

RENAULT

Workshop Repair Manual

Manual gearboxes

Vehicle	Type						
	JB0	JB1	JB2	JB3	JB4	JB5	JC5
Renault 5	X	X		X	X	X	
Extra	X	X			X		
Renault 9	X	X		X	X	X	
Renault 11	X	X		X	X	X	
Renault 19	X	X		X	X	X	
Renault 21			X	X			
Clio	X	X		X	X	X	X
Twingo		X					
Laguna				X			X
Mégane		X		X			X

This document cancels and replaces JB Gearbox manual part number
77 11 093 922 and JC5 Gearbox manual part number
77 11 092 186
and technical notes
n° 1978, 2127, 2229A, 2284A, 2383A, 2457A.

77 11 192 787

FEBRUARY 1997

Edition Anglaise

"The repair methods given by the manufacturer in this document are based on the technical specifications current when it was prepared.

The methods may be modified as a result of changes by the manufacturer in the production of the various component units and accessories from which his vehicles are constructed".

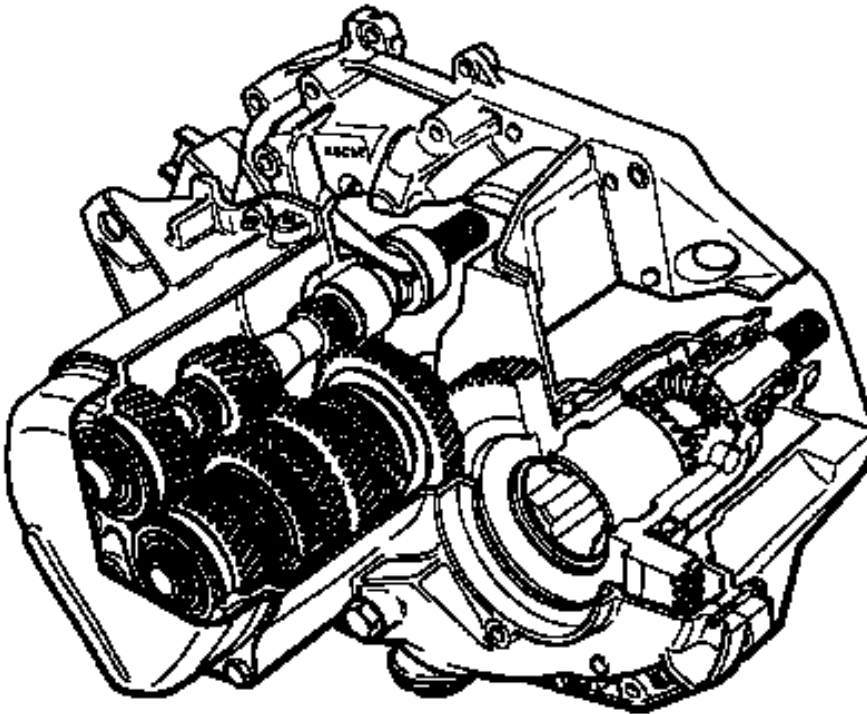
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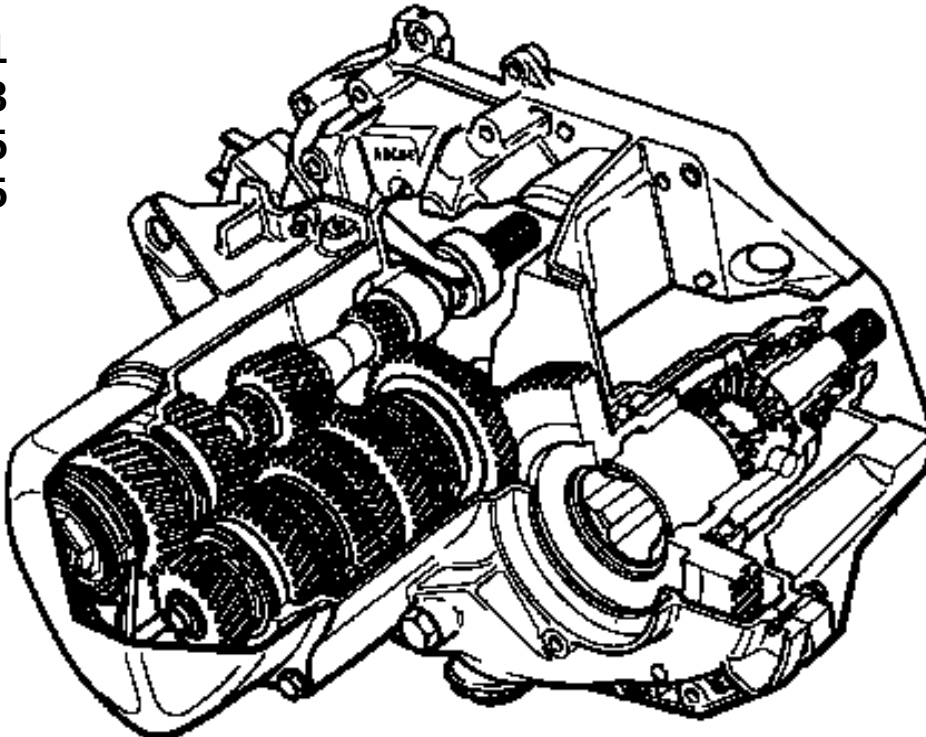
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JB0
JB2
JB4

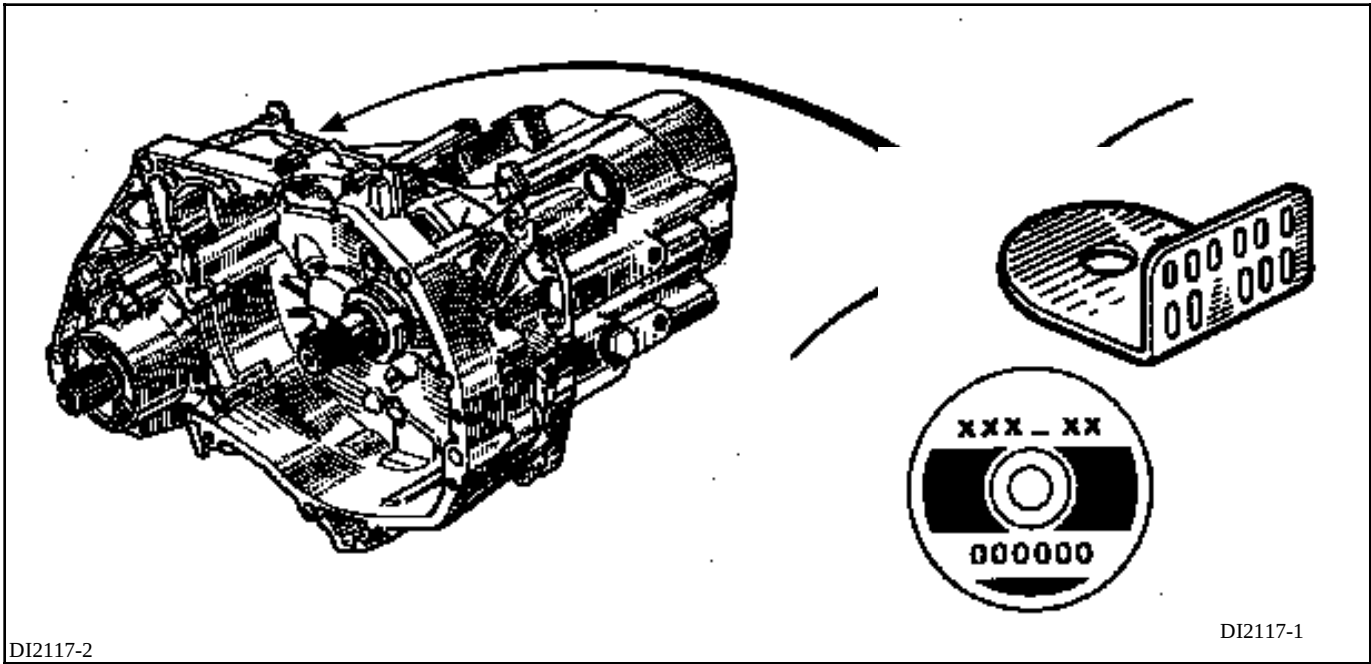


DI2101

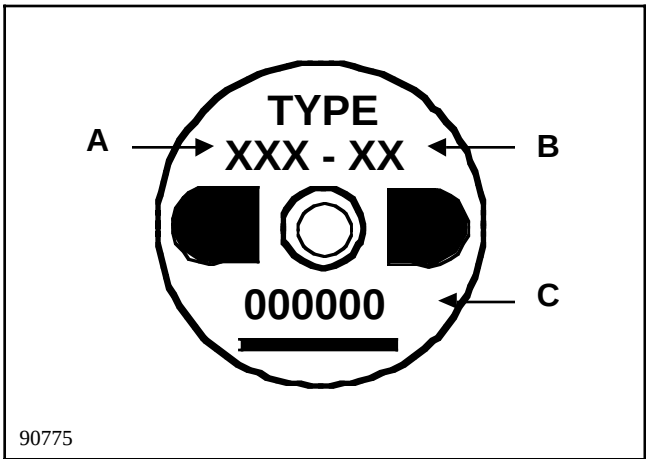
JB1
JB3
JB5
JC5



DI2102

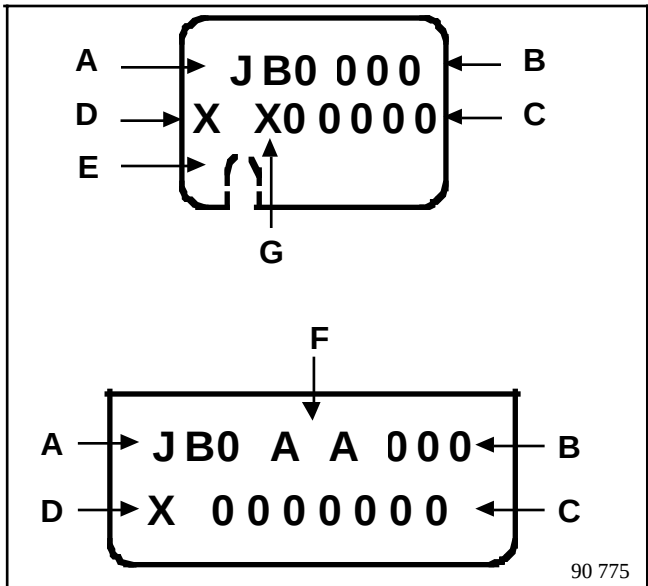


1st assembly



- At **A** : Gearbox type.
At **B** : Gearbox suffix.
At **C** : Production number.

2nd assembly

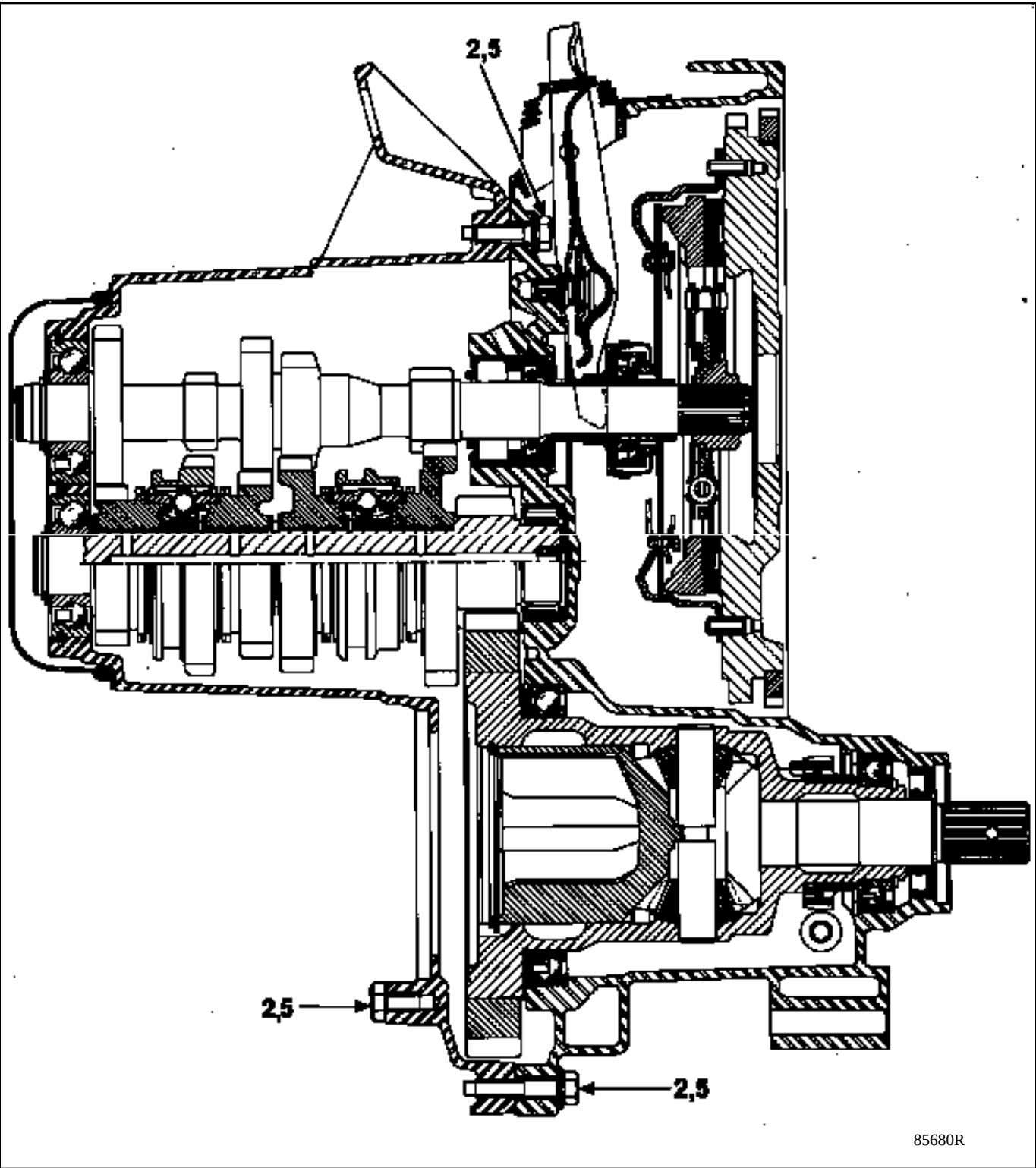


- At **A** : Gearbox type.
At **B** : Gearbox suffix.
At **C** : Production number.
At **D** : Manufacturing factory.
At **E** : A notch if the gearbox is assembled with a **C** or **E** engine.
At **F** : Homologation letter.
At **G** : Letter preceding production numbers greater than **999 999**.

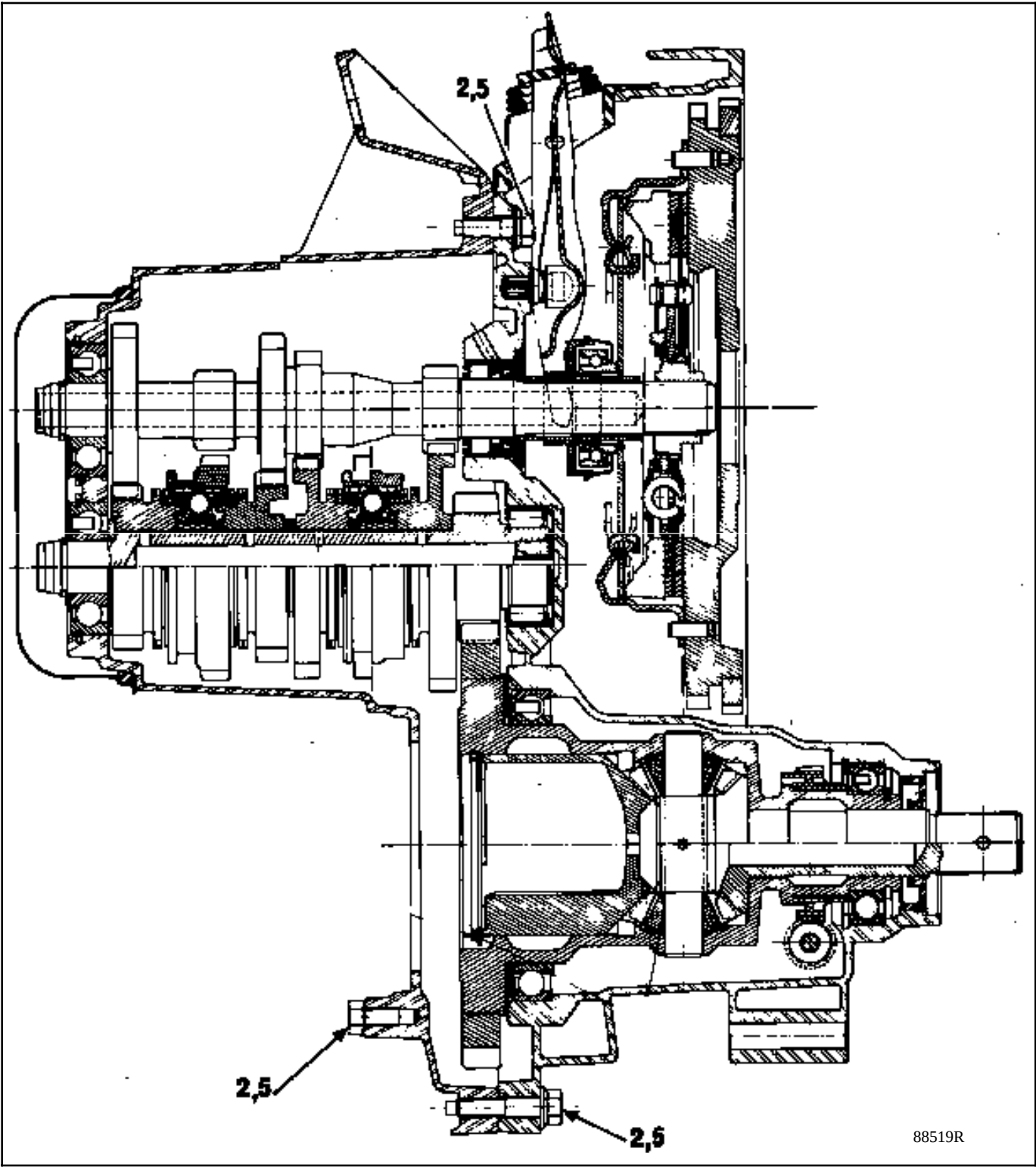
Following saturation of the production numbering system on the identification plate of **JB** and **JC** gearboxes, a new numbering system will be in force for numbers greater than **999 999** (at **C**).

These will have a letter in place of the first number, (at **G**).

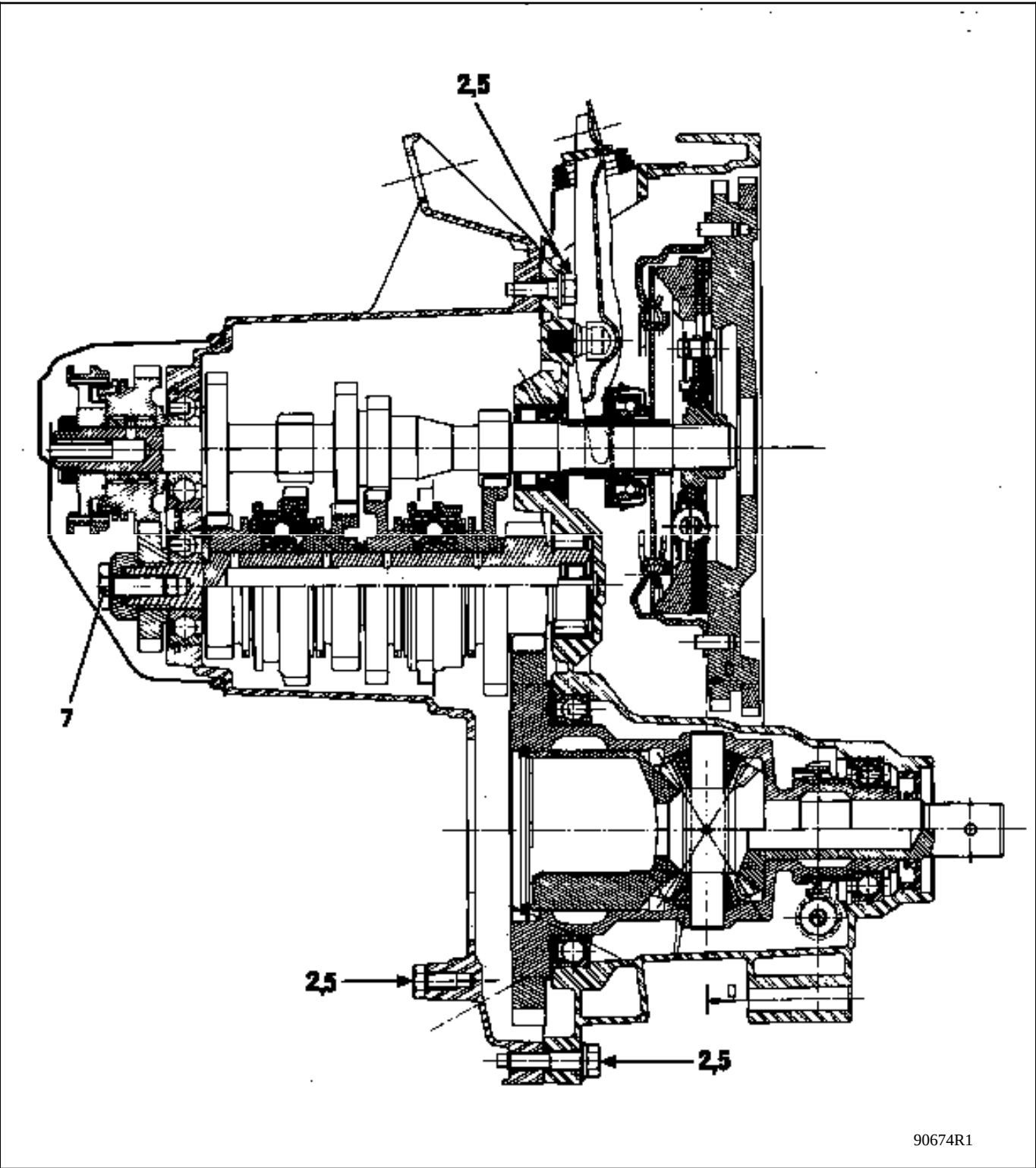
JB 4-speed manual gearbox - 1st assembly



JB 4-speed manual gearbox - 2nd assembly

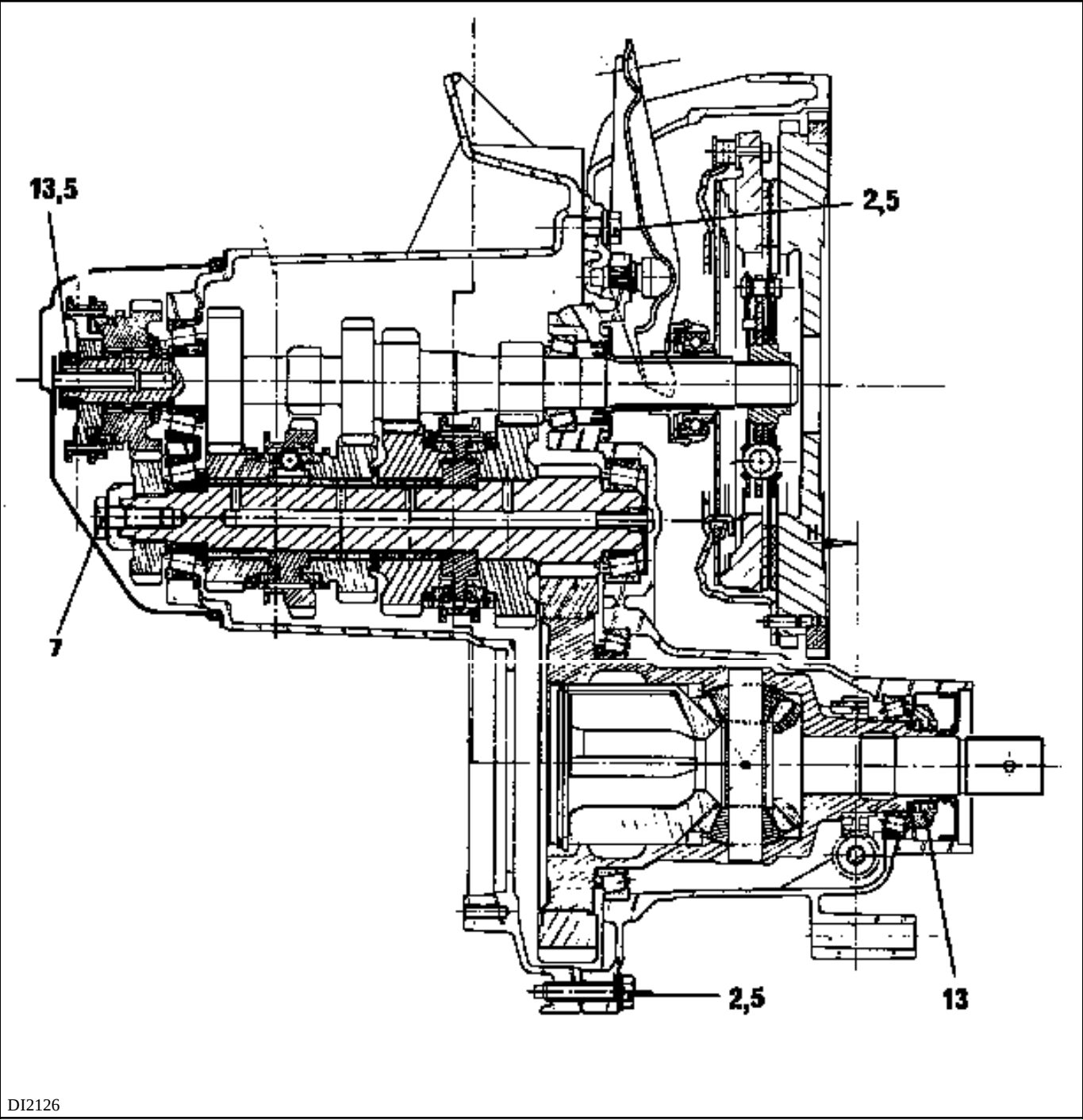


5-speed manual gearbox



90674R1

JC 5-speed manual gearbox



Tightening torques



Description	Torque in daN.m
Bolt securing the mechanism housing to the clutch housing	2.5
Output shaft bolt	7
Input shaft nut	13.5
Body (5th gear detent)	2
Rear cover bolt	2.5
Thrust pad guide tube bolt	2.5
Drain plug	2.5
Reversing lights switch	2.5
Bolt securing the left-hand drive shaft bellows	2.5
Bolt securing the gearbox to the cylinder block	5

These tables group together all of the gears available for **JB** gearboxes.

JB0 gear table

Gear	1st	2nd	3rd	4th	Reverse
A	11	16	25	31	11
	--	--	--	--	-- 26
	39	33	33	28	39
B	11	19	25	31	11
	--	--	--	--	-- 26
	41	39	33	28	39
C	11	21	28	31	11
	--	--	--	--	-- 26
	41	43	37	28	39

Gearbox suffixes	Vehicles	Differential ratio	Speedometer drive gear	Gear
000	L 421 - L 422 - L 425 B / C / S 371 B / C 372 C 37S	15	21	A
		--	--	
		58	19	
003	L 422	14	21	A
		--	--	
		59	19	
004	L 422 B / C 372	15	21	A
		--	--	
		58	19	
006	L 422 - L423	14	21	B
		--	--	
		59	19	
008	L422 B / C 372	15	21	B
		--	--	
		58	19	
009	B / C / S 404	19	21	B
		--	--	
		59	20	
010	F 404	16	21	B
		--	--	
		57	19	
011	L 421 - L 422 - L 423 L425 - L 426 B / C / S 371 B / C 372 - B / C 375 F 401 - F 40H	15	21	B
		--	--	
		58	19	
014	F 400	14	21	B
		--	--	
		63	19	

Gearbox suffixes	Vehicles	Differential ratio	Speedometer drive gear	Gear
016	L 422 - L 423 B 372 - B 373 B / C 401	14 -- 59	21 -- 19	B
017	B / C / L 531 - B / C / L 532 B / C / L 537 - B / C / L 53P B / C / L 53R	16 -- 57	21 -- 19	C
018	F 401	15 -- 58	21 -- 19	B
019	B / C / L 53H K / S 480	15 -- 56	21 -- 19	C
021	B 372 - B 401	14 -- 59	21 -- 19	C
022	F 400	14 -- 63	21 -- 19	C
023	B / C 37S F 401 - F 40H B / C / L / S 530	15 -- 58	21 -- 19	C
024	F 404	16 -- 57	21 -- 19	C
025	F 401	15 -- 58	21 -- 19	C
028	B / C 400 F 401 - F 40T	15 -- 58	21 -- 20	C
029	B / C / S 401	17 -- 56	21 -- 20	C
031	B / C / S 571	16 -- 55	21 -- 20	C
032	B / C 572 C 57A	16 -- 57	21 -- 20	C
033	F 401 - F 404 - F 40H	15 -- 58	21 -- 19	C
034	B / C 57N	16 -- 57	21 -- 19	C
035	F 40F	15 -- 61	21 -- 19	C
036	F 40F	15 -- 61	21 -- 20	C
038	F 404	15 -- 61	21 -- 19	C

JB1 gear table

Gear	1st	2nd	3rd	4th	5th	Reverse
A	11	16	25	31	33	11
	--	--	--	--	--	-- 26
	39	33	33	28	25	39
B	11	16	26	31	37	11
	--	--	--	--	--	-- 26
	41	33	33	28	27	39
C	11	16	25	31	37	11
	--	--	--	--	--	-- 26
	39	33	33	28	27	39
D	11	19	25	30	34	11
	--	--	--	--	--	-- 26
	41	39	33	29	27	39
E	11	21	28	30	39	11
	--	--	--	--	--	-- 26
	41	43	37	29	31	39
F	11	22	28	30	41	11
	--	--	--	--	--	-- 26
	41	41	37	29	31	39
G	11	22	28	30	39	11
	--	--	--	--	--	-- 26
	34	41	37	29	31	39
H	11	21	28	30	41	11
	--	--	--	--	--	-- 26
	41	43	37	39	31	39
I	11	21	28	34	34	11
	--	--	--	--	--	-- 26
	41	43	39	35	28	39
J	11	22	28	30	39	11
	--	--	--	--	--	-- 26
	37	41	37	39	31	39
K	11	21	28	34	39	11
	--	--	--	--	--	-- 26
	41	43	39	35	32	39
L	11	22	28	30	41	11
	--	--	--	--	--	-- 26
	37	41	37	29	31	39
M	11	22	28	30	39	11
	--	--	--	--	--	-- 26
	37	41	37	39	32	39
N	11	21	28	30	39	11
	--	--	--	--	--	-- 26
	41	43	37	29	32	39
O	11	21	28	30	41	11
	--	--	--	--	--	-- 26
	41	43	37	29	31	39

MANUAL GEARBOX

Gears

21

Gearbox suffixes	Vehicles	Differential ratio	Speedometer drive gear	Gear
001	L 421 - L 422 - L 423 B/C 371 - B/C 372 B/C 373	14 -- 59	21 -- 19	A
002	L 421	15 -- 58	21 -- 19	A
003	L 422 - L 423	15 -- 58	21 -- 19	B
004	L 421 - L 424 B/C/S 374	15 -- 58	21 -- 19	C
005	L 422 - L 423 B/C 372 - B 373	14 -- 59	21 -- 19	A
006	L 424 B/C 374	15 -- 58	21 -- 19	C
007	L 424 B/C 374	14 -- 59	21 -- 19	C
008	B/C 373	14 -- 59	ELECTRONIC SPEEDOMETER	A
009	L 421 - L 422 - L 423 L 424 - L 42A - L 42C L 42R - L 42S B/C 371 - B/C 372 B/C/S 373 B/C 37A - B/C 37C B 37R - B/S 37S	15 -- 61	21 -- 19	D
011	L 424 - B/C/S 374 F 401 - F 402 - F 407 F 40H	15 -- 58	21 -- 19	E
012	B 373	15 -- 61	ELECTRONIC SPEEDOMETER	E
013	B/C/S 404	17 -- 56	21 -- 20	E
014	L 424 B/C 374	15 -- 58	21 -- 19	E
015	L 424 B 374	16 -- 57	21 -- 19	E
016	L 422 - L 423 B/C 372 - B 373 B 374	17 -- 56	21 -- 19	D
018	L 423 B/C 373 B/C 402	14 -- 63	21 -- 19	D
019	L 424 B/C/S 374 F 404	15 -- 58	21 -- 19	D

MANUAL GEARBOX

Gears

21

Gearbox suffixes	Vehicles	Differential ratio	Speedometer drive gear	Gear
020	B / C 404	16 -- 57	21 -- 20	D
021	F 404	15 -- 61	21 -- 19	D
022	B 402	15 -- 61	21 -- 19	D
023	F 401 - F 402 - F 407 F 40H - F 40M B / C / L 532	15 -- 58	21 -- 19	E
024	B / C 53	15 -- 57	21 -- 19	E
025	L 423 - L 424 - L 42A L 42C - L 42S B / C 373 - B / C 37A B 37C F 401 B / C / L / S 537 B / C / L / S 530 B / C / L / 53A B / C / L 53R	15 -- 61	21 -- 19	E
026	F 402	15 -- 58	21 -- 19	D
027	F 402 B / L 53H	15 -- 58	21 -- 19	E
028	B / C / S 404	17 -- 56	21 -- 20	E
029	B 402 B / C 480 K / S 480 B / C / L 53G	15 -- 61	21 -- 19	E
030	F 404 L 424 B / C / S 374	15 -- 58	21 -- 19	E
031	B / C / S 404	16 -- 57	21 -- 20	E
032	F 404	15 -- 61	21 -- 19	E
033	L 423 B 373	14 -- 63	21 -- 19	E
034	B / C / L 531 B / C / L 53P	16 -- 57	21 -- 19	E
035	B / C / S 401 B / C 403 B / C / S 407 B 40H	16 -- 55	21 -- 20	E

MANUAL GEARBOX

Gears

Gearbox suffixes	Vehicles	Differential ratio	Speedometer drive gear	Gear
036	B / C 400 F 401 F 40T	15 -- 61	21 -- 20	E
037	C 402 B / C / S 40F	17 -- 56	21 -- 20	E
038	B / C 402 B / C 40F B / C / S 571	16 -- 57	21 -- 20	E
039	B / C 570	14 -- 59	21 -- 20	E
041	X 57	14 -- 59	21 -- 20	F
042	X 40	15 -- 61	21 -- 20	F
043	B / C / S 572 - B / C 573 B / C 57A - B / C 57B B / C 57J - B / C 57L B / C 57T	16 -- 57	21 -- 20	E
044	F 401 - F 40H	15 -- 58	21 -- 19	E
045	B / C 57N B / C 57P	14 -- 59	21 -- 19	F
046	B / C / S 572 B / C / S 57A B / C / S 57R	14 -- 59	21 -- 20	G
047	F 40F	14 -- 63	21 -- 19	E
048	F 40A - F 40U F 40V - F 40Y	14 -- 63	21 -- 19	E
049	F 40A	14 -- 63	21 -- 20	E
050	F 40F	14 -- 63	21 -- 20	E
051	F 407	14 -- 59	21 -- 19	E
052	C06 3	15 -- 56	21 -- 20	H
053	X 57	14 -- 59	21 -- 20	F
054	BA0 E	15 -- 61	21 -- 19	E

MANUAL GEARBOX

Gears

21

Gearbox suffixes	Vehicles	Differential ratio	Speedometer drive gear	Gear
057	X 06	15 -- 56	21 -- 20	H
061	X 06 with AC	15 -- 58	21 -- 20	I
066	X 57	15 -- 56	21 -- 20	I
068	BA0 A - BA0 U DA0	15 -- 56	21 -- 19	E
069	X 06 with AC	15 -- 58	21 -- 20	E
070	X 53 - F 40	15 -- 61	21 -- 19	E
071	X 57	16 -- 57	21 -- 20	E
072	X 57	15 -- 59	21 -- 19	F
074	X 57	15 -- 58	21 -- 19	E
080	X 57	15 -- 56	21 -- 20	I
082	X 57	16 -- 57	21 -- 20	E
085	B / C 57	15 -- 56	21 -- 20	I
087	B / C 57	15 -- 56	21 -- 19	E
095	BA0 E SA0 E	15 -- 61	21 -- 19	E
097	JA0 E	14 -- 63	21 -- 18	K
099	BA0 DA0	15 -- 58	21 -- 19	E
100	F 40	15 -- 61	21 -- 19	E
104	X 57	17 -- 56	21 -- 20	E

MANUAL GEARBOX
Gears

21

Gearbox suffixes	Vehicles	Differential ratio	Speedometer drive gear	Gear
105	X 57	17 -- 56	21 -- 20	E
106	BA0 DA0	15 -- 58	21 -- 19	E
107	F 40	15 -- 58	21 -- 19	E
109	F 40	15 -- 58	21 -- 19	E
110	F 40	16 -- 57	21 -- 19	D
111	X 53 X 48	16 -- 57	21 -- 19	D
119	BA0 L BA0 F	15 -- 58	21 -- 19	J
120	BA0 L BA0 F	15 -- 58	21 -- 19	J
123	BA0 L BA0 P	15 -- 58	21 -- 19	J
124	BA0 L BA0 F	15 -- 58	21 -- 19	J
126	F 40	16 -- 61	21 -- 19	E
129	BA0 SA0	15 -- 56	21 -- 19	E
130	BA0 E JA0 E	14 -- 63	21 -- 18	K
131	X 57	17 -- 56	21 -- 20	H
132	C 06	15 -- 56	21 -- 20	L
137	C 06	15 -- 56	21 -- 20	L
138	B / C 57	15 -- 56	21 -- 20	K
140	X 57	15 -- 56	21 -- 20	I

Gearbox suffixes	Vehicles	Differential ratio	Speedometer drive gear	Gear
141	X 57	14 -- 59	21 -- 20	F
142	XA0	15 -- 56	21 -- 19	E
143	XA0	15 -- 56	21 -- 19	E
144	X06	15 -- 58	21 -- 20	M
145	X06	15 -- 58	21 -- 20	M
164	XA0	15 -- 58	21 -- 19	M
165	XA0	15 -- 58	21 -- 19	M
166	B/DA0	15 -- 58	21 -- 19	M
167	B/DA0	15 -- 58	21 -- 19	M
168	XA0	15 -- 56	21 -- 19	O
169	XA0	15 -- 56	21 -- 19	O
170	BA0	15 -- 58	21 -- 19	N

JB2 gear table

Gear	1st	2nd	3rd	4th	Reverse
A	11	19	25	31	11
	--	--	--	--	-- 26
	41	39	33	28	39
B	11	21	28	31	11
	--	--	--	--	-- 26
	41	43	37	28	39

Gearbox suffixes	Vehicles	Differential ratio	Speedometer drive gear	Gear
000	K / L / S 481	17	21	A
	K / L 482	--	--	
	K / L 48M	56	19	
001	X53	16	21	B
		--	--	
		55	19	
002	B / K / L / S 481	17	21	B
	B / K / L 482	--	--	
	K / L 48M	56	19	
004	X48	17	21	A
		--	--	
		56	19	
005	F40	17	21	B
		--	--	
		56	19	

MANUAL GEARBOX
Gears

JB3 gear table

Gear	1st	2nd	3rd	4th	5th	Reverse
A	11	19	25	30	34	11
	--	--	--	--	--	-- 26
	41	39	33	29	27	39
B	11	19	25	30	33	11
	--	--	--	--	--	-- 26
	34	35	33	29	25	39
C	11	21	28	30	39	11
	--	--	--	--	--	-- 26
	41	43	37	29	31	39
D	11	22	38	30	41	11
	--	--	--	--	--	-- 26
	41	41	37	29	31	39
E	11	22	28	30	41	11
	--	--	--	--	--	-- 26
	34	41	37	29	31	39
F	11	19	25	30	39	11
	--	--	--	--	--	-- 26
	34	35	33	29	31	39
G	11	21	28	34	34	11
	--	--	--	--	--	-- 26
	41	43	39	35	28	39
H	11	22	28	34	34	11
	--	--	--	--	--	-- 26
	34	41	37	35	28	39
I	11	19	25	30	34	11
	--	--	--	--	--	-- 26
	34	35	33	29	27	39
K	11	19	25	30	41	11
	--	--	--	--	--	-- 26
	34	35	33	29	31	39
L	11	22	28	30	39	11
	--	--	--	--	--	-- 26
	34	41	37	29	41	39
M	11	21	28	30	41	11
	--	--	--	--	--	-- 26
	41	43	37	29	31	39
N	13	21	28	30	41	11
	--	--	--	--	--	-- 26
	45	43	37	29	31	39
O	11	21	28	34	39	11
	--	--	--	--	--	-- 26
	41	43	39	35	32	39
P	11	22	28	30	42	11
	--	--	--	--	--	-- 26
	34	41	37	29	31	39

MANUAL GEARBOX

Gear

21

Gearbox suffixes	Vehicles	Differential ratio	Speedometer drive gear	Gear
001	B / C 37F - B / C 376 L 426 - L 42F	16 -- 57	21 -- 19	A
002	B / C 375 L 425	15 -- 61	ELECTRONIC SPEEDOMETER	B
003	B / C 376	16 -- 57	ELECTRONIC SPEEDOMETER	A
005	X 42	17 -- 56	21 -- 19	A
006	X 42	16 -- 57	21 -- 19	A
008	X 42	15 -- 61	21 -- 19	A
009	C 405	15 -- 56	ELECTRONIC SPEEDOMETER	B
010	L 426 - L 42F L 42L - L 42N B / C 376 - B / C 37F B / C 37G - B / C 37L B 37M - C 37N K / L / S 481 - K / L / S 482 K / L 48F	16 -- 57	21 -- 19	A C
011	B / C 375 L 425	15 -- 61	ELECTRONIC SPEEDOMETER	B
012	B 376	16 -- 57	ELECTRONIC SPEEDOMETER	A C
013	B 376 L 426	15 -- 61	21 -- 19	A
014	C 405	15 -- 56	ELECTRONIC SPEEDOMETER	B
017	B 376 L 481 - L 482 K / L 48E - K / L 48J K / L 48N	15 -- 61	21 -- 19	B
019	C 409	15 -- 58	21 -- 20	B
020	X 42	15 -- 61	21 -- 19	B D
021	L 42E B / C 37E	14 -- 59	21 -- 19	B
022	K / L 482	15 -- 58	21 -- 19	A

MANUAL GEARBOX
Gears

Gearbox suffixes	Vehicles	Differential ratio	Speedometer drive gear	Gear
023	B / C 408	16 -- 57	21 -- 20	A
024	B / C 40G B / C 40K	16 -- 57	21 -- 20	B
026	C 376 - B / C 37D B / C 37F - B 37H B / C 37L - C 37N L 42D - L 42L L 42F - L 42N K / L / S 481 - K / L / S 482 K / L 48F - K / L 48M	16 -- 57	21 -- 19	A
027	B / K / L / S 481 B / K / L / S 482 B / K / L / 484 B / K / L / 48E - K 48F B / K / L 48J L / B 48L - K / L 48M K / C 48N B / C / L 533 - L 53B B / C / D 53C B / C / L 53M	15 -- 61	21 -- 19	D
028	L 42D - L 42F L 42N - C 37D B / C 37F - B 37H C 37N B / K / L / S 481 B / K / L / S 482 K / L 48E B / K / L 48F B / K / L / S 48H K / L 48M B / C / L 533 B / C / L / S 534 B / C / L 53B B / C 53E B / C / L 53C B / C / L / S 53J	16 -- 57	21 -- 19	C
029	X 53	15 -- 61	21 -- 19	C
030	X 53	14 -- 59	21 -- 19	B
031	B / K 482 B 533 B / L 536	15 -- 58	21 -- 19	C
032	C 405	15 -- 56	ELECTRONIC SPEEDOMETER	B
033	C 409	15 -- 58	21 -- 20	E
034	B / C 408	16 -- 57	21 -- 20	C

MANUAL GEARBOX

Gears

21

Gearbox suffixes	Vehicles	Differential ratio	Speedometer drive gear	Gear
035	B/C 40G B/C 40K	16 -- 57	21 -- 20	E
036	L 425 B/C 375	15 -- 61	ELECTRONIC SPEEDOMETER	B
037	L 42E B/C 37E B/C/D/L 53C B/C/L 53F	14 -- 59	21 -- 19	E
038	B 376 L 426 K/L 48U	15 -- 61	21 -- 19	C
041	B/C/S 576 B/C/S 57L	17 -- 56	21 -- 20	C
044	B/C/L 539 B/C/D/L 53D	15 -- 61	21 -- 19	F
045	B/C 574	16 -- 55	21 -- 20	C
046	B/C 574 - B/C 57C B/C 57U	15 -- 58	21 -- 20	D
047	B/L 57B	16 -- 55	21 -- 19	C
048	C 575 - C 57D	14 -- 59	21 -- 19	F
050	F 40N - F 40P	15 -- 58	21 -- 19	C
051	B/C/L 539 B/C/D/L 53D	15 -- 61	21 -- 19	F
059	X 53 - X 48	15 -- 61	21 -- 19	D
060	X 53 - X 48	16 -- 57	21 -- 19	C
062	X 42 - X 48	14 -- 59	21 -- 19	E
064	X 57	17 -- 56	21 -- 20	C
066	X 57	15 -- 58	21 -- 20	E
067	X 53	16 -- 55	21 -- 19	C

MANUAL GEARBOX
Gears

21

Gearbox suffixes	Vehicles	Differential ratio	Speedometer drive gear	Gear
078	X 57	15 -- 61	21 -- 19	E
080	BA0 JA0	15 -- 61	21 -- 18	M
083	X 53	15 -- 61	21 -- 19	H
097	F 40	16 -- 57	21 -- 19	C
100	B 56B	15 -- 58	21 -- 18	G
101	B 56B	16 -- 57	21 -- 18	M
102	B 56B	15 -- 61	22 -- 18	G
103	X 57	17 -- 56	21 -- 20	C
106	BA0 G	15 -- 61	21 -- 19	P
108	B / K 56	15 -- 58	21 -- 18	O
113	K 56	16 -- 57	21 -- 18	M
132	K 56	15 -- 58	21 -- 18	G
140	X 56	15 -- 56	21 -- 18	M
142	BA0 SA0	15 -- 59	21 -- 18	S
143	BA0 DA0	15 -- 61	21 -- 19	P
170	BA0 LA0	15 -- 61	21 -- 18	C

JB4 gear table

Gear	1st	2nd	3rd	4th	Reverse
A	11	19	25	31	11
	--	--	--	--	-- 26
	41	39	33	28	39

Gearbox suffixes	Vehicles	Differential ratio	Speedometer drive gear	Gear
000	L 421 - L 425	15	21	A
	F 40F	--	--	
	B / C 537	58	19	
	C 375			
001	X 400	15	21	A
		--	--	
		58	20	
002	X 401	17	21	A
		--	--	
		56	20	
003	X 40F	16	21	A
		--	--	
		57	20	
004	X 40F X 571	16	21	A
		--	--	
		55	20	
005	B / C 53	16	21	A
		--	--	
		57	19	
006	B / C 53	16	21	A
		--	--	
		57	19	
007	B / C 53	15	21	A
		--	--	
		58	19	
008	X 57	16	21	A
		--	--	
		57	20	

JB5 gear table

Gear	1st	2nd	3rd	4th	5th	Reverse
A	11	19	25	30	34	11
	--	--	--	--	--	-- 26
	41	39	33	29	27	39
B	11	19	25	30	33	11
	--	--	--	--	--	-- 26
	34	35	33	29	25	39

Gearbox suffixes	Vehicles	Differential ratio	Speedometer drive gear	Gear
000	L 421 - L 422	15	21	A
	B/C/L 42S	--	--	
	B/C 371 - S 372	61	19	
	B/C/S 375			
001	B/L/S 530			A
	B/C/S 401	16	21	
	B/C 403 - B/C 407	--	--	
	B/C 40H - B/C 40J	55	20	
002	B/C 40M			B
		15	21	
		--	--	
003	B/C 403	61	20	A
004	B/C 402 - B/C 407	17	21	A
		--	--	
		56	20	
005	B/C/S 40F			A
		15	21	
		--	--	
006	B/C 400	61	20	A
007	B/C 402 - B/C 40F	16	21	A
		--	--	
		57	20	
008	B/C/S 571			A
		16	16	
		--	--	
009	B/C/L 531	57	57	A
010	C 53P	15	21	A
		--	--	
		58	19	
011	F 401			A
		15	21	
		--	--	
012	F 40 H	58	20	A
013	B/C 40F	15	21	A
		--	--	
		58	20	
014	L 422 - L 423			A
		15	21	
		--	--	
015	B/S 372	61	19	A
016	B 373	16	21	A
		--	--	
		57	20	
017	B/C 572			A
		14	21	
		--	--	
018	B/C/S 572	59	20	A

MANUAL GEARBOX
Gears

These tables group together all of the gears available for JC5 gearboxes.

Gear	1st	2nd	3rd	4th	5th	Reverse
A	11	21	28	35	41	11
	--	--	--	--	--	-- 26
	41	43	37	34	31	39
B	11	21	28	31	42	11
	--	--	--	--	--	-- 26
	41	43	37	29	31	39
C	11	22	28	35	41	11
	--	--	--	--	--	-- 26
	41	41	37	34	31	39
D	11	22	28	34	39	11
	--	--	--	--	--	-- 26
	34	41	37	35	31	39
E	11	21	28	35	42	11
	--	--	--	--	--	-- 26
	41	43	37	34	31	39
F	11	21	28	35	39	11
	--	--	--	--	--	-- 26
	41	43	37	34	31	39
G	11	22	28	31	37	11
	--	--	--	--	--	-- 26
	37	41	39	34	33	39
H	11	22	28	34	39	11
	--	--	--	--	--	-- 26
	37	41	37	35	32	39
I	11	21	28	31	39	11
	--	--	--	--	--	-- 26
	41	43	39	34	32	39

MANUAL GEARBOX
Gears

21

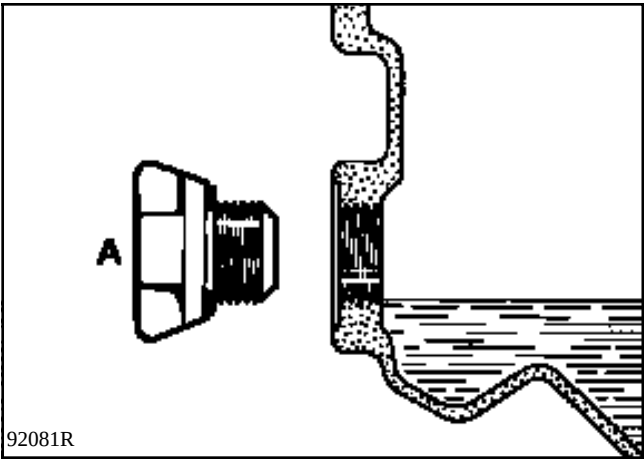
Gearbox suffixes	Vehicles	Differential ratio	Speedometer drive gear	Gear
002	X 53K	17 -- 56	21 -- 19	A
004	B 56C	15 -- 58	21 -- 18	B
005	X 56	15 -- 56	21 -- 18	C
014	X 57	15 -- 61	21 -- 29	D
016	B 56C	15 -- 61	22 -- 18	E
017	X 56	15 -- 61	22 -- 18	E
022	B 56C	15 -- 61	22 -- 18	B
024	B 56C	15 -- 58	21 -- 18	F
025	XA0	15 -- 61	21 -- 18	H
026	JA0	15 -- 61	21 -- 18	F
028	B 56	15 -- 61	21 -- 18	G
029	B 56	15 -- 61	21 -- 18	G
032	B / K 56	15 -- 58	21 -- 18	F
033	B / K 56	15 -- 61	22 -- 18	E
036	K / S 56	15 -- 56	21 -- 18	F
037	B / K 56	15 -- 61	21 -- 18	G
038	B / K 56	15 -- 61	21 -- 18	G
039	B / K 56	15 -- 61	21 -- 18	G

Gearbox suffixes	Vehicles	Differential ratio	Speedometer drive gear	Gear
040	B / K 56	15 -- 61	21 -- 18	G
044	X 56	15 -- 58	21 -- 18	C
045	X 56	15 -- 61	22 -- 18	B
047	B / K 56	15 -- 61	22 -- 18	G
048	B / K 56	15 -- 61	22 -- 18	G
052	XA0	17 -- 56	21 -- 29	A
053	XA0	15 -- 61	21 -- 18	H
066	JA0	15 -- 61	22 -- 18	I
067	JA0	15 -- 61	22 -- 18	E
075	B 56	15 -- 61	22 -- 19	H
076	B 56	15 -- 61	22 -- 18	H

CAPACITY (in litres)	4-speed gearbox		5-speed gearbox	
Plug with no dipstick: <i>normal level</i>	JB0 JB2	3.25	JB1 JB3	3.40
			JC5	3.1
Plug with dipstick: <i>low level</i>	JB4	2.8	JB5	2.90
Plug with no dipstick: From September 89	JB4	2.8	JB5	2.90

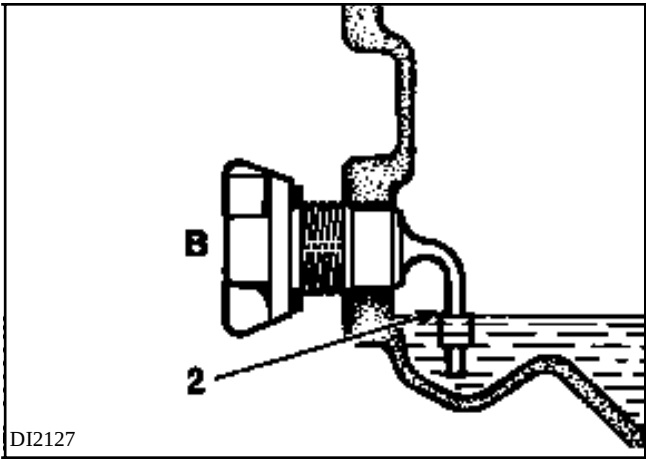
LEVEL CHECK

Plug (A) with no dipstick



Fill to the level of the opening.

Plug (B) with dipstick



Wipe the dipstick section.

Replace the plug without tightening it, dipstick directed downwards.

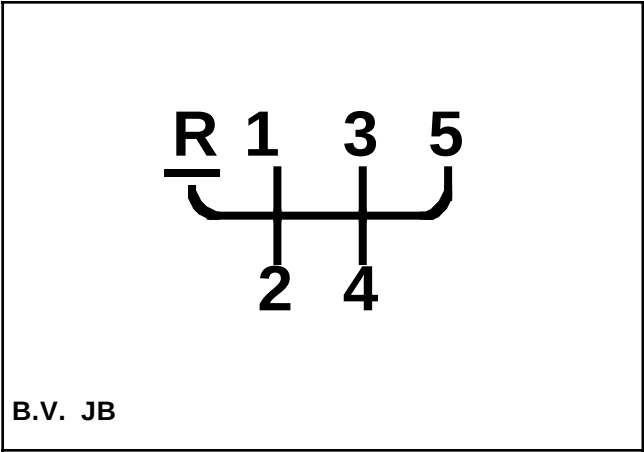
Remove the plug, the level should be on the boss (2).

Gearboxes

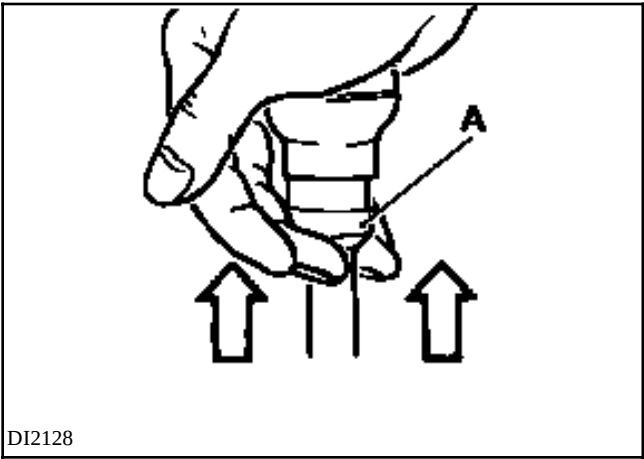
JB0	}	4 forward gears
JB2		
JB4		
	1 reverse gear	
JB1	}	5 forward gears
JB3		
JB5		
JC5		
	1 reverse gear	

are fitted with BORG-WARNER synchronisers.

GEAR GRID



To engage reverse gear, raise the locking ring (A) and move the lever.



MATCHED PARTS

Synchroniser hubs and sliding gears.

In all cases, it is advisable to mark the sliding gears in relation to the hubs and to mark the hubs in relation to the shafts.

DIFFERENTIAL

The differential cannot be adjusted.

Two types of bearing assembly are used, either with balls or with tapered rollers.

SHAFTS

The lip seal and the guide tube bearing rollers are in direct contact with the input shaft.

If the mating surface is imperfect, the input shaft must be changed.

The hubs are fitted free on the output shaft and their sideways movement is checked by thrust washers.

The reverse gear is sold fitted to the shaft.

The thrust pad guide tube can only be removed following removal of the clutch housing.

The use of 037M00 equipment simplifies the operation, refer to the procedure on page 21-92.

INTERNAL CONTROLS

The fifth gear fork has two plastic pads which are greased via a mechanism housing channel.

The pins are fitted on the selection finger one after the other.

SPECIAL FEATURES OF THE JC5 GEARBOX

Adoption of tapered bearings on the input and output shafts.

Setting of the input and output lines.

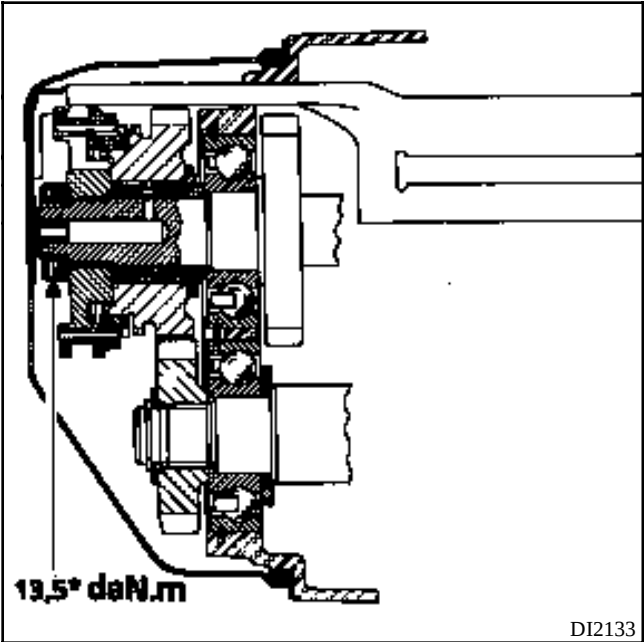
Guide tube with double sealing on the housing and clutch shaft which can be removed without opening the gearbox.

Strengthening of the mechanism and clutch housings.

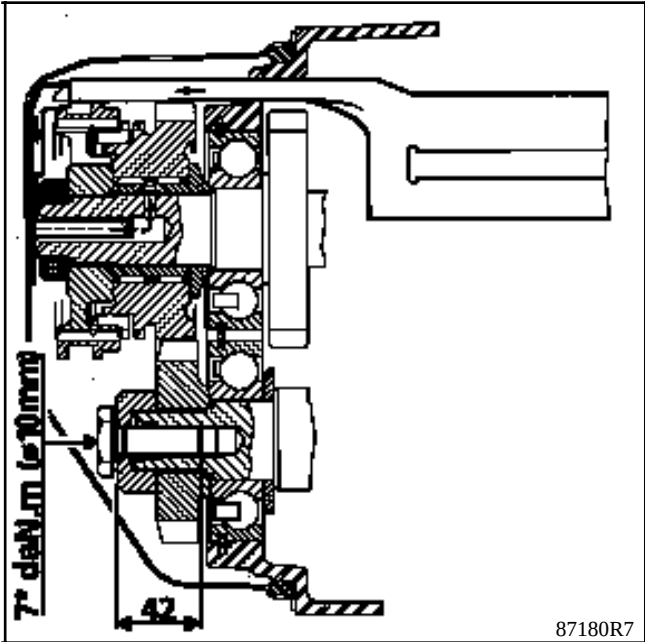
Widening of the teeth.

5th gear fixed gear mounting

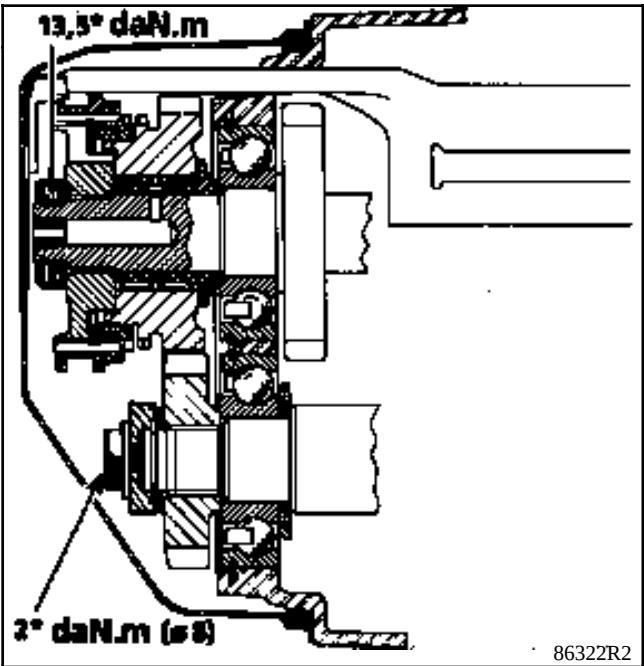
1st assembly



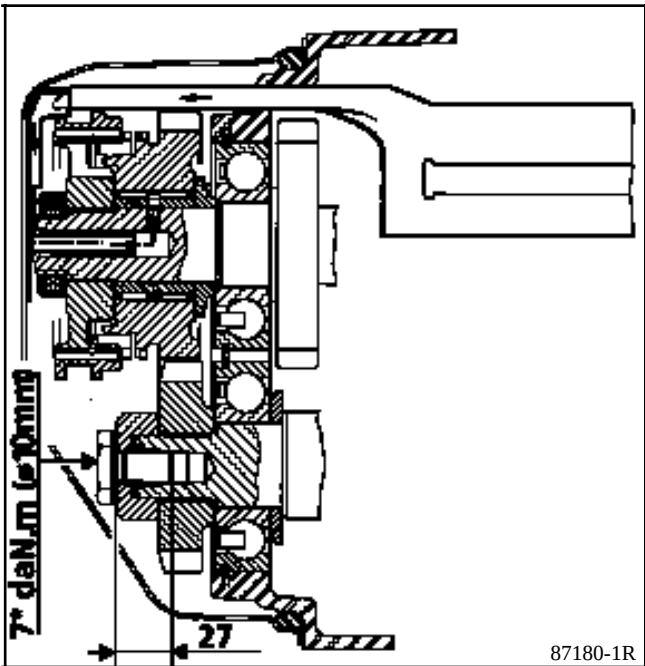
3rd assembly



2nd assembly



4th assembly



Special features:

Reduction of the tapping depth at the end of the output shaft into which the 5th gear fixed gear mounting bolt is inserted.

It is essential to fit a 27mm long bolt.

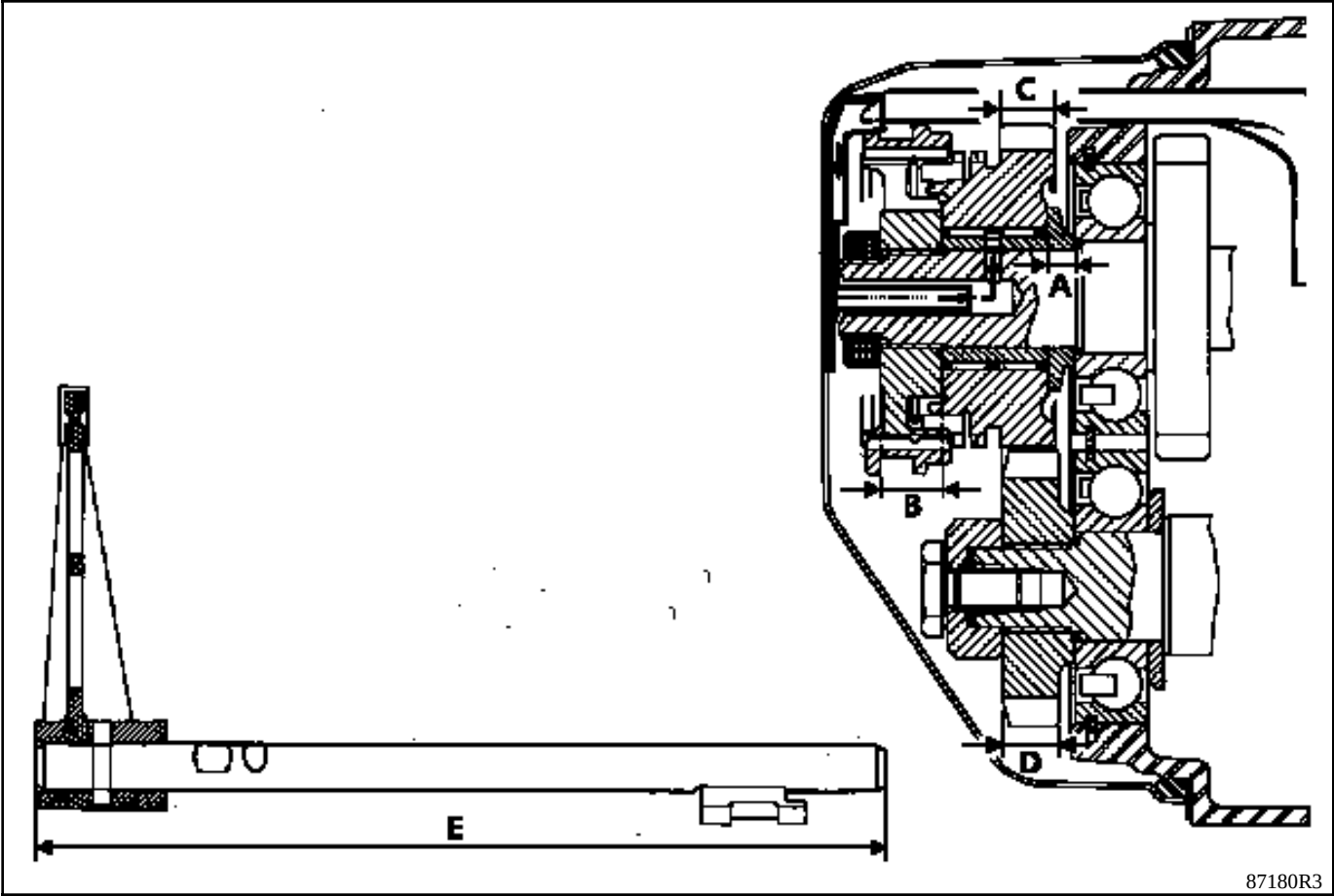
* Glue using "Loctite Frenbloc"

Widening of the teeth of the 5th gear on JB1 / JB3 gearboxes.

Fixed gears	JB1 and JB3	27 teeth
	JB3	25 teeth
Idle gears	JB1 and JB3	34 teeth
	JB3	33 teeth

	Thrust washer dimension A (mm)	* Hub Dimension B (mm)	Idle gear Dimension C (mm)	Fixed gear Dimension D (mm)	** Fork shaft Dimension E (mm)
1 st assembly	5.5	14.1	13.7	13	237.3
2 nd assembly	7.5	12.1	15.7	15	239.3

- * Only the hub dimension changes, the sliding gear remains identical for both assemblies.
- ** Following the modification to the length of the fork shaft, the position of the fork pads changes by 2 mm.



87180R3

Type	Packaging	Part N°	Component
Molykote "BR2"	1 Kg box	77 01 421 145	Clutch fork pad. Clutch fork pivot. Clutch thrust pad guide tube Right-hand sun wheel grooves.
Loctite 518	24 ml syringe	77 01 421 162	Housing assembly surfaces.
Loctite FRENBLOC	24 cc flask	77 01 394 071	5th gear fixed gear and hub. Input and output shaft nut. Output shaft bolt.
RHODORSEAL 5661 EX: CAF 4/60 THIXO	100 g tube	77 01 404 452	Ends of the roll pins on the drive shaft. Switch threads.

Parts which must always be changed

When they have been removed:

- the lip seals,
- the O-rings,
- the stop rings,
- the thrust pad guide tube,
- the differential ball bearings,
- the speedometer crown wheel (JB2 - JB3, differential fitted on tapered bearings),
- the speedometer shaft and gear,
- the roll pins,
- the output shaft and differential nuts,
- the rings under the gears,
- the input and output shaft bearing circlips.

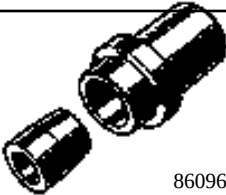
Figure	Procedures reference	Part number	Description
 90723S	B. Vi. 22-01	00 01 216 401	Bearing extractor body.
 90722S	B. Vi. 28-01	00 01 227 301	Bearing extractor with claws.
 77743S1	B. Vi. 31-01	00 01 259 401	Set of 3 pins for fitting the 5 mm diameter roll pins.
 84519-1S	B. Vi. 902-01	00 00 090 201	Tool for fitting circlips to the input and output shafts.
 86095S	B. Vi. 945	00 00 094 500	Mandrel for fitting the sun wheel seal.
 86096-1S	B. Vi. 946	00 00 094 600	Mandrel for fitting the snap ring on the sun wheel.
 86097S	B. Vi. 947	00 00 094 700	Mandrel for fitting the bearings in the mechanism housing.

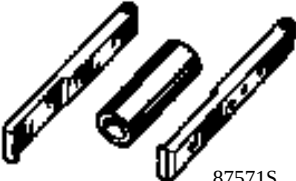
Figure	Procedures reference	Part number	Description
 86098S	B. Vi. 949	00 00 094 900	Fork roll pins fitting and removal tool.
 90664S	B. Vi. 950-02	00 00 095 002	Adaptable gearbox stand on the Desvil stand.
 87213S	B. Vi. 1 000	00 00 100 000	Extractor for the 5th fixed gear on the output shaft, use with B.Vi. 22-01 .
 87571S	B. Vi. 1 007	00 00 100 700	Claws for B.Vi. 28-01 .
 86097S	B. Vi. 1 030	00 00 103 000	Mandrel for fitting bearings into mechanism housing.
 90594S	B. Vi. 1 057	00 00 105 700	Tool for inhibiting rotation of the differential, JB and JC gearboxes.
 90592S	B. Vi. 1 058	00 00 105 800	Mandrel for fitting the output seal on JB and JC gearboxes, differential end.

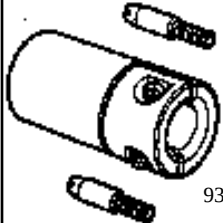
Figure	Procedures reference	Part number	Description
 90588S	B. Vi. 1 059	00 00 105 900	Rings for fitting differential bearings, JB / JC gearbox.
 91218-1S	B. Vi. 1 078	00 00 107 800	Tool for fitting the crown wheel sensor mounting spring on the JB 3 gearbox.
 93229S	B. Vi. 1 162	00 00 116 200	Mandrel for changing the control shaft bearing rings.
 93190S	B. Vi. 1 170	00 00 117 000	Extractor for the 5th gear hub on the input shaft.
 93461S	B. Vi. 1 175	00 00 117 500	5th fixed gear mounting bolt.
 84328S	Emb. 880	00 00 088 000	Clutch fork roll pin extractor (JC gearbox).
 93068S1	Emb. 1163	00 00 116 300	Thrust pad guide tube extraction and fitting tool (JC gearbox).

Figure	Procedures reference	Part number	Description
 93226S1	B. Vi. 1 161	00 00 116 100	Dial gauge support plate and pre-load pre-setting washers.
 93407S1	B. Vi. 1 165	00 00 116 500	Tool for extracting the output shaft bearing on the clutch-differential housing.
 69306-1S	Roul. 15-01	00 01 331 601	Shaft protective end piece, internal diameter 16 mm.

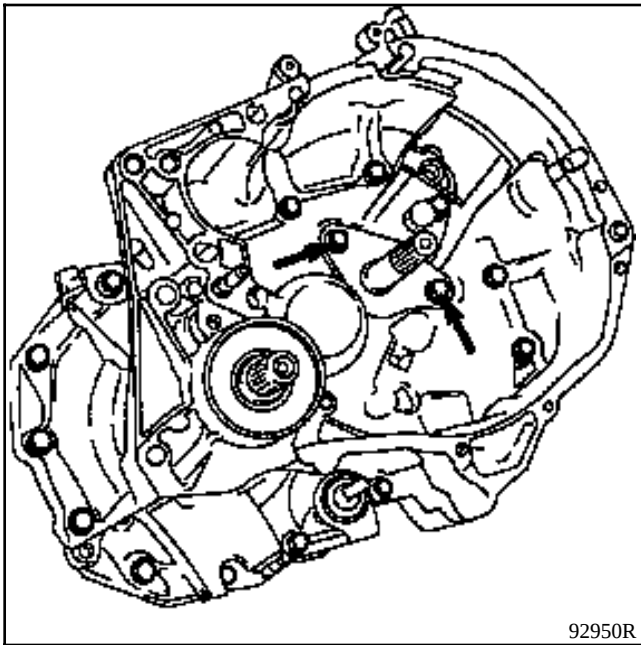
Parts must be removed and handled on a work bench with a covering which protects against impact (rubber or thick plastic).

SEPARATING THE HOUSINGS

Remove the thrust pad and the fork from inside the housing.

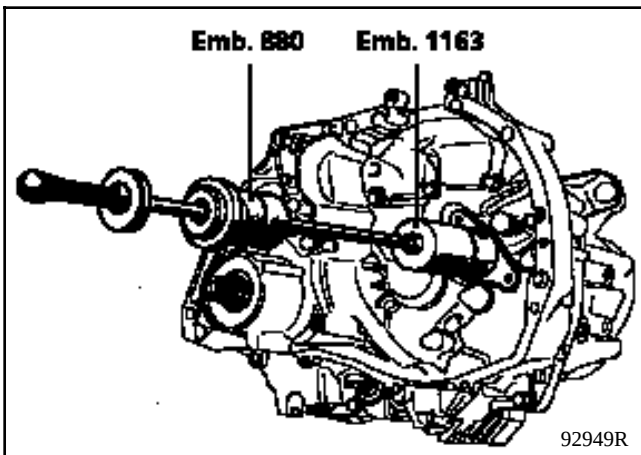
Special features of the JC5 gearbox

Remove the two thrust pad guide tube mounting bolts.



Fit tool **Emb. 1163** on the guide tube and tighten it.

To this, tighten tool **Emb. 880** and extract the guide tube.



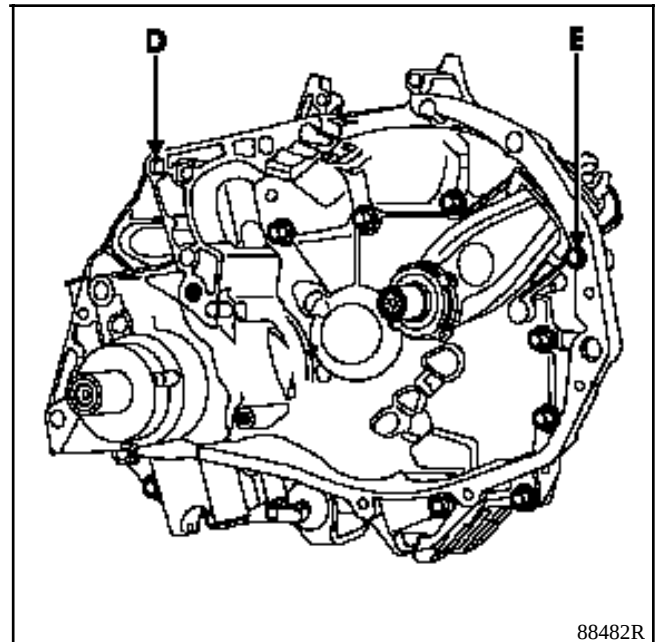
Extract the guide tube lip seal carefully using 2 screwdrivers.

NOTE:

The guide tube-lip seal assembly must be changed whenever it is removed.

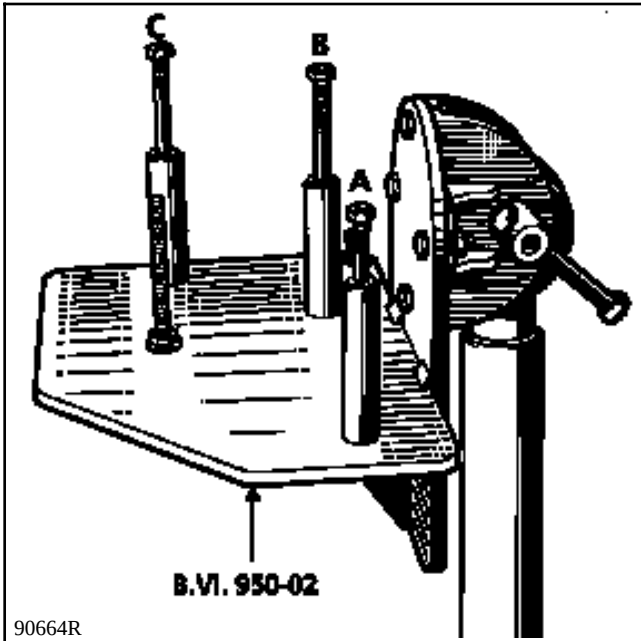
All types:

Remove the bolts located inside the clutch housing.



If necessary, remove the centring pins placed at (D) and (E).

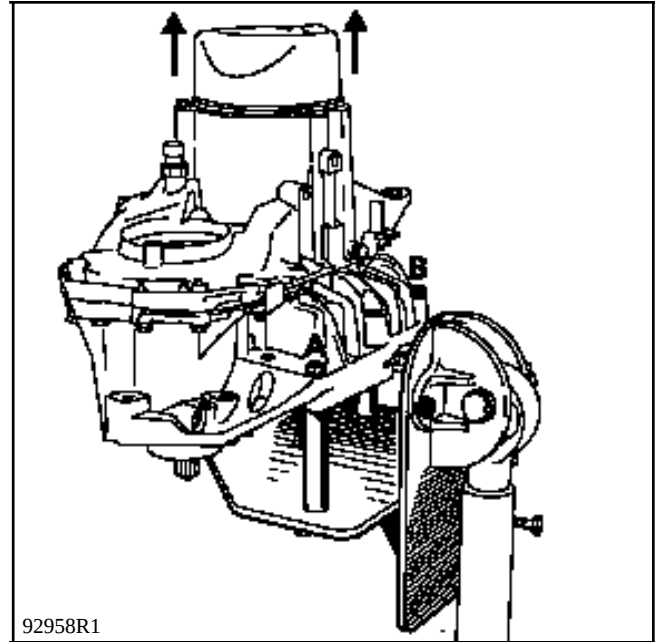
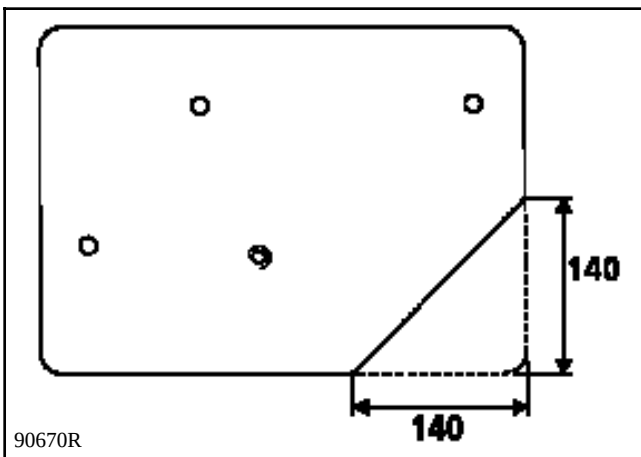
Secure the gearbox to the adaptable stand **B. Vi. 950-02** on the DESVIL base.



NOT E:

In order to allow removal of the differential fitted on tapered bearings (JB2 - JB3), stand **B. Vi. 950-02** must be used or stand **B. Vi. 950-01** must be modified.

Saw the support plate **B Vi. 950** as shown below.



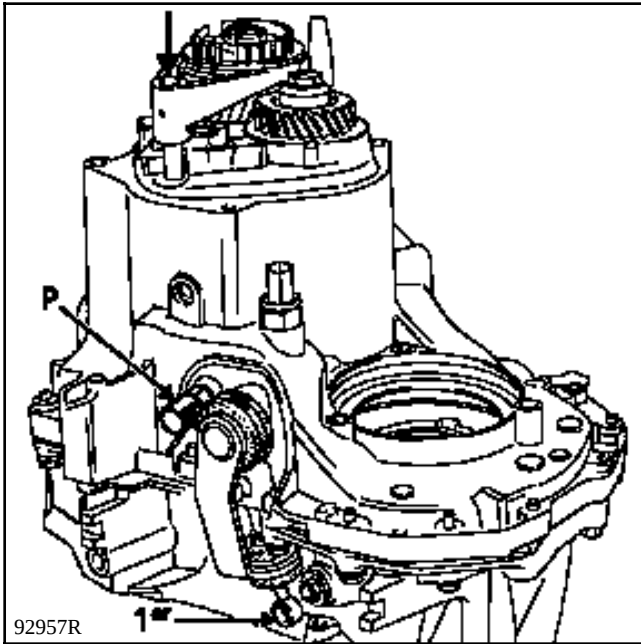
Remove the rear housing. This must be removed in the horizontal centreline of the gearbox as it has a lubrication nozzle located in the input shaft bore.

4-speed gearbox

The two input and output shaft circlips and their respective washer.

5-speed gearbox

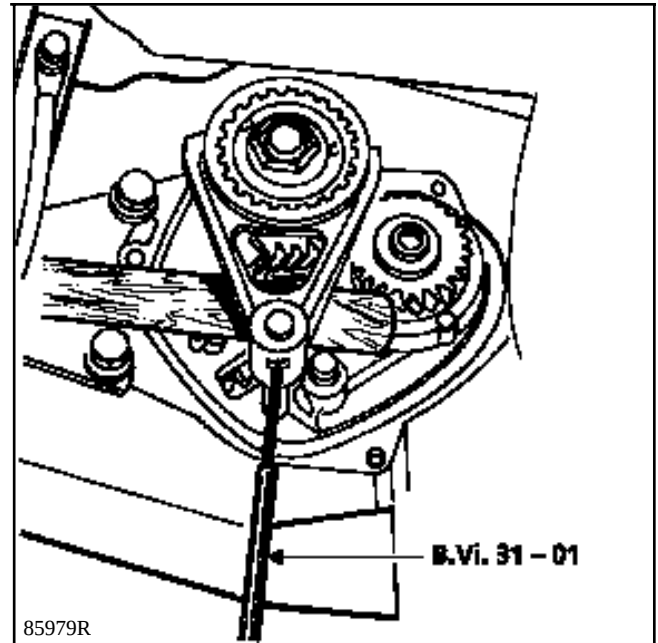
Engage 1st gear with the gear lever and 5th gear by sliding the 5th gear fork on its shaft.



Remove the 5th gear detent (P).

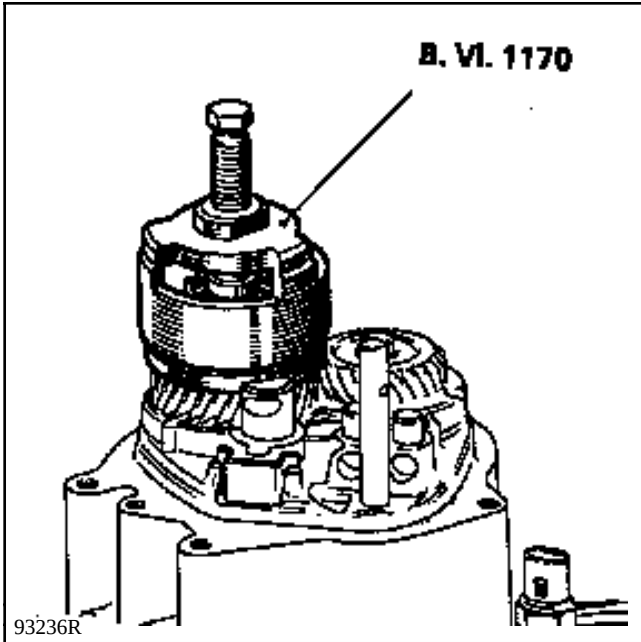
Remove the input shaft nut (27 mm) and the output shaft bolt.

Using tool **B. Vi. 31-01** remove the 5th gear fork pin placing a piece of wood behind the shaft to support it.



Place the gearbox in neutral again.

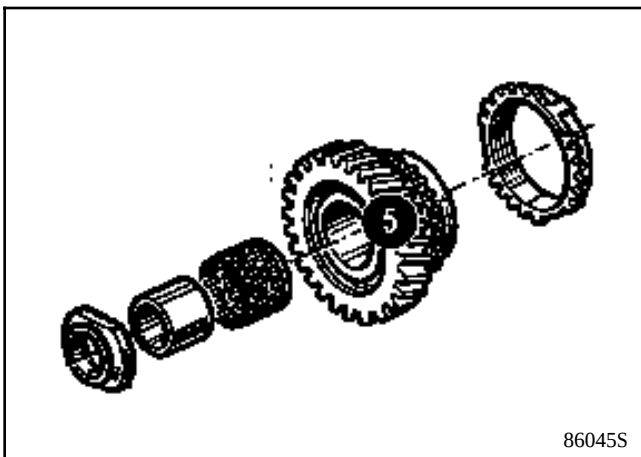
Extract the 5th gear synchroniser hub using tool **B Vi. 1170**.



Remove the 5th gear fork and sliding gear.

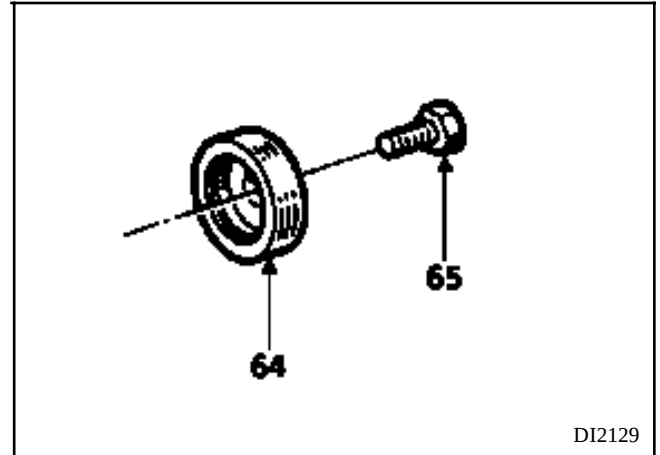
Fit tool **B. Vi. 1170** onto the 5th gear and turn it in order to position the sliding gear grooves and the hub grooves opposite each other.

Remove the 5th gear assembly.



On the output shaft

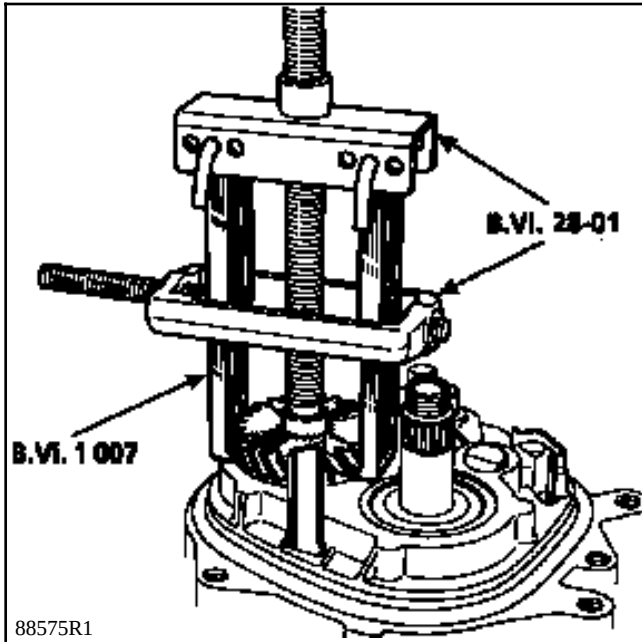
Remove the shouldered washer (64).



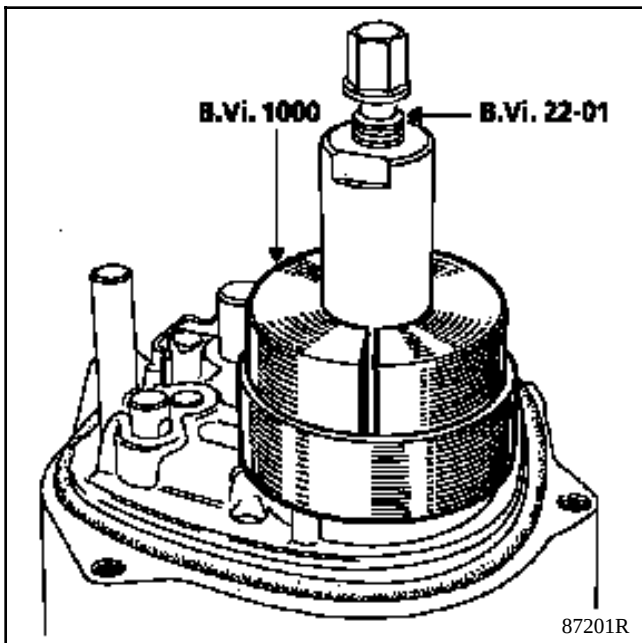
Extract the 5th gear fixed gear.

Two options:

1. Using tool **B. Vi. 28-01** fitted with claws **B. Vi. 1007** and inserting the protective end piece **Rou 15-01**.

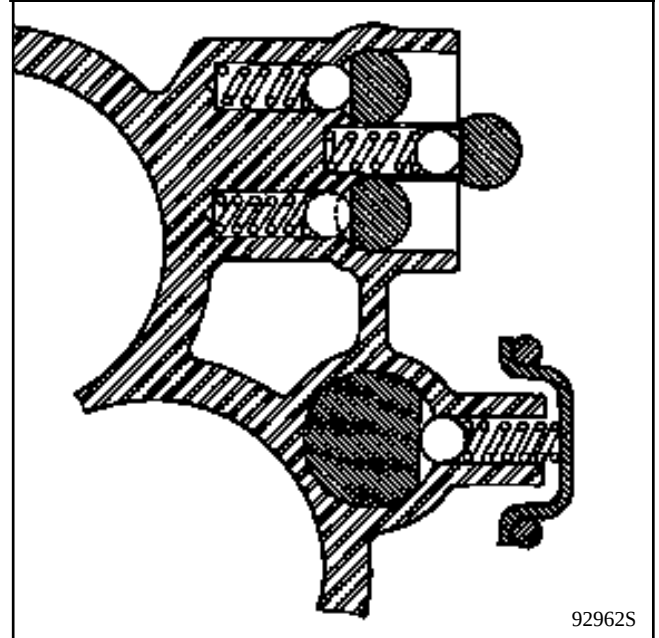


2. Using tools **B. Vi. 22-01** and **B. Vi. 1000**.

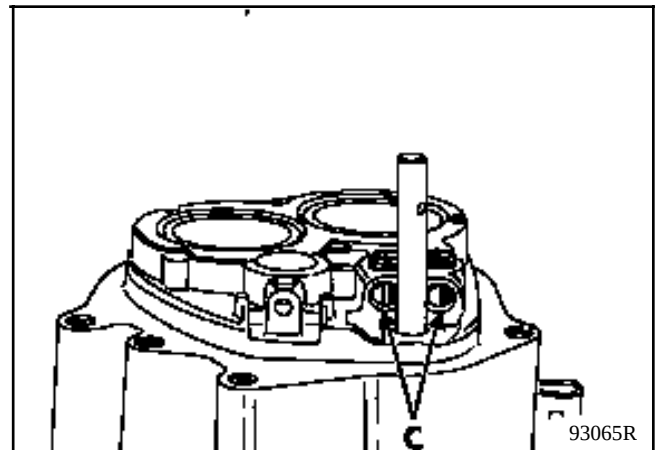


Remove the mechanism housing mounting bolts.

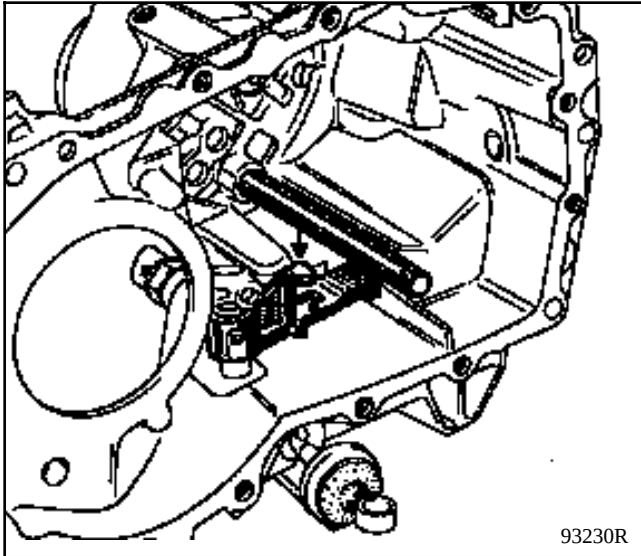
Remove the reverse gear ball indentation U-clip, retrieve the spring and the ball.



It is advisable to fit two magnets or to close the openings (C) in order to retrieve the 1/2 and 3/4 shaft locking balls and springs.

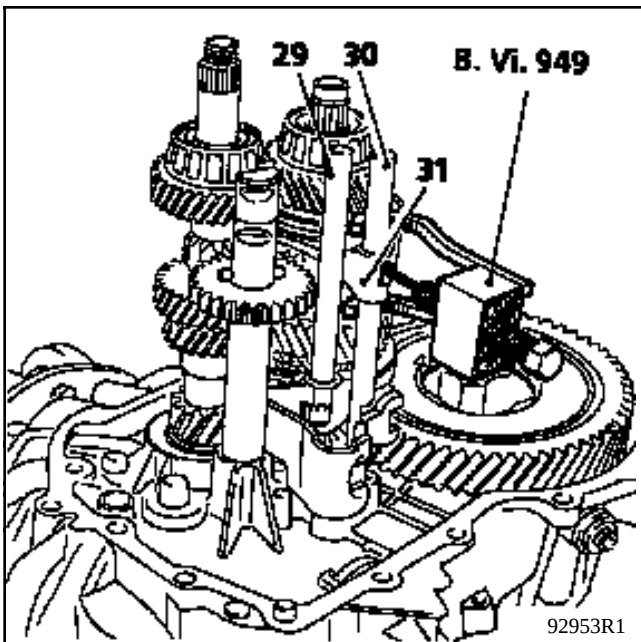


Pull the control shaft outwards; the gear engagement finger is then placed in the 5th gear detent.



Detach and raise the mechanism housing fitted with the 5th gear shaft.

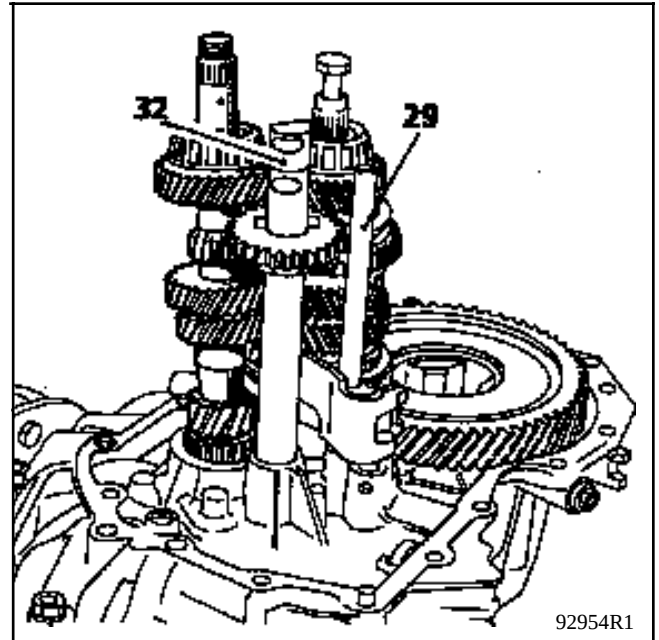
Unpin the 3/4 fork (31) using tool **B. Vi. 949**.



Place the 1/2 shaft (29) and the reverse gear (32) in neutral).

Remove the 3/4 shaft (30) from the housing bore sliding it in the fork and remove the shaft-fork assembly.

Raise and separate the input and output shafts and remove the reverse gear shaft (32).



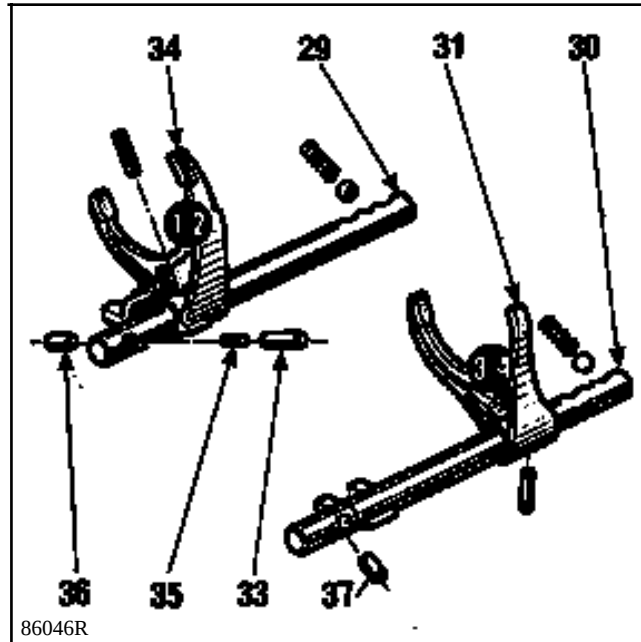
Simultaneously pull the two shafts (input - output) and the assembled 1/2 fork shaft, (29 and 34).

Remove the assembly and retrieve the locking plunger (35) located in the 1/2 shaft (29).

Hold the output shaft in a vertical position, 1st gear at the bottom, so as not to drop the gears.

In the housing:

- retrieve the locking plungers (33), (36) and (37) for the 5-speed gearbox,
- remove the magnet (B) and clean it.



Retrieve the interlock plunger (35) located in the 1st/2nd shaft as well.

Cleaning the housings:

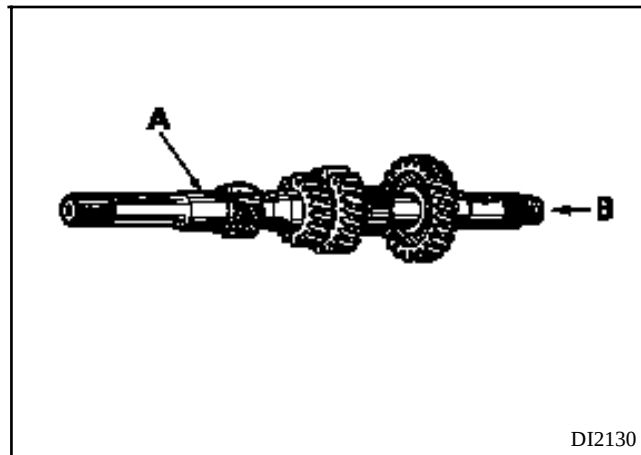
The housing assembly surfaces must not in any circumstances be scratched using a metal tool but must be cleaned using a cloth soaked in a cleaning product and dried using compressed air.

If necessary, hone any burrs.

INPUT SHAFT

The input shaft cannot be repaired.

There is no adjustment to be carried out.



DI2130

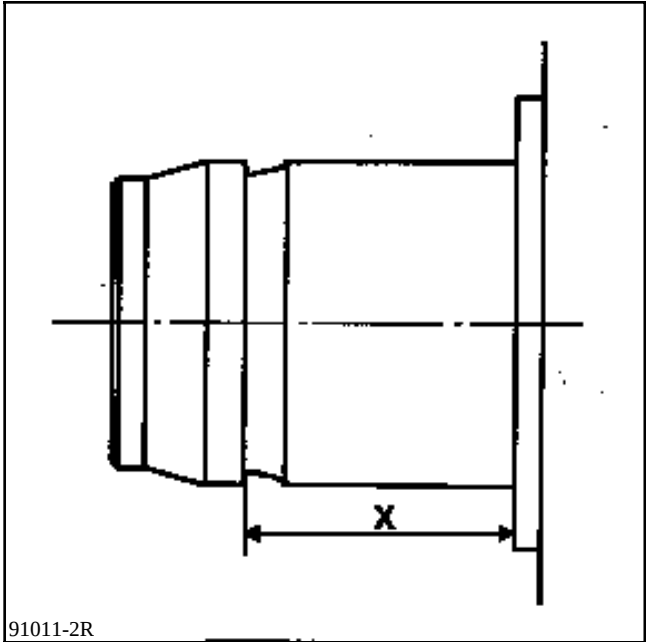
On shafts which have a jet (B), this cannot be removed. Clean the 5th gear lubrication hole.

As the lip seal and the guide tube bearing rollers are in direct contact with the shaft, check the condition of the mating surface (A). If there are any scratches or faults in appearance, change the input shaft.

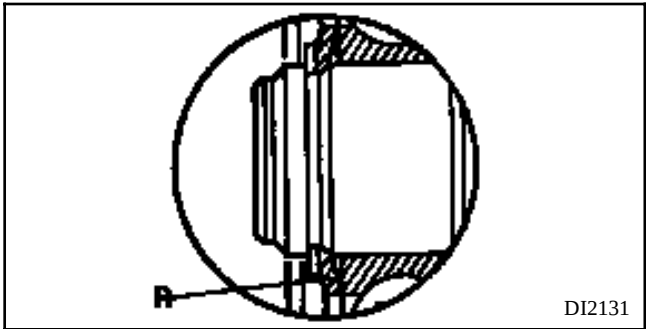
INPUT AND OUTPUT SHAFTS ON THE JB0 AND JB2 GEARBOXES

Modification to the circlip groove on the input and output shafts and to the spring washer fitted to them.

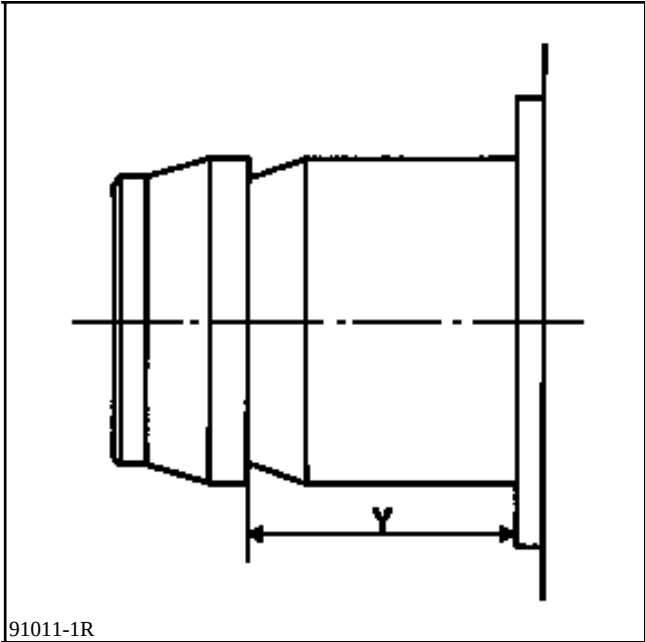
1st assembly



Assembly with spring washer "R" Ø 35.6 mm thickness 2.6 mm.



2nd assembly



Special features:

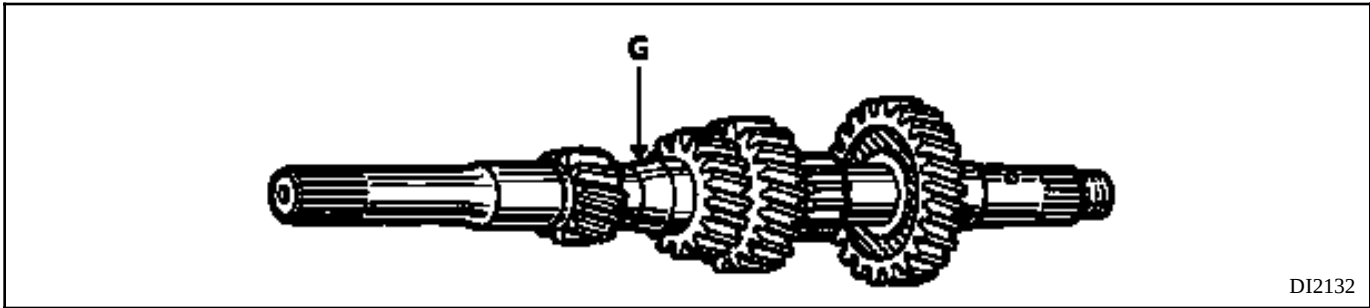
New shape and displacement of the circlip groove by 0.2 mm.

$$Y = X - 0.2$$

New spring washer "R" Ø 33 mm thickness 2.4 mm.

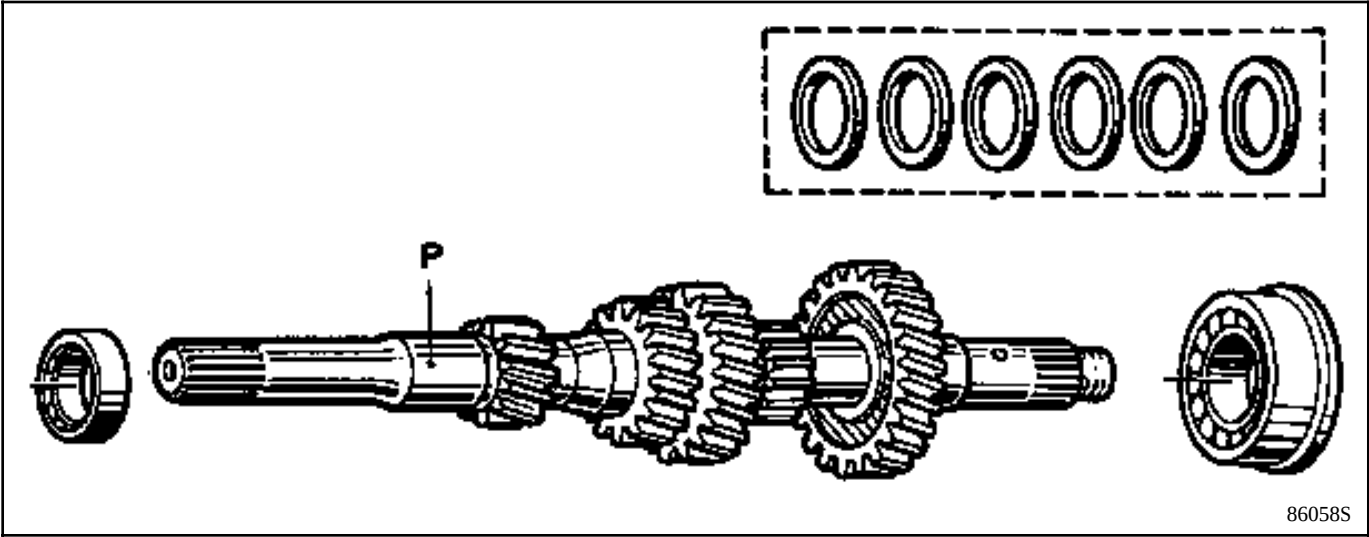
It is essential to fit spring washers which correspond to the shafts.

To identify the new shafts, only the input shaft has a mark: Groove "G" on the 1st/2nd shaft.

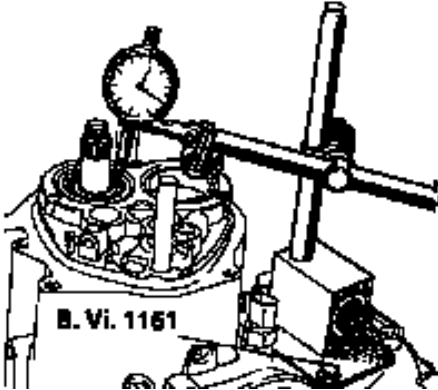


On JB2 gearboxes, this modification is accompanied by the fitting of sealed bearings (Ø 62 mm).

INPUT SHAFT



As the lip seal is in direct contact with the input shaft, check the condition of mating surface P.
If there are any scratches or faults in appearance, change the input shaft.

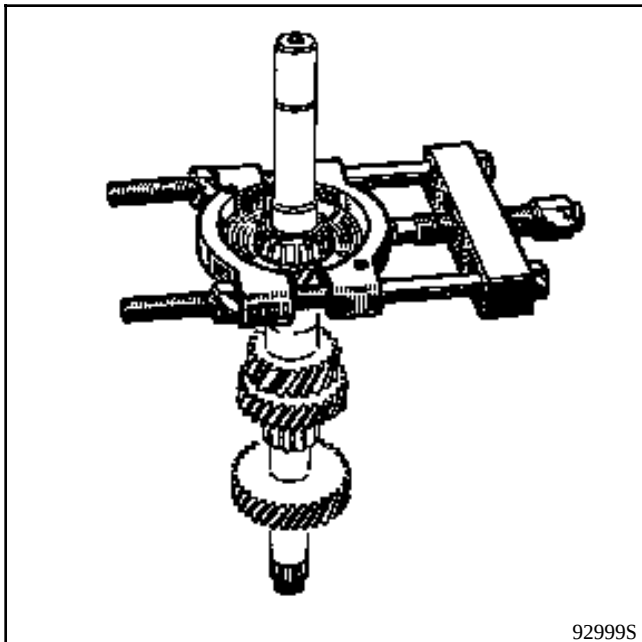
Input shaft bearings	 with tapered rollers Fitting in an "X" configuration 93227S6
Bearing pre-load adjustment	 by washers 93227S4
Value specified to obtain the correct bearing pre-load (new bearings).	0 mm
Means of checking: Dial gauge and support B. Vi. 1161 with standard washer thickness 0.62 mm	 92951R1
Thickness of replacement washers supplied.	 Step of 0.04 mm Range: 0.92 to 1.16 mm 93227S5

INPUT SHAFT (cont)

Changing bearings:

- Using a bearing extractor, placed between the bearing cone and the first gear teeth, taking care not to damage it.

Extract the cone using a press.



- **On the Clutch Differential housing.**

Extract the bearing outer race using a **39.5 mm** external diameter tube engaged from outside the housing.

- **On the mechanism housing.**

Proceed in the same manner as previously using tool **B. Vi. 1167** or using a tool made on site.

Note: The gear teeth should not have be chip-ped or show signs of excessive wear. Ensure that the lip seal surface is not scratched and does not show any signs of abnormal wear.

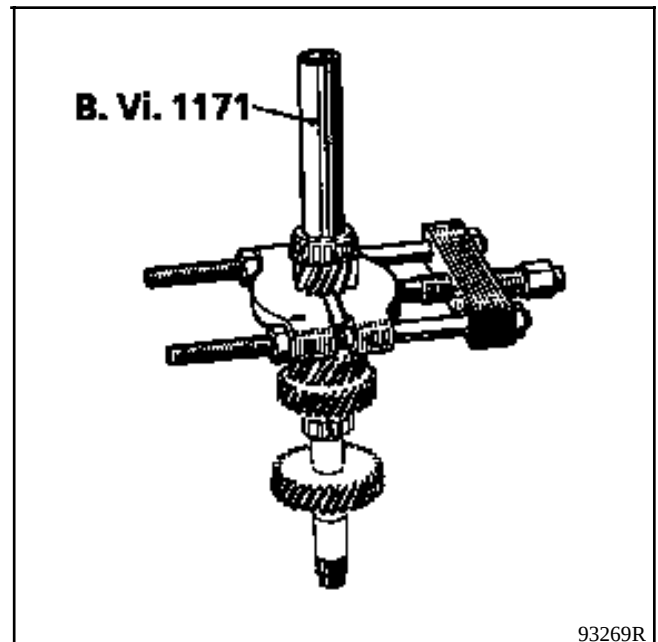
NOTE:

The bearings must be changed if they are scratched or shows signs of overheating or excessive wear.

If the bearings are changed their pre-load must always be set.

Refitting:

Fit the bearing using a press use tool **B. Vi. 1171** or using a tool made on site taking the load under the 1st gear teeth.

**NOTE:**

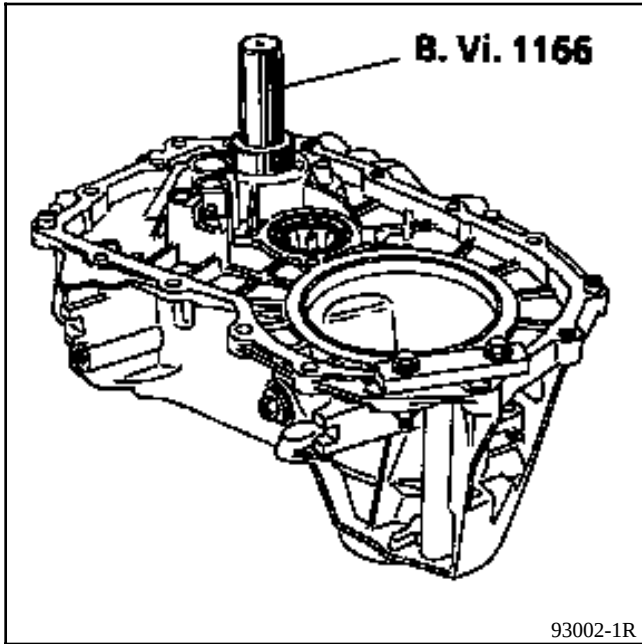
As the lip seal is in direct contact with the input shaft, it is essential that its mating surface is not scratched when the bearing is fitted.

INPUT SHAFT (cont)

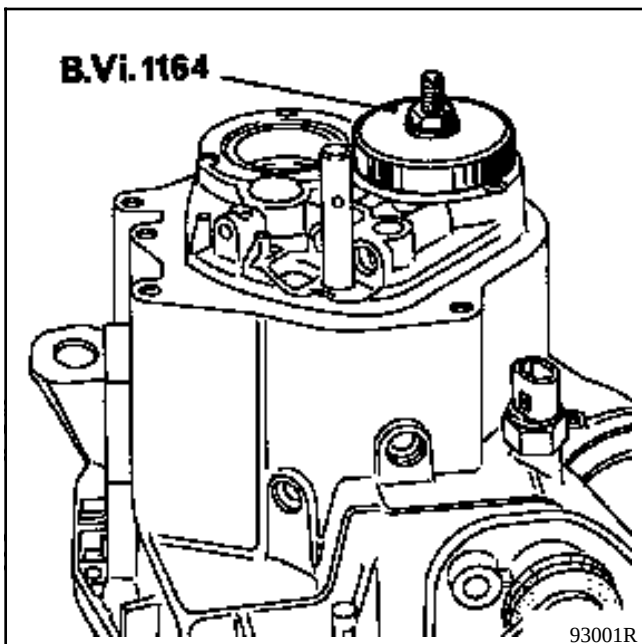
Changing bearings

Refitting:

Fit the outer race to the Clutch-Differential housing using tool **B. Vi. 1166** or equivalent.

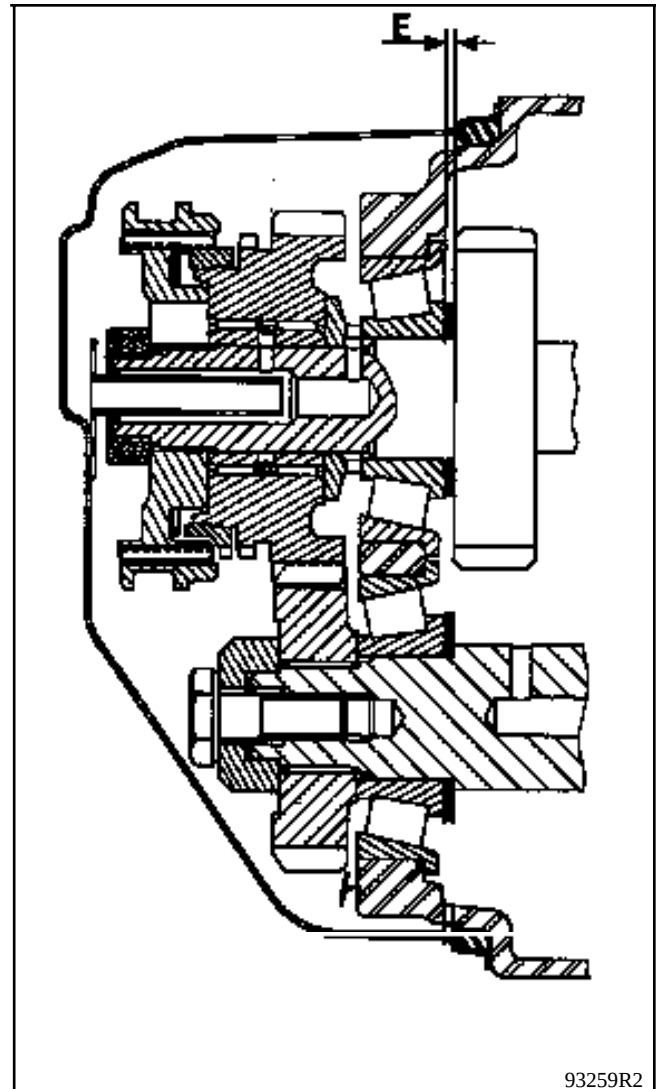


The mechanism housing twin bearing outer races are fitted using tool **B. Vi. 1164** or equivalent.



Then adjust the bearing pre-loads.

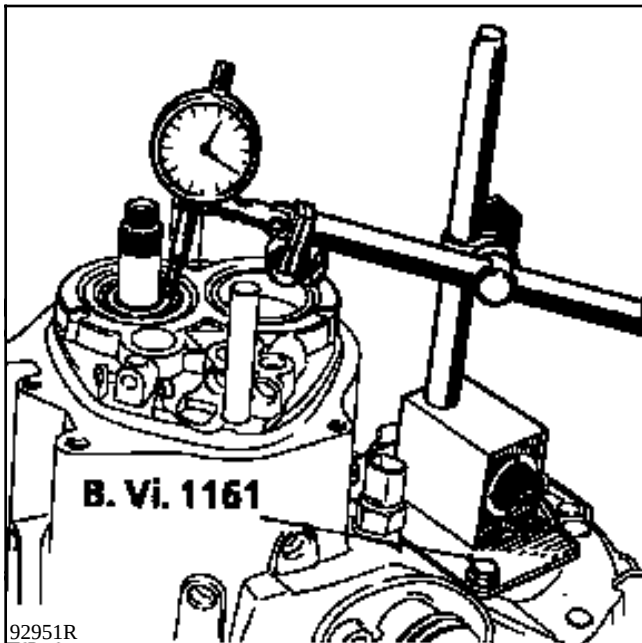
The thickness "E" of the setting washer determines the pre-load of the input shaft bearings.



INPUT SHAFT (cont)

Adjusting the pre-load of the input shaft bearings:

- Clutch housing without differential and without output shaft.
- Fit the input shaft with the bearings and the **0.62 mm** pre-setting washer **B. Vi. 1161** (small external diameter).
- Fit the mechanism housing, **position the gearbox bolts and tighten them to the specified torque.**
- Fit the dial gauge support plate **B. Vi. 1161** to the driveshaft gaiter retaining position.



- Position the dial gauge with its magnetic base.

A) Turn the input shaft by several revolutions to settle the bearings.

B) Set the dial gauge to zero.

C) Pull the input shaft upwards.

D) Read the value on the dial gauge.

Repeat the operations several times (**A** to **D**).

Calculate the average of the values read.

Calculating the value of the setting washer

Specified value + pre-setting washer value + average of the values read on the dial gauge = value of the pre-load setting washer.

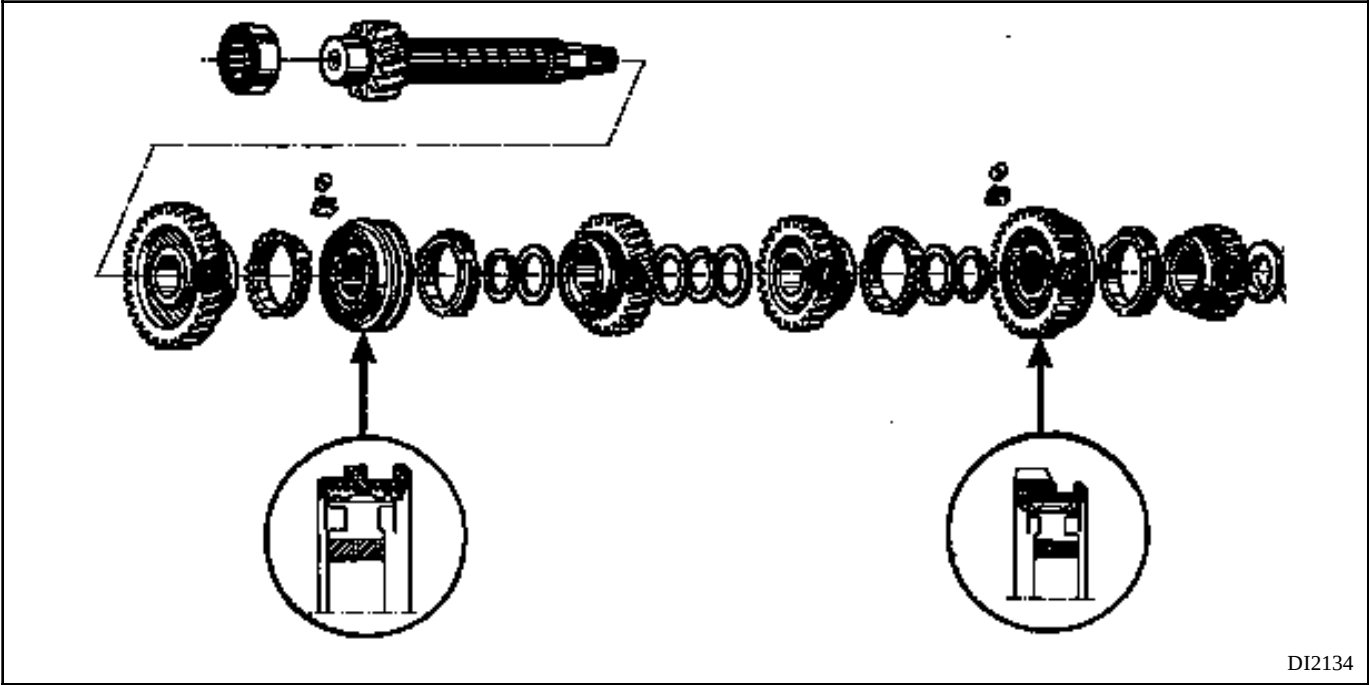
Example : (Values in mm)

$$\begin{array}{ccccccc}
 0 & + & 0.48 & + & 0.62 & = & 1.10 \\
 \downarrow & & \downarrow & & \downarrow & & \downarrow \\
 \text{Specified} & & \text{Average} & & \text{Pre-setting} & & \text{Pre-load} \\
 \text{value} & & \text{of values} & & \text{washer} & & \text{setting} \\
 & & \text{read} & & \text{value} & & \text{washer} \\
 & & & & & & \text{value}
 \end{array}$$

Note:

A set of setting washers of thickness **0.92 mm** to **1.16 mm** rising in stages of **0.04 mm** are supplied as a replacement part.

OUTPUT SHAFT



REMOVING THE GEARS

Place the output shaft in a vice fitted with soft jaws and remove the assembly from right to left.

REFITTING

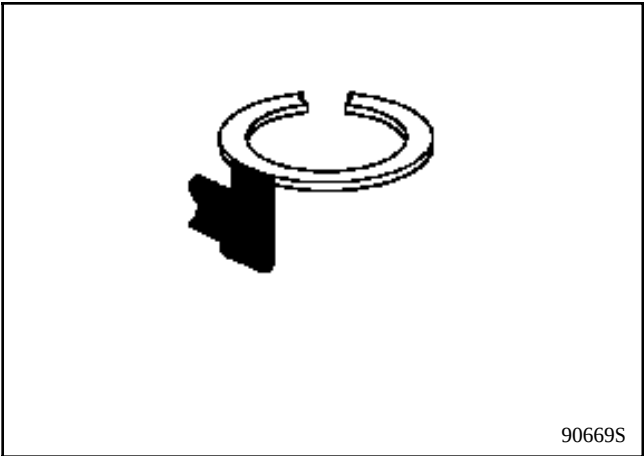
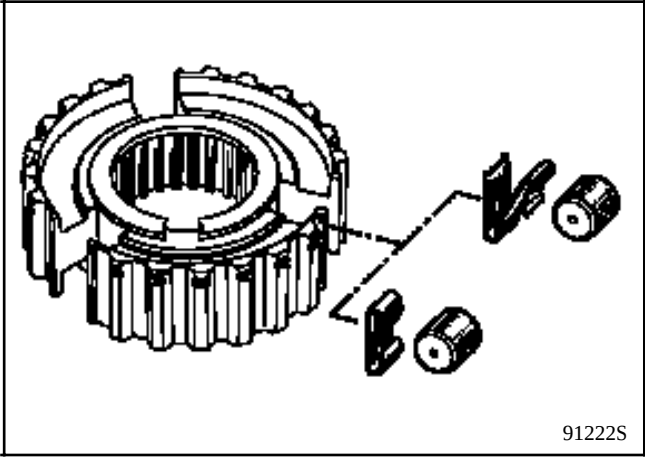
Refit in the reverse order to removal coating each gear with oil.

Follow the direction of fitting:

- of the hubs and sliding gears of the 1st, 2nd, 3rd, 4th and 5th gear synchronisers.
- the synchroniser roller springs: stop tabs fitted at the circlip end.

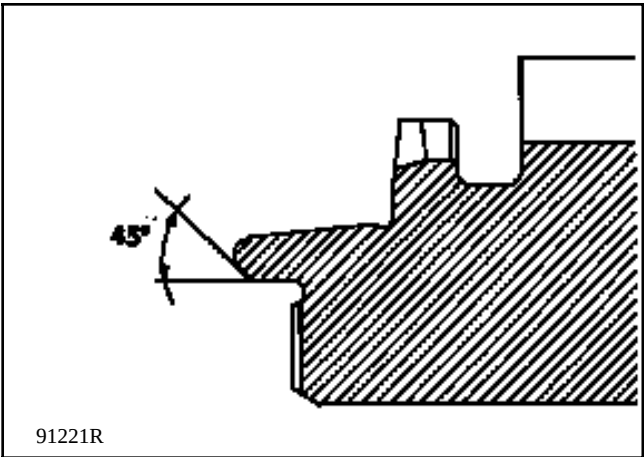
WARNING

Two types of synchroniser roller springs are used: the "Z"-shaped springs are replaced by "heart"-shaped springs.

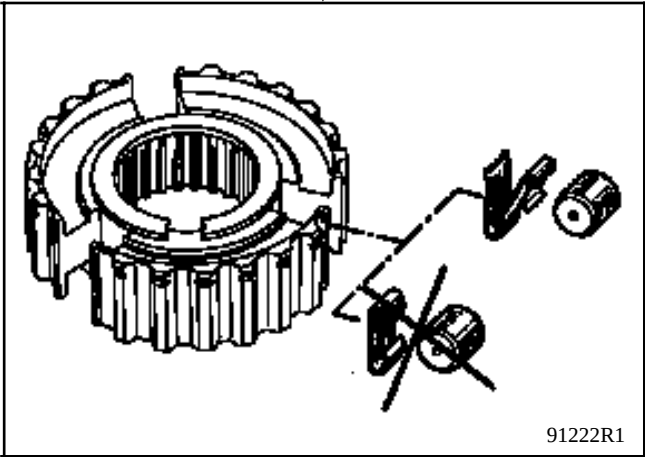


Consequently, the "heart"-shaped springs can only be used with modified idle gears.

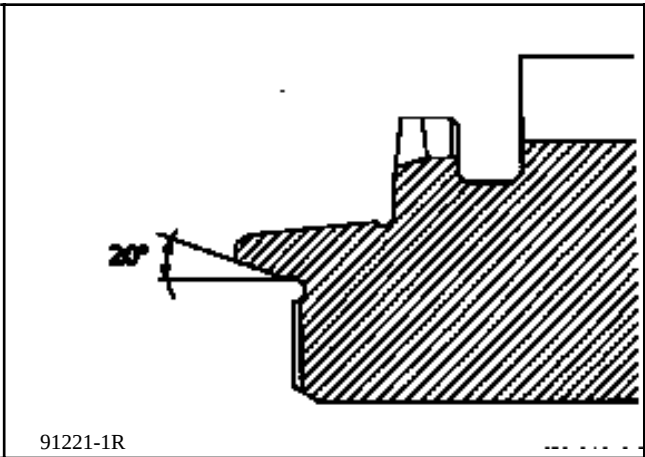
Idle gear detail (E)



The 45° input chamfer (E) for the groove and tongue joint under the synchronisation cone will only allow the fitting of "Z"-shaped springs.



Idle gear detail (E)

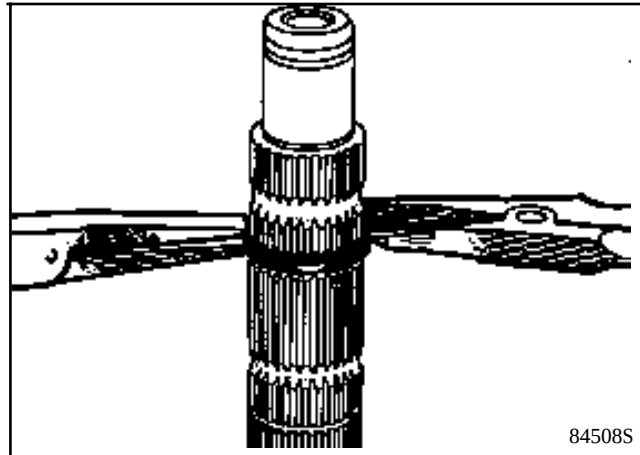


SPECIAL FEATURE

Idle gears which have a 20° input chamfer (E) allow the fitting of both "heart"-shaped and "Z"-shaped springs. However, it is **essential that springs on the same synchronisation assembly are not mixed.**

The circlips must always be changed.

When refitting the circlips, use circlip pliers on one side in order to separate the jaws and flat pliers on the opposite side to prevent the circlips from twisting.



CHANGING THE BEARINGS ON THE MECHANISM HOUSING

1st assembly:	thickness	17 mm
2nd assembly:	thickness	17.5 mm
3rd assembly:	thickness	17.5 mm with offset groove.

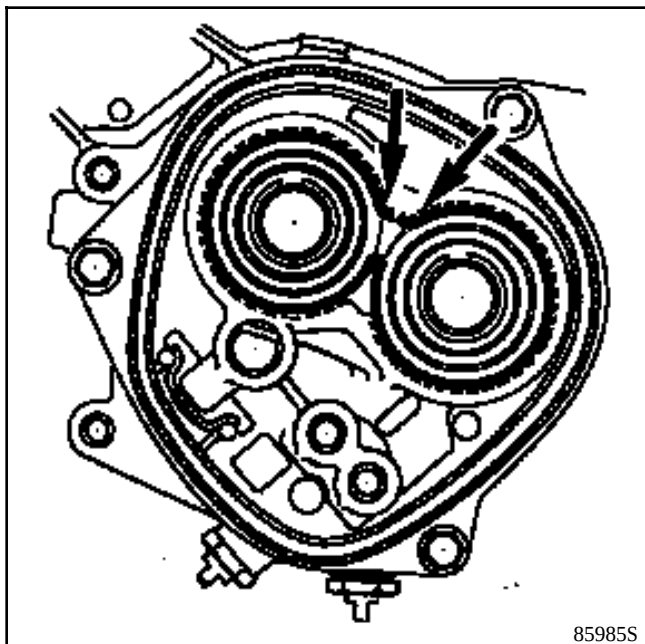
When changing the bearing, it is essential to fit a bearing which is identical to the original.

REMOVAL

Separate the circlips using circlip pliers and expel the bearing towards the inside of the housing using a hammer.

REFITTING

Place the **new** circlips in their seats positioning the jaws correctly.



Fit the bearings to tools **B. Vi. 947** (JB0 - JB1 - JB2 - JB3) or **B. Vi. 1 030** (JB4 and JB5), groove at the opposite end to the input cone.

Push in the tool with the bearing using a hammer or a press.

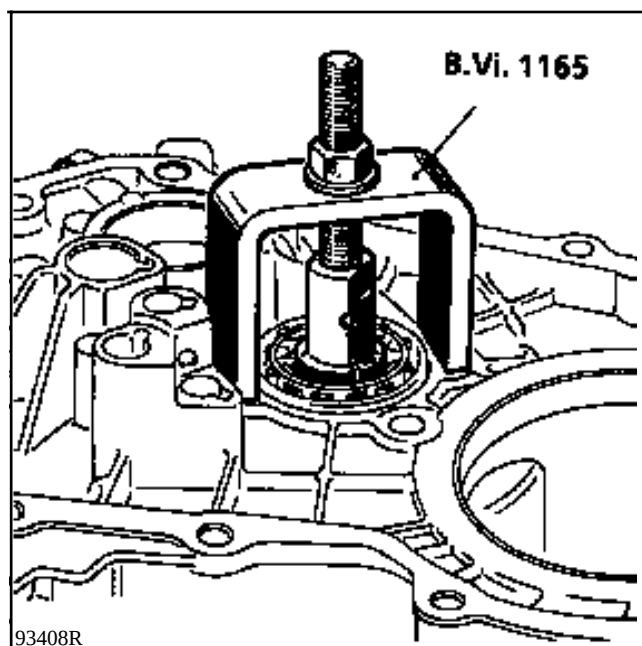
The cone-shape of the tool allows the circlips to be separated in the seat of the housing and allows the bearing to be inserted.

Ensure that the circlips are correctly positioned in the bearing groove in order to prevent movement of the bearing in the bore.

CHANGING THE BEARING ON THE CLUTCH DIFFERENTIAL HOUSING

Cut the plastic nozzle located in the centre of the bearing at its base.

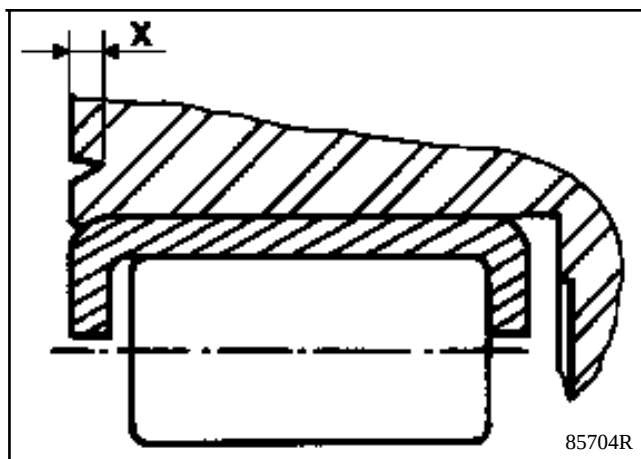
Fit tool **B. Vi. 1165** and extract the bearing.

**NOTE:**

Ensure that the extractor is positioned correctly under the bearing cones.

REFITTING

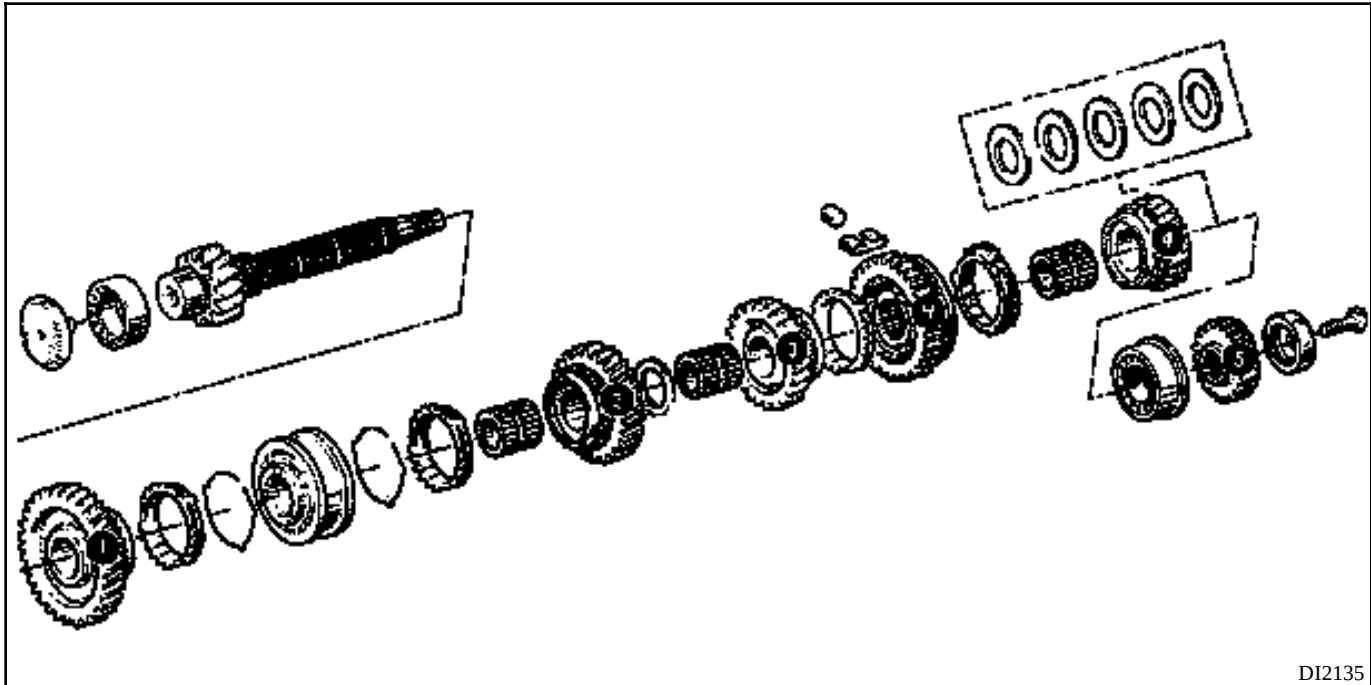
Position the deflector then the bearing using a press, flush with the internal surface of the housing.

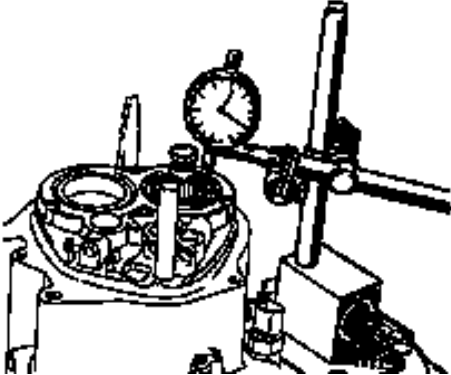


Crimp the bearing using a chisel observing the crimping depth (X).

X = 0.9 to 1.3 mm

OUTPUT SHAFT



Output shaft bearings	 with cone-shaped rollers Fitting in an "X" configuration 93227S6
Adjusting the bearing pre-load	 by washers 93227S4
Specified value for obtaining the correct bearing pre-load (new bearings).	0.26 mm
Means of measurement: Dial gauge and support B. Vi. 1161 with 1.60 mm thick pre-setting washer.	 92952S
Thickness of washers supplied as replacement parts.	 93227S5 Step of 0.04 mm Range: 2.15 to 2.43 mm

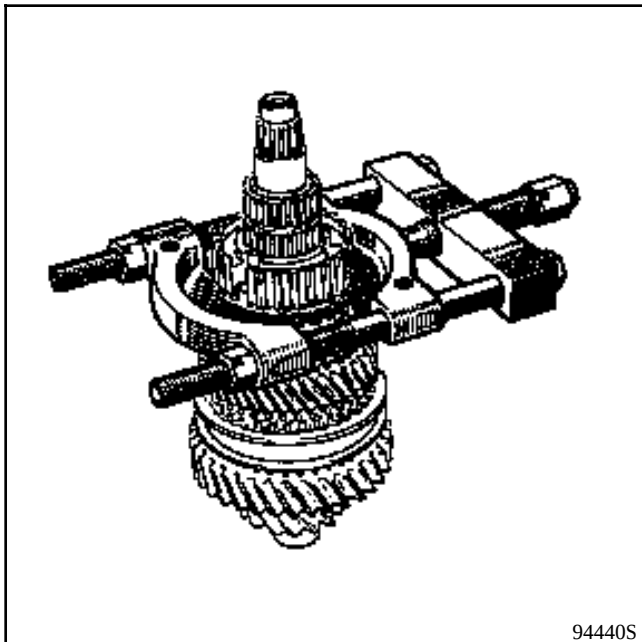
Removing the gears

The inner hubs under the 2nd, 3rd, 4th gears are interference-fit. They must be changed when they are replaced.

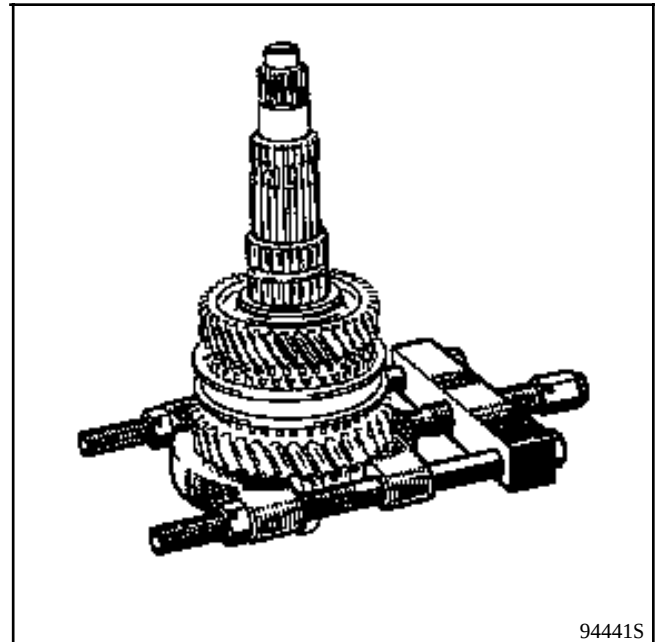
Remove:

- the bearing,
- the pre-load setting washer,
- the 4th gear,
- the 3/4 sliding gear.

Using a press, remove the inner hub, hub, 3rd gear assembly pressing under the teeth of the 3rd gear claw.



Using a press, remove the inner hubs, 1st and 2nd gears, hub, sliding gear assembly, taking the load under the 1st gear.



In all cases, it is advisable to mark the position of the sliding gears in relation to the hubs.

Parts check:

The gear teeth and the claws should not have any chips or be excessively worn.

Also ensure that the surfaces of the shaft and the internal walls of the gears do not show any signs of seizing or abnormal wear.

Hubs-sliding gears:

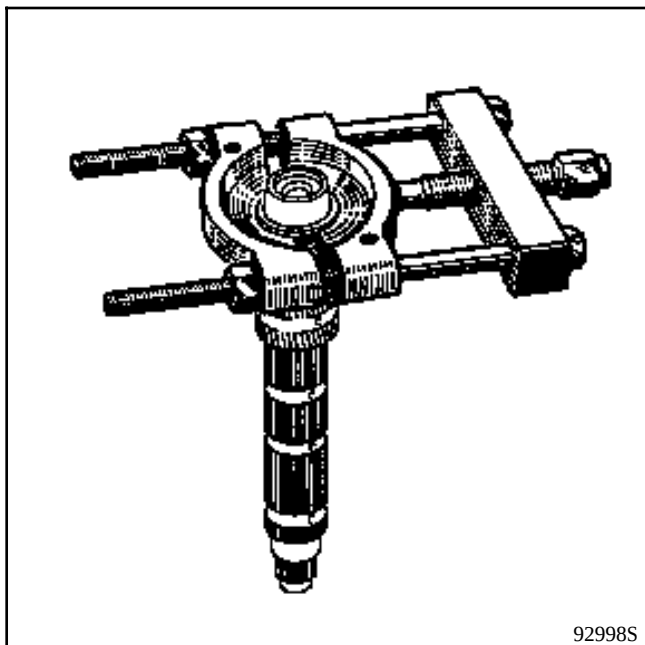
Ensure that the hubs and their sliding gears have no chips and are not excessively worn.

Bearings:

The bearings must be changed if they are scratched, show signs of overheating, or are excessively worn.

Changing bearings:

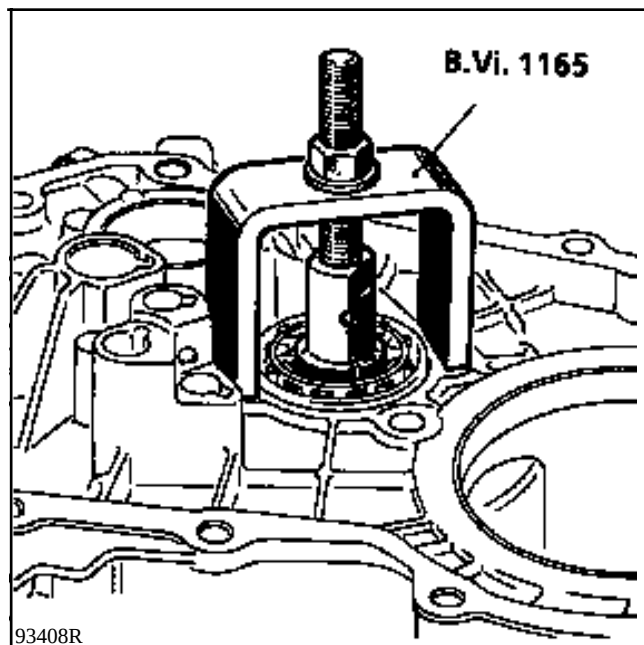
- Detach the bearing cone from its support on the drive pinion teeth taking care not to damage the teeth.
- Extract the cone using a press.



- **On the clutch-differential housing:**

Cut the plastic nozzle located in the centre of the bearing at its base.

Fit tool **B. Vi. 1165** and extract the bearing.

**NOTE:**

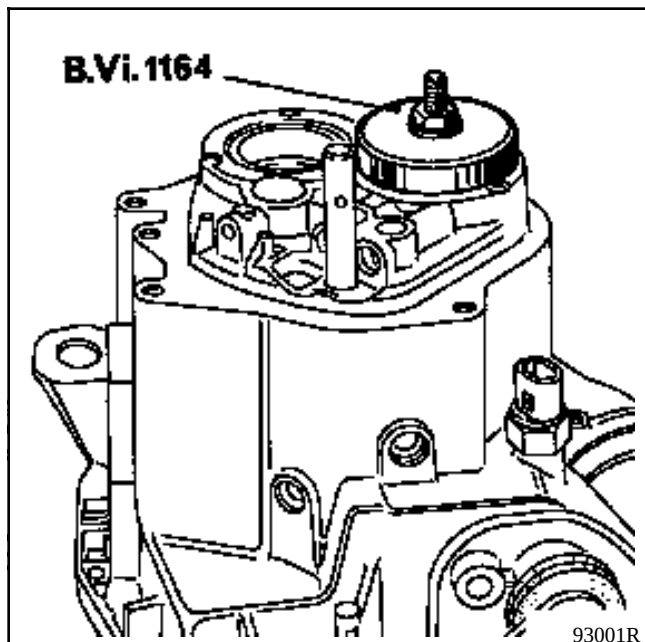
Ensure that the extractor is positioned correctly under the bearing cones.

- **On the mechanism housing:**

Extract the bearing outer race using tool **B. Vi. 1167**.

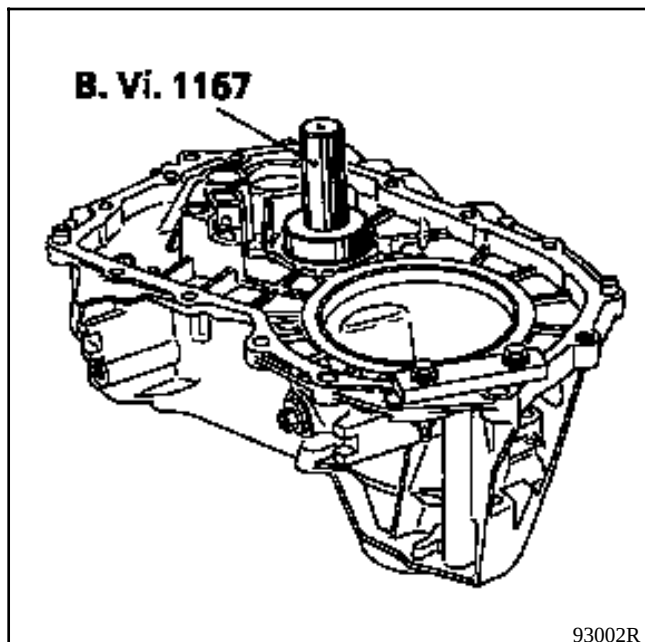
REFITTING

Position the outer race using tool **B. Vi. 1164** or equivalent.

**On the clutch-differential housing:**

Fit the lubrication nozzle.

Fit the complete bearing using tool **B. Vi. 1167** or equivalent.

**On the output shaft:**

Fit the cone using a press with the load on the used bearing cone.

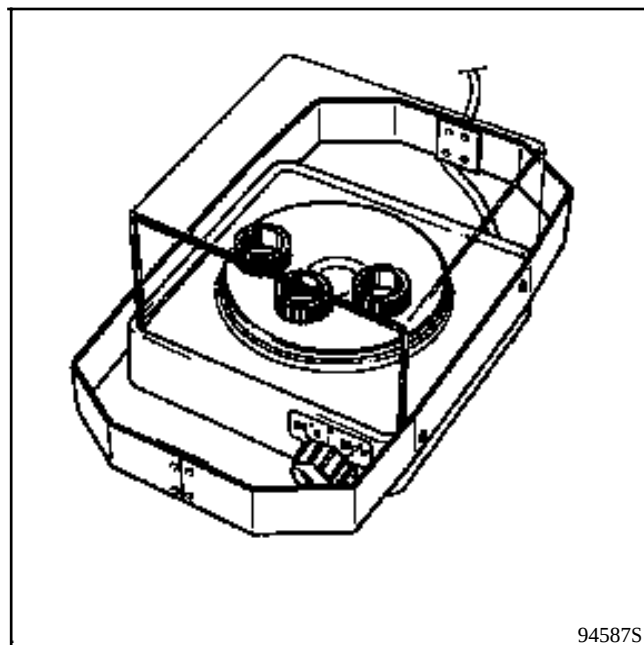
Note:

The bearing pre-load must always be set when the bearings are changed.

A heated plate with a **150°C** setting must be used for refitting.

Refitting:

Place the new inner hub on a cold heated plate. Heat them for 15 minutes, with the thermostat at **150°C**.

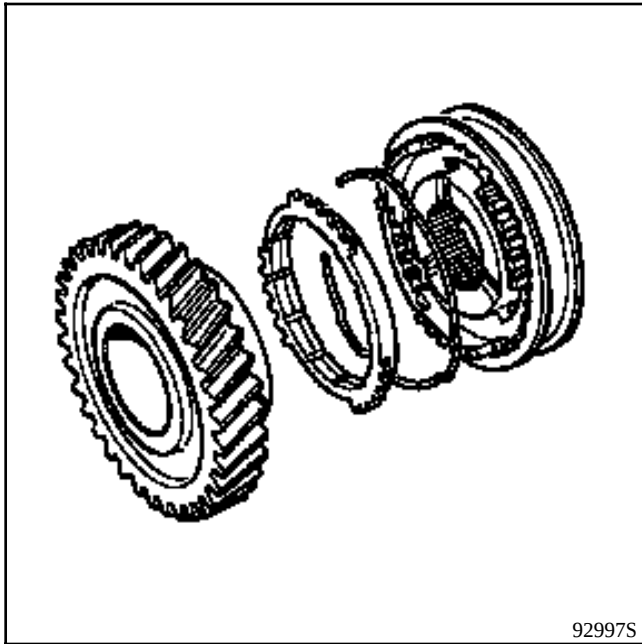


All of the cleaned and checked parts will be gradually coated with oil as they are refitted.

Refit the 1st gear.

Place the 1/2 sliding gear on the hub and refit the synchroniser springs.

Align and make flush the notches of the hub with the notches of the synchronisation rings.



Refitting the inner hubs :

Using pliers, remove an inner hub from the heated plate and fit it to the shaft.

When the inner hub is on the shaft, using a press and a **33 mm** interior diameter tube, place the inner hub in correct contact with hub.

Refit the 2nd gear and the thrust washer.

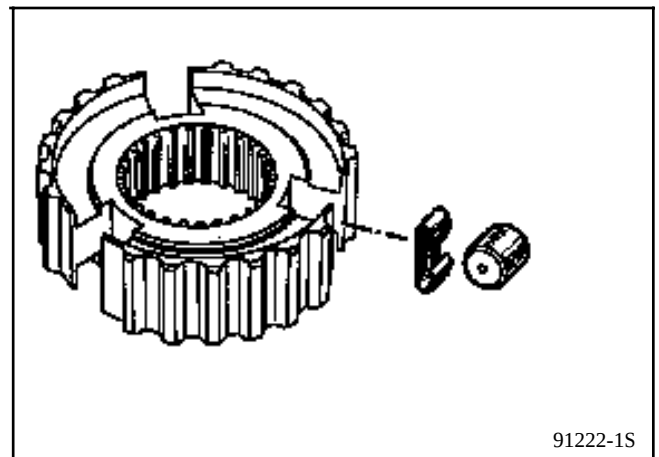
For the inner hubs under the 3rd and 4th gears, carry out the same operations as previously.

Refit:

- the inner hub under the 3rd gear.
- the 3rd gear
- the 3/4 sliding gear hub,
- the 3/4 synchroniser.

Observe the direction of fitting of the "heart"-shaped springs: flat part fitted at the synchroniser hub end.

Take care to align the notches on the hub with the bosses on the synchroniser ring.



Refit:

- the inner hub under the 4th gear,
- the 4th gear,
- the pre-load setting washer,
- the bearing.

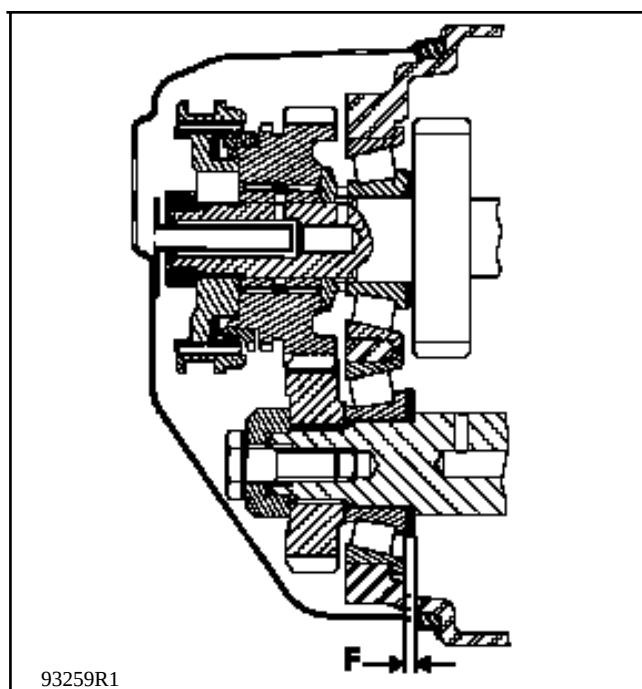
Check that the idle gears rotate freely and check the changing of the various gears.

Then adjust the bearing pre-loads if necessary.

Note:

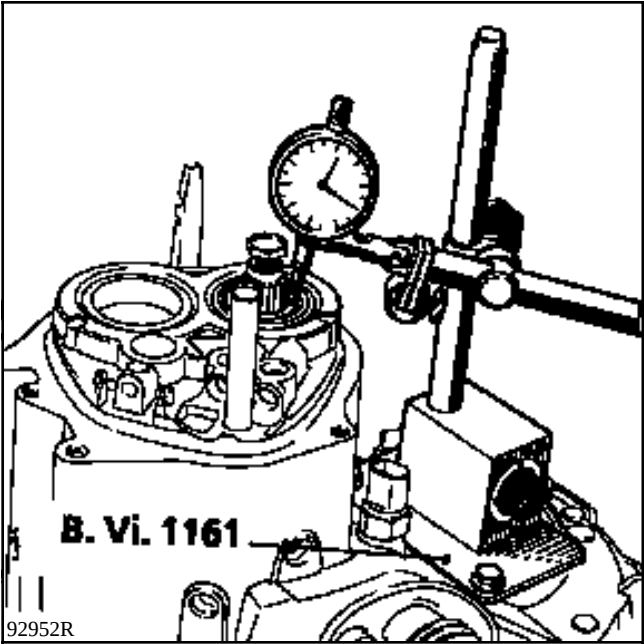
The adjustments must be carried out shaft by shaft without the differential.

The thickness of the setting washer "F" determines the pre-load of the output shaft bearings.



Adjusting the pre-load of the output shaft bearings

- Clutch housing without the differential and without the input shaft.
- Position the output shaft in the clutch housing with the bearings and the **1.60 mm** pre-setting washer **B. Vi. 1161** or equivalent, (large external diameter).
- Fit the mechanism housing.
- Fit the gearbox bolts and tighten them to the specified torque.
- Fit dial gauge support plate **B. Vi. 1161** or equivalent on the the driveshaft mountings.



Fit the dial gauge with its magnetic base.

- A)** Turn the output shaft by several revolutions to position the bearings.
- B)** Set the dial gauge to zero.
- C)** Pull the output shaft upwards.
- D)** Read the value on the dial gauge.

Repeat the operations several times (**A** to **D**).

Calculate the average of the values read.

Calculating the value of the pre-load setting washer

Specified value + pre-setting washer value + average of values read on the dial gauge = value of the pre-load setting washer.

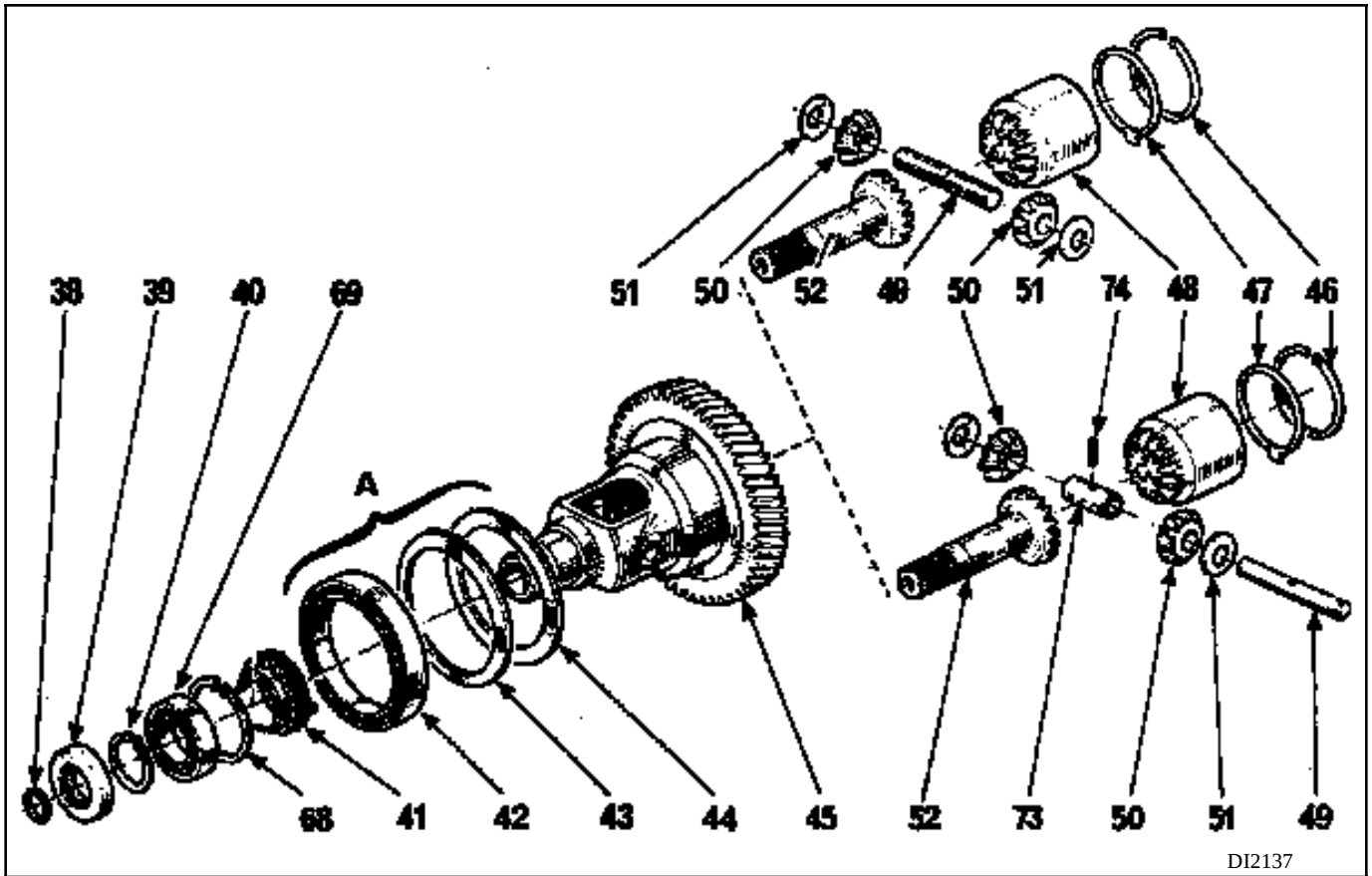
Example : (Values in mm)

0.26	+	0.49	+	1.60	=	2.35
↓		↓		↓		↓
Specified value		Average of values read		Pre-setting washer value		Pre-load setting washer value

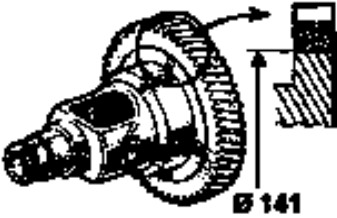
Note:

A set of setting washers of thickness **2.15 mm** to **2.43 mm** rising in steps of **0,04 mm** is supplied as a replacement part.

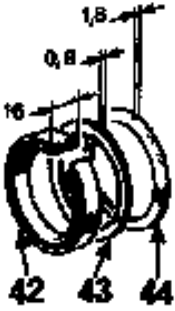
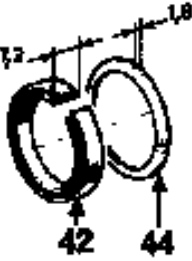
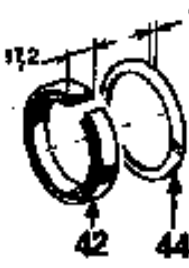
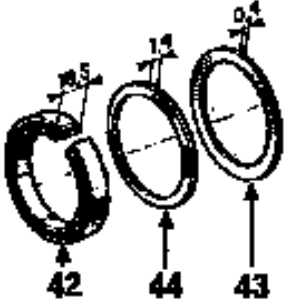
DIFFERENTIAL (FITTING TO BALL BEARINGS)



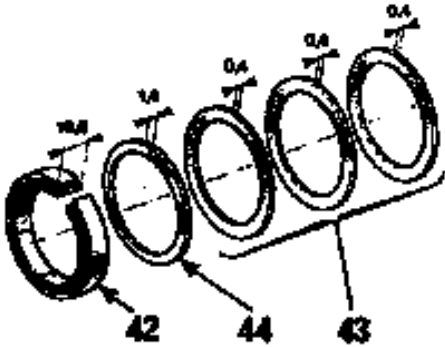
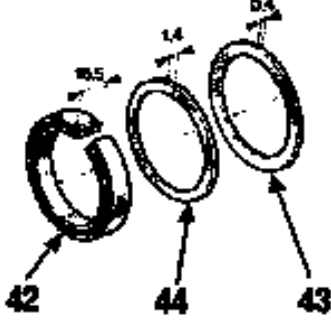
DIFFERENTIAL (DIFFERENT ASSEMBLIES)

GEARBOX WITHOUT BEAD  DI2138	GEARBOX WITH BEAD  DI2139
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IN-PRODUCTION SOLUTION

1st assembly with circlip 40 thickness: 1.75  DI2140	2nd assembly with circlip 40 thickness: 1.75  DI2141	3rd assembly with circlip 40 thickness: 2.5  DI2142	4th assembly with circlip 40 thickness: 2.5  DI2143
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REPAIR SOLUTION
(if the bearing is changed)

 DI2144	 DI2145
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DIFFERENTIAL (FITTING TO BALL BEARINGS)

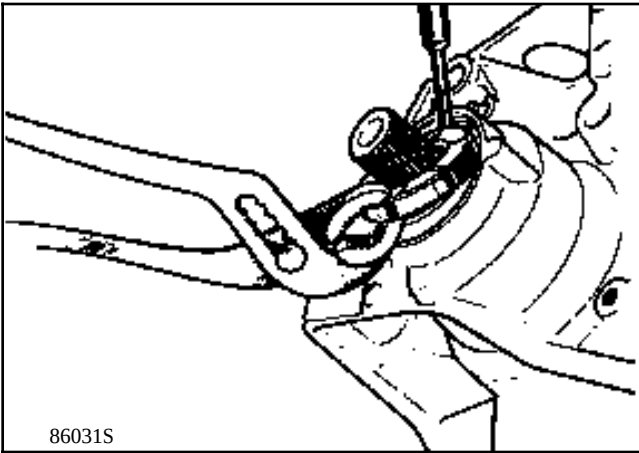
REMOVAL

This operation is carried out after separating the housings.

Remove the O-ring (38).

Strike the lip seal using a pin extractor and a small hammer in order to tilt it.

Remove the seal taking care not to damage the splines on the sun wheel.



Using a press:

- place a board under the crown wheel to support it,
- push the clutch housing and the differential to free the circlips (40) and extract it.

The differential is extracted by pushing on the sun wheel (52) using a press. Extract (43) if the housing is fitted with it, then (44).

Turn the assembly over.

Tighten the housing (45) in a vice with soft jaws.

Remove the snap ring (46) and remove the shim (47).

Extract the tripod sun gear (48) and remove the planet gear shaft (49).

JB4-JB5

Remove the pin (74) and remove the planet gear shaft (49).

Retrieve the sleeve (73) and remove (50 and 51) attaching the washers to their respective planet gears.

Remove the shouldered sun gear.

If necessary, remove the speedometer crown wheel, the speedometer shaft and the gear.

NOTE: these parts must always be changed once they have been removed.

CHECKING PARTS:

Check the condition of:

- the teeth,
- the bearing surfaces,
- the washers (of the planet gears),
- the grooves,
- the housing.

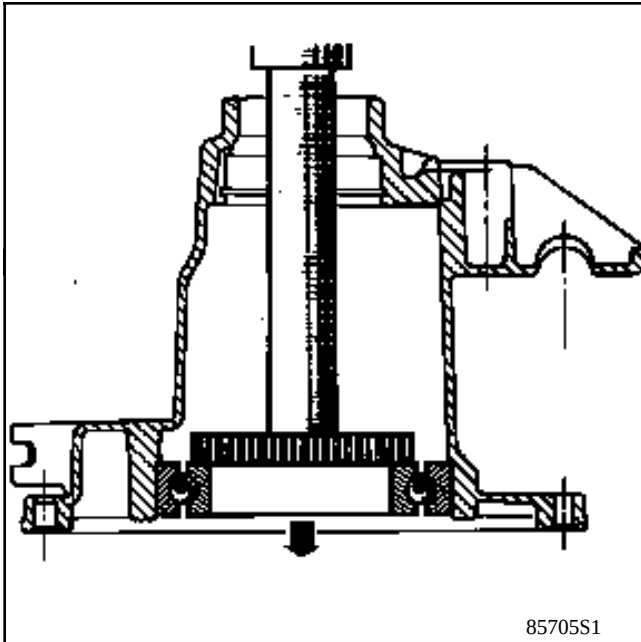
DIFFERENTIAL CHANGING BEARINGS

Crown wheel end bearing

REMOVAL

Pass a flat bar inside the gearbox and place it flat on the bearing.

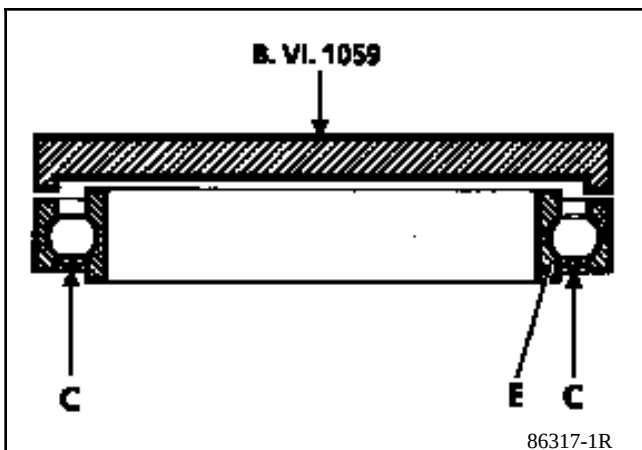
Press on the press using a lengthened tube and extract the bearing.



REFITTING

The bearing housing (C) must be directed to the end opposite the crown wheel.

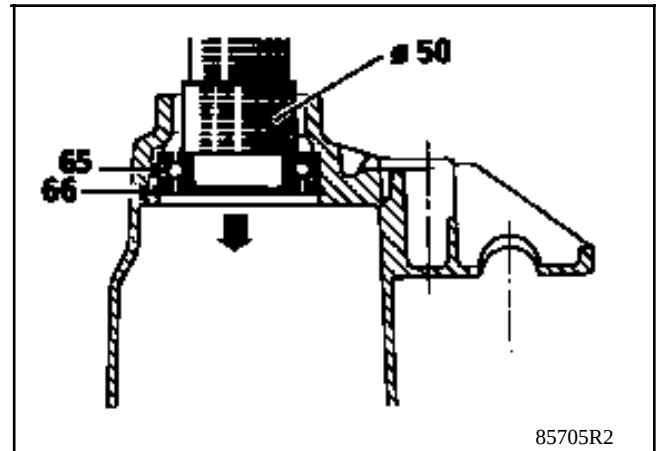
Push on the bearing using a press, using tool **B. Vi. 1 059**, with the load on the bearing outer ring.



Shouldered sun gear end bearing

REMOVAL

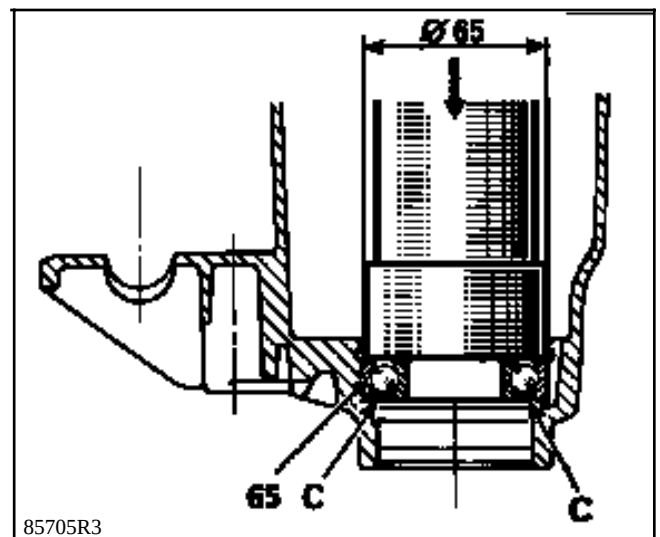
Remove the circlips (66) retaining the bearing (65) in its seat, then, using a press, remove the bearing towards the inside of the housing using a **50** diameter sleeve.



REFITTING

The bearing housing (C) must be directed to the end opposite the crown wheel.

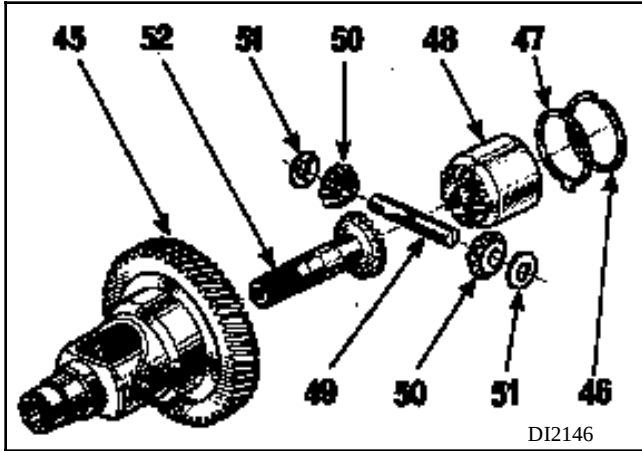
Use a **65** diameter sleeve pressing on the bearing outer housing (65).



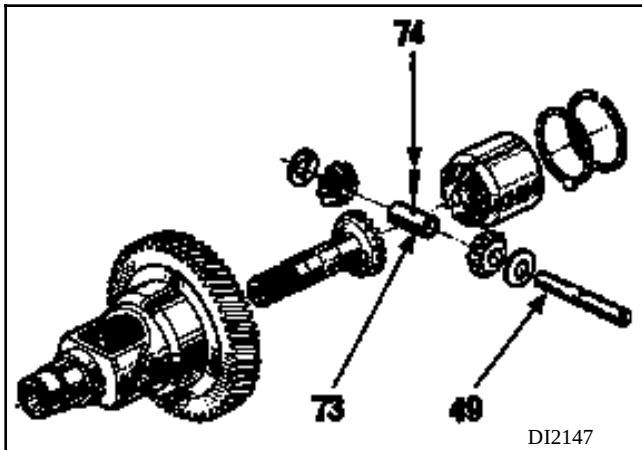
Change the bearing retaining circlips.

DIFFERENTIAL REFITTING - Special point

JB - 1st Assembly



JB - 2nd Assembly



It is essential to fit a new pin (74) (tool B. Vi. 31-01).

Place the speedometer crown wheel (41), notch in the housing seat.

Refit the new speedometer gear and shaft using flat pliers.

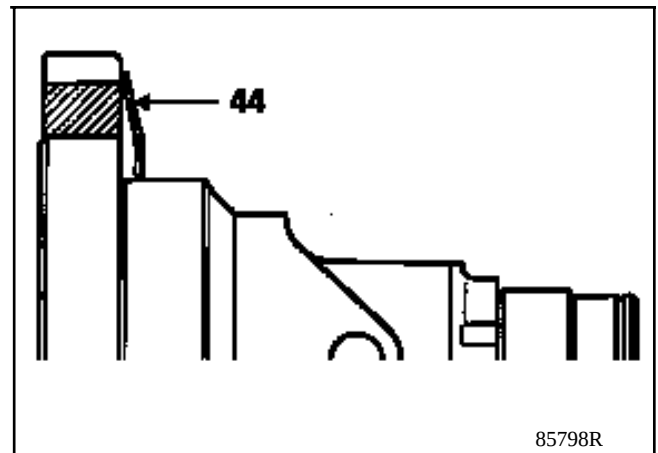
Ensure that it is clipped correctly.

REFITTING

Refit:

- 1st assembly: (44) then (43) and (41).
- 2nd and 3rd assembly (44) then (41).
- 4th assembly and repair solutions: (44) then (43) and (41).

NOTE: in all cases direct (44) as below.

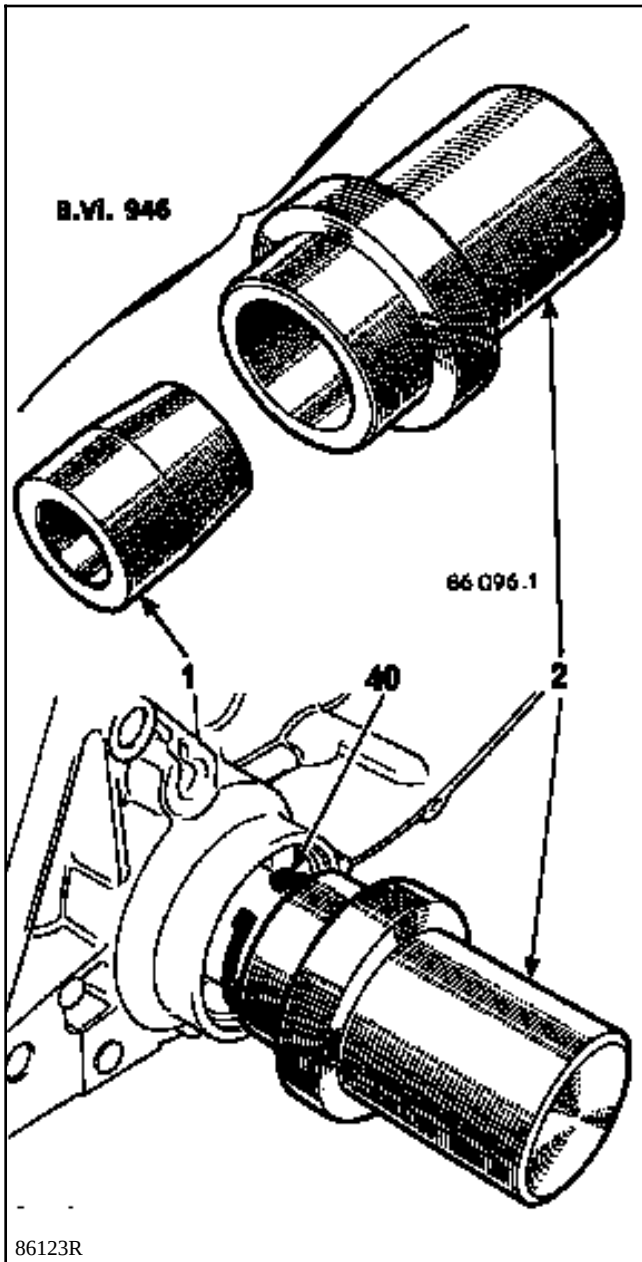


Replace the differential in the clutch and differential housing.

Using a press:

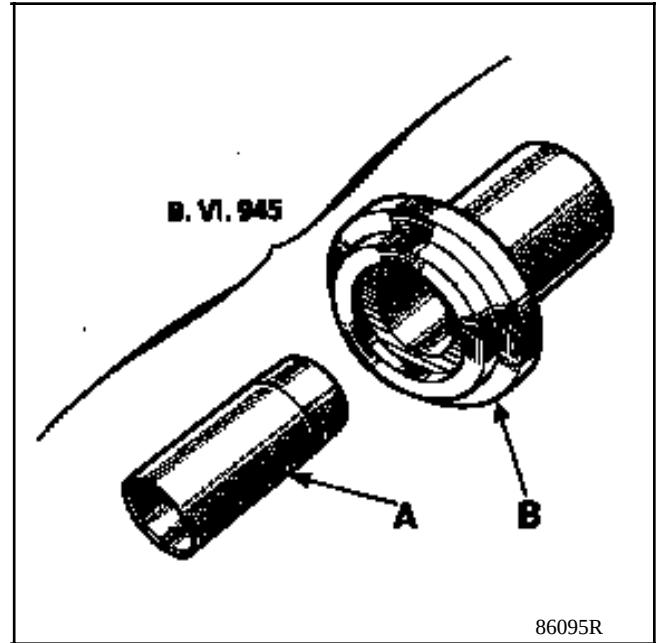
- place a wooden shim under the crown wheel,
- ensure that the thickness of the circlips corresponds to the width of the groove,
- fit the circlips (40) onto the tapered guide (1) of tool B. Vi. 946, then fit the tapered guide to the sun wheel,
- fit tool (2) B. Vi. 946 on the tapered guide (1) and push using the press until the circlips are positioned in its groove. Remove tool B. Vi. 946,
- turn the assembly and check the rotation of the speedometer gear.

DIFFERENTIAL

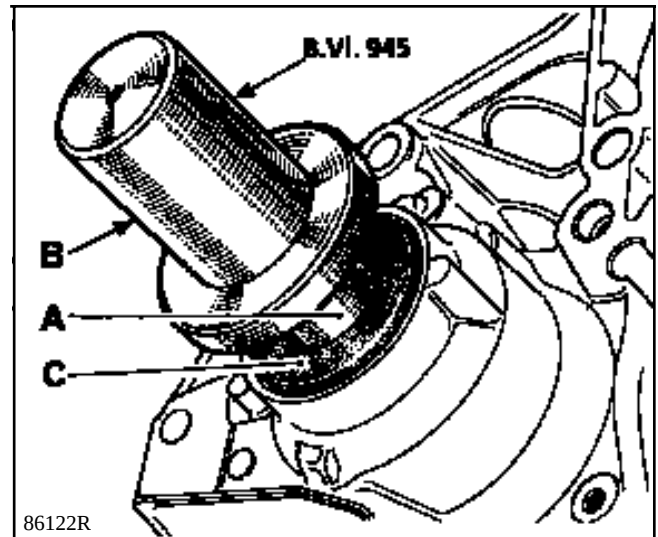


The seal is refitted using tool **B. Vi. 945** made up of:

- a seal protector (A),
- a tool for fitting the seal (B).

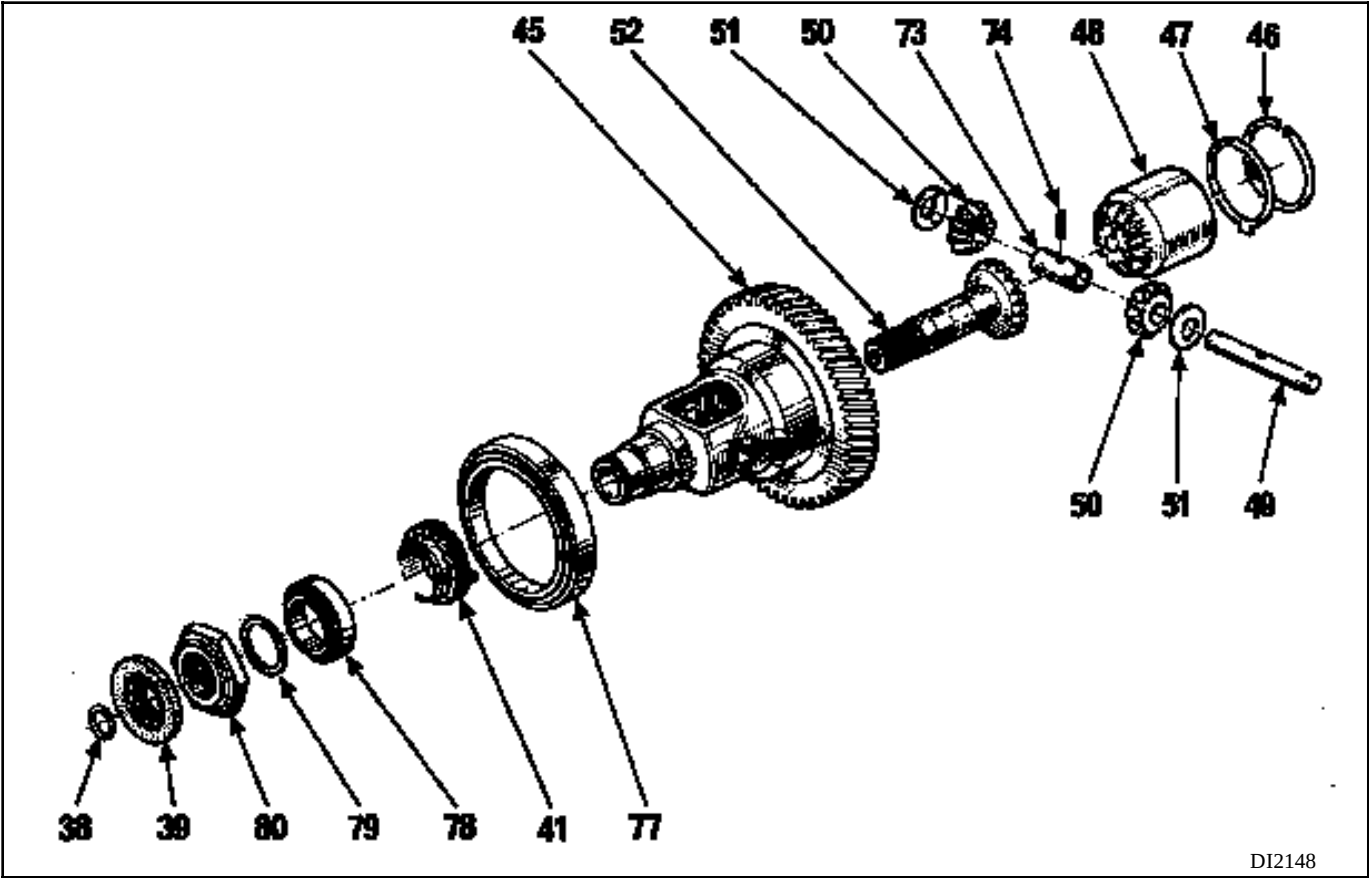


Fit the protector (A) coated with oil to the sun wheel and position the seal (C) coated with oil using tool (B).



NOTE: the lip seal can be changed on the vehicle with the gearbox in place.

DIFFERENTIAL (FITTING ON CONE-SHAPED BEARINGS)



DI2148

Differential bearings



with tapered rollers
fitting in an O configuration

93227S3

DIFFERENTIAL

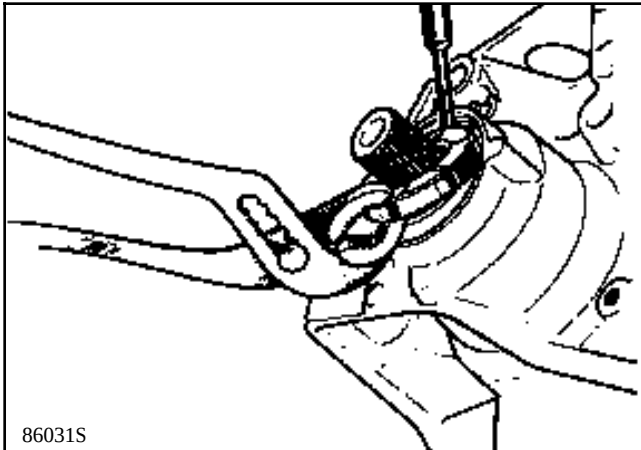
REMOVAL

This operation is carried out after separating the housings.

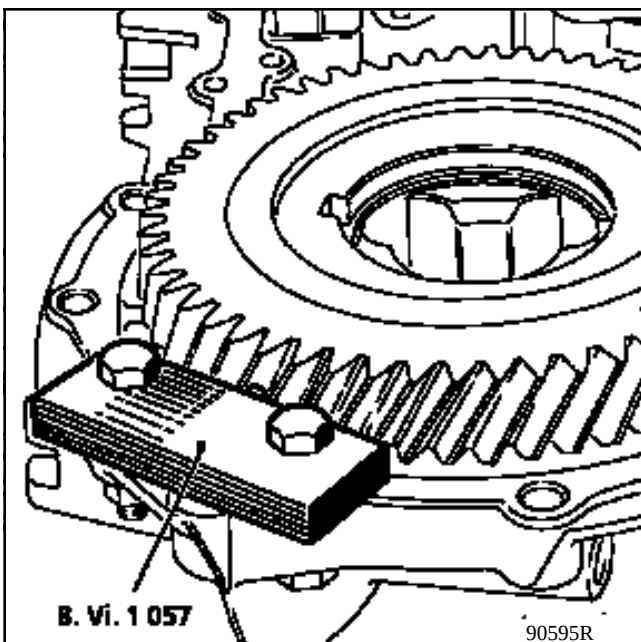
Remove the O-ring (38).

Strike the lip seal using a pin extractor and a small hammer in order to tilt it.

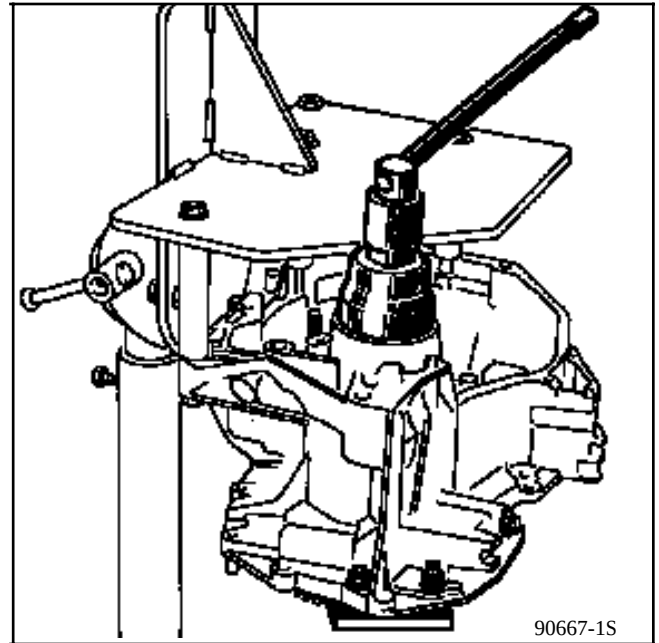
Remove the seal taking care not to damage the splines on the sun wheel.



Immobilise the differential housing - crown wheel assembly using tool **B. Vi. 1 057** secured to the housing.



Remove the gearbox mounting nut.



Retrieve the bearing pre-load setting shim (79).

Remove the assembly pushing on the sun wheel.

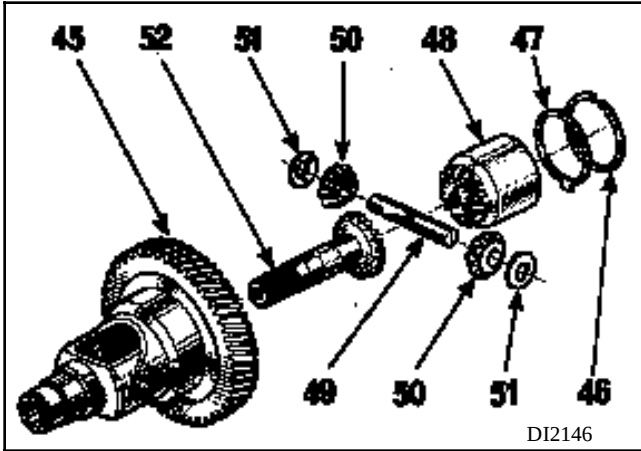
Turn the assembly over.

Tighten the housing (45) in a vice with soft jaws.

Remove the snap ring (46) and remove the shim (47).

Extract the tripod sun wheel (48).

Remove the pin (74) and remove the planet gear shaft (49).



Retrieve the sleeve (73) and remove (50 and 51) attaching the washers to their respective planet gears.

Remove the shouldered sun wheel.

If necessary, remove the speedometer crown wheel, the speedometer shaft and the gear.

NOTE: these parts must always be changed once they have been removed .

Checking parts:

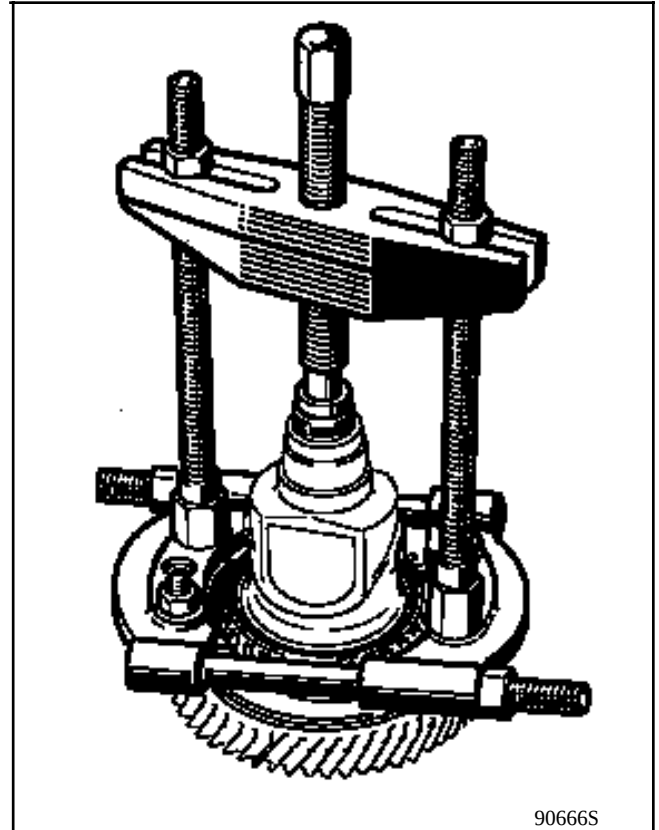
Check the condition of:

- the teeth,
- the bearing surfaces,
- the washers (of the planet gears),
- the grooves,
- the housing.

Changing the crown wheel end bearings

REMOVAL

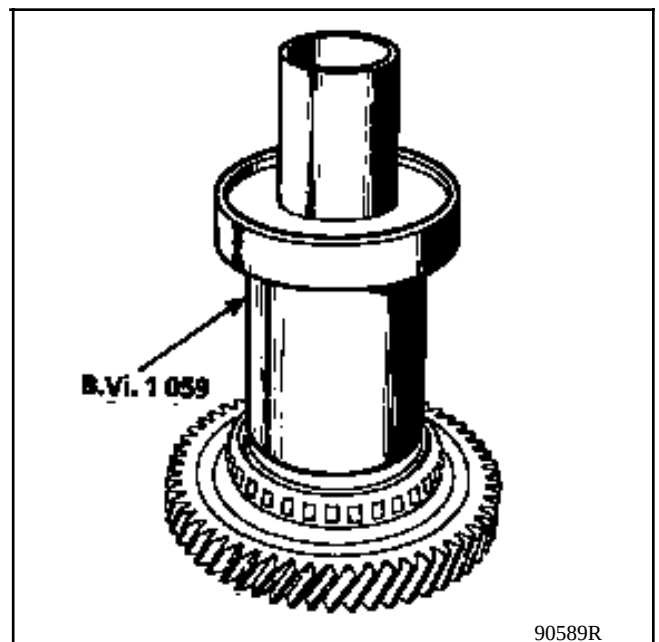
Detach the bearing from its support on the housing and extract the crown wheel end bearing using an extractor.



REFITTING

Place a board under the crown wheel to support it.

Using tool **B. Vi. 1 059** and a press fit the bearing as far as it will go on the housing.

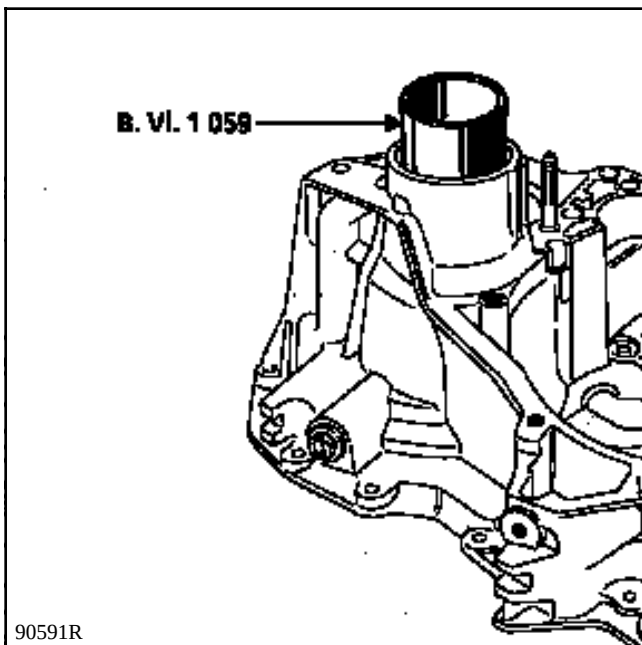
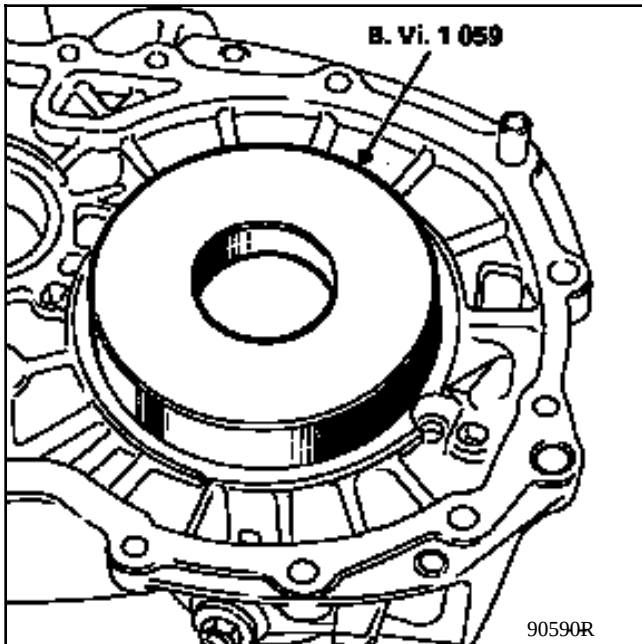


Bearing housings

Extract the bearing housings using a tube engaged from inside the housing.

REFITTING

Using tool **B. Vi. 1 059** and a press, fit the bearing housings until they are in contact with the housing shoulder.



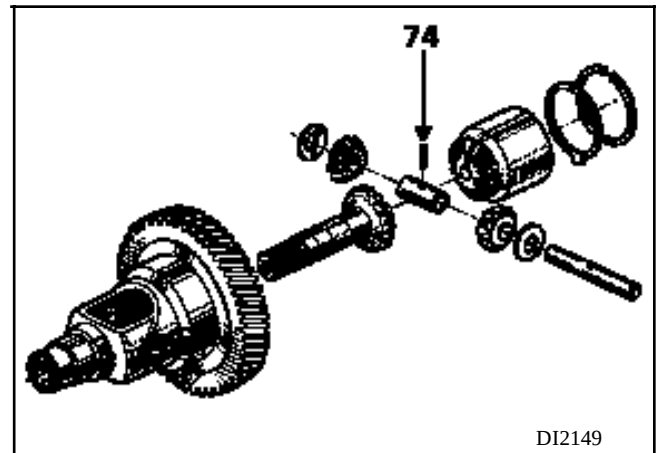
DIFFERENTIAL (FITTING TO CONE-SHAPED BEARINGS)

REFITTING

All of the cleaned and checked parts are gradually coated with oil as they are fitted.

The roll pins must always be changed.

The fitting and adjusting operations must be carried out with care and precision in the order shown.

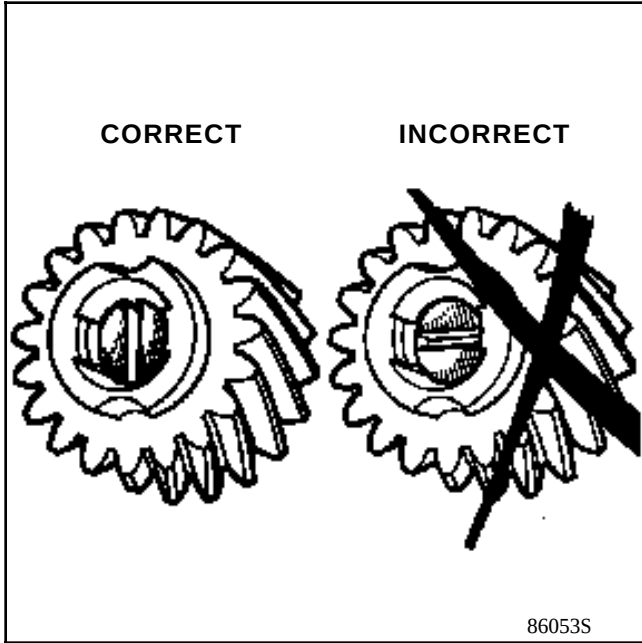


It is essential to fit a new pin (74) (using tool **B. Vi. 31-01**).

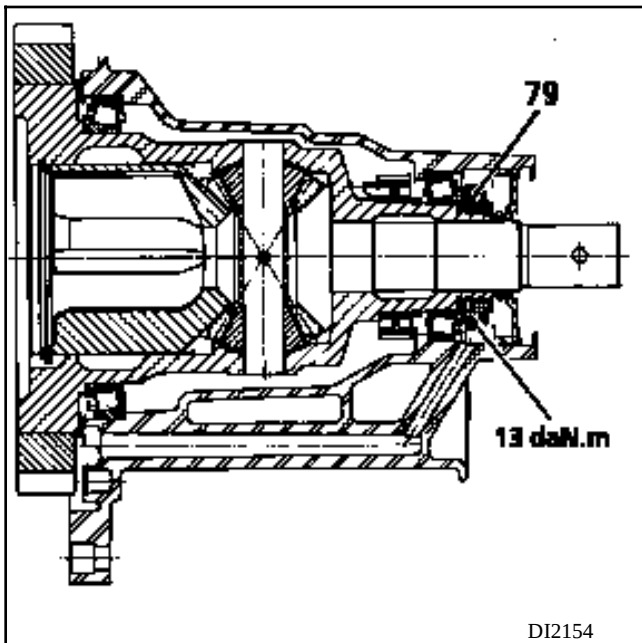
Fit the speedometer crown wheel (41) with the notches clipped in housing circular groove.

Refit the new speedometer shaft and gear using flat pliers.

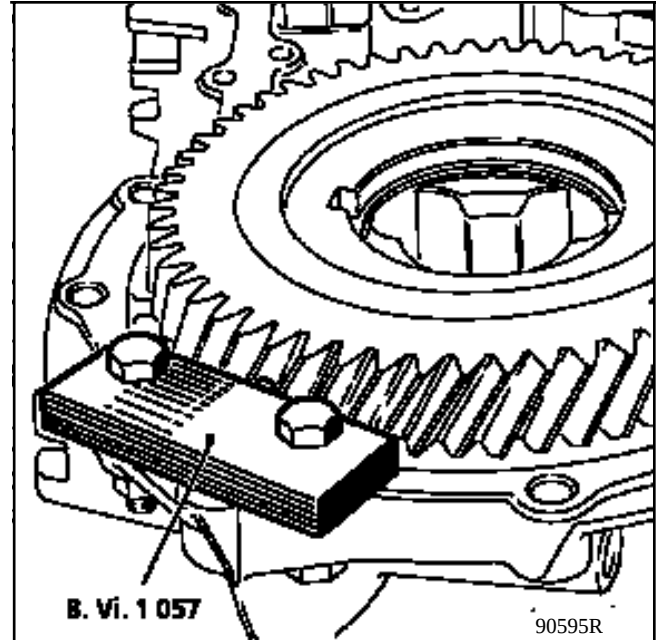
NOTE: ensure that the housings are correctly positioned and in correct contact in their seats.

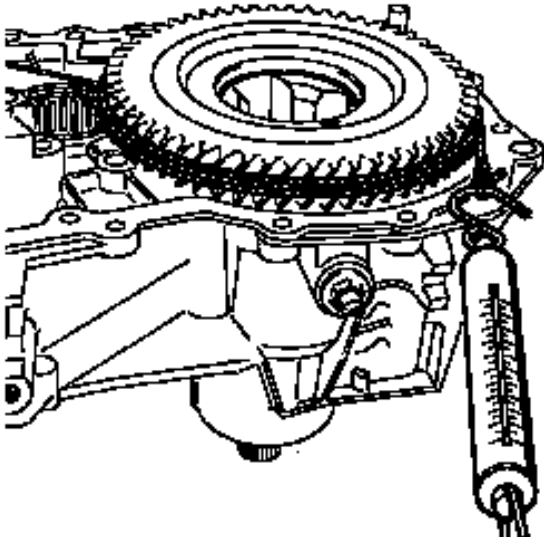


With the differential bearing external outer races in place, fit the differential in the housing with the bearings lightly coated with oil.



As on removal, immobilise the housing - crown wheel assembly using tool **B. Vi. 1 057** secured to the housing.



Bearing Pre-load Adjustment	 by washers 93227S4
Differential bearing pre-load	• Reused bearings: 0 to 2 daN. • New bearings: 1.6 to 3.2 daN.
Means of checking Dynamometer	 90668S
Thickness of washers sold as replacement parts	 93227S5 2.225 mm to 2.525 mm from 0.05 to 0.05 mm

DIFFERENTIAL

Adjusting the bearing pre-load.

SELECTING THE SETTING WASHER:

Three cases are possible:

1st case: all of the parts are reused (bearings, differential housing, housing).
Refit the original setting washer (79) and check the pre-load.

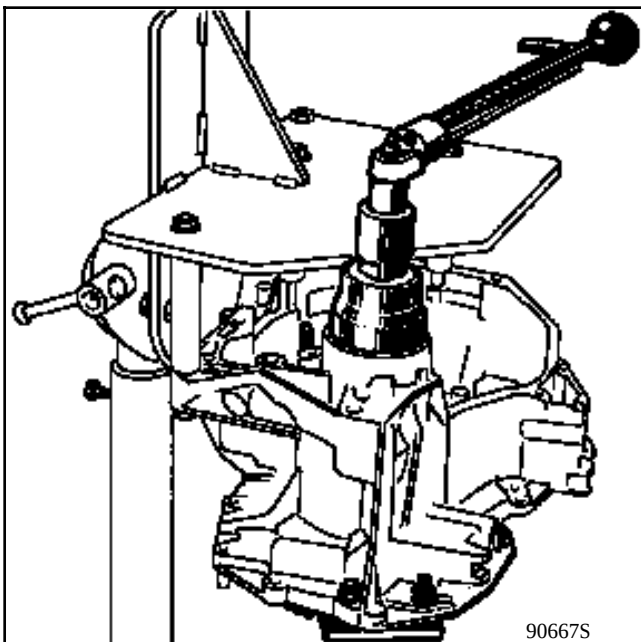
2nd case: the bearings are reused, but one of the parts is changed (differential housing or housing).
Use the thickest setting washer in the set (**2.525 mm**). Check the pre-load and adjust it if necessary.

3rd case: the bearings are new (with or without changing of the differential housing or the housing).
Use the thickest setting washer in the set (**2.525 mm**). Check the pre-load and adjust it if necessary.

Fit the bearing at the shouldered sun gear end on the differential housing.

Fit the setting washer and the spring nut observing the direction of fitting (groove at the bearing end).

Pre-tighten to a torque of **1 to 2 daN.m**.



Remove tool **B. Vi. 1057** and turn the differential to position the bearings.

Refit tool **B. Vi. 1057** and tighten the nut to a torque of **13 daN.m**.

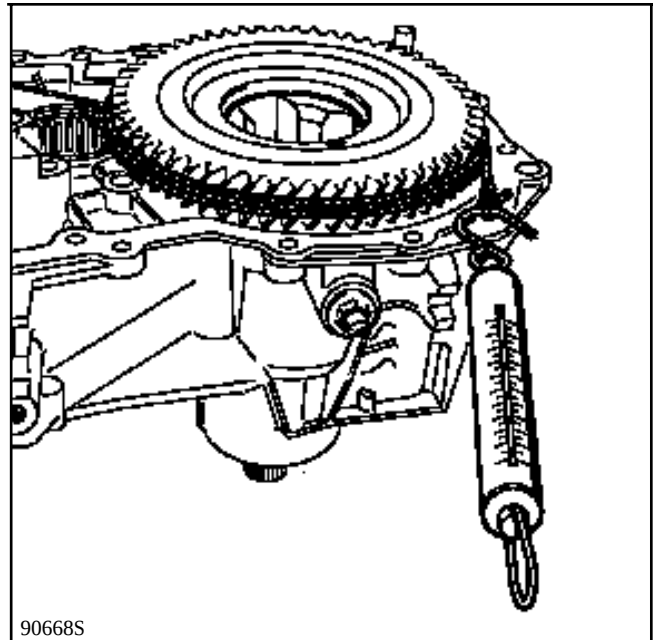
Remove tool **B. Vi. 1057**.

CHECKING THE PRE-LOAD

Turn the differential through several revolutions.

Wind a string around the crown wheel.

Pull the string using a spring balance.



1st and 2nd case: bearings reused.

The differential should turn under a load of between **0** and **2 daN**.

3rd case: new bearings

The differential should turn under a load of between **1.6** and **3.2 daN**.

This is the load necessary for rotation of the differential.

If the setting is not correct:

Determine the thickness of the setting washer to be fitted knowing that:

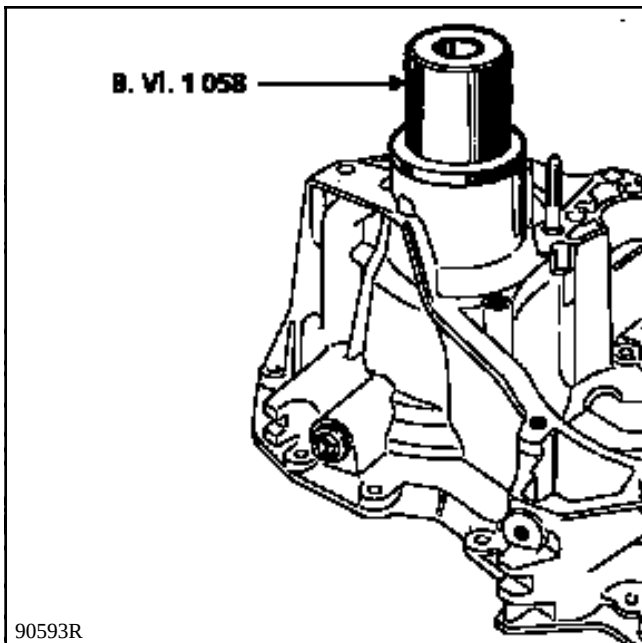
the pre-load increases by **0.7** to **0.8 daN**, when the thickness of the setting washer is decreased by 0.05 mm and vice versa.

There is a set of setting washers with a thickness of 2.225 mm to 2.525 mm rising in stages of 0.05 mm.

Fit the new setting washer and check the pre-load again.

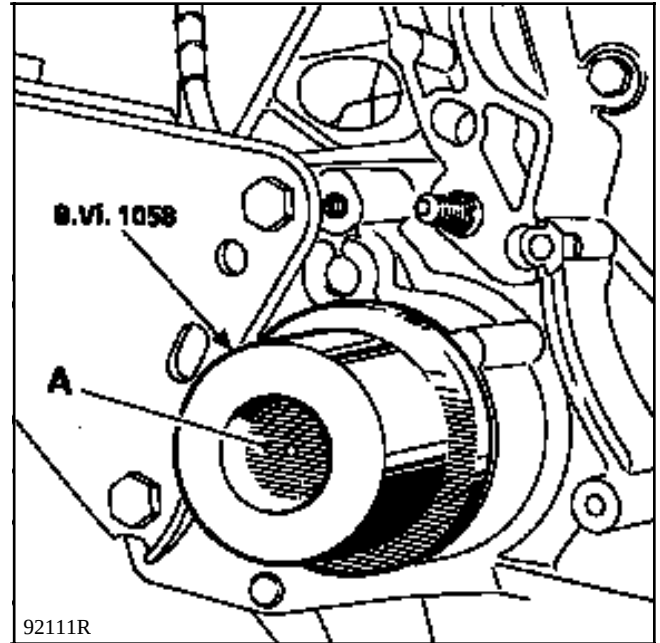
Check the rotation of the speedometer shaft.

Fit a protector (A) to the splines on the sun wheel (tapered guide of **B. Vi. 945**) and fit the lip seal coated with oil using tool **B. Vi. 1 058**.

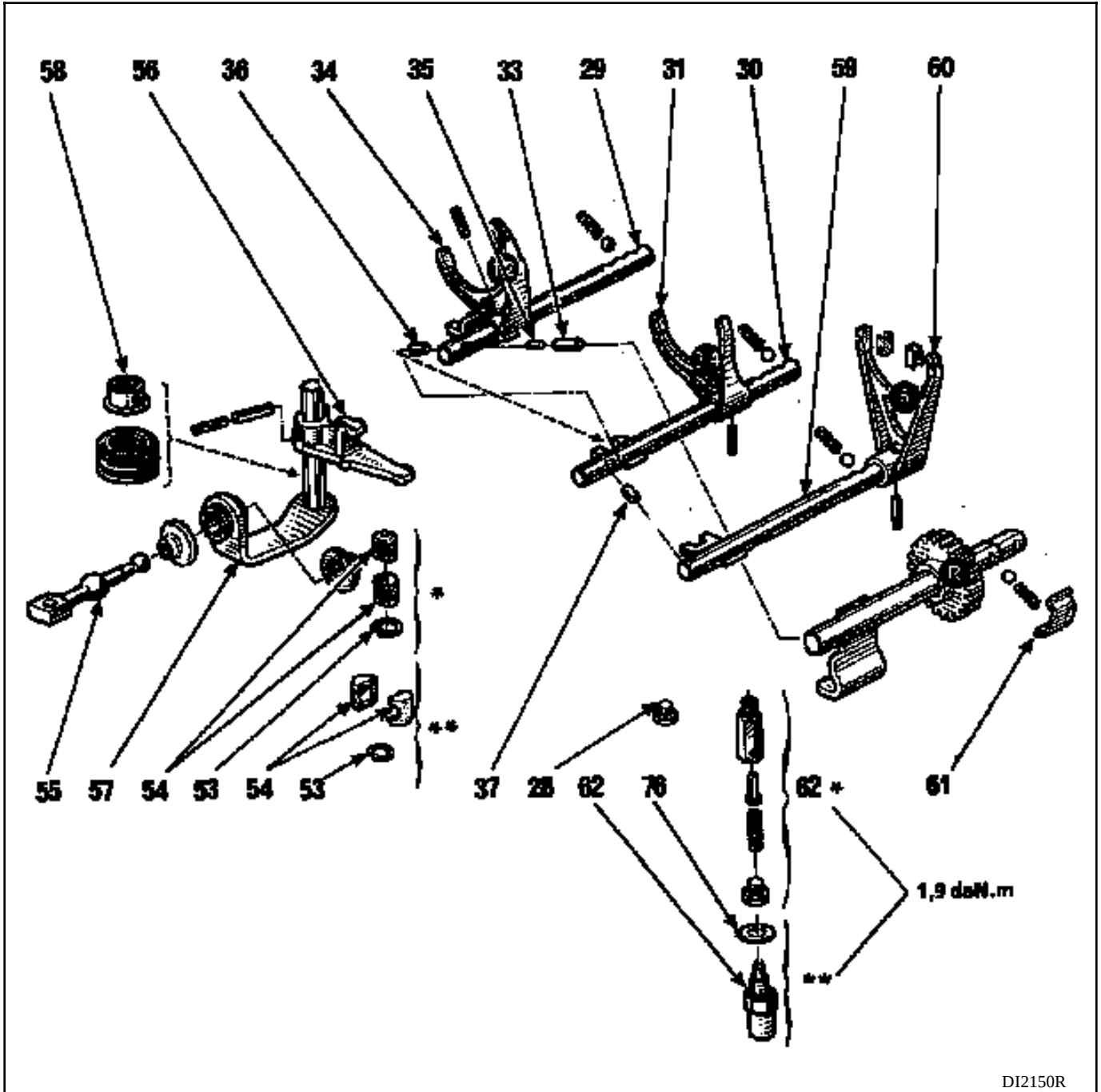


Fit the O-ring on the sun wheel and coat the splines with **MOLYKOTE "BR2"** grease.

NOTE: the lip seal can be changed on the vehicle with the gearbox in place.



INTERNAL CONTROLS



DI2150R

The shafts must not be deformed and the locking balls seat must not be worn. The locking balls must also slide freely in their bearings without excessive clearance.

Fork check:

the surface of the forks which is in contact with the sliding gear grooves must not be deformed or worn.

CHANGING THE CONTROL (SHAFT - GEAR ENGAGEMENT LEVER AND FINGER)

REMOVAL

Remove the control rod circlip (53).

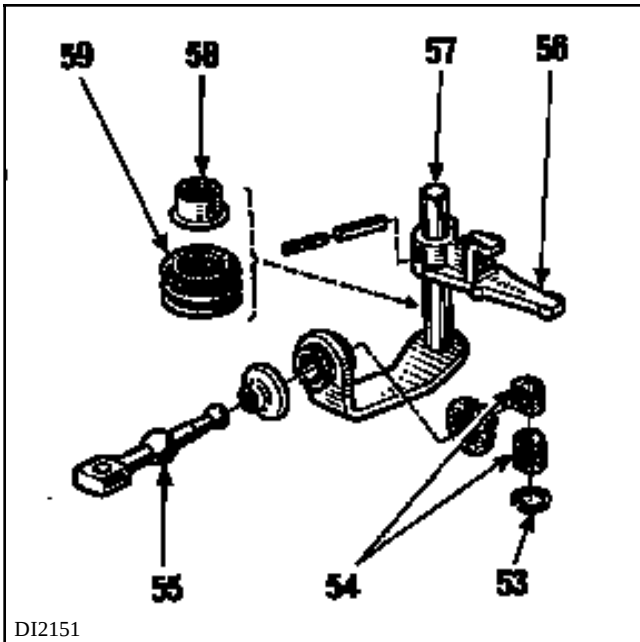
Remove the rod bracket (54) and the rod (55).

Unpin the selection finger (56) using a 7 mm diameter pin extractor.

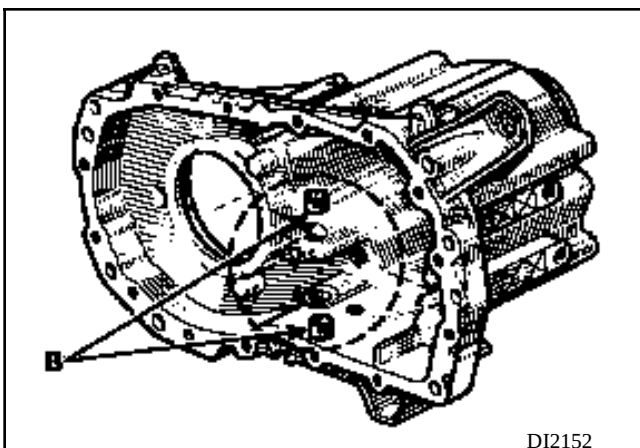
Remove the bellows (59) from the ring (58).

Pull the control shaft (57) outwards.

Remove the lip seal (58).



Expel the two bearing rings (B) using a tube with an external diameter of 16.5 mm.

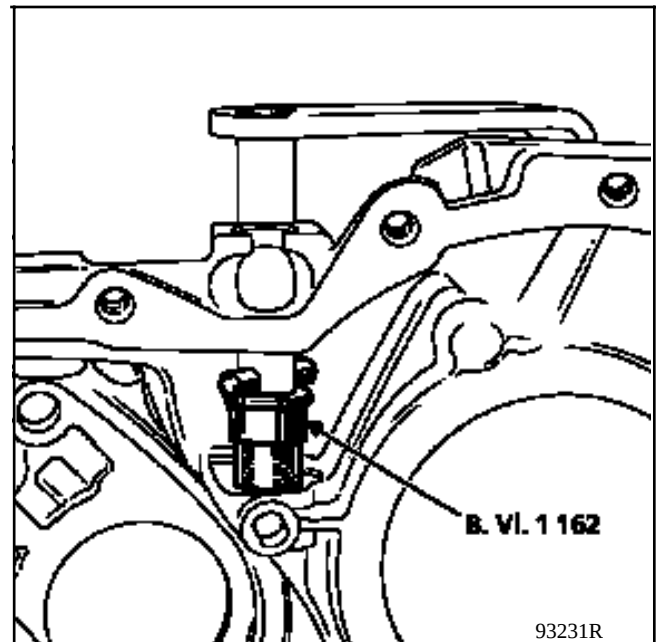


REFITTING

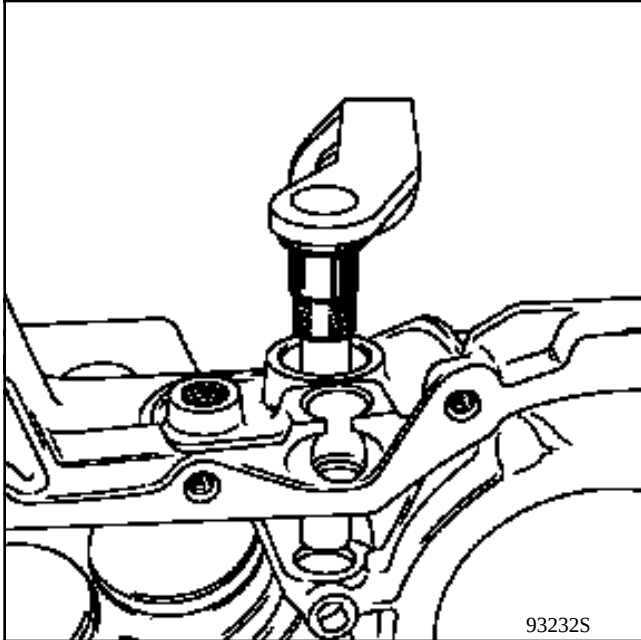
When a control shaft lip seal is changed, it is advisable to always change the control shaft bearing rings. Also, the control shaft must not be scratched or worn.

The rings are changed using sleeve **B. VI. 1 162**, and a worn control shaft.

1) Internal bearing

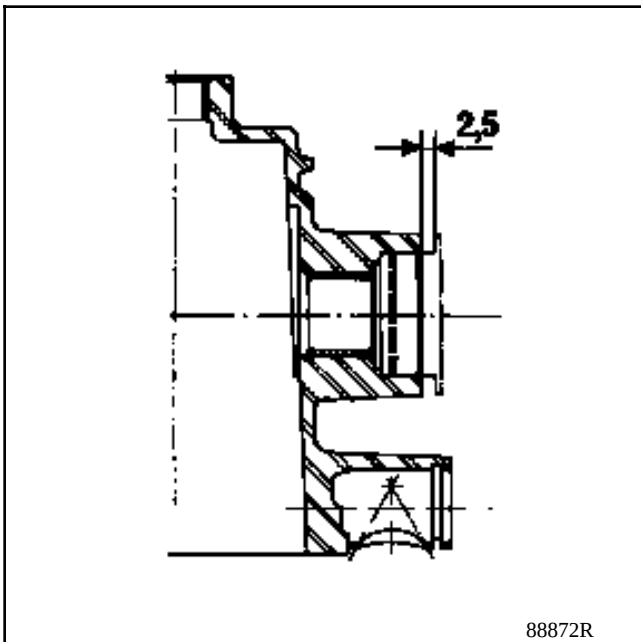


2) External bearing

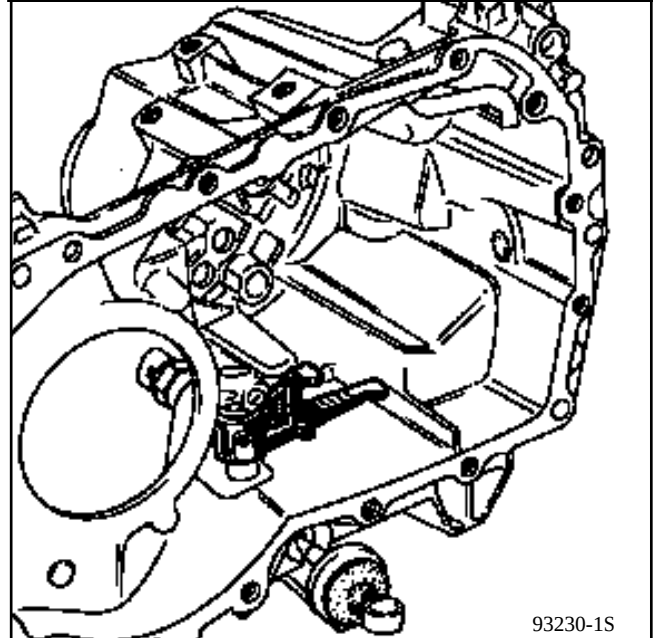


Refit in the order:

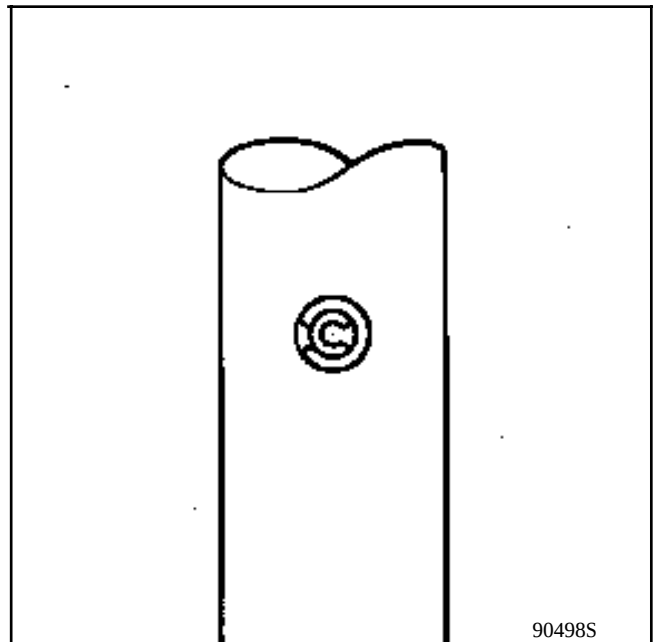
- the lip seal coated with oil using tool **B. Vi. 1 162**,
- observe its fitting dimension,



- the gear engagement finger (56), large fork at the external rod end,
- the shaft (57) coated with oil and fitted with bellows (59).



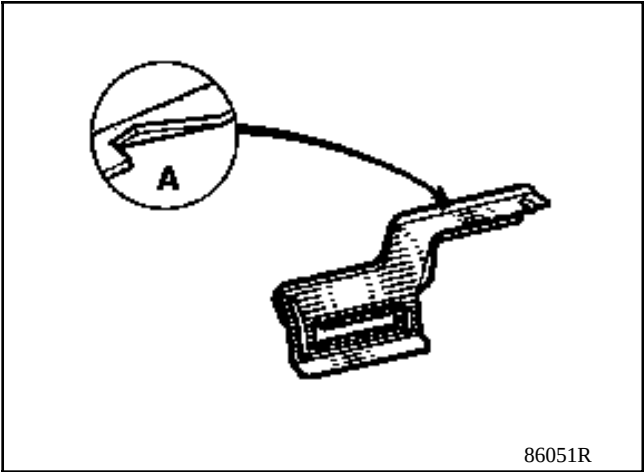
Observe the direction of the pins, their slits must be perpendicular to and opposite the shaft.



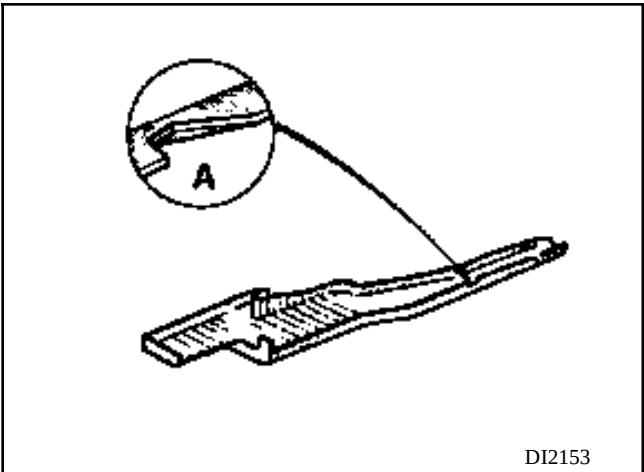
Change the rod (55), its bracket (54) and the circlips (53).

CHANGING THE LUBRICATION
CHANNEL

1st assembly



2nd assembly

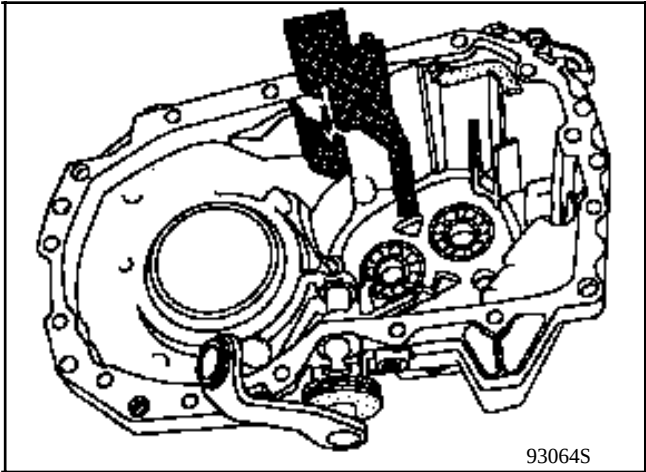


REMOVAL

Fold back the channel retainer (A) and push it inside the mechanism housing.

REFITTING

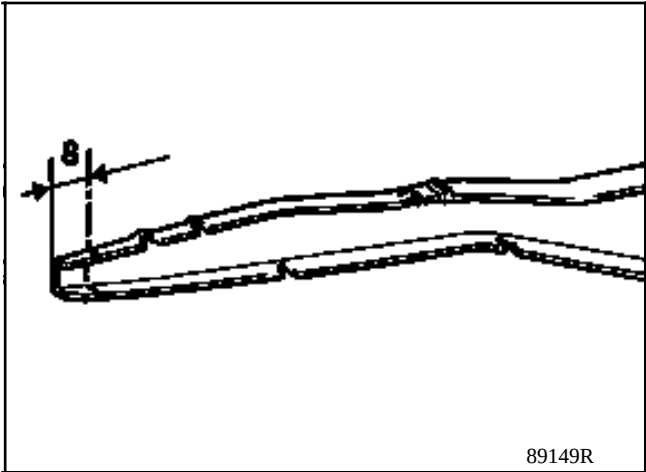
Fit the channel rails in the mechanism housing ribs.



Push as far as possible and check the clipping of the retainer (A).

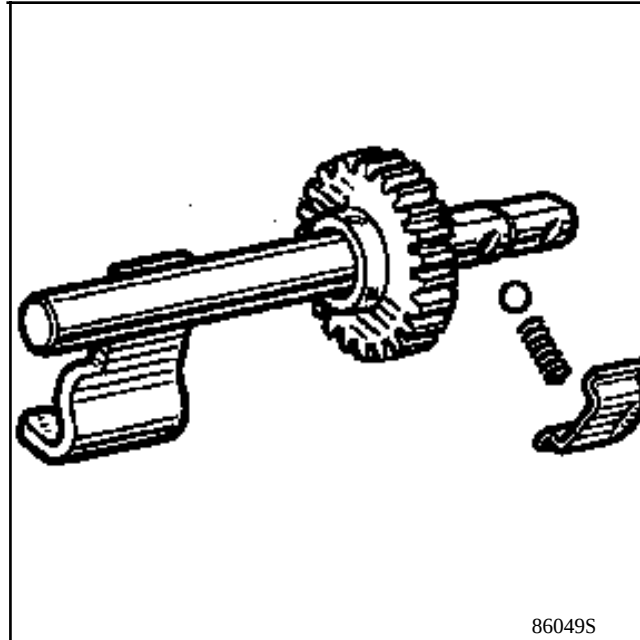
NOTE: modification to the 5th gear sliding gear lubrication channel due to changing of the mechanism housing.

When the 5th gear cover is refitted and following replacement of the mechanism housing fitted with a sheet metal channel with a mechanism housing designed for a plastic channel, it is necessary to cut the plastic channel by approximately **8 mm**.

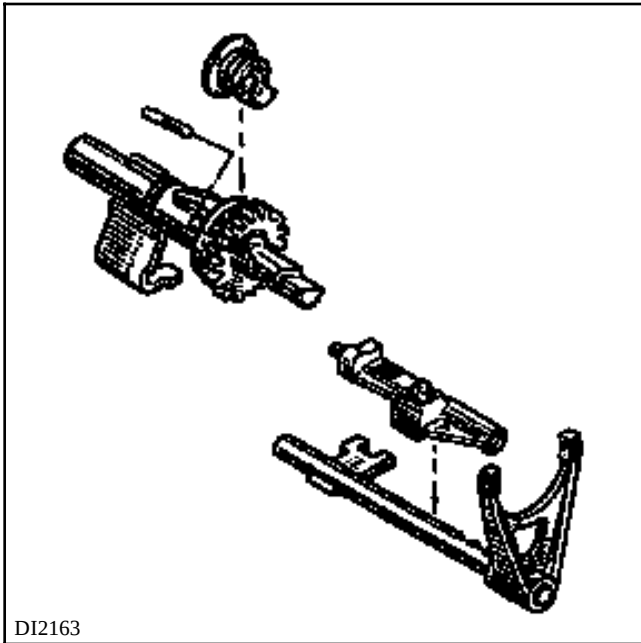


The reverse gear shaft cannot be repaired and is sold with the intermediate gear assembled.

There is no adjustment to be made.



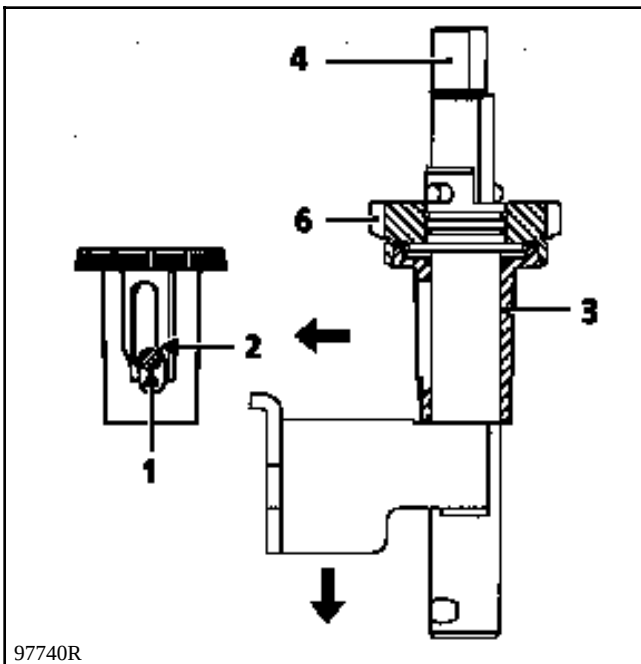
EXPLODED VIEW



DI2163

OPERATION

Some **JC5** or **JB** gearboxes have the reverse gear constant engagement device.



97740R

This device, which complements the reverse gear brake, allows the gear to be engaged with no impact of the teeth.

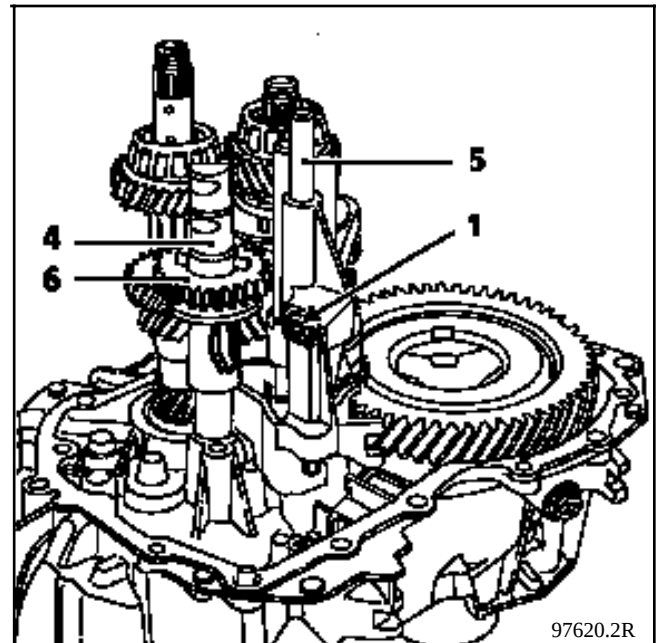
The intermediate gear (6) is permanently driven by the input shaft when it is driven by the engine.

When the clutch is released to engage reverse gear, the input shaft is freed. The gear on the output shaft is then stationary.

By operating the gear lever, the cone (3) is brought into friction with the intermediate gear (6).

The torque created acts like a brake on the input shaft and positions the boss (2) in contact with the end (1) connected to the housing.

The engagement of the boss (2), and thus of the reverse gear, can only take place when the input shaft is stationary.



97620.2R

4 Reverse gear shaft

5 5th gear control shaft

MODIFICATION TO GEARBOX REPAIR

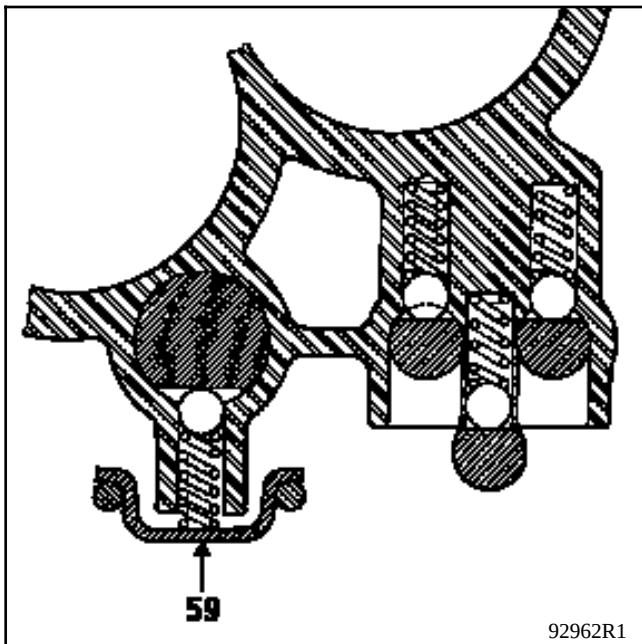
Separating the housings

Remove:

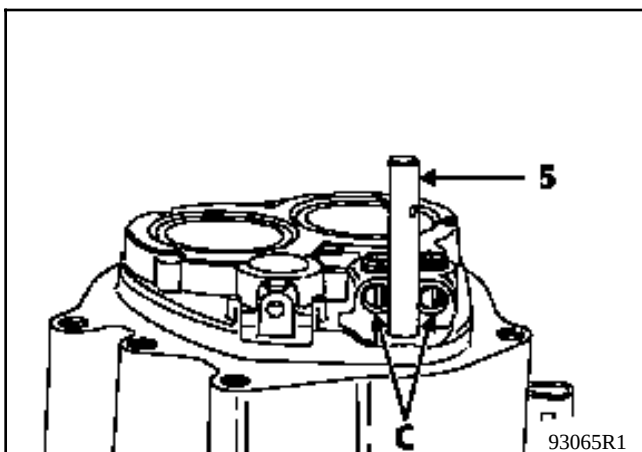
- the 5th gear assembly,
- the mechanism housing mounting bolts.

Remove the reverse gear ball indentation U-clip (59).

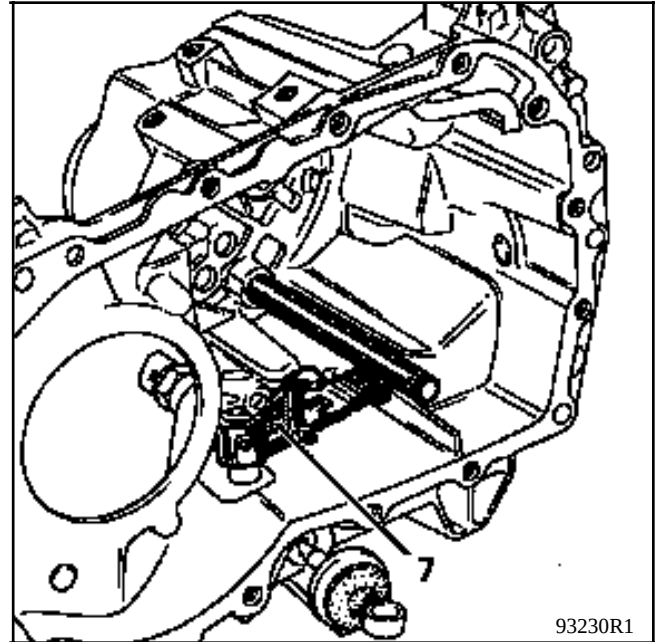
Retrieve the spring and the ball.



It is advisable to fit two magnets or to close the openings (C) in order to retrieve the locking springs and balls of the 1/2 and 3/4 shafts.



Ensure that the gear engagement finger (7) no longer controls the movements of the claws.

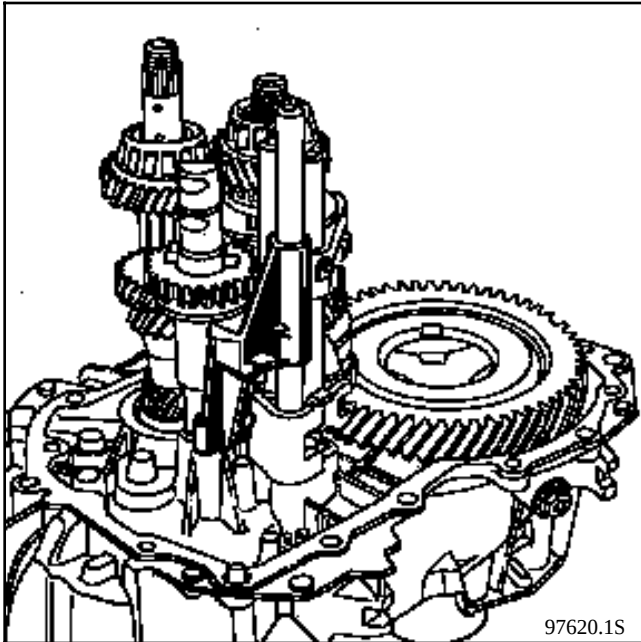


If necessary, act on the 5th gear engagement shaft (5).

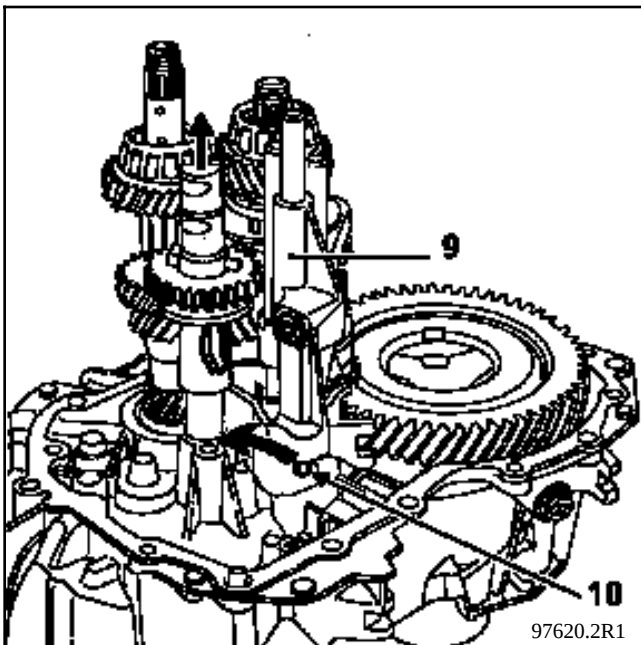
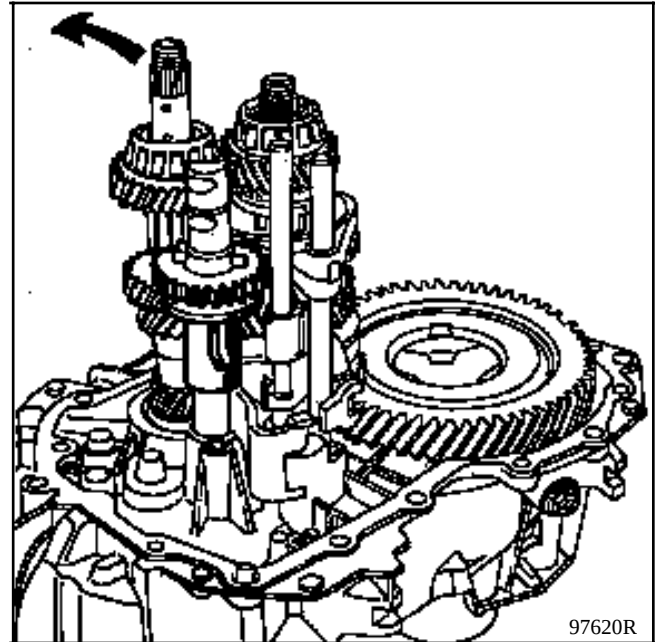
WARNING: while lifting the mechanism housing , push back the 5th gear shaft (5) ; it remains solid with the clutch housing.

Retrieve the 5th gear locking ball and spring.

To remove the reverse gear assembly, lift the reverse gear in order to disengage the 5th gear shaft and the reverse gear guide.



To remove the reverse gear shaft, lift the input shaft outwards.



Lifting the reverse gear guide (9), the end is disengaged from its seat (10).

REFITTING

Proceed in the reverse order to removal.

Parts susceptible to wear (to be checked) :

- ring under the gear,
- intermediate gear,
- friction cone.

No interchangeability (shape of housings).

SPEEDOMETER DRIVE GEAR

1st case:

Only the speedometer gear or the shaft is damaged.

REMOVAL

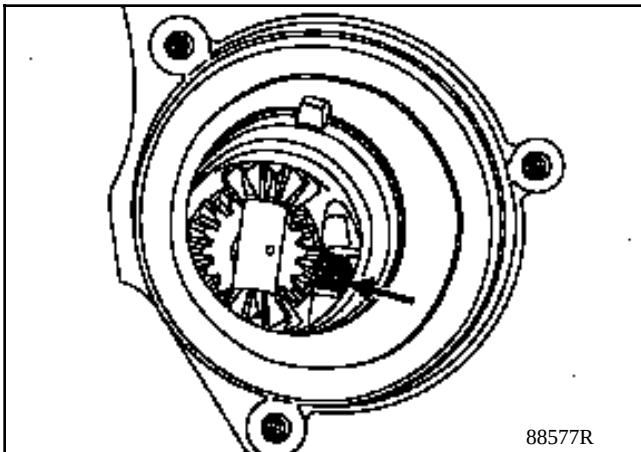
It is not necessary to remove the gearbox completely.

Remove the tripod sun wheel.

Turn the differential by hand so that the speedometer gear is accessible.

Unclip the shaft pulling it vertically using long nosed pliers.

Using the pliers, remove the gear from its seat.



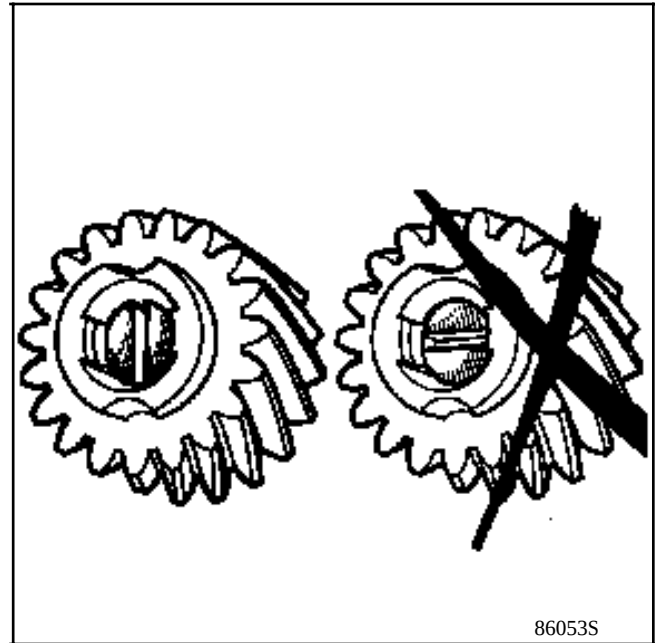
NOTE: The gear and the shaft must be changed whenever they are removed.

REFITTING

Refit the new speedometer gear using flat pliers.

The gear and its shaft are refitted by hand. The shaft must be positioned correctly in relation to the gear key lugs because of the elasticity of the lips of the shaft.

Ensure correct clipping using a mallet.



Refit the tripod sun wheel.

2nd case:

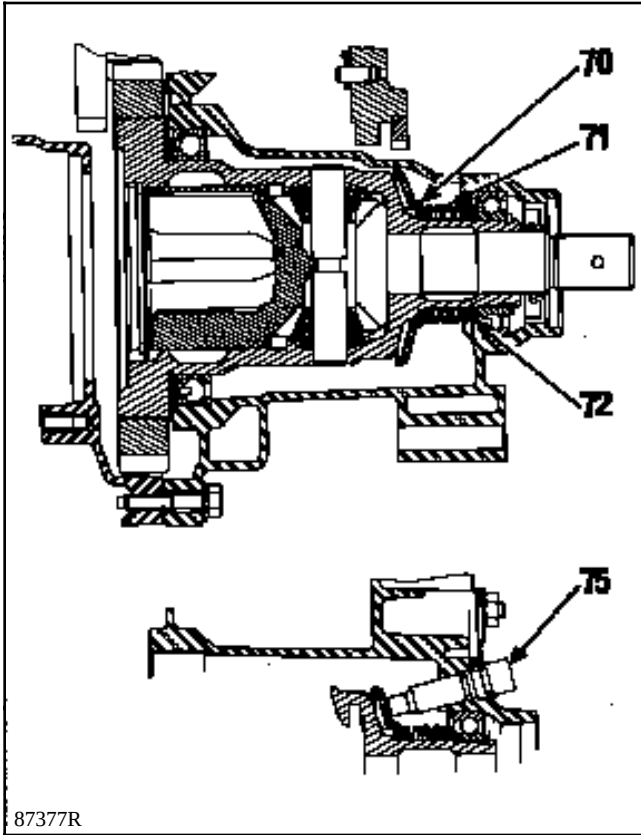
The speedometer crown wheel and the gear are damaged.

REMOVAL

The gearbox must be removed and the final drive must be disassembled.

ELECTRONIC SPEEDOMETER

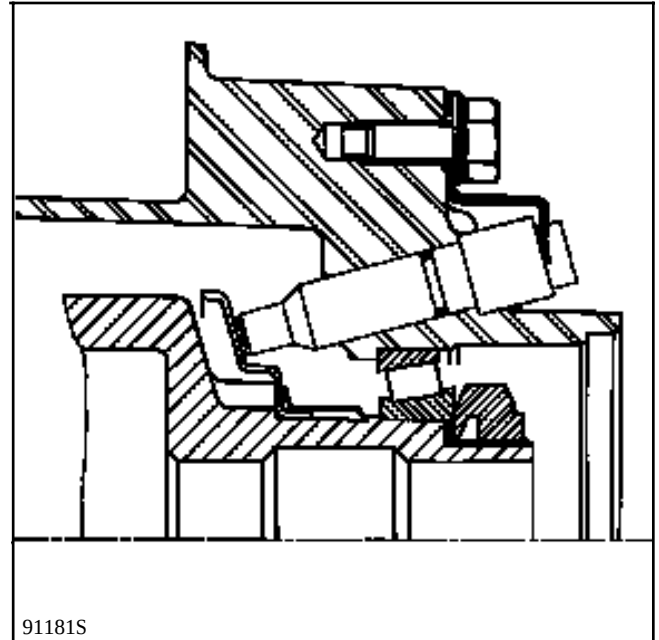
1st assembly



The speedometer sensor air gap cannot be adjusted.

- 70 Speedometer target
- 71 Spring
- 72 Trust washer
- 75 Speedometer sensor

2nd assembly



The spacer and the spring which up until now secured the sensor crown wheel have now been replaced by a single spring (R) of a different type.

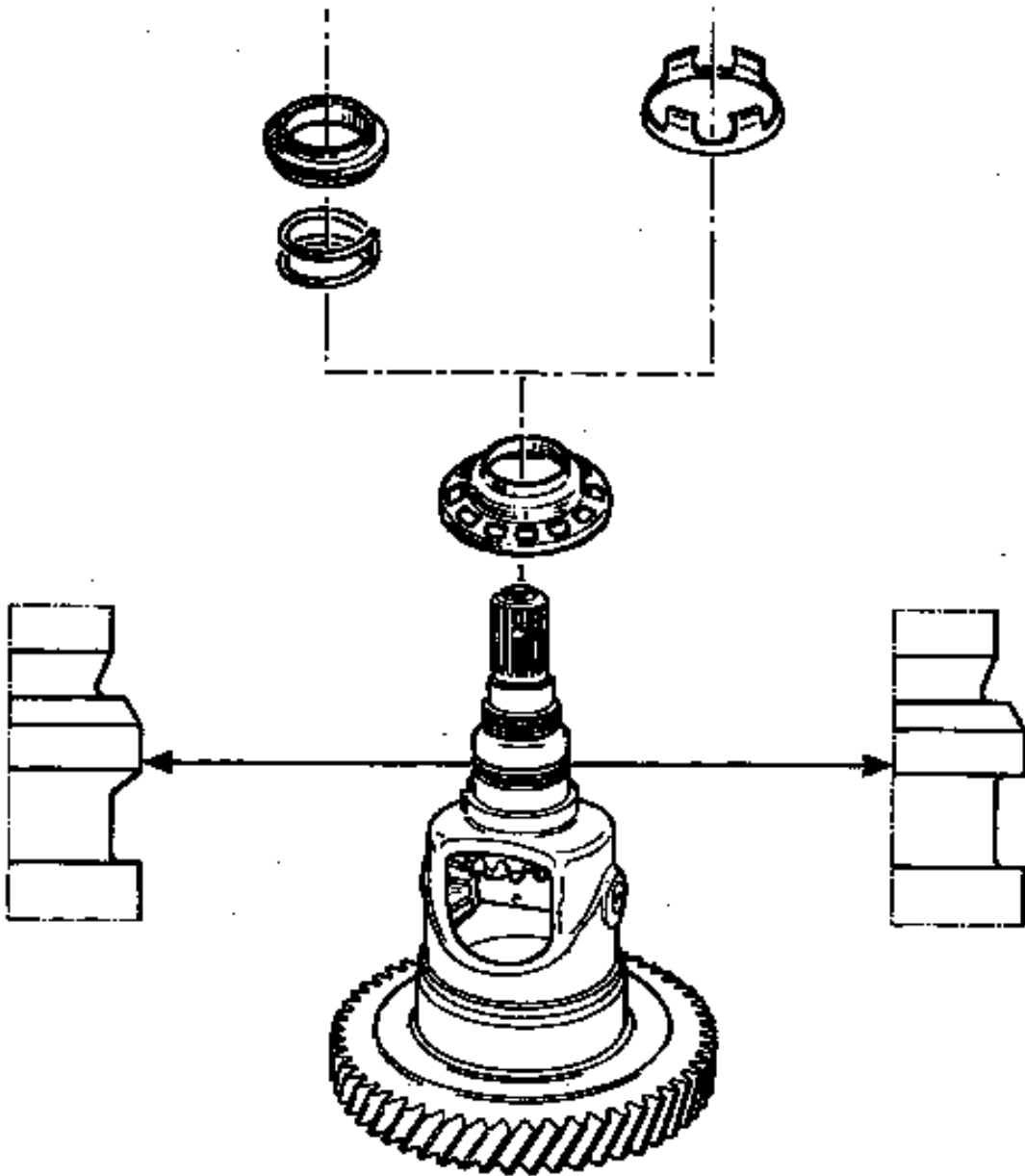
In order to allow the fitting of the new spring, the shape of its securing groove on the differential housing has been modified.

Consequently, the new spring cannot be fitted to an old differential housing (groove not modified). However, the first assembly (spacer / old spring) can be assembled on a modified differential housing.

ELECTRONIC SPEEDOMETER

1st ASSEMBLY

2nd ASSEMBLY



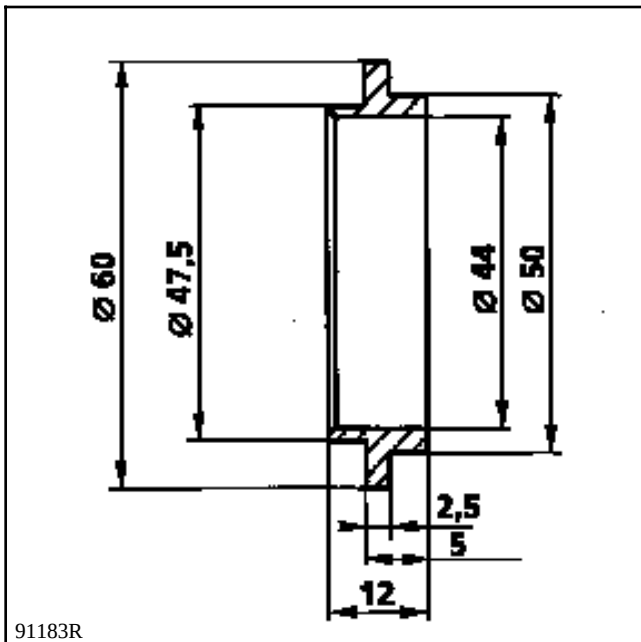
DI2156

ELECTRONIC SPEEDOMETER (cont)

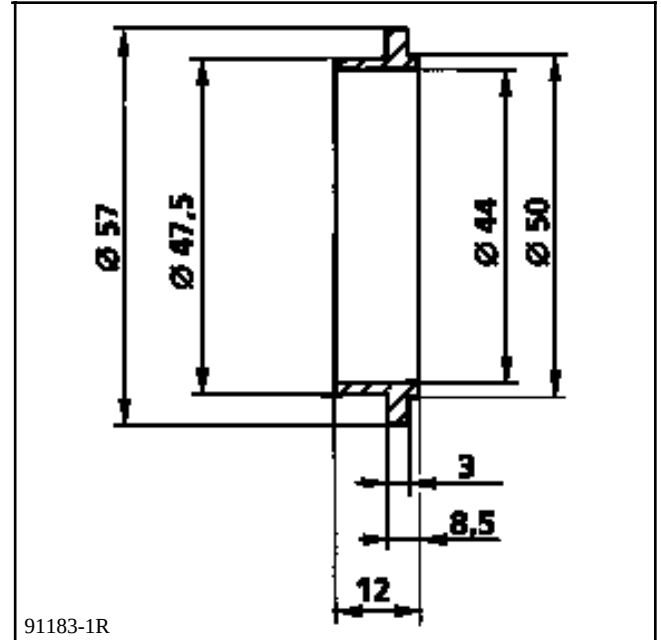
1st ASSEMBLY - REMINDER

Depending on the type of bearings fitted to the differential housings, two types of spacer were used to secure the sensor crown wheel of gearboxes fitted with an electronic speedometer.

Spacer assembled on a differential housing fitted on **BALL BEARINGS** .



Spacer assembled on a differential housing fitted on **TAPERED BEARINGS** .



It is essential that the spacer which corresponds to the type of differential housing is fitted .

2nd ASSEMBLY - Special features

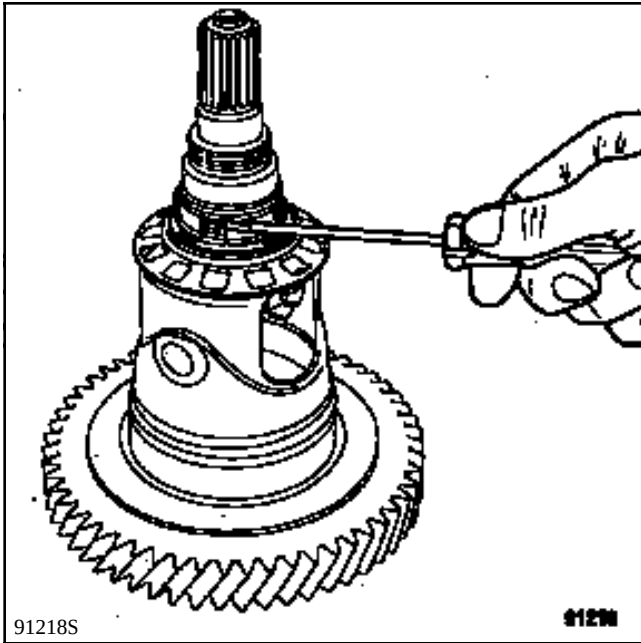
New shape of the spring securing groove on the differential housing.

Accepts both assemblies.

ELECTRONIC SPEEDOMETER (cont)

REMOVAL - Special features

Using a small screwdriver, move aside the spring securing tabs and remove the spring.

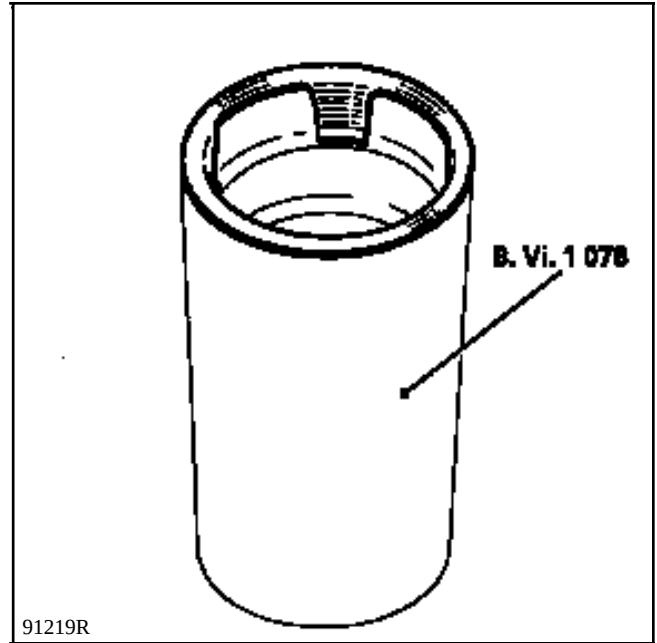


Always change the spring when it has been removed.

REFITTING - Special features

Fit the sensor crown wheel on the differential housing.

Fit the sensor crown wheel securing spring using tool **B. Vi. 1 078** and a mallet.



Fit the spring tabs in the groove on the differential housing.

NOTE: in order to avoid damaging the spring on fitting, it is essential to use tool **B. Vi. 1 078**.

First method

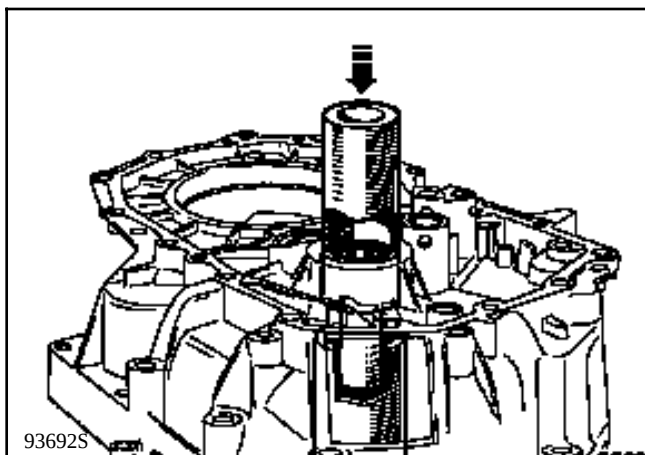
CHANGING THE THRUST PAD GUIDE TUBE (JB0 - JB1 - JB2 - JB3)

REMOVAL

The lip seal and the clutch shaft (input) bearing are solid with the thrust pad guide tube. Lubrication is via an opening linked to the clutch housing bore.

If the guide tube is changed, the shaft must be changed if the mating surface is not correct as the rollers and the lip seal are in direct contact with the input shaft.

With the housing in contact with a tube with a 48 mm internal diameter and a 55 mm external diameter, extract the guide tube using a press using a tube with an external diameter of 45 mm.

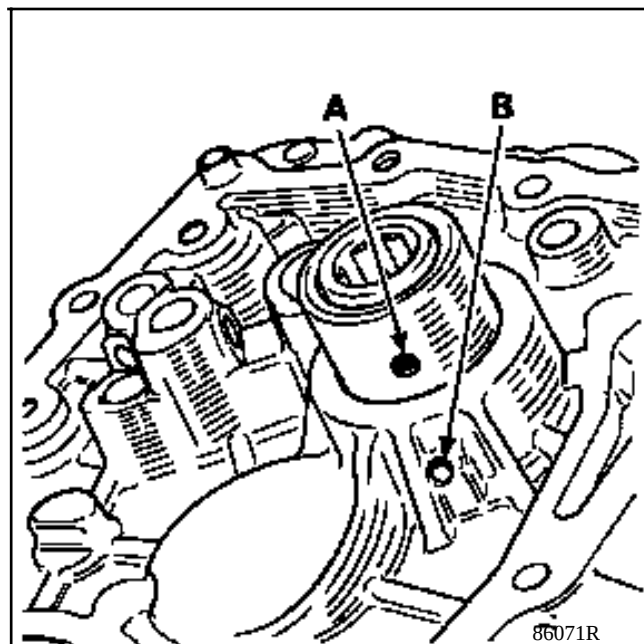


REFITTING

The guide tube is supplied with an integral lip seal protector to prevent the seal from being damaged when it passes over the clutch shaft splines.

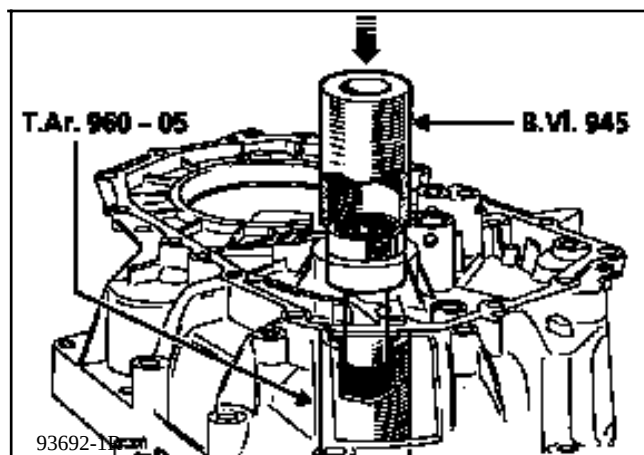
Apply a film of **MOLYKOTE "BR2"** grease to the bore walls.

Align the lubrication hole of bearing (A) in the the guide tube opposite that of the clutch housing (B).



With the housing in contact with the tube.

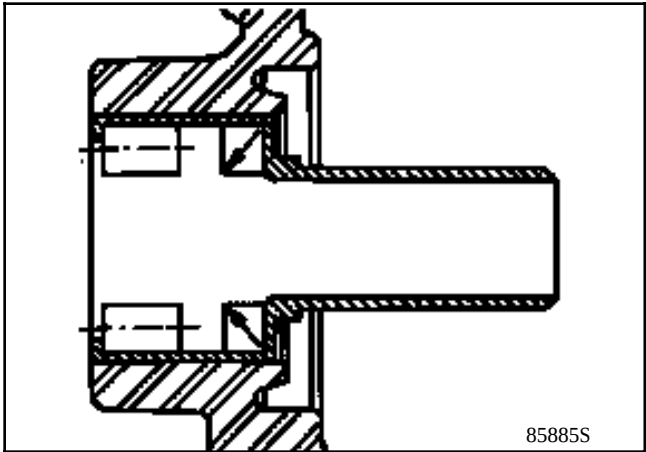
Insert the guide tube using a press until it is in contact with the internal surface of the housing using tool **B. Vi. 945**.



The guide tube lubrication hole is lower down than the housing hole.

CHANGING THE THRUST PAD GUIDE TUBE
(JB0 - JB1 - JB2 - JB3)

Check that the lubrication hole (A) is opposite the housing lubrication hole (B).



CHANGING THE THRUST PAD GUIDE TUBE
(JB4 - JB5)

This operation is carried out after removing the gearbox and disassembling the clutch housing.

Refer to the section "Separating the housings".

TIGHTENING TORQUES (in daN.m)	
Housing bolt	2.5



REMOVAL

Extract the guide tube using a press.

When a guide tube is extracted using a press, it cannot be reused.

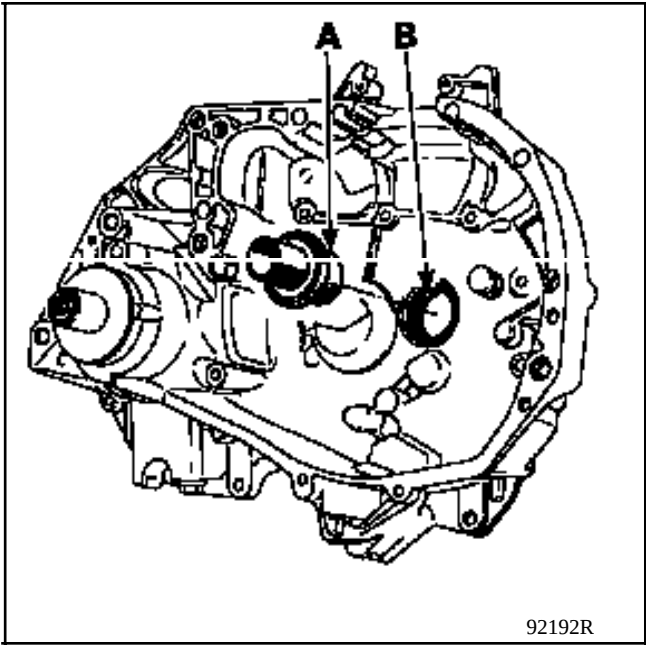
REFITTING

The guide tube is supplied with an integral lip seal protector to prevent the seal from being damaged when it passes over the clutch shaft splines.

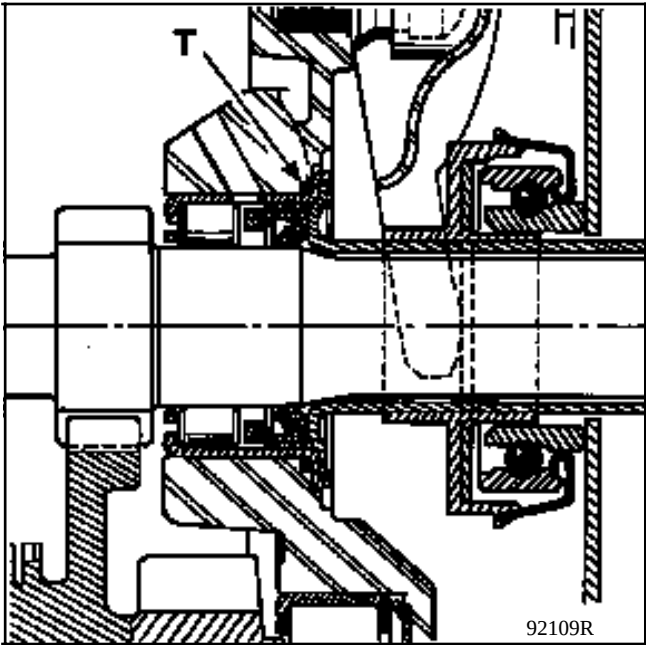
Check the presence of the O-ring (T).

Apply a film of MOLYKOTE "BR2" grease to the bore walls.

Align the bearing lubrication hole (A) in the guide tube opposite the clutch housing lubrication hole (B).



Insert the guide tube using a press until it is in contact with the external surface of the housing.



Second method

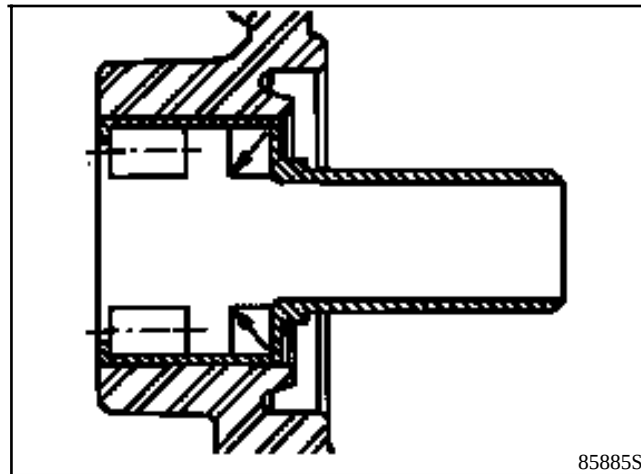
CHANGING

This operation is carried out after removing the gearbox without it having to be opened.

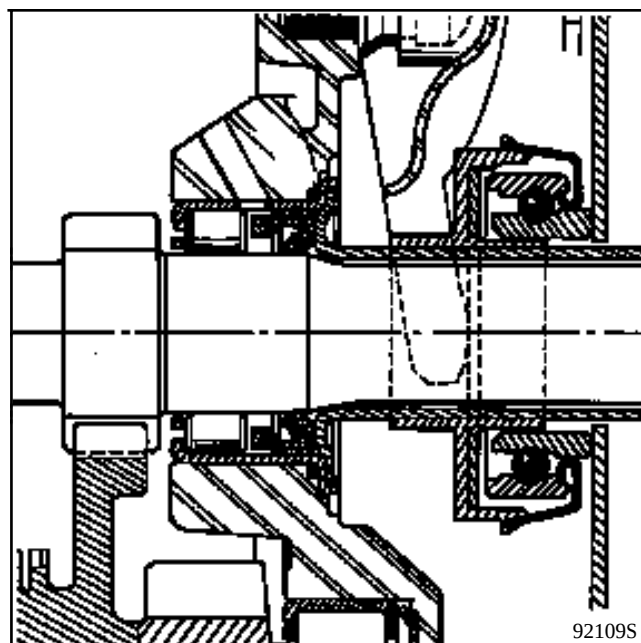
Following removal of the thrust pad guide tube, check the condition of the input shaft surfaces. If they are not correct to specification, change the input shaft.

Two types of guide tubes are fitted to JB gearboxes, depending on the type of gearbox.

Guide tube without flange

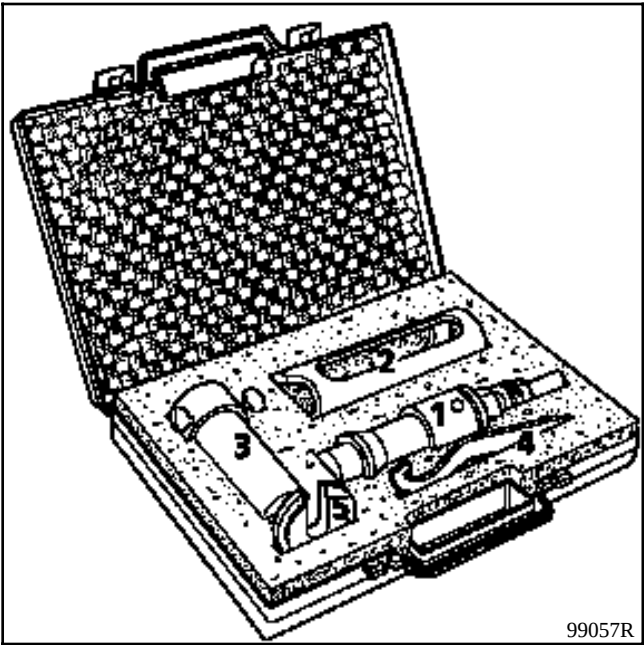


Guide tube with flange



DESCRIPTION OF THE CLUTCH GUIDE TUBE
EXTRACTION TOOL

EQUIPMENT REQUIRED	
Make	Type
BMP	037M00



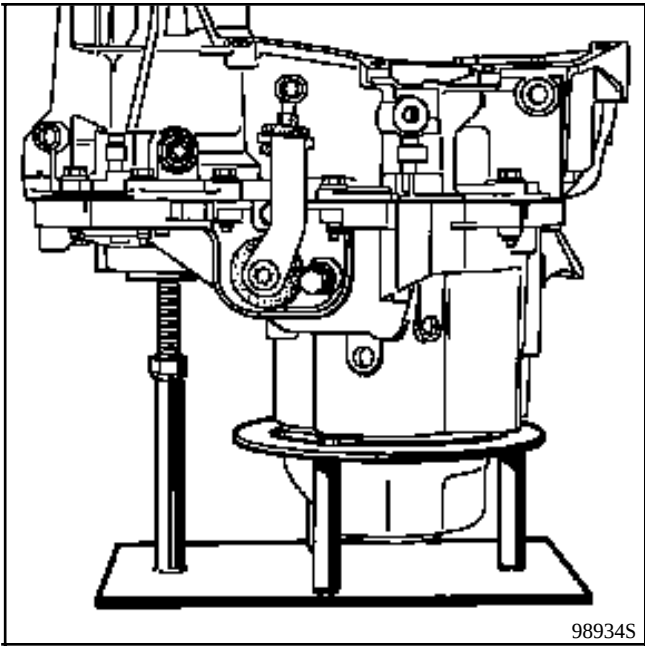
- 1 Tightening clamp
- 2 Sheath
- 3 Gauge
- 4 Wrench
- 5 Split ring

For use on the 23 mm diameter guide tube, use the adapter ring.

REFITTING

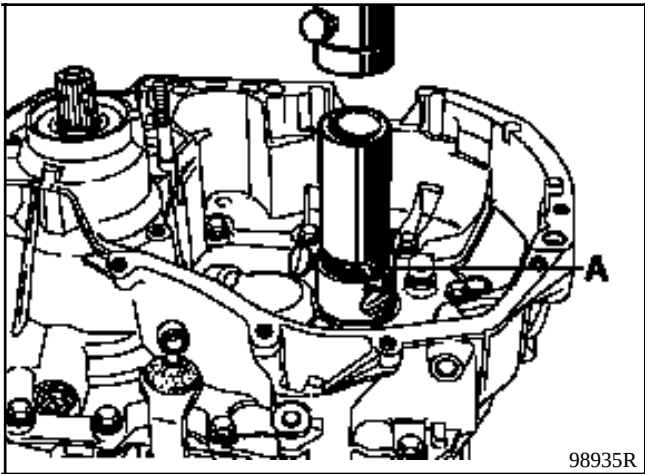
Position the gearbox on the stand.

Adjust the adjustable rest if necessary.

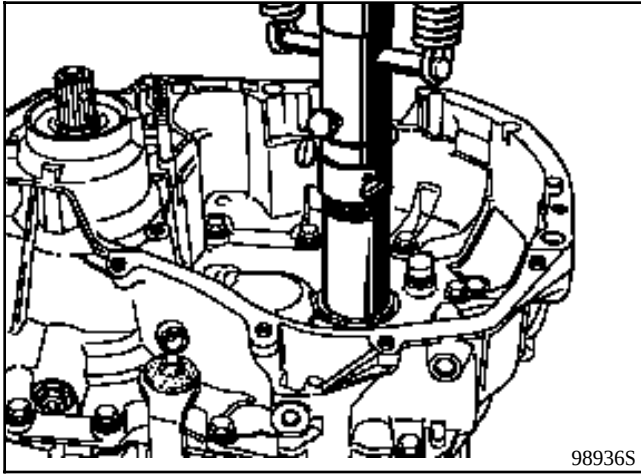


For JB0 - 1 - 2 - 3 gearboxes

Using the cursor (A), mark the guide tube fitting dimension in order to be able to ensure correct positioning on refitting.



With the same tool, inverted, detach the piece gently using a press.

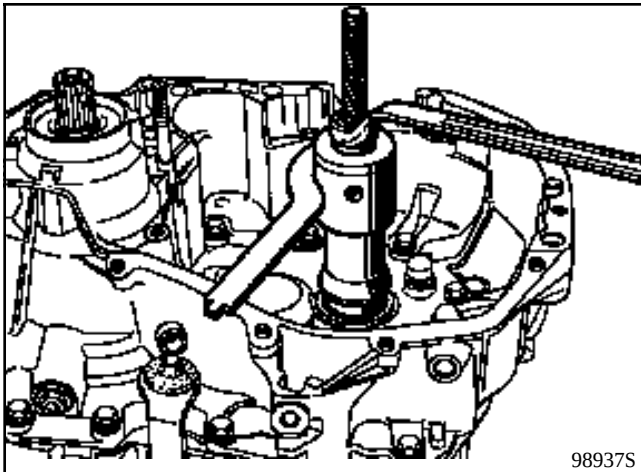


All types of JB gearbox

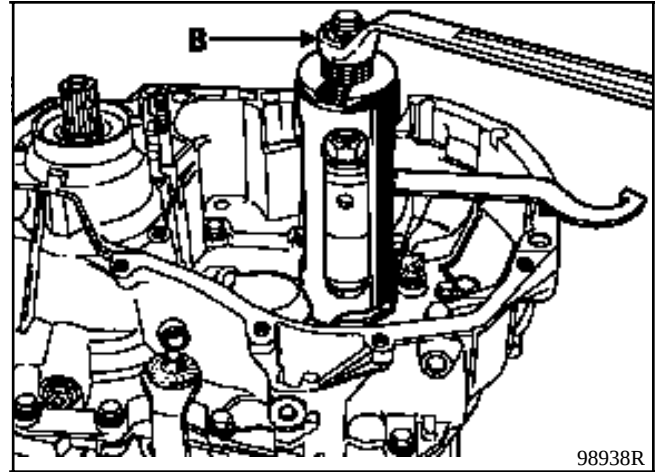
Degrease the guide tube (cleaning the surface).

Fit the tool clamp to the tube pushing down as much as possible.

Immobilise the tightening clamp using the wrench and tighten the nut fully.



Fit the sheath and the split ring and then gently extract the guide tube acting on the upper nut (B).

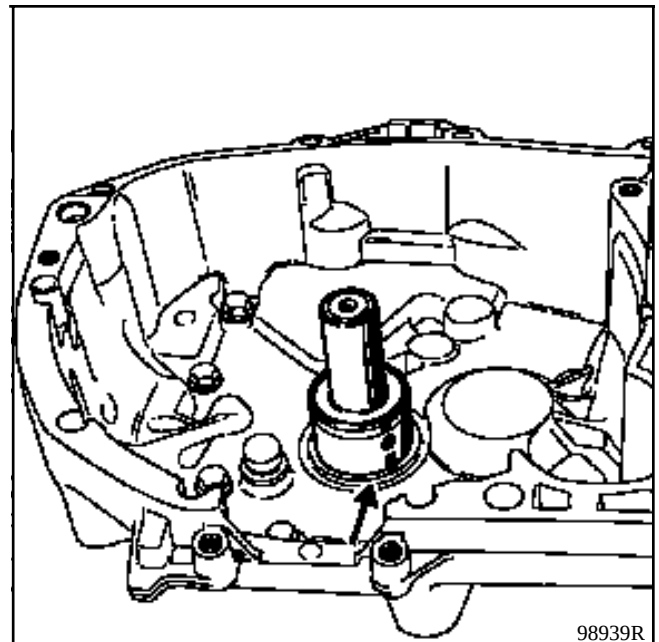


REFITTING

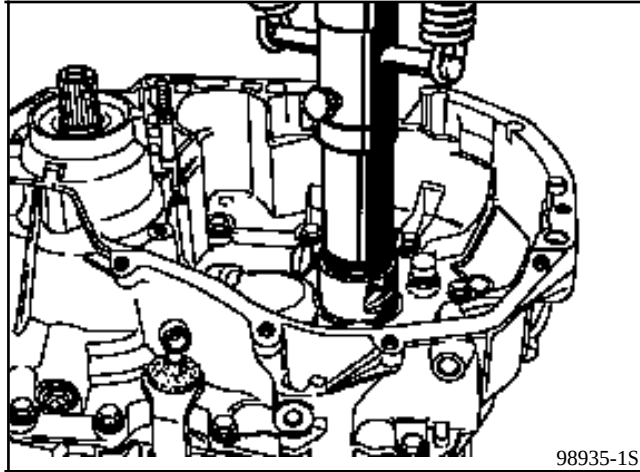
Draw a mark on the housing in the alignment of the lubrication hole.

Position the new part on the housing.

Align the guide tube bearing lubrication hole opposite the housing lubrication hole.



For guides without flanges (JB0 - 1 - 2 - 3), push down the part until it is flush with the gauge housing (marked by the ring position graduation on the tube).



For guides with flanges (JB4 and 5), fit as far as possible using a press.

IMPORTANT NOTES

Observe the fitting dimension strictly: the graduations on the tool allow full contact of the cursor on the housing.

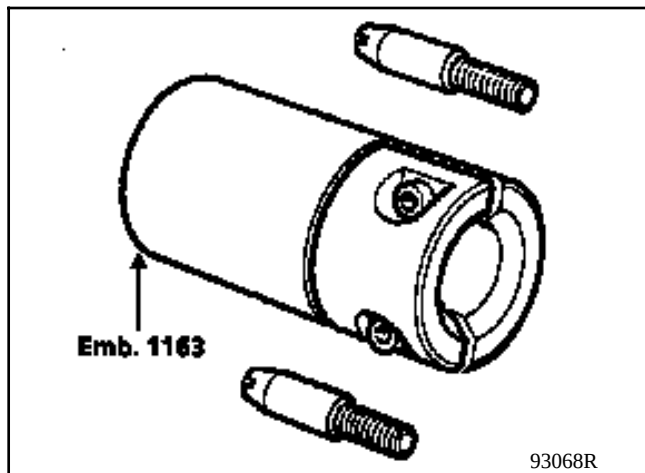
As a general rule, as soon as the cursor is in contact, the guide tube is positioned correctly.

JB4 and 5 gearboxes: **CEASE ALL FORCE** on the clutch guide tube to prevent cracking of the clutch housing.

CHANGING THE THRUST PAD GUIDE TUBE

The clutch shaft (input shaft) lip seal is assembled on the thrust pad guide tube and fitted with a protector to prevent the lip from being damaged when passing over the shaft splines.

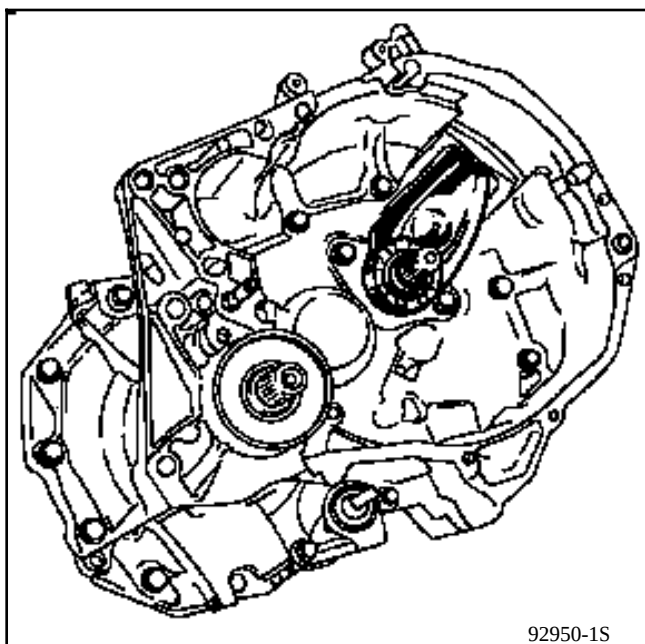
The thrust pad guide tube is changed using tools **Emb. 880** and **Emb. 1163**.



REMOVAL

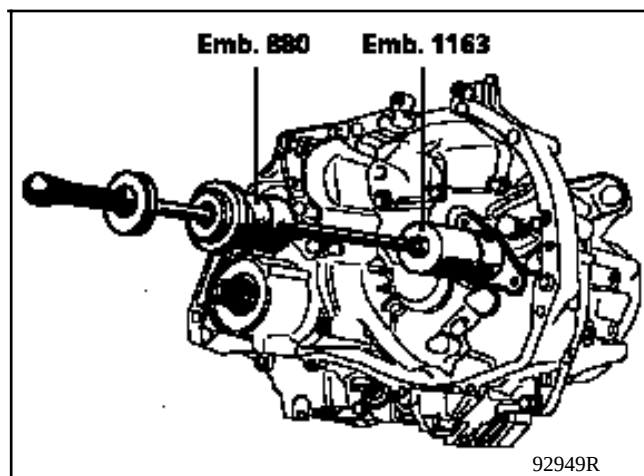
Remove the thrust pad and the fork from inside the housing.

Remove the two guide tube mounting bolts.



Fit tool **Emb. 1163** onto the guide tube and tighten it.

Screw tool **Emb. 880** onto this and extract the guide tube.



Extract the lip seal **(1)** from the guide tube carefully using 2 screwdrivers.

NOTE:

The guide tube lip seal assembly must be changed whenever it is removed.

CHANGING THE THRUST PAD GUIDE TUBE (cont)

Refitting

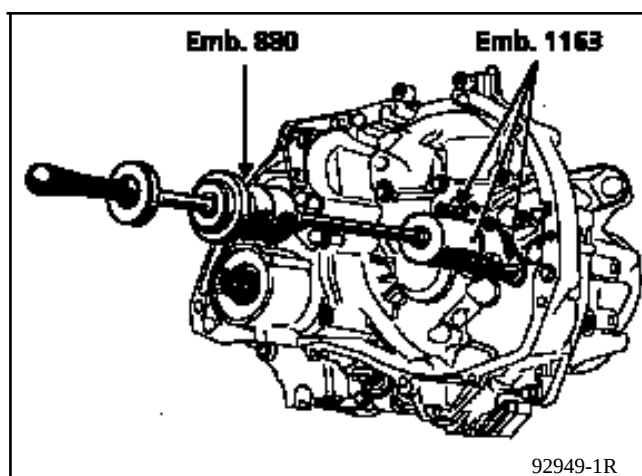
Fit the guide tube lip seal assembly, protector in tool **Emb. 1163**.

Check that the guide tube plate is in correct contact with the tool and tighten very lightly.

Screw the 2 pins **Emb. 1163** in place of the two guide tube mounting bolts.

Coat the external part of the seal and its mating surface on the shaft.

Fit, ensuring that the tool remains perpendicular in relation to the housing during the operation.



Remove the protector and the tool.

Check the contact of the plate on the housing and that there is no fouling between the guide tube and the shaft.

Fit the two mounting bolts and tighten them to a torque of **2.4 daN.m**.

NOTE:

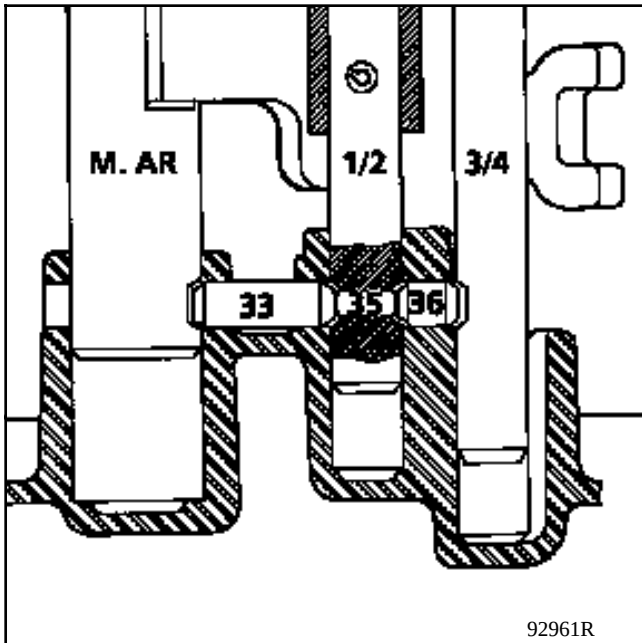
On the guide tube supplied as a replacement part, the lip seal is offset in order to offset its mating surface on the input shaft.

This operation is carried out after having determined the thickness of the input shaft, output shaft and differential bearing pre-load setting washers and having refitted the differential.

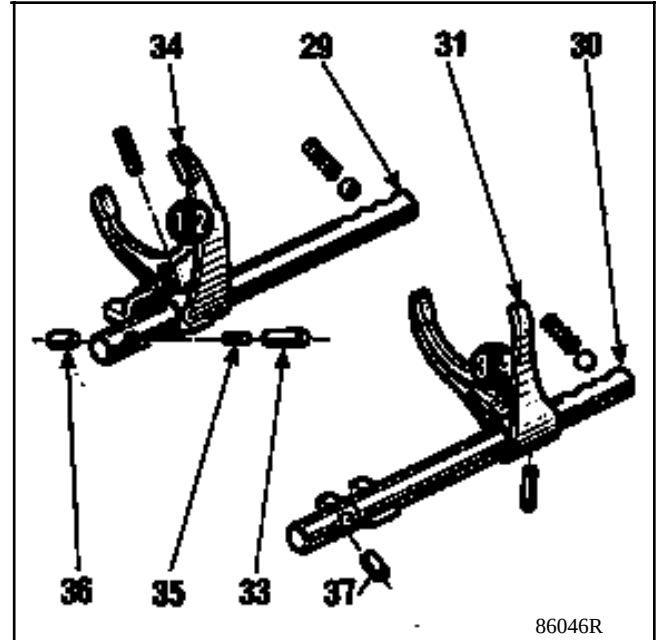
The housing assembly surfaces must be even (small imperfections can be eliminated using a soft file).

In the clutch-differential housing, fit the locking plungers:

- **33** between the bore of the reverse and 1/2 shafts
- **36** between the bore of the 1/2 / 3/4 and 3/4 / 5 shafts



Check that they slide correctly.



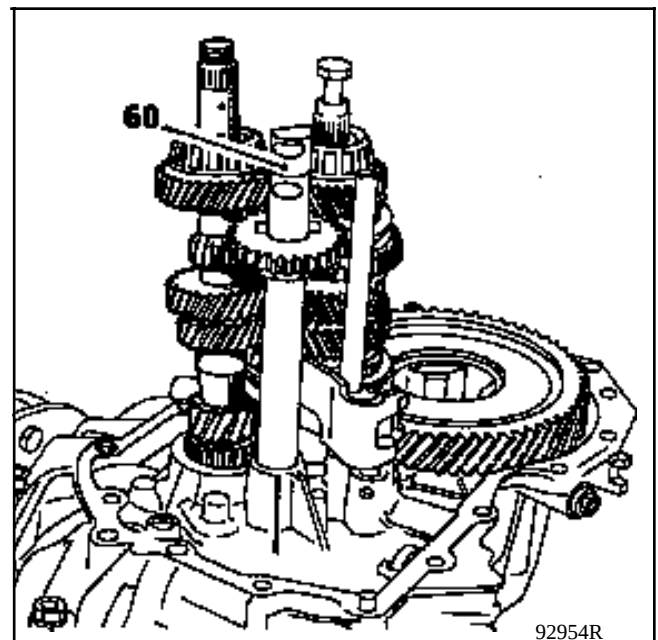
Fit the assembled 1/2 shaft and fork to the 1/2 sliding gear of the assembled output shaft, fitted with the locking plunger (35).

Take the two shafts (input and output) with the 1/2 shaft and fork and position them in the clutch and differential housing at the same time.

Tilt the crown wheel and the output shaft until the end of the output shaft enters the bearing.

- 1/2 shaft in neutral:

Lift the input shaft and move it aside slightly in order to fit the reverse gear shaft (60).



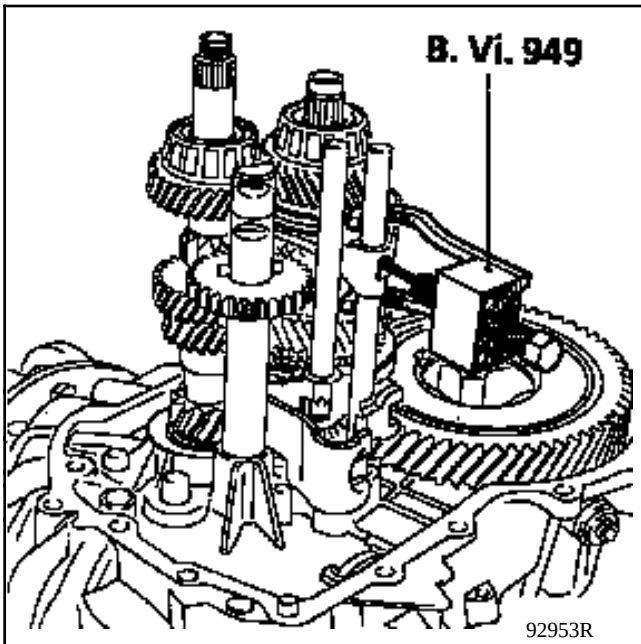
With the 1/2 and reverse shafts in neutral, fit:

- the 3/4 fork **(31)** (thickest end towards the differential crown wheel).
- 3/4 fork shaft **(30)** (ball indentation shapes at the shafts end).

Lower the 3/4 shaft into the housing bore.

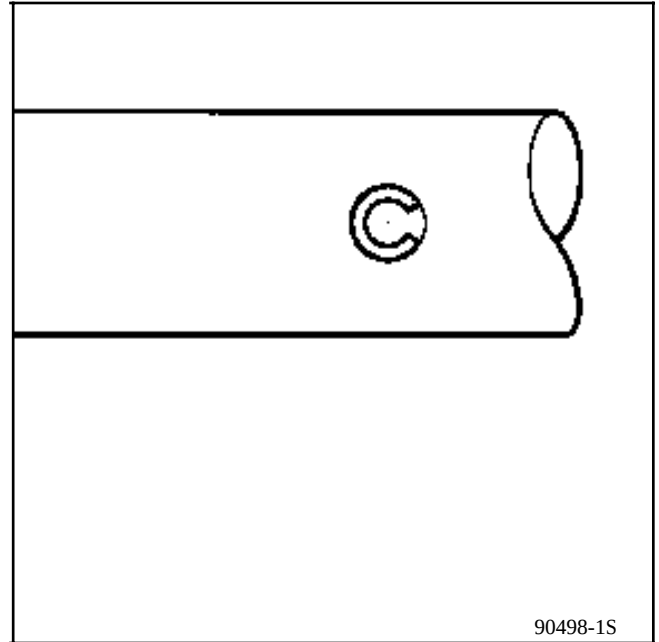
Ensure that the locking plungers **(37)** are in place.

Pin the fork using **B. Vi. 949**.



NOTE:

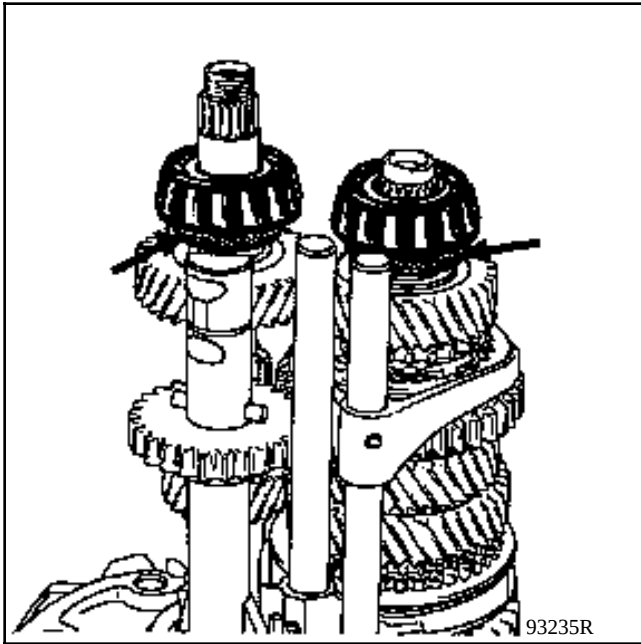
- 1) The slit in the pin must be directed in the centreline of the shafts.



- 2) The pin must always be changed whenever it is removed.

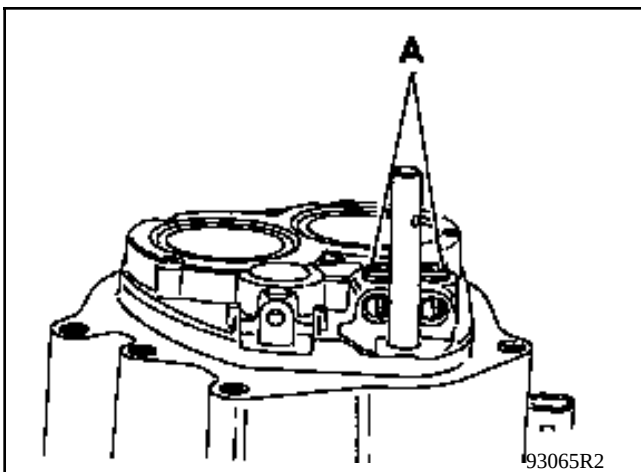
Check the position of:

- the 2 centring pins,
- the magnet,
- the bearing pre-load setting washers (according to assembly).

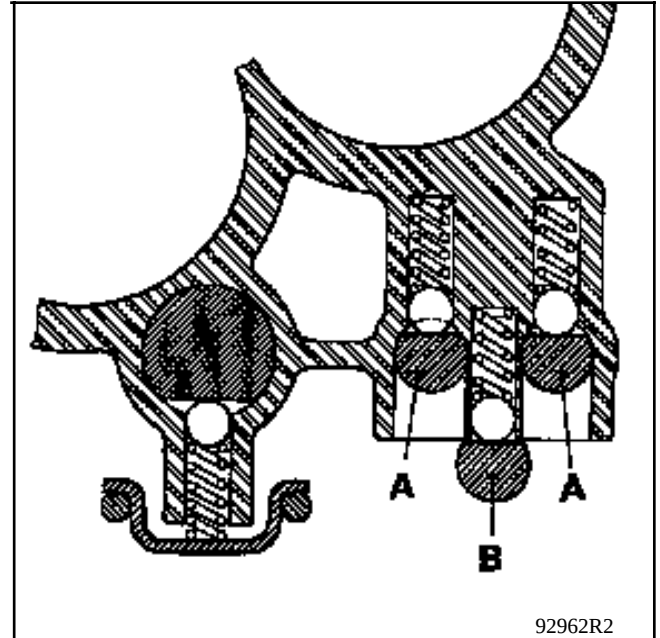


Fit the 1/2 and 3/4 locking balls and springs in the mechanism housing then fit the 13 mm diameter dummy shafts (A).

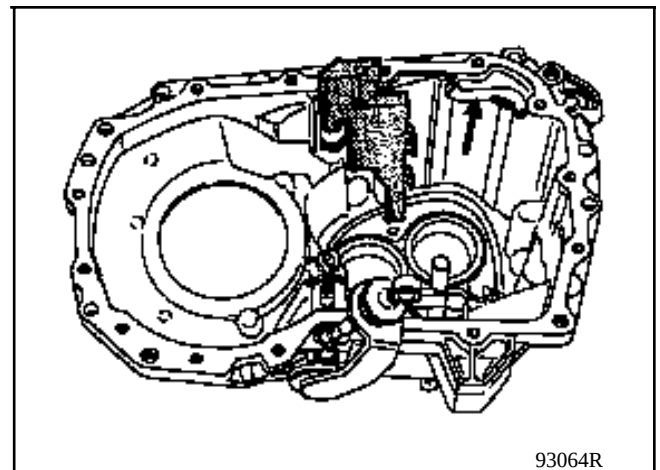
Example: gearbox engine centring pin.



- Fit the 5th gear locking ball and spring in the mechanism housing then place the 5th gear fork shaft (B) in neutral.

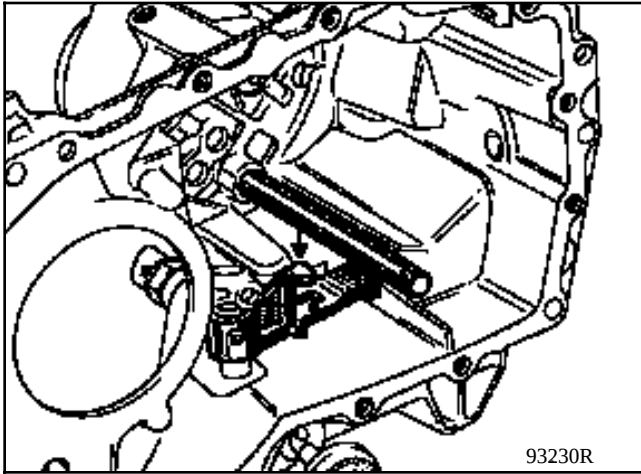


Check the position of the 5th gear lubrication channel and the breather.



Also, ensure that the pipe is not damaged or blocked.

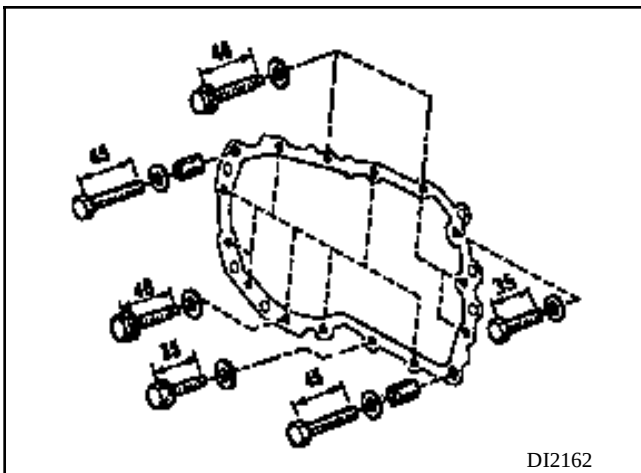
Pull the control shaft towards the outside in order to place the gear engagement finger in the 5th gear shaft claw.



Apply **Loctite 518** to the mating surface between the clutch housing and the mechanism housing.

Align the shafts and the fork shafts, then fit the mechanism housing in place.

Fit the mounting bolts.

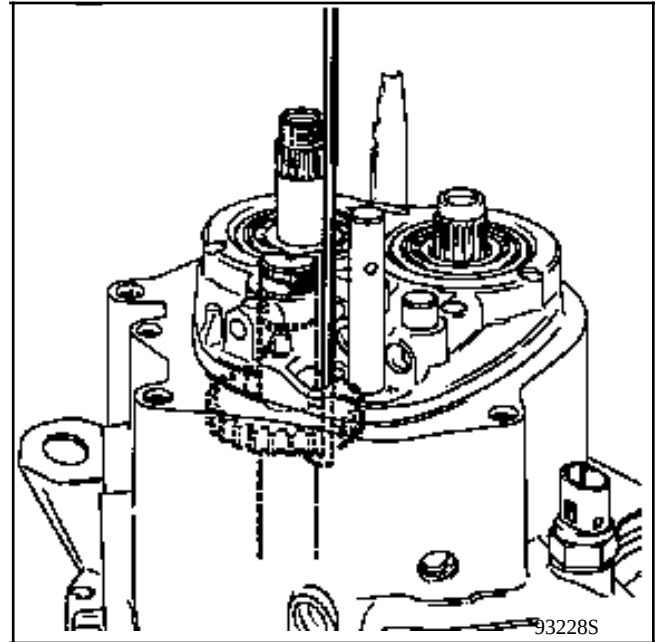


Tighten the peripheral bolts to the specified torque after turning the input shaft to ensure correct final coupling of the cones on the tapered rollers.

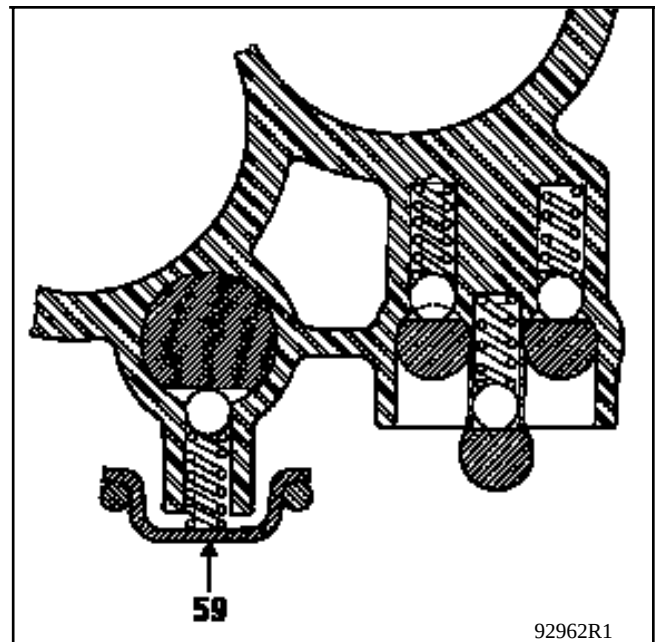
Note:

All of the bolts must be tightened to the specified torque within thirty minutes of fitting the mechanism housing due to the polymerisation of the **Loctite 518**.

Lift the reverse gear shaft passing a hook into the opening in the housing.



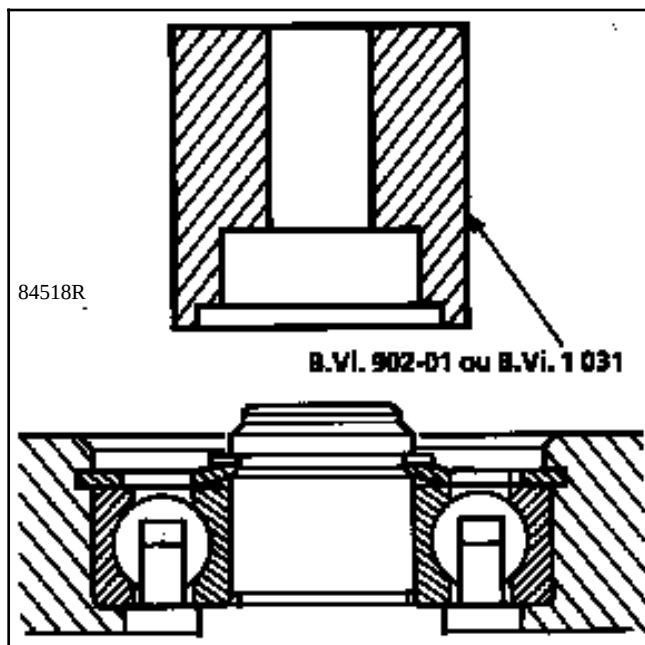
Fit the locking ball, its spring and the retaining U-clip (59).



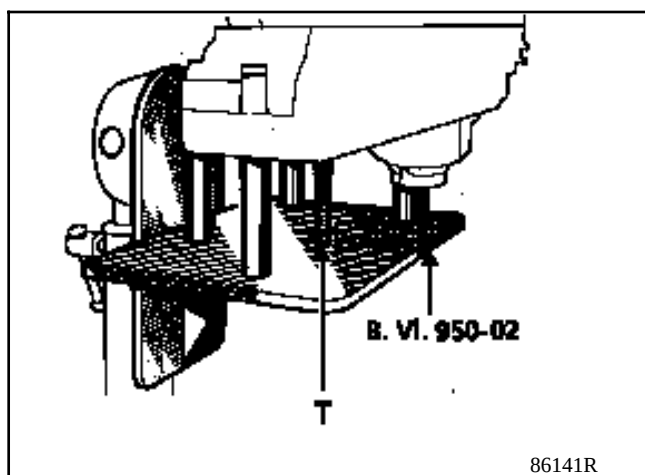
ON THE OUTPUT SHAFT

4-speed gearbox:

Fit the output shaft washer and the circlip using tool **B. Vi. 902-01** (JB0 - JB2) or **B. Vi. 1 031** or equivalent (JB4).



Fit the input shaft washer and fit the circlip by reaction, immobilising the shaft at the clutch splines end using bolt (T) of plate **B. Vi. 950-02** ; ensure that the circlips are correctly fitted in the groove.



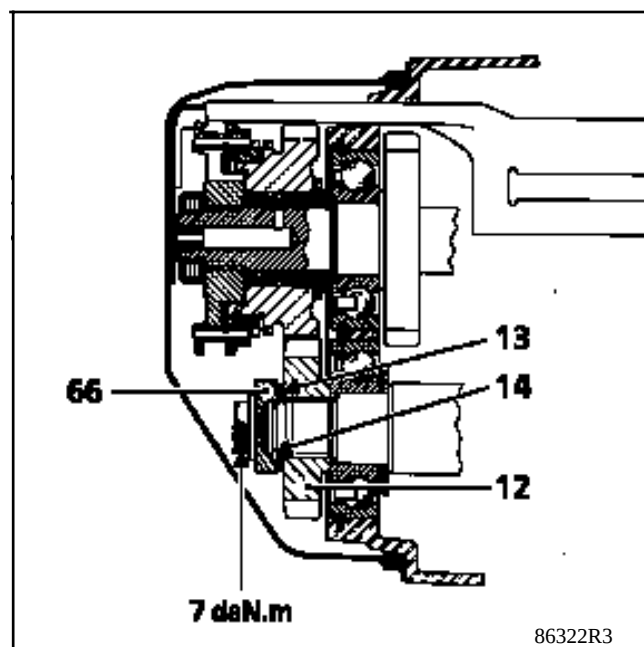
4-speed gearbox: change the threaded thrust pad.

5 -speed gearbox:

1st assembly

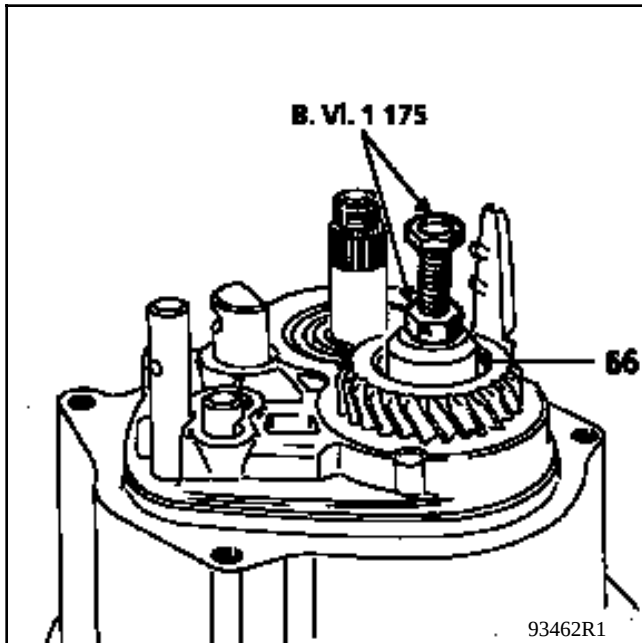
without shouldered washer but, always apply the 2nd assembly.

2nd assembly

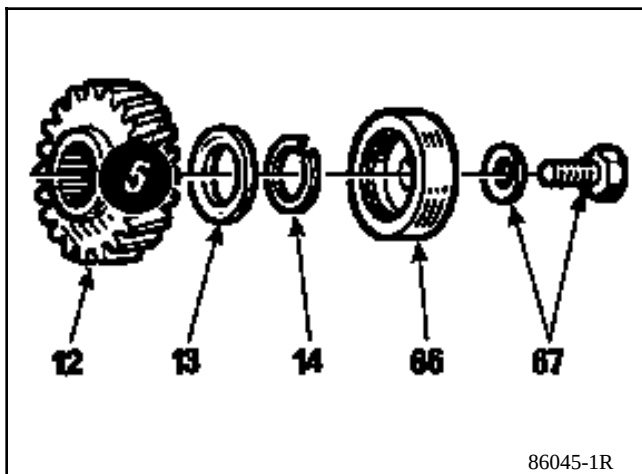


ON THE OUTPUT SHAFT

Apply 3 drops of Loctite FRENBLOC to the splines of the fixed gear (12), fit using tool **B. Vi. 1175** and the shouldered washer (66).



Remove tool **B. Vi. 1175** and the washer (66).



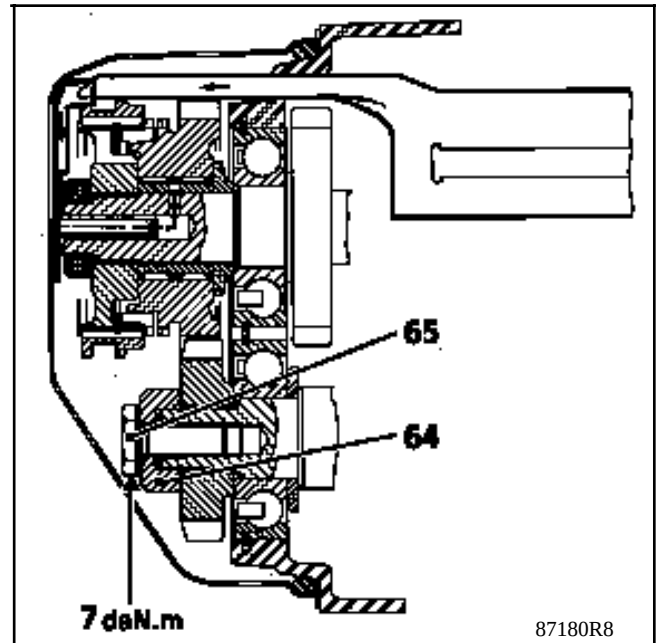
Fit the washer (13) and the circlip (14) : tool **B. Vi. 948** or equivalent.

Ensure, via the notches, that the 5th gear circlip is correctly positioned in the groove.

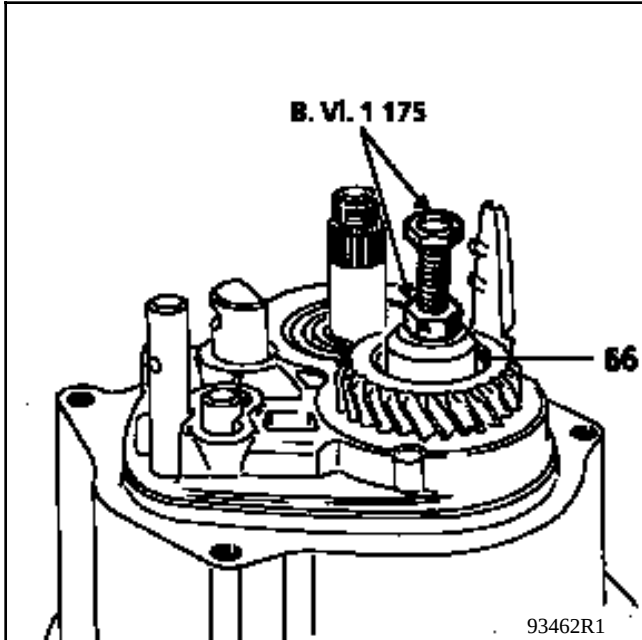
Refit the shouldered washer (66).

Fit bolt (67) coated with 3 drops of Loctite FRENBLOC.

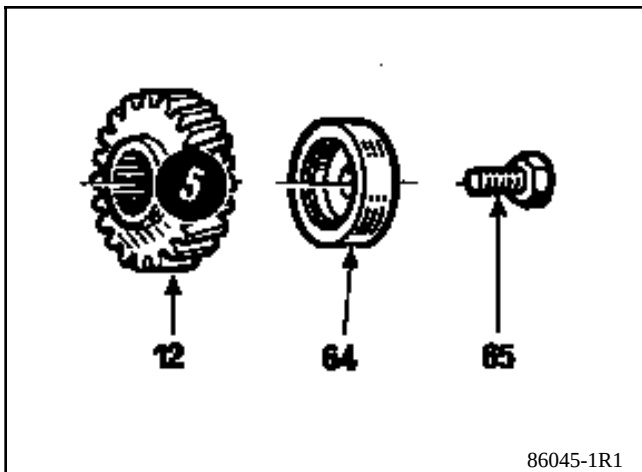
3rd and 4th assembly



Apply 3 drops of **Loctite FRENBLOC** to the splines of the fixed gear (12), fit using tool **B. Vi. 1175** and the shouldered washer (64).



Remove tool **B. Vi. 1175** and fit bolt (65) coated with 3 drops of **Loctite FRENBLOC**.



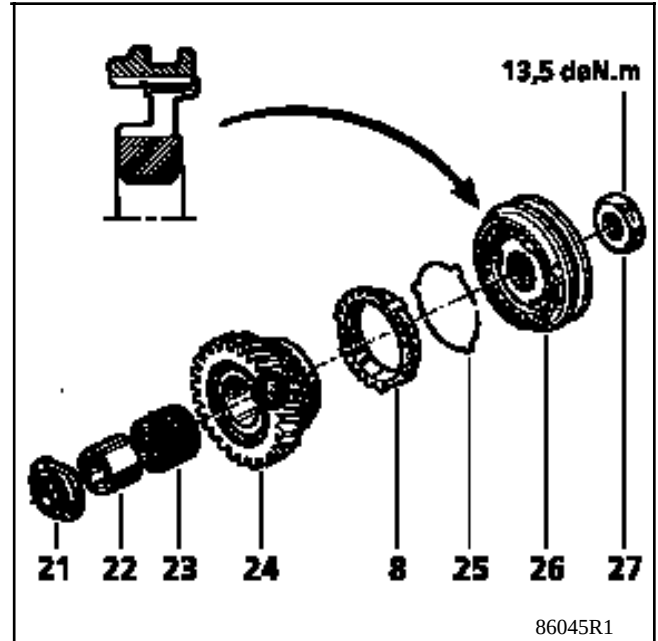
On the input shaft

Refit in the order: (21) large contact surface at the 5th gear end, (22), (23), (24), and (8).

Fit the fork on the sliding gear (26) fitted with spring (25).

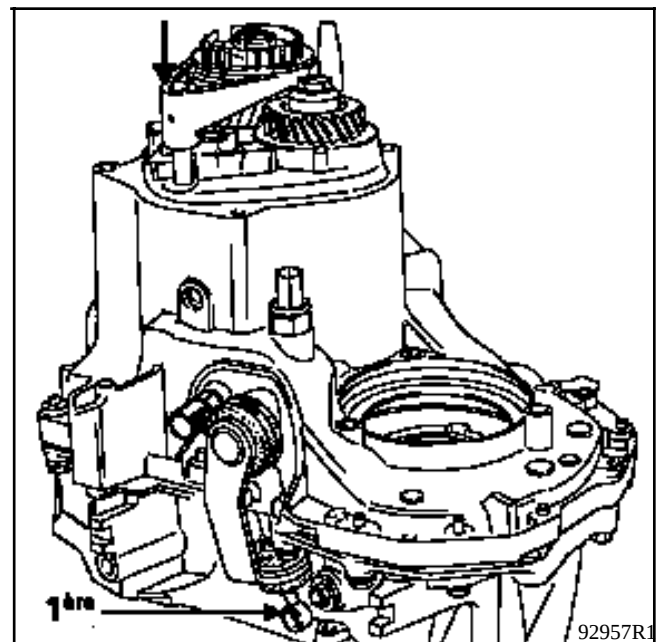
Apply 3 drops of **Loctite FRENBLOC** to the hub and change the sliding gear hub and fork assembly.

Fit the synchro ring bosses in the hub notches.



In order to allow the input and output shaft nut and bolt to be tightened to the specified torque, the two 5th gears must be fitted and two gears must have been engaged.

Engage 1st gear at the gear lever and 5th gear at the gearbox sliding the 5th gear fork on its shaft.

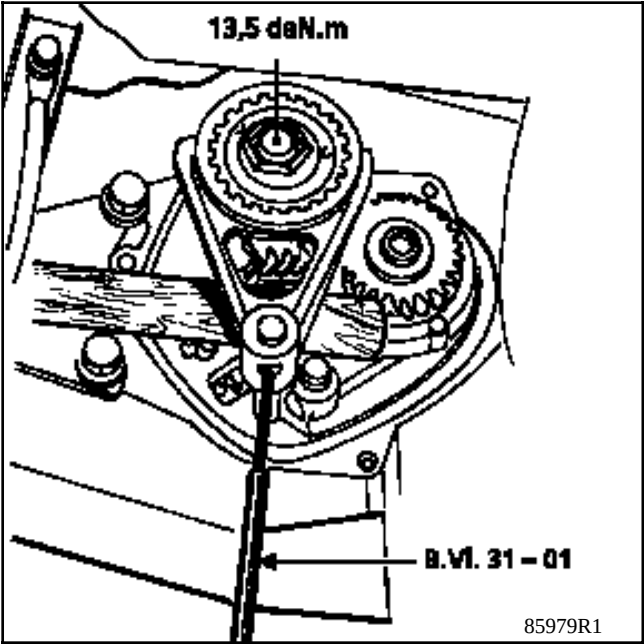


Apply 3 drops of **Loctite FRENBLOC** to input shaft nut (27) and the output shaft bolt.

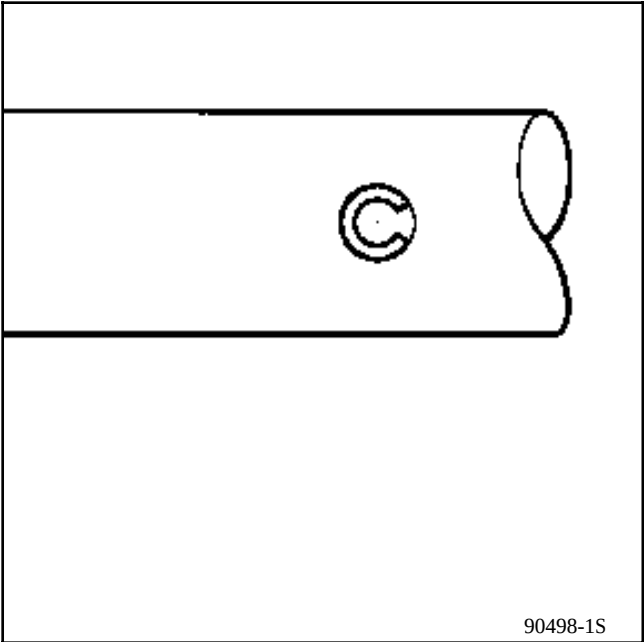
Input shaft; **13.5 daN.m.**

Output shaft:
1st and 2nd assembly: **2 daN.m.**
3rd and 4th assembly: **8 daN.m.**

Pin the fork, supporting the underneath of the shaft using a wooden shim, using **B. Vi. 31-01** as for removal.



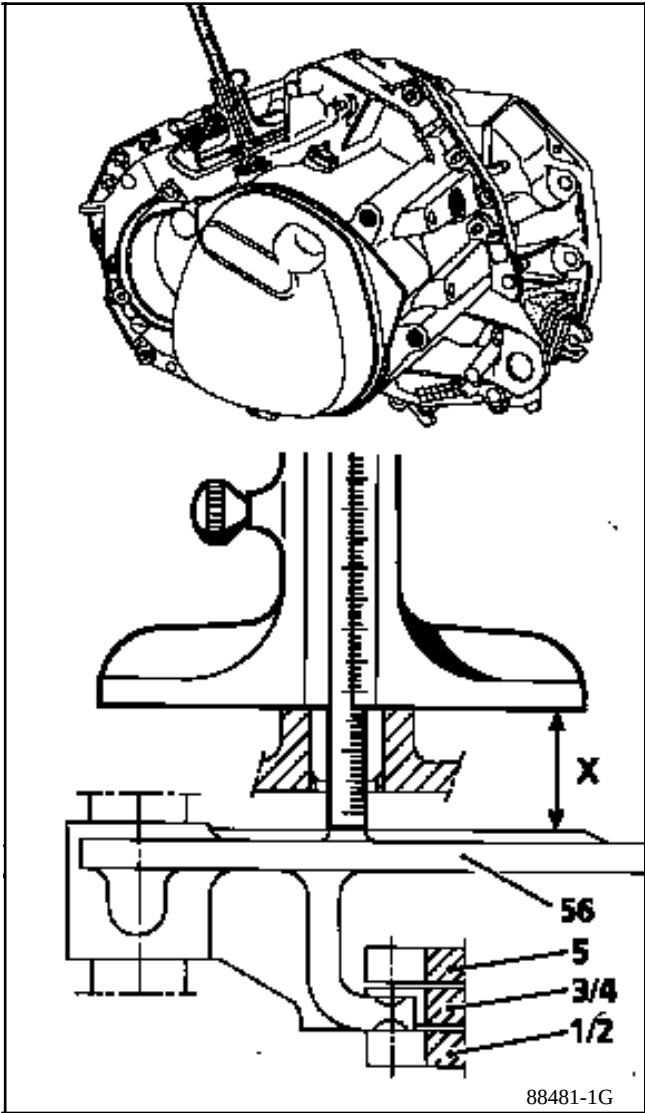
Observe the direction of fitting, the split must be directed towards the rear housing.



Place the gearbox in neutral again.

SETTING THE 5th GEAR DETENT

The dimension X is measured with 4th gear engaged, selection finger (56) in contact with the 1/2 claw (34).



X (in mm)	E (in mm) (washer thickness)
21.70 to 22.02	0.66
22.02 to 22.35	0.33
greater than 22.35	no washer

Following the dimension X which is measured, insert a washer (76) of thickness E between the housing and the 5th gear detent.

ALL TYPES

Fit a new O-ring to seal the rear housing.

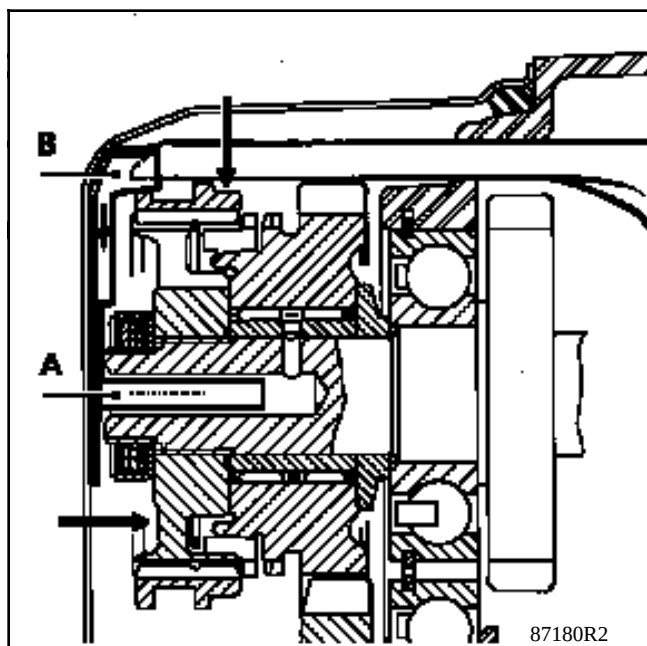
Place the gearbox in neutral again.

4-speed and 5-speed gearboxes (1st and 2nd assembly)

Position the rear housing and tighten the bolts to a torque of **2.5 daN.m**.

5-speed gearbox (3^r and 4th assembly)

Position the rear housing engaging the nozzle (A) in the input shaft and the lubrication channel, in the oil supply rail (B) and tighten the bolts to a torque of **2.5 daN.m**.



Check that all of the gears can be engaged.

In the event of any faults, check that the reverse gear or the 5th gear are not engaged.

ALL TYPES

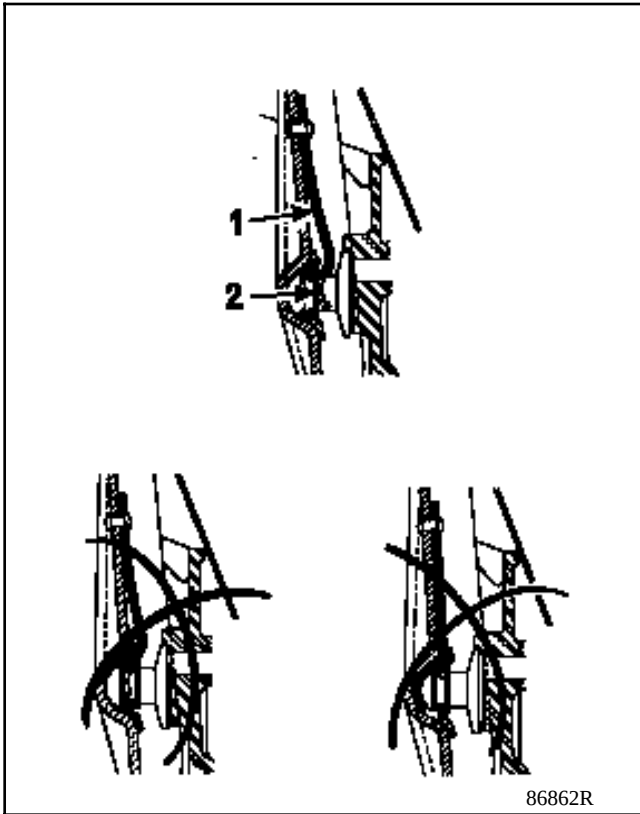
Lower the gearbox from stand **B. Vi. 950-01** or **B. Vi. 950-02** and fit the bolts in the clutch housing tightening them to a torque of **2.5 daN.m**.

Refit the guide tube if necessary.

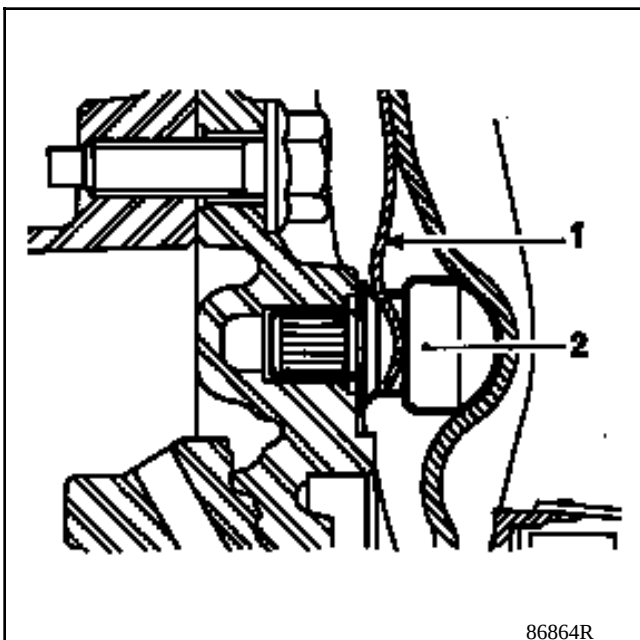
Grease the fork pivot using **Molykote "BR2"** grease.

Position the fork placing the spring (1) behind the cup (2) and check that it operates correctly.

1st assembly



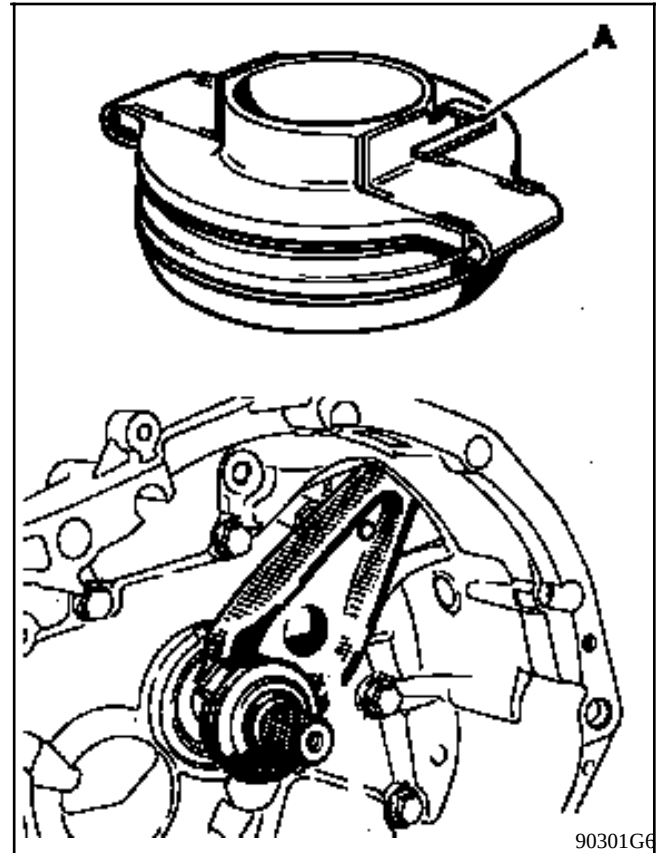
2^{ns} assembly (without rubber washer)



3rd assembly: without washer

Coat the walls of the thrust pad guide tube with **Molykote "BR2"** grease.

Fit the thrust pad on the guide tube positioning the notch (A) in the fork.



Check that it slides correctly.

NOTE:

During and after engine-gearbox assembly, **DO NOT LIFT** the fork as it risks becoming disengaged from the thrust pad notch (A).

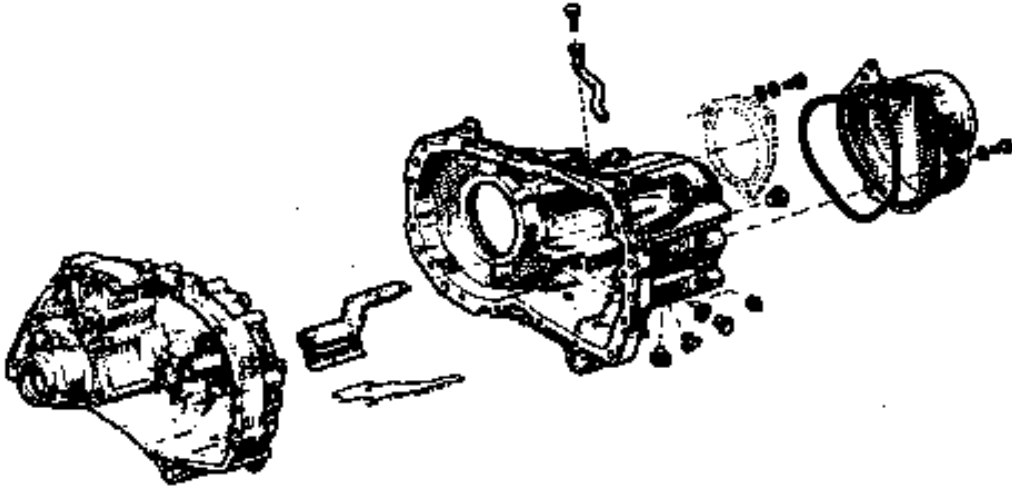
MANUAL GEARBOX

Exploded view parts directory

21

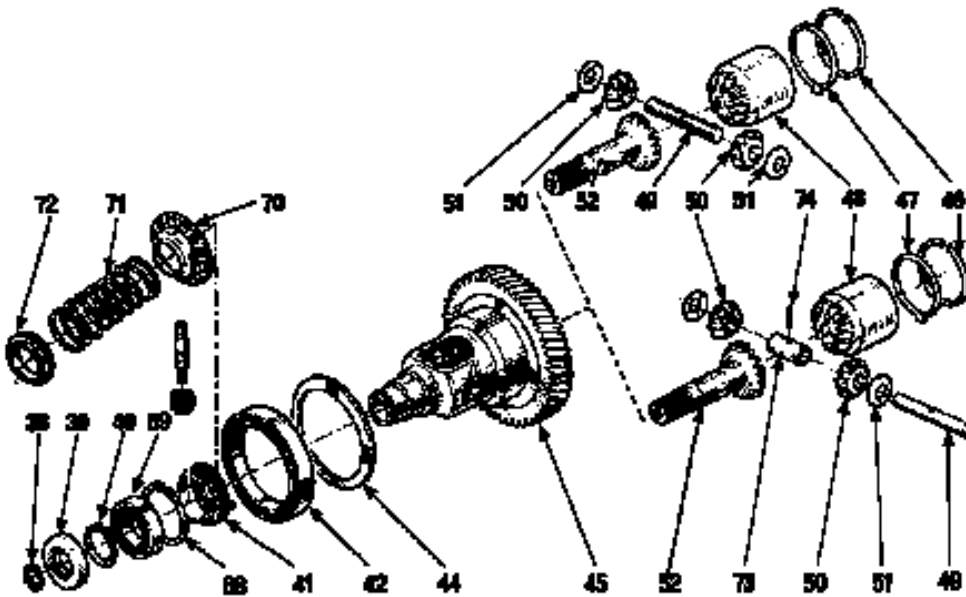
1	Roller bearing	41	Speedo drive
2	Output shaft	42	Ball bearing
3	Roller	43	Thickness washer
4	Roller spring	44	Spring washer
5	Circlip	45	Differential housing
6	2 nd gear	46	Snap ring
7	3 rd gear	47	Thickness shim
8	Synchro ring	48	Tripod sun wheel
9	3/4 sliding gear hub	49	Planet gear shaft
10	4 th gear	50	Planet gears
11	Washer	51	Planet gear washers
12	5 th gear (output)	52	Shouldered sun wheel
13	Washer	53	Circlips
14	5 th gear circlips	54	Rod bracket
15	1 st gear	55	Rod
16	1/2 sliding gear	56	Selection finger
17	Input shaft	57	Input shaft
18	Grooved washer	58	Ring
19	Ball bearing	59	5 th gear shaft (5-speed gearbox)
20	Circlips	60	5 th gear fork (5-speed gearbox)
21	Washer	61	Reverse gear U-clip
22	5 th gear ring	62	5 th gear detent (5-speed gearbox)
23	Needle bearing	63	Deflector
24	5 th gear (input)	64	Thrust washer
25	5 th gear ring	65	5 th gear end piece on the output shaft
26	5 th gear sliding gear hub	66	Shouldered washer
27	5 th gear nut	67	Retaining bolt and washer
28	Threaded thrust pad	68	Bearing 69 circlips
29	1/2 shaft	69	Ball bearing
30	3/4 shaft	70	Speedometer target
31	3/4 fork	71	Spring
32	Reverse gear and shaft	72	Thrust washer
33	Locking plunger between 1/2 and reverse	73	Spacer sleeve
34	1/2 fork	74	Roll pin
35	Locking plunger in 1/2	75	Speedometer sensor
36	Locking plunger between 1/2 and 3/4	76	5 th gear detent setting washer
37	5 th gear locking plunger (5-speed gearbox)	77	Tapered bearing
38	O-ring	78	Tapered bearing
39	Lip seal	79	Setting washer
40	Shouldered sun wheel circlips	80	Differential nut

HOUSINGS



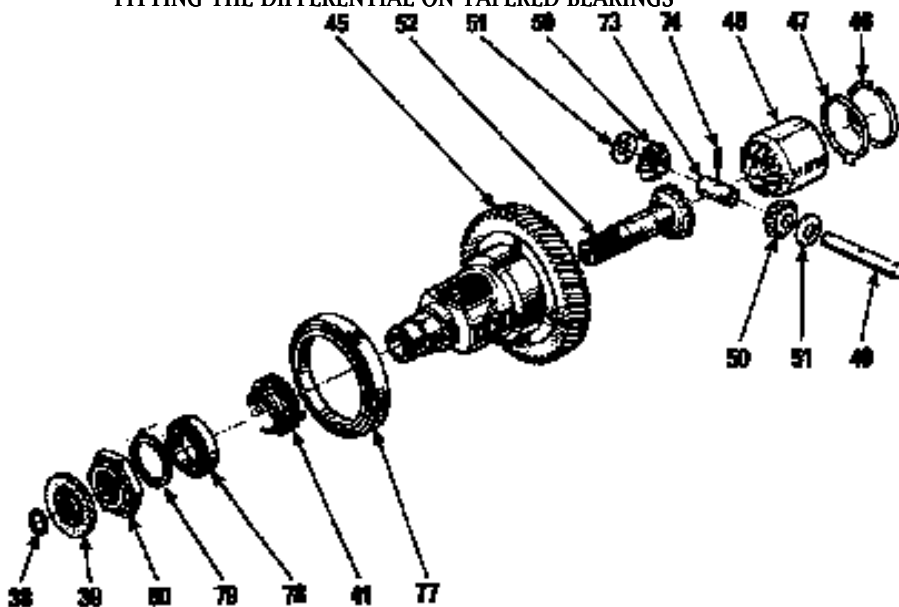
DI2157

FITTING THE DIFFERENTIAL ON BALL BEARINGS

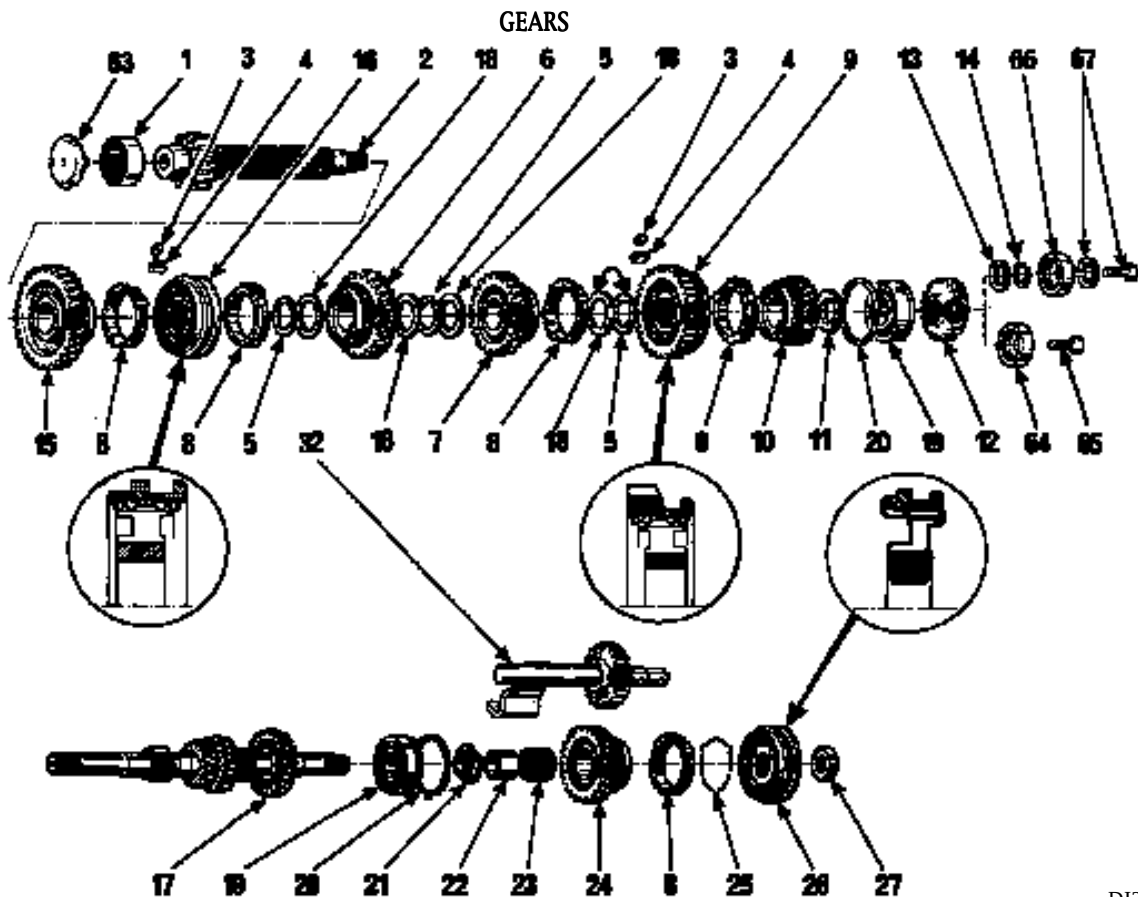


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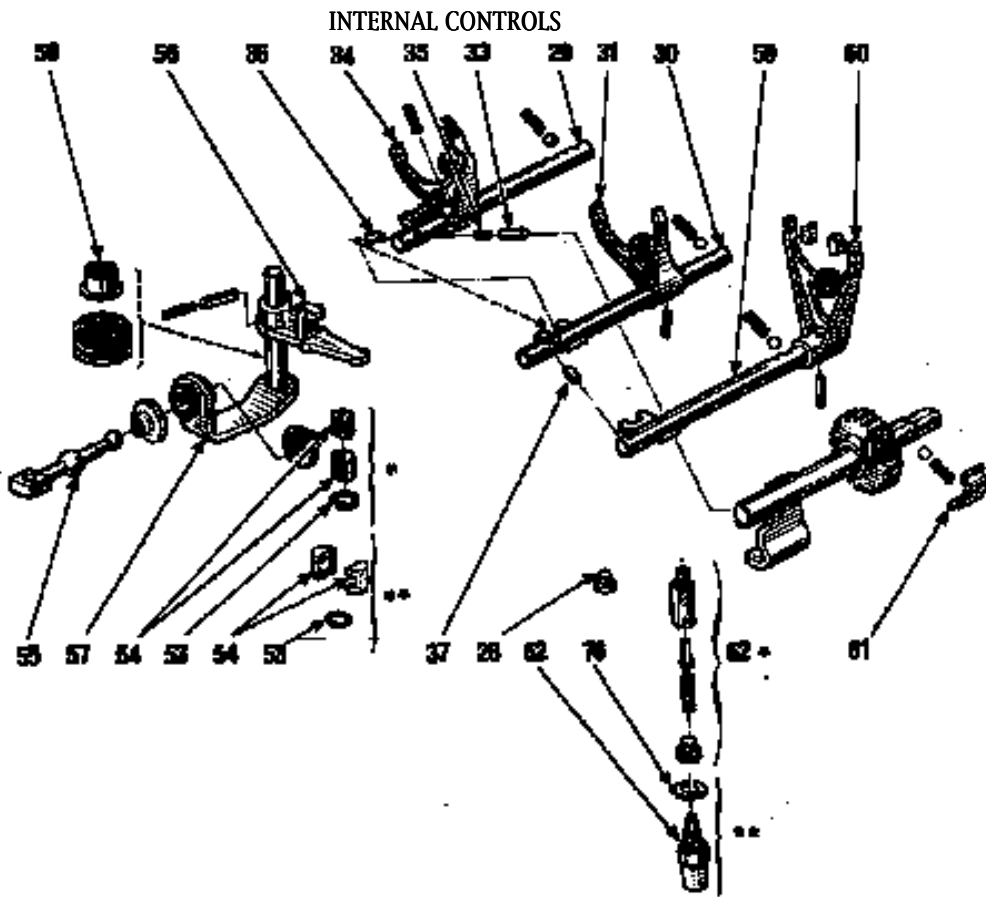
FITTING THE DIFFERENTIAL ON TAPERED BEARINGS



DI2159



DI2160



DI2161R