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Identification - data

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GEARBOX SPECIFICATIONS AND
SPECIAL FEATURES

GEARBOX SPECIFICATIONS AND SPECIAL FEATURES

FOUR SPEED GEARBOX

SPECIFICATIONS

Ratios

NOTE : The speeds stated are for vehicles equipped with 165 R 14 XCA tyres, the developed tread-band length of which, under load, is 1.89 metres.

Gearbox for type XM7-T engine = BV : 2 GE 05 → 10/81

Gear	Gearbox ratio	Final drive ratio	Overall reduction ratio	Speed in km/h (mph) per 1 000 engine rpm
1	(11/41) 0.2683	(12/62) 0.1935	0.0519	5.89 (3.7)
2	(18/35) 0.5143		0.0995	11.28 (7.0)
3	(28/35) 0.800		0.1548	17,55 (10.9)
4	(35/29) 1.206		0.2336	26,48 (16.4)
R	(13/41) 0.3170		0.0613	6,96 (4.3)

Speedometer drive ratio : 15 x 29

Gearbox for type XM7-T = B.V. : 2GE 12 → 1/86 - 2GE 81 → 1/8 → 7/86
engines U25/651 and U25/661 = B.V. : 2GE 03 → 1/86 and 2GE 82 → 7/86

Gear	Gearbox ratio	Final drive ratio	Overall reduction ratio	Speed in km/h (mph) per 1 000 engine rpm
1	(11/41) 0.2683	(13/62) 0.2096	0.0562	6,38 (4.0)
2	(18/35) 0.5143		0.1078	12,22 (7.6)
3	(28/35) 0.800		0.1677	19.09 (11.9)
4	(35/29) 1.206		0.2530	28,69 (17.8)
R	(13/41) 0.3170		0.0665	7,54 (4.7)

Speedometer drive ratio : 15 x 29

1 A : Possible variation of differential bearing retaining system.

Assembling the gearbox housing sections :

Sealing : Coat the final drive housing joint faces with jointing compound.

Recommended tightening torques (identical on five speed gearbox).

Drain and filler plugs

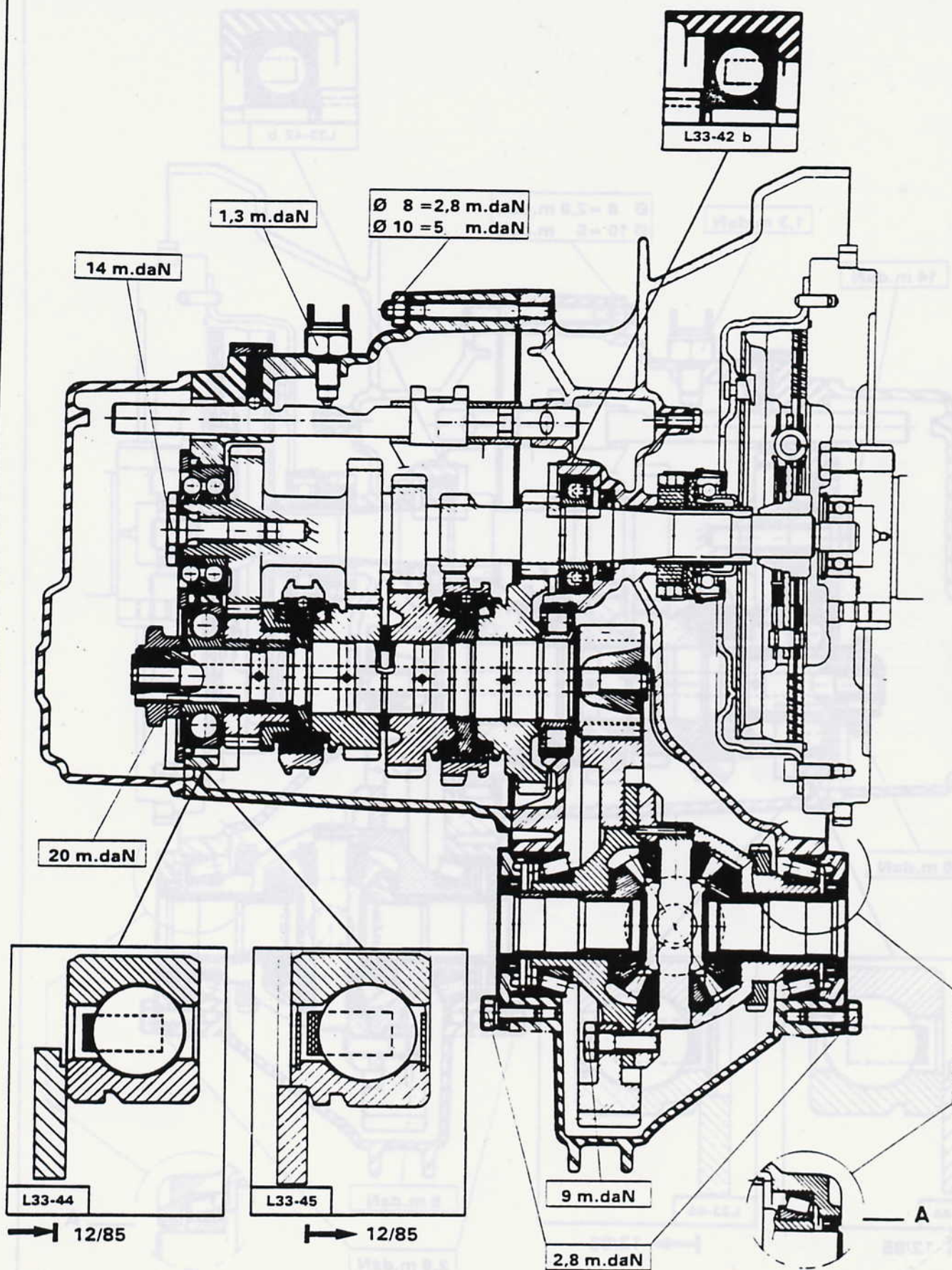
Final drive housing assembly nuts (Ø = 8 mm)

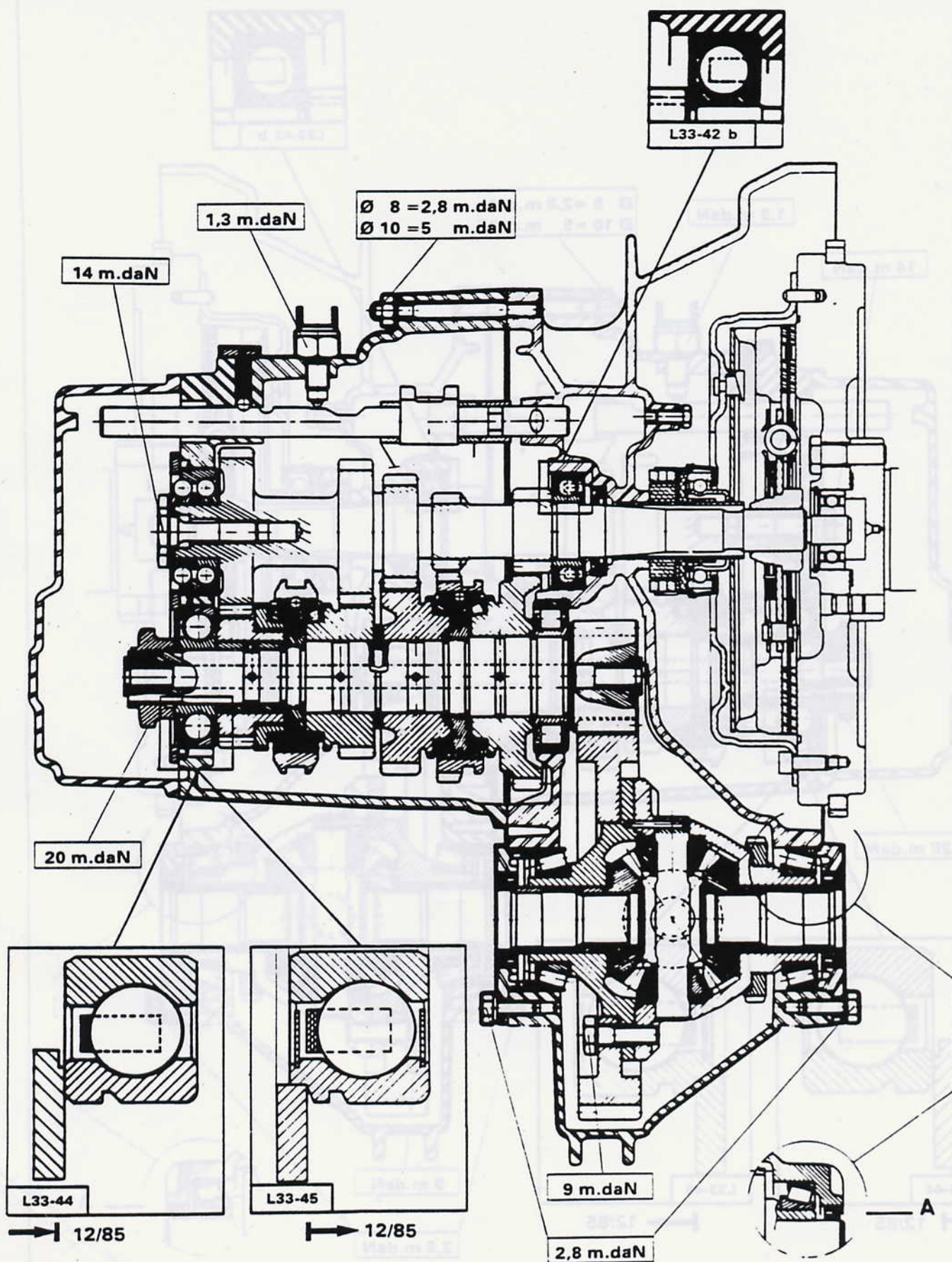
Final drive housing assembly nuts (Ø = 10 mm)

Gear selector shaft ring nut

Shift fork shaft bolts

	Torque		
	m.daN	Nm	lbf ft
Drain and filler plugs	4	40	30
Final drive housing assembly nuts (Ø = 8 mm)	2,8	28	21
Final drive housing assembly nuts (Ø = 10 mm)	5	50	37
Gear selector shaft ring nut	12	120	88
Shift fork shaft bolts	2,8	28	21





J5	GEARBOX DATA AND SPECIAL FEATURES	3	A1.005
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FOUR SPEED GEARBOX

DATA

Gear ratios :

NOTE : The speeds given are for vehicles equipped with 185 SR 14 tyres, the developed tread-band length of which, under load, is 1.97 metres.

Gearbox for type XM7-T engine = B.V. : 2 HE 07 → 7/86

Gear	Gearbox ratio	Final drive ratio	Overall reduction ratio	Speed, in km/h per 1000 rpm, engine
1	(11/41) 0.2683	(12/62) 0.1935	0.0519	6.13
2	(18/35) 0.5143		0.0995	11.76
3	(28/35) 0.800		0.1548	18.29
4	(35/29) 1.206		0.2336	27.61
REVERSE	(13/41) 0.3170		0.0613	7.24

Speedometer drive ratio : 10 x 20

Gearbox for engine type U25/661 = B.V. : 2GE 87 → 7/86

Gear	Gearbox ratio	Final drive ratio	Overall reduction ratio	Speed, in km/h per 1000 rpm, engine
1	(11/41) 0.2683	(13/62) 0.2096	0.0	6.64
2	(18/35) 0.5143		0.1078	12.74
3	(28/35) 0.800		0.1677	19.82
4	(35/29) 1.206		0.2530	29.9
REVERSE	(13/41) 0.3170		0.0665	7.85

Speedometer drive ratio : 10 x 20

A : Possibility of retaining the differential bearing

Assembling the gearbox housings :

Sealing : Coat the differential casing joint faces with sealing compound.

Recommended tightening torques (identical to 5 speed gearbox)

	Torque in Nm (lbf.ft)
Drain and filler plug	40 (29.5)
Differential casing assembly nuts (diameter 8 mm)	28 (20.6)
Differential casing assembly nuts (diameter 10 mm)	50 (36.9)
Gear selector shaft bush - nut	120 (88.5)
Bolts on shift fork shaft	28 (20.6)

5 SPEED GEARBOX

DATA

Gear ratios :

NOTE : The speeds are given for vehicles equipped with 185 SR 14 tyres, the developed treadband length of which, under load, is 1.97 metres.

Gearbox for engine type XN1-T = B.V. : 2 GE 06 → 1/84 - 2 GE 31 → 1/84 → 1/86

2 GE 84 → 1/86

engine type U25/661 - U25/673 = B.V. : 2 GE 04 → 1/84 - 2 GE 30 → 1/8 → 1/86 -
2 GE 85 → 1/86

Gear	Gearbox ratio	Final drive ratio	Overall reduction ratio	Speed, in km/h per 1000 rpm, engine
1	(11/41) 0.2683	(12/62) 0.1935	0.0519	6.13
2	(18/35) 0.5143		0.0995	11.76
3	(27/37) 0.7297		0.1412	16.69
4	(32/31) 1.032		0.1998	23.62
5	(43/33) 1.303		0.2522	29.81
REVERSE	(13/41) 0.3170		0.0614	7.26

Speedometer drive ratio : 10 x 20

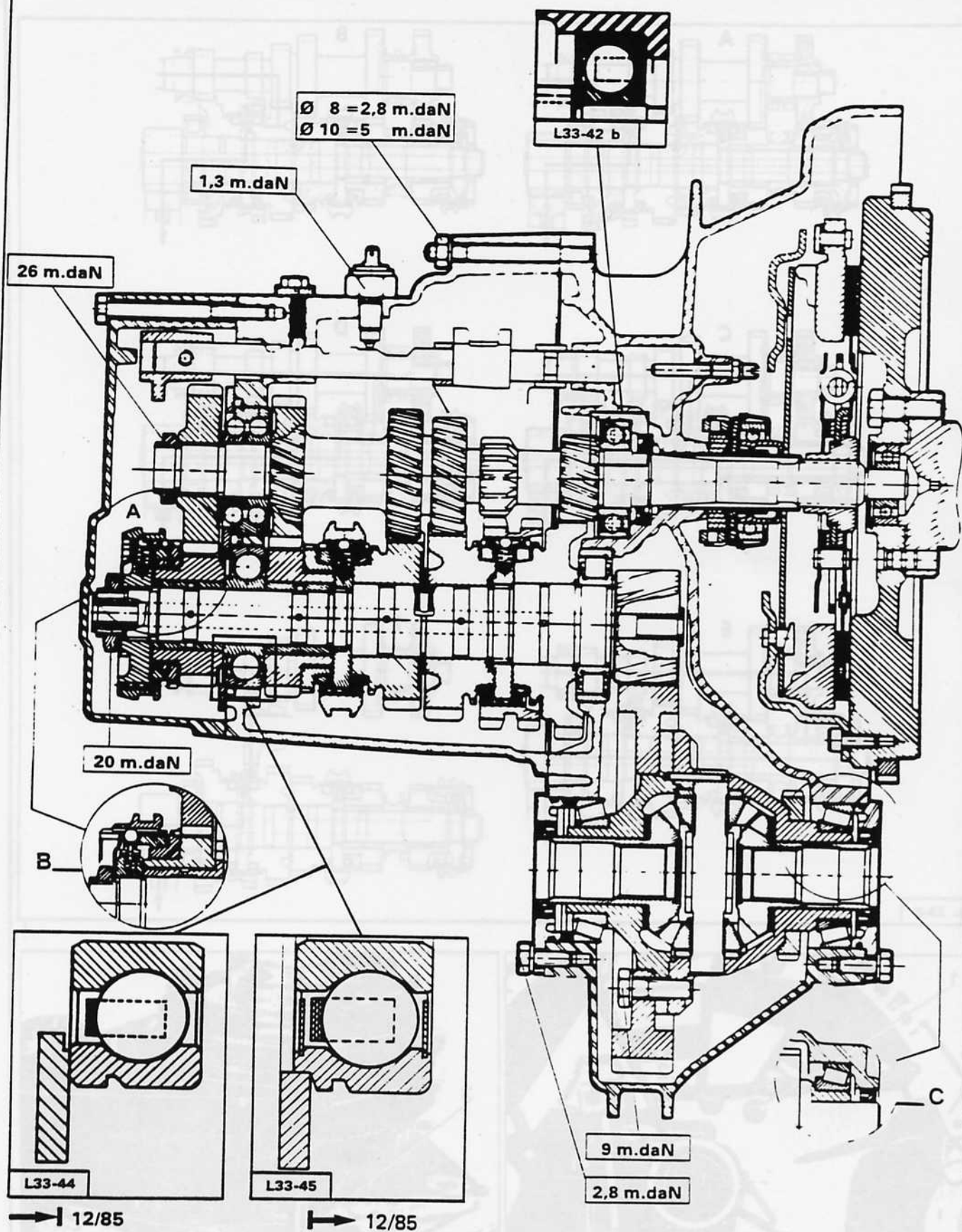
NOTE : The speeds are given for vehicles equipped with 195/75 R 16 tyres, the developed treadband length of which, under load, is 2.145 metres.

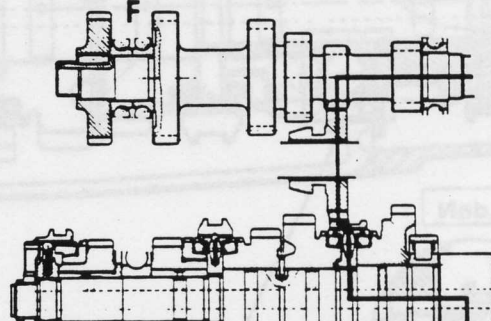
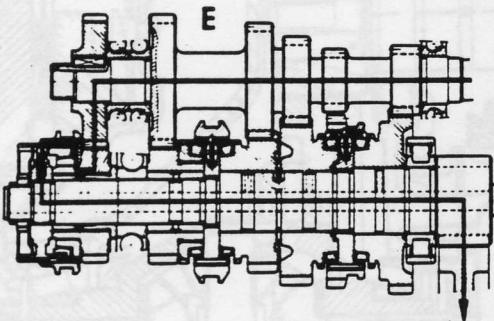
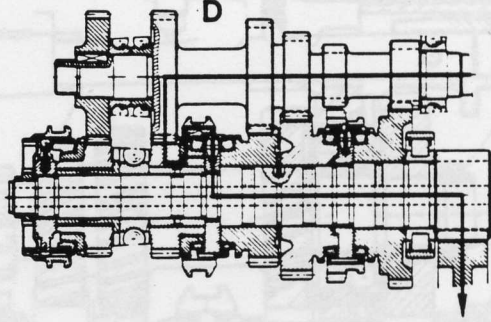
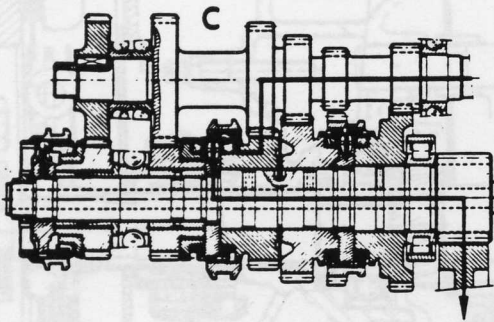
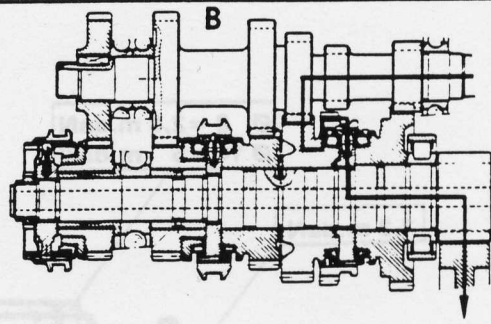
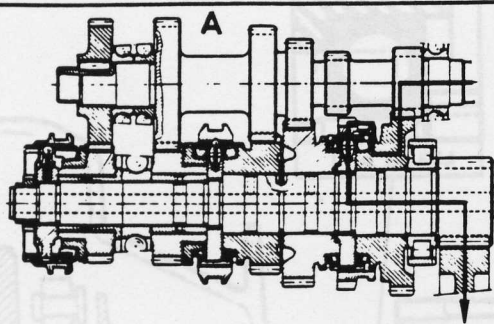
Gearbox for engine type U25/673 = B.V. : 2HE 03

Gear	Gearbox ratio	Final drive ratio	Overall reduction ratio	Speed, in km/h per 1000 rpm, engine
1	(12/41) 0.2927	(12/62) 0.1935	0.0566	7.33
2	(18/35) 0.5143		0.0995	12.89
3	(28/35) 0.8		0.1548	20.05
4	(34/30) 1.1333		0.2193	28.40
5	(46/31) 1.4839		0.2872	37.19
REVERSE	(13/41) 0.3170		0.0613	7.98

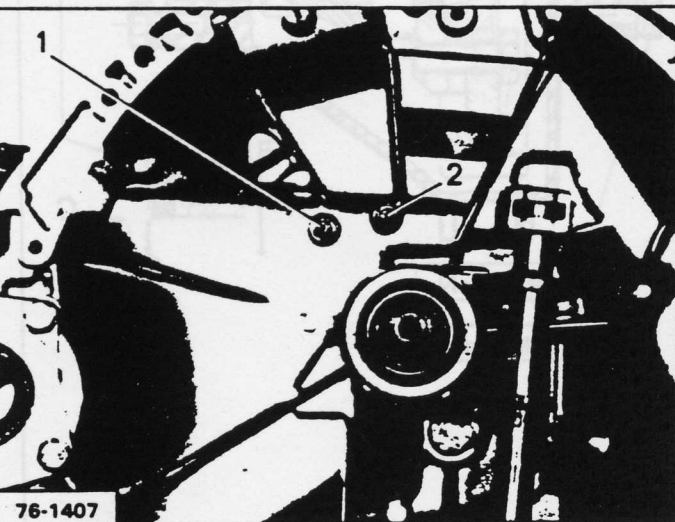
Speedometer drive ratio : 10 x 22

A : 5th speed synchroniser type : CITROEN
B : 5th speed synchroniser type : LANCIA
C : Possibility of retaining the bearing

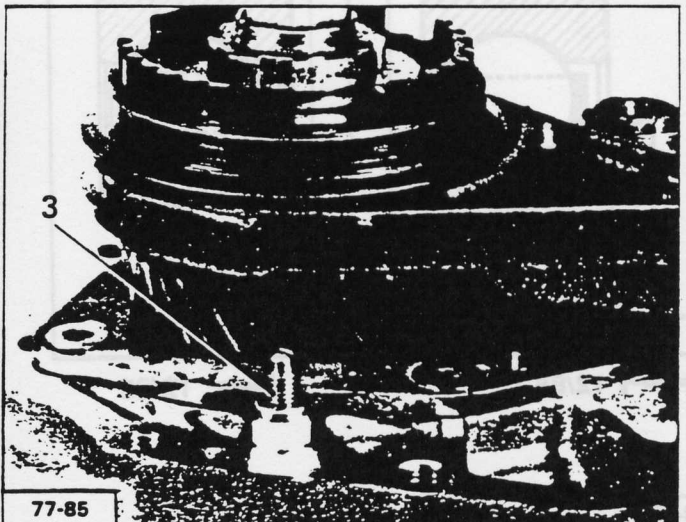




L. 33-6



76-1407



77-85

Lubrication :

- Oil grade :
- Total capacity :
- Difference between max and min on dipstick :

ESSO GEAR OIL GX 80 W 90

1.25 litres

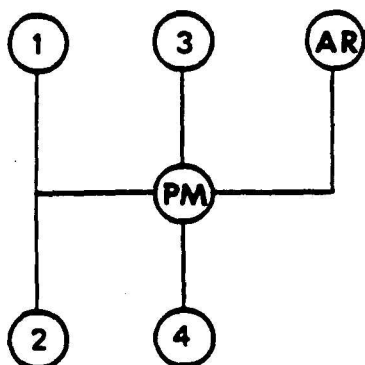
0.150 litres

Gearshift control :

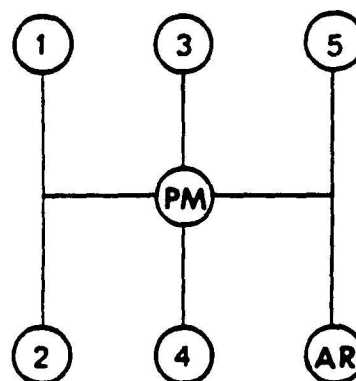
Shift lever on steering column

Gearshift gates :

4 speed box



5 speed box

**Gearbox drive paths Fig. I**

- A : 1st speed
- B : 2nd speed
- C : 3rd speed
- D : 4th speed
- E : 5th speed
- F : Reverse

Adjusting the 4 speed and 5 speed gearbox shift fork stops Figs. II and III.

This operation is carried out with the gearbox removed from the vehicle. The bolts must be coated with jointing compound.

3rd speed engaged	Bring the stop screw (1) into contact with the shift fork shaft	Screw in by one turn to ensure positive contact and tighten the nut
4th speed engaged	Bring the stop screw (3) into contact with the shift fork shaft	Screw in by one turn to ensure positive contact and tighten the nut
5th speed engaged	Bring the stop screw (2) into contact with the shift fork shaft	Screw in by one turn to ensure positive contact and tighten the nut

J5	GEARBOX REMOVING - REFITTING	XUD9A	3	A4.001
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REMOVING AND REFITTING THE GEARBOX
(on the vehicle)
Engine type XUD9A

A4.002

3

XUD9A

**GEARBOX
REMOVING - REFITTING**

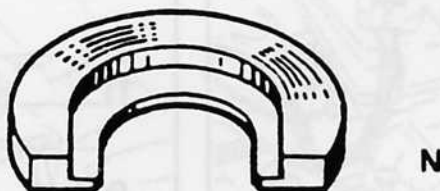
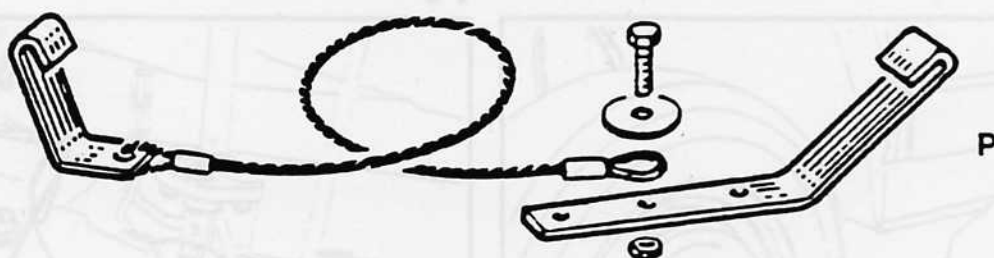
J5

I**SPECIAL TOOLS**

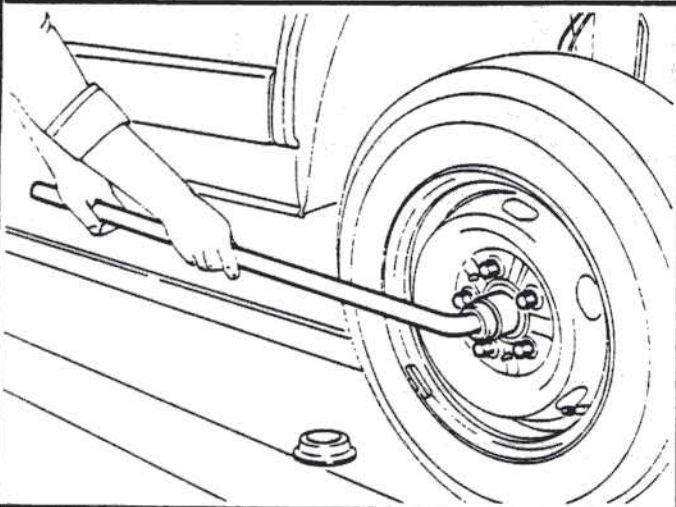
- (-).0316N - Engine retaining sling.
- (-).0204 - Tool for centralising the tie rod-suspension arm securing points and the gearbox rear mounting.
- (-).0316P - Thrust plate for extracting the right hand drive shaft.

Additional tools :**1 hydraulic stand.****II****TIGHTENING TORQUES**

	N.m (lbf.ft.)
- Nut securing drive shaft to stub axle carrier :	500 (369)
- Nut securing engine mounting flange (cylinder head side) :	50 (36.9)
- Nut securing engine mounting flange (gearbox side) :	50 (36.9)
- Nut securing flexible pad (differential side) :	55 (40.6)
- Bolt securing tie rod flange and suspension arm :	50 (36.9)
- Bolt securing gearbox rear mounting flange to cross member :	50 (36.9)
- Suspension ball joint bolts :	50 (36.9)
- Reversing light switch :	13 (9.6)

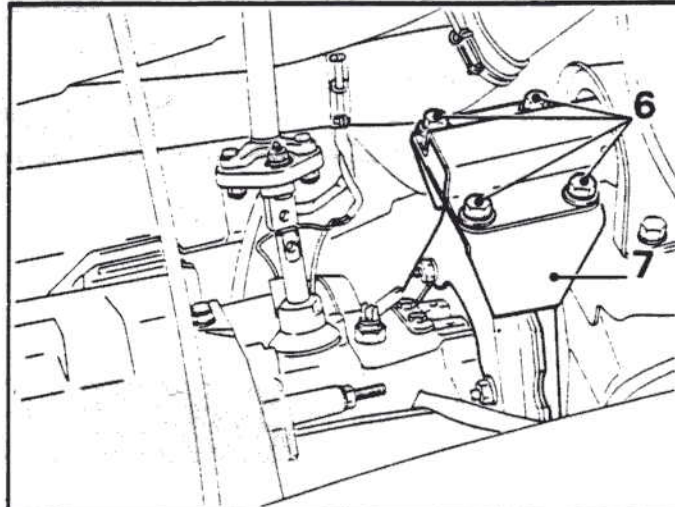


I



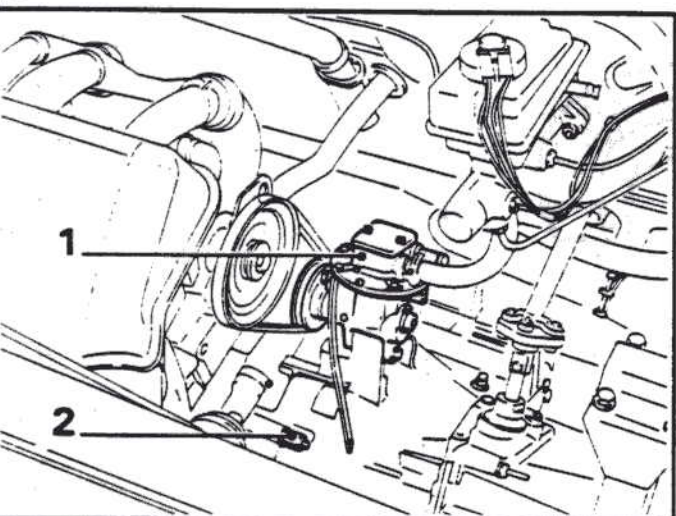
27-11-87 CAR10

IV



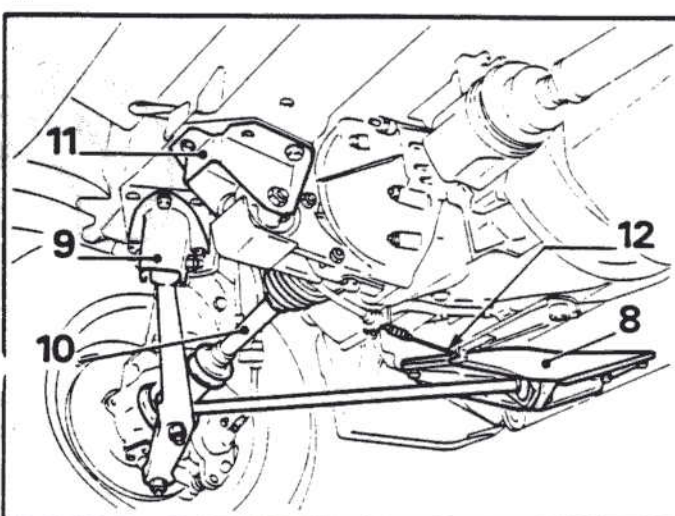
27-11-87 CAR9

II



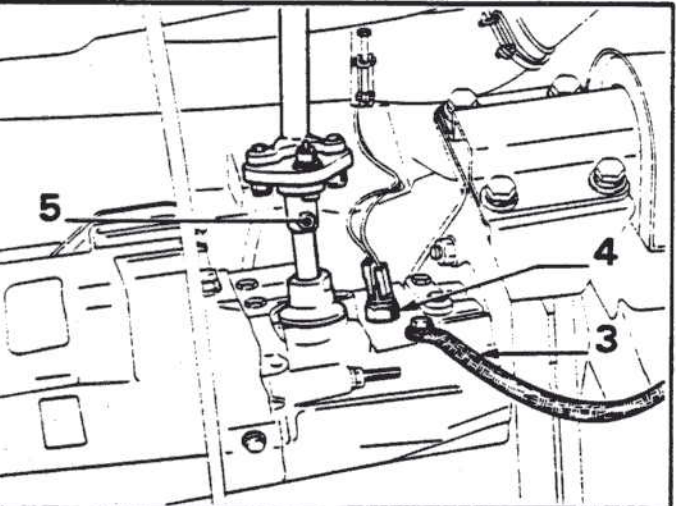
27-11-87 CAR1

V



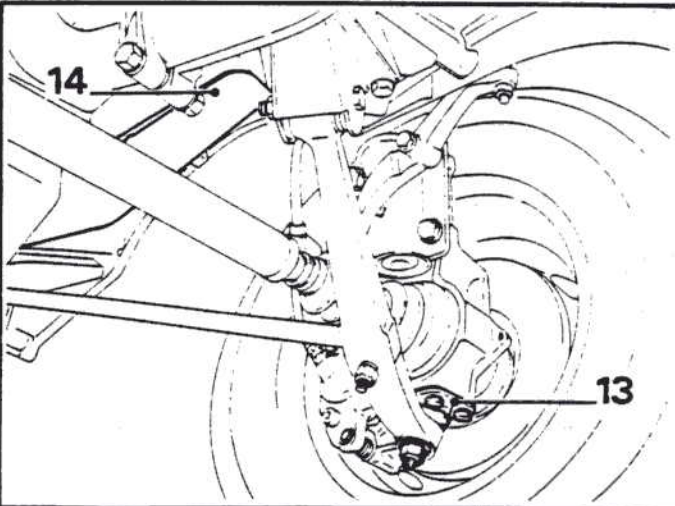
27-11-87 CAR14

III



27-11-87 CAR11

VI



27-11-87 CAR2

J5	GEARBOX REMOVING - REFITTING	XUD9A	3	A4.005
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I

- With the vehicle on a lift, loosen the front drive shaft nuts.

IV

- Loosen the 4 bolts (6) from the left hand mounting (7) and remove 3.

II

- Disconnect the battery.
- Remove :
 - the spare wheel,
 - the air filter assembly,
 - the exhauster (1),
 - the upper gearbox securing bolts. One of these bolts (2) also retains the exhauster tie rod.

V

- Support the vehicle on stands.
- Remove :
 - the bolts securing the tie rod flange (8) and the left hand suspension arm flange (9),
 - the left hand drive shaft (10) using 2 levers,
 - the gearbox rear mounting flange (11).
- Disconnect the clutch cable (12).

III

- Disconnect :
 - the earth cable (3),
 - the reversing light switch (4),
 - the gear shift control (5).

VI

- Remove :
 - the 4 bolts from the right hand suspension arm ball joint (13),
 - the alternator drive belt protector (14).

REMOVING - REFITTING

I

- Using the thrust plate (15) ref. (-)0.316N and 2 levers remove the right hand drive shaft.

IV

- Remove the dipstick (20).
- Disconnect the speedometer drive cable (21).
- Place a hydraulic stand under the gear-box.
- Apply light pressure to it and remove the last bolt from the left hand mounting.

II

- Remove :
 - the protector (16),
 - the starter motor (17).

V

- Lower the gearbox so that the weight of the engine is resting on the sling.
- Remove :
 - the TDC sensor (22).

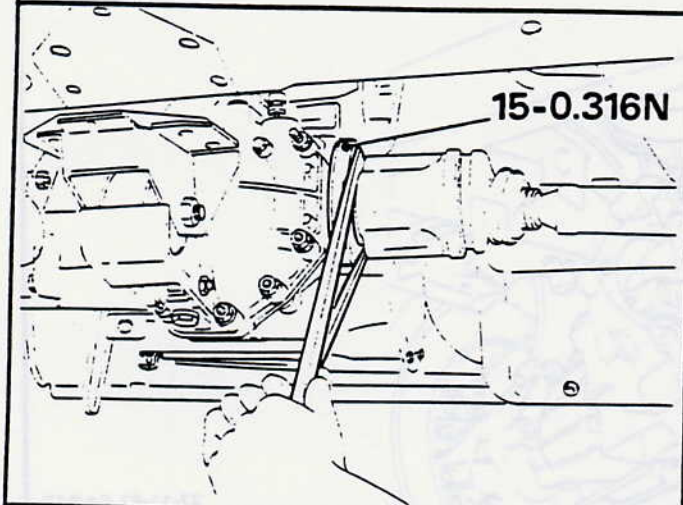
III

- Fit the engine retaining tool (ref. (-)0.316P),
 - the longest hook (18) to the front cross member,
 - the short hook (19), together with the sling in the hole in the rear cross member.
- Select the best positioned hole in the front hook to which to secure the sling.

VI

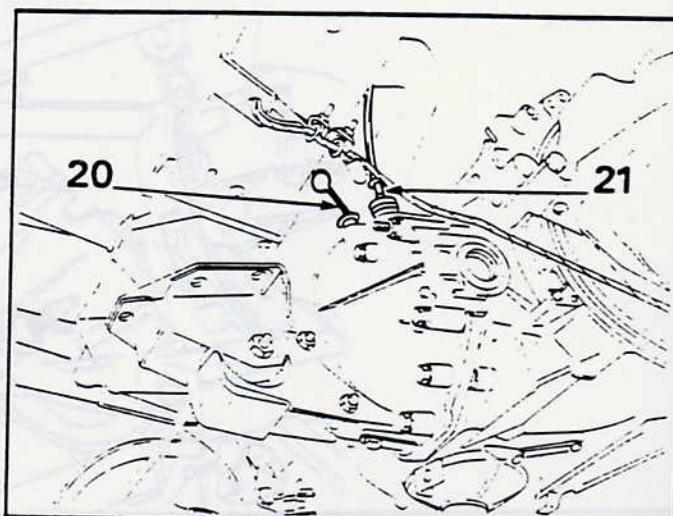
- the left hand mounting (23),
- the lower bolts (24) that secure the gear-box to the engine.

I



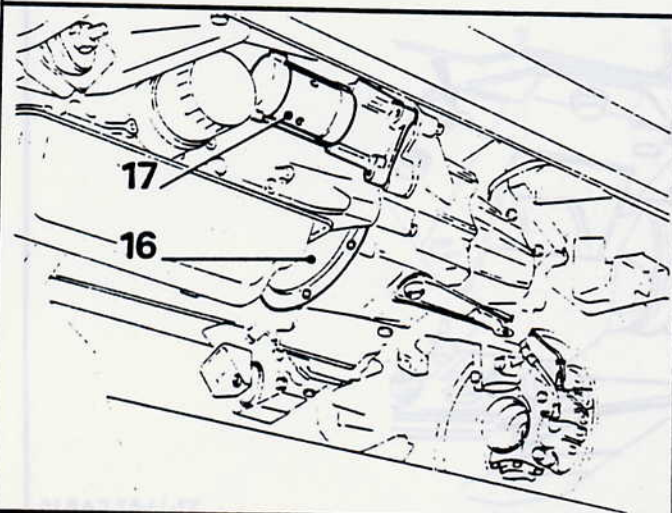
27-11-87 CAR3

IV



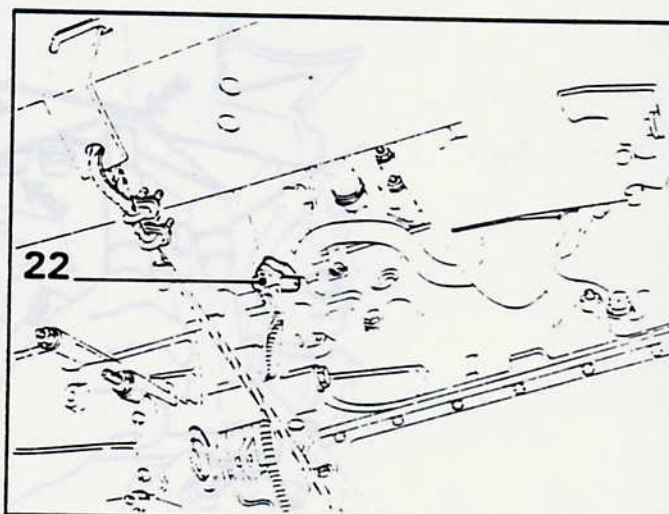
27-11-87 CAR6

II



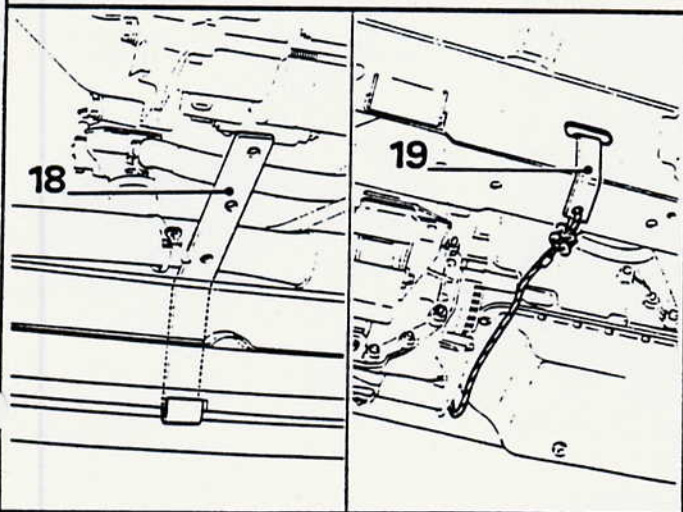
27-11-87 CAR15

V



27-11-87 CAR13

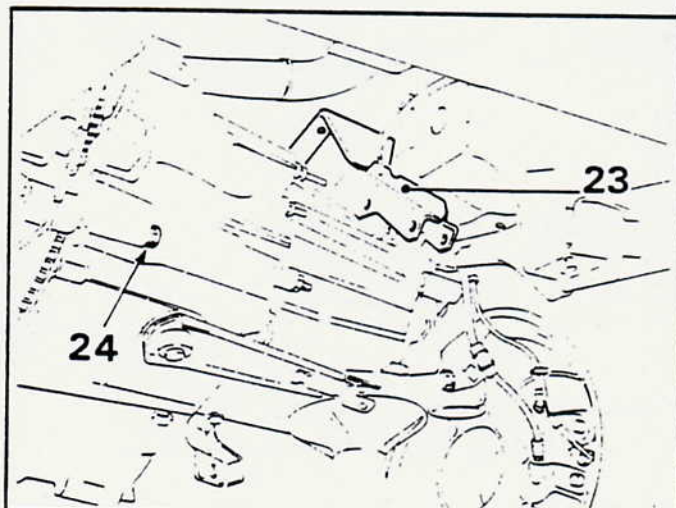
III



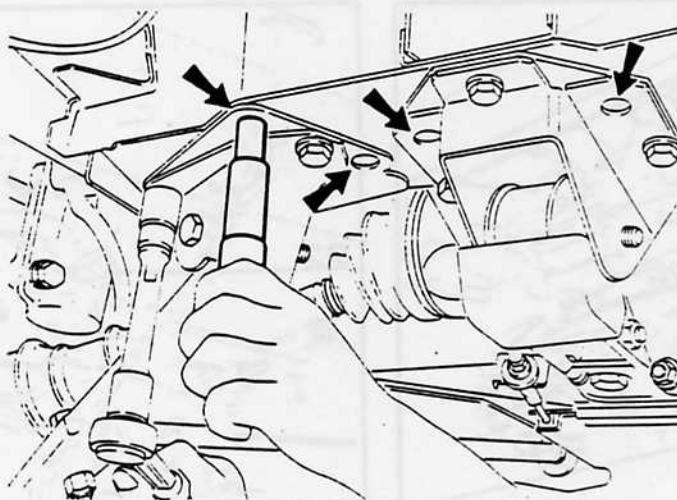
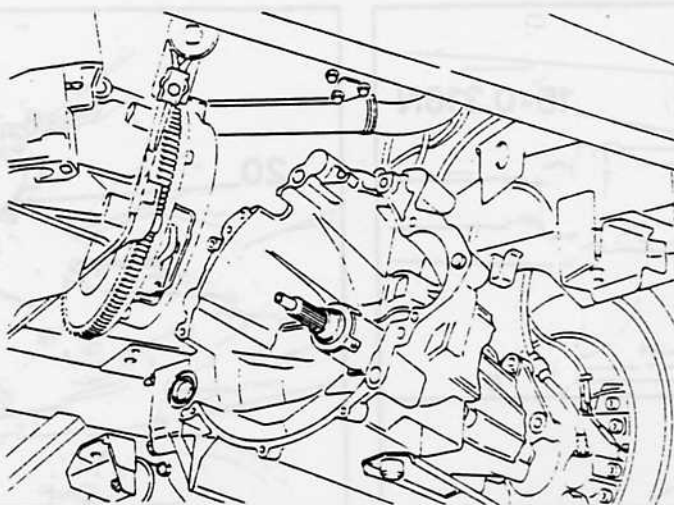
27-11-87 CAR5

27-11-87 CAR8

VI



27-11-87 CAR7



J5

GEARBOX
REMOVING - REFITTING

XUD9A

3

A4.009

I

- Remove the gearbox.

II

- The gearbox is refitted by carrying out the removing operations in reverse.
- Grease the following with MOLYKOTE BR 2 PLUS paste :
 - splines on the input shaft
 - the release bearing guide sleeve
 - the clutch shaft thrust arms.

PRECAUTION : Centralise the flanges on the :

- gearbox rear mounting
- tie rods and left hand suspension arm

using tool : 8.0204 →

III

- If the gearbox has been drained, fill it with oil of the specified grade.

Capacity : 1.25 litres.

It is easier to fill the box through the reversing light switch tapping.

Check the level with the dipstick.

I

The gearbox/final drive is removed after taking out the power unit assembly (see corresponding section)

IV

Remove :

- The bolts (8) that secure the camshaft bearing casing.
- The 7 bolts that secure the clutch housing to the engine.

II

Remove :

- the alternator and its tensioner
- the starter motor

Loosen the exhaust centre securing bolt (1).

Remove the belt tensioner, the belt and the exhaust.

V

Disconnect the gearbox/final drive assembly from the engine.

III

Remove :

- The bolts (2) that secure the pulley (6) and the plate (3).
- The nut protector and nut (4).

Loosen the drive belt tensioner securing bolt (5).

Remove the pulley (6) and the 3 belts (7).

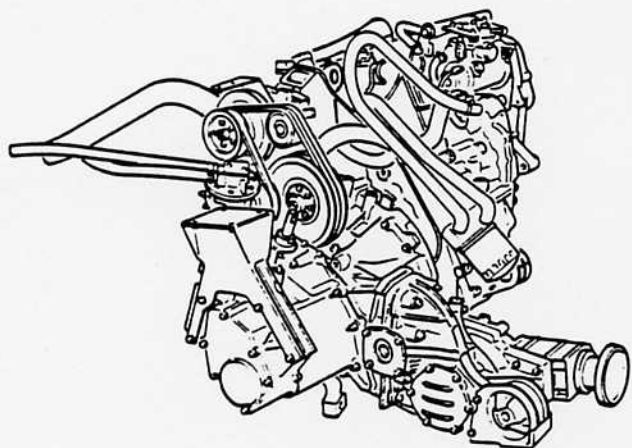
VI**REFITTING**

Carry out the removing operations in reverse.

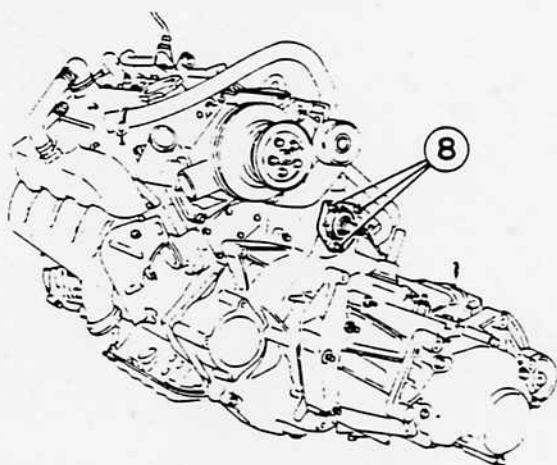
PRECAUTIONS

Ensure that the dust seal is in position and correctly located behind the camshaft bearing casing.

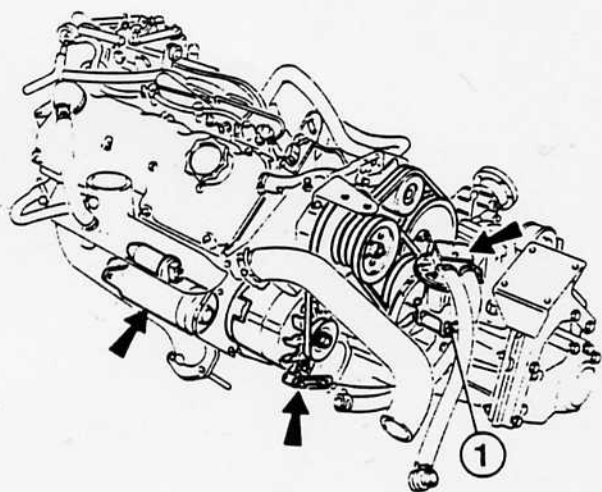
Fit the camshaft nut after applying « Loctite Frenetanch » to it and tighten it to a torque of 90 N.m (66.4 lbf.ft.).



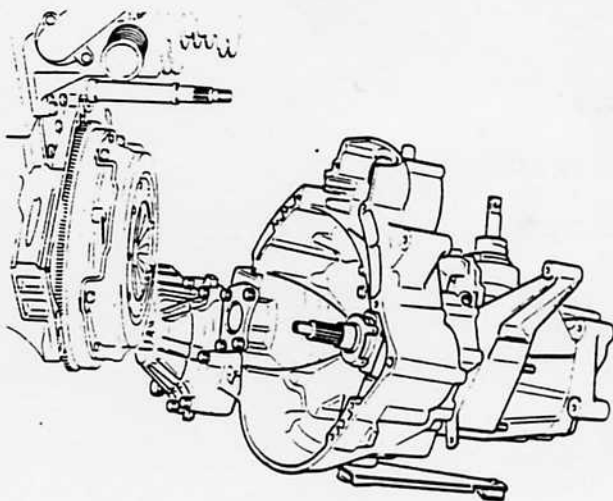
12.10.88 CAR 14



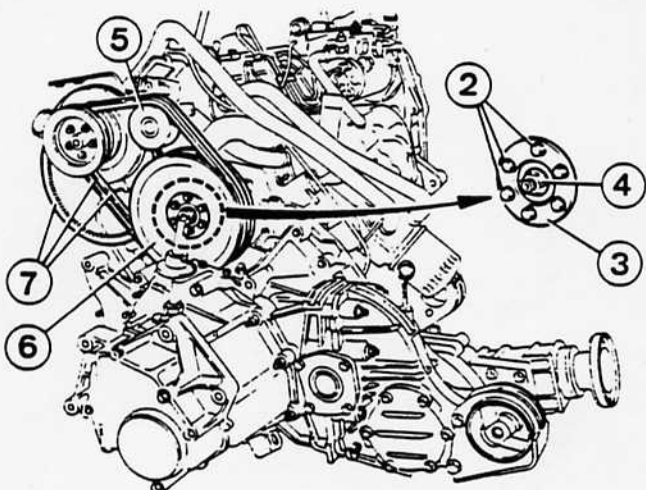
12.10.88 CAR 7



12.10.88 CAR 15



12.10.88 CAR 6



12.10.88 CAR 9

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Tightening torques	A5.006
Adjusting shims	A5.008
Dismantling	A5.010
Preparing	
— the differential	A5.017
— the input and output shafts	A5.021
Reassembly	A5.025

SPECIAL TOOLS

A : Impact extractor

Reference 8.0316 A

E : FACOM 36 mm open spanner and fitting
for output shaft nut (4 speed gearbox).

B : Dial indicator support adaptor

Reference 8.0110 H

F : Retaining ring pliers

Reference 8.0316 B

C : Extractor - release tool

Reference FACOM U53 T2 plus acces-
sories.

G : Adaptor, extracting the bearings from the
final drive housing.

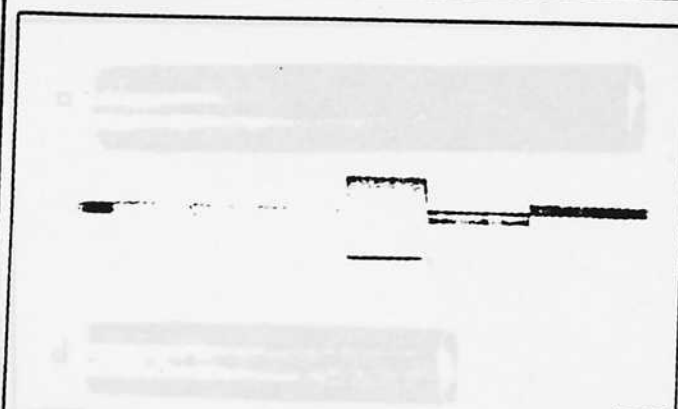
Reference 8.0316 K.

D : Dial indicator.

Reference 8.1504

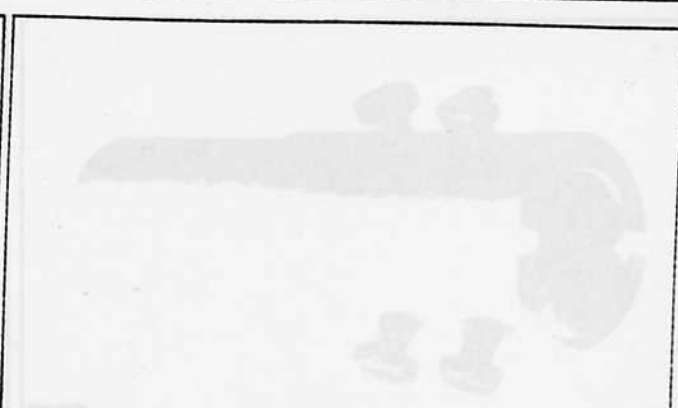
H : Peg spanner for slotted nuts on gearbox
shaft (5 speed gearbox)

Reference 8.0316 C.

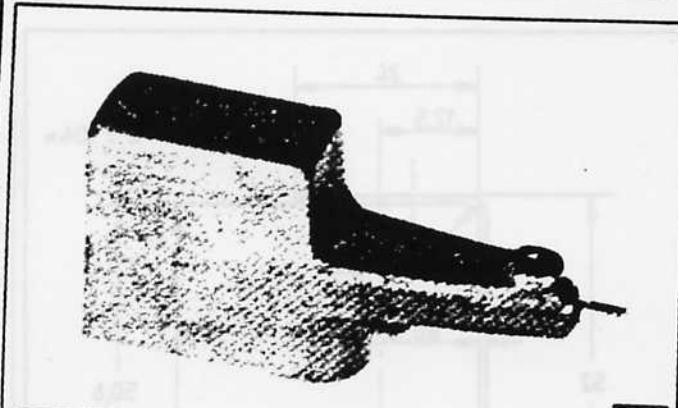


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A

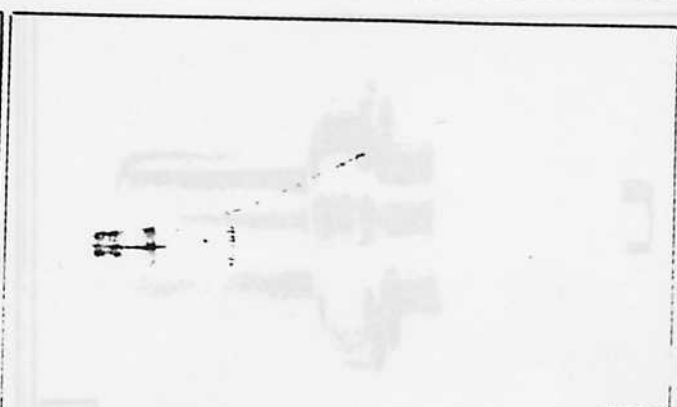


E



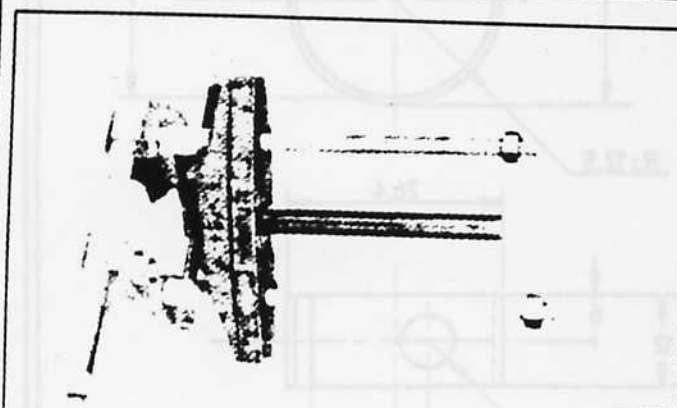
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B



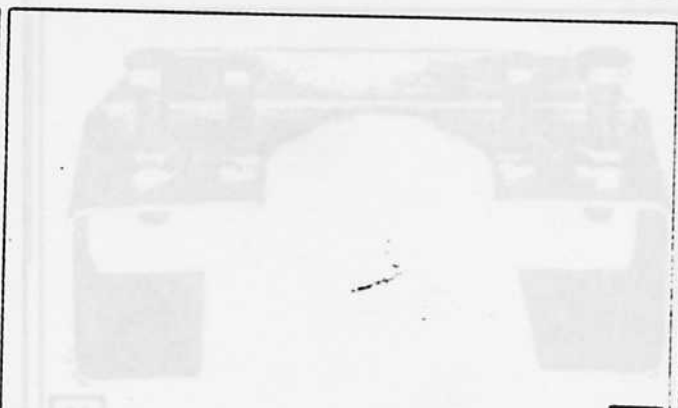
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F



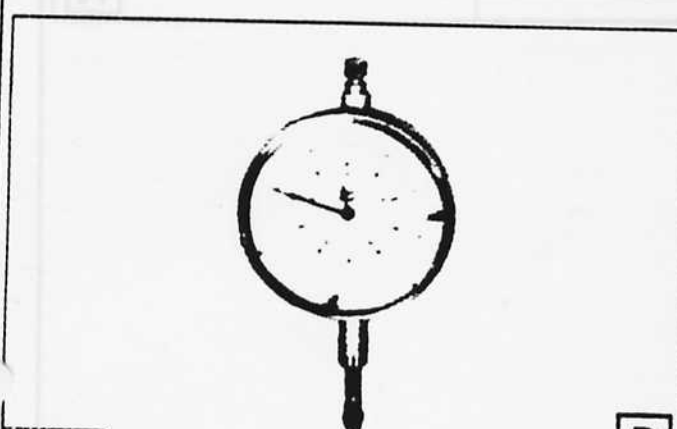
14429

C



12118

G



12827

D



77-59

H



77-332

I



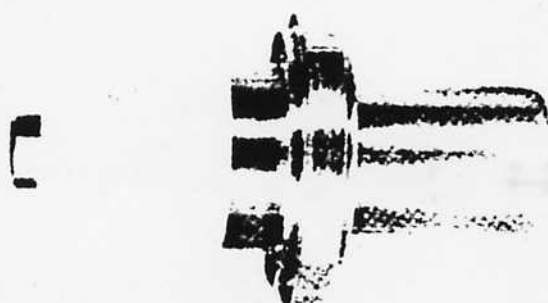
a



b

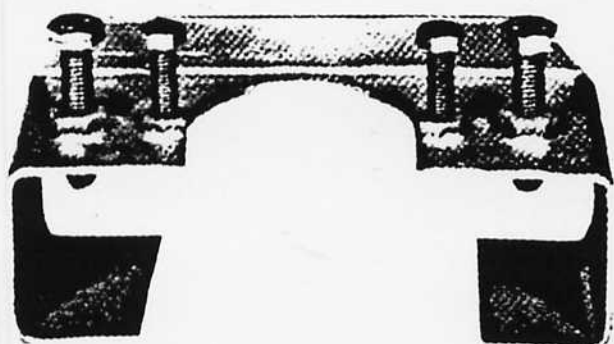
81-3125

M



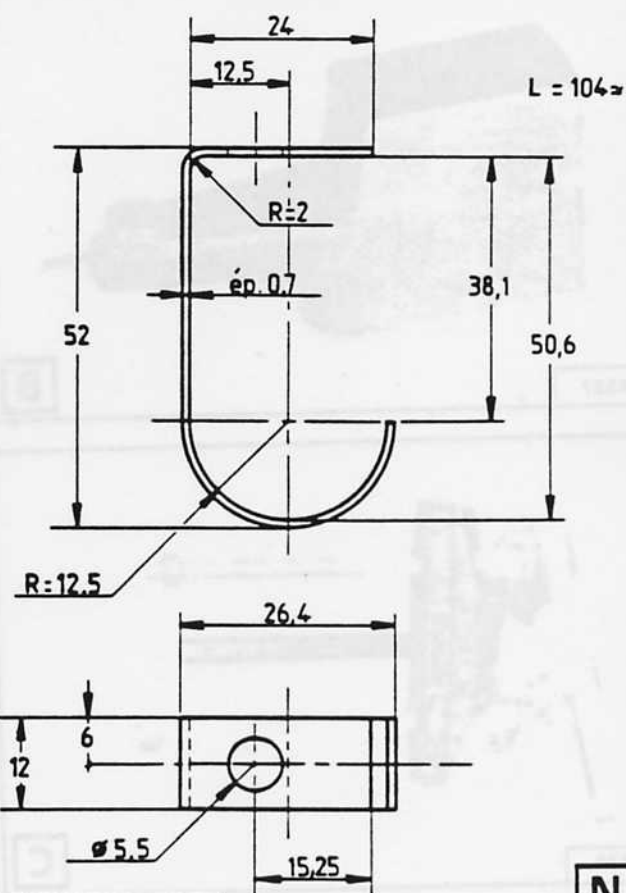
80-1273

J

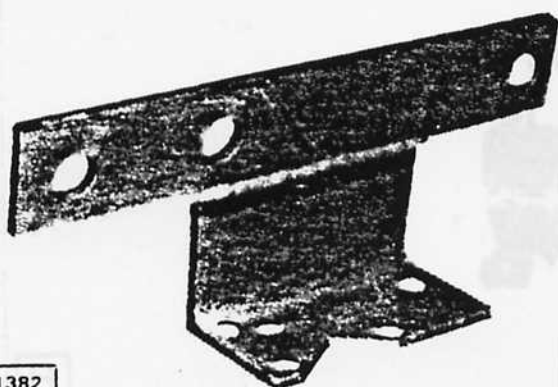


81-29

K



N



80-1382

L

SPECIAL TOOLS

I : Extractor for removing and refitting the clutch release bearing guide sleeve (used in conjunction with A).

Reference 8.0316 D.

SPECIAL TOOLS

J : Mandrel for fitting the final drive oil seals.

Reference 8.0316 E.

M:a: Drift, \varnothing 42 x 48 mm, length = 280 mm for fitting the output shaft bearing.

Reference : 8.0316 H.

b: Drift, \varnothing 36 x 42 mm, length = 200 mm for fitting the input shaft bearing and the clutch housing lip seal.

Reference : 8.0316 J.

K : Clamp for removing and refitting the fifth speed roller type synchromesh assembly (5 speed gearbox).

Reference 8.0316 F.

N Clamp for retaining the reverse shift plunger.

This part can be made from a clip of the « SERFLEX » type, width 12.

L : Gearbox mounting support.

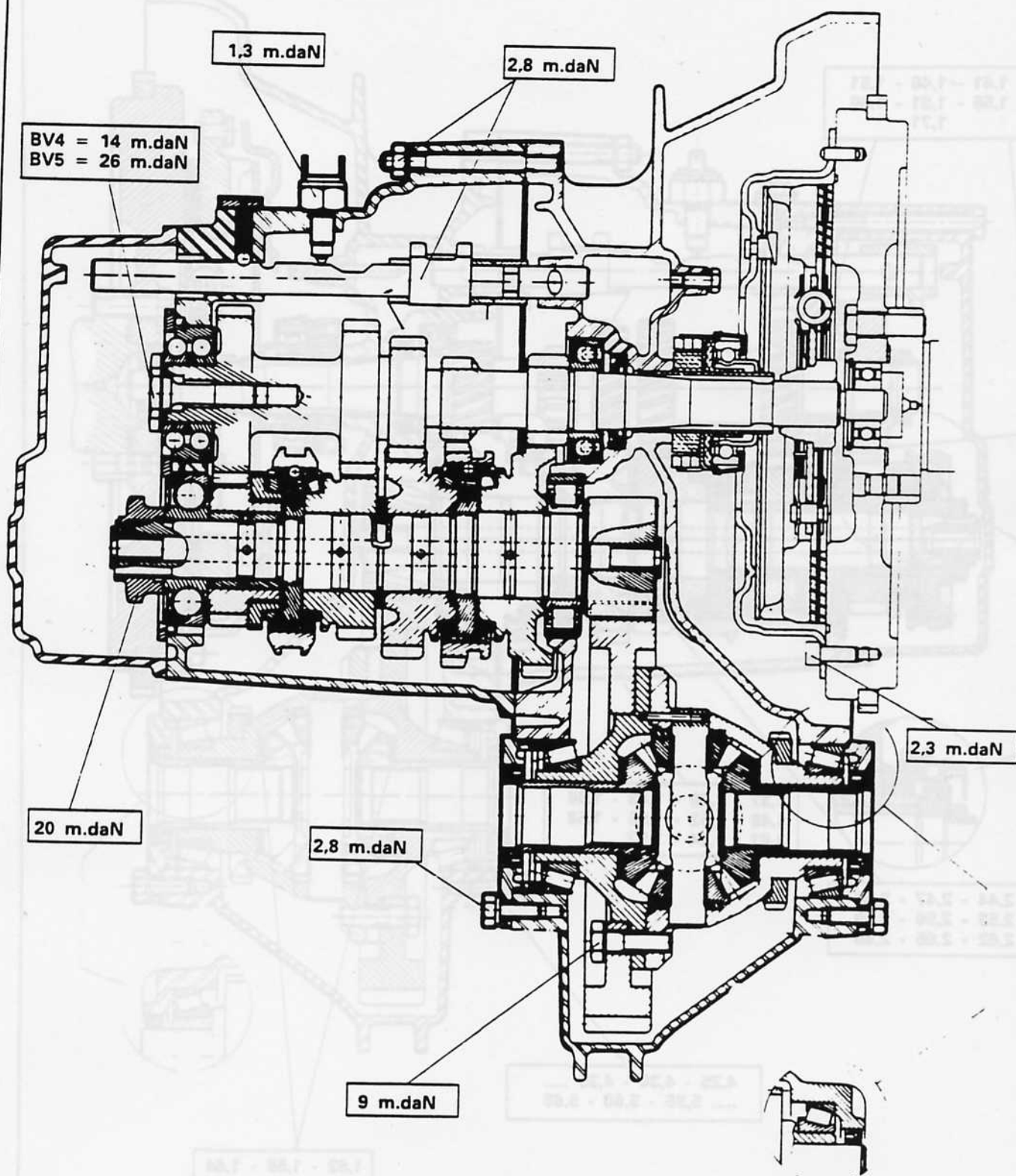
Reference 8.0316 G.

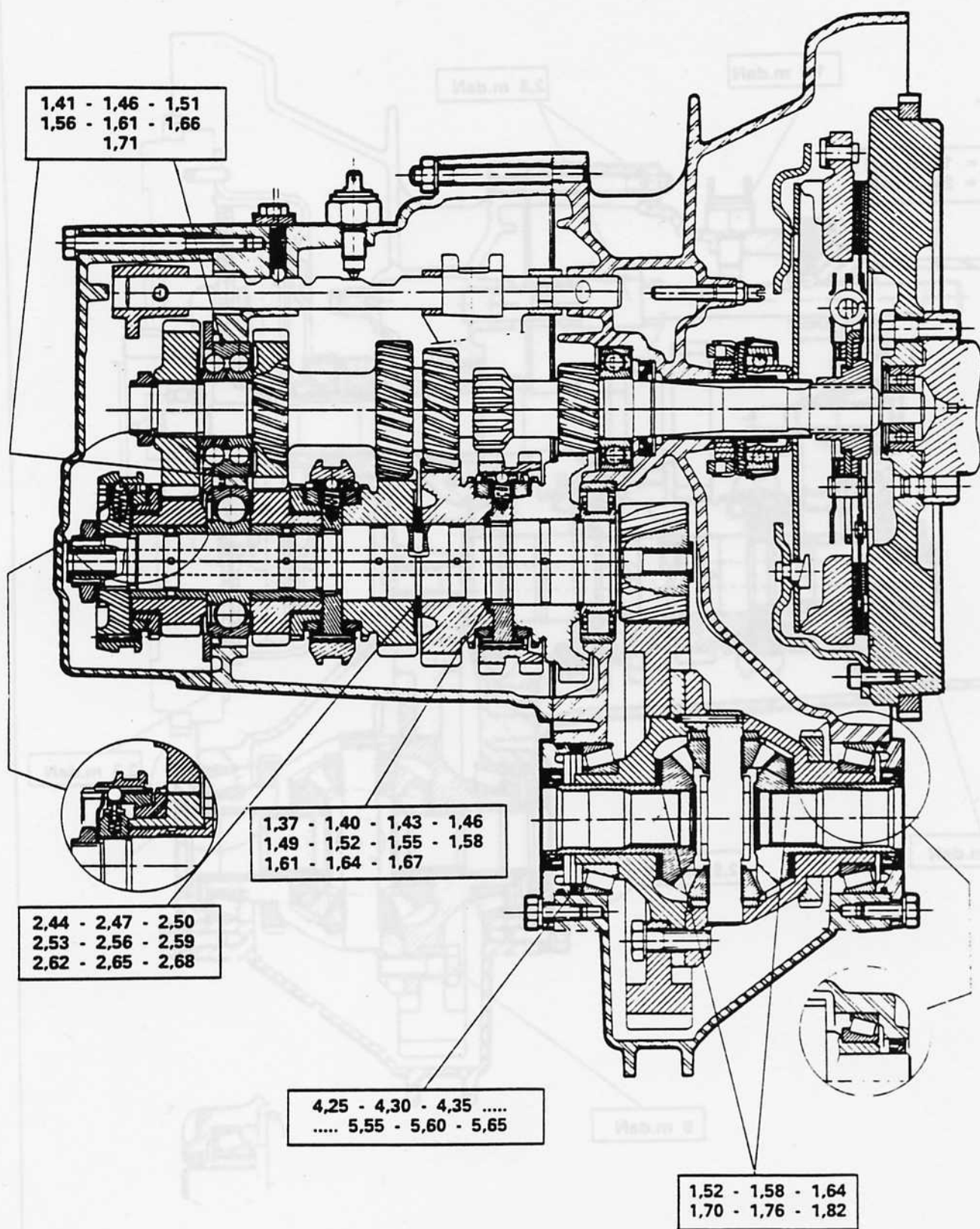
TIGHTENING TORQUES

Recommended tightening torques

Torques

	4 speed GB			5 speed GB		
	m.daN 14	Nm 140	lbf ft 103	m.daN 20	Nm 200	lbf ft 148
Input shaft nut						
	m.daN		Nm			lbf ft
Output shaft nut	20		200			148
Crown wheel securing bolts (Face and thread oiled)	9		90			66
Gear shift selector ring nut	12		120			88
Shift fork shaft bolts	2,8		28			21
Differential bearing cap bolts	2,8		28			21
8 mm dia. housing bolts	2.8		28			21
10 mm dia. housing bolts	5		50			37
Drain and filler plugs (copper washer)	4		40			30
Reverse lamp switch	1,3		13			10





Dismantling.

Drain the gearbox oil (there are two plugs).

Mount the gearbox upright, avoiding any load on the input shaft.

Remove : Fig. I

- the bolts (→)
- the cover and its gasket.

5 speed gearbox :

NOTE - One of two different types of synchroniser may be fitted.

First arrangement : Ball type synchroniser, Fig. II.

Second arrangement : Roller type synchroniser, Fig. III.

Remove the 5th gear assembly : Fig. II and Fig. III.

Unlock nuts (2) and (3).

Lock the shafts to unscrew bolt (4) and engage 5th gear by pushing in its shift fork (1).

Loosen nuts (2) and (3).

Use peg spanner 8.0316 C to loosen the slotted nuts.

Second arrangement, Fig. IV.

Roller type synchroniser.

Keep the component parts of the fifth speed synchroniser assembly together by fitting clamp **K** 8.0316 F.

Place the hooks under the synchroniser ring and screw in the four bolts until they make contact with the various parts.

Remove : Fig. II, III and IV

- nuts (2) and (3),
- the synchroniser hub sliding gear assembly together with the shift fork.
- gear (5) and its spacer,
- gear (6).

Remove : Figs. V and VI.

- bearing retaining plate (7),
- plate (8) and the locking balls and springs,
- the reverse lamp switch.

4 speed gearbox : Fig. VI.

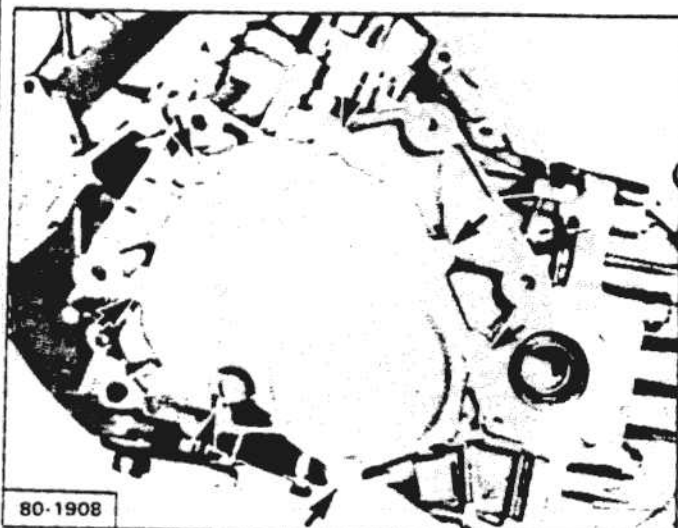
- Remove the bearing circlips (9),
- Remove plate (10) that retains the reverse gear shaft.

5 speed gearbox :

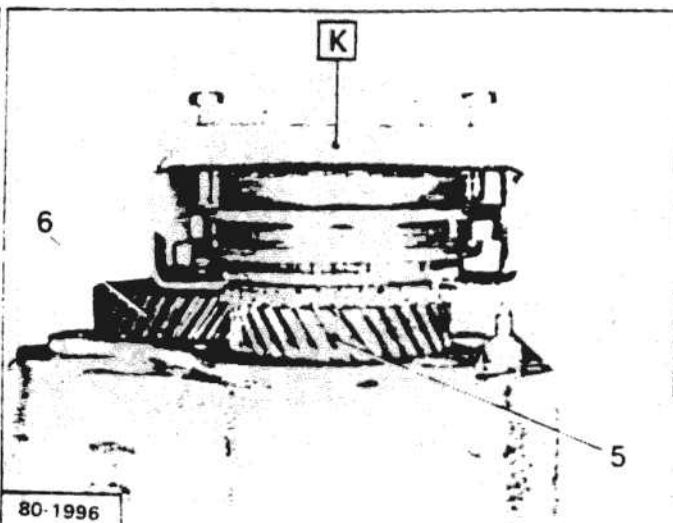
Remove the bearings with their circlips.

REMOVE : Fig. V.

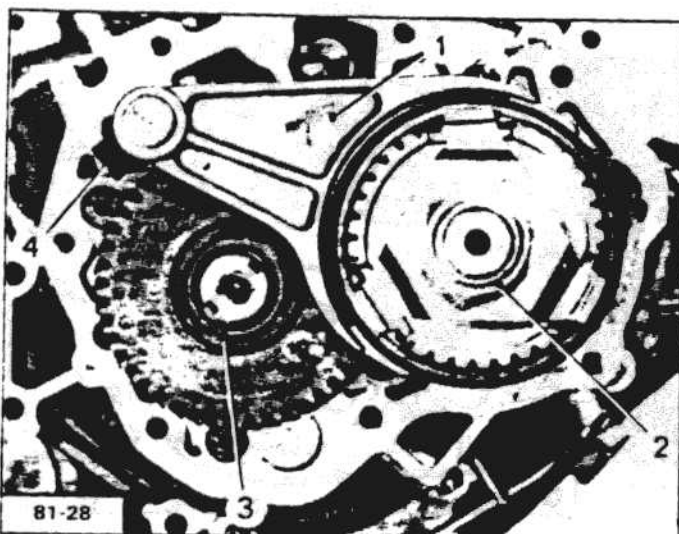
- the housing bolts (→)
- the housing and its gasket.



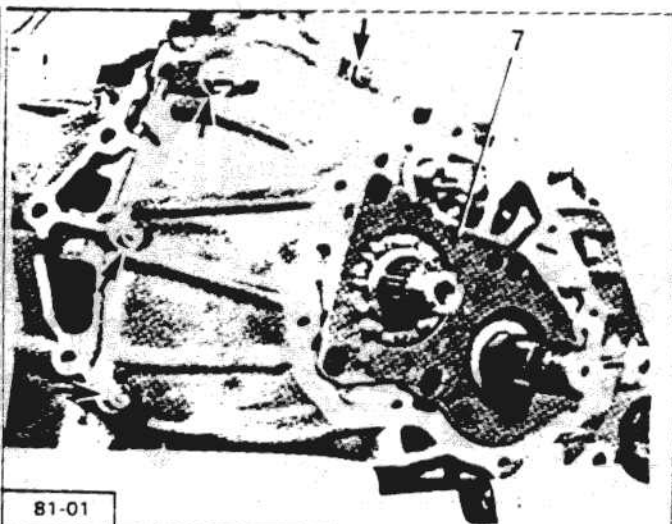
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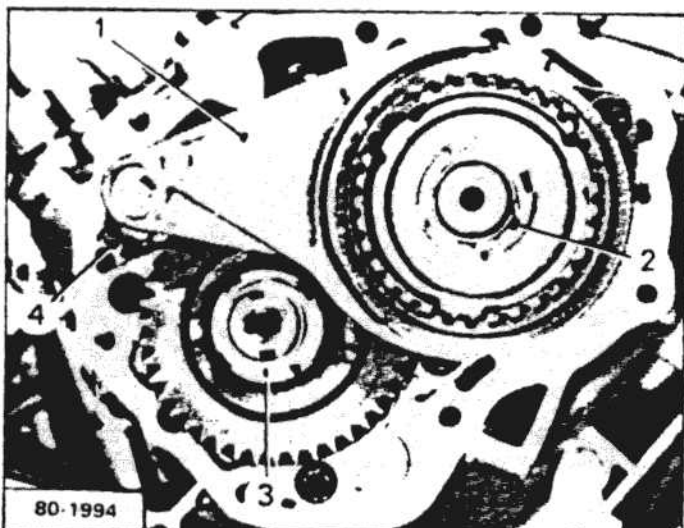
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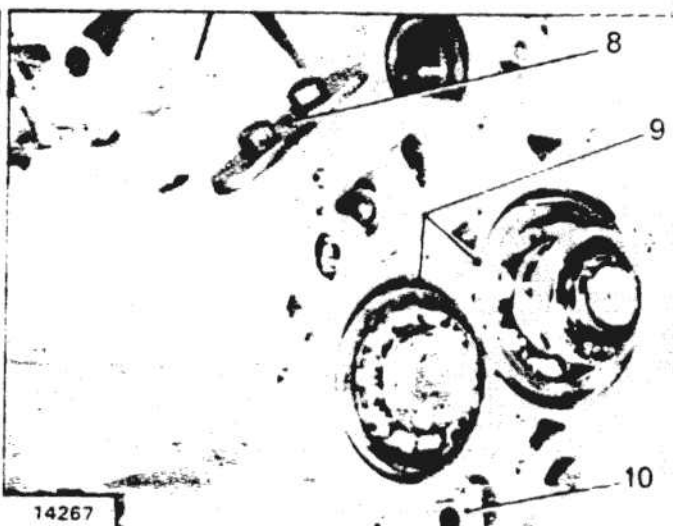
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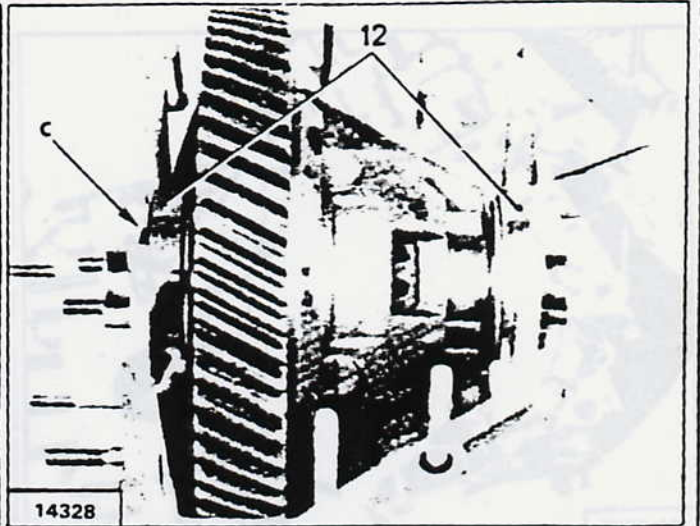
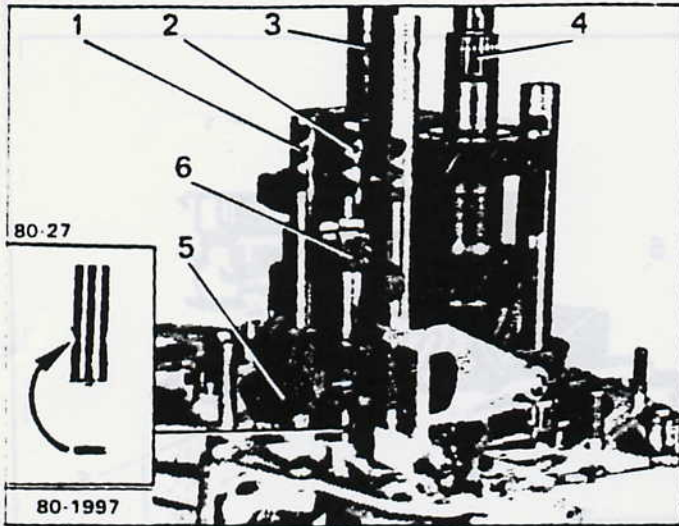
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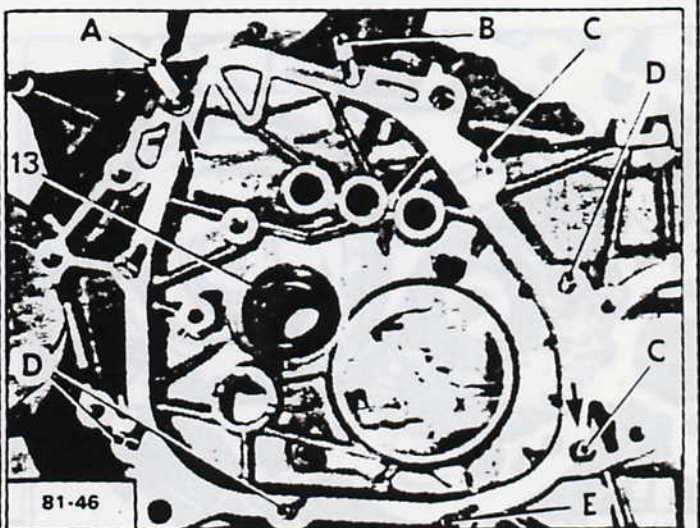
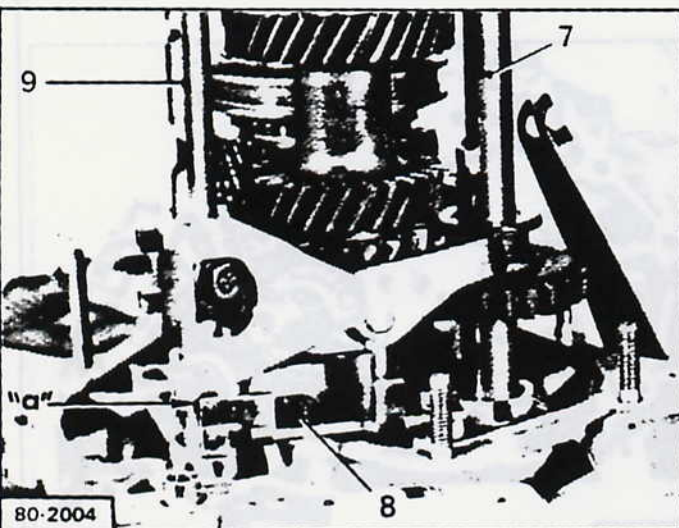
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VI

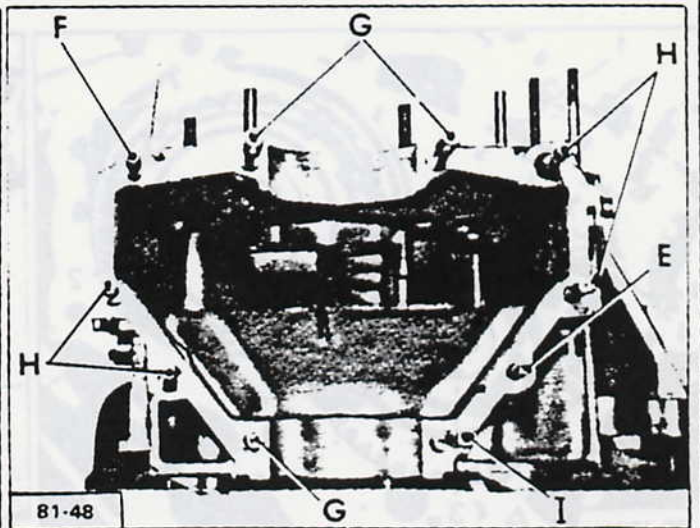
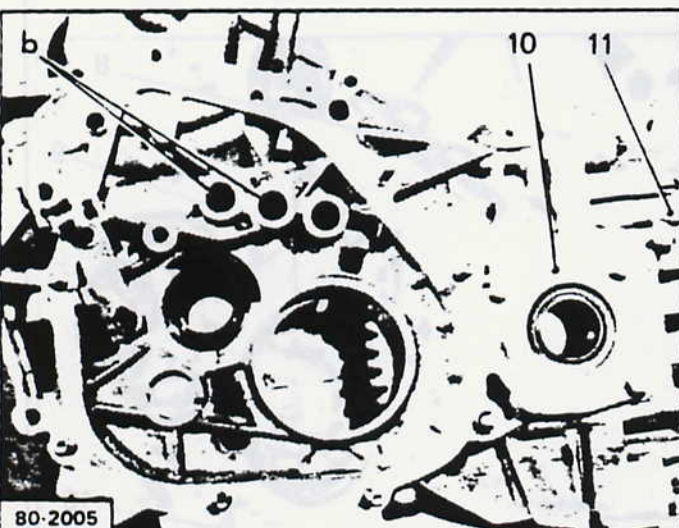


IV



II

V



III

VI

Remove the shift fork shafts and shift forks, Figs. I and II

Remove :

- bolts (5) and (6),
- shafts (1) and (2) their forks : shaft (2) has a locking plunger on it.

Place the reverse shift control in the reverse position, Fig. II.

Remove, Fig. II.

- shaft (7) and the reverse gear,
- shaft (9) and the control components.
(Warning - there is a ball and a spring at (a)),
- bolt (8), and take out the bracket.

Remove, Fig. I : the input shaft (4) and the output shaft (3), together.

Take out : Fig. III.

- the locking plungers, from points (b), using a magnet.

Remove the crown wheel carrier : Fig. III and IV.

Remove :

- the bearing retainer plates (10),
- the final drive casing (11).

Remove the crown wheel carrier : Fig. IV.

If the bearings are to be reused, mark the positions of their outer track rings (12) and retain the adjusting shims that are fitted at (c).

PREPARING THE HOUSINGS

Prepare the clutch housing : Fig. V.

Replace seal (13), Oil its outer periphery and fit it, using the 36 mm i.d. x 42 mm o.d. tube.

Fit the assembly studs, when applicable, Figs. V and VI.

STUD			
Ref.	Qty	Ø in mm	Length in mm
A	1	8	100
B	1	8	85
C	2	8	60
D	4	8	45
E	2	8	50
F	1	8	65
G	3	10	90
H	4	8	75
I	1	10	115

Check that the two locating dowels (➡) are in position.

Removing the clutch control : Figs. I and II.

Unclip and remove the clutch release bearing and the dust seal (3).

Remove :

- the circlip (5),
- the control (4),
- the bearing (6).

Push the fork (1) downwards to release it from its pivot bearings.

Refitting the clutch control : Figs. I and II.

Lubricate the pivot bearings. * Fit protective sleeve (2) and fork (1).

Fit :

- bearing (6) in its location,
- the control (4),
- the circlip (5).

Impregnate the dust seal (3) with engine oil.

Lubricate the release bearing guide tube* before fitting the seal (3) and the bearing. Clip the release bearing in place.

*Using MOLYKOTE B 21 lubricating varnish.

Prepare the gearbox housing.

Removing the gear shift control : Fig. III.

Loosen the guide nut (7) and remove the control from inside the housing.

Refitting the gear shift control : Figs III and IV.

Fit the spring (9) and its locating ring (8) in place, then fit the roll pin. Fit the spring (10). Place a new "O" ring seal in position (a) on the guide nut (7) and fit a new copper washer at (11).

Lubricate the bearing and the "O" ring seal. Fit the control.

Tighten the guide nut (7) to a torque of 12 m.daN (120 Nm, 88 lbt ft).

Adjusting the bearing end float : Fig. V.

Fit a circlip (12) into the groove in the bearings and place them in the housing.

Fit dial indicator **D** 8.1504 to extension **B** 8.0110 H hand set the assembly, on zero, on a surface plate.

Place the extension on the housing and measure the distance between the face (c) on the housing and the upper bearing face (b).

The upper face on the bearing (b) is to be between a maximum of 0.05 mm below face (c) on the carter, and a maximum of 0.02 mm above it. This ensures that there is between a clearance of 0.05 mm and a preload of 0.02 mm at the bearings.

Select a circlip (12) of the correct thickness to obtain these conditions.

Preparing the differential casing : Figs. VI, VII and VIII.

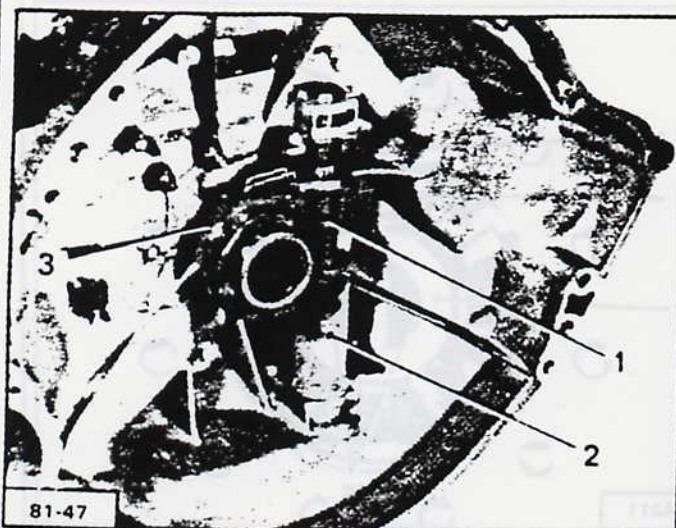
Remove bolt (13) and the speedometer drive assembly (14).

Ensure that the two locating dowels (→) are in position.

Fit an "O" ring seal at (d).

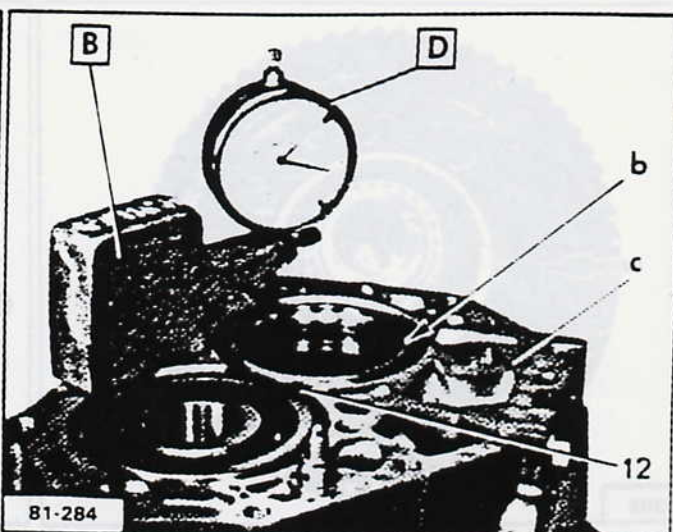
Lubricate the gear locating area before fitting it.

Fit guide (14) and bolt (13) without tightening the bolt.



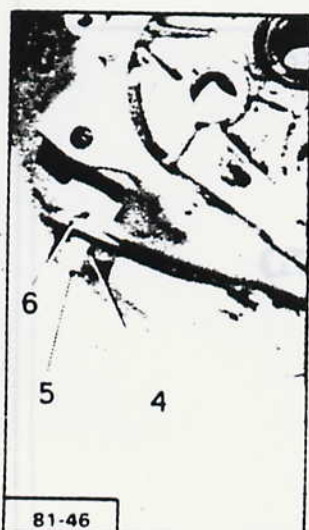
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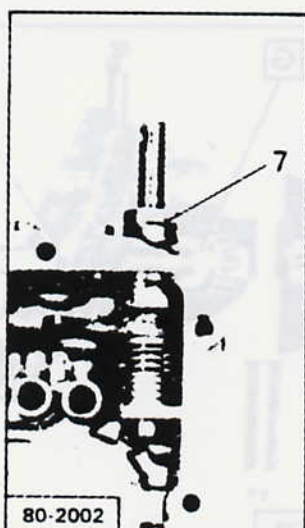
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V



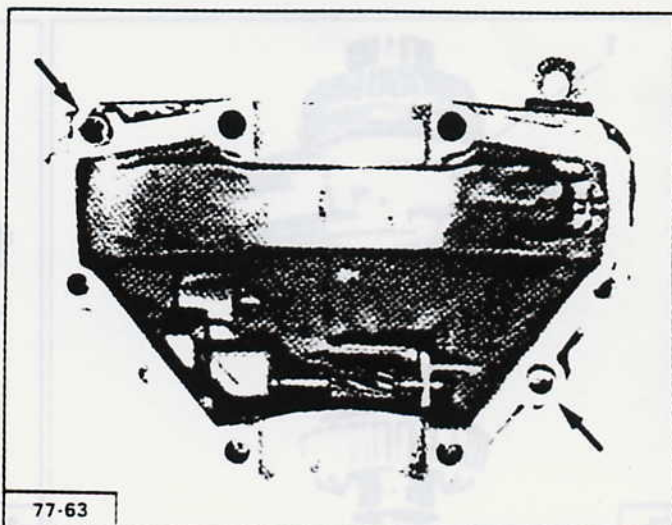
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II



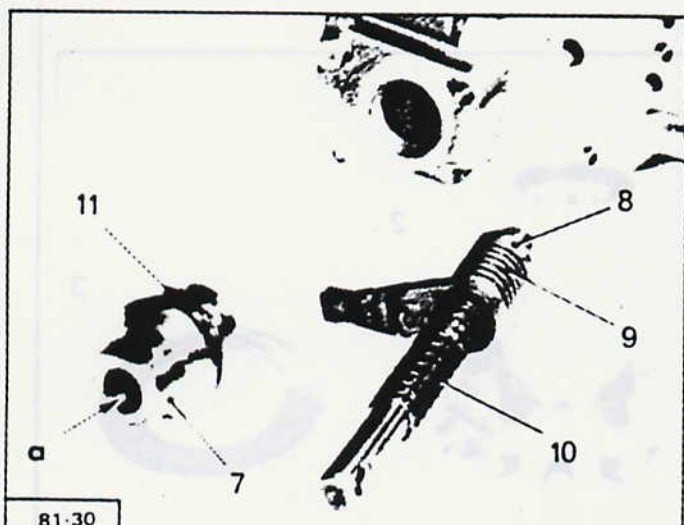
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III



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VI



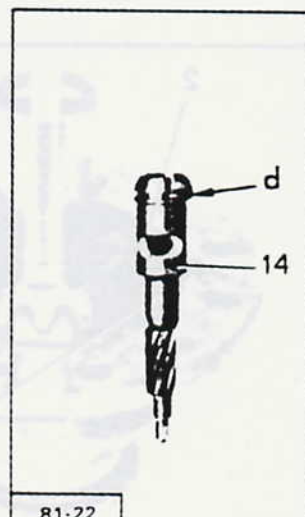
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IV



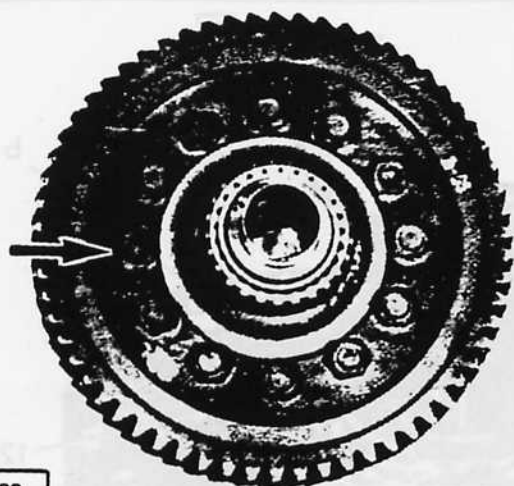
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VII

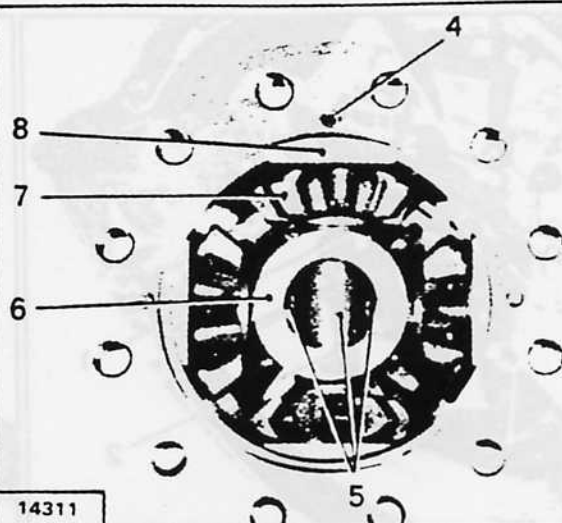


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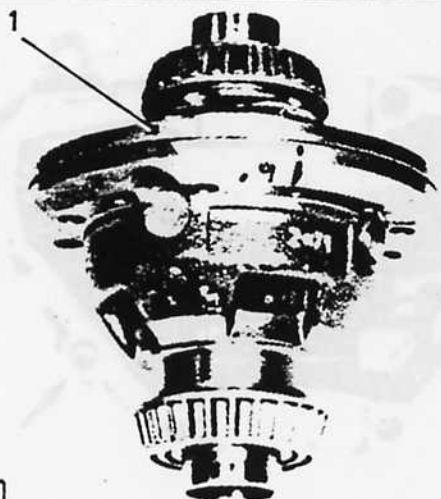
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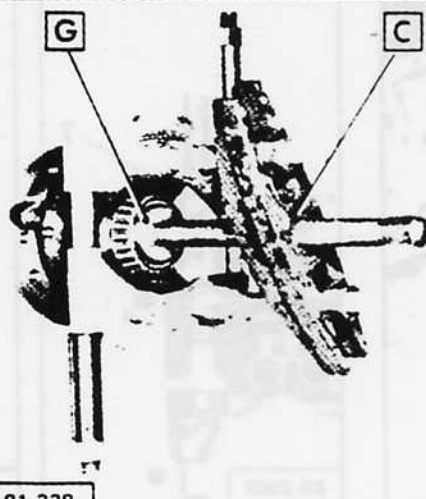
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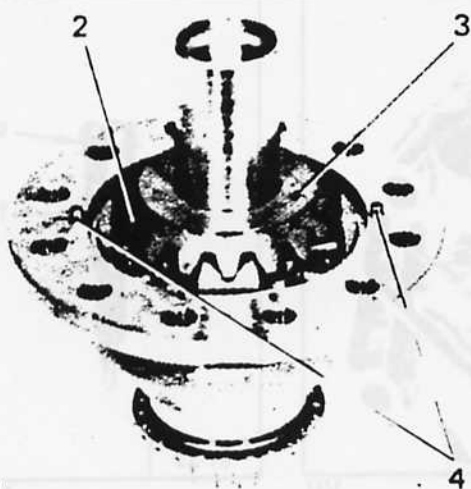
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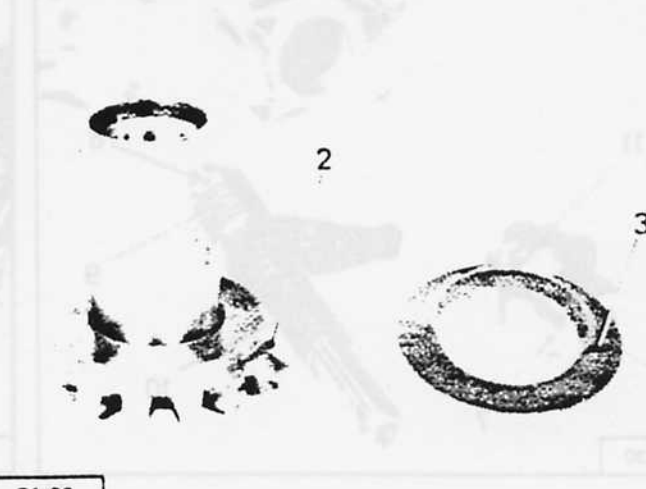
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V



III



VI

PREPARING THE DIFFERENTIAL

Dismantling the differential.

Remove Figs. I, II, III and IV.

- the crown wheel securing bolts (→),
- the crown wheel,
- the differential housing flange (1),
- the sun wheel (2) and its adjusting washer (3),
- the three dowel pins (4),
- the three planet gear spindles (5),
- the spider (6),
- the four planet gears (7) and their thrust pads (8),
- the second sun gear and its adjusting washer.

Remove the bearings : Fig. V.

Use extractor-release tool (C) and pad (G) 8.0318 K. to remove the bearings.

Clean all the parts.

Fitting the bearings.

Fit the taper roller bearing inner track rings, using a press and a tube (with a minimum inside diameter of 46 mm).

Do not interchange the bearing outer track rings.

Place in the housing : Figs. VI and IV.

- one adjusting washer (3), (with the slooth face, in which the lubrication groove is machined, against the sun gear) and one sun gear (2),
- the thrust pads (8) (with the chamfer towards the inside of the housing),
- the planet gears (7),
- the spider (6),
- the spindles (5),

The sun gear (2) must turn freely, without any stiffness, and must be seated against the bottom of the housing.

Adjusting the differential.

Adjust the first of the sun gears : Fig. I and II.

Prepare the assembly shown in figure 1.

Set extension [B] 8.0110 H H, fitted with dial indicator [D] 8.1504 and a 35 mm spacer, on the housing, with the dial indicator plunger against one of the teeth on the sun gear.

Adjust the dial indicator to zero.

Without moving the extension, rest the assembly on the end of the sun gear at (a).

Repeat this operation on several different teeth. The minimum end float should be approximately 0.10 mm.

If it is not, fit an adjusting washer of the thickness necessary to obtain the required end float.

Fit : Fig. IV

- the spindle dowel pins (2).

Fit the second sun gear (3) and the second adjusting washer (4) (with its groove against the wheel).

Adjust the second sun gear : Fig. III and IV.

Place the extension fitted with the dial indicator and a 20 mm adapter against the differential flange (1).

Set the dial indicator on zero.

Place the extension against the adjusting washer (4) with its plunger on the differential housing.

Take this reading at several different point.

The minimum difference should be approximately 0.10 mm.

If it is not, fit a washer of the required thickness to obtain this difference.

Fit, to the housing : Fig. V and VI.

- the flange (1),
- the crown wheel (with groove (b) on the same side as the bolt heads).

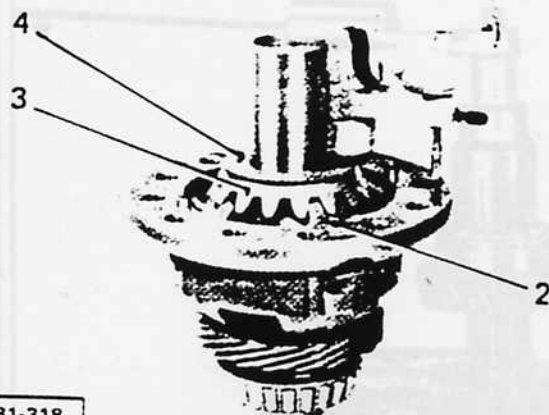
Tighten the bolts to 9 m.daN (90 Nm, 66 lbf ft) (faces and threads oiled).

Ensure that the assembly turns freely, without any tight points.



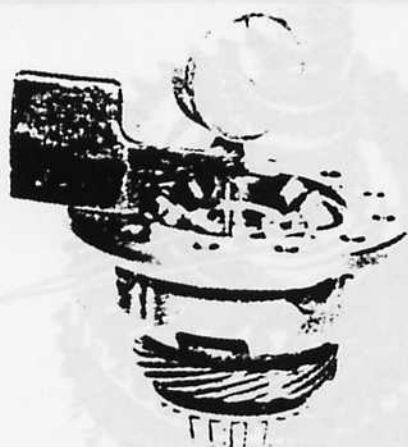
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I



81-318

IV



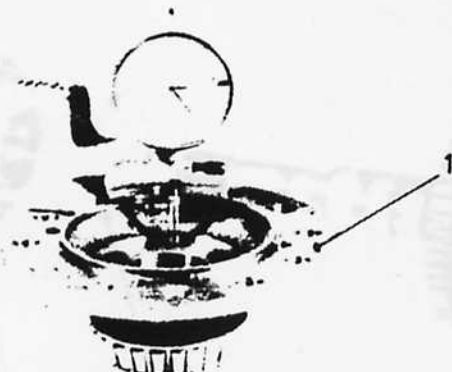
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II



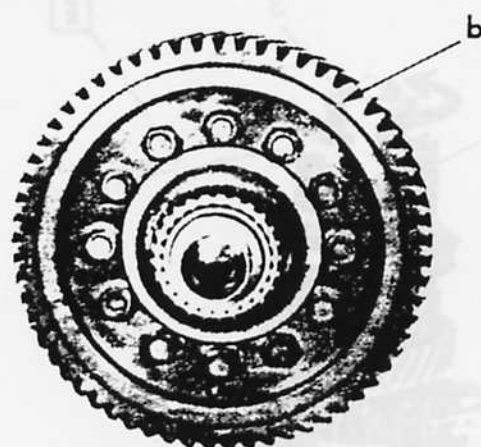
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V



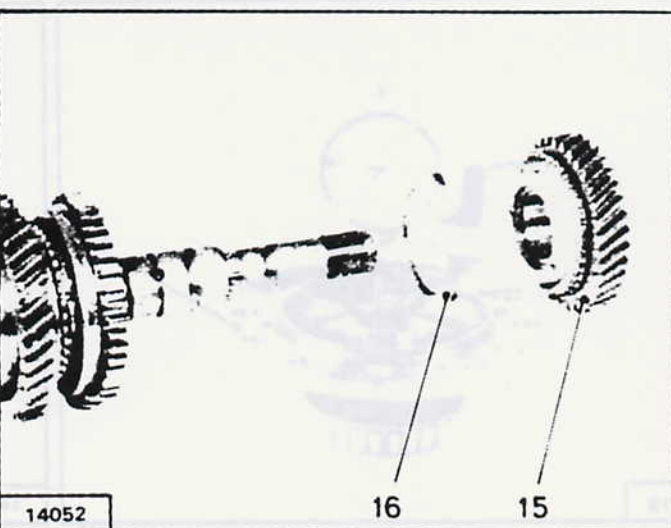
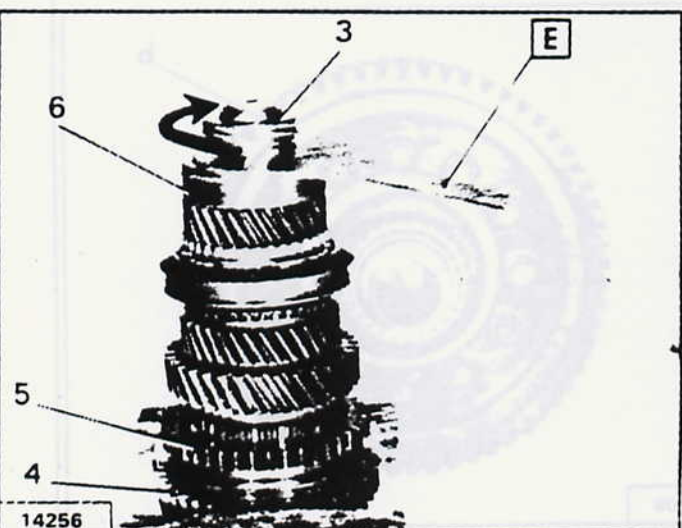
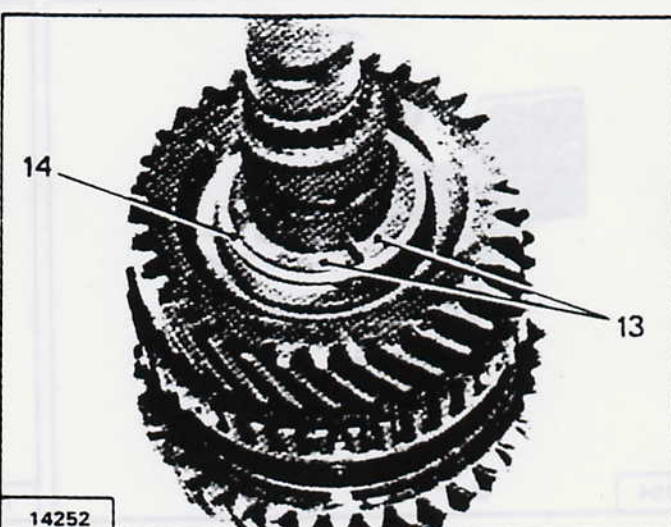
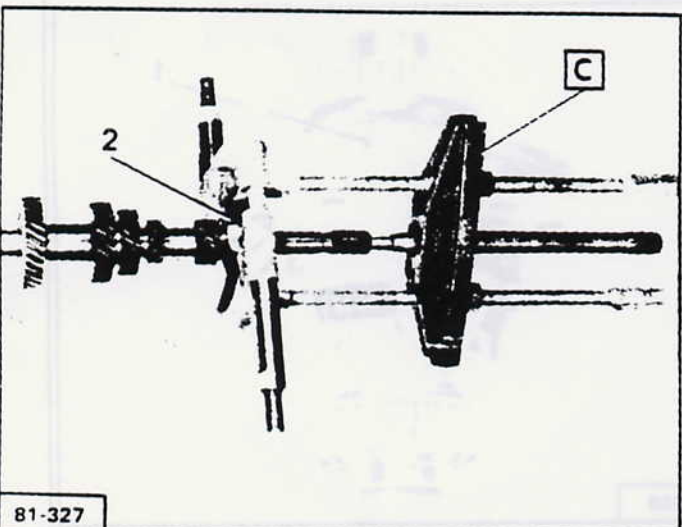
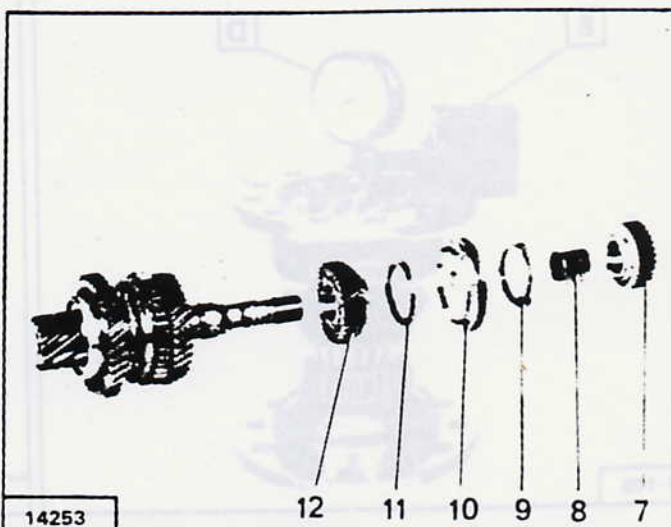
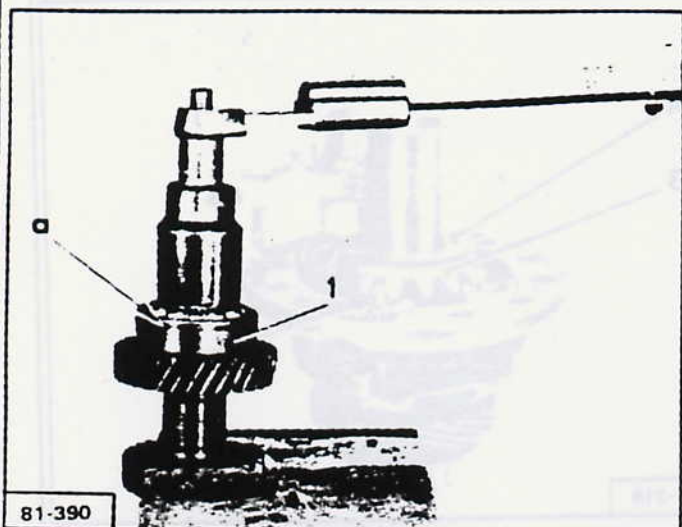
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VI



PREPARING THE INPUT SHAFT.

Replace the bearings : Fig. II.

Remove the bearing (2) using extractor [C].

Fit the bearing (2) using a tube 36 mm i.d. x 42 mm o.d. x 200 mm long.

4 speed gearbox : Fig. I.

Remove the bolt by gripping the shaft in a vice fitted with soft jaws.

Fit the bearing (1) (without its circlips) and with groove (a) facing towards the outer end of the shaft.

Tighten the bolt to a torque of 14 m.daN (140 Nm 104 lbf ft).

Remove : Fig. IV.

- the 4th speed gear (7), and its bush (8),
- the 4th speed baulk ring (9).

If the synchroniser assemblies are to be re-used keep the baulk rings with their respective gears.

- the 3rd-4th synchroniser hub assembly (10),
- the 3rd speed baulk ring (11),
- the 3rd speed gear (12).

Remove : Fig. V

- retaining ring
- retaining ring (14),
- the thrust washers (13).

PREPARING THE OUTPUT SHAFT.

Dismantling the output shaft.

4 speed gearbox : Fig. III

Grip the output shaft in a vice fitted with soft jaws, across the first speed gear (4) which is locked to the shaft by sliding gear (5).

Unlock and remove nut (3).

WARNING : It has a left hand thread

Use a 36 mm open ended spanner.

Remove bearing (6).

Remove : Fig. VI

- the 2nd speed gear (15),
- the 2nd speed baulk ring (16).

- Remove : Fig. I
- the circlip (1) using pliers **F** 8.316 B.

Remove : Fig. II.

- The 1st-2nd speed synchroniser hub assembly (2).
- The baulk ring (3).
- The 1st speed gear (4).

Replace the bearing : Fig. III.

Remove the circlip at (a), using pliers **F** 8.0316 B.

Remove the bearing (5) using extractor **C** (Place one contact washer at (c) to protect the pastic end).

The bearing areas for the various gears on the output shaft must be absolutely free from defect.

Under no circumstances are these areas to be refaced by any means whatsoever.

The output shaft must be fitted with its two plastic ends (6).

Fit the bearing (5) on the press using the tube 42 mm i.d. x 48 mm o.d. 280 mm long and fit the circlip at (a) : Fig. II.

Place the pointed ends of the circlips on the opposite side to their respective components to facilitate their removal, at a later date, if necessary.

Oil the gear bearing areas and the baulk rings with gearbox oil before fitting them.

Fit : Fig. II

- the 1st speed gear (4),
- the baulk ring (3),
- the 1st-2nd speed synchroniser hub assembly (2) (with groove (b) towards the 1st speed gear).

Assembling a ball type synchroniser : Fig. IV.

Place the three springs (8) and the three pads (9) in the hub (7).

Place this assembly against the sliding sleeve (11). (The flat face of the hub (7) is to be towards the groove on the sliding gear (11). Fit the three ball (10).

Measure the 1st-2nd speed synchroniser hub end float Fig. I and V.

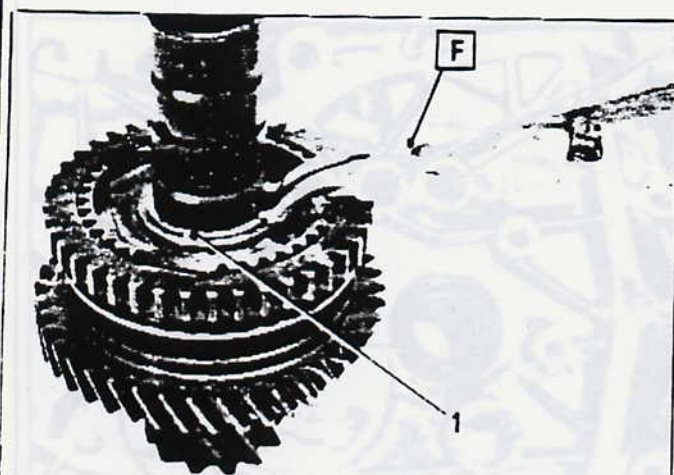
Select, from the circlips thicknesses available (1) one that will provide a maximum end float of 0.05 mm.

It should not be possible to insert a 0.05 mm feeler gauge between the retaining ring (1) and the side wall of the groove.

Repeat these operations to determine the thickness of the 2nd and 3rd speed gear thrust washers (maximum clearance 0.05 mm).

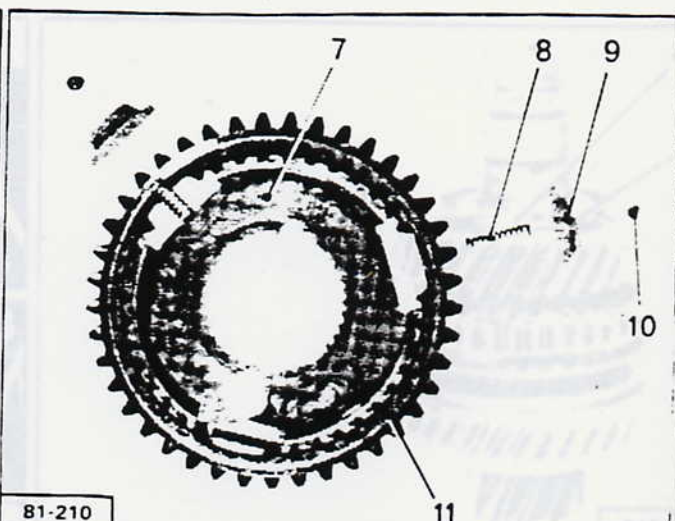
Fit : Fig. VI

- the 2nd speed baulk ring (12),
- the 2nd speed gear (13).



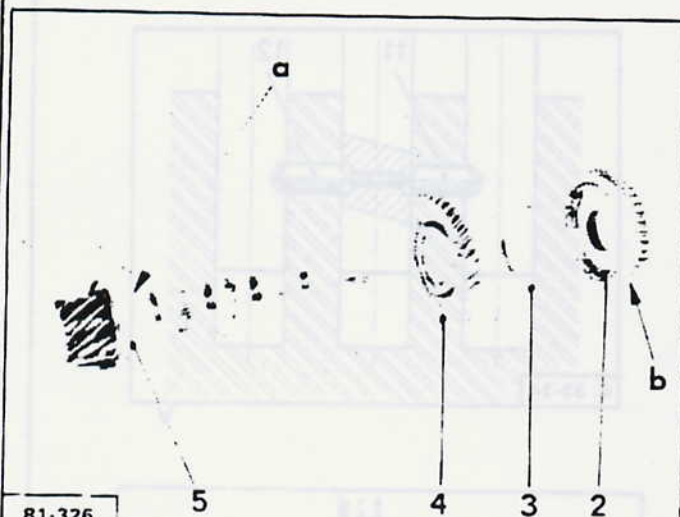
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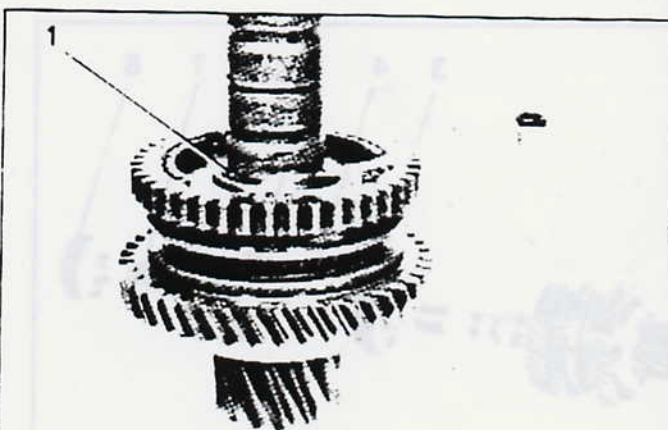
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IV



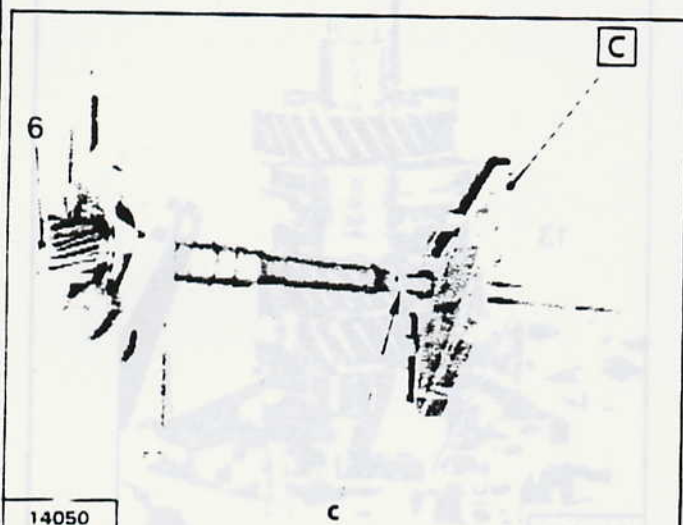
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II



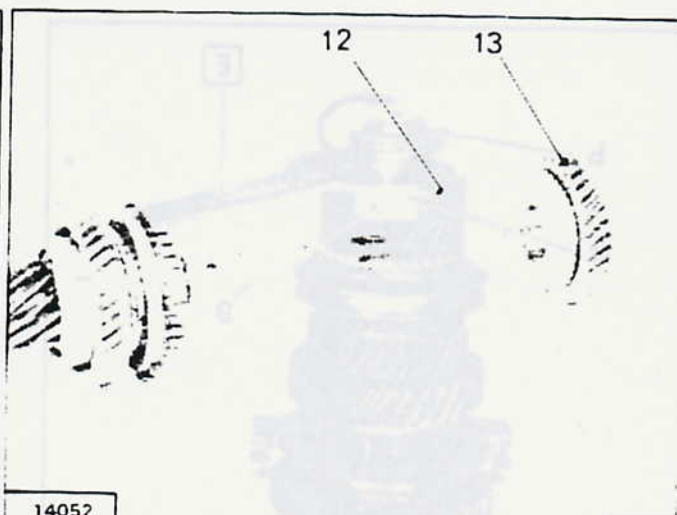
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V



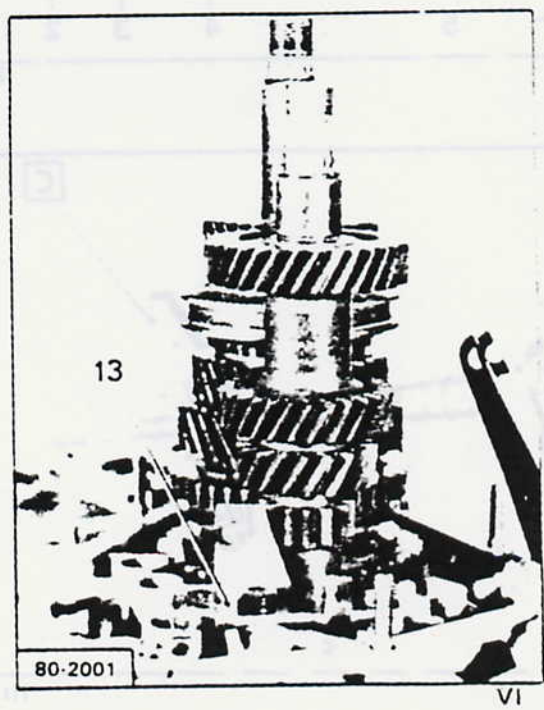
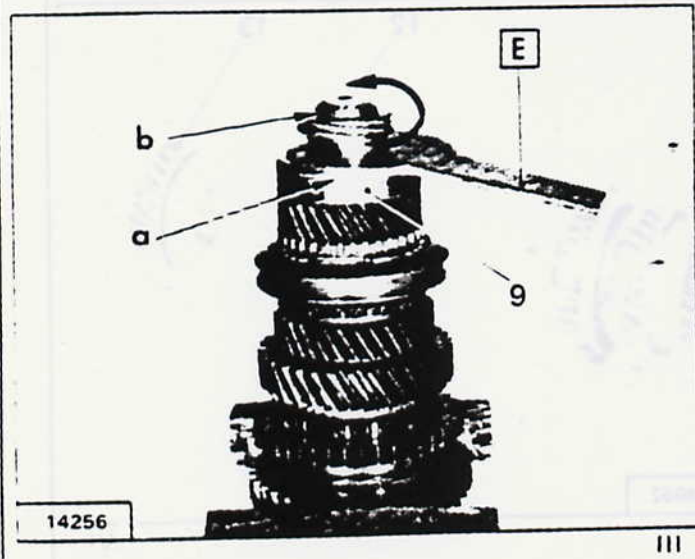
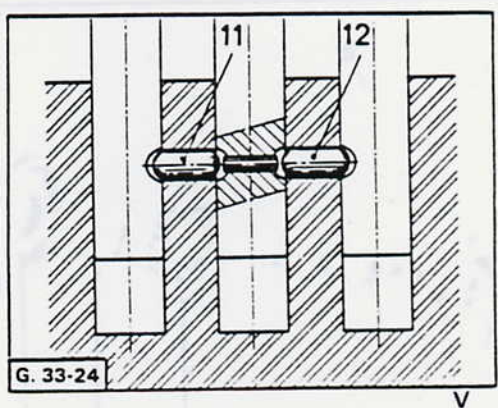
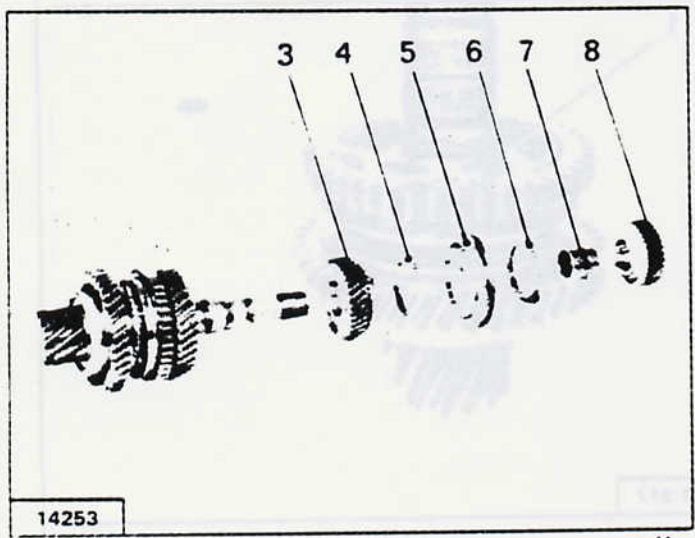
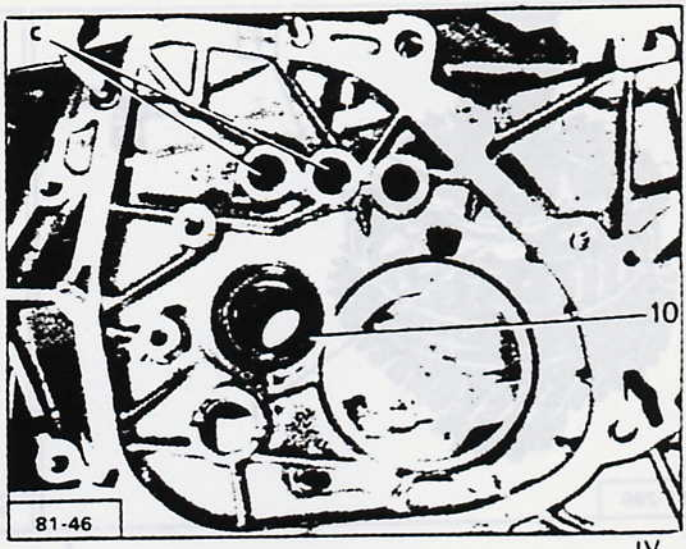
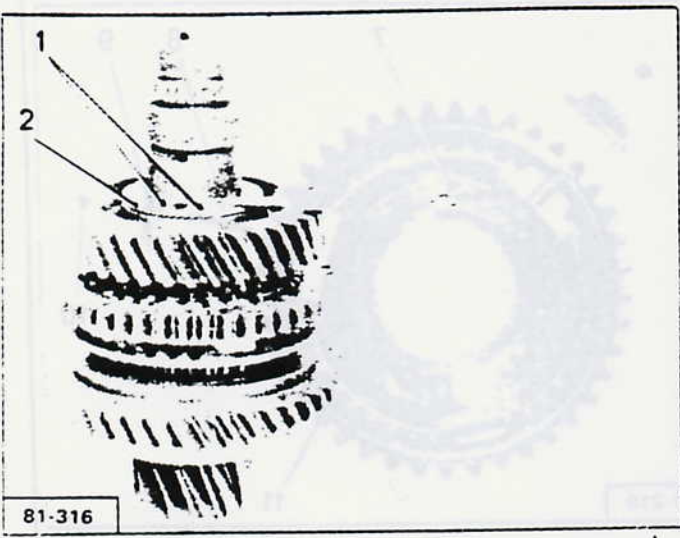
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III



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VI



Fit : Fig. I

- the thrust washers (1) (after having adjusted the clearance),
- the retaining washer (2).

Fit : Fig. II

- the 3rd speed gear (3),
- the 3rd speed baulk ring (4),
- the 3rd-4th speed synchroniser hub and sliding sleeve assembly (5),
- 4th speed baulk ring (6),
- the 4th speed gear bush (7),
- the 4th speed gear (8).

4 speed gearbox, Fig. III.

Place the bearing (9) in position (without its circlip) and with the groove (a) towards the outer end of the bearing (it has a left hand thread).

Grip the shaft across the 1st speed gear in a vice equipped with soft jaws. Engage the 1st-2nd speed sliding sleeve with the 1st speed gear to lock the shaft.

Tighten the nut to a torque of 20 m.daN, (200 Nm, 148 lbf ft.

(using the FACOM 36 mm open ended spanner end fitting).

Peen the collar (b) into to the slot in the output shaft.

REASSEMBLING THE GEARBOX

Prepare the clutch housing : Figs. IV and V.

Fit the locking plungers (11) and (12) into their locations marked (c), between two of the shift fork shaft recesses.

Fill the space between the two lips on seal (10) with grease.

Fit the shafts : Fig. VI.

Insert the input and output shaft TOGETHER AS AN ASSEMBLY.

Fit bracket (13).

Tightening torque - 2.8 m.daN (28 Nm, 21 lbf ft).

Identifying the shift fork shafts : Fig. I.

- A) 1st-2nd shift fork shaft :
- 3 ball detents at (a),
 - 1 detent groove at (g).
- B) 3rd-4th shift fork shaft
- 3 ball detents at (b),
 - 2 detent slots at (f) plus an interlock pin,

4 speed gearbox :

- C) Reverse shift fork shaft (not illustrated)
- 2 ball detents at (c),
 - 1 flat at (d).

5 speed gearbox

- C) Reverse and 5th speed shift fork shaft :
- 3 ball detents at (c),
 - 1 flat at (d),
 - 1 groove at (e).

Identifying the shift forks and the reverse selector systems, Figs. II and III.

- A) 1st-2nd shift fork,
- B) 3rd-4th shift fork and transfer lever,
- C) Reverse or 5th speed shift fork.

4 speed gearbox : Fig. II

- assembly (1) and spacer (2).

5 speed gearbox : Fig. III

- assembly (1) and piston (3) with its spring.

Prepare the reverse - 5th shaft Fig. I, II, III and IV

Place the reverse shift shaft C, the clamp (4) and the relay (6) in position (on the 4 speed gearbox, the spacer (2) is to be placed in position « 1 »)

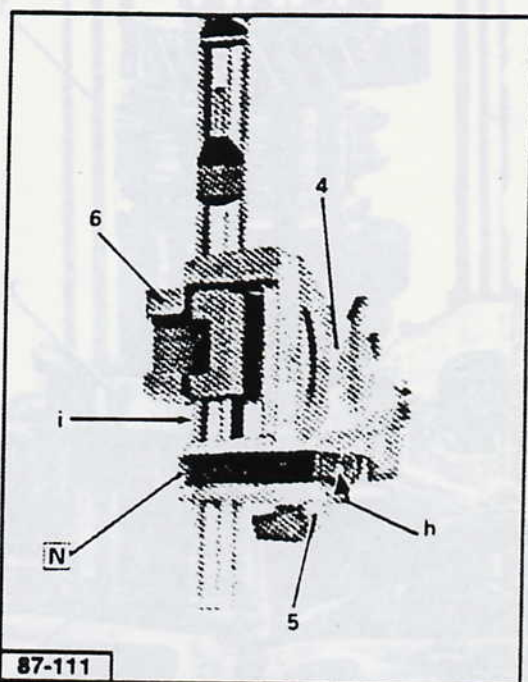
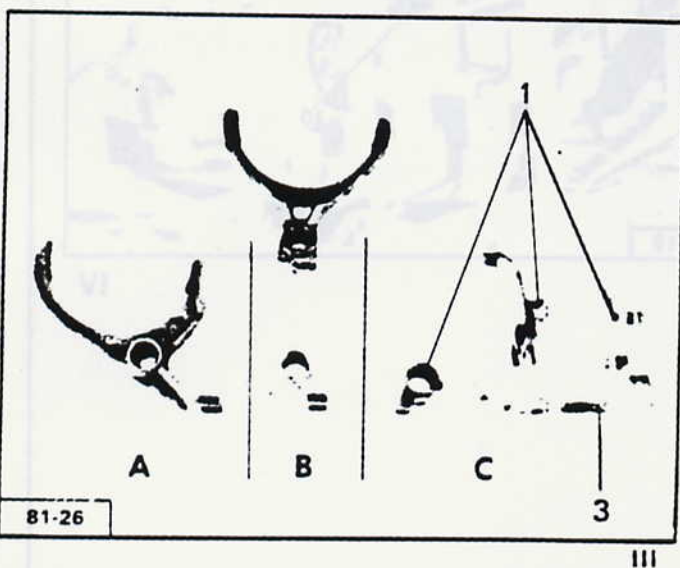
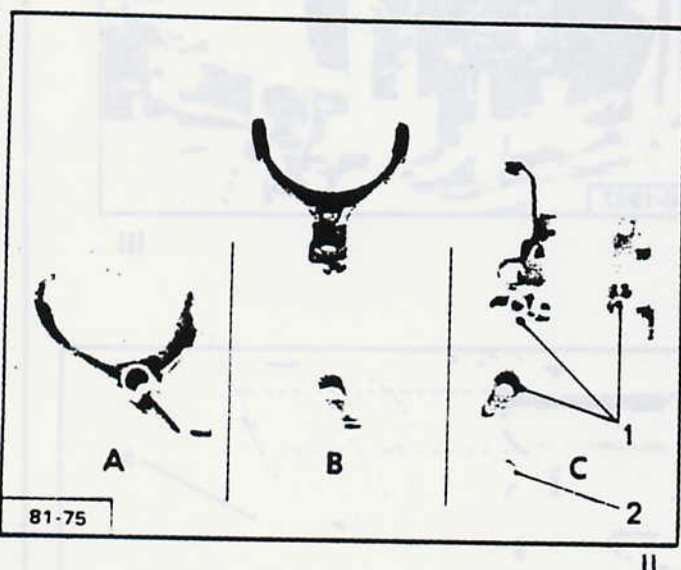
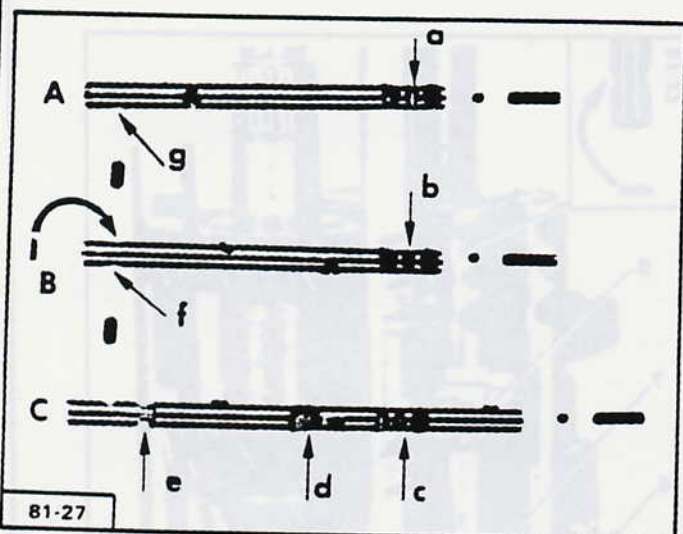
Tighten the relay (6) to 28 N.m (20.6 lbf.ft.)

On the 5 speed gearbox, prepare the tool (N) as shown in the drawing. Place the piston (3) and the spring in position « h » (the piston should enter the groove « e » in the shaft).

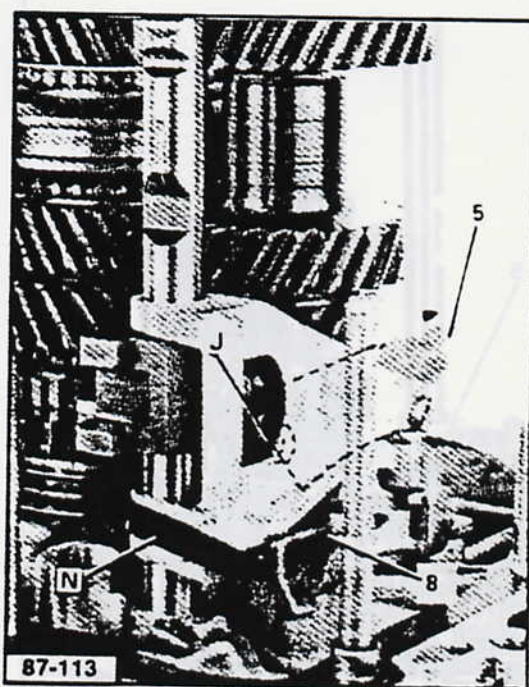
Fit the tool (N) to retain the piston in its groove.

Place the lever (5) in position

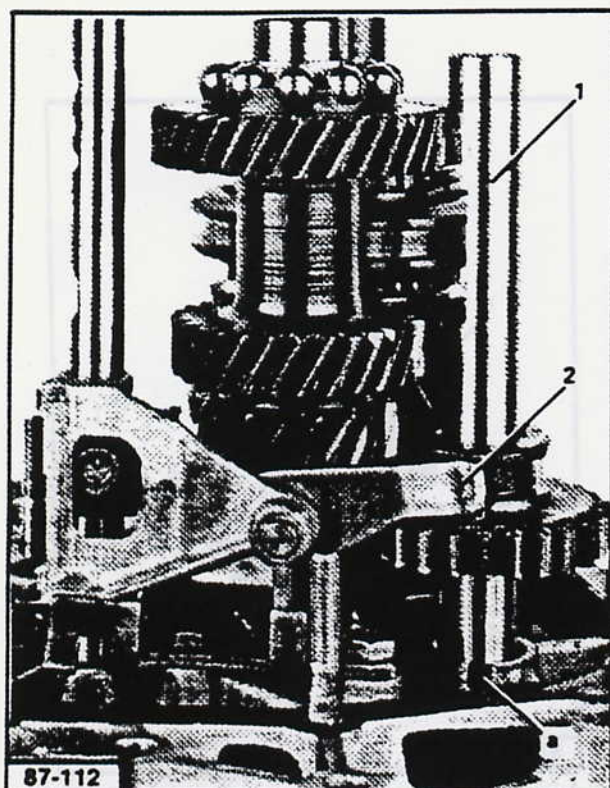
Fit the reverse shift control Fig. V
Ensure that the slot « j » in the lever (5) engages with the support shaft (7).



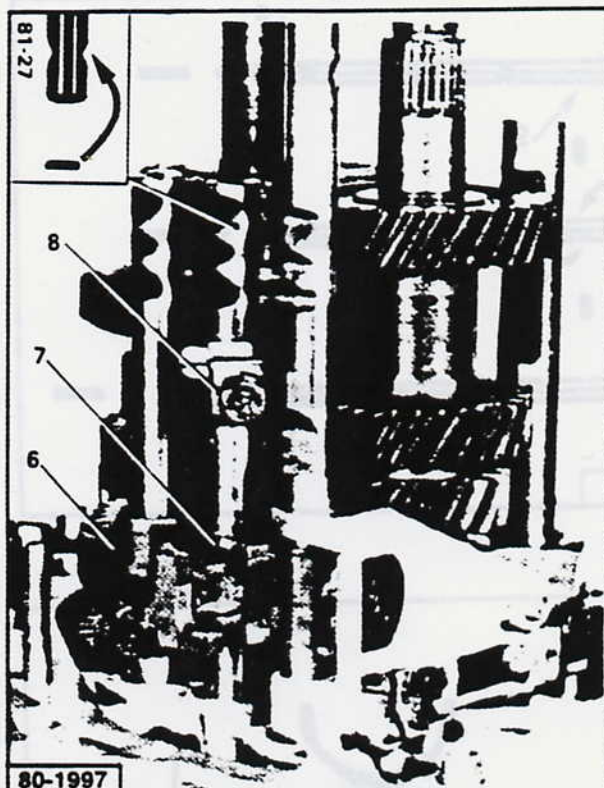
IV



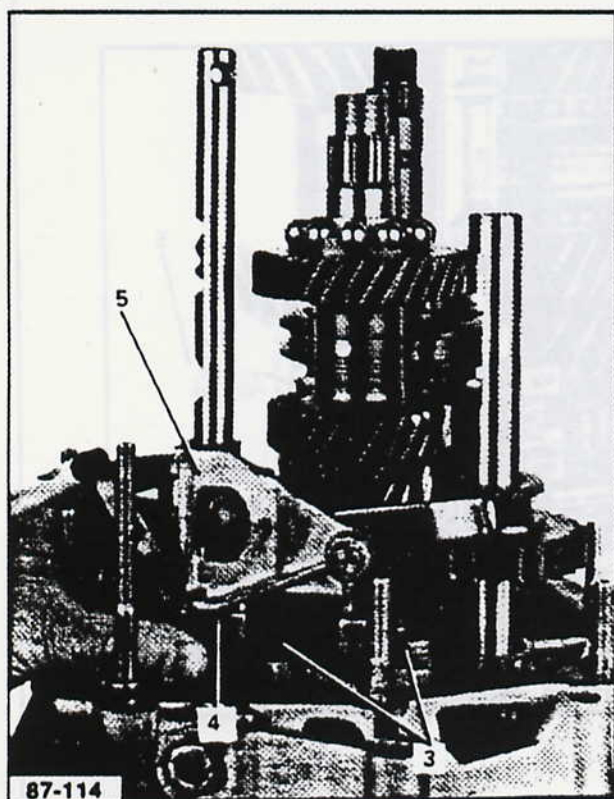
V



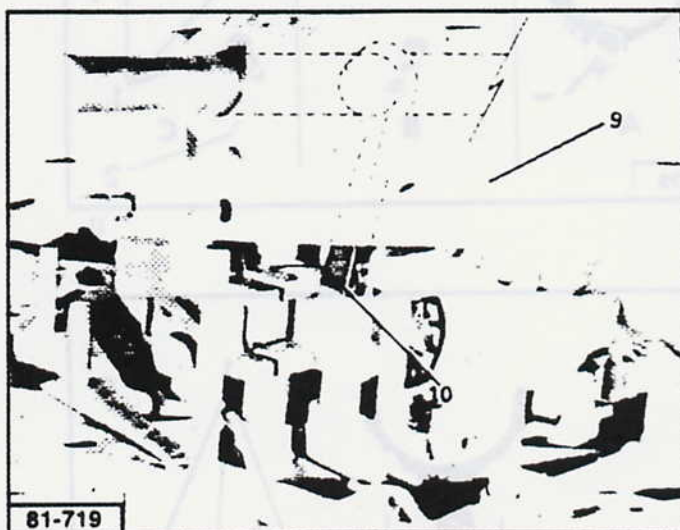
I



III



II



IV

With the gear shift in the reverse position

Fit, Fig. I, the shaft (1) together with the reverse gear, engaging the lever (2) in the groove in the reverse gear, until the retaining pin enters its location « a » (grease the shaft O ring).

Remove (N)

Fit, Fig. II, between the support (4) and the control (5), a 0.5 mm shim

Tighten the bolts (3) to 28 N.m (20.6 lbf.ft.).

Place the reverse shift control in the neutral position.

Fit, Fig. III

- The 1st - 2nd shift fork (6)
- Tighten the control relay (7) on the 3rd - 4th shaft to 28 N.m (20.6 lbf.ft.)
- Place the locking relay finger in its location and fit the shaft and fork assembly (8)
- The 1st - 2nd fork shaft, engaging it in the 1st - 2nd shift fork

Tighten the bolts to 28 N.m (20.6 lbf.ft.)
(Spring washers)

Fit the gearbox housing : Fig. IV

Fit the housing gasket.

Ensure that all the gears are in the neutral position (relays in alignment).

Engage the housing (9), ensuring that the selector finger (10) is in exactly the correct position in the control relay (when the selector finger (10) is in position, the selector can only move longitudinally, in both directions ↔).

Tighten the housing nuts. Torque 28 N.m (20.6 lbf.ft.) (flat washers).

Fit the bearing retaining plate : Fig. I and II

4 speed gearbox :

Fit the retaining circlips (2) with the bearings in position.

5 speed gearbox :

Fit the bearings already fitted with the circlips.

Fit the bearing retaining plate (5).

Tighten the bolts to 22 N.m (16.2 lbf.ft.).

Fit the locking balls : Fig. I

Fit the three balls (3) and the three springs (4). Fit the paper gasket and the plate (1).

Tightening torque = 28 N.m (20.6 lbf.ft.).

Ensure that the gears select correctly.

5 speed box :

Synchronisers :

1st possibility : Fig. III

Ball type synchronisers, the same as synchronisers as are fitted to 1st - 2nd and 3rd - 4th (see page 22).

2nd possibility : Fig. V

Roller type synchronisers.

Fit the 5th speed assembly :

1st possibility :

Fit : Fig. III and IV

- To the input shaft (10) :

- the gear (14),
- the nut.

- To the output shaft (11) :

- the bush (12),
- the gear (13),
- the synchroniser ring.

Place the synchroniser hub and sliding gear assembly (7), together with the fork (6), the retaining washer (8) and the nut, in position.

2nd possibility

Assembling a roller type synchroniser :

Fit the gear (13) : the synchroniser ring (16) and the sliding gear (15) (in the gear engaged position). Fit the synchroniser hub (17) together with the three springs (18) and the three plungers (19). Fit the three rollers (20) at the same time bushing back the plungers (19) with a small screwdriver. Fit the retaining plate (21).

Place the sliding gear in the neutral position.

Fit the clamp (K).

Fit : Fig. V and VI

- To the input shaft (10) :

- the gear (14),
- the nut.

- To the output shaft

- the bush (12),
- the gear (13),
- the assembly formed by the synchroniser ring, the synchroniser, and the fork, retained by clamp (K),
- the nut.

Tightening : input shaft nut = 260 N.m (192 lbf.ft.)

output shaft nut = 200 N.m (147 lbf.ft.)

(Engage 4th speed, using the selector and 5th speed, by pressing on the fork (6) to lock the shafts)

spanner (H)(-).0316 C, if necessary.

Lock the nuts by peening metal into the grooves in the shafts.

Fit the bolt (9) to the shift fork shaft.

Tightening : 28 N.m (20.6 lbf.ft.)

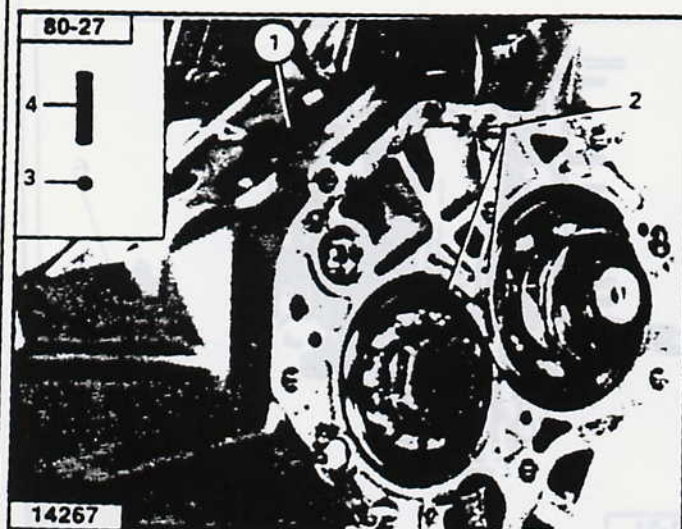
REMARK : it is possible to assemble the synchroniser DIRECTLY on the gearbox. To do this :

- Fit the following to the output shaft (11) :

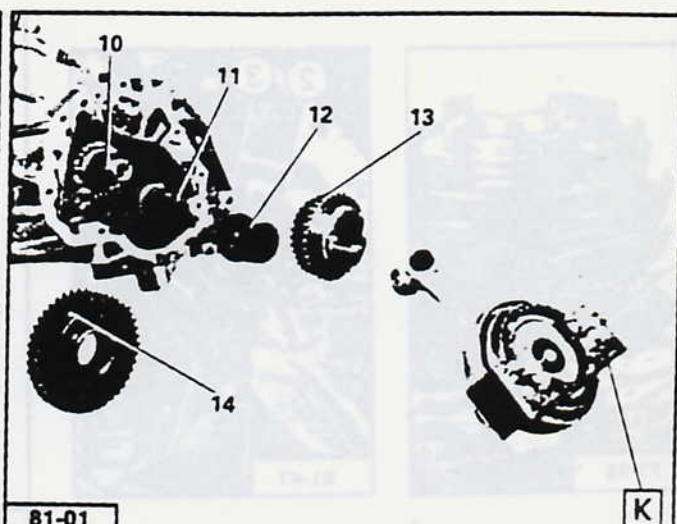
- the bush (12),
- the gear (13),
- the synchroniser ring (16),
- the sliding gear (15) and the fork (6) engaged on the shift fork shaft in an « gear engaged » position.
- Place, on the shaft, the synchroniser hub (17) together with the three springs (18) and the three plungers (19).

- Fit the three rollers (20), whilst pushing back simultaneously, the plungers (19) with a small flat screwdriver.

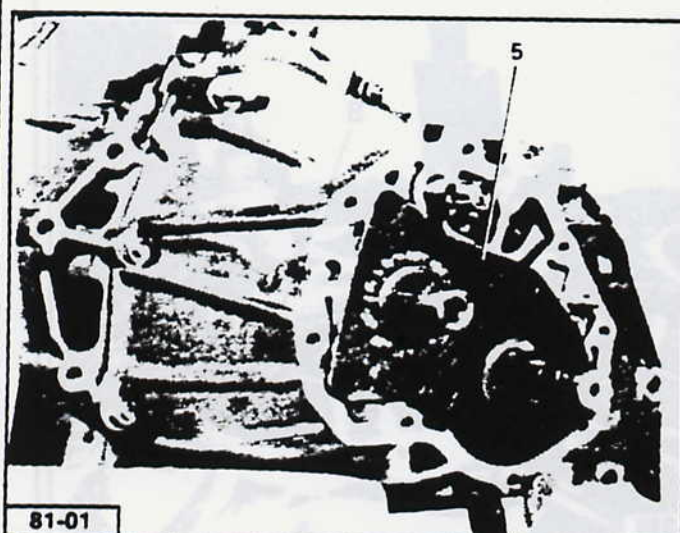
- Fit the retaining plate (21) and the nut.



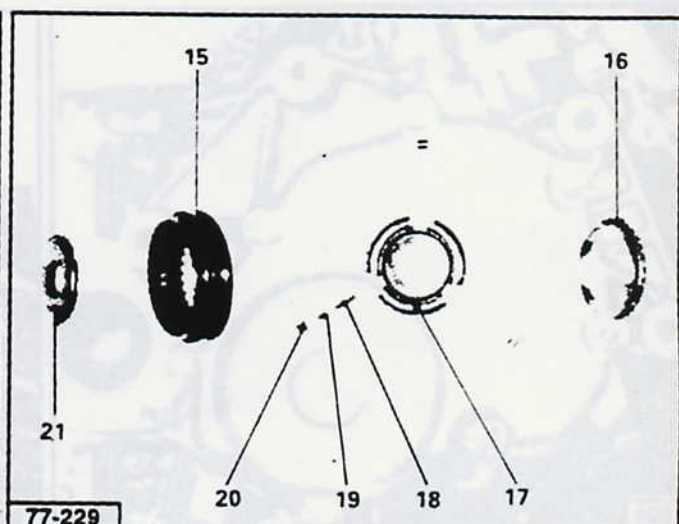
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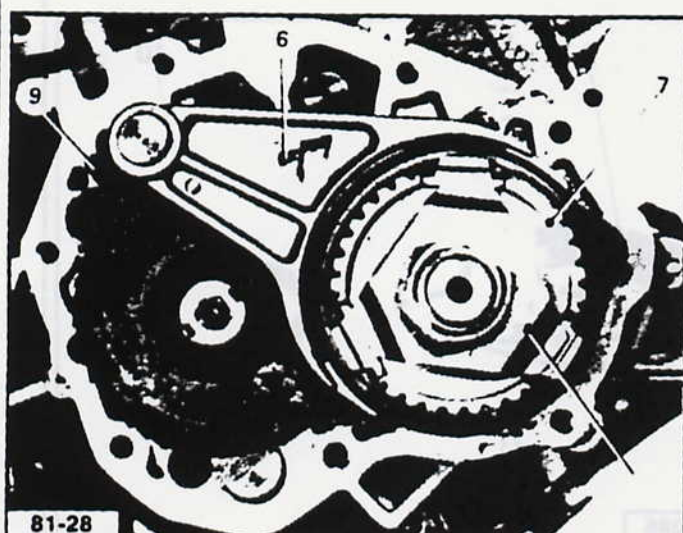
IV



II



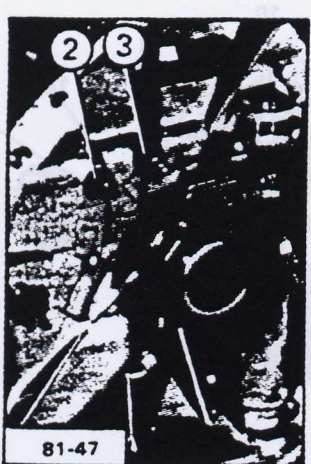
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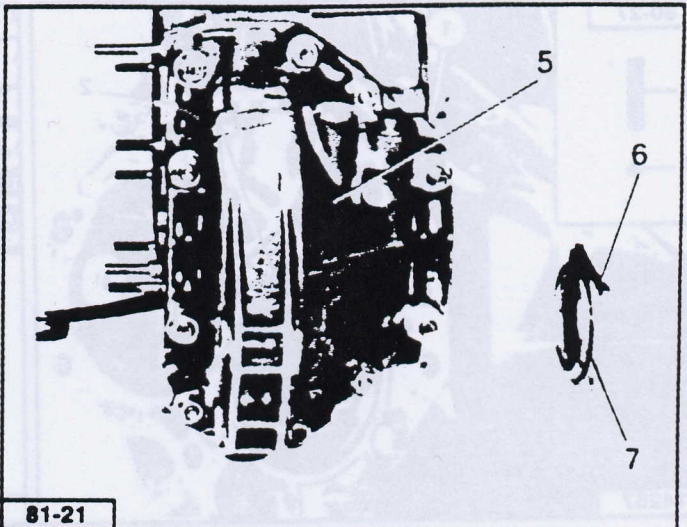
III



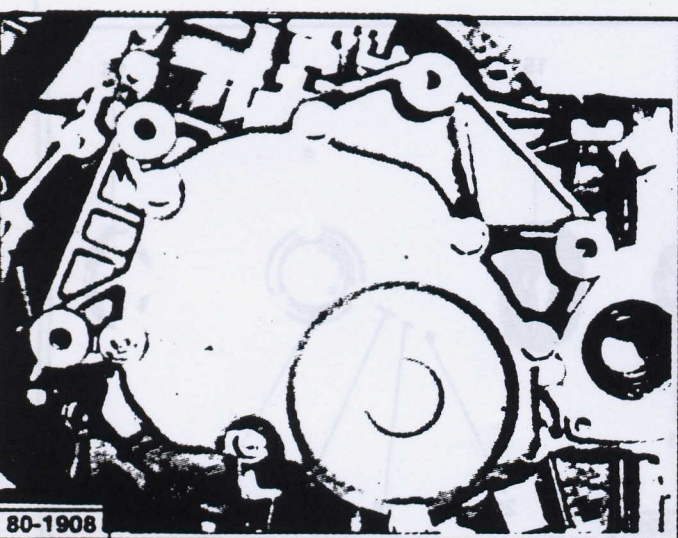
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II



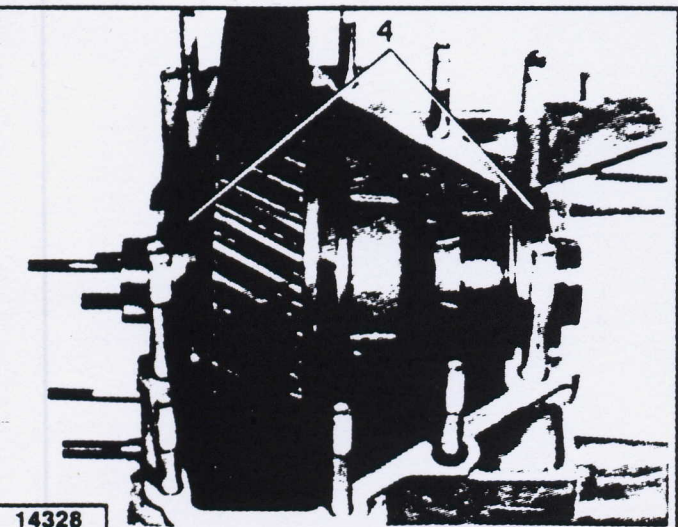
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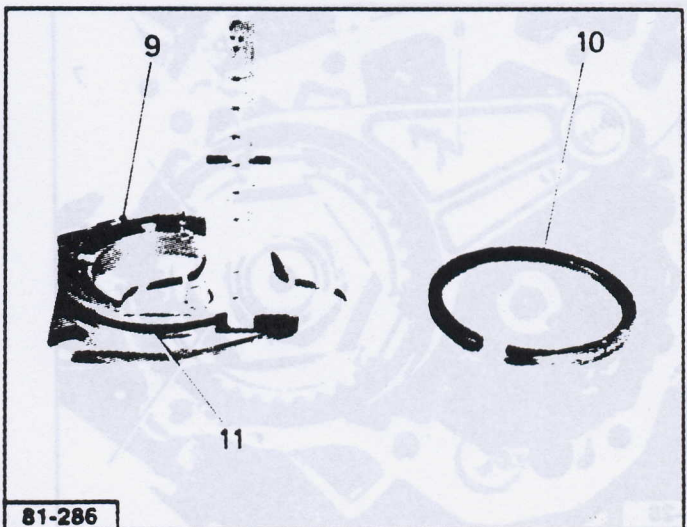
III



VI



IV



VII

Adjust the shift fork stop screws : Fig. I and II

Engage the gear in question. Using the shift fork, hold the sliding gear against the idle gear. Bring the adjusting screw into contact with the shaft, then screw it by an additional turn to make contact positive between the fork and the face of the sliding gear groove.

- screw (1) : 4th speed stop
- screw (2) : 5th speed stop
- screw (3) : 3rd speed stop

Tighten the lock nut.

Screws (2) and (3) are to have jointing compound applied to them before fitting.

Fit the cover : Fig. III

Fit the gasket.

Fit the seal.

Tighten the bolts to 28 N.m (20.6 lbf.ft.) (flat washers).

FIT THE FINAL DRIVE

Fit : Fig. IV

- the final drive gears fitted with their bearings (4).

Coat the joint face with jointing compound.

Fit : Fig. V

- the half housing (5),
- the cap (6), fitted with its O ring (7) previously oiled.

Tighten the 8 mm \varnothing bolts to 28 N.m (20.6 lbf.ft.) (flat washers)

Tighten the 10 mm \varnothing bolts to 50 N.m (36.9 lbf.ft.) (flat washers)

Knock the bearing outer track rings in position with a mallet.

Adjust the preload on the bearings : Fig. VI and VII

Determine the thickness of the shims with a depth gauge :

Measure the distance between the gasket face and the bearing outer track ring (8) locating face.

Measure the distance between the face on which the bearing cap (9) locates and its gasket face.

To the difference between these two readings :

Add 0.15 mm to obtain the bearing preload.

This dimension is the thickness of the shim (10) to be fitted. Fit the shim and the bearing cap together with its O ring seal (11) which has previously been oiled.

Tighten to 28 N.m (20.6 lbf.ft.) (flat washers).

Fit the seals : Fig. I

Grease the lips and the outer part and fit the seal (1) to the mandrel (J).

Fit a seal in a cap :

Fit the flat face « a » of the thrust washer on the opposite side of the seal : Fig. II.

Fit the seal in the housing :

Fit the flat face « a » of the thrust washer on the same side as the seal : Fig. III.

Fill the gearbox with oil :

Tighten the drain plugs (40 N.m (29.5 lbf.ft)

Pour in 1.25 litres of oil.

REPLACING A RELEASE BEARING GUIDE-SLEEVE.

If a guide-sleeve assembly is replaced, it is **ESSENTIAL** also to fit a new release bearing.

Remove the guide-sleeve : Fig. IV and V

Remove the release bearing.

Place the extractor (1)

fitted with an inertia extractor assembly (a) over the guide-sleeve

Tighten the six bolts (→) on the guide-sleeve and extract it.

Degrease the new guide-sleeve and its location.

Fit the release bearing guide-sleeve :

Coat the end of the guide-sleeve (the end that enters the housing) with LOCTITE FRENBLOC.

Fit the guide-sleeve into the extractor (1) without tightening the bolts (→).

Using the extractor (A), fit the guide-sleeve into the housing until the tool makes contact with the housing. (The guide-sleeve protrusion provided by the extractor is : 48.5 ± 0.5 mm.

Remove all traces of LOCTITE from the guide-sleeve.

Fit the clutch release bearing : Fig. IV.

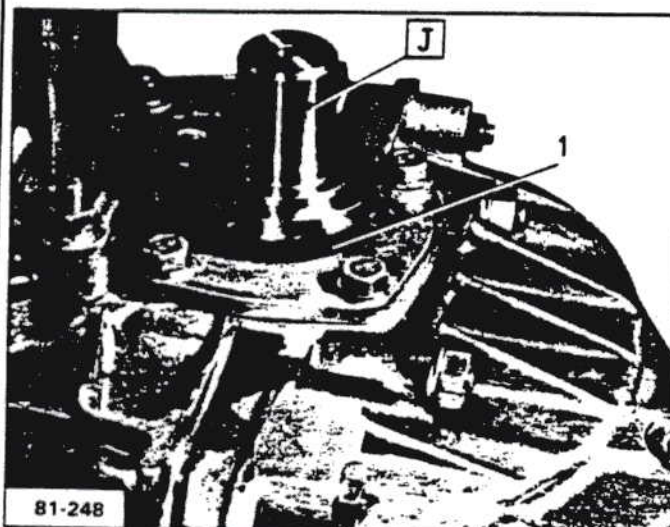
Impregnate the seal (2) with oil before fitting it.

Grease the release bearing guide before fitting the release bearing.

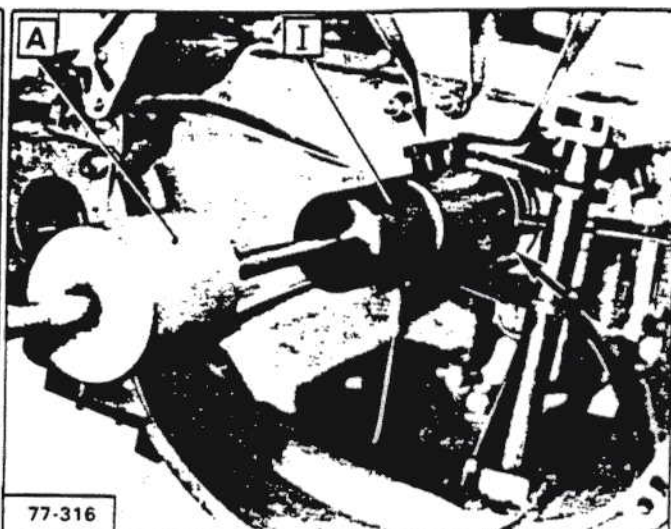
HANDLING

Use the support (L).

Secure it by the bolts (3).



I



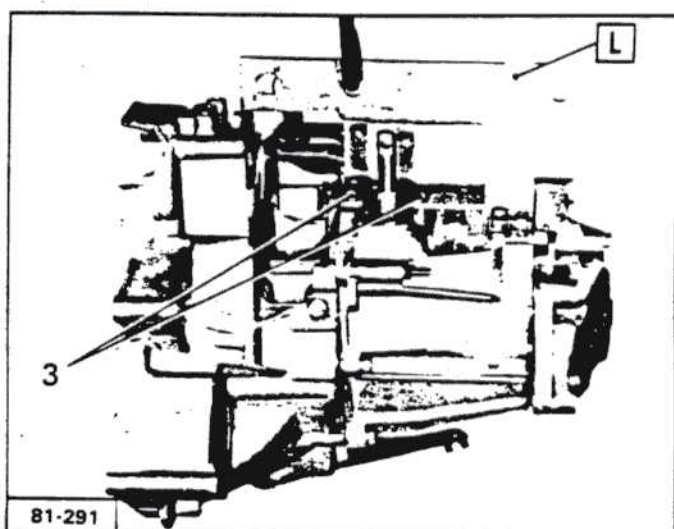
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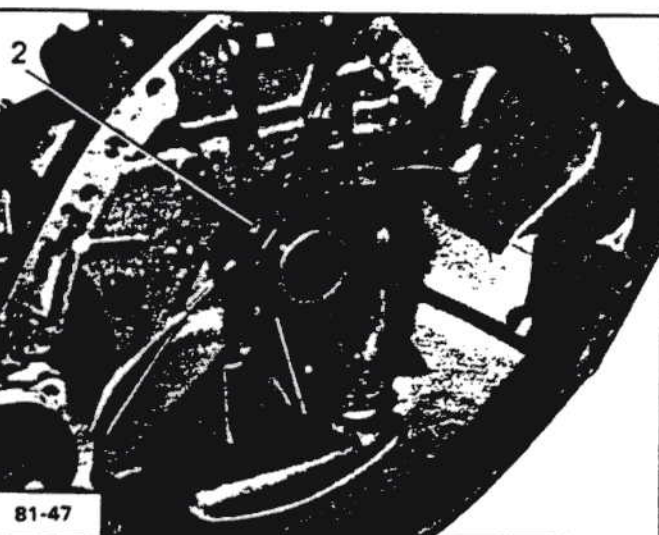
II



III



VI



IV

**GEARBOX
IDENTIFICATION OF THE GEAR
MECHANISM (RIGHT HAND DRIVE)**

Earlier assembly : double bar

→ Chassis no. : 367.155

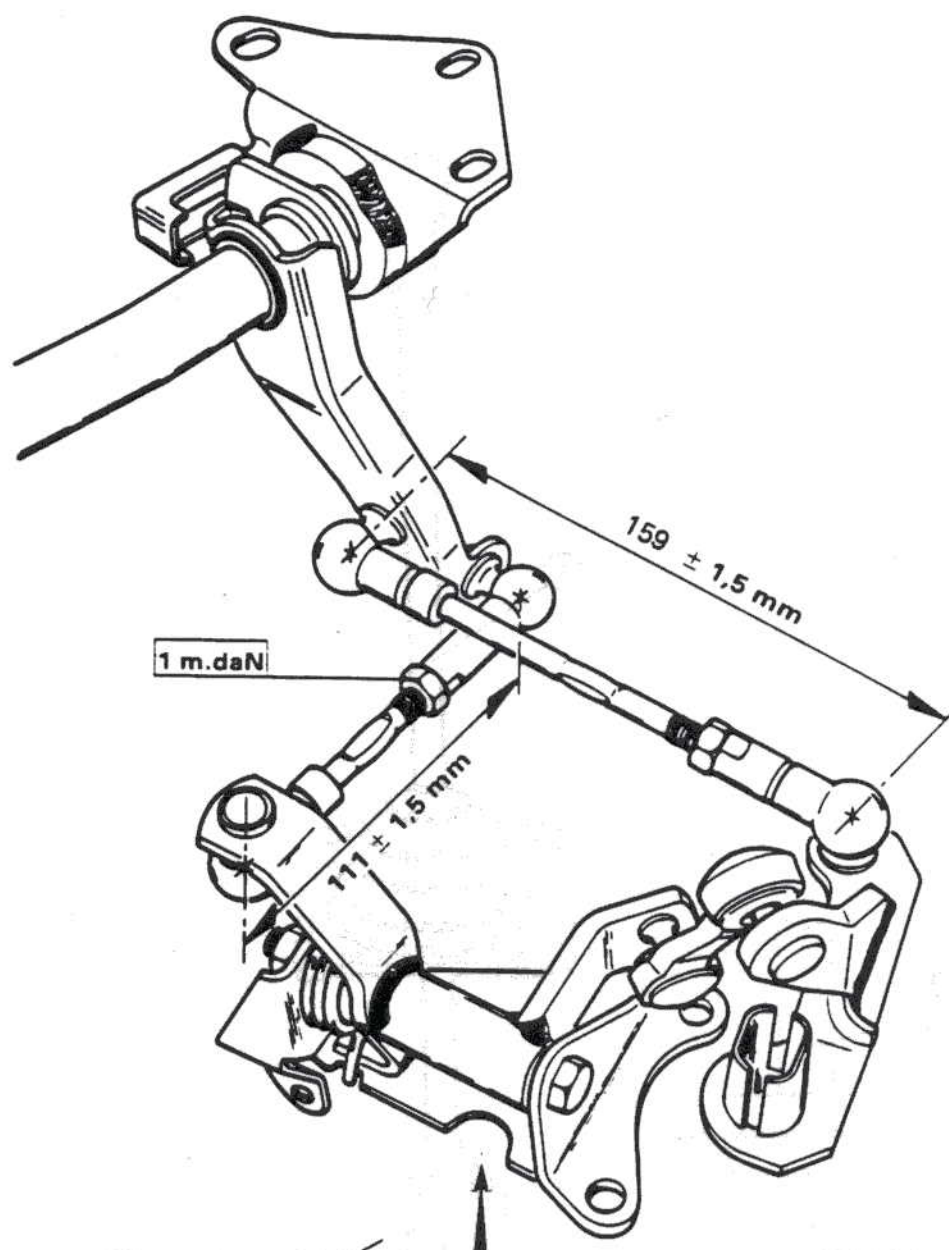
IDENTIFICATION OF THE GEAR CHANGE MECHANISM (Right hand drive)

- 1 - Gear change lever
- 2 - Gear change lever, lower section.
- 3 - Selector cross rod (ball joint centre to centre dimension : $(X) = 350$ mm.
- 4 - Selector relay lever.
- 5 - Selector operating rod.
- 6 - Coupling sleeve, linkage to gearbox.
- 7 - Relay rod, gear engagement.
- 8 - Operating rod, gear engagement (ball joint centre to centre dimension $(y) = 155$ mm).

Details of side view :

- a - flat for assembling the parts (1) and (2).
- b - nut, HT 10 x 1,25 - tightening torque : 3,5 m.daN (26 lbf ft).

Important - These parts, including the main nut, must be assembled with thread locking Loctite.



2.8 m.daN

12 m.daN

