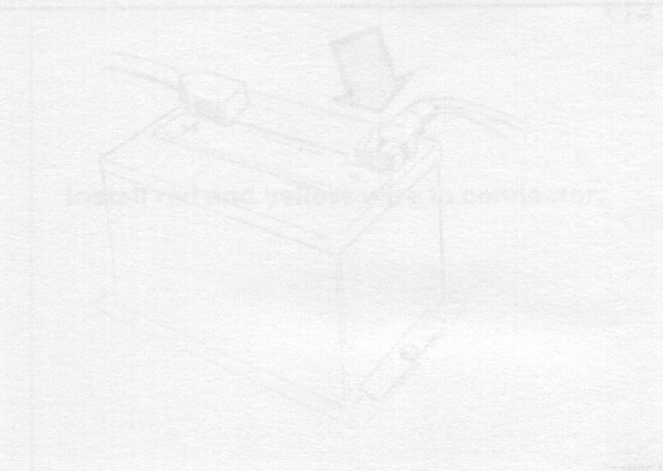
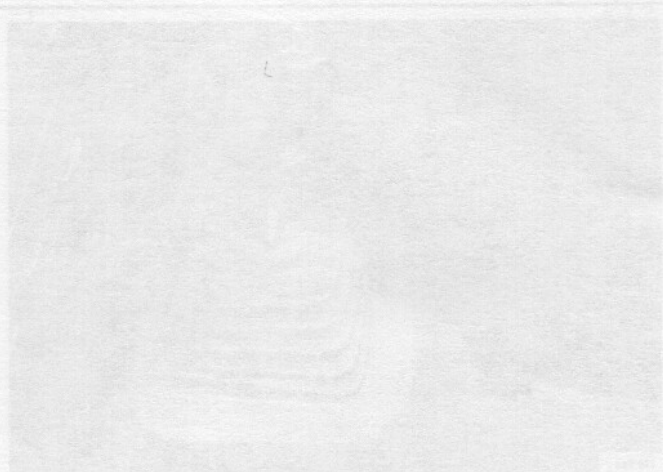


**Connect battery ground cable.**

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