NEW HOLLAND TF76 TF78

REPAIR MANUAL

NEW HOLLAND

SERVICE

Print No. 604.64.016.00

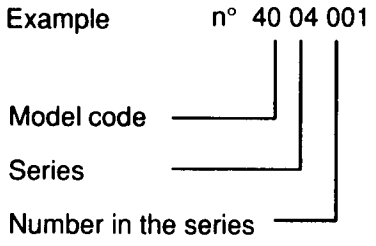
CONTENTS

INTRODUCTION

EXPLANATION OF MACHINE AND HEADER SERIAL NUMBERS

Machine serial number

PRODUCT IDENTIFICATION

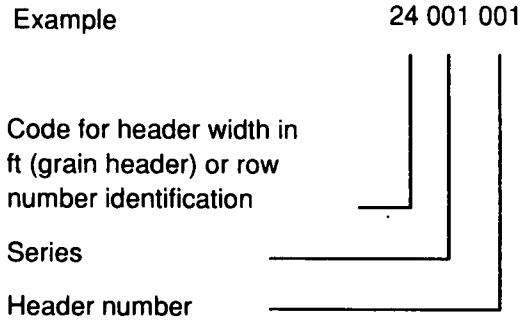


Explanation of model code

Type 40 = TF78

Header number

PRODUCT IDENTIFICATION



AVAILABLE HEADERS

19: 19 ft width flex header
20: 20 ft width grain header
24: 24 ft width grain header
61: 6-row maize header

NOTES FOR SERVICE PARTS CATALOGUE CONSULTING

NOTES FOR CATALOGUE CONSULTING

UPDATING ONLY MICROFICHE

MODIF.	ITEM	PART NR.	NT	Q.	DESCRIPTION	DENOMINAZIONE	DESIGNATION	L.C.
	1	84007894		1	SPACER	DISTANZIALE	ENTRETOISE	075D
C0202	2	80380429		1	GREASE ZERK	INGRASSATORE	GRAISSEUR	060I
	3	84000265		1	BEARING	CUSCINETTO	ROULEMENT	341C
	4	80100020		4	NUT, M16	DADO	ECROU	010D
	5	80140048		4	LOCKWASHER, 16MM	ROSETTA DI SICUREZZA	RONDELLE DE SECURITE	132R
	6	80120089		4	BOLT, M16 x 40	BULLONE	BOULON	140B
	7	80353308		2	NUT, M6	DADO	ECROU	010D
	8	80140015		2	WASHER, 6MM	ROSETTA PIANA	RONDELLE	131R
	9	84007920		1	CAM (10)	CAMMA	CAME	040C
	10	80062312	A	1	SCREW, M10 x 25	VITE	VIS	040V

NOTE: A = FOR FRANCE ONLY

C0202: 2502001 2502999

FOR TX66 ONLY

6.4

March '94

84006012 - 84006758

KNOTTERS
ANNODATORI
NOUEURS
KNUPFER
ANUDADORES

TX66-TX68

6

1 **ITEM** - **Reference** - Code of **Part Number.**

2 **PART NR.** - **Part Number.**

3 **NT** - **Note** - relating to the Part Number. There is a key to symbols and abbreviations at the bottom of the text page.

4 **Q.** - Total **Quantity** of the Part referred to in the page.
The quantity can be replaced by the following indications:
M = supplied in metres. **AR** = quantity as requested.

5 **MODIF.** - **Modification.**
C 0202 = Part valid **UNTIL 0202.**
D 0300 = Part valid **FROM 0300.**

6 **Implementation of change.** Serial number from which the change starts. The numbers are indicated on the identification plate of the model (see page 5).
E.g.: **D0300 Serial n° 2503001** means that the part has been installed **"FROM"** serial number **2503001.** Consequently, the parts marked by **C0202,** were installed **UP TO** serial number **2502999.**

7 [2] Includes item(s) ..... (See English discription)

8 [1.5] Part illustrated in the **Group.**

9 Technical specifications relating to the Part indicated.

10 Model **Trademark.**

11 **"Section" Code.**

12 **"Group" name.**

13 **"Group" code.**

14 **Page number.**

15 **Date** of printing or updating of page (month-year).

16 Part **Description.**

17 **L.C.-Lexicon code** for the identification of Part names in **German** and **Spanish** (see page 33).

18 **Further description** of the Part. Besides the specific indications of the Part such as size and use, common descriptions can be utilized (see page 34).

19 Specific **Notes** to the illustrations or to the text.

20 **Position** of the **"Section"** on the machine.

21 **Running direction** (see page 34).

22 Parts illustrated without item number are shown in the following group.

23 General information of the group.

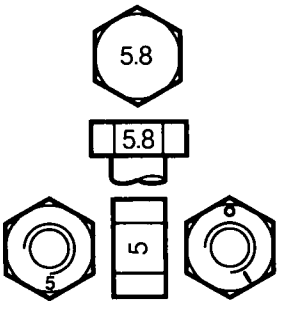
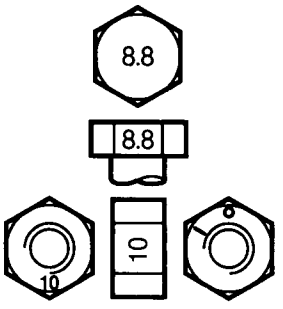
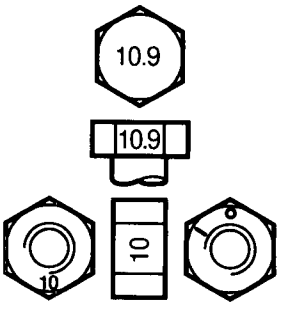
CONVERSION CHART

	Foot	Yard	Mile	Inch	Metre
1 Foot	1	0.333	–	12	0.3048
1 Yard	3	1	–	36	0.9144
1 Mile	5280	1760	1	63360	1609.35
1 Inch	0.0833	0.0277	–	1	0.0254
1 Metre	3.281	1.0936	–	39.37	1

1 US bushel	=	35.2391 litre	1 litre = 0.028 US bushel	
1 US quart	=	0.9464 litre	1 litre = 1.056 US quart	
1 UK bushel	=	36.3687 litre	1 litre = 0.027 UK bushel	
1 UK quart	=	1.1365 litre	1 litre = 0.879 UK quart	
1 US gallon	=	3.785 litre	1 litre = 0.264 US gallon	
1 UK gallon	=	4.5461 litre	1 litre = 0.22 UK gallon	
1 barrel	=	158.987 litre	1 litre = 0.0063 barrel	
1 acre	= 0.4047 ha		1 ha	= 2.471 acre
1 pound	= 0.4536 kg		1 kg	= 2.204 pound
1 hp	= 0.736 kW		1 kW	= 1.358 hp
1 lb/ in^2	= 0.0689 bar = 6.894 kPa		1 bar 1 kPa	= 14.5 lbs/ in^2 = 0.145 lbs/ in^2
1 pa	= 10^{-5} bar = 1.450×10^{-4} lbs/ in^2		1 bar 1 lb/ in^2	= 100 kPa = 6.896 kPa
1 kgf.m	= 9.806 Nm		1 Nm	= 0.1019 kgf.m
1 lbf ft	= 0.1385 kgm		1 kgf.m	= 7.22 lbf ft

TIGHTENING TORQUES

Metric hardware

	Property class 5.8 Torque (Nm)		Property class 8.8 Torque (Nm)			Property class 10.9 Torque (Nm)	
							
Nominal size	plain	plated	lock nut	plain	plated	plain	plated
M4x0.7	1.7	2.2	2.3	2.6	3.4	3.7	4.8
M6x1	5.8	7.6	7.9	8.9	12	13	17
M8x1.25	14	18	19	22	28	31	40
M10x1.5	28	36	38	43	56	61	79
M12x1.75	49	63	66	75	97	107	138
M16x2	121	158	164	186	240	266	344
M20x2.5	237	307	331	375	485	519	671
M24x3	411	531	573	648	839	897	1160

NOTE:
These torque values are for general use only.
They can not be used if specified otherwise.

SPEED RANGES (maximum idle)

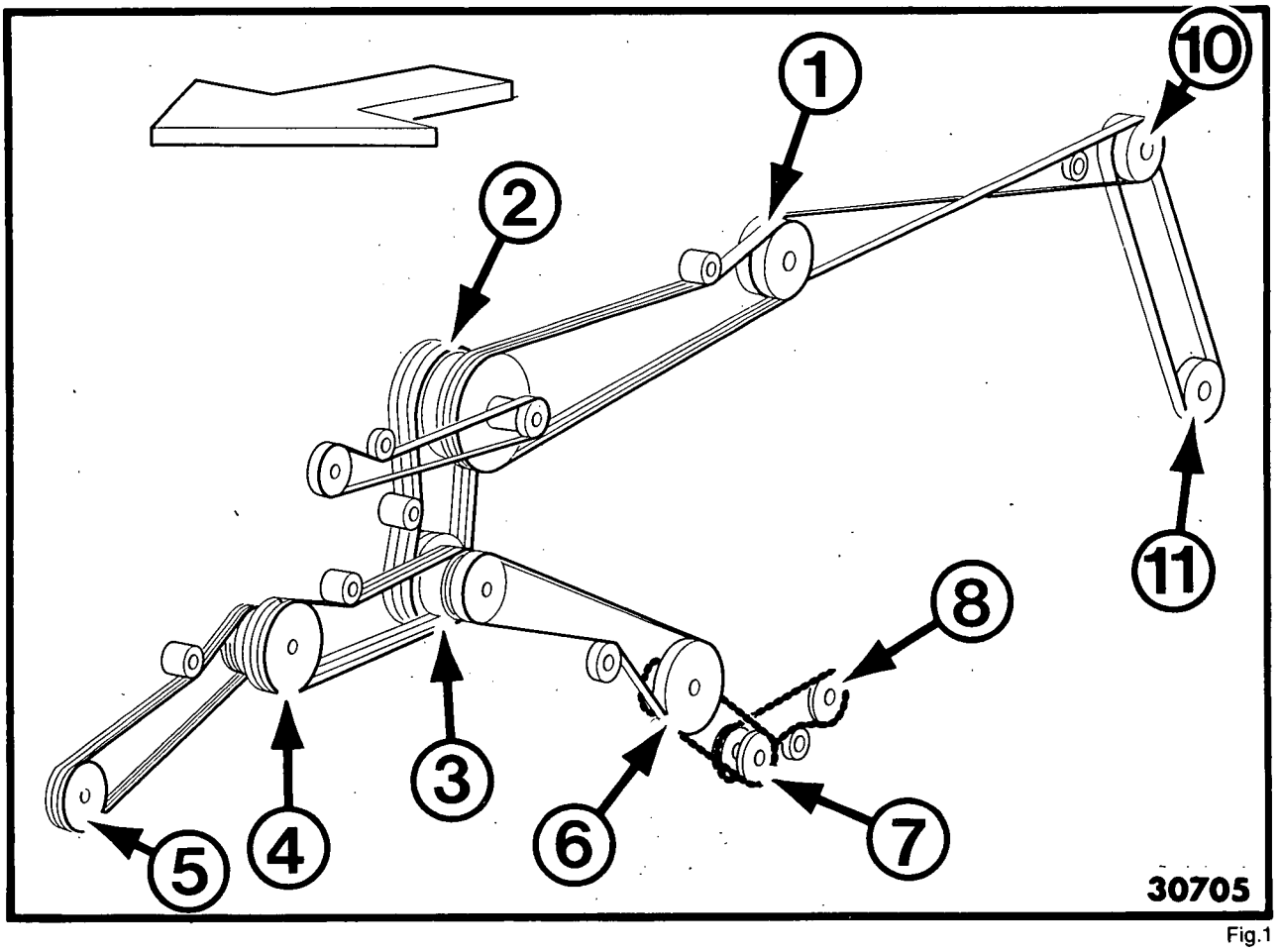
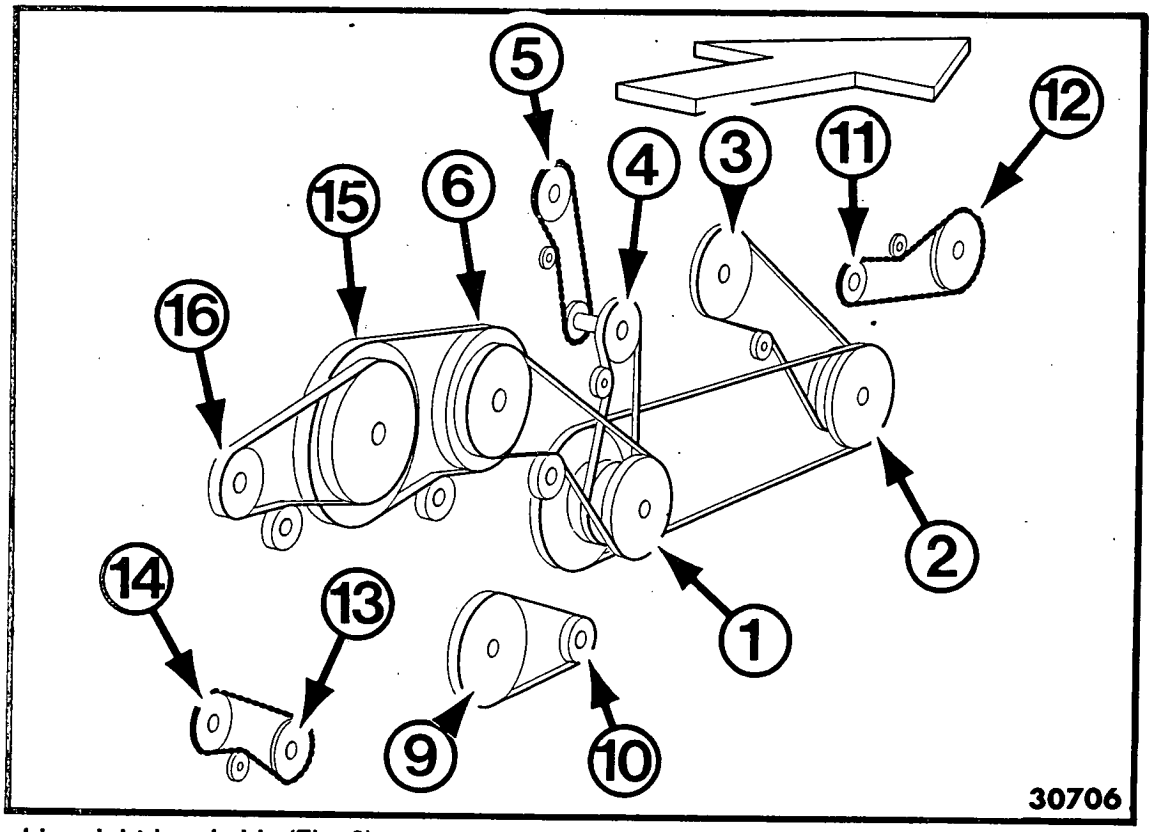


Fig.1

Combine left-hand side (Fig. 1)

		RPM
1	Engine	2100
2	Loose pulley on beater shaft	1340
3	Intermediate shaft	800
4	Straw elevator upper shaft	374
5	Header drive	433
6	Cleaning shoe drive	600 (540*)
7	Returns cross auger and roto-thresher	800 (720*)
8	Returns auger and thrower	800 (720*)
10	Straw chopper drive	2599
11	Straw chopper	3500

* When using small diameter drive pulley 3



Combine right-hand side (Fig. 2) Fig.2

		RPM
1	Intermediate shaft	800
2	Threshing drum	385 to 1140
3	Beater	256 to 760
4	Bubble-up auger speed (gearbox):	
	standard	370
	option	441
5	Grain elevator upper shaft:	
	standard	382
	option	456
6	Rotary separator	760 or 400
9	Eccentric shaft	320 (288*)
10	Cleaning fan	500 to 920/450 to 838*
11	Grain tank unloading intermediate shaft	1340
12	Grain tank unloading auger	604
13	Returns cross auger and roto-thresher	800 (720*)
14	Returns auger and thrower	800 (720*)
15	Twin Flow rotor	651 (343*)
16	Throw-out beaters	1200 or 1000

* When using small diameter drive pulley 3 on left-hand side

Combine engine compartment (Fig. 3)

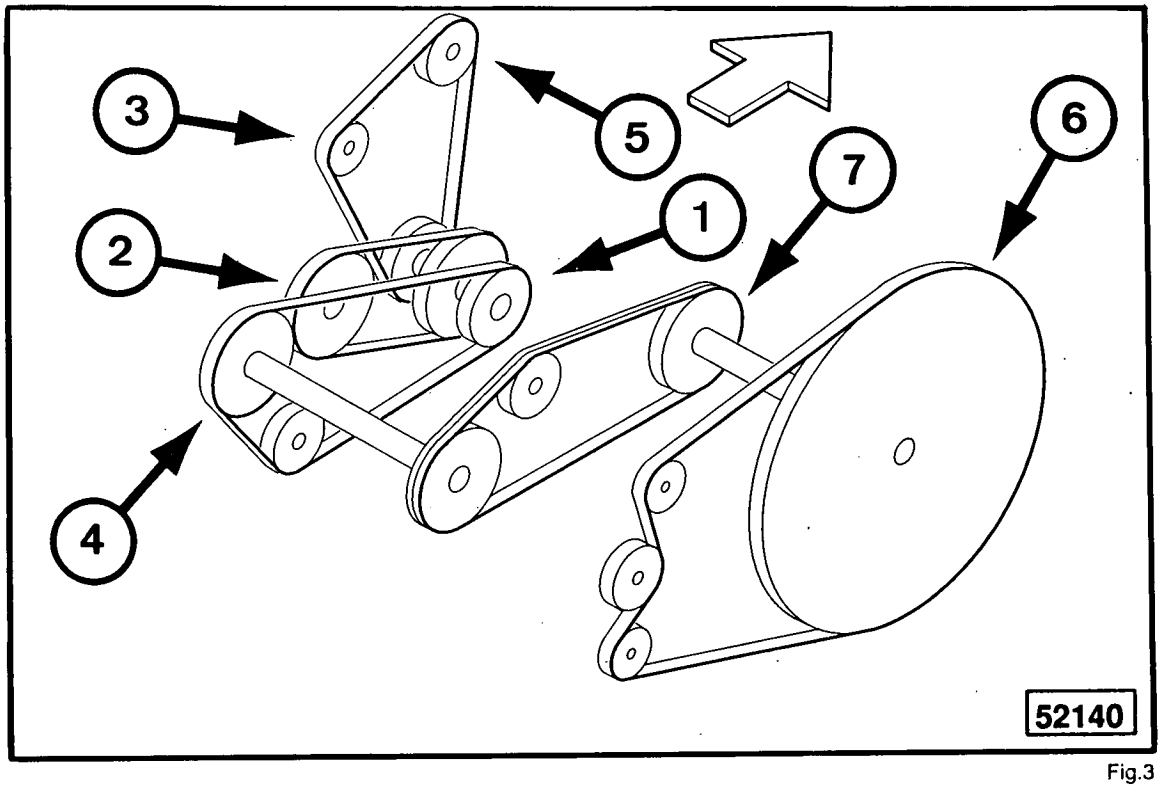


Fig.3

		RPM
1	Engine	2100
2	Hydraulic pump	2564
3	Alternator	3934
4	Intermediate shaft	1563
5	Airconditioning compressor	2355
6	Rotary dust screen	229
7	Engine fan	1496

Grain header (Fig. 4)

		RPM
1	Knife speed	575 (1150 cuts/min)
2	Reel speed with	
	23-tooth sprocket	21 to 57
	13-tooth sprocket	12 to 32
3	Auger speed with	
	44-tooth sprocket	176
	52-tooth sprocket	150

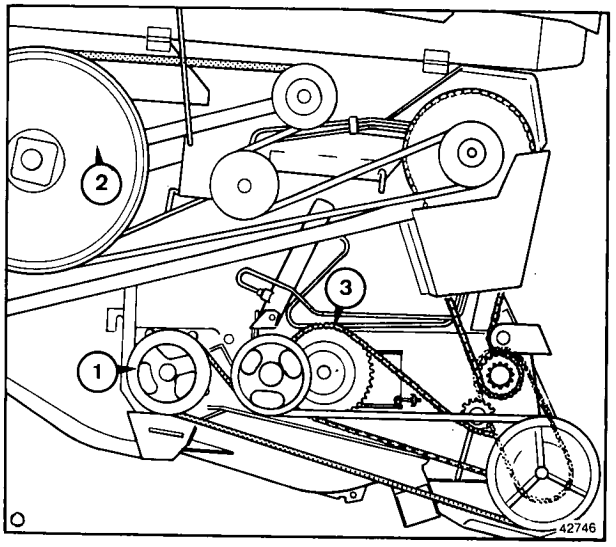


Fig.4

Maize header (Fig. 5)

		RPM
1	Auger speed	144
2	Stalk roll speed with	
	28-tooth sprocket	892
	24-tooth sprocket	1041
	20-tooth sprocket	1249
	Gathering chains with	
	28-tooth sprocket	1.27 m/sec
	24-tooth sprocket	1.47 m/sec
	20-tooth sprocket	1.76 m/sec

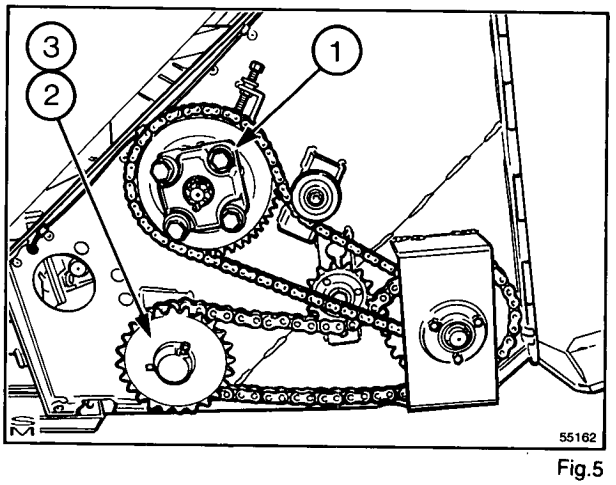


Fig.5

OIL APPLICATION GUIDE

Item	Servicing interval	Amount/unit (litres)	Recommended NH oil reference	Corresponding international classification
Grease nipples	10 h 50 h 100 h	– – –	M1C-137-A or M1C-75-B	NLGI Class 2
Traction gearbox	Change: - after first 100 h - after first 200 h - every 400 h or annually	15	M2C-94-A	API-GL-5 or MIL-L-2105 B SAE 80W-90
Final drive gearboxes	Change: - after first 100 h - after first 200 h - every 400 h or annually	6	M2C-94-A	API-GL-5 or MIL-L-2105 B SAE 80W-90
Chaff spreader gearboxes	Change every 200h or annually	0.3	M2C-94-A	API-GL-5 or MIL-L-2105B SAE 80W-90
Engine (oil + filters)	Check daily Change: - after first 50 h - every 200 h	21.5	M2C-121-C3	API-CD/SF
Chains **Threaded rods** **Pivot points**	Daily 200 h 200 h	–	M2C-94-A M2C-94-A M2C-94-A	API-GL-5 or MIL-L-2105B SAE 80W-90
Brake system	Change every 2 years	0.5 (reservoir) 2 (system)	M6C-25-A	SAE J 1703A or DOT4
Hydraulic system (oil + filters)	Check daily Change: - after first 100 h - every 400 h	20	M2C-48-C3	DIN 51524 HLP 46 Min. viscosity index: 155
Hydrostatic system (oil + filters)	Check daily Change: - after first 100 h - every 400 h	18	M2C-48-C3	DIN 51524 HLP 46 Min. viscosity index: 155
Drum speed reducer [if installed]	Change: - after first 50 h - every 400 h	1	M2C-94-A	API-GL-5 or MIL-L-2105 B SAE 80W-90
Tracks [if installed] (track rollers and guide wheels)	Service - every 200 h	0.35 / roller 0.35 / wheel	M2C-159-B	API-CC-CD or MIL-L-2104 L SAE 30

TRACTION AND STEERING AXLE

TRACTION GEARBOX

Oil change

- After the first 100 operating hours
- After 200 operating hours
- Thereafter, every 400 operating hours or annually

Gearbox capacity

15 litres

Oil specification

Use AMBRA HYPOID 90 oil (ref. NH520A) meeting the following specification:

- API GL5 or MIL-L 2105D
- Viscosity grade: SAE 80W90

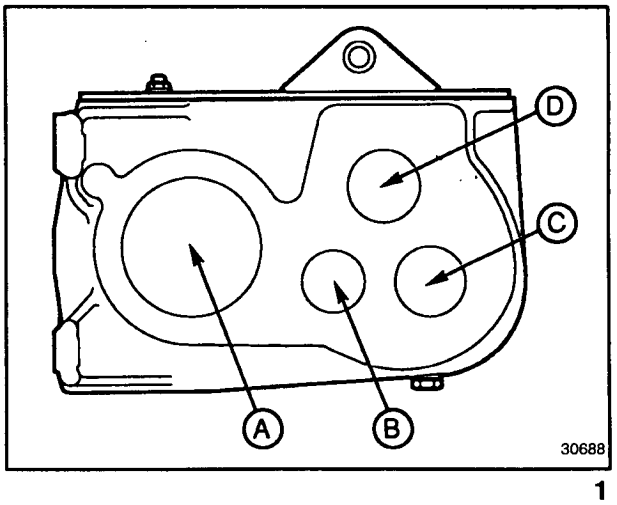
Gear shifting diagram – Figure 1

Shaft A: half-shafts from differential

Shaft B: transmission main shaft

Shaft C: countershaft

Shaft D: drive shaft



1

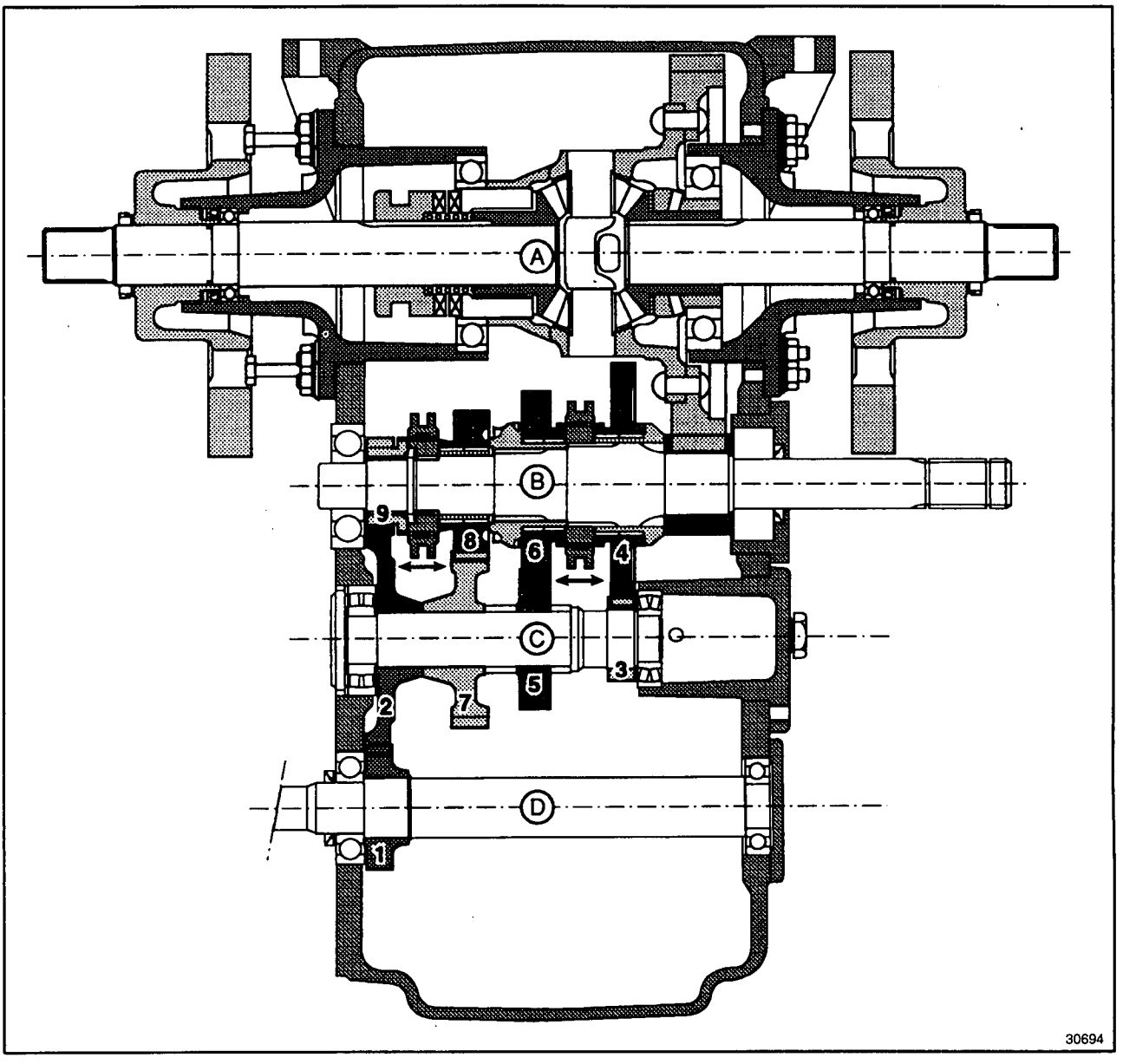
Shifting diagram – Figure 2

First gear: 1 - 2 - 3 - 4 differential

Second gear: 1 - 2 - 5 - 6 differential

Third gear: 1 - 2 - 7 - 8 differential

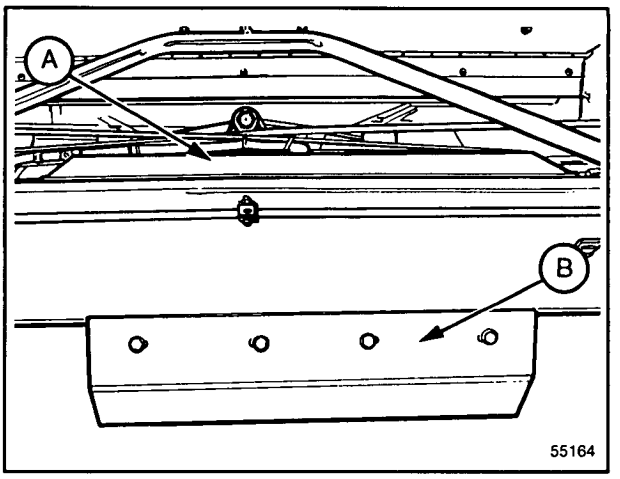
Fourth gear: 1 - 2 - 9 differential



2

REMOVAL – Figures 3 to 6

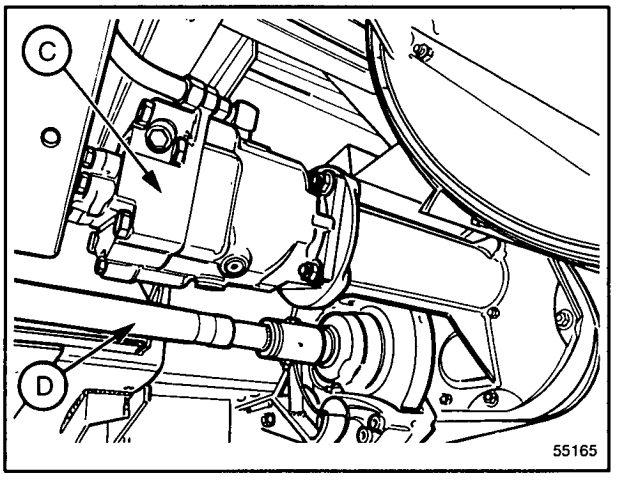
1. Remove cover A and cover B.



3

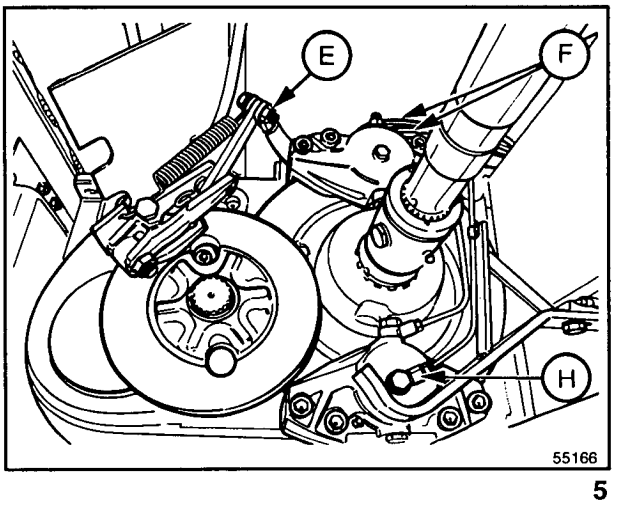
CAUTION:
Before removing any components, secure the machine safely in place by placing adequate wedges against both traction and steering wheels.

2. Remove hydrostatic motor C, and drive shaft D on both sides of the gearbox.



4

3. Disconnect handbrake cable E, and wires F on both sides.
4. Remove tubes H on both sides of the gearbox.
5. Remove the cable for the differential lock.

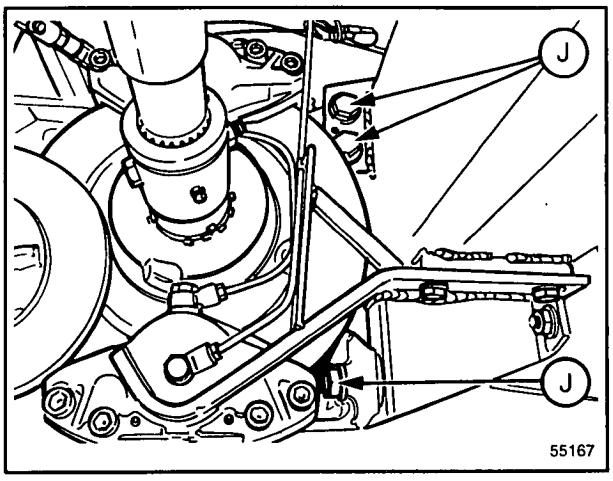


5

6. Install a suitable and safe support underneath the gearbox (e.g. a wooden pallet on a forklift).

CAUTION:
The gearbox is heavy (±350 kg).
Take extreme caution when removing!
Use a supporting device which can handle this weight!

7. Loosen bolts J on both sides of the gearbox and lower the gearbox slowly.



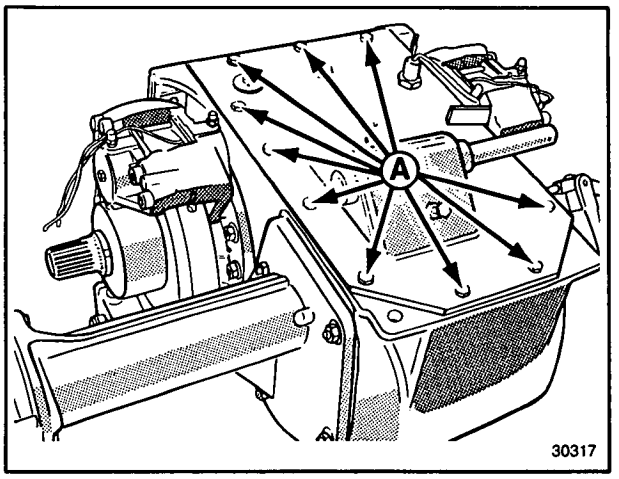
6

INSTALLATION

1. Reinstall in reverse order of the removal sequence.
   Refer to paragraph headed "Brakes", subheading "Bleeding brakes".

DISASSEMBLY

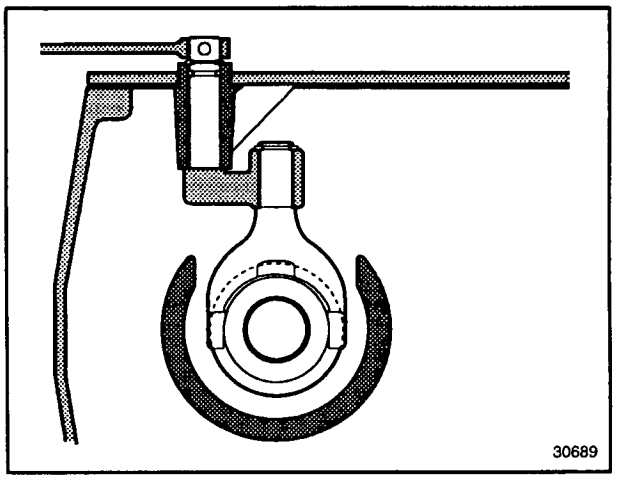
NOTE:
To disassemble and reassemble a complete gearbox, the following special tools will be needed: 80434443, 84014512, 80434446, 80434450, 80434416.
Make sure these tools are available before starting any repair.



7

General – Figures 7 and 8

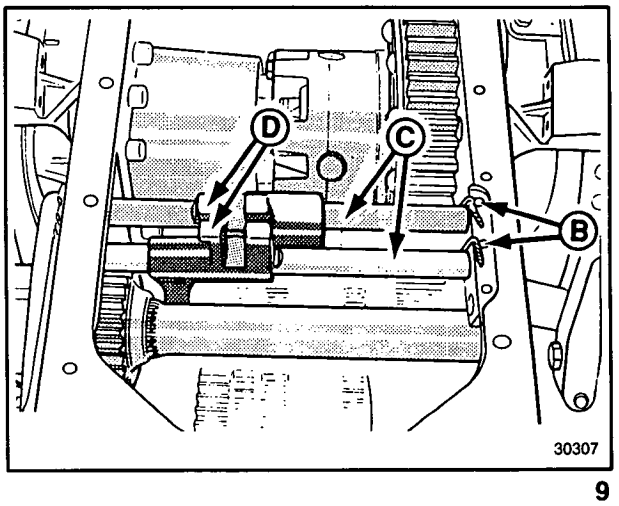
1. Remove the hydrostatic motor housing from the gearbox, if not done before.
2. Remove the cover by removing bolts A.
3. Refer to Figure 8 for the disassembly of the differential lock control.



8

Removal of selector forks and shifter shafts – Figure 9

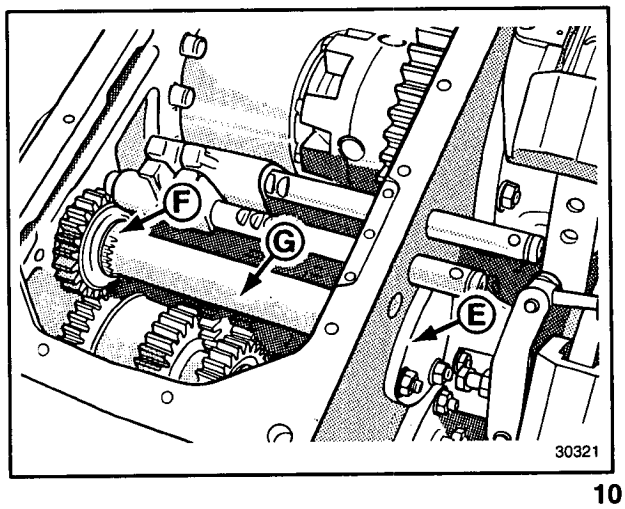
1. Drive out roll pins B.
2. Move shifter shafts C to the right-hand side and remove the selector forks D. Ensure balls and springs do not fall into the gearbox.



9

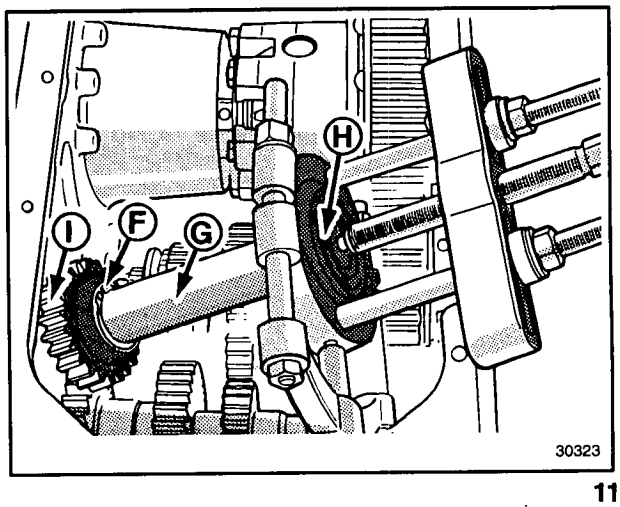
Removal of drive shaft – Figures 10 and 11

1. Remove the selector fork and shifter shafts.
2. Remove cover E.
3. Remove circlip F and slide it halfway the shaft G.
4. Drive shaft G to the left-hand side.



10

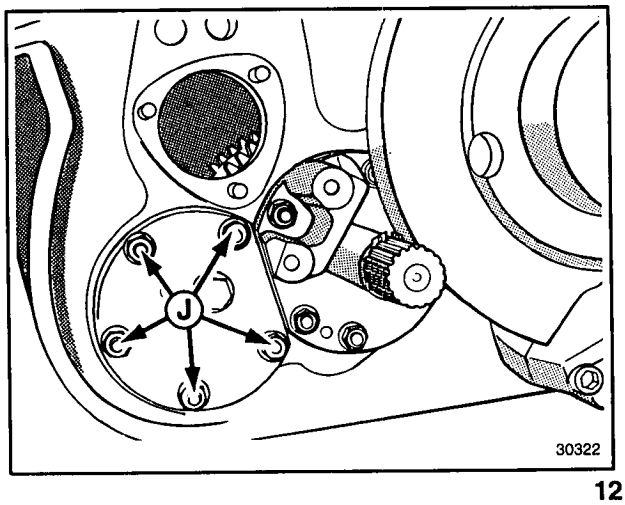
5. Remove ball bearing H and slide circlip F and gear I from the shaft G.
6. Remove shaft G from the left-hand side.



11

Removal of the countershaft – Figures 12 to 14

1. Remove the handbrake shoe and disc (Refer to paragraph headed "Brakes", subheading "Disassembly of brake shoes and discs").
2. Remove the five nuts J and drive out bearing housing K (Fig. 13) from the inside using a plastic hammer.



12

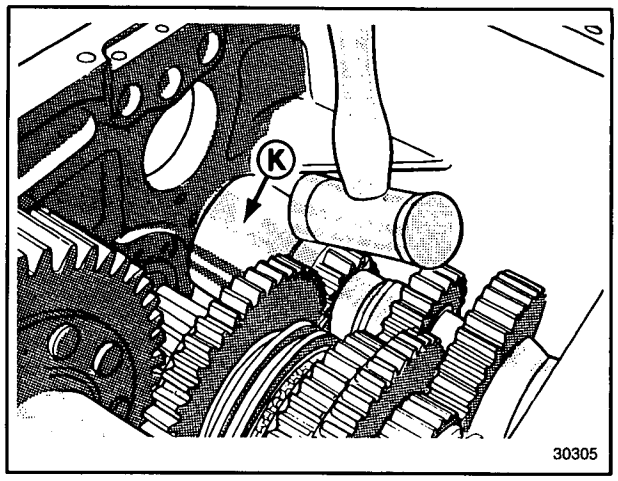
3. Install special tool L (80434443) and install bearing housing K the other way around (Fig. 14).

4. Drive the shaft out to the right until the left-hand part of the shaft is detached from the left-hand bearing.

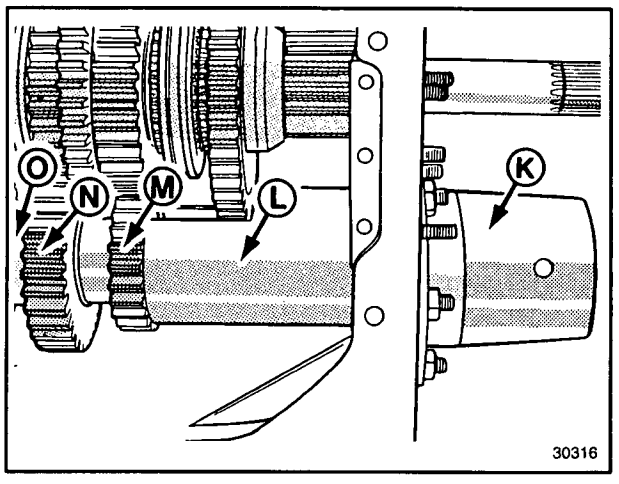
5. Remove bearing housing K and special tool L (80434443).

6. Remove the shaft together with gears M and N. Finally remove gear O.

NOTE:
This shaft can be removed without removing the shifter shafts C (Fig. 9) or input shaft G (Fig. 11).



13



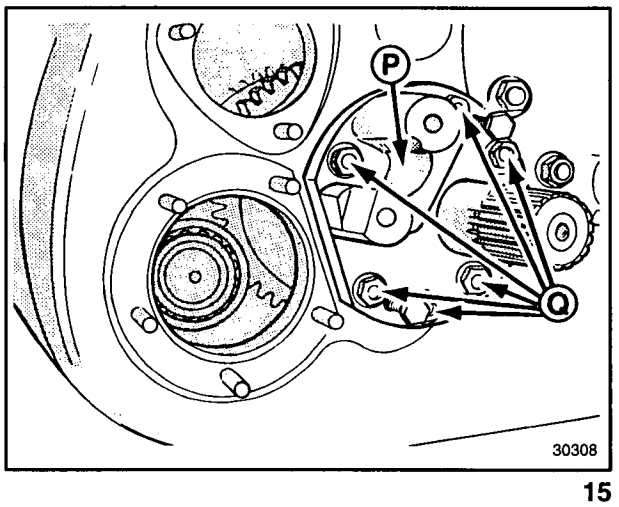
14

Removal of transmission main shaft –
Figures 15 to 18

1. Remove the brake shoes and discs on both sides (Refer to paragraph headed "Brakes", subheading "Disassembly of brake shoes and discs").

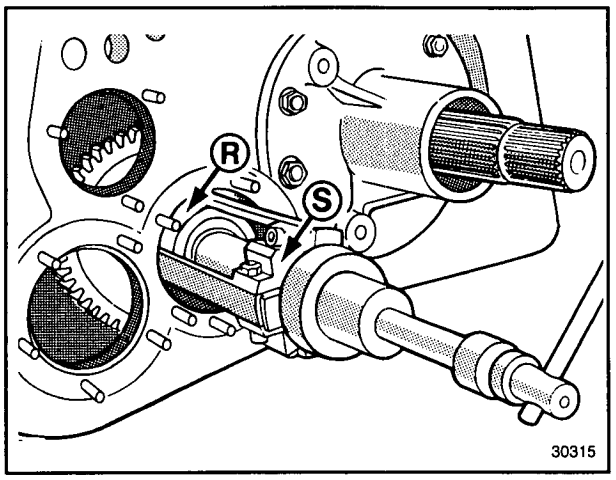
2. Remove the selector forks and shifter shafts (Refer to subheading "Removal of selector forks and shifter shafts").

3. Remove bearing housing P by removing the six nuts Q and by screwing two bolts into the bearing housing P.



15

4. Pull bearing R from the shaft using special puller S (84014512) on the right-hand side.

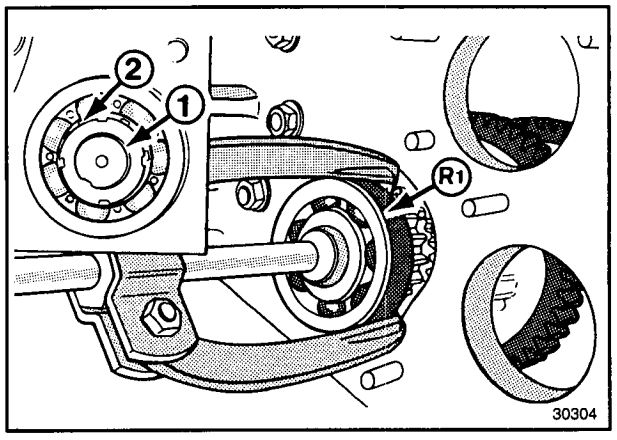


16

5. Drive the shaft to the left-hand side and remove slotted nut 1, lock washer 2 and bearing R1.

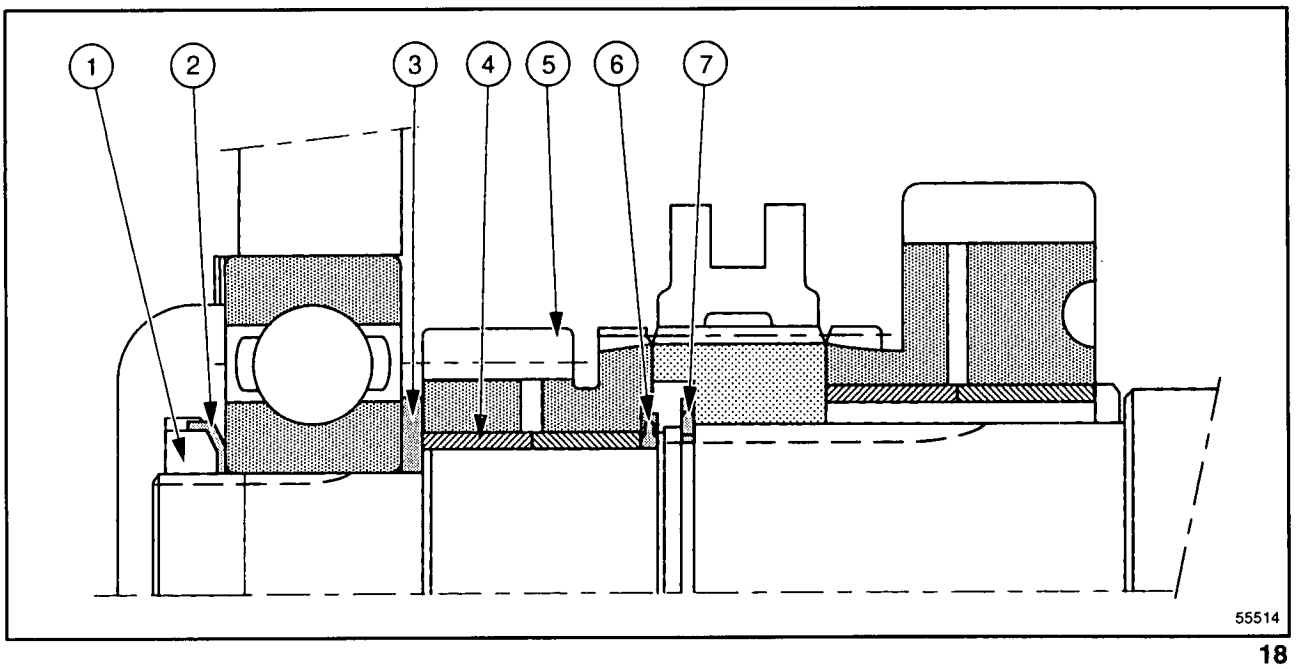
6. Remove ring 3, gear 5, needle bearing 4, ring 6 and circlip 7 through the aperture in the left-hand side of the gearbox.

7. Remove the shaft with the remaining gears from the gearbox.



17

NOTE:
This shaft can be removed without removing the input shaft or the countershaft.



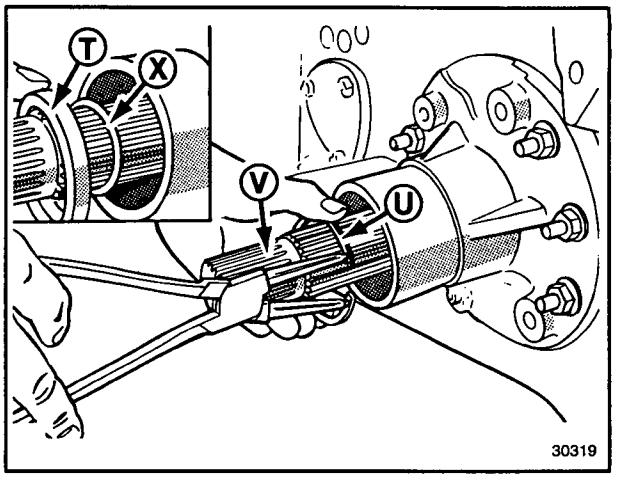
18

Removal of the half-shaft from the differential – Figures 19 and 20

1. Remove the brake shoes and brake discs on both sides (Refer to paragraph headed "Brakes", sub-heading "Disassembly and assembly of brake shoes and discs").

2. Carefully remove oil seal ring T, O-ring X and circlip U on both sides.

3. Pull out both shafts V, together with bearings W.



19

Removal of the differential – Figures 20 and 21

NOTE:
It is possible to remove the differential without removing the drive shaft, the transmission main shaft and the countershaft.

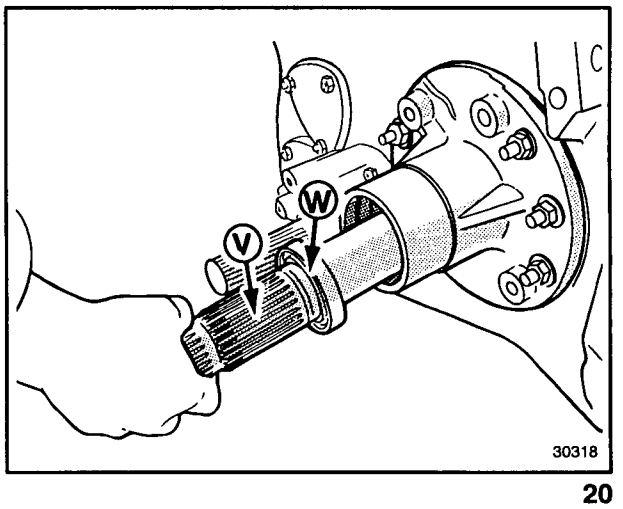
1. Remove both half-shafts V.

2. Remove six nuts 8.

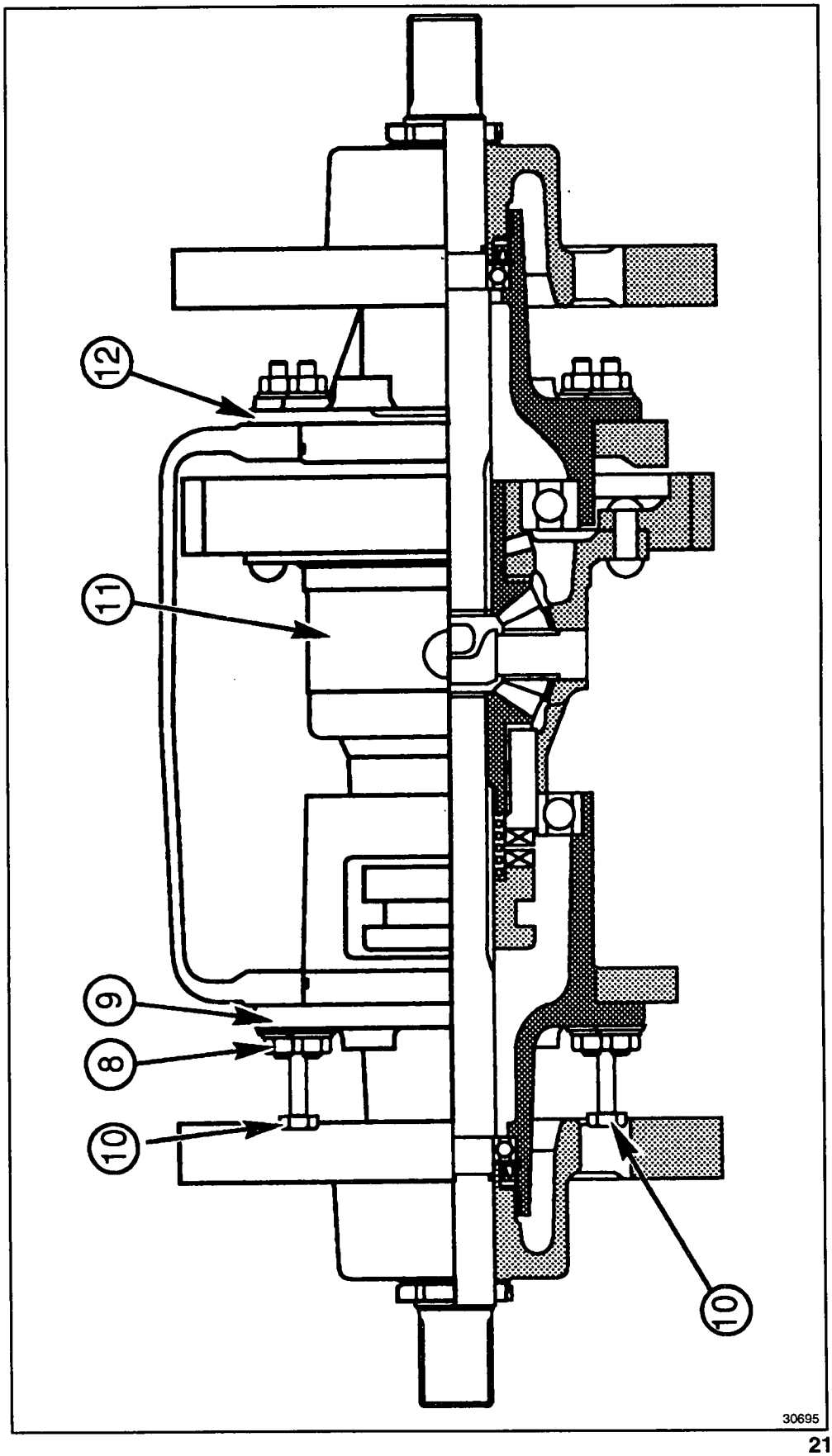
3. Remove bearing housing 9 by screwing two bolts 10 (M8 x 60) instead of two M8 x 16 bolts.

4. Remove the differential lock jaws and spring together with housing 9.

5. Proceed in the same way on the other side and remove differential 11.



20



21

ASSEMBLY

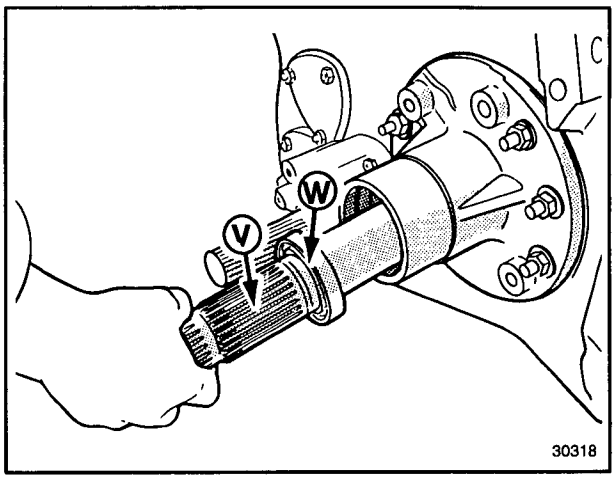
Assembly of the differential – Figure 21

1. Install the bearing housing 12 with six nuts 8 on the right-hand side.

2. Position the differential between bearing housing 12 and bearing housing 9 and drive bearing housing 9 to the right-hand side.

   NOTE:
   Before driving the bearing housing 9 to the right-hand side, install the differential lock jaws and spring between the differential and the bearing housing 9.

3. Install the six nuts 8 on the left-hand side securing the bearing housing 9.



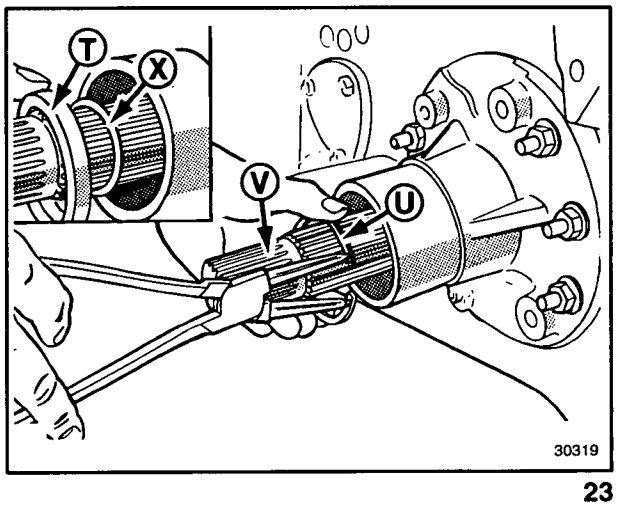
22

Assembly of the half-shafts of the differential – Figures 22 and 23

1. Install bearing W on shaft V.

2. Install the shaft V, circlip U, O-ring X and oil seal ring T. Ensure that oil seal ring T is installed as deep as possible.

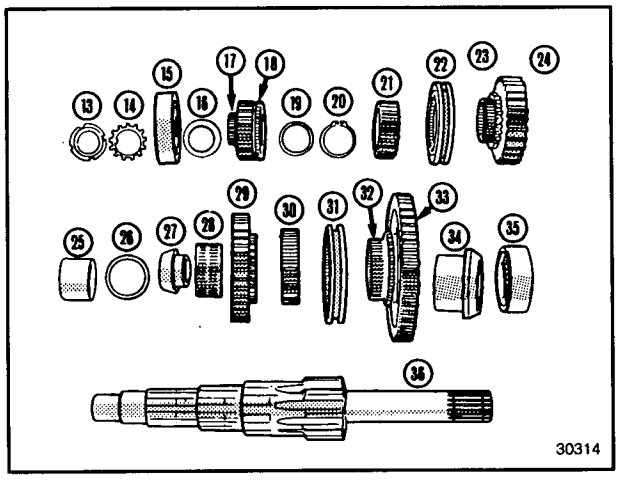
3. Proceed in the same way on both sides.



23

   NOTE:
   An alternative way to assemble the left-hand half-shaft V with the differential lock is:

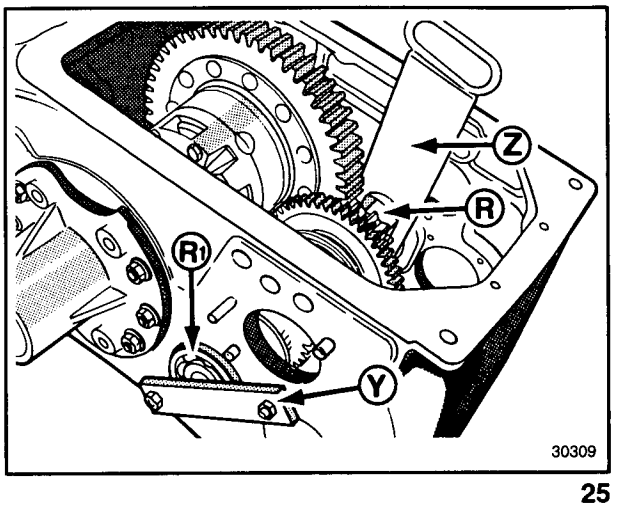
   a) Before installation of the housing 9 on the gearbox, pre-assemble the housing 9 together with shaft V, bearing W, O-ring X, oil seal T and circlip U as one unit.
   b) Slide the differential lock jaws and spring onto half-shaft V.
   c) Slide the whole unit into the gearbox and secure with nuts 8 (Fig. 21).



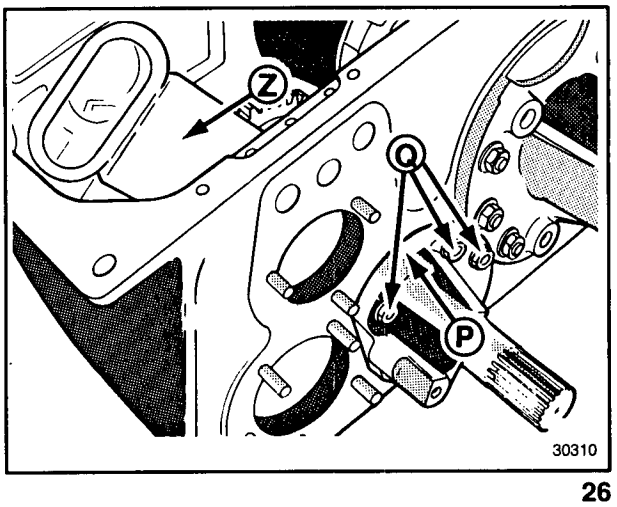
24

Assembly of transmission main shaft – Figures 24 to 26

1. Position shaft 36 in its aperture in the gearbox and install from the left-hand side in following sequence:
   - sleeve 34, needle bearing 32, gear 33, shifting gear 30, shifter ring 31.
   - needle bearing 28, gear 29, sleeve 27, ring 26, ring 25, needle bearing 23, gear 24, shifting gear 21, shifter ring 22 and circlip 20.
   - ring 19, needle bearing 17, gear 18 and ring 16.
2. Install special tool Z (80434446) (Fig. 25).
3. Install bearing R1 on the left-hand side of the shaft and drive it further with the shaft in the gearbox .
4. Install special tool Y (80434450) (Fig. 25).
5. Install bearing R on the right-hand side (Fig. 25) and bearing housing P (Fig. 26). Drive bearing housing P to the left-hand side and tighten it with nuts Q (Fig. 26).
6. Remove special tools Z and Y.
7. Drive the shaft and bearing R1 to the right-hand side.
8. Install lock washer 2 and slotted nut 1 (Fig. 18). Tighten nut 1 with a torque of 130 Nm.



25

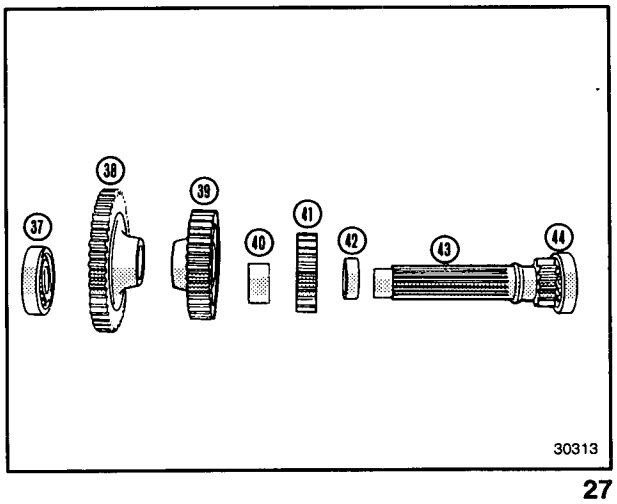


26

Assembly of the countershaft – Figures 27 and 28

Install following parts on the shaft outside the gearbox:

1. Bearing 44 on the right-hand side (the small gear on the right-hand side is part of the shaft.
2. Narrow ring 42.
3. Gear 41, with the wider part of the hub to the left-hand side.
4. Wide ring 40.
5. Gear 39, with the wider part of the hub to the left-hand side.



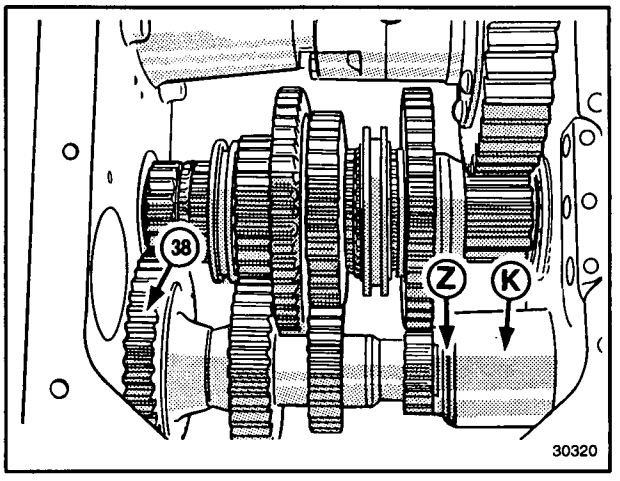
27

Introduce the pre-assembled shaft in the gearbox and install:

6. Gear 38, with the wider part of the hub to the right-hand side.

7. Gasket together with bearing housing K using special tool Z (80434446). Tighten the bearing housing K with nuts J (Fig.12).

8. Left-hand bearing 37, maintaining a minimum axial clearance between the gears.



28

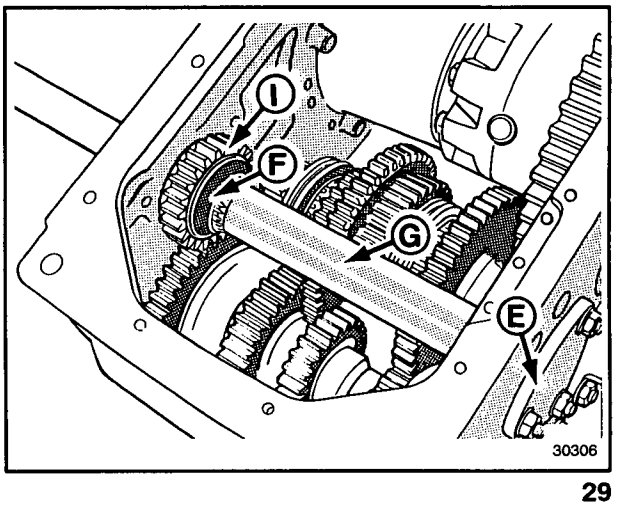
Assembly of the drive shaft – Figure 29

1. Install input shaft G with the pre-assembled left-hand bearing in the gearbox and slide gear I with circlip F on the shaft.

2. Install the right-hand bearing and cover E .

3. Slide gear I and circlip F to the left-hand side in the right place .

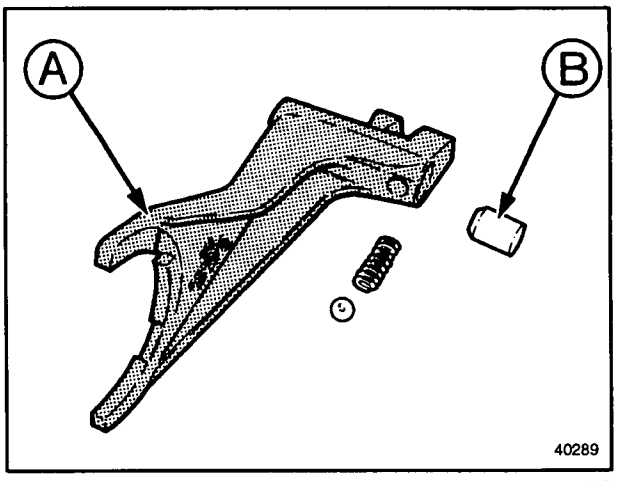
4. Install the left-hand bearing against gear I keeping a minimum clearance and ensuring that the filler opening in the bearing outer ring is located at ± 25° before the vertical axial line.



29

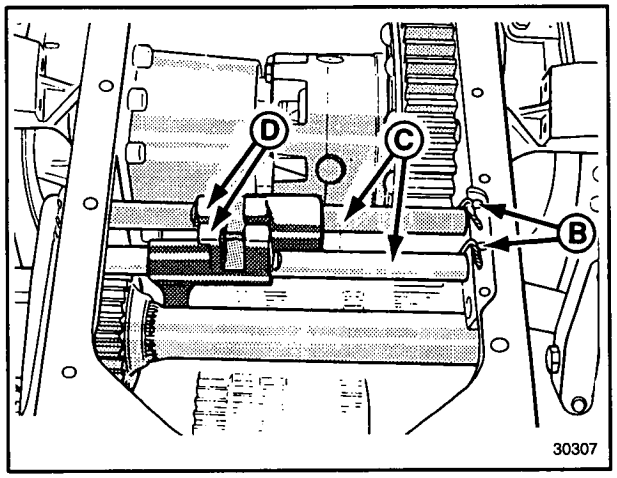
Assembly of selector shafts and forks – Figures 30 and 31

1. Install ball and spring in selector forks A using special tool B (80434416).



30

2. Slide selector shafts C in the forks D (the notch pointing upwards) and secure the latter with pins B which are themselves secured with a piece of wire.



31

Calculation of shims to be installed on the shafts

ON INPUT DRIVE OR CLUTCH SHAFT AND THE COUNTERSHAFT

The permissible axial clearance of these shafts is 0.2 to 0.6 mm.

1. Depth of bearing in gearbox: 2 mm.

2. Raised part on the clutch housing: 1.2 mm
   Difference: 0.8 mm.

3. Thickness of gasket: 0.15 mm
   Total: 0.95 mm.

Shims to be installed: 0.75 to 0.35 mm.

ON TRANSMISSION MAIN SHAFT

The permissible axial clearance of this shaft is 0.5 to 0.8 mm.

To calculate the shims, proceed in the same way as explained above.

Assembly of the cover – Figure 32

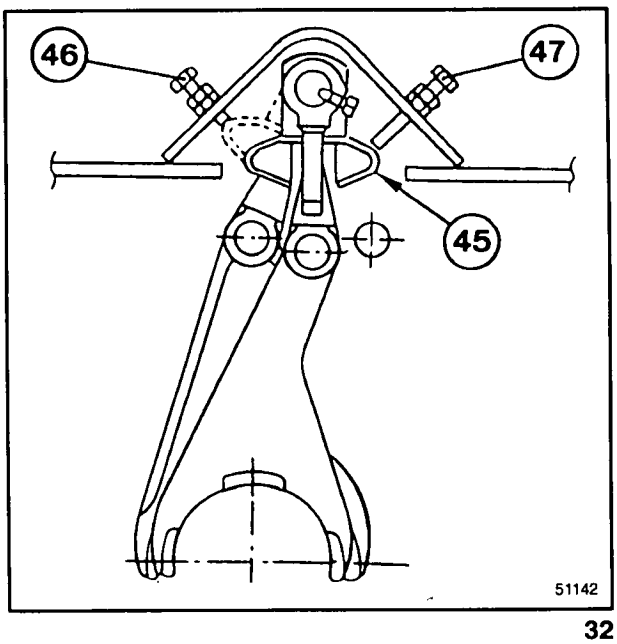
Install the cover and adjust pawl 45 as follows:

1. Position the shifter shaft in third or fourth gear.

2. Turn in adjusting bolt 47 until it is tight and unscrew one turn. Tighten the lock nut.

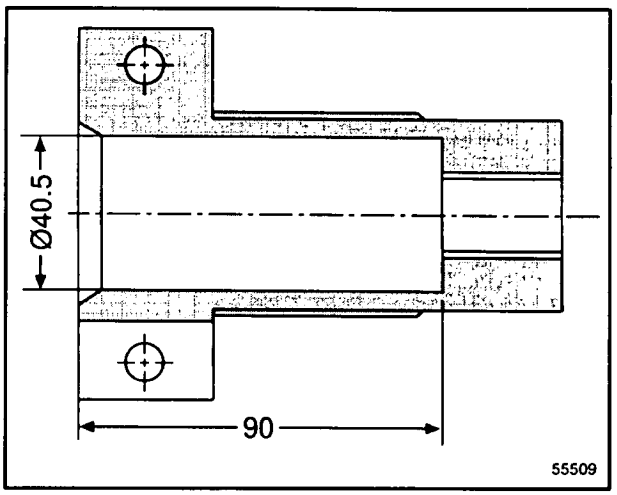
3. Position the shifter shaft in first or second gear. Turn in adjusting bolt 46 until it is tight and unscrew one turn. Tighten the lock nut.

Fill the gearbox with 15 litres of AMBRA HYPOID 90 oil (ref. NH520A), specification API GL5 or MIL-L 2105D, grade SAE 80W90.

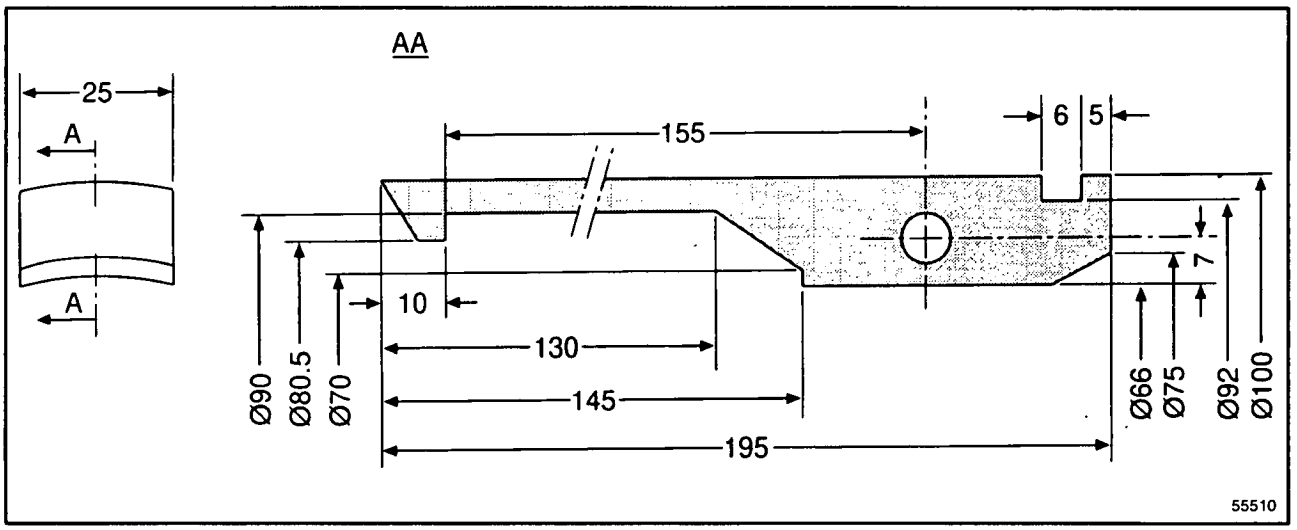


32

NOTE:
To remove bearing R (Fig. 16) special puller S has to be used. The previous version (80434463) cannot be used any longer, but it can be modified.
Two things have been changed: the fingers have been enlarged (see Fig. 34) and the bore dimension in Fig. 33 has changed. To have good results, make the finger of 42CrMoS4V+S material.



33



34