RENAULT

Workshop repair manual

AUTOMATIC TRANSMISSION

Type	Range
MB1	**Renault 5** **Extra** **Renault 9/11** **Renault 19** **Clio** **Twingo**
MB3	**Renault 5** **Renault 9/11** **Renault 19**
MJ1	**Renault 18** **Renault Fuego**
MJ3	**Renault 18** **Renault Fuego** **Renault 20** **Renault 21** **Renault 25**
ML1	**Renault Trafic**

Cancels and replaces Workshop Manual M.R. T.A.M., Part Number : 77 11 088 275 and N.T. N° 1275 - 1599 - 1769 - 1770 - 2061

77 11 193 528 **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 introduced by the manufacturer in the production of the various component units and accessories from which his vehicles are constructed."

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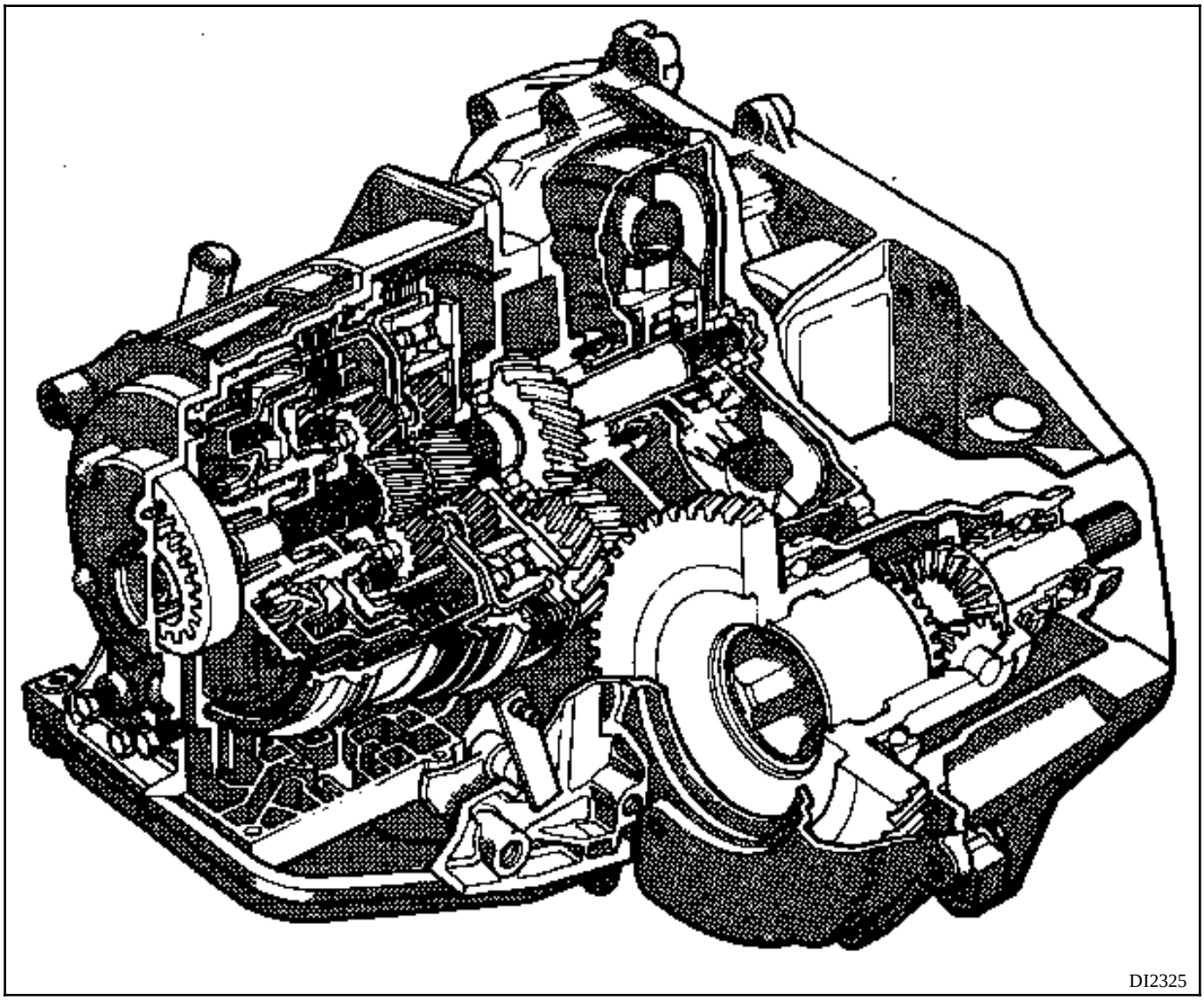
37 AUTOMATIC TRANSMISSION

This diagram represents an automatic transmission

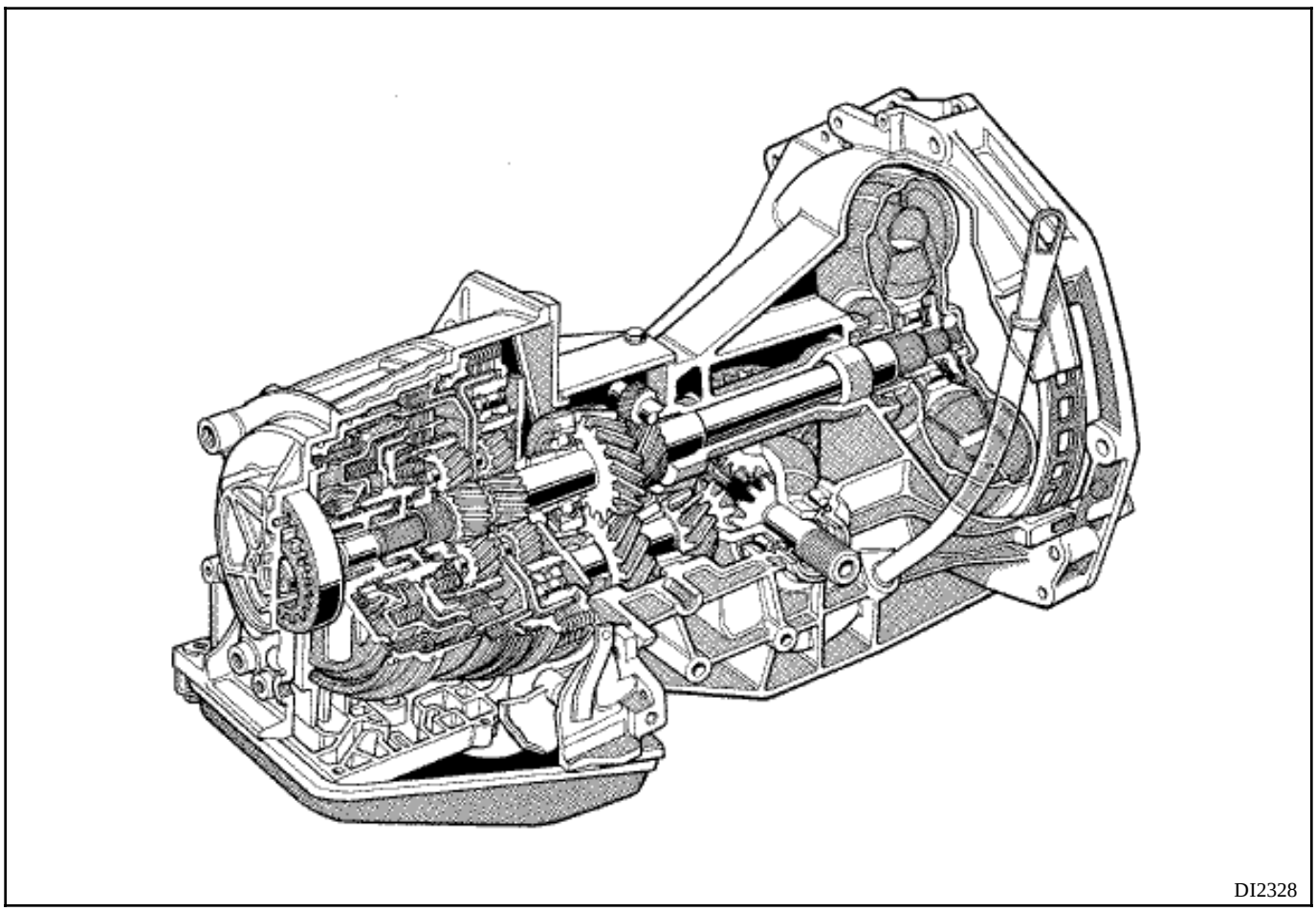
Type MB



DI2325

This diagram represents an automatic transmission

Type MJ



DI2328

DRIVING

As the automatic transmission is lubricated under pressure, lubrication only occurs if the engine is running.

Consequently, the following instructions must be respected in order to avoid serious damage:

- Never move the vehicle with the ignition off (when going down a slope for example), the danger of such a measure cannot be emphasised too greatly.

- Never have the vehicle pushed (for example in order to reach the next service station), unless precautions taken in the "**Towing**" are followed).

In addition, the vehicle can only be driven if the engine is running. It is therefore impossible to start the engine on a vehicle with automatic transmission by pushing the vehicle.

TOWING

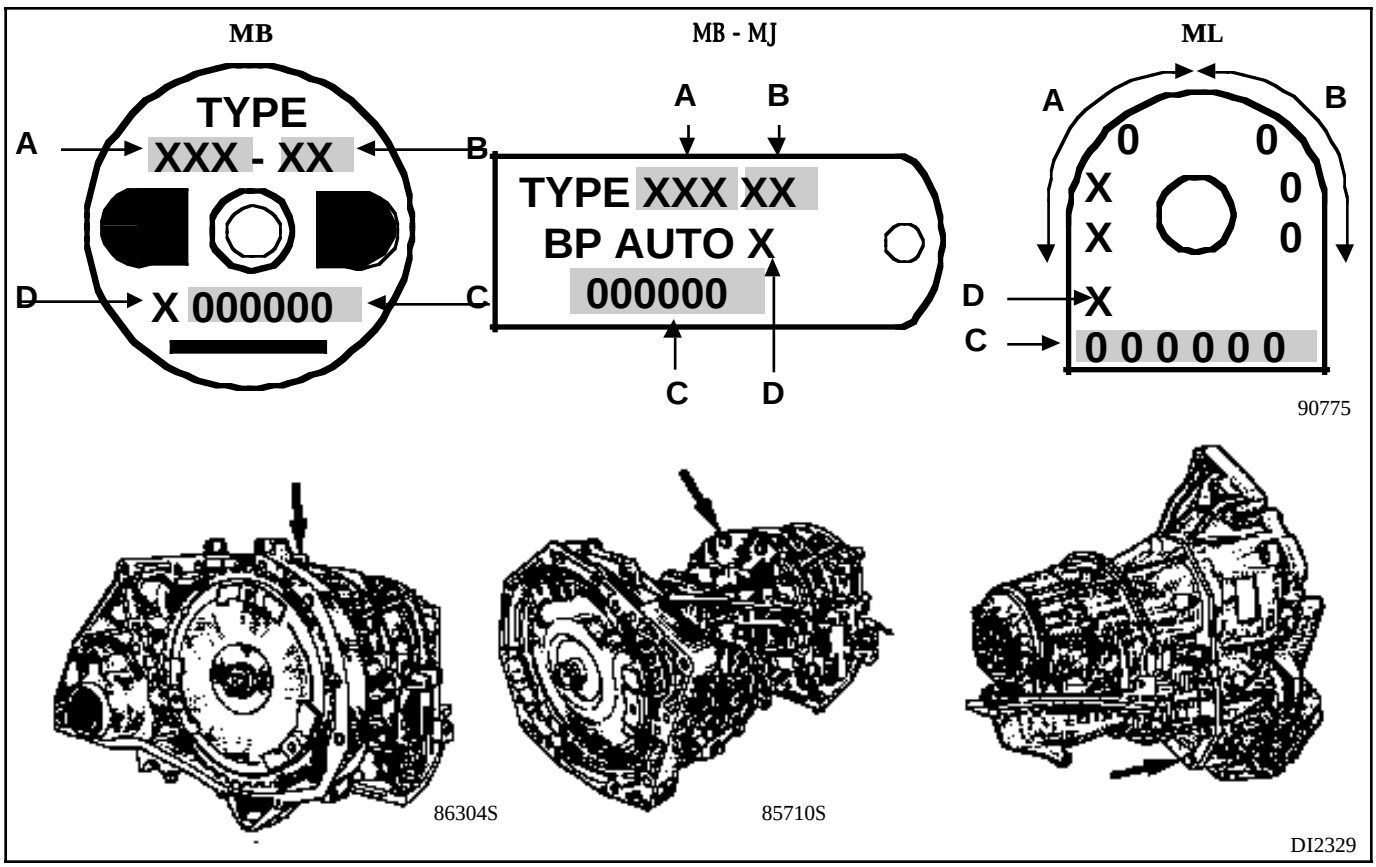
The front of the vehicle must be raised, however if this is impossible towing can be carried out in exceptional cases with the wheels on the ground in the following conditions:

1 - Add an additional 2 litres of oil to the automatic transmission ("**Elf Renaultmatic D2**" or **Mobil ATF 220**).

2 - When towing, do not exceed a speed of **25 mph** (40 km / h) or a distance of **30 miles** (50 km) maximum (lever in **N**).

Remember to drain off the excess oil at the end of the towing operation.

The identification plate indicates:
- at **A** : the type of automatic transmission,
- at **B** : the type suffix,
- at **C** : the fabrication number,
- at **D** : the manufacturing factory.



Vehicle	Type of A.T.	Suffix	Final drive ratio	Step-down gear ratio	Speedo drive ratio	Oil pressure in bar ±0.1 bar)	No. of planet wheels	Computer number
B / C 403 B / C 40J	MB1	600 601 602 603	17 / 56	29 / 24	21 / 20	4.4	3	21 221 135
B / C 408	MB3	001	16 / 57	29 / 24	21 / 19	4.4	3	134
L 423 B / C 373	MB1	000 001 007 013 017 021 025	16 / 57	25 / 23	21 / 19	4.4	3	05 24 224 228 125
B 373	MB1	002 008 014 018	16 / 57	25 / 23	Electric	4.4	3	05 24 224
L 423 B / C 373 Switzer-land	MB1	003 011 015 019	16 / 57	25 / 23	21 / 19	4.4	3	11 25 125

Vehicle	Type of A.T.	Suffix	Final drive ratio*	Step-down gear ratio	Speedo drive ratio	Oil pressure (in bar ±0.1 bar)	No. of planet wheels	Computer number
L 423 B / C 373 DAI	MB1	500 501 502 503 504	15 / 58	25 / 23	21 / 19	4.4	3	11 25 125 129
L 426 B 376	MB3	001 356	16 / 57	29 / 24	21 / 19	4.4	3	132 133
B C L } 53B	MB3	003 005	16 / 57	29 / 24	21 / 19	4.4	3	132 137
B C L } 537 / A	MB1	023 027 031 300	15 / 58	29 / 24	21 / 19	4.4	3	138 140
1342 1352	MJ1	000	9 / 32	25 / 23	7 / 20	4.2	3	04
1342 1352	MJ1	001	9 / 32	25 / 23	7 / 20	4.4	3	04 104
1362	MJ1	100	9 / 32	26 / 25	6 / 18	4.2	3	04
1362	MJ1	101	9 / 32	26 / 25	6 / 18	4.4	3	04 104
1341 1351 } DAI	MJ1	500	9 / 32	25 / 26	6 / 20	4.4	3	10 110
1363	MJ3	300	9 / 32	26 / 25	6 / 18	4.6	4	03
1343 1353 1363	MJ3	301 351 352	9 / 32	26 / 25	6 / 18	4.6	4	03 103 107
1344 1354	MJ3	200	9 / 32	25 / 22	7 / 19	4.2	3	08*
1344 1354	MJ3	201	9 / 32	25 / 22	7 / 19	4.2	3	14
1279	MJ3	000 001 002 102	9 / 32	26 / 25	6 / 18	4.8	4	02 102
1277	MJ3	002 100 101 102	9 / 32	26 / 25	6 / 18	4.6	4	02 102
1277 DAI	MJ3	500	9 / 32	23 / 25	6 / 19	4.6	4	02
F40	MB1	031 038	15 / 58	29 / 24	21 / 19	4.15	3	141
X57 B / T B 573 C573	MB1	021 026 029 030	16 / 57	29 / 24	21 / 20	4.4	3	139

* The instrument panel warning light must be disconnected.

Vehicle	Type of A.T.	Suffix	Final drive ratio	Step-down gear ratio		Speedo drive ratio	Oil pressure (in bar ±0.1 bar)	No. of planet wheels	Computer number
				Step down mechanisms	Differential step down				
B 297	MJ3	110 111	9 / 32	25 / 23		Elec.	4.5	4	13 113
B 297	MJ3	120 121	9 / 32	25 / 23		7 / 19	4.5	4	13 113
B297 B29B with cruise control	MJ3	012 116 112	9 / 37	26 / 21		Elec.	4.5	4	13 113
B29B B297	MJ3	126	9 / 37	26 / 21		7 / 20	4.5	4	113
B29E	MJ3	011 010	9 / 32	25 / 23		Elec.	4.7	4	13 113
B29E	MJ3	016	9 / 37	26 / 21		Elec.	4.7	4	113
L, K } 483, 48K, 489	MJ3	800 (1) 801 (2)	9 / 37	26 / 20		7 / 19	4.7	4	130 126
L, K } 48A (USA)	MJ3	760 761 762	9 / 37	26 / 20		7 / 19	4.7	4	126
Txx1	ML1	001 004 005 006 007 008	9 / 32	28 / 25	23 / 32	5 / 20 5 / 21	4.7	3	20 120
C06	MB1	033	15 / 58	29 / 24		21 / 20	4.15 ± 0.05	3	143
F40	MB1	031 038	15 / 58	29 / 24		21 / 19	4.15	3	141
X57 B / T B573 C573	MB1	024 026 029 030	16 / 57	29 / 24		21 / 20	4.4	3	139

(**1**) Sump **6 mm** deeper, felt gauze strainer with increased surface area, leaktight dipstick with reduced level.

(**2**) Sump **6 mm** deeper, felt gauze strainer with increased surface area; leaktight dipstick with reduced level. Unidirectional differential output seals (specific to right hand / left hand sides).

B403 - C403

Pedal position	1 → 2		2 → 3	
	↗	↘	↗	↘
No load	25*	15	35*	30
Full load	75	60	20	110

(The kickdown switch is integrated into the computer).

B408 - C408

Pedal position	1 → 2		2 → 3	
	↗	↘	↗	↘
No load	23	15	33	26
Full load	68	54	108	98

(The kickdown switch is integrated into the computer).

L423 - B373 - C373

Pedal position	1 → 2		2 → 3	
	↗	↘	↗	↘
No load	25	15	45	25
Full load	70	55	110	95
Kickdown	66	55	109	95

L423 - B373 - C373 (DAI)

Pedal position	1 → 2		2 → 3	
	↗	↘	↗	↘
No load	20	15	35	25
Full load	60	55	100	90

(The kickdown switch is integrated into the computer).

L423 - B373 - C373 (Switzerland)

Pedal position	1 → 2		2 → 3	
	↗	↘	↗	↘
No load	22*	15	38*	25
Full load	67	60	110	95

(The kickdown switch is integrated into the computer).

1342 - 1352 - 1343 - 1353 - 1277 - 1279

Pedal position	1 → 2		2 → 3	
	↗	↘	↗	↘
No load	25*	15	50*	25
Full load	65	45	115	85
Kickdown	70	60	125	105

1362

Pedal position	1 → 2		2 → 3	
	↗	↘	↗	↘
No load	22*	12	44*	25
Full load	62	42	110	79
Kickdown	68	56	117	100

1363

Pedal position	1 → 2		2 → 3	
	↗	↘	↗	↘
No load	22*	12	46*	25
Full load	65	44	113	81
Kickdown	70	58	121	103

* These values are given as an example.

L48K - L483 - L489 - L/K 48A

Pedal position	1 → 2		2 → 3	
	↗	↘	↗	↘
No load	26	17	43	30
Full load	75	66	122	107

(The kickdown switch is integrated into the computer).

L42

Pedal position	1 → 2		2 → 3	
	↗	↘	↗	↘
No load	22	14	37	25
Full load	67	58	109	94

(The kickdown switch is integrated into the computer).

B297 - B29B - B29E

Pedal position	1 → 2		2 → 3	
	↗	↘	↗	↘
No load	25*	15	35*	30
Full load	75	60	125	110

(The kickdown switch is integrated into the computer).

Txx1

Pedal position	1 → 2		2 → 3	
	↗	↘	↗	↘
No load	20*	10	35*	20
Full load	45	30	70	53
Kickdown	50	40	80	70

* These values are given as an example.

B/C 373/573

Pedal position	1 → 2		2 → 3	
	↗	↘	↗	↘
No load	23	15	33	26
Full load	71	43	120	80
Kickdown	71	60	120	107

X57 B/T

Pedal position	1 → 2		2 → 3	
	↗	↘	↗	↘
No load	21	14	29	22
Full load	74	48	126	99
Kickdown	74	62	126	114

F40 (031)

Pedal position	1 → 2		2 → 3	
	↗	↘	↗	↘
No load	19	12	27	20
Full load	68	44	116	91
Kickdown	68	56	116	105

F40 (038)

Pedal position	1 → 2		2 → 3	
	↗	↘	↗	↘
No load	21	16	37	27
Full load	72	47	123	94
Kickdown	72	60	123	114

1343 - 1353 - 1363

Pedal position	1 → 2		2 → 3	
	↗	↘	↗	↘
No load	23	14	45	26
Full load	65	43	112	81
Kickdown	70	57	120	101

1343 - 1353 - 1363 (Argentina)

Pedal position	1 → 2		2 → 3	
	↗	↘	↗	↘
No load	20	15	35	25
Full load	60	55	100	85

(The kickdown switch is integrated into the computer).

1341 - 1351 (DAI)

Pedal position	1 → 2		2 → 3	
	↗	↘	↗	↘
No load	20*	10	40*	25
Full load	60	40	100	75
Kickdown	65	50	110	90

1344 - 1354

Pedal position	1 → 2		2 → 3	
	↗	↘	↗	↘
No load	15*	10	40*	20
Full load	60	45	105	90

(The kickdown switch is integrated into the computer).

B53B - C53B - L53B

Pedal position	1 → 2		2 → 3	
	↗	↘	↗	↘
No load	24	15	40	27
Full load	72	63	118	102
Kickdown	72	63	118	102

B537 - C537 - L537

Pedal position	1 → 2		2 → 3	
	↗	↘	↗	↘
No load	23	13	46	26
Full load	62	40	102	74
Kickdown	67	54	109	94

X53A

Pedal position	1 → 2		2 → 3	
	↗	↘	↗	↘
No load	20	13	28	21
Full load	71	46	121	95
Kickdown	71	59	121	110

1277 (DAI)

Pedal position	1 → 2		2 → 3	
	↗	↘	↗	↘
No load	20*	15	45*	25
Full load	60	40	110	80
Kickdown	65	55	115	95

* These values are given as an example.

C06

Pedal position	1 ⟷ 2		2 ⟷ 3	
	↗	↘	↗	↘
No load	19	15	41	29
Full load	65	45	111	92
Kickdown	67	57	113	106

(The kickdown switch is integrated into the computer).

The figures in the tables indicate the theoretical average gear change speeds (actual time speed).

These figures may vary depending on the accepted tolerance limits on the component units and tyres fitted.

No load = Foot off accelerator pedal.
Full load = Kickdown switch disconnected, full throttle.
Kickdown = Kickdown connected, full throttle.

For vehicles B53A - C53A - L53A - B537 - C537 - L537

Gear ratio	1st	2nd	3rd	Reverse
Gear reduction	2.5	1.5	1	2
Gear reduction + stepdown	2.069	1.241	0.828	1.655
Overall reduction	7.999	4.799	3.199	6.399
Speed in km / h per 1000 rpm. *	12.937	21.562	32.343	16.171

For vehicles B53B - C53B - L53B

Gear ratio	1st	2nd	3rd	Reverse
Gear reduction	2.5	1.5	1	2
Gear reduction + stepdown	2.069	1.241	0.828	1.655
Overall reduction	7.370	4.422	2.948	5.896
Speed in km / h per 1000 rpm. *	14.042	23.403	35.105	17.552

* For vehicles fitted with **165/70 R13** tyres.

For vehicles B 573 - C 573

Gear ratio	1st	2nd	3rd	Reverse
Gear reduction	2.5	1.5	1	2
Gear reduction + stepdown	2.069	1.241	0.828	1.655
Overall reduction	7.370	4.422	2.948	5.896
Speed in km / h per 1000 rpm. *	13.431	22.385	33.578	16.789

* For vehicles fitted with **165/65 R13** tyres.

For vehicles C06

Gear ratio	1st	2nd	3rd	Reverse
Gear reduction	2.5	1.5	1	2
Gear reduction + stepdown	2.069	1.241	0.827	1.655
Overall reduction	8	4.8	3.2	6.4
Speed in km / h per 1000 rpm.	12.52	20.87	31.31	15.656

Tyres: **155/70 R 13**.

For vehicles F40

Gear ratio	1st	2nd	3rd	Reverse
Gear reduction	2.5	1.5	1	2
Gear reduction + stepdown	2.069	1.241	0.827	1.655
Overall reduction	8	4.8	3.2	6.4
Speed in km / h per 1000 rpm.	13.2	22	33	16.5

Tyres: **155 R 1**3.

REPLACEMENT INSTRUCTIONS

- **Damaged brakes or clutch:**

1st possibility:

Repair the gear section and clean the final drive, oil cooler, converter* and check the hydraulic distributor.

2nd possibility:

Change the gear section alone. (Adjust the end float and the oil pressure setting). Or change the entire automatic transmission (service exchange or new transmission).

* The cleaning method is given in the "**Torque converter**" section.

- **Bearing(s) which is/are noisy but not broken:**

Change the bearing(s) and the filter.

- **Bearing(s) or other mechanical component damaged:**

If the damage is extensive, change the automatic transmission (service exchange or new transmission).

For a service exchange:

Return the worn transmission with the packaging in which the new part was delivered.

Parts to be replaced (after removal)

- roll pins,
- O and square section seals,
- lip seals,
- paper seals,
- bearings (if they have had to be removed),
- circlips,
- differential bank (**MJ**),
- speedometer drive shaft (**MB**),
- speedometer drive gears (if they have had to be removed),
- the entire free wheel (if there is a problem),
- the quadrants with the drive hub (if they are seized in the hub).

Consumables

Name	Packaging	To be used for:
LOCTITE FORMAJOINT	50 ml bottle	Housing joint faces
LOCTITE FRENETANCH	24 ml bottle	1 drop on converter drive plate bolt at crankshaft end.
LOCTITE SCELBLOC	24 ml bottle	1 drop on converter seal (**MB**).
Transmission oil ELF RENAULTMATIC D2 or MOBIL ATF 220		Immersion of all parts before assembly (except those for **ML** final drive).
Final drive oil SAE 80 W or 75 W		Immersion of final drive components (**ML**).

MB.MJ automatic transmissions have a single oil level and a single oil grade for all sections (converter, final drive, gear section). **ML** type automatic transmission has **two different oil levels and grades** .

1°) Oil for MB.MJ automatic transmission and for ML converter and gear section

Grade: ELF RENAULTMATIC D2
otherwise use MOBIL ATF 220

Capacity in litres (approximately) :

AT	MB	MJ	ML
Theoretical total	4.5	6	5
After oil change	2	2.5	2.5

2°) Oil for ML final drive section

Oil grade { API GL5 or MIL L2105 B or C

Viscosity { SAE 80 W: Hot and temperate countries
SAE 75 W: Cold countries

Capacity in litres: Final drive 0.8

DRAIN - REFILL

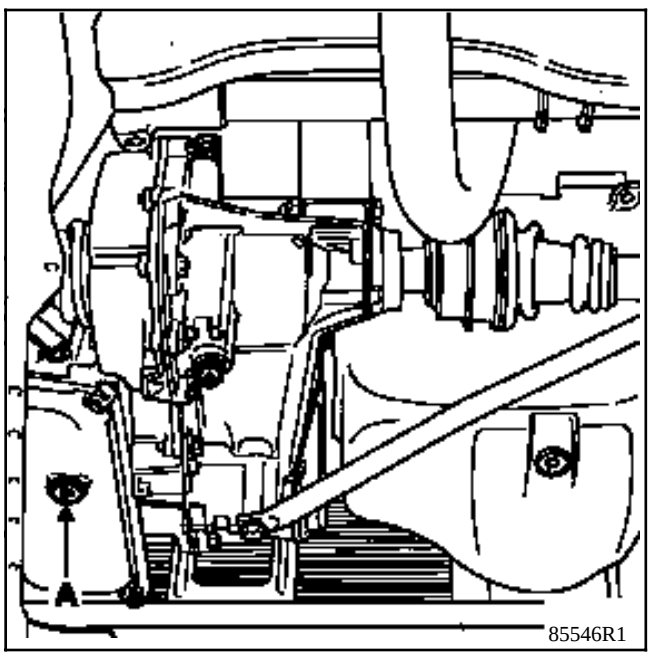
ML, MB and MJ gear sections

The oil must be drained when the engine is cold and with dipstick and plugs (A) removed.

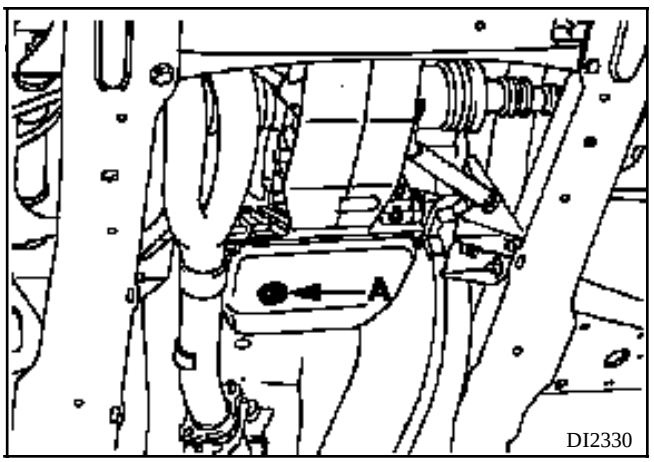
Allow the oil to drain out for as long as possible.

Refit the plugs with new seals.

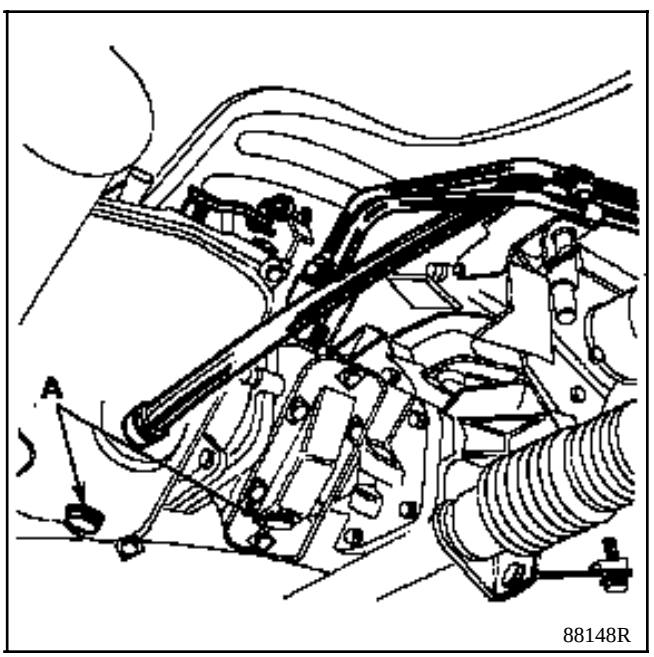
MB



MJ



ML

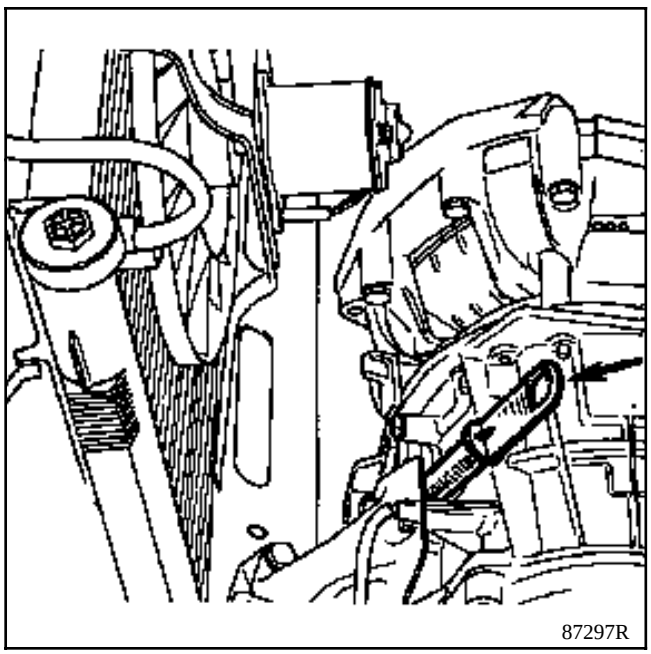


The oil is refilled via the dipstick tube.

Use a funnel fitted with a **15/100** mesh filter to trap any impurities in the oil.

When the oil has been drained, refill with **the recommended oil**.

Start the engine and let it idle, check the oil level and top up if necessary.
EXAMPLE : **MB**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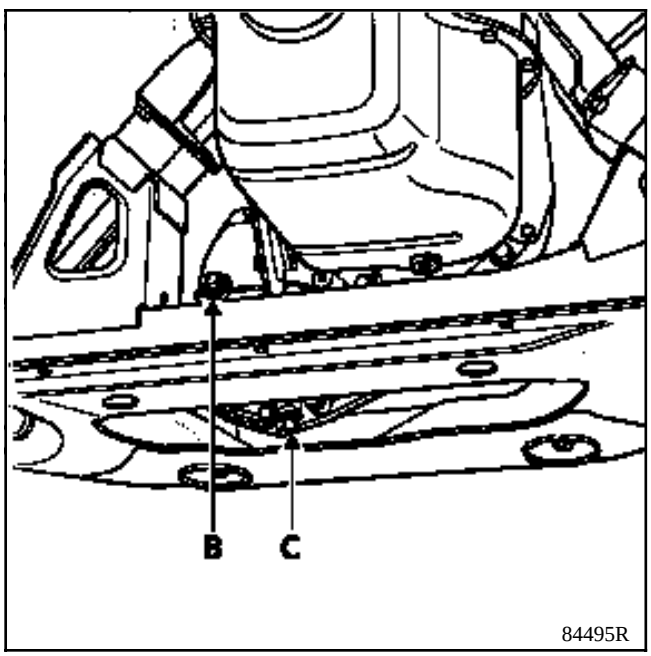
2) ML final drive

The oil must be drained with plugs (B) and (C) removed.



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Fit plug (C).

The oil is refilled through plug (B) and the oil should be level with the bottom of the aperture of plug (B).

CHECKING THE LEVEL (gear section oil)

The vehicle must be unladen.

The oil is at ambient temperature (engine cold).

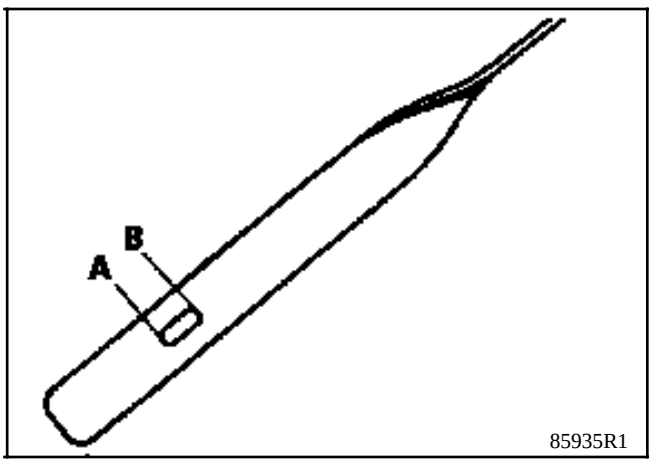
Place the vehicle on a flat, horizontal surface.

Place the selector lever in "**Park**" (P).

Start the engine and wait one or two minutes for the converter and cooler to fill with oil

Remove the dipstick with the engine running.

The oil level **must not be below the** MIN COLD mark (risk of damage) or **above the** MAX COLD mark (risk of damage).



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A Min cold
B Max cold

ATTENTION:

Too much oil will lead to
- the oil **overheating** abnormally,
- **leaks**.

Too little oil will lead to:
- the gear section being **damaged**.

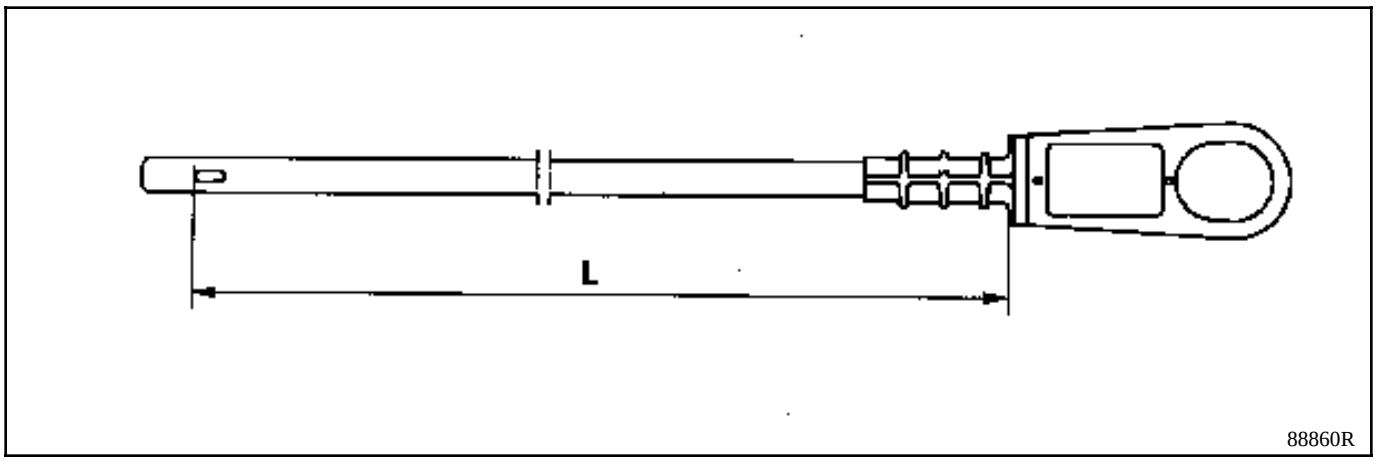
CONFORMITY OF THE DIPSTICK

IMPORTANT: in order to ensure that the oil level is correct, you must check the conformity of the dipstick .

1341 - 1342 - 1351 - 1352 - 1362 No PAS - no CA	Grey (1) L = 225 mm	MJ1	001		
1341 - 1342 - 1351 - 1352 - 1362 with PAS and CA	Yellow (1) L = 660 mm	MJ1	500 501		
1343 - 1353 - 1363 - 1277 - 1279 B29E - B297 - B29B	Green (1) L = 243 mm	MJ3	301 350 010 012 112 120 122 110		
B29E - B29B - B297 L / K 483 - L / K 48K - L / K 489	Blue (2) L = 247 mm	MJ3	015 016 115 116 125 126 800 801		
B / C 403 - B / C 408 - B / C 40J L423 - B / C 373	Green (2) L = 243 mm	MB3 MB1	All types 000 001 002 003 007	011 013 015 017 019	021 504 600 601 602
L423 - L426	Red (1) L = 252 mm	MB1	500 501 502 503		
C40J - C403 / B	Red (2) L = 243 mm	MB1	500 501 502 503		
C57 / 3 / B	Red (2) L = 243	MB1	024 026		
	Orange (2) L = 231 mm	MB1	029		
F40	Violet (2) L = 347 mm	MB1	031 038		
L423 - B / C 373 DAI with air pre-filter	White (1) L = 324 mm	MB1	500 501 502 503		

1344 - 1354	Yellow (1) L = 240 mm	MJ3 200 201
L/K 48A (deeper sump)	Grey (2) L = 247 mm	MJ3 761 762
B, C, L } 53B	Red (2) L = 243 mm	MB3 003 005
B, C, L } 537	Yellow (2) L = 334 mm	MB1 023 027
X06	Light grey (2) L = 338 mm	MB1 033
C373	Green (2) L = 243 mm	MB1 001 011 019 002 013 021 003 015 504 007 017 MB3
B373	(1) L = 252 mm	MB1 500 501 502 503

1



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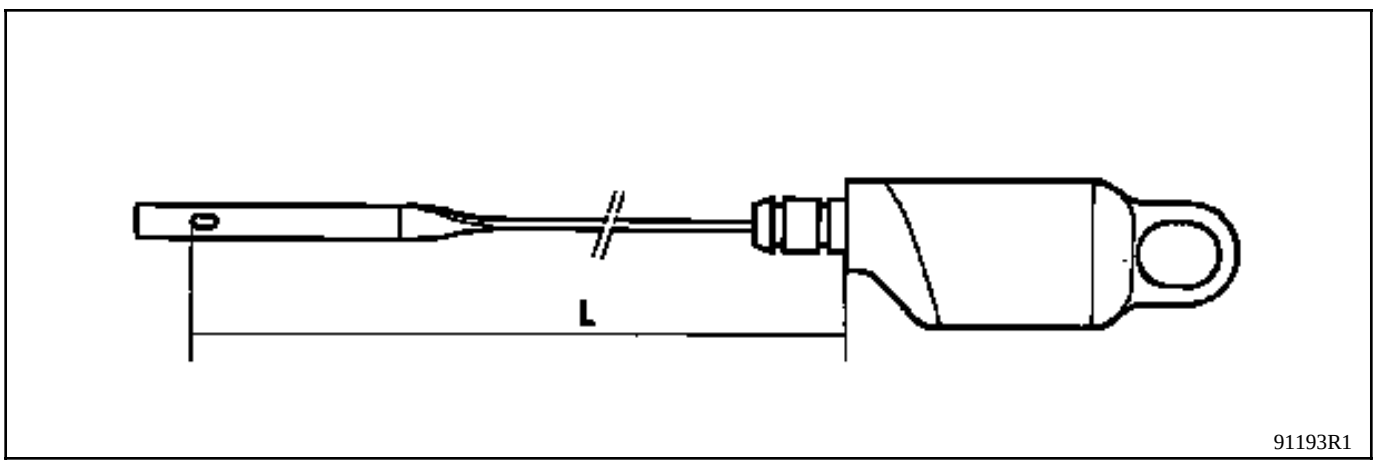
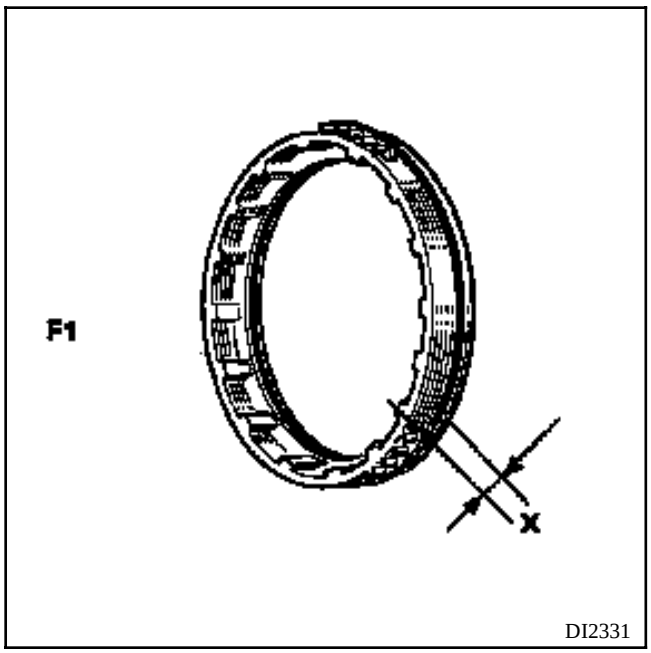
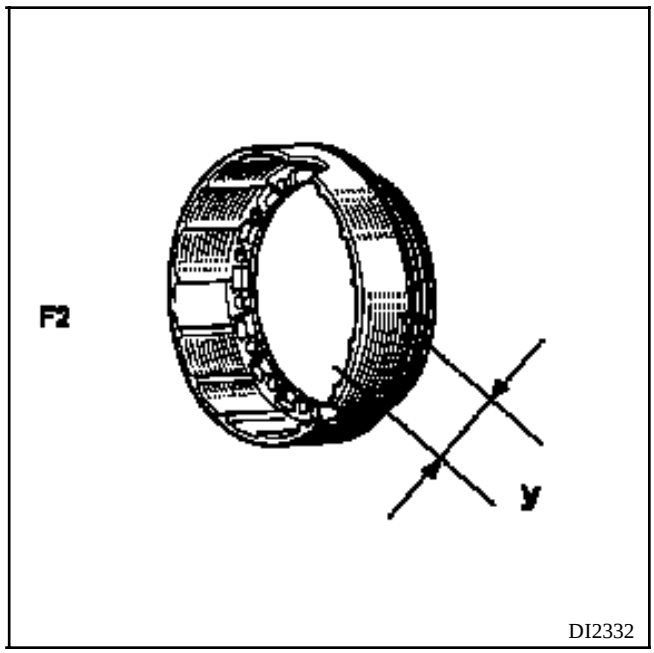


Identification of pistons F1 - F2





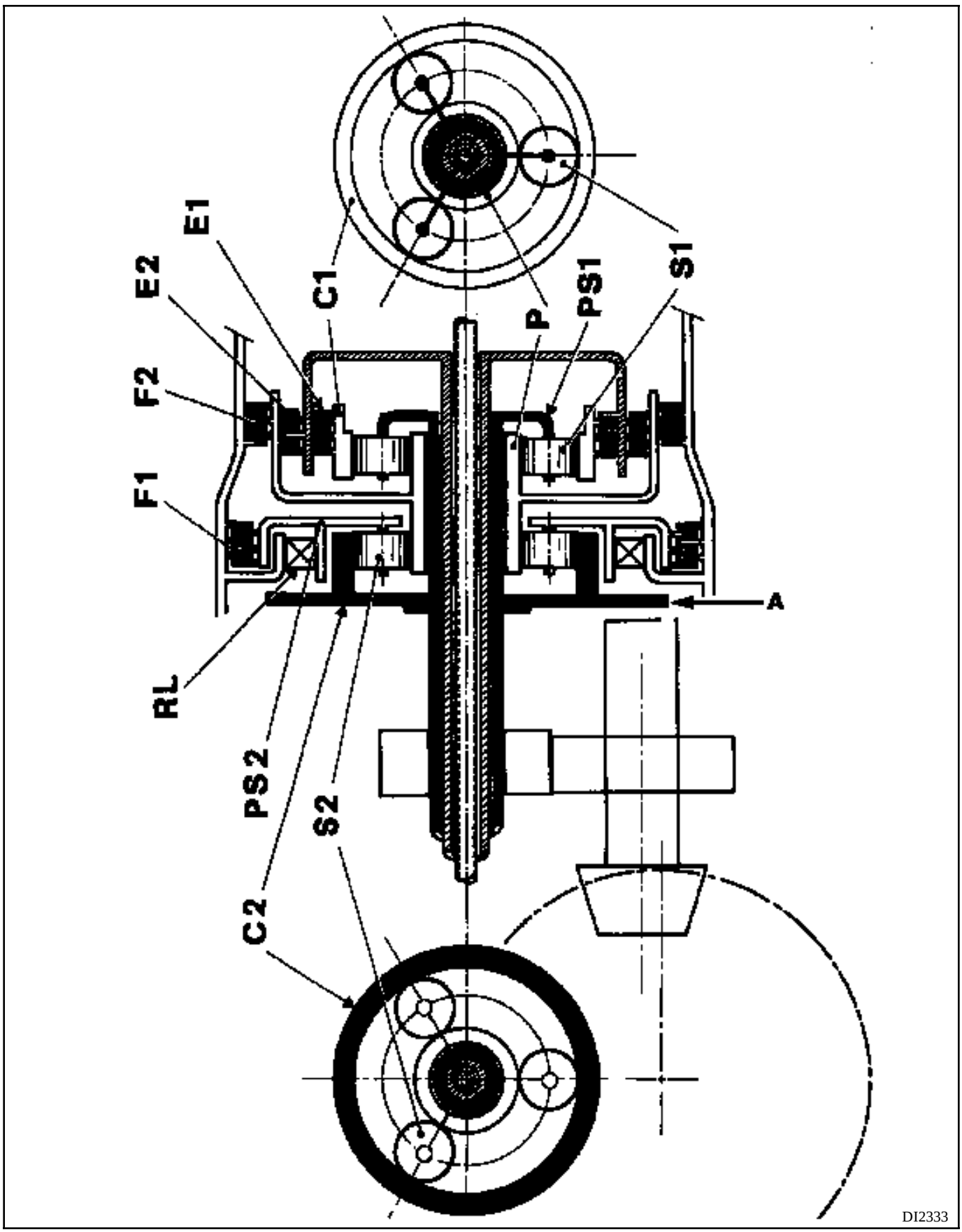
A.T.	Dimension F1 (x in mm)	Dimension F2 (y in mm)
MB1	25.7 ± 0.35	62.4 ± 0.2
MJ	21.8 ± 0.35	58.4 ± 0.2
ML	21.8 ± 0.35	58.4 ± 0.2
MB3	21.8 ± 0.35	58.4 ± 0.2

Number of discs

TYPE OF AT	F1		F2		E1		E2	
	Steel discs	**Lined discs**	**Steel discs**	**Lined discs**	**Steel discs**	**Lined discs**	**Steel discs**	**Lined discs**
MB1	3	3	4	3	4	4	4	4
MJ ML MB3	4	4	5	4	5	5	5	5

One undulated disc is fitted to each group of brakes and clutches.

OPERATING COMPONENTS



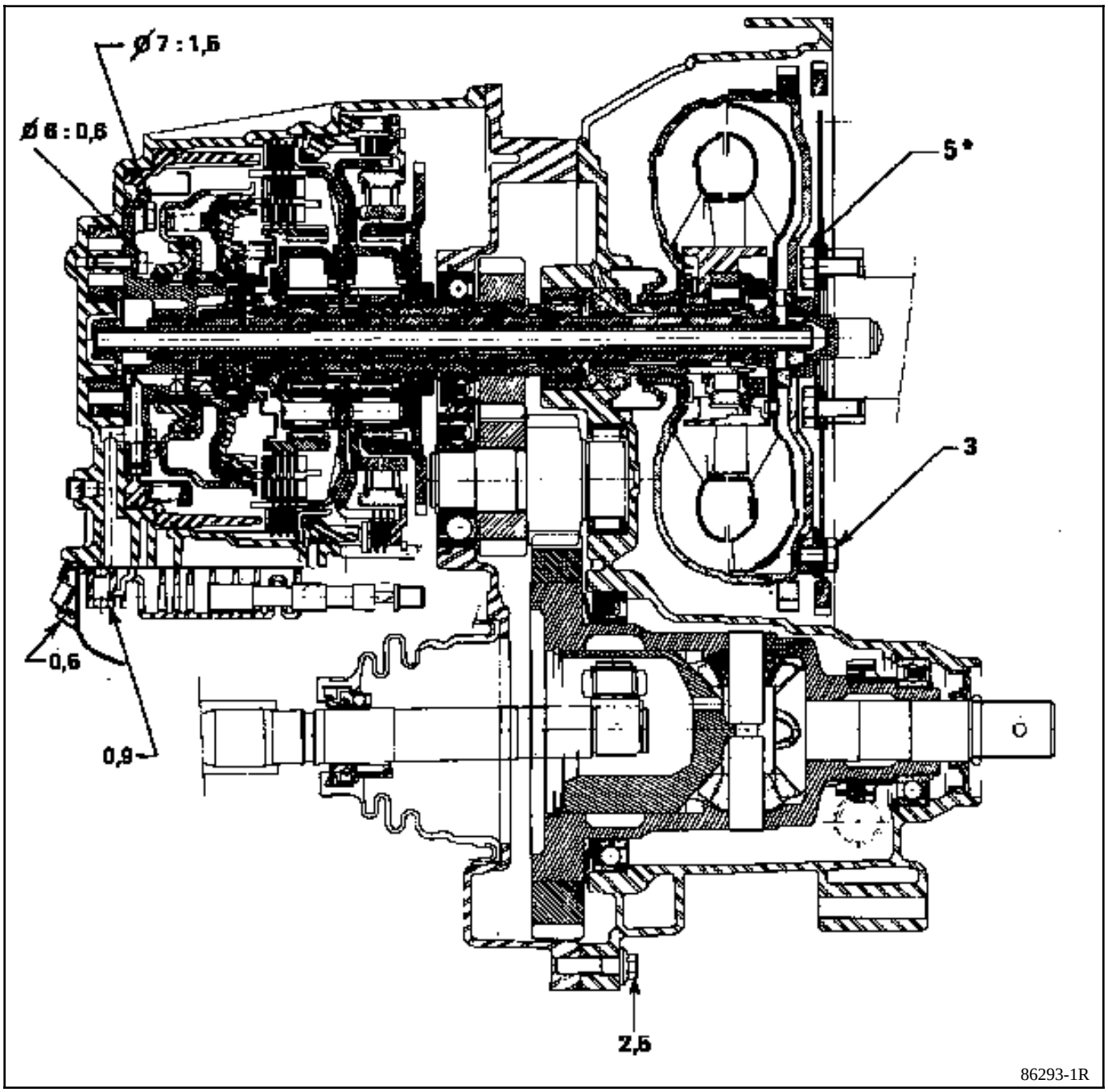
A Park wheel

OPERATING COMPONENTS ⊠

Lever position		RL	E1	E2	F1	F2	EL1	EL2
P								⊠
R				⊠	⊠			⊠
N								⊠
D	1	⊠	⊠					⊠
	2		⊠			⊠	⊠	⊠
	3		⊠	⊠				
2nd GEAR HOLD			⊠			⊠	⊠	⊠
1st GEAR HOLD			⊠		⊠			⊠

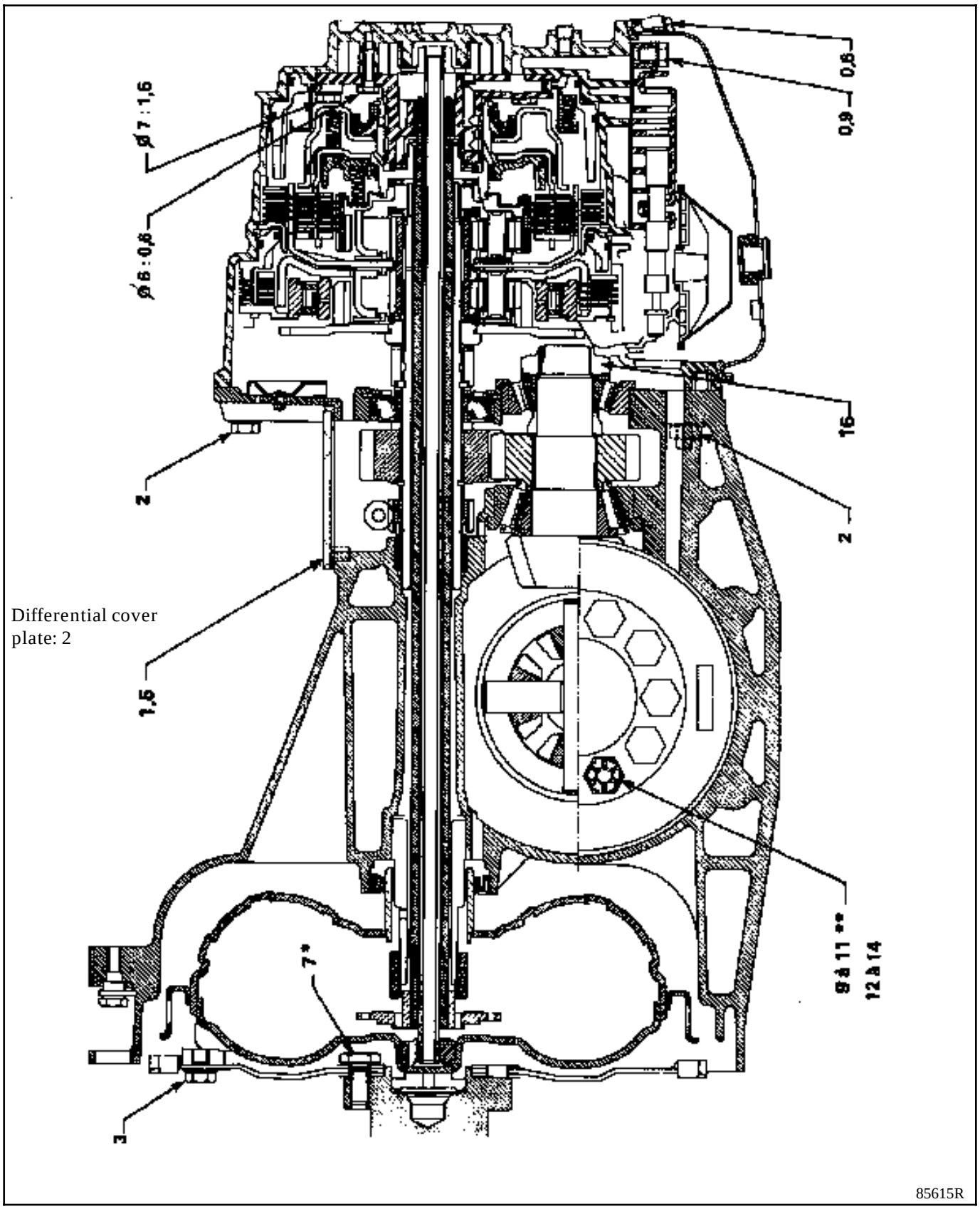
RL = Free wheel
E1 = Clutch 1
E2 = Clutch 2
F1 = Brake 1
F2 = Brake 2
EL1 = Solenoid pilot valve 1
EL2 = Solenoid pilot valve 2

MB AUTOMATIC TRANSMISSION



* Bolts coated with "Loctite FRENETANCH".

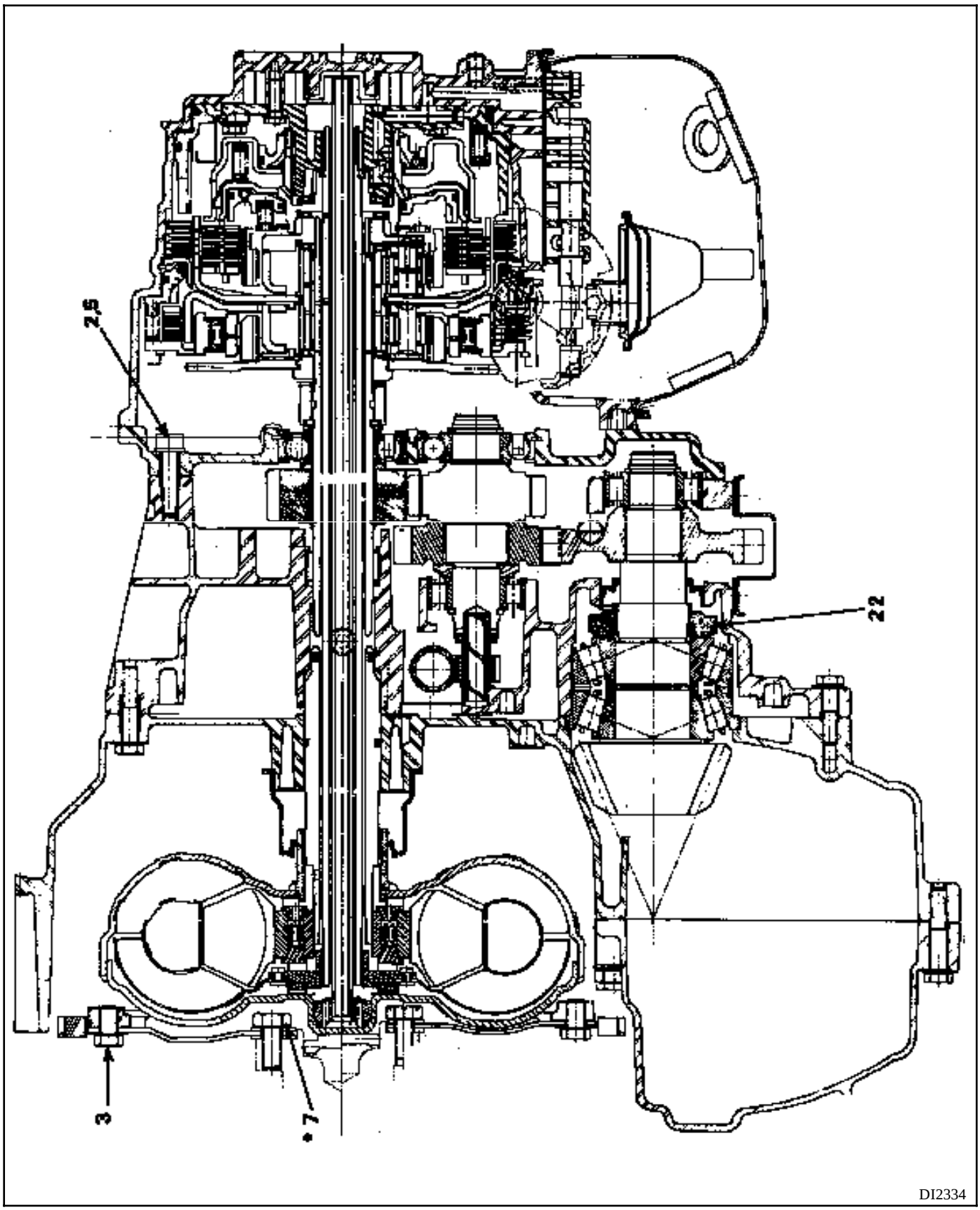
MJ AUTOMATIC TRANSMISSION



Differential cover plate: 2

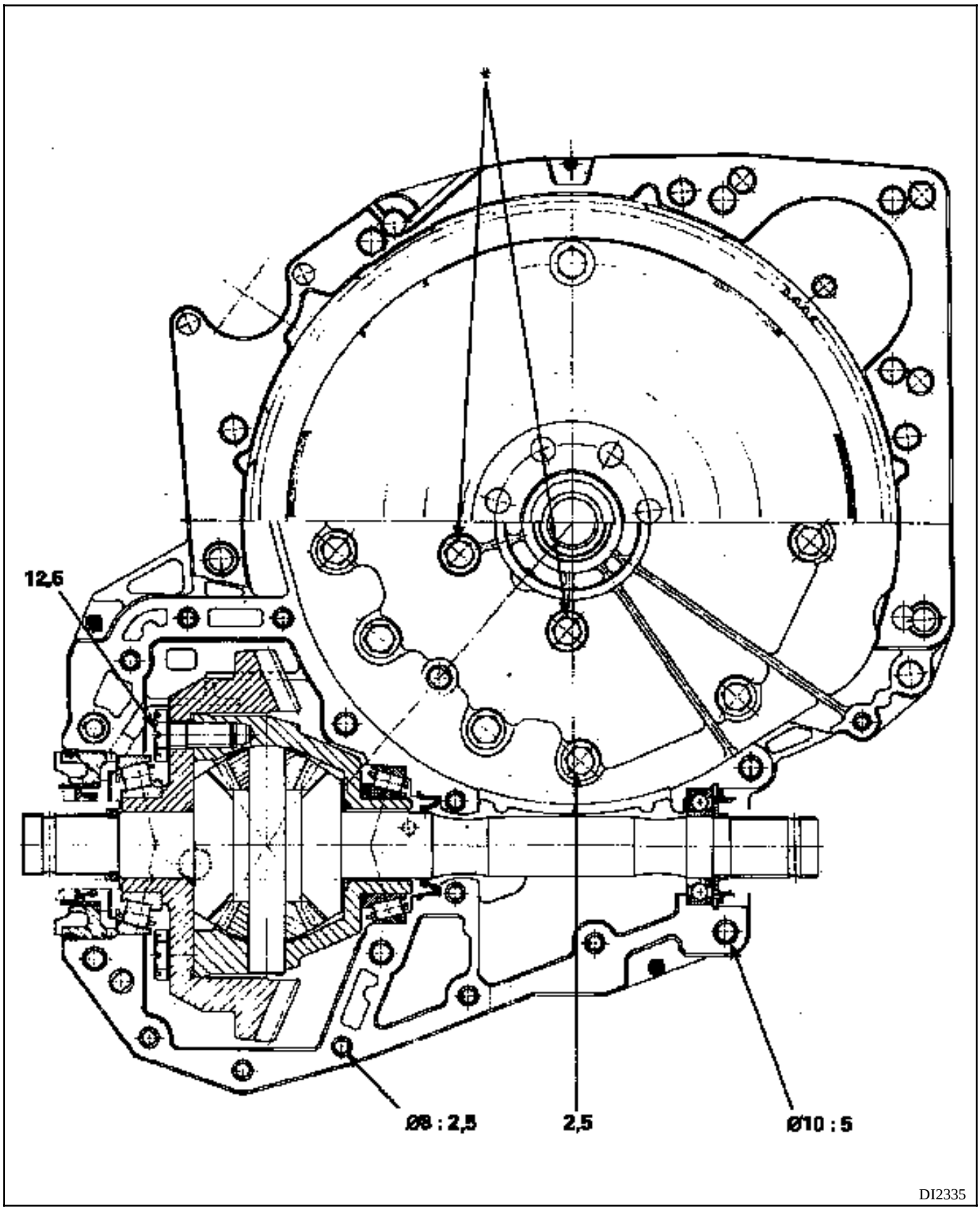
* Bolts coated with "Loctite FRENETANCH".

ML AUTOMATIC TRANSMISSION



Gear train housing bolts on spacer housing... **2.5**.
* Bolts coated with "**Loctite FRENETANCH**".

ML AUTOMATIC TRANSMISSION



* Pre-coated with "Loctite FORMAJOINT ".

The strainer filters the oil and ensures that the automatic transmission operates correctly.

Tightening torques (in daN.m)	
Distributor bolt (strainer bolt)	**0.9**
Sump bolts	**0.6**

REMOVAL

Drain the oil and remove:
- the sump (for vehicles fitted with MB AUTOMATIC TRANSMISSION, this must be raised up),
- the strainer and its seal.

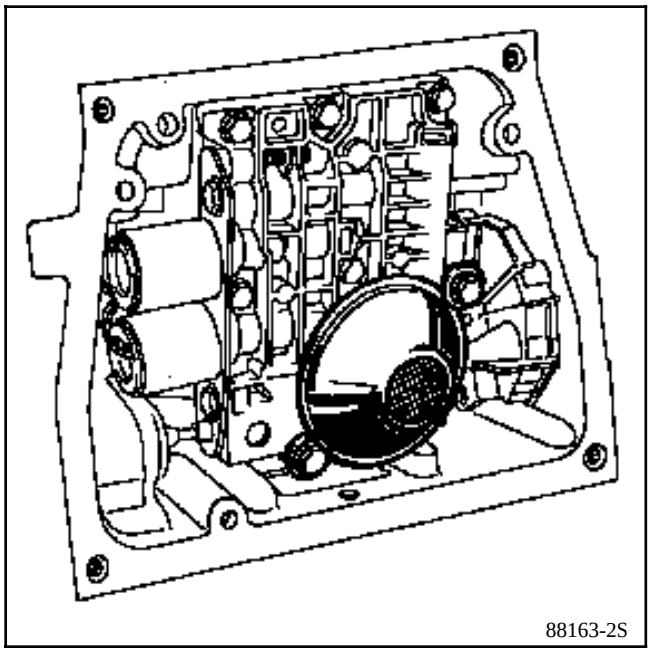
Before refitting, clean the sump and its magnets and replace them as shown in the diagrams (see following page).

REFITTING

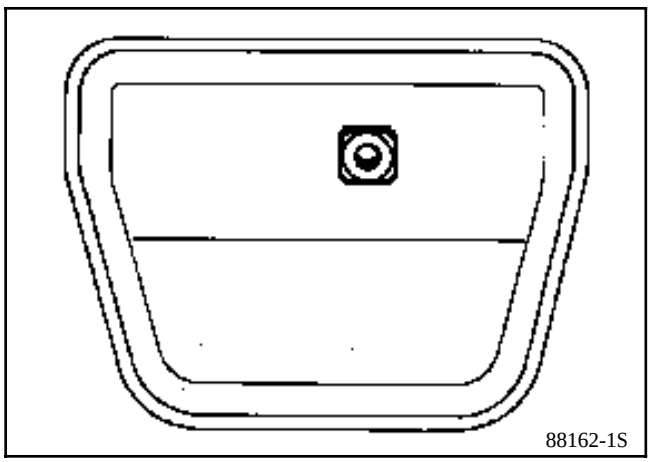
Refit:
- the new strainer with its seal, **check the assembly direction** (see diagram) and tighten to a torque of **0.9 daN.m**,
- the sump and refill with oil.

Original fitment

MB - MJ

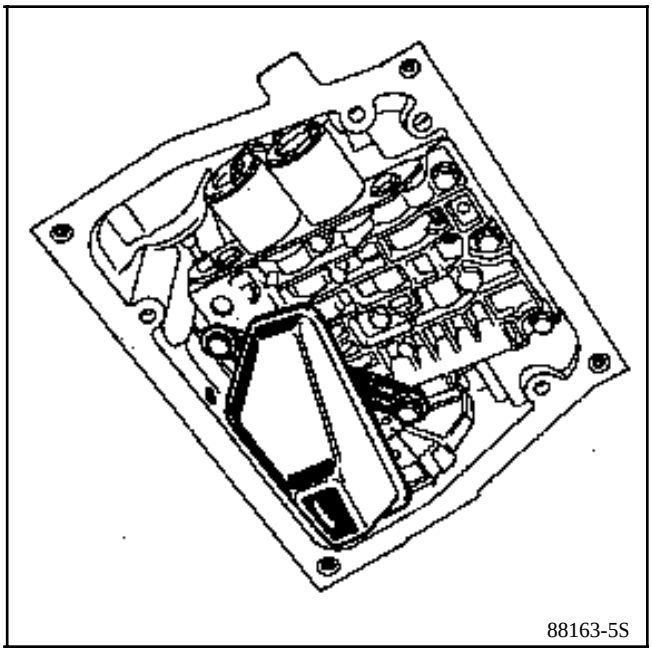


With sump.

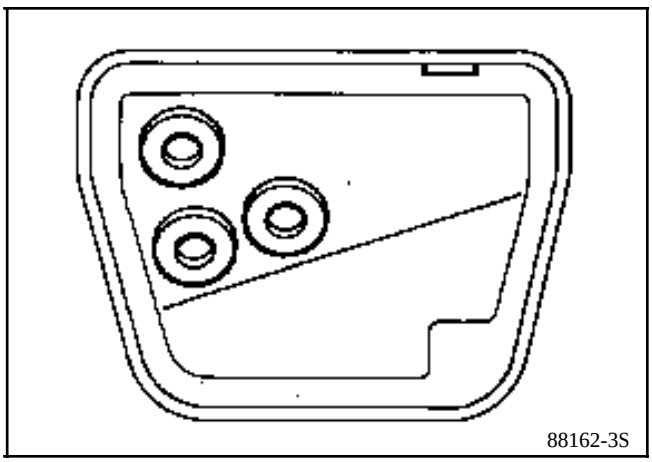


Second fitment (check assembly direction)

MB



With sump and three magnets*.



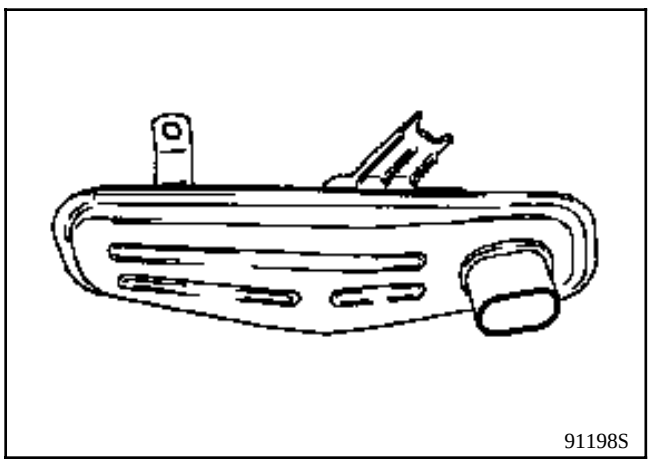
* Direction for fitting magnets: ribbed side against plate.

3rd fitment (except MB1 600/601)

NOTE: The deeper type of sump must be fitted with a modified strainer and dipstick (see "**Dip-stick conformity**" table).

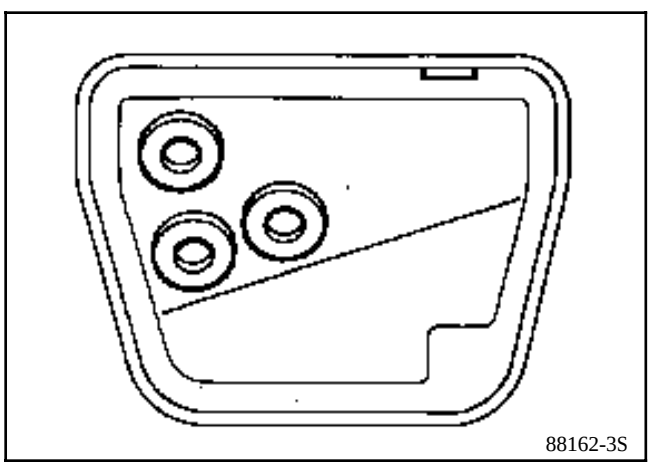
No modifications have been made to the sump or the oil level on **MB** transmissions.

Strainers A with D or E

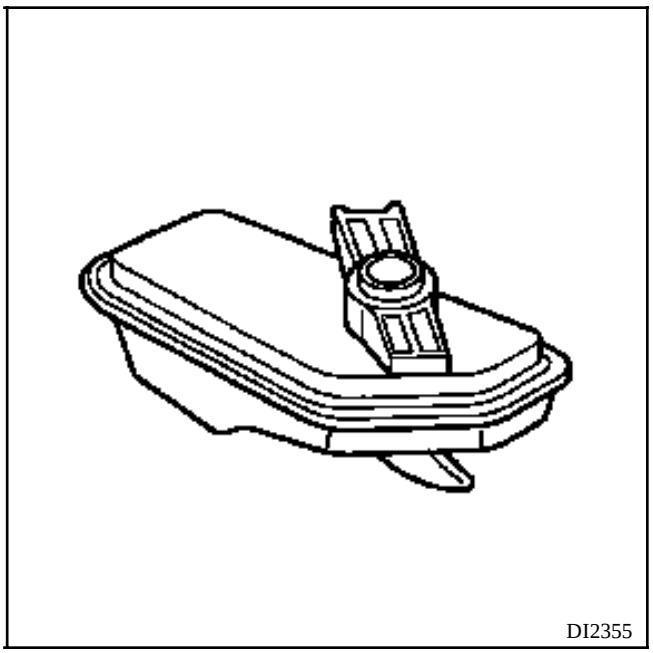


D

With its sump and three magnets*.

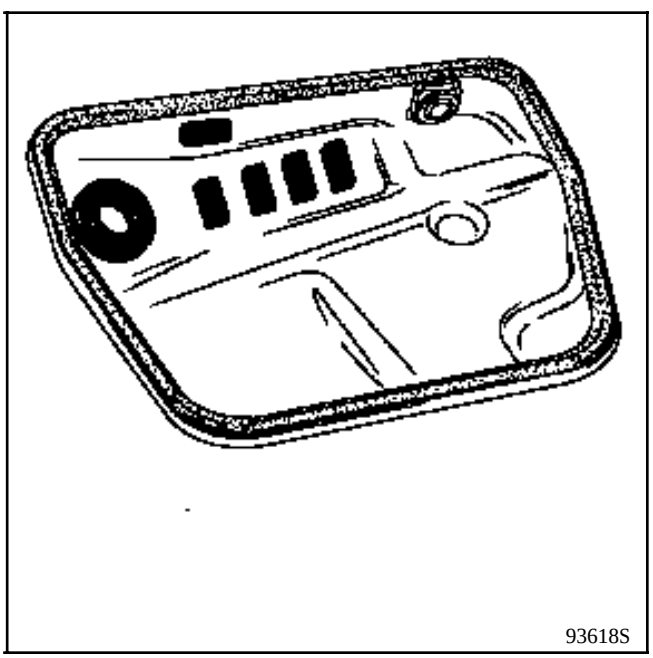


Strainer B with D or E



E

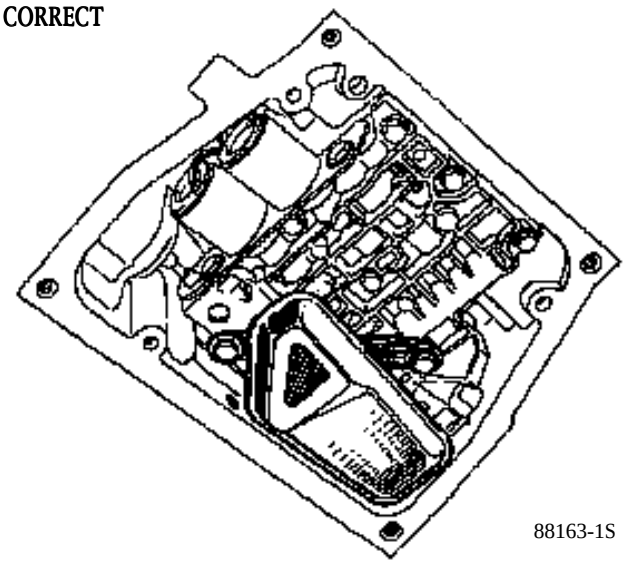
With its sump and six magnets*.



* Direction for fitting magnets: ribbed side against plate.

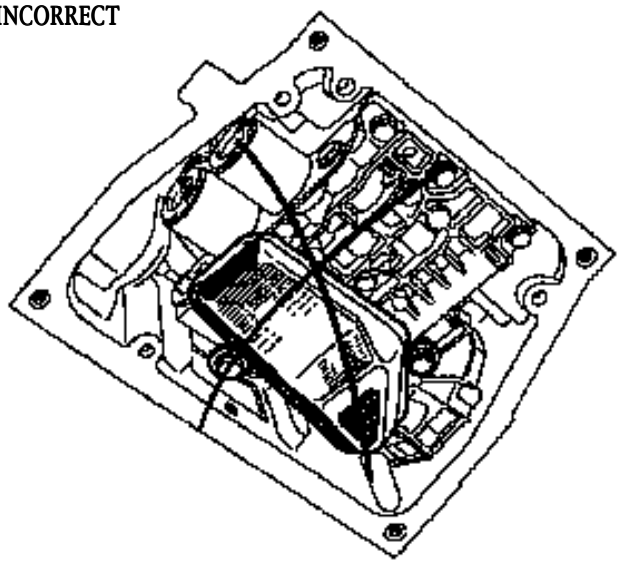
MJ

CORRECT



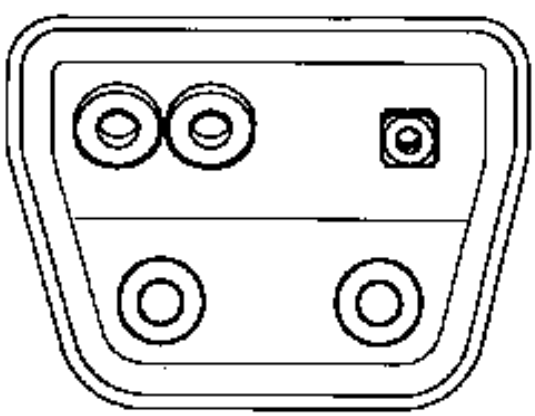
88163-1S

INCORRECT



88163S

With its sump and 4 magnets*.

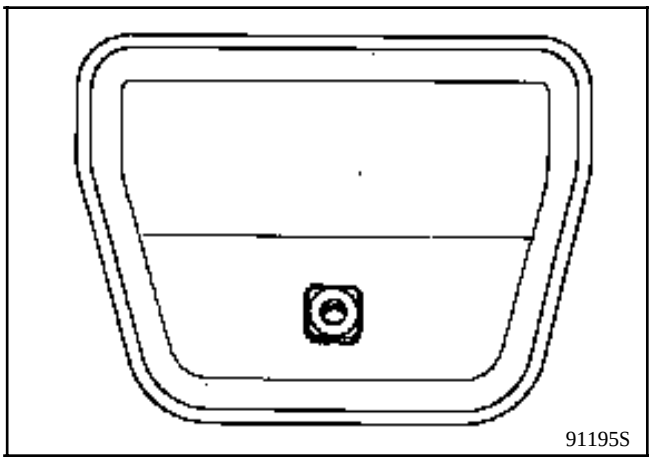


88162-2S

As for the following transmissions:

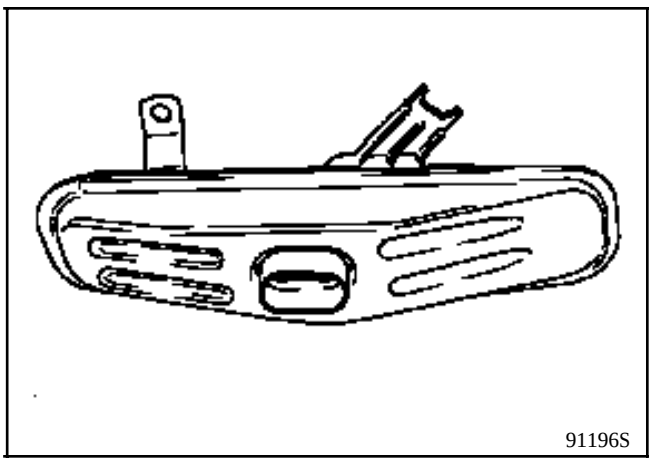
- **MJ3 761/762/800** and **801** for **L483 - L489 - L48K - L/K 48A**,
- **MJ3 016/116/126** for **B29E - B297** and **B29B** ,

the sump has been modified. Its depth has been increased by **6 mm** and the drain plug moved.

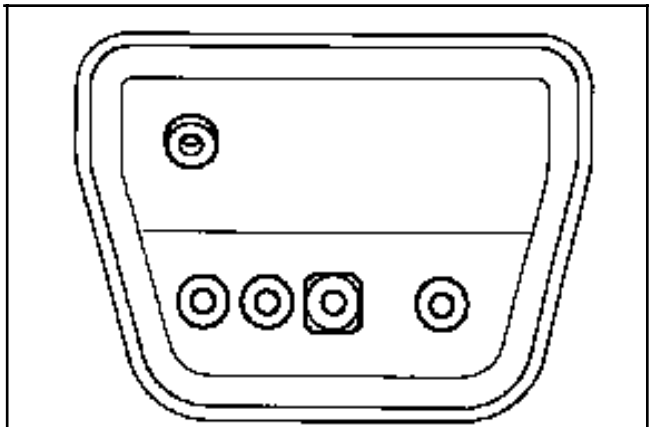


91195S

This modification is connected with the replacement of the strainer which has improved filtering ability.



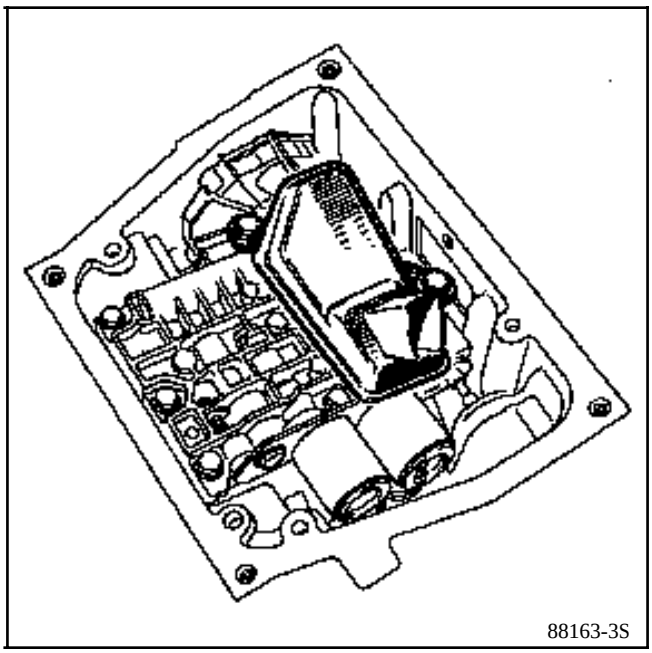
91196S



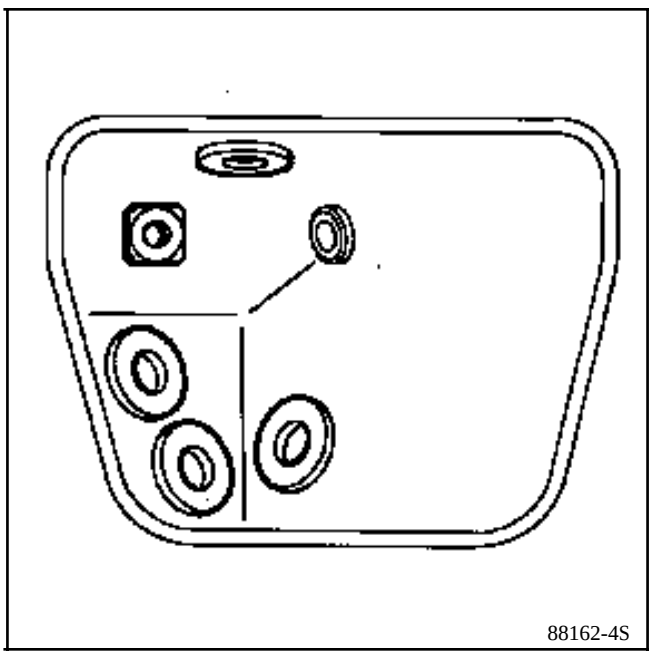
91195-1S

* Direction for fitting magnets: ribbed side against plate.

ML



With its sump and four magnets*.



* Direction for fitting magnets: ribbed side against plate

The hydraulic distributor delivers (or discharges) oil to (or from) the clutches and brakes in accordance with the solenoid valve feed.

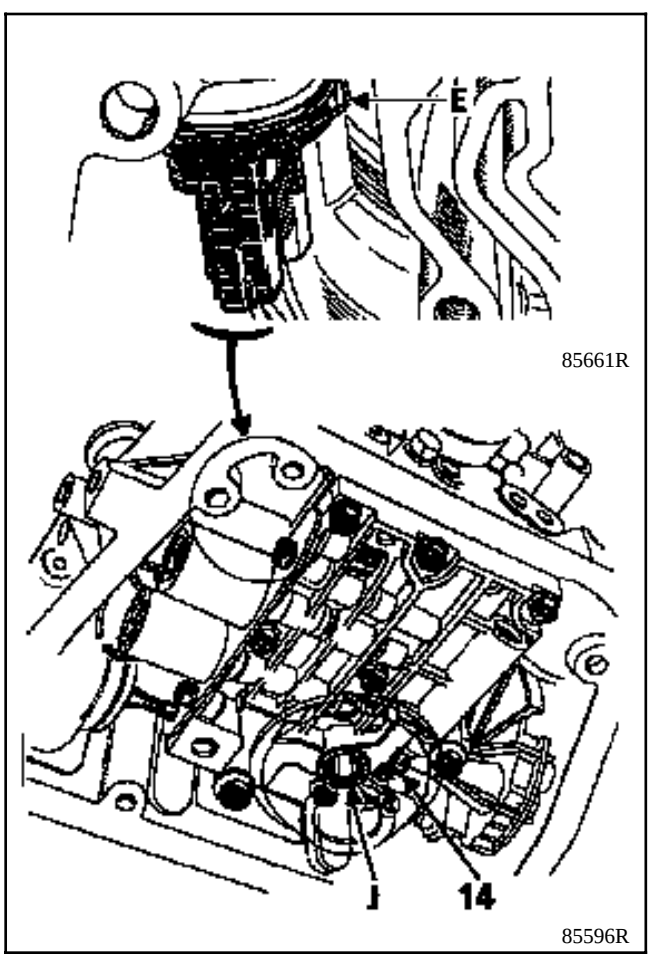
Tightening torques (in daN.m)	
Distributor bolts	**0.9**
Sump bolts	**0.6**
Cover plate bolts	**1.3**

REMOVAL

Drain the oil and remove:
- the sump (for vehicles fitted with type **MB automatic transmission**, this must be raised up),
- the strainer and recover its seal (J),
- all distributors bolts except for bolt (A).

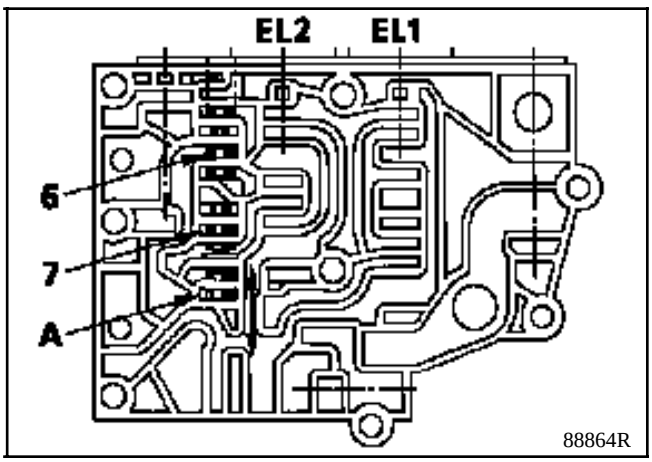
When removing bolt (A), take care that the following do not fall:
- the manually operated valve (14),
- the plate and two seals located under the hydraulic distributor.

Remove clip (E) from the sealed connector and remove the distributor / solenoid valve assembly.



CHECKING

Check that the sequence valves (6) and (7) slide freely at (A) using a small screwdriver and also make sure that the other valves slide freely. **TAKE CARE not to damage the parts.**



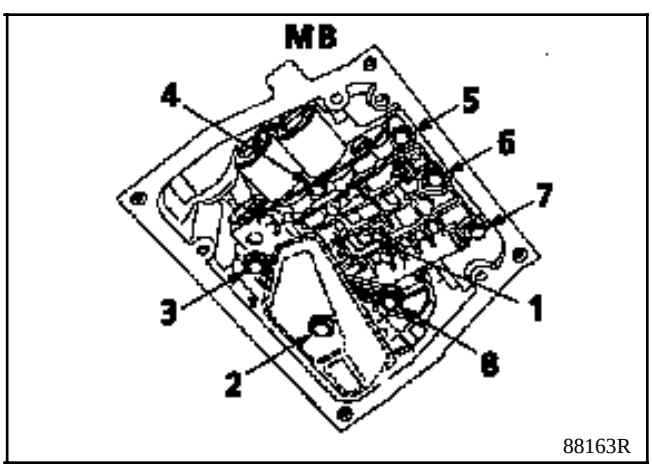
REFITTING

Fit clip (E) to the sealed connector and reconnect it.

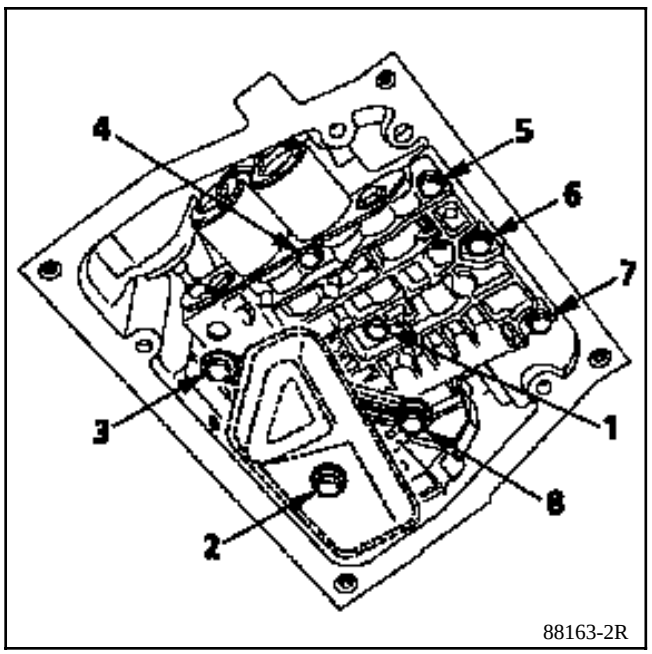
Fit the manually operated valve (14) in the centreline of the toothed quadrant.

Place the vacuum capsule on the pressure regulating valve (11).

Tighten bolts (2) and (6) on the distributor as far as they will go since they determine the position of the distributor when all the bolts have been tightened.
Using a torque wrench (**0.3** to **2 daN.m**), tighten the hydraulic distributor bolts to **0.9 daN.m** in the order given.

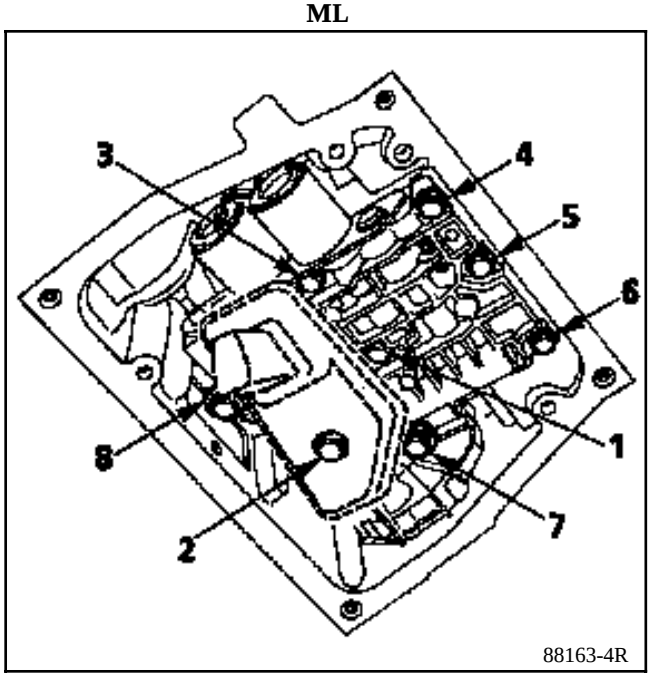


MJ



After tightening bolts (1) and(2), fit the new strainer (fitting direction shown in diagram) together with its seal.

ML

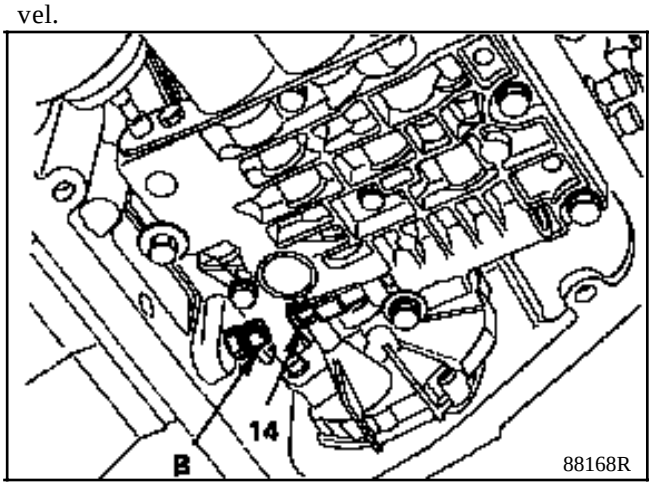


After tightening bolts (1) to (6), fit the new strainer (fitting direction shown in diagram) together with its seal.

After fitting, check that the manually operated valve moves correctly.

Original fitment:

The stop screw (B) is used to prevent the manually operated valve (14) slipping at the end of its travel.

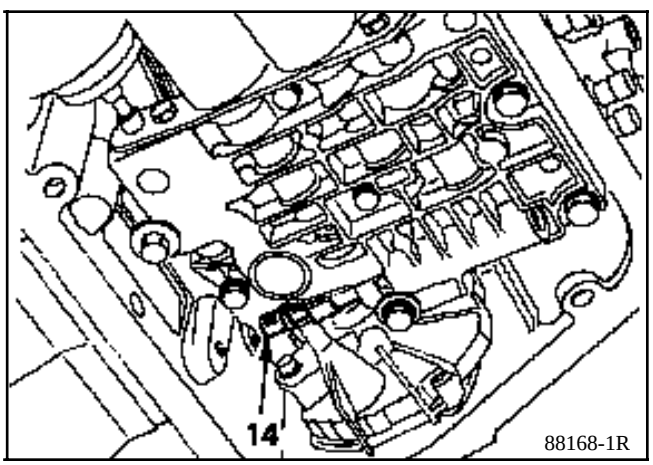


Adjust stop screw (B):

- put selector quadrant in "**Park**",
- slacken the lock nut and bring screw (B) to within **1 mm** of the manually operated valve,
- tighten the locknut.

2nd fitment:

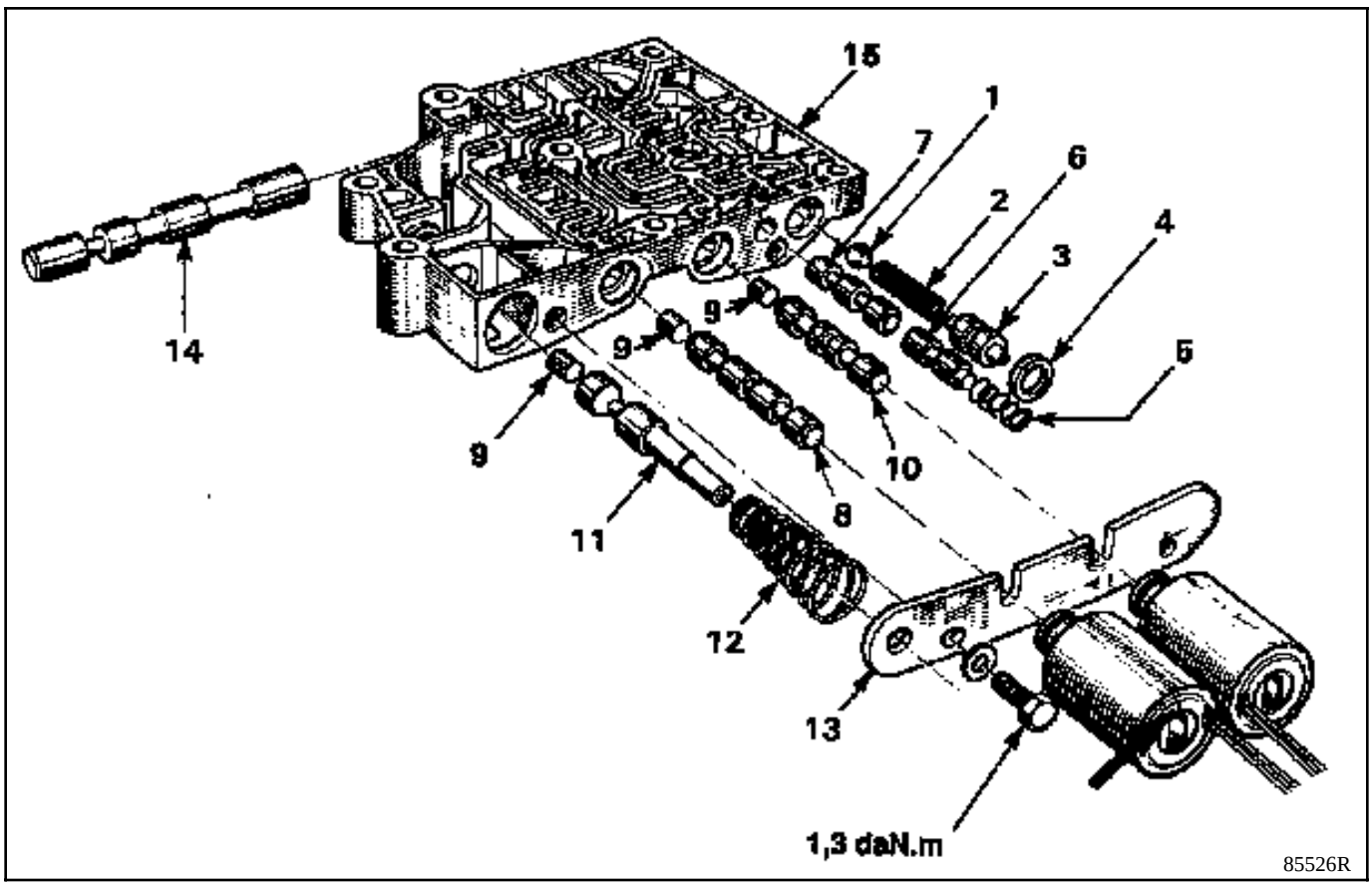
However, the **Parts Department** supplies distributors with the **2nd fitment manually operated valve** (14) **(extended by 14 mm)**. This distributor must in all cases be fitted by removing stop screw (B).



Refit the sump equipped with a perfect gasket.

Top up the oil and **adjust the oil pressure**.

REMOVAL - REFITTING



1 Pressure limiting valve ball (VLP)
2 Pressure limiting valve spring (medium size) (VLP)
3 Pressure limiting valve (VLP)
4 Pressure limiting valve seal (VLP)
5 Sequence valve spring (small) (VS)
6 Sequence valve (SV)
7 Sequence valve (SV)
8 No. 1 selector valve (VP1)
9 Plungers
10 No. 2 selector valve (VP2)
11 Pressure regulating valve (VRP)
12 Pressure regulating valve spring (large size) (VRP)
13 Cover plate
14 Manually operated valve (VM)
15 Hydraulic unit

The plungers (9) are identical.

Valves (3, 7, 8, 10) are symmetrical.

Valve (6) is not symmetrical.

Removal must be performed in a clean, dust-free location.

REMOVAL

Remove in succession the 2 bolts securing the cover plate (13). **Take care not to lose the spring** (12).

Remove the other components turning the manually operated valve unit (14) over.

CLEANING

Use:
- White Spirit,
- lint-free wadding for wiping down,
- compressed air, blowing strongly into all ducts.

CHECKS

If there are any scoring or wear marks on any of the valves, the entire hydraulic distributor must be changed.

All valves should move freely and should not stick at any point.

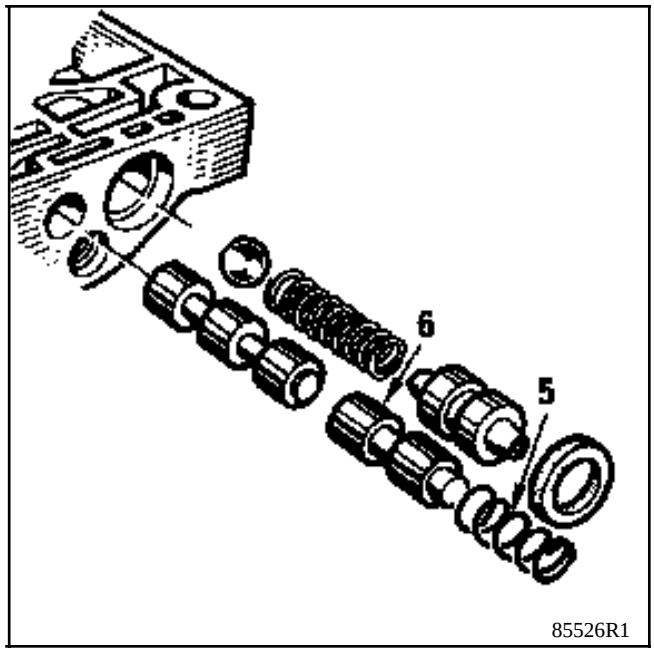
The seal (4) and those on the solenoid pilot valves must be in perfect condition.

REFITTING

Oil all parts and refit them as shown in the exploded diagram.

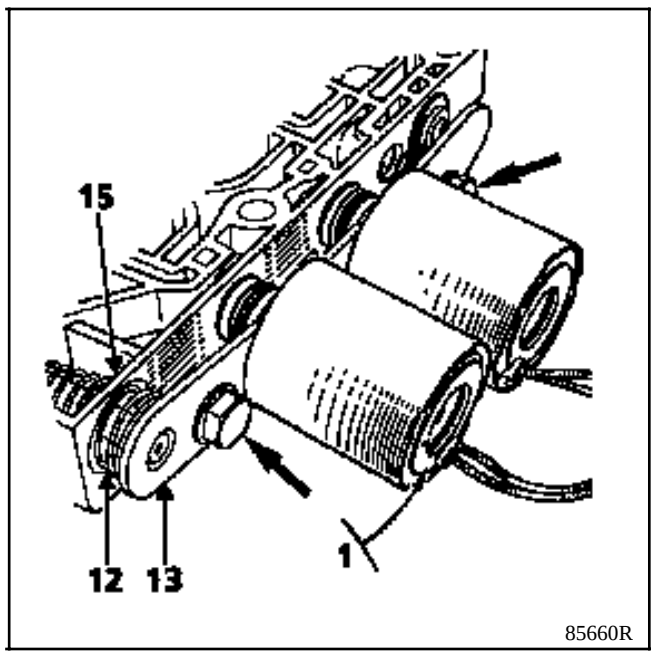
IMPORTANT:

Valve (6) (with the biggest spigot) must face towards the small spring (5).



85526R1

Secure plate (13) by its two bolts and fit the solenoid pilot valve with mark (1) at the same end as the pressure regulating valve.



85660R

Tighten the bolts securing the cover plate (13) progressively so that the last coil of the spring (12) is not jammed between the plate (13) and the unit (15) and tighten to a torque of **1.3 daN.m**.

IMPORTANT: Ensure that the wiring mounting clips are secured correctly to the solenoid pilot valves and are in their original position.

Check that all valves move freely.

HYDRAULIC DISTRIBUTOR PLATE
(Modification)

Some vehicles may change abruptly from 2nd to 3rd gear and vice versa when driving particularly slowly in town.

The distributor plate can be modified (**only on vehicles fitted with MB1 automatic transmission and up until 1994**).

Special tooling:
- 1 drill bit **diameter 2.5 mm**.
- 1 drill bit **diameter 1.1 mm**.

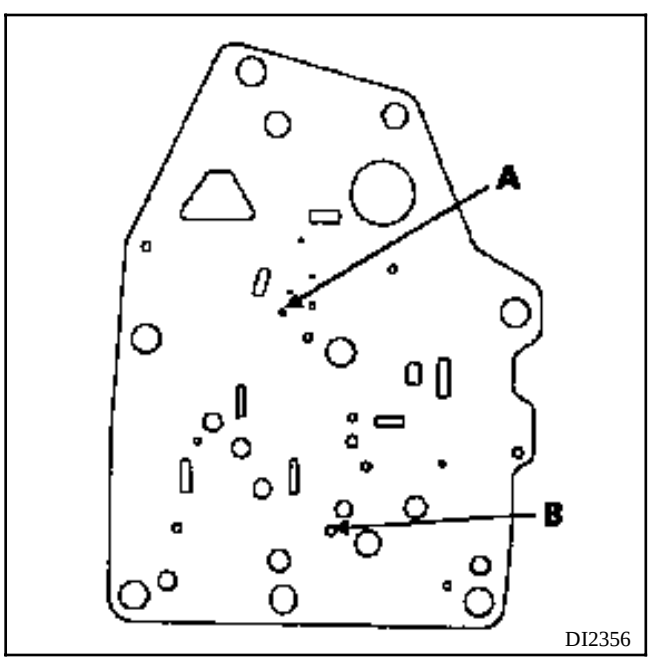
1) Reduce the dividing hole **n° 21 diameter 1.3 mm** so that it becomes **1.1 mm**.

Put the plate on a flat, hard and clean surface.

Using a **3** or **4 mm** punch and a copper hammer, restrict the diameter to **1.1 mm**.

If necessary, check the **1.1 mm** again.

2) Increase hole **E2 n° 11 diameter 1.7 mm** to **2.5 mm**.



A Hole **n° 21 diameter 1.3 mm** becomes **1.1 mm**.
B Hole **n° 11 diameter 1.7 mm** becomes **2.5 mm**.

3) Perform the following:
- clean the plate,
- replace the seals.

Tighten the distributor bolts to the correct torque.

The oil pressure must be checked and adjusted if necessary (see relevant section).

Tightening torques (in daN.m)	
Distributor bolts	**0.9**
Sump bolts	**0.6**
Cover plate bolts (retains solenoid valves)	**1.3**

REMOVAL

The hydraulic distributor must be removed in order to remove the solenoid valves (see "**Hydraulic distributor**" section).

Slacken the two bolts until the solenoid valves can be released.

TAKE CARE not to lose the spring (12)

Before refitting, check:
- that seal (J) is in perfect condition,
- that O-rings (T) on the solenoid valves and the sealed connector are in perfect condition,
- that the ball bearings move properly and that the solenoid valves are clean.

REFITTING

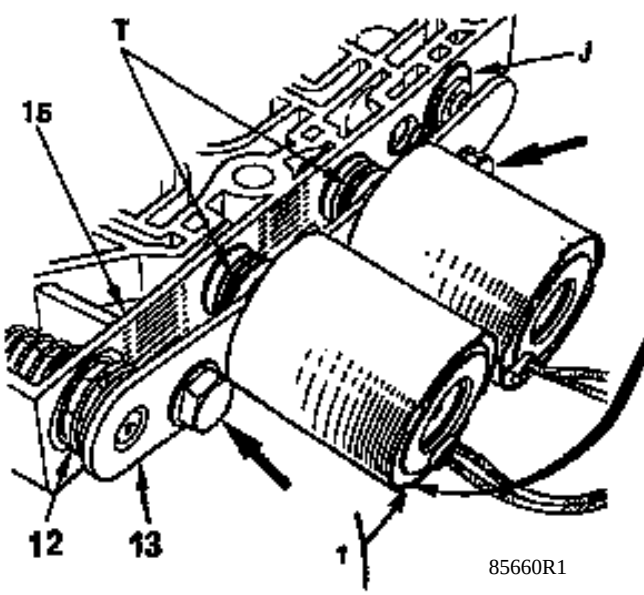
Lubricate the solenoid valves and fit the solenoid pilot valve marked 1 on the regulating valve side (see diagram).

Tighten the bolts securing the plate (13) progressively so that the final coil of the spring (12) is not jammed between the plate (13) and the unit (15) and tighten to a torque of **1.3 daN.m**.

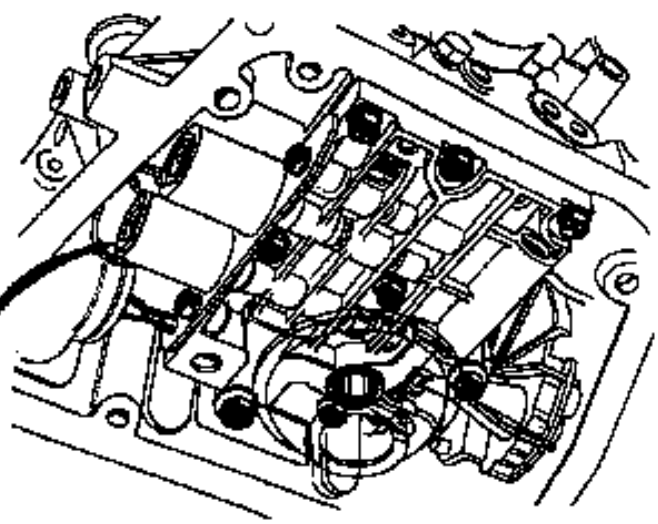
Fit the clip into the socket of the sealed connector and reconnect it.

Refit the hydraulic distributor (see previous pages).

Top up the oil and adjust the oil pressure.



85660R1


85596S

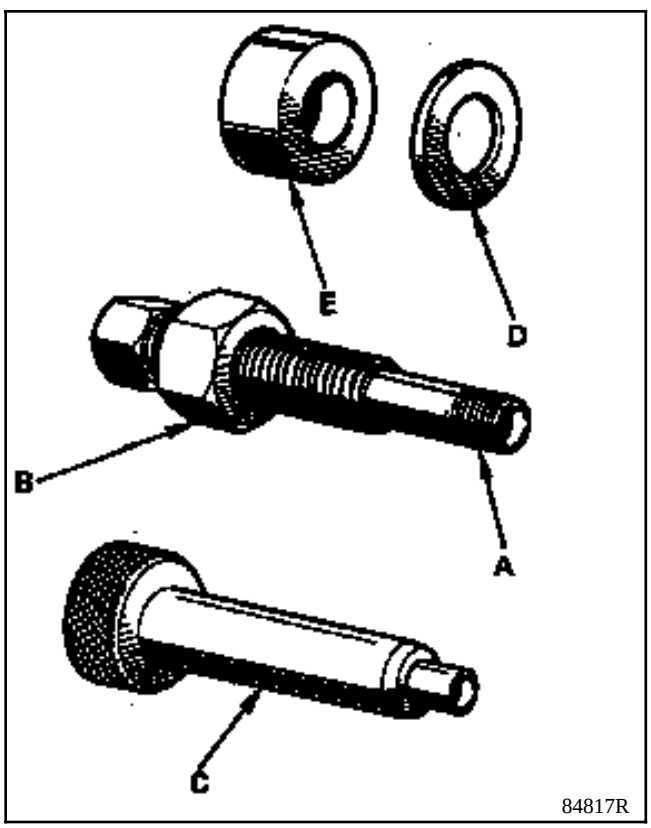
85596G

IMPORTANT: if the solenoid valves are not fitted in the correct locations, the vehicle will no longer have 1st gear.

REPLACING

SPECIAL TOOLING REQUIRED	
B. Vi. 905-02	**Tool for removing and refitting speedometer drive shaft seal**

The speedometer drive shaft seal is replaced using tool **B. Vi. 905** which comprises:
- a seal extractor (A) fitted with a nut (B),
- a tool for positioning seals (C),
- a thin spacer (D),
- spacer (E) is not used.



84817R

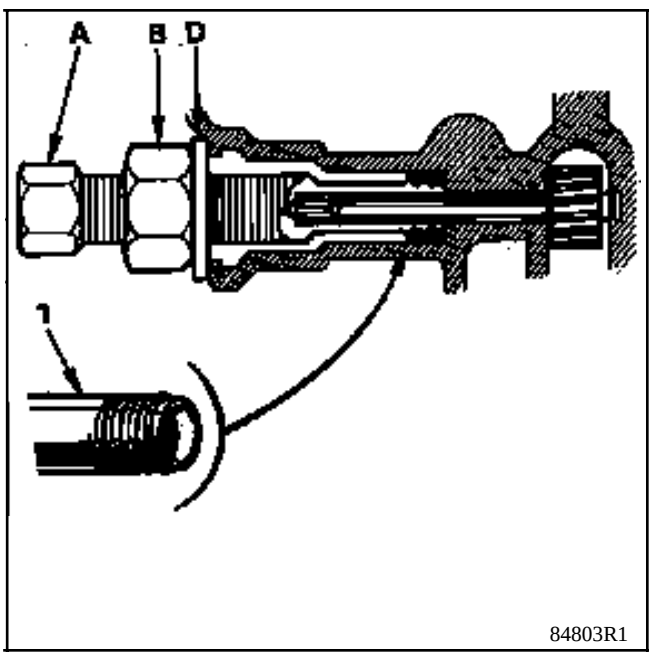
REMOVAL

Disconnect the speedometer drive cable from the automatic transmission.

Fit the extracting tool (A) fitted with nut (B) and spacer (D).

Screw in tool (A) for approximately 3 turns after the tool has made contact with the seal so that the screw thread (1) penetrates the rubber.

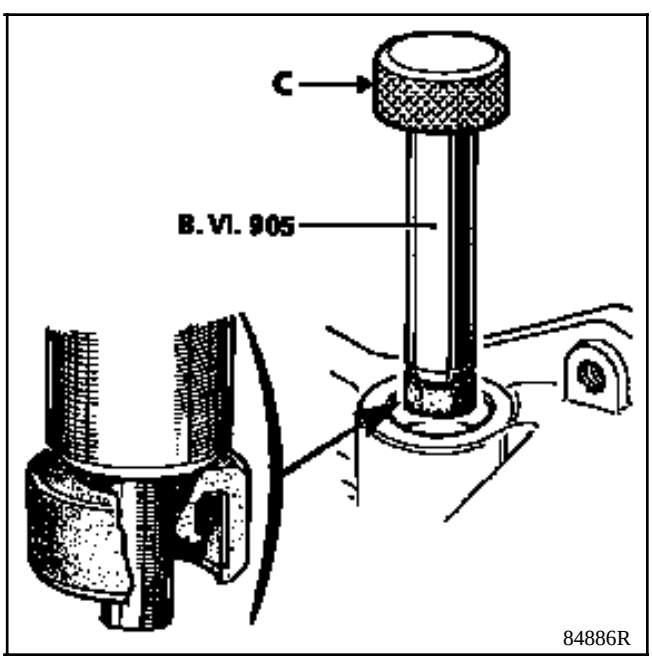
Extract the seal by turning nut (B) and holding tool (A).



84803R1

REFITTING

Fit the seal on tool (C) making sure it is the correct way round and tap the end of the tool.

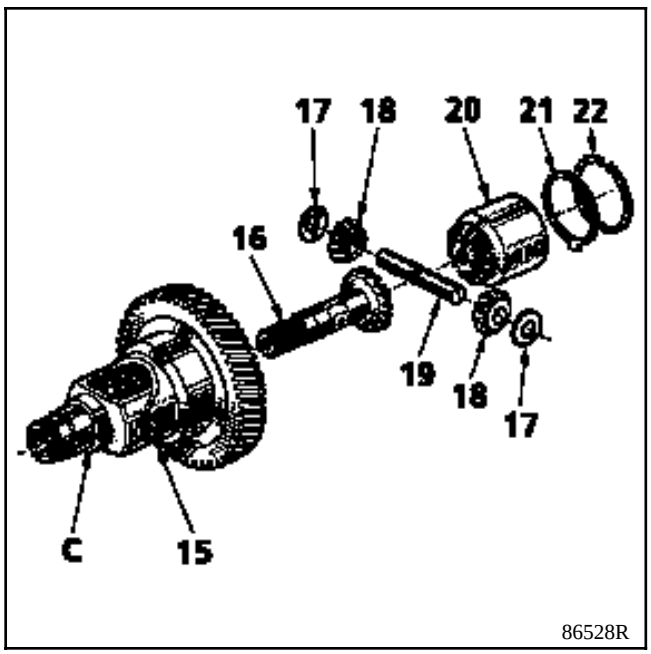


84886R

REPLACING

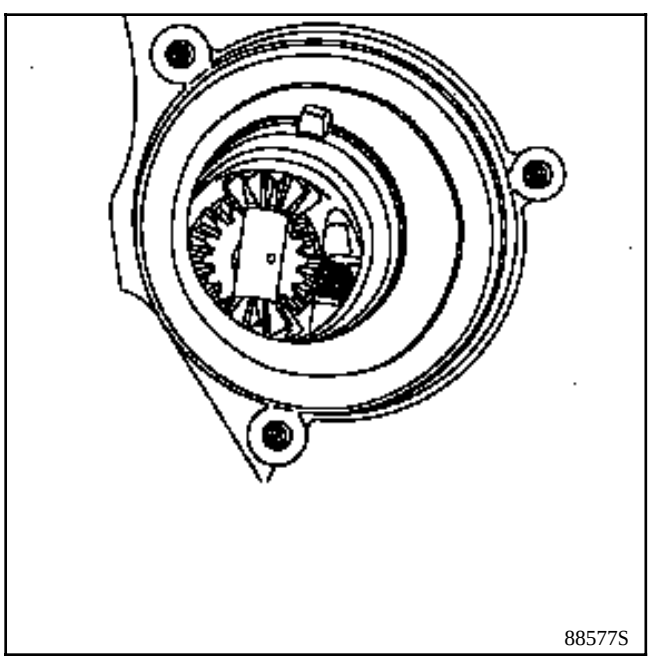
1st CASE: Only the speedometer drive pinion or shaft is damaged.

The automatic transmission must be removed but the final drive assembly does not have the be dismantled. Process as follows:
From the differential, remove:
- the circlip (22) and the washer (21),
- the sunwheel (20).



Pull the speedometer drive shaft using a pair of flat-nose pliers.

Rotate the differential until the speedometer drive pinion can be seen inside it.

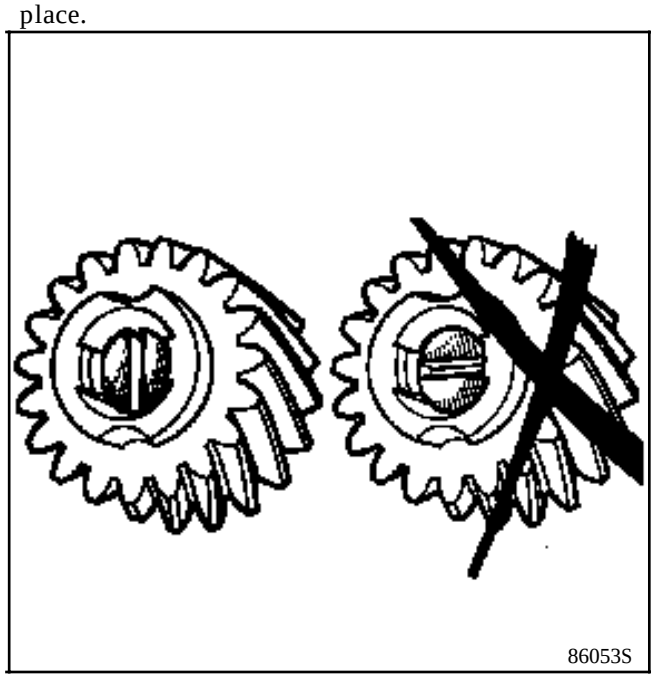


Loosen the pinion with a screwdriver and recover it.

Fit the new speedometer drive pinion using a pair of flat-nose pliers.

The pinion and its drive shaft can be refitted by hand. The drive shaft must be correctly positioned in relation to the pinion key notches due to the resilience of the lips of the shaft.

Use a mallet to ensure that it is properly clipped in place.



Reposition the drive shaft (19) in the differential and refit:
- the sunwheel (20),
- the washer (21) (make sure that the notch is in the correct position) and its circlip (22).

Refit the automatic transmission

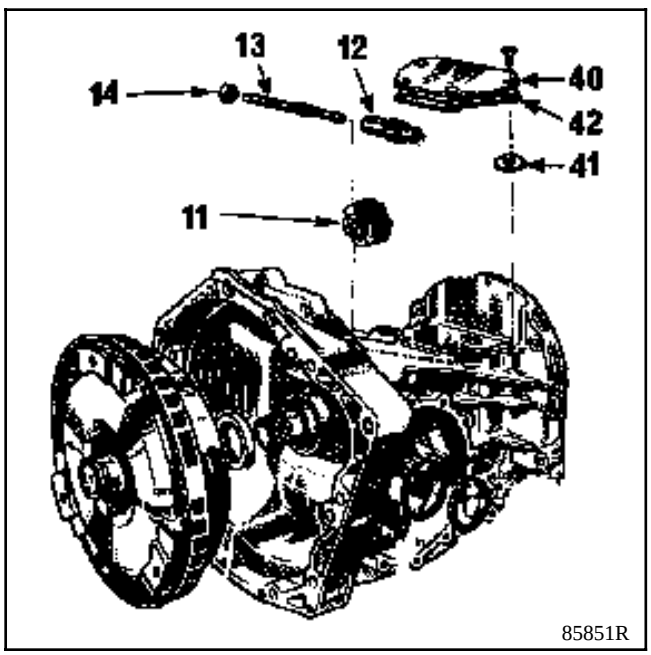
2nd CASE: The speedometer drive pinion and wheel are damaged.

The automatic transmission does not have to be removed and the final drive does not have to be dismantled.

REPLACING

Depending on the type of vehicle, release or remove the steering mechanism to gain access to the inspection plate (40).

Disconnect the speedometer cable.



85851R

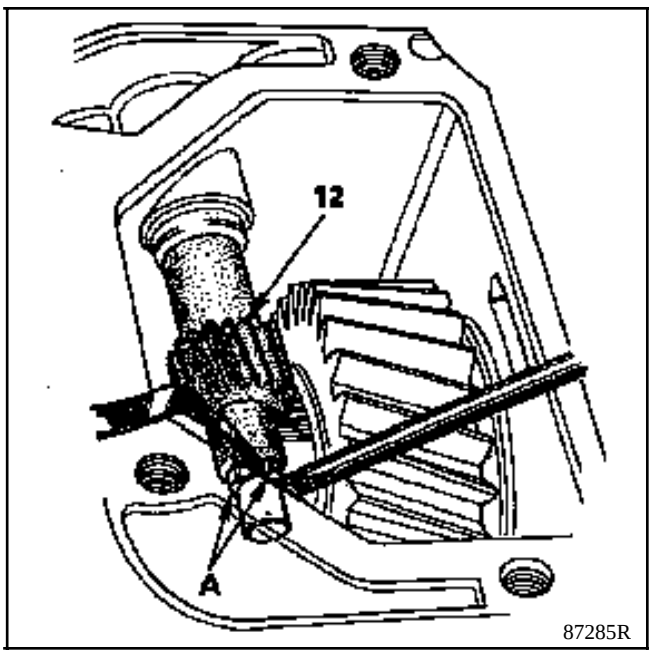
REMOVAL

Remove:
- the cover plate (40) carefully (**do not drop spacers (41) if working on original fitment**),
- the spacers (41) of the seal (42) using a magnet (original fitment),
- the seal (42).

1st CASE: Only the speedometer drive pinion (12) or the shaft (13) is damaged.

Pass a **piece of 0.05 mm thick strap iron** under the three notches (A) of the speedometer drive pinion (12), spreading them apart slightly with a screwdriver.

Pull the speedometer drive shaft (13) with a pair of flat-nose pliers (do not let the **strap iron fall into the sump**).

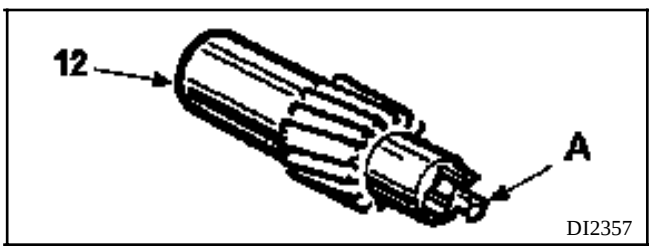


87285R

2nd CASE: The pinion (12) and the drive wheel (11) are damaged.

The automatic transmission must be removed.

Break off notches (A) from (12) and recover them.



DI2357

Pull the speedometer drive shaft (13).

Remove the speedometer drive wheel (11) (see page 145).

REFITTING

Special features:
- Check the condition of (13).
- Replace (12) systematically.
- Grease all parts before assembly.
- Top up the oil level.

If particles of polyamide from the speedometer drive pinion or wheel are found in the oil, the automatic transmission must be drained and refilled with clean oil and the strainer changed.

REPLACEMENT

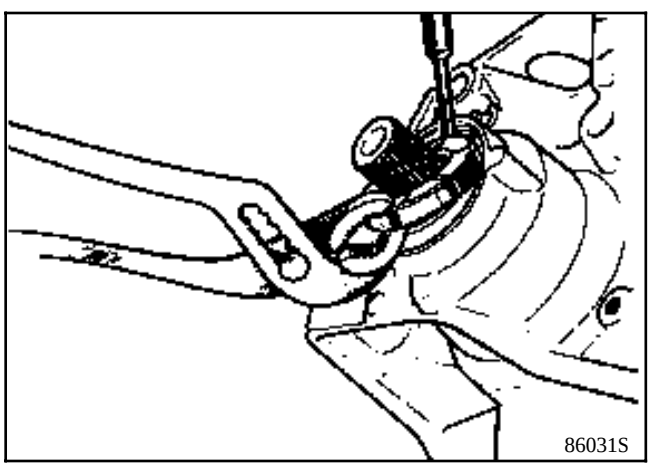
SPECIAL TOOLING REQUIRED		
B. Vi.	**945**	**Tool for fitting lip seal**

REMOVAL

Remove the sunwheel O-ring.

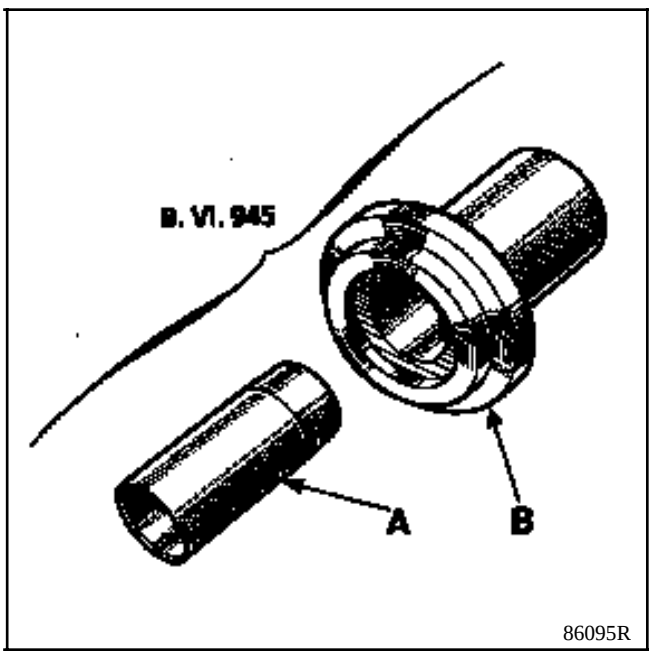
Strike the lip seal base with a pin punch and a light hammer to cause it to tilt in its location.

Once the seal is dislodged, remove it with pliers taking care not to damage the sunwheel splines.



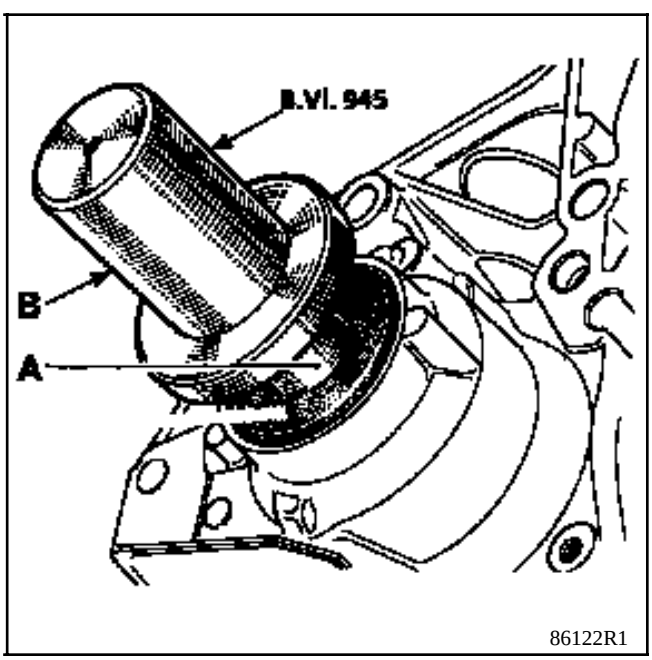
REFITTING

The seal is fitted using tool **B. Vi. 945** which consists of:
- a seal protector (A),
- a tool for fitting the seal (B).



Method:

Put the greased protector (A) on the sunwheel and position the seal with the tool (B).



REPLACEMENT

SPECIAL TOOLING REQUIRED		
B. Vi.	**951**	**Tool for fitting the differential oil seal**

TIGHTENING TORQUES (in daN.m)	
Cover plate securing bolts	**2**

REMOVAL

Remove the sunwheel O-rings and the differential cover plate securing bolts.

Using a mallet, tap the right hand sunwheel to remove the cover plate.

During this operation, take care not to allow the differential to drop.

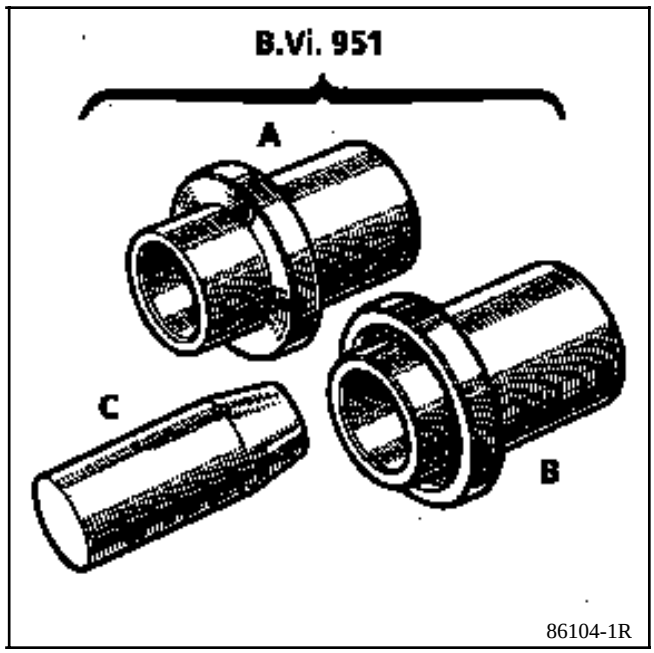
Remove the two baffles and the two lip seals.

REFITTING

Refit:
- the two baffles,
- the differential,
- the cover plate fitted with a new O-ring. Tighten the cover plate bolts to the correct torque.

The lips seals are refitted using tool **B. Vi. 951** which consists of:

A - A tool for fitting the seal on the cover plate side
B - A tool for fitting the seal on the opposite side to the cover plate.
C - A protective sleeve. Oil sleeve (C) before using it.



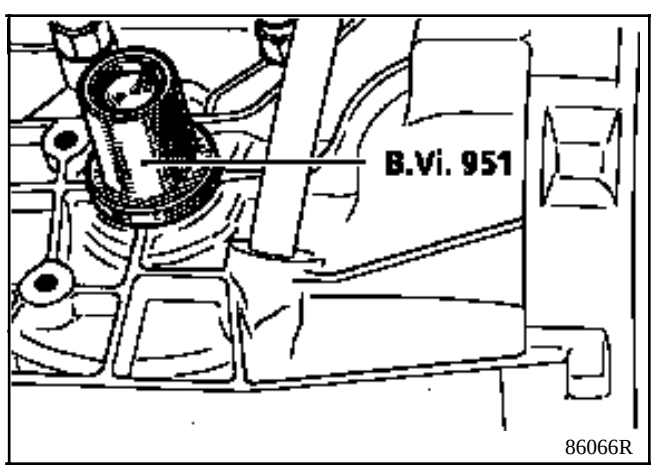
Method:

- **On the cover plate side:**

Fit the sleeve (C) to the sunwheel, fit the seal to the sleeve and position the seal using tool A.

- **On the opposite side to the cover plate:**

Follow the same method using tool B to position the seal.



REPLACEMENT

SPECIAL TOOLING REQUIRED		
B. Vi.	**645**	**Castellated wrench for differential lock nut**
B. Vi.	**805**	**Castellated wrench for differential lock nut (can be fitted to B. Vi. 645)**

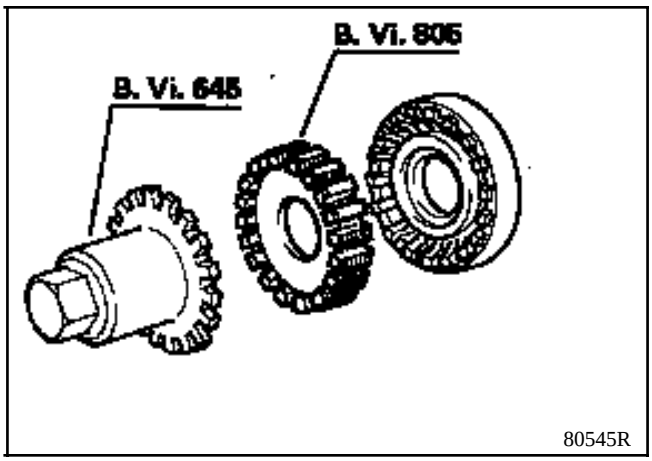
Drain the final drive casing.

Disconnect the driveshaft at the final drive end.

Mark the position of the adjusting nut in relation to the casing.

Remove the lock plate.

Slacken the nut, counting the number of turns using tools: **B. Vi. 805** and **B. Vi. 645**.



Replace the seal alone or the nut / seal assembly.

Refit the nut fitted with a new, lubricated O-ring, tightening it by the same number of turns as was needed to slacken it and making sure it is in line with the marks made during removal.

Refit the lock plate.

Reconnect the driveshaft.

Fill the final drive casing with oil.

As from **1985**, on MB automatic transmissions, the **VERTO diameter 216** converter has been replaced by a **RENAULT diameter 227** converter.

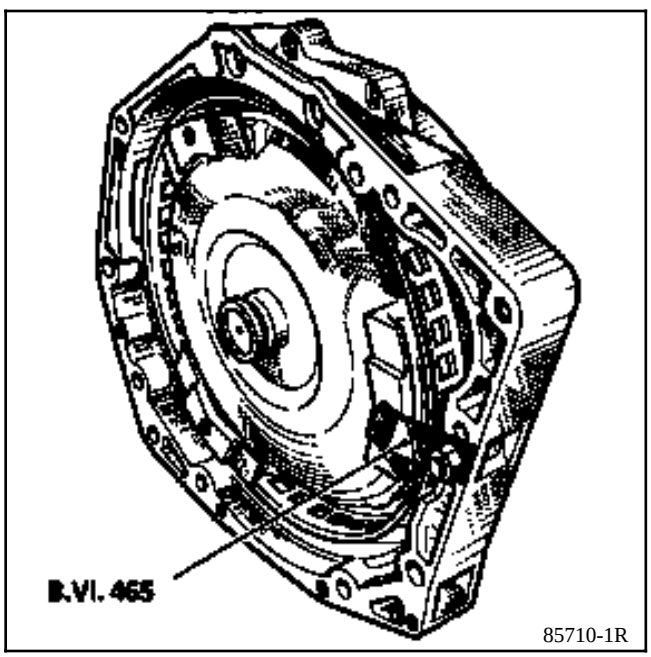
Replacing the torque converter involves:
- replacing the drive plate,
- replacing the pump, turbine and stator shafts.

The method for removing and refitting the torque converter and pump and turbine shafts on the automatic transmission is the same as the method described on the following page.

SPECIAL TOOLING REQUIRED	
B. Vi. 465	**Tooling for replacing the converter seal**

REMOVAL

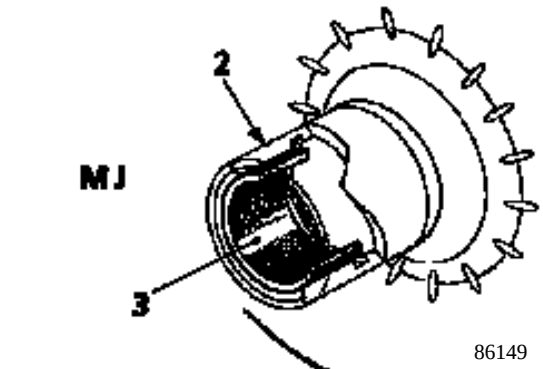
Remove the retaining bracket **B. Vi.465**.



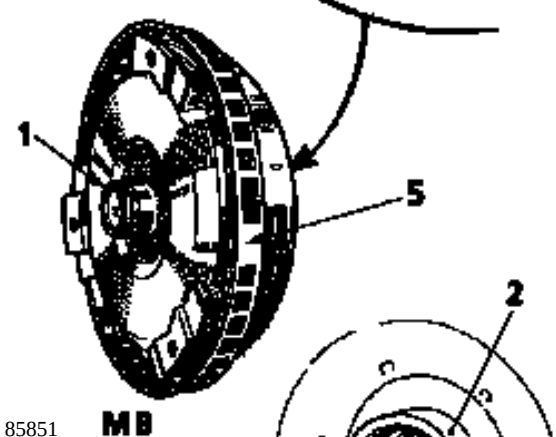
Pull the converter towards you and remove it.

CHECKING

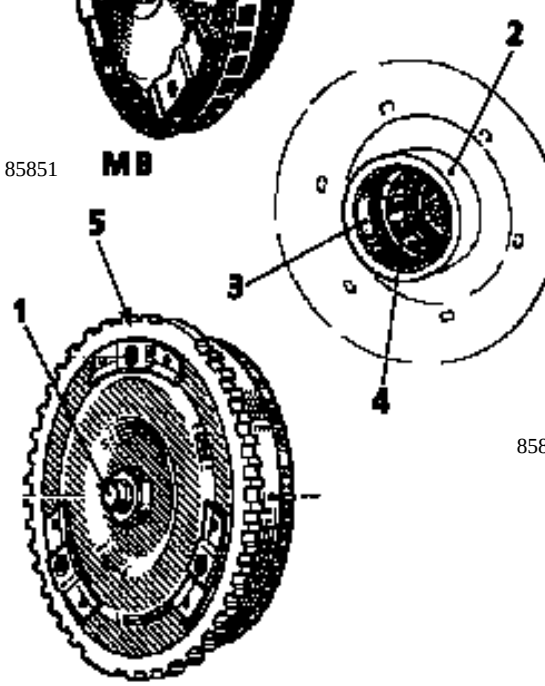
Check the condition of:
- the converter centring device (1) (at crankshaft and converter end) **diameter 16**: MB - **diameter 40** : MJ, ML ,
- the sealing area (2),
- the converter"**white metal**" bush (3),
- the free wheel (4) for MB1 ,
- the three securing points or studs,
- the ignition sensor target (5).



86149



85851 MB



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86498

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NOTE:

1) ONLY THE RECOMMENDED OIL MUST BE USED IN THE TORQUE CONVERTER.

2) If the oil contains particles from damaged clutches or brakes (the oil will be black and smell burnt and no trace of swarf in the sump), follow the instructions below for discharging the oil from the converter:

- ALLOW THE OIL TO DRAIN FROM THE CONVERTER

- FILL THE CONVERTER WITH CLEAN OIL (ELF RENAULTMATIC D2). USING A TURBINE SHAFT, ROTATE THE TURBINE TO MIX THE OIL AND LET IT DRAIN.

- AFTER REFITTING THE AUTOMATIC TRANSMISSION, TOP UP THE OIL AND RUN THE ENGINE (lever in Park) FOR SEVERAL MINUTES. DRAIN THE AUTOMATIC TRANSMISSION AND REPLACE THE STRAINER.

Refitting
Rotate the oil pump shaft and turbine shaft by hand to check that they turn freely.

Oil the "white metal" bush and the seal joint face

Fit the torque converter and the retaining bracket **B. Vi. 465.**

Protect the seal joint face with a plastic cap whilst the converter is being handled.

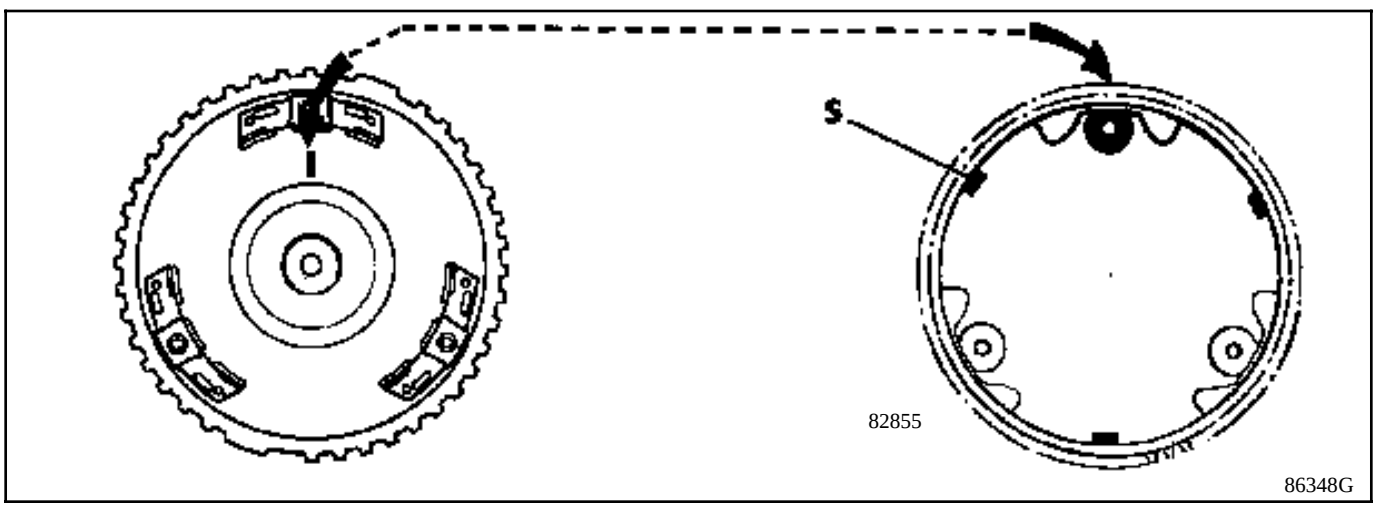
ATTENTION:

Both the torque converter and the drive plate have a mark on them.

These marks should line up with each other.

If they do not line up, the converter will be offset by 120° when mounted which means that the ignition timing point mark will be read at the wrong time.

MB (diameter 216 converter)



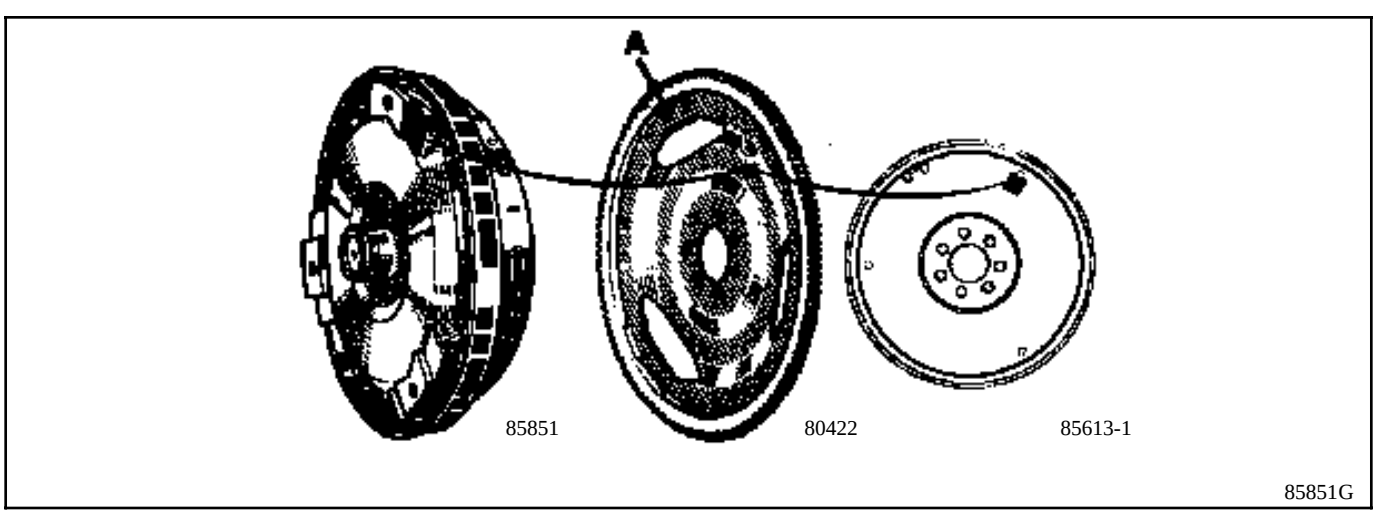
Dab of paint on the converter

Dab of paint and pointed section cut out of drive plate.

MB (diameter 227 converter)

On **MB** automatic transmissions fitted with a ∅ **227** converter, the converter and plate do not have to line up (no ignition target and no TDC mark on the converter).

MJ all types



Dab of paint on the converter

Dab of paint on the drive plate (the **TDC** park (A) is on the plate).

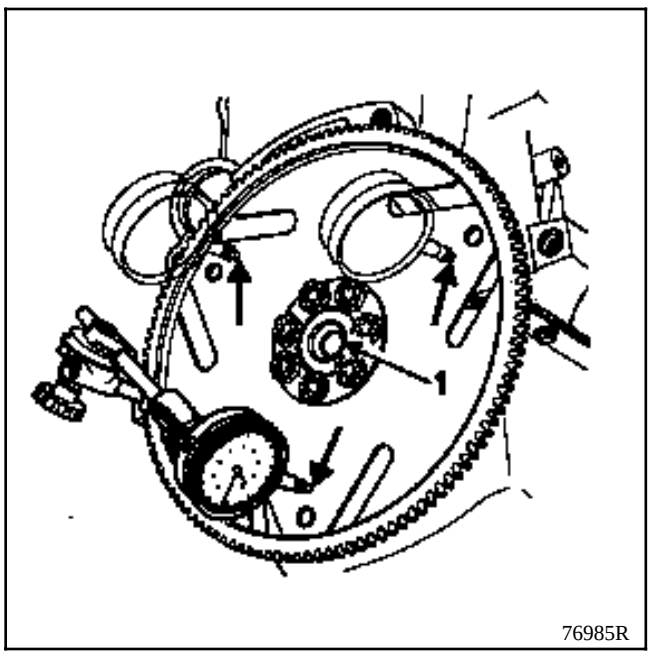
CHECK

Place a support, fitted with a dial gauge, on one of the cylinder block mounting holes.

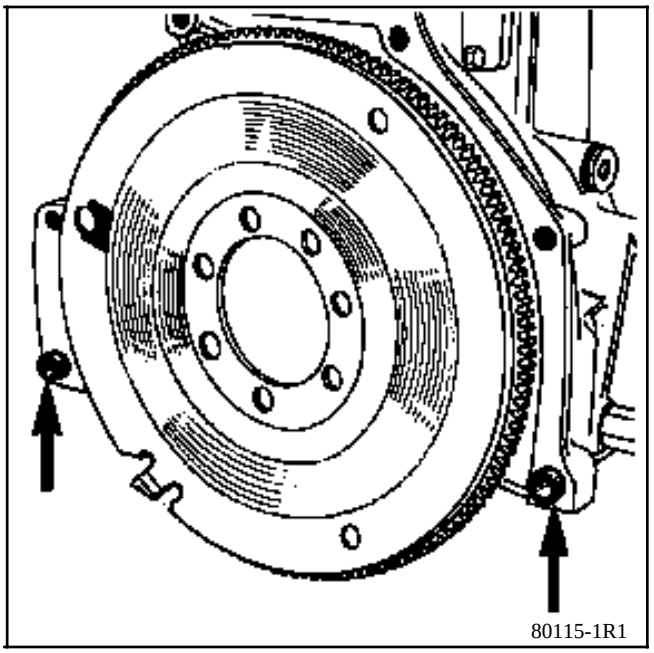
Take a reading at each converter mounting hole.

Compare the readings:
- the permissible runout is:
  . **0.3 mm** (all types),
  . **0.5 mm** (C06).

If the readings are above this figure, the drive plate must be replaced.



Before refitting the automatic transmission, check:
- the condition of the locating spigot (1) in the crankshaft,
- that the locating dowels are present on the engine and starter,
- that the ignition sensor target on the drive plate is circular for a diameter **227** converter.



ATTENTION:

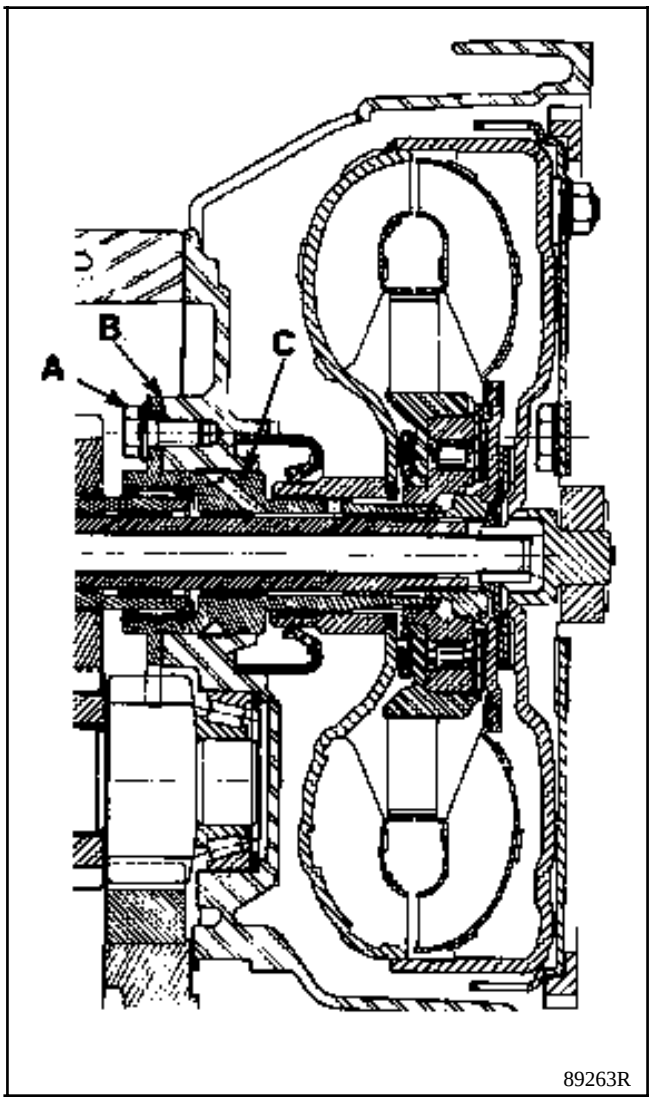
The drive plate of a **CO6** requires specific assembly. Refer to the relevant technical note.

The stator shaft can be removed from the converter housing.

To do this, after opening the final drive housing, remove the bolts (A) and extract the shaft.

When refitting, ensure that the paper seal (B) is fitted and that the O-ring (C) is in good condition. Tighten the stator shaft mounting bolts to:

$2.5\ ^{+0.5}_{0}$ daN.m



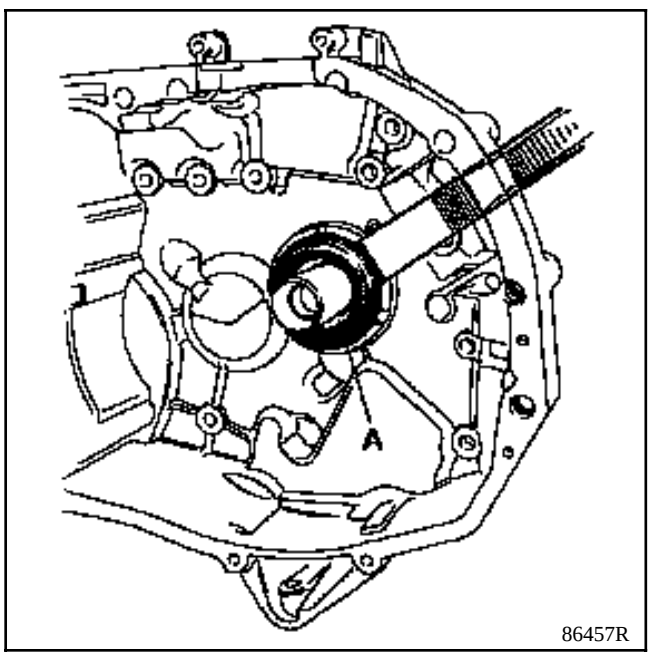
Length of pump shaft	.....	**324 mm**
Length of turbine shaft	.....	**284 mm**

SPECIAL TOOLING REQUIRED	
B. Vi. 1405	**Tool for extracting converter seal (from kit B. Vi. 1400-01)**
B. Vi. 1402	**Tool for centring converter seal (from kit B. Vi. 1400-01)**
B. Vi. 465	**Tool for replacing converter seal (MJ automatic transmission).**

This operation is performed after the converter has been removed.

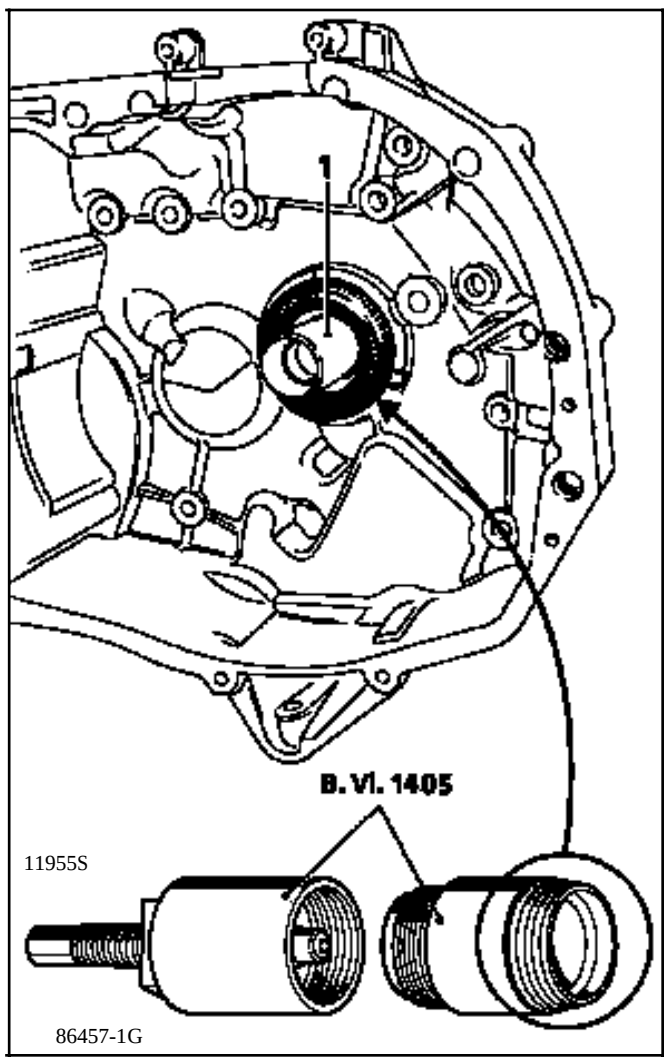
Removal

Remove the seal using a chisel but **only for metal shelled seals (old fitment).**



For rubber encased seals (new fitment).

Remove the sealing ring (A) using tool **B. Vi. 1405**, with the ring marked **41/50**, inserting it very straight. Then turn it through approximately one revolution and extract the seal by progressively tightening the bolt of the extractor.

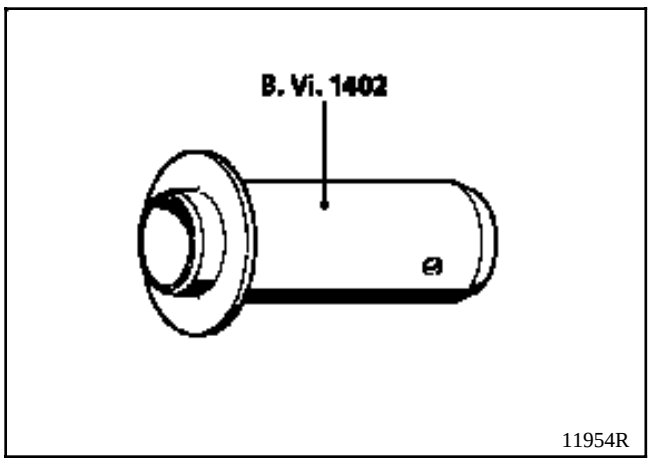


Check the condition of the smooth part of the stator shaft at (1).

Refitting

FIT A RUBBER ENCASED SEAL ONLY

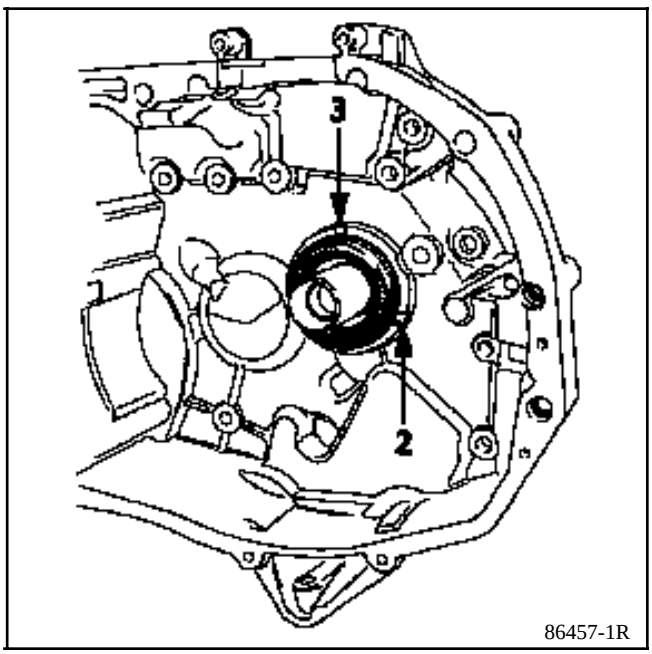
Position the lip seal (oiled) using tool **B. Vi. 1402** (take care not to allow dirt to enter when fitting the seal).



Refit the converter, lubricating the face of the seal with automatic transmission oil.

SPECIAL NOTES

NOTE: depending on when the **MB** automatic transmissions were manufactured, the converter casing may or may not have grooves (2) and (3).



If the casing does have grooves, follow the instructions below:

- remove the sharp edges of the grooves (2) and (3) at the bore,
- after fitting the seal, fill grooves (2) and (3) with "Loctite SCELBLOC".

MJ automatic transmission

Removal

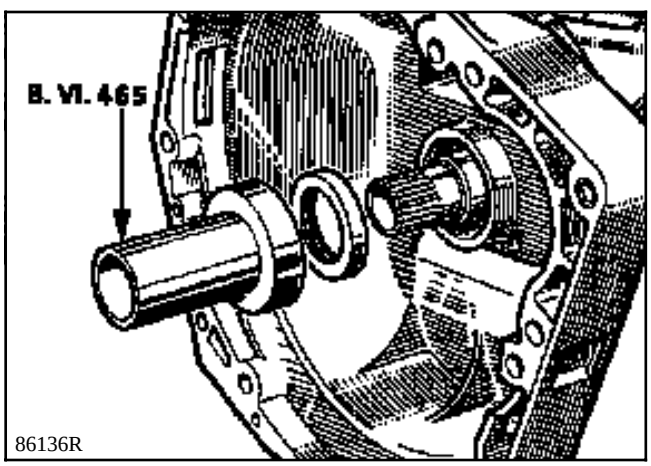
When the converter has been removed, remove the seal (use a tool without any mould seams so that the casing bore is not damaged).

Check the condition of the smooth part of the stator shaft at (1).

Refitting

Lightly grease the new seal and fit it on the chamfer.

To position it, use tool **B. Vi. 465**, tapping lightly.

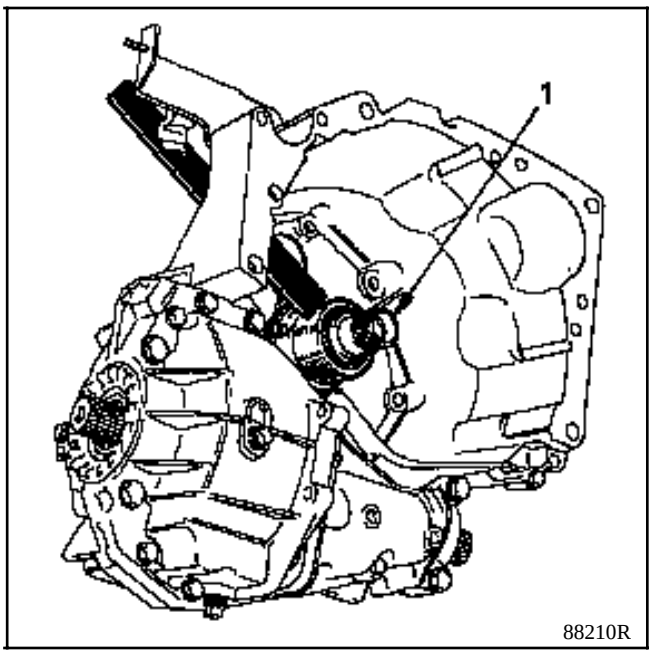


Refit the converter after having lubricated the seal face

ML automatic transmission

Removal

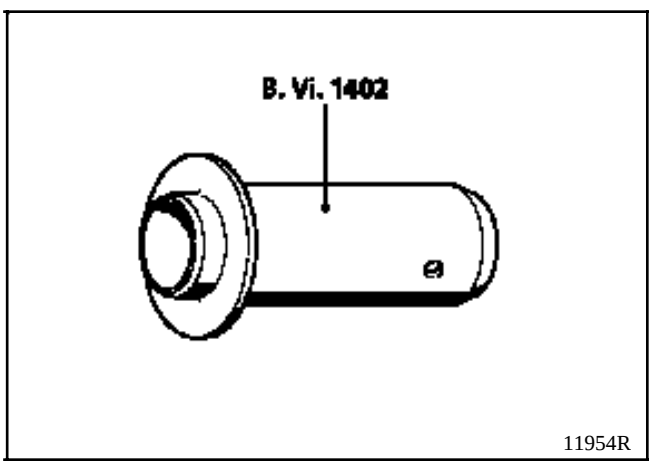
When the converter has been removed, remove the seal using a chisel or an extracting tool.



Check the condition of the smooth part of the stator shaft (1).

Refitting

Oil the seal and push it fully on using tool **B. Vi. 1402**.



Refit the converter after lubricating the seal face.

NEEDLE THRUST RACES AND WASHERS

Needle thrust race between the drive hub and **E1 E2**
30 x 48 x 3.60

Needle thrust race between **E1 E2** and planet wheel carrier.
32 x 48 x 3.60

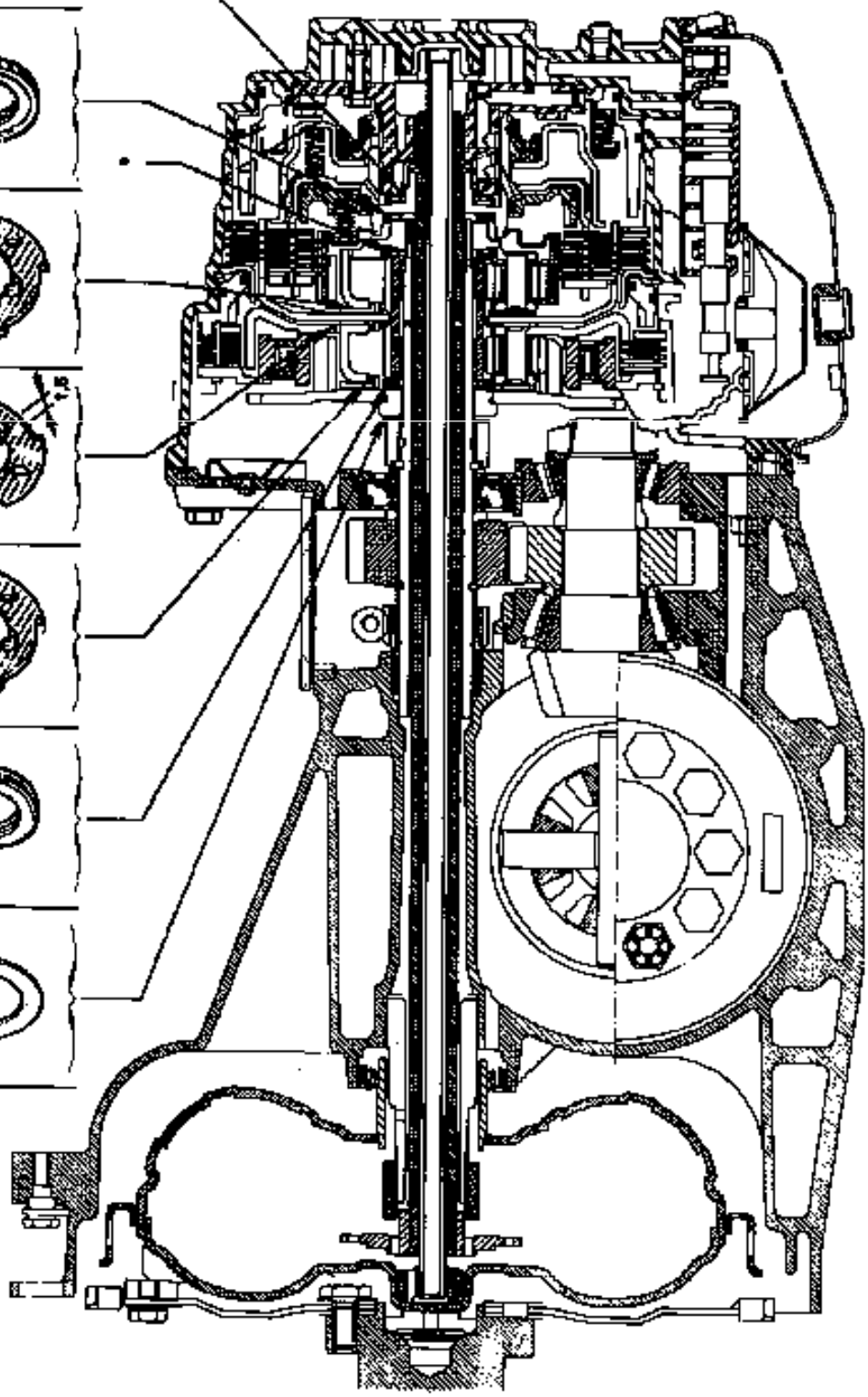
Plastic washer between bell housing **E2** and the planet wheel carrier.

Plastic washer between bell housing **E2** and the planet wheel carrier.

Plastic washer between park wheel and planet wheel carrier, thickness depends on type of automatic transmission

Needle thrust races between park wheel and sunwheel
30 x 48 x 3.60

Adjusting shim (**0 to x**)



* unremovable.

DI2358

SPECIAL TOOLING REQUIRED		
B. Vi.	**952**	**Tool for removing F2 piston**
B. Vi.	**715**	**Tool from kit B. Vi. 710**

TIGHTENING TORQUES (in daN.m)		
Gear section casing mounting bolts		**2**
Sump bolts		**0.6**
Hydraulic distributor mounting bolts (see tightening order)		**0.9**
Oil pump hub mounting bolts	**Diameter 7**	**1.5**
	Diameter 6	**0.6**

REMOVAL

The components must be removed and handled on a bench with a padded top (rubber or thick plastic).

SEPARATING THE CASINGS

Remove the converter.

Remove the pump drive shaft.

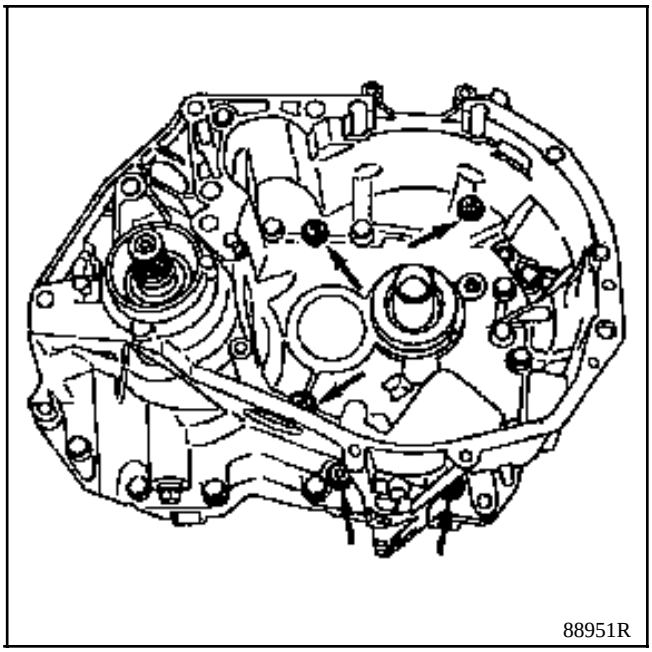
Remove the dipstick tube and its O-ring (**MJ**).

Separate the final drive casing from the gear section casing.

Special notes:

MB

Remove the bolts marked with an arrow and the external bolts from the gear section housing. **REMEMBER TO REMOVE THE NUT AT THE LEFTHAND SUNWHEEL END.**

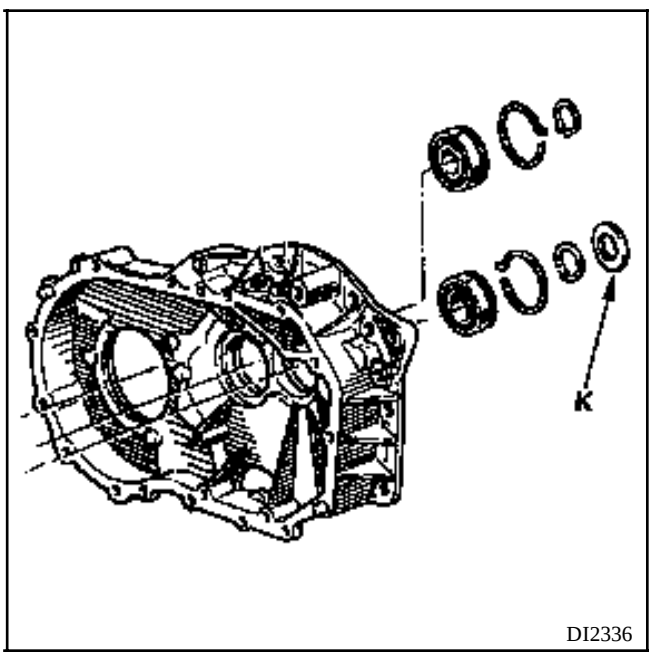

88951R

ML

Remove the external bolts from the gear section casing **and the two internal bolts which can be reached by removing the sump and strainer**.

MB

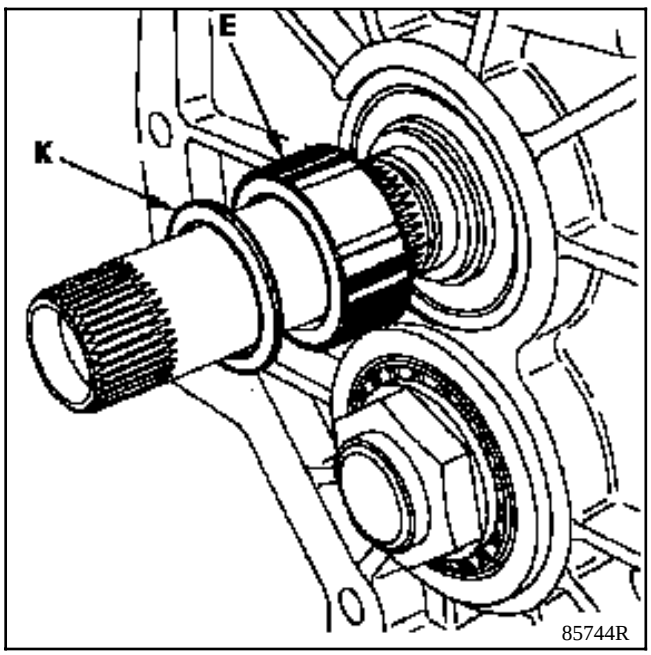
Leave shim (K) for adjusting the end float on the converter casing - spacer casing assembly on the output shaft.



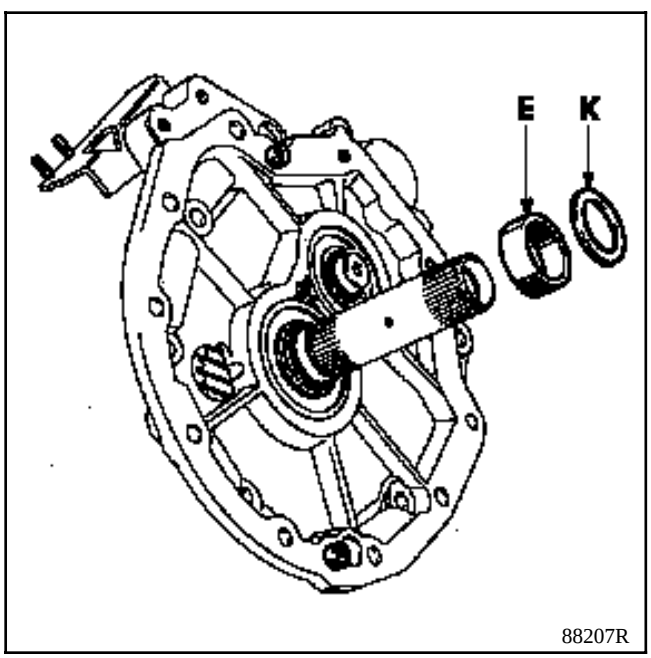
DI2336

Leave spacer (E) and shim (K) on the output shaft.

MJ

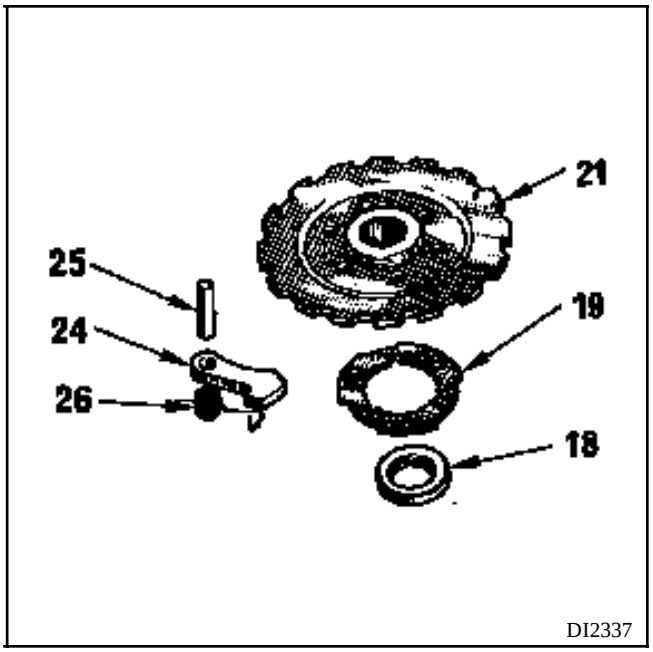


ML

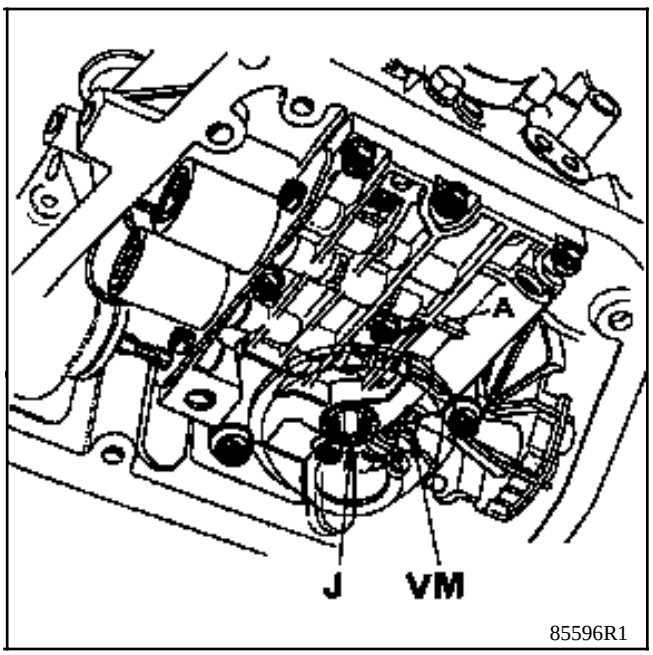


REMOVAL

From the gear section remove:
- the park wheel (21),
- the park pawl (24) and it spring (26),
- the plastic washer (19),
- the needle thrust race (18),



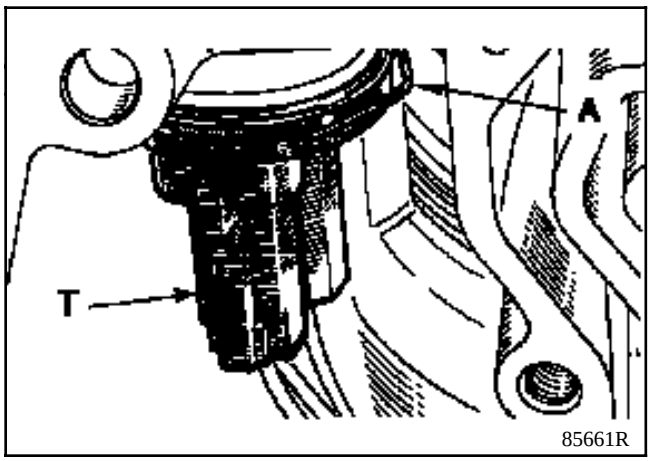
- the sump,
- the strainer and retrieve its seal (J),
- all the distributor bolts except bolt (A).



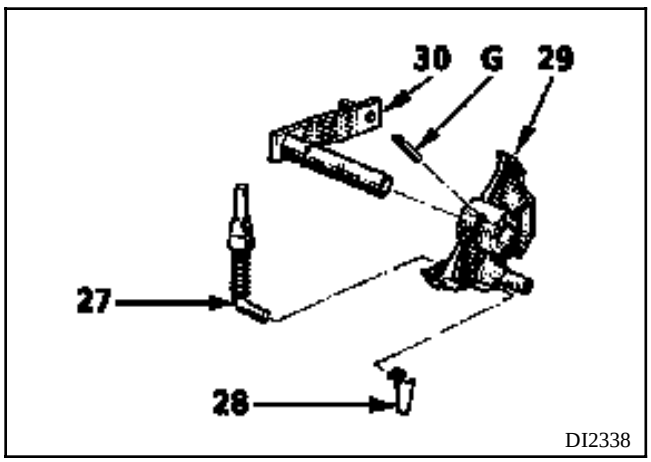
When removing bolt (A), take care not to let the following drop:
- the manually operated valve (**MV**),
- the plate and the two seals located under the distributor.

NOTE: See the "**hydraulic distributor**" section for complete instructions on removal.

Remove clip (A) and pull on connector (T).



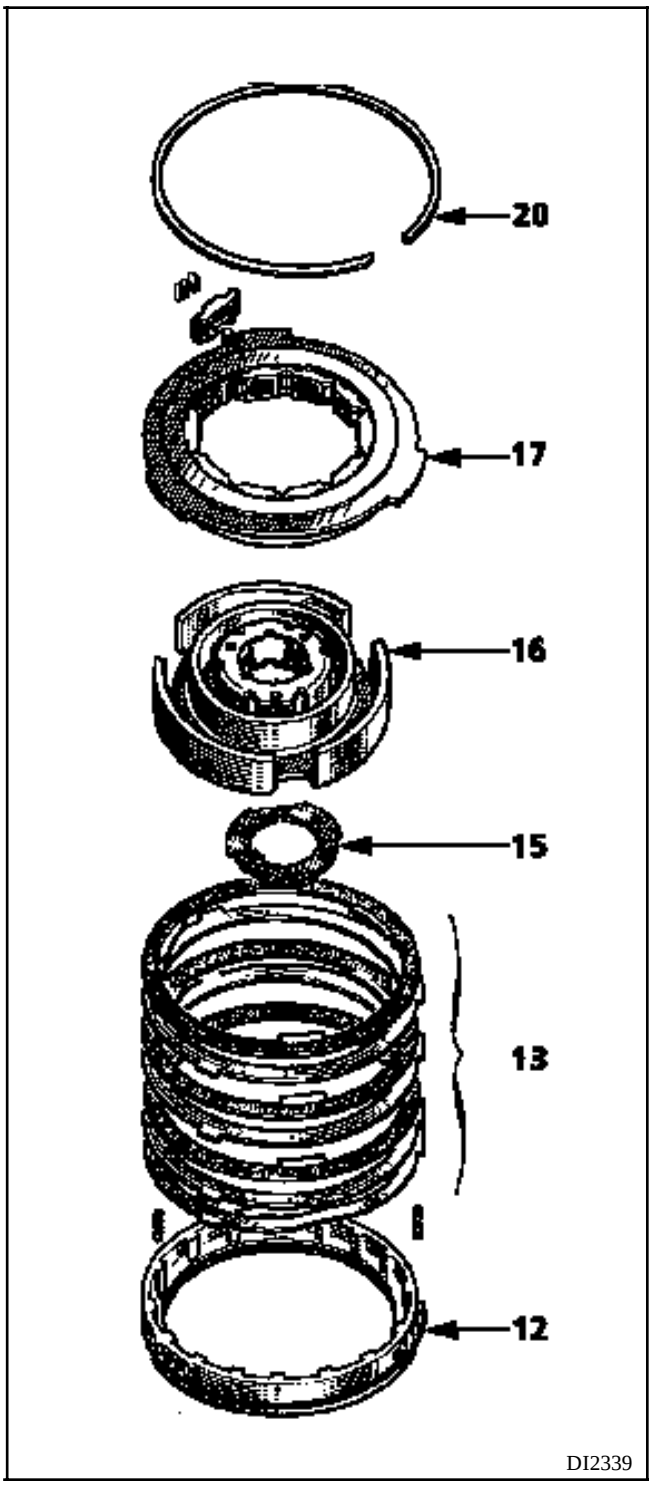
Remove:
- (28) - (27).



NOTE: to remove the lever (30), put it in 1st gear "hold" (opposite the "Park" position) and extract roll pin (G).

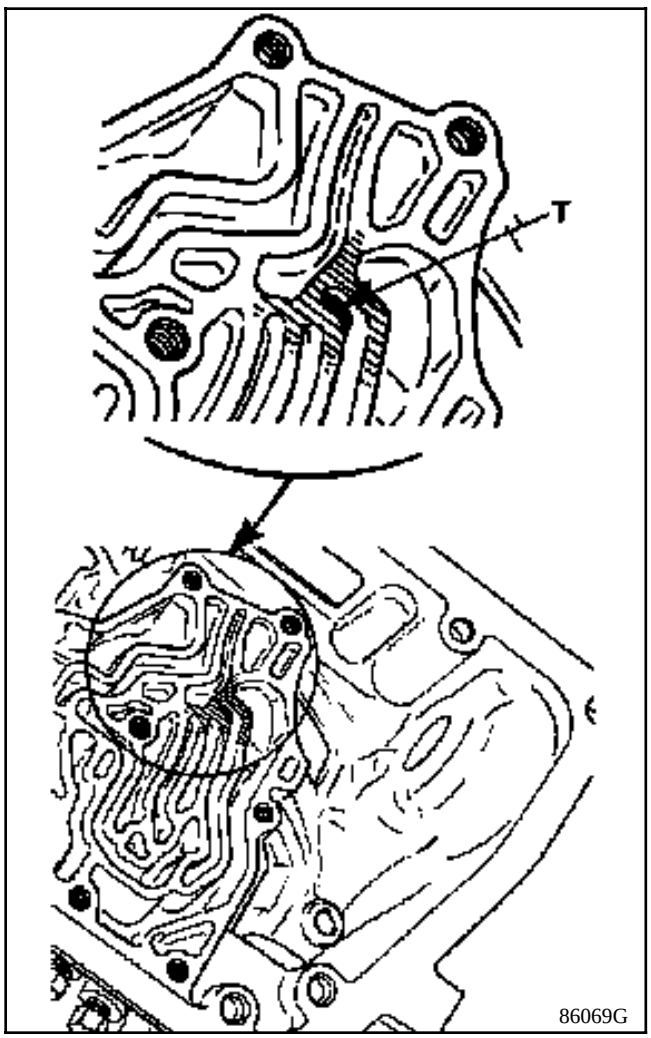
TAKE CARE NOT TO LOSE THE QUADRANT BALL AND SPRING.

- the circlip (20) and assembly (17 - 16 - 15 - 13),

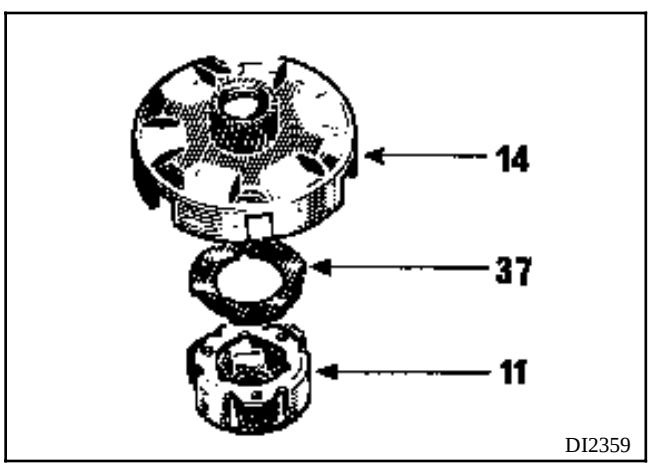


- the piston (12) blowing compressed air through hole T (see next page),

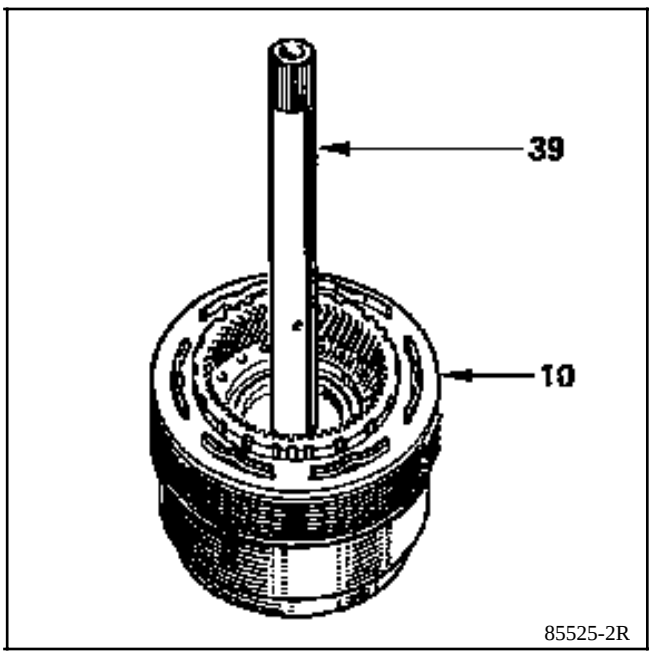
(insert a small pipe into hole T and apply compressed air). DO NOT USE TOOLS TO RELEASE (12).



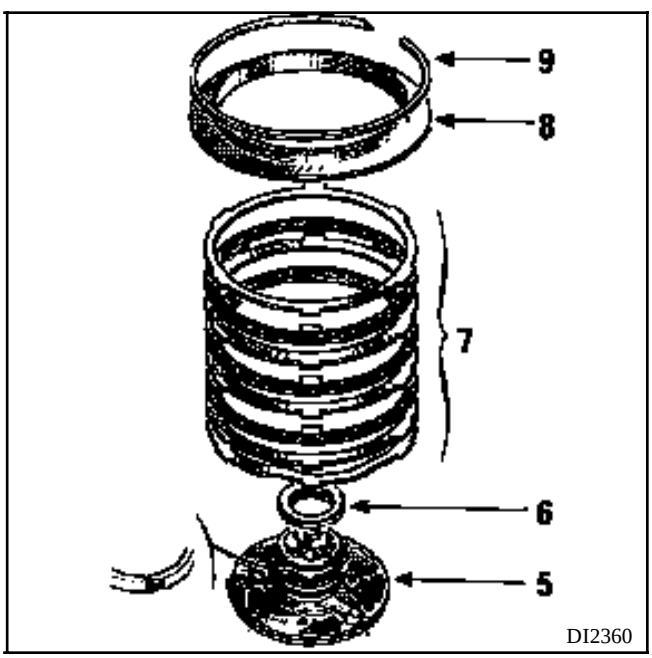
- the bell housing of **E2** (14) and (37-11),



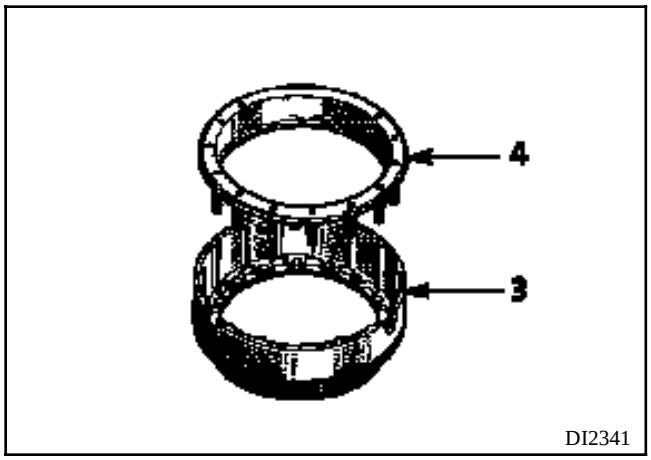
- the assembly **E1 - E2**, (10) using the turbine shaft (39) (assembly (10) cannot be repaired),

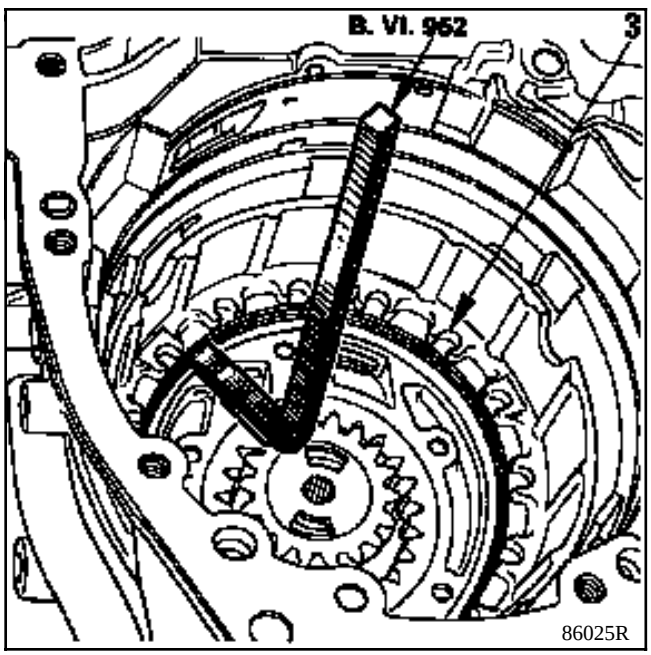


- circlip (9) and from (8 to 5),



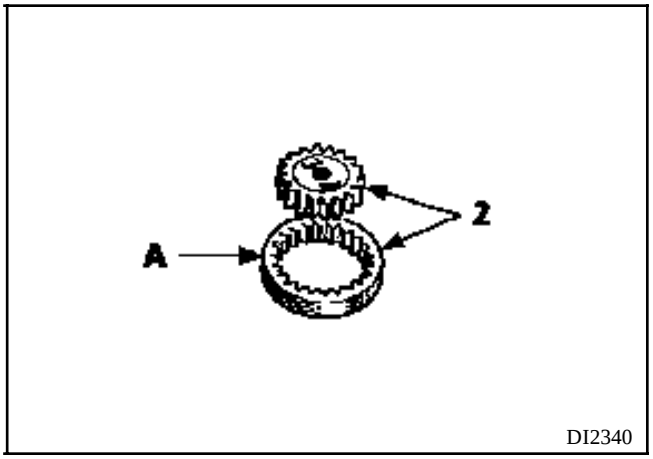
- the cup (4), the piston (3) using tool **B. Vi. 952** or a locally manufactured tool (see "**Special tooling**" section).





Mark the face (chamfer A) of the oil pump outer pinion and remove (2).

NOTE: on some versions, the faces are reversible.

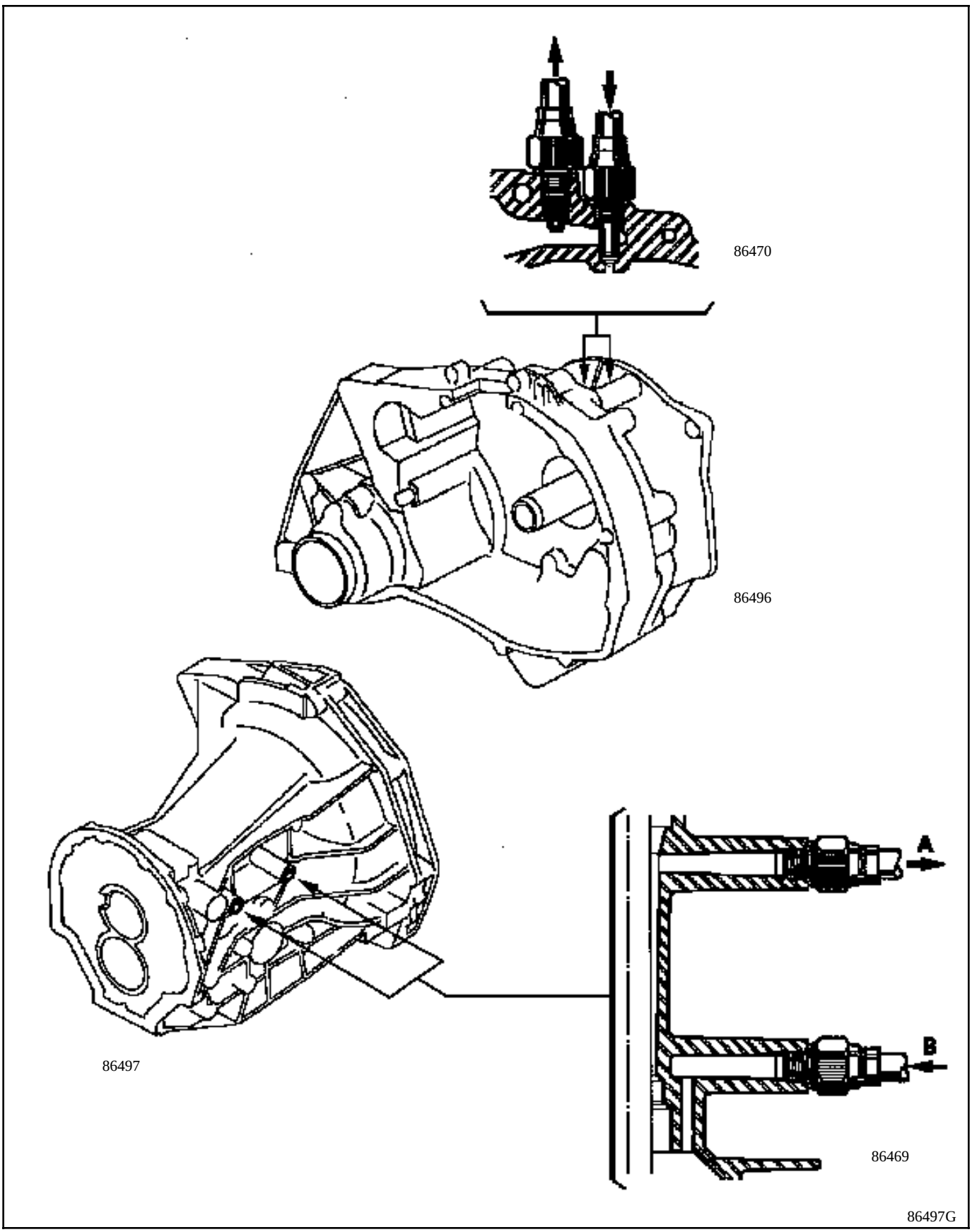


CLEANING

Do not use trichloroethylene as this may splash on the seals and cause damage.

Do not use cloths which could leave fluff in the system.

Use:
- white spirit or degreasing fluid, except on the seals, and lint-free wadding for wiping off,
- compressed air, blowing hard in all holes, feed ways and oil ways on:
  - the gear section casing (1),
  - the free wheel (17),
  - the forward gear train (11),
  - the reverse gear train (16),
  - the **E2** bell housing (14),
  - the pistons (12-3),
  - the drive hub (5),
  - the oil pump (2)
  - the pump shaft (38),
  - the turbine shaft (39).

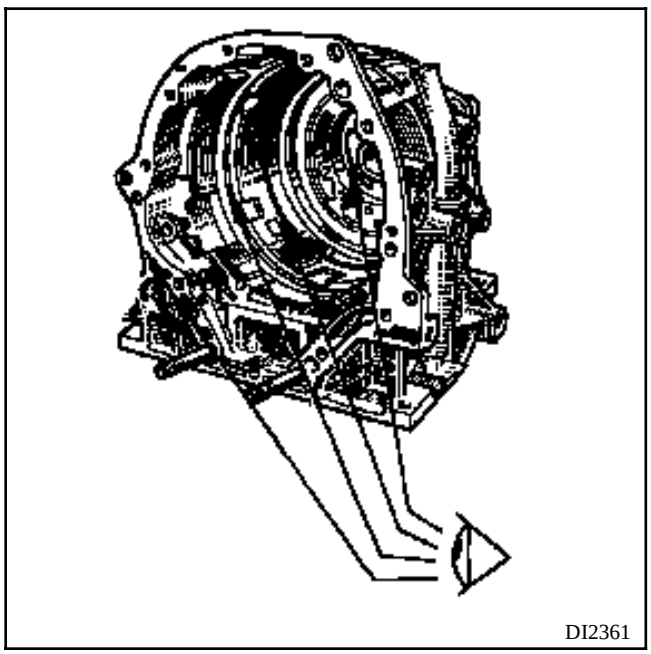


Blow compressed air into the oil cooler inlet and return pipes (A and B).

After cleaning, lubricate the parts immediately with recommended oil.

CHECKING

- GEAR SECTION CASING (1)


DI2361

Check that the following are in good condition:
- the oil pump location (see "**Oil pump**"),
- the circlip grooves,
- the seal faces for pistons **F1** and **F2**,
- the face of the casing holding the hydraulic distributor,
- the coupling faces,
- the seal faces of the sealed connector and input shaft.

- OIL PUMP (2)

Check the condition of the oil pump pinions.

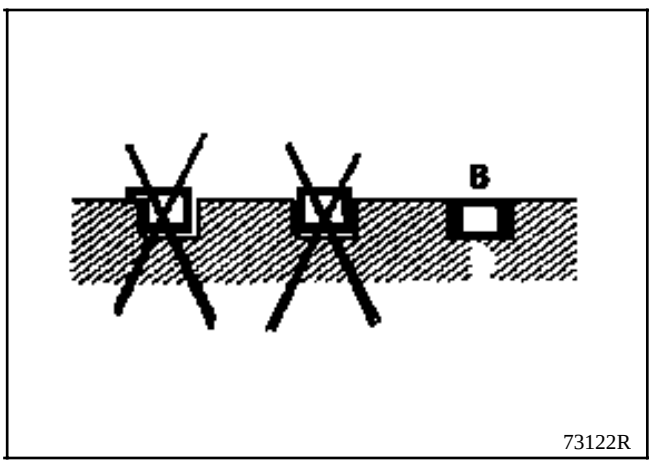
The "gear section casing-pinions-wheel" assembly is matched.

If one part has to be changed, then the entire assembly must be changed

- DRIVE HUB - SEALING RINGS (5)

Before removing the rings from the hub, **check that they rotate freely on the hub**. If they are seized, CHANGE THE HUB-RING ASSEMBLY.

Remove the rings and check the condition of the following on the hub:
- the bottom of the three grooves in which the rings fit,

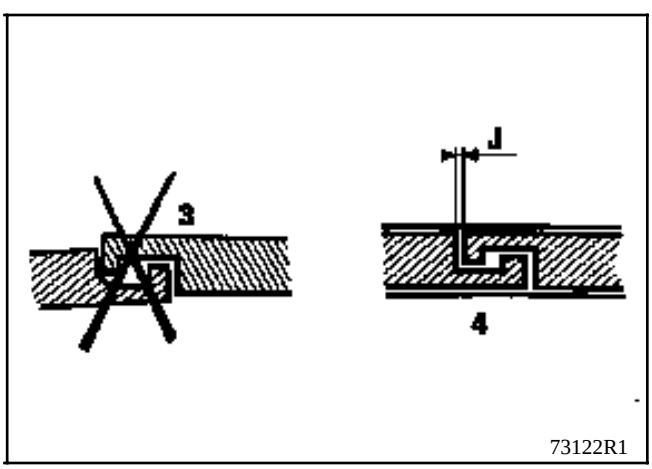


73122R

B = CORRECT

- the white metal faced bush,
- the face at the oil pump end.

On the rings, check:
- the ring gap ends (3), - they should fit together exactly (4),
- the clearance at section (J); must be between **0.05** and **0.35 mm**.



73122R1

- BRAKES (7) (13)

Any lined discs showing signs of overheating (blackening of lining) on which the finish is poor or which are worn must be scrapped.

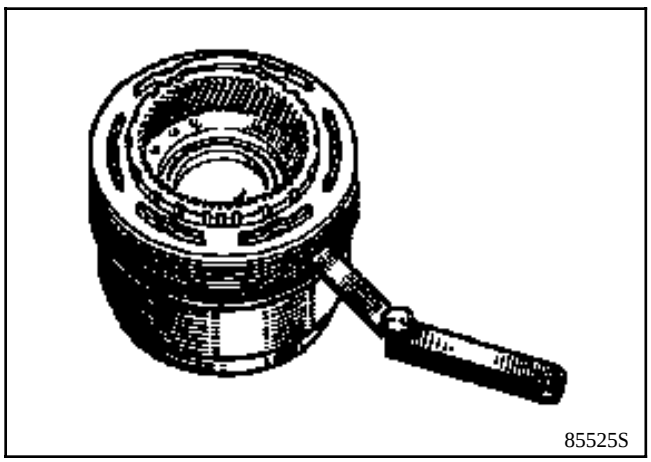
Scrap all steel discs that show signs of picking-up or seizing.

- CLUTCH E1, E2 (10)

Clutch **E1**, **E2** cannot be dismantled.

Clutch **E2** has visible discs.

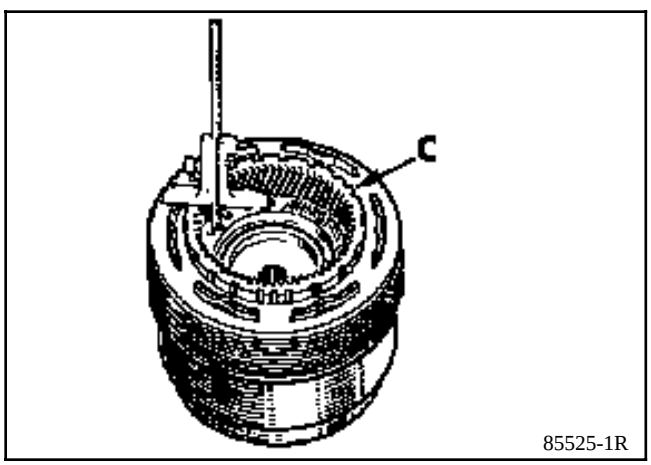
Using a set of shims, check the clearance of clutch **E2**.


85525S

Maximum permissible clearance: **MB: 3.5 mm**
MJ-ML: 4.1 mm

If the clearance is not correct, change **E1** - **E2** and check the hydraulic distributor.

Clutch **E1** is not visible but the clearance can be checked by moving ring (C).



85525-1R

Permissible movement: **MB: 3 mm**
MJ-ML: 3.5 mm

On **E1** - **E2**, check the condition of:
- the turbine shaft retaining seal,
- the inside of the bore accommodating the **E2** BELL HOUSING (14).

Check the condition of:
- the pinion,
- the two white metal faced bushes.

- CUP WITH PRESSED SPRING (4)

Check that the springs and their crimped areas are in good condition.

- SEALS

(Systematically replace all removed seals).

- HYDRAULIC DISTRIBUTOR (23)

The hydraulic distributor assembly can be removed (see "**Hydraulic distributor**" section).

If clutch **E1** is burnt out, change the hydraulic distributor.

- EPICYCLIC GEAR TRAIN (11) (16)

Check the condition of the teeth on all the gears.

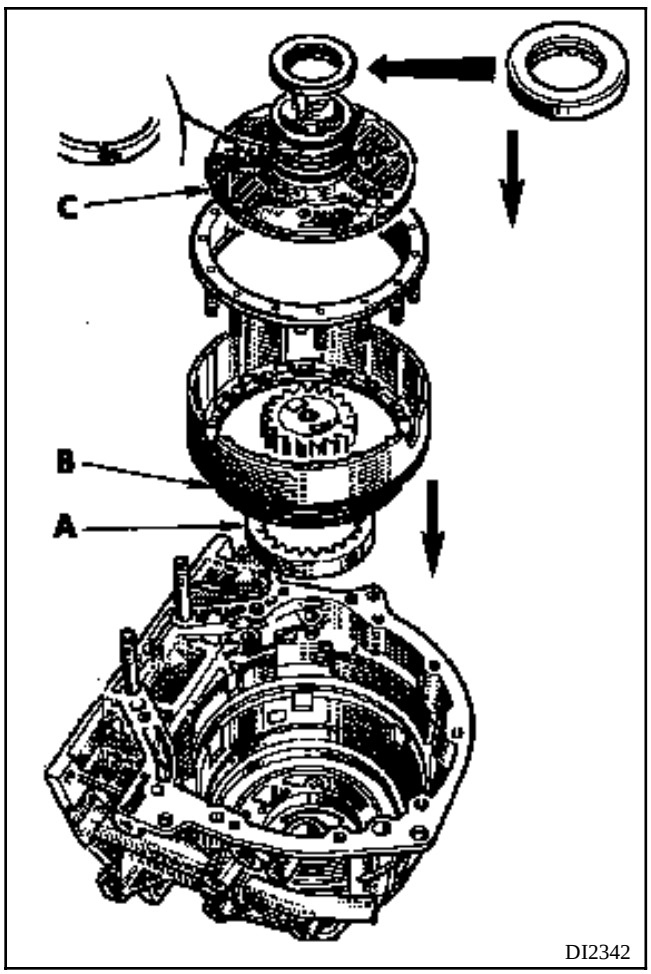
Ensure that all the gears in the forward and reverse gear trains turn freely and without excessive play on their shafts

- FREE WHEEL (17)

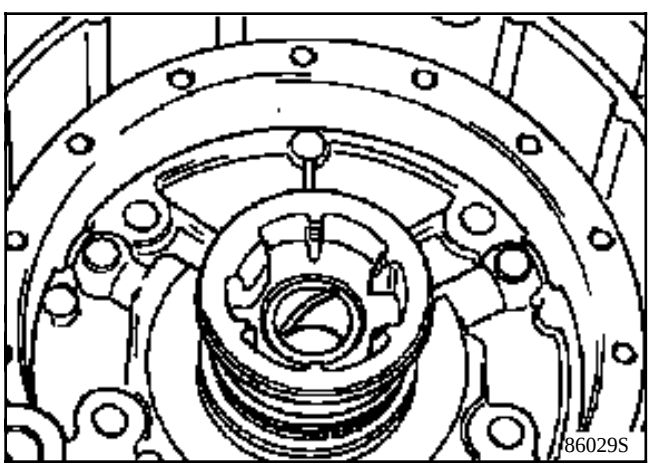
Check the condition of:
- the components of the free wheel (spring, roller, body),
- the surface of the free wheel track (16).

If any components are faulty, the entire free wheel and the reverse gear train (16) must be replaced.

REASSEMBLY

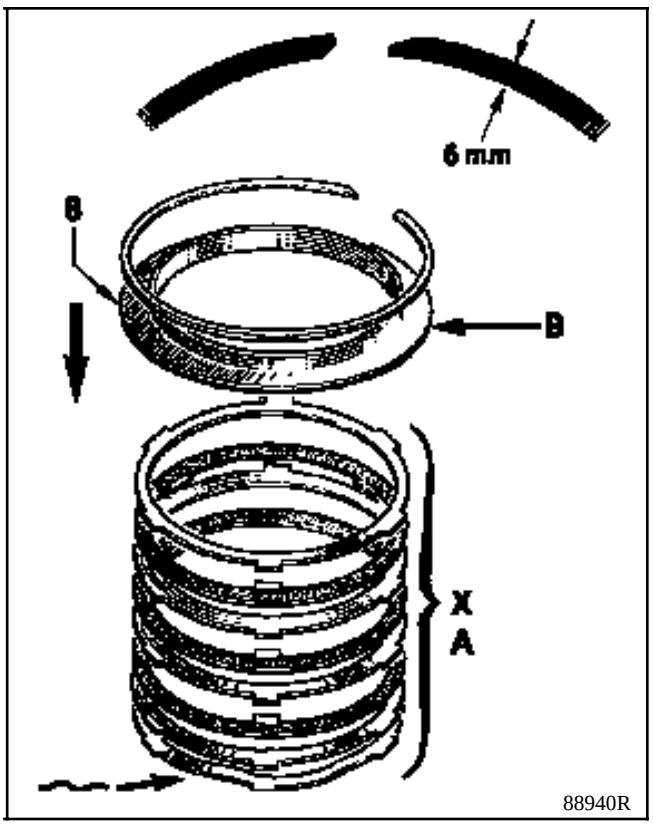


A - Outer pinion following mark made during dismantling (chamfer facing downwards, depending on version).Lubricate it and check that it rotates freely in the casing.
B - Grease or lubricate the seals.
C - Centre the drive hub, insert the bolts and tighten them progressively.
diameter 7: 1.5 daN.m
diameter 6: 0.6 daN.m

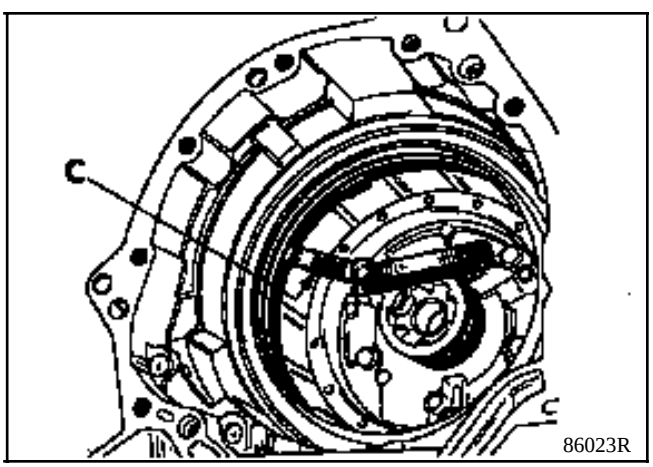


BRAKE F2

IMPORTANT: there are several different ways of fitting the circlip. In all cases, fit circlip part number: 77 04 002 420 identified by:



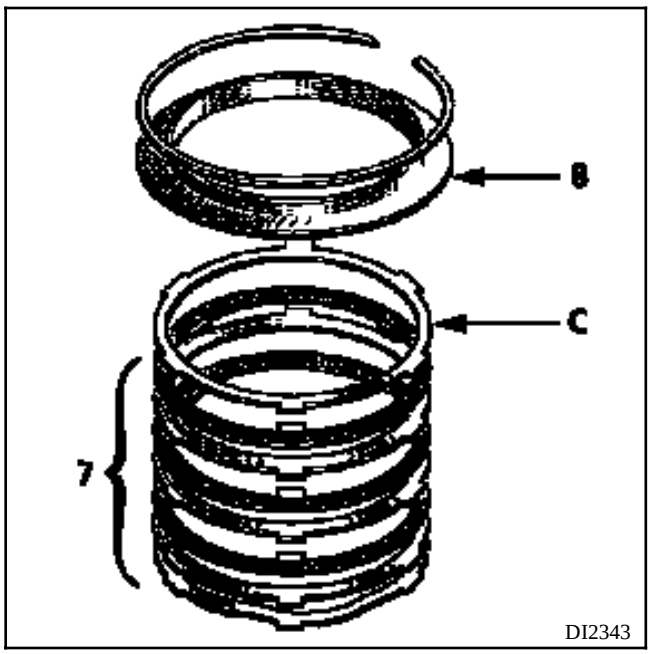
A - One undulating disc, one flat disc and one lined disc alternately.
B - A new lubricated **F1** piston support (8).
X - Number of discs (see identification).



C - The operating clearance should be between **1.5** and **2.1 mm**.

ADJUSTING BRAKE F2

This is adjusted using a spacer shim (C) which is available in three size (**0.5**, **1** and **2**) and is placed between the **F1** piston support (8) and the discs of **F2** (7).



Calculation example:
- clearance measured: **3.6 mm**,
- select the **2 mm** shim,
- clearance after adjustment: **3.6 - 2 = 1.6.**

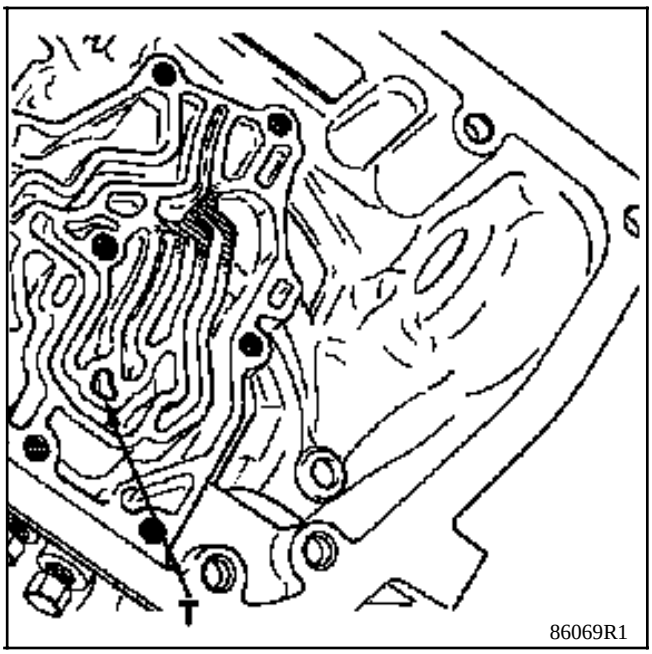
When the assembly has been refitted with the shim, check the clearance again.

Do not fit more than two shims.

If this clearance is not correct, check the way the rings are stacked and the dimension of the piston (refer to the "**Identification**" section).

CHECKING THE OPERATION

Ensure that the piston is working properly by blowing compressed air through hole (T).

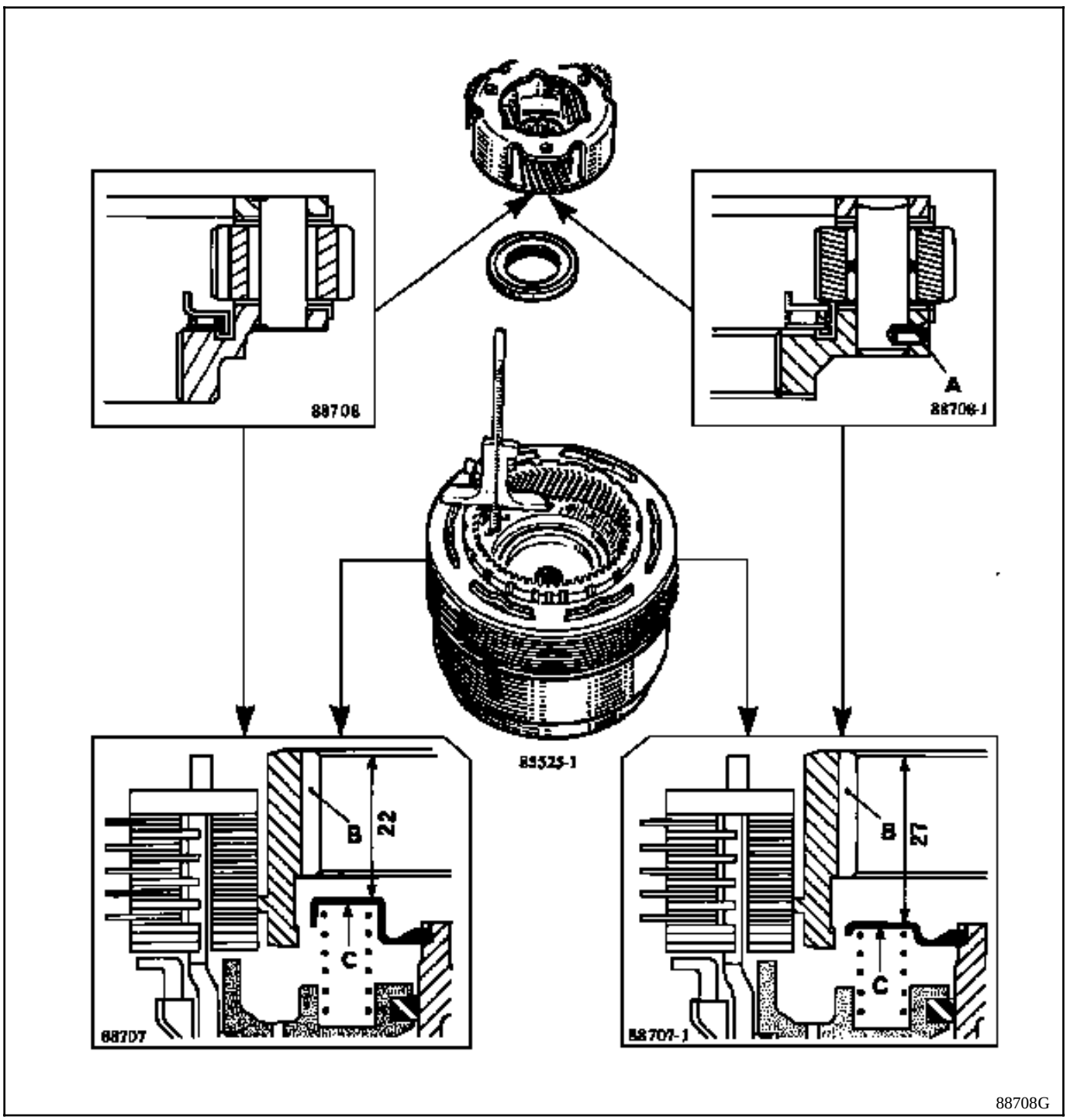


Check that the piston moves backwards and forwards properly.

STRENGTHENED FORWARD GEAR TRAIN ON MB-MJ TYPE AUTOMATIC TRANSMISSION

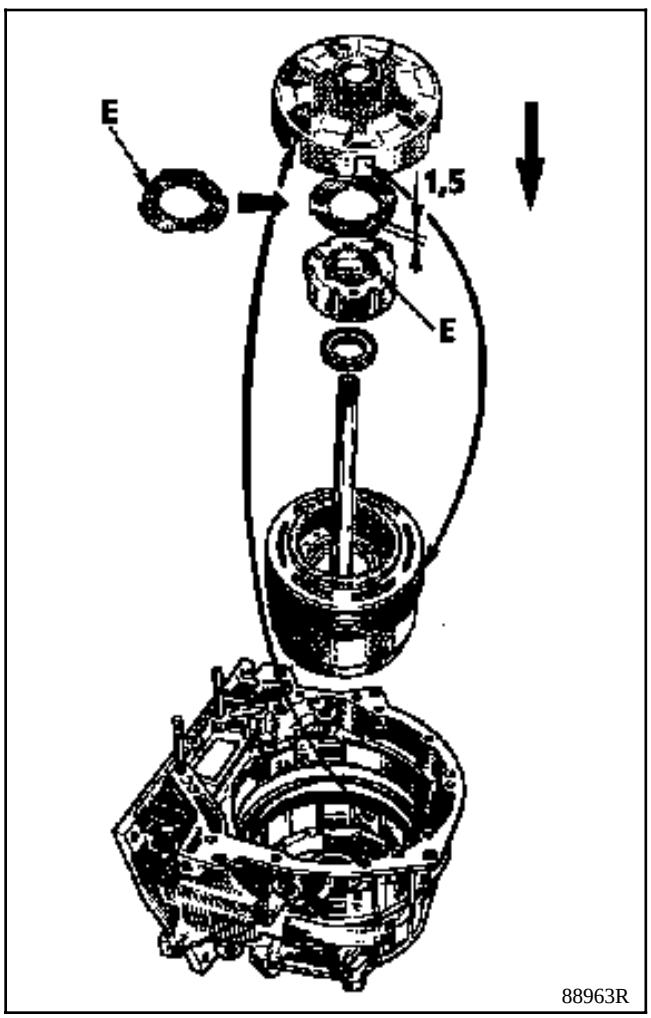
There is a strengthened forward gear train with 3 planet wheels as well as an **E1 - E2** clutch assembly which can be identified by three roll pins (A) on the forward gear train and a distance of **27 mm** between the crown wheel (B) and cup (C) of **E1** on **E1 - E2**.

Original fitment (not strengthened) **Second fitment (strengthened)**



All automatic transmissions of the **MB-MJ** type before the **85** model may be fitted with the modified **E1-E2** assembly - identified by a dimension of **27 mm**. However, it is not possible to fit the strengthened forward gear train to an **E1-E2** assembly which has not been modified.

Clip the turbine shaft in the **E1-E2** assembly and fit:

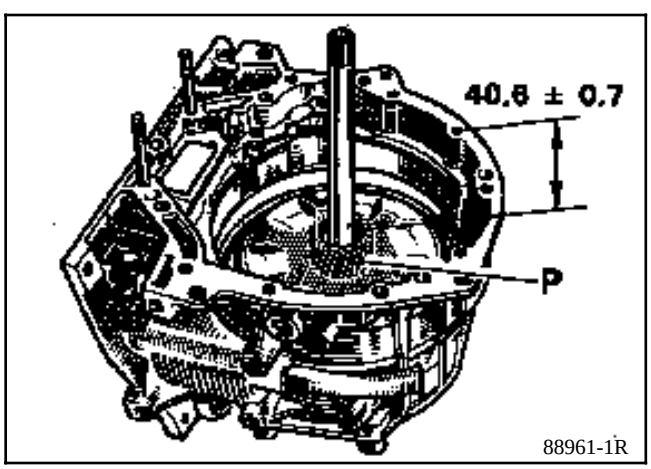


88963R

IMPORTANT:
Take care not to mix the **F2** and **E2** discs.

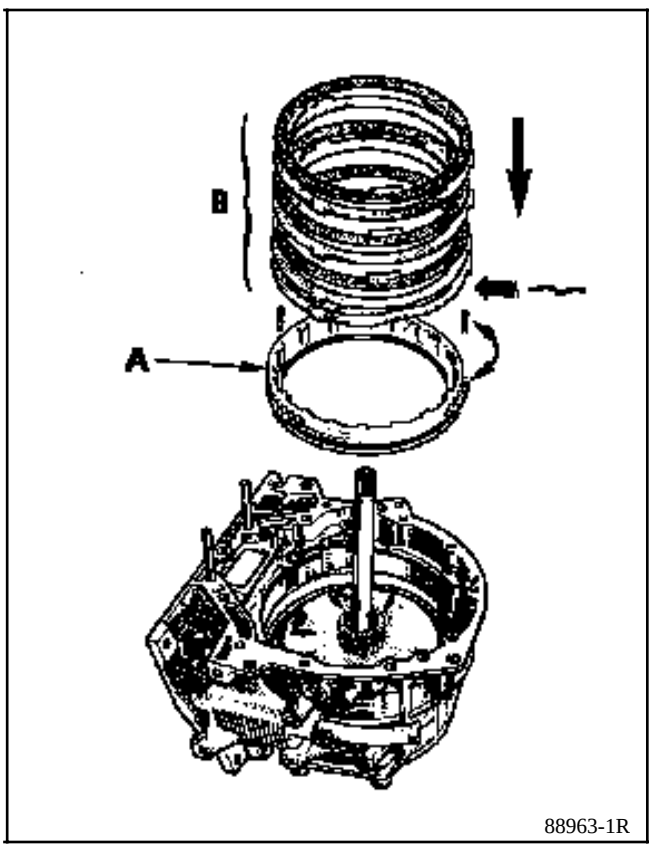
CHECKING THAT THE ASSEMBLY IS CORRECT

The dimension between the end of sunwheel (P) and the joint face must be: **40.6 ± 7 mm**.



88961-1R

BRAKE F1

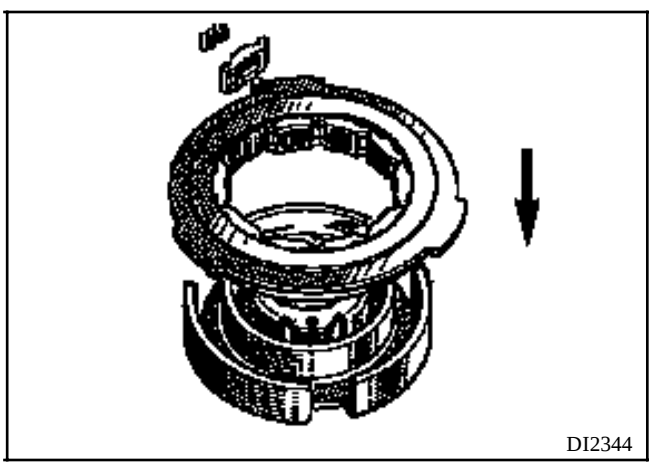


88963-1R

A - Oil the seals and fit them progressively onto the piston.

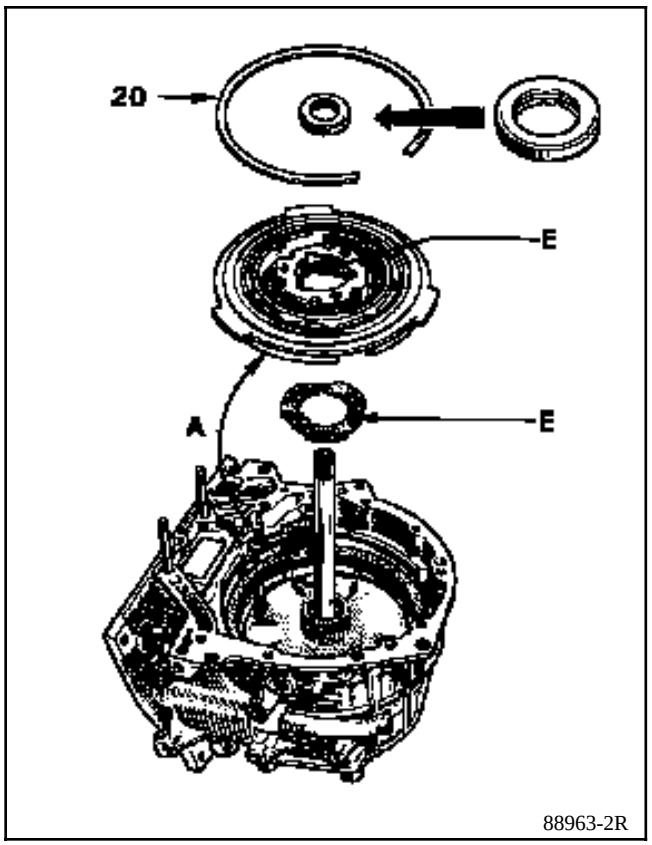
B - One undulated disc, one flat disc and one line disc should be fitted alternately.

PRE-ASSEMBLY OF THE FREE WHEEL AND REVERSE GEAR TRAIN


DI2344

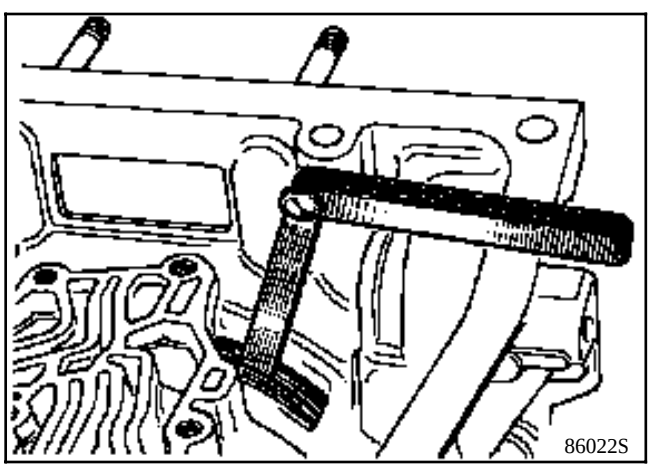
NOTE: The components of the free wheel should only be dismantled in exceptional circumstances.

IMPORTANT: Circlip (20), part number: **77 04 002 420,** must be fitted.



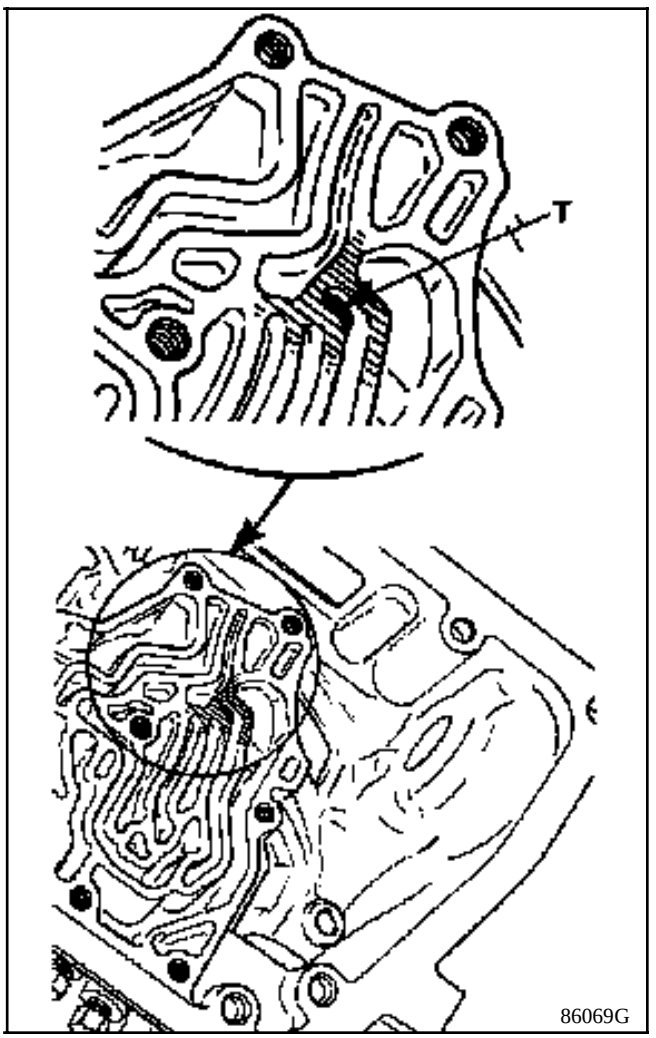
A - Offer up the assembly and rotate the reverse gear train so that the brake notches are in line with their locations.

The operating clearance for brake **F1** should be between:
- **0.8 and 2.7 mm** for **MB**
- **1.1 and 3.1 mm** for **MJ-ML**

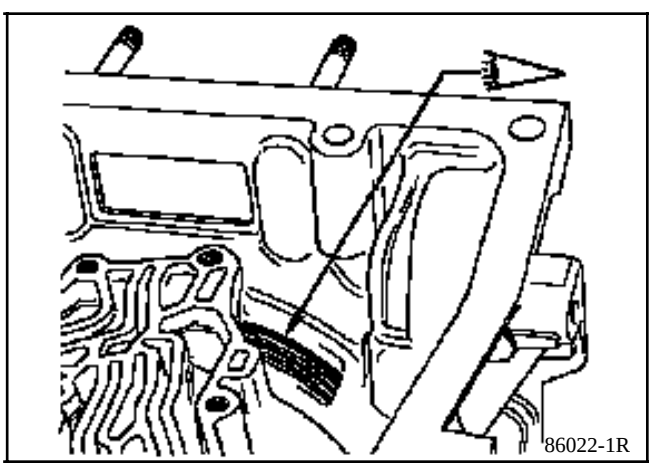


CHECKING THE OPERATION

Ensure that the piston is working properly by blowing compressed air through hole (T).



Check that the piston moves backwards and forwards properly



ADJUSTING THE REVERSE GEAR TRAIN

The aim of the adjustment is to restrict the displacement of the reverse gear train by determining the thickness of the plastic shim (19).

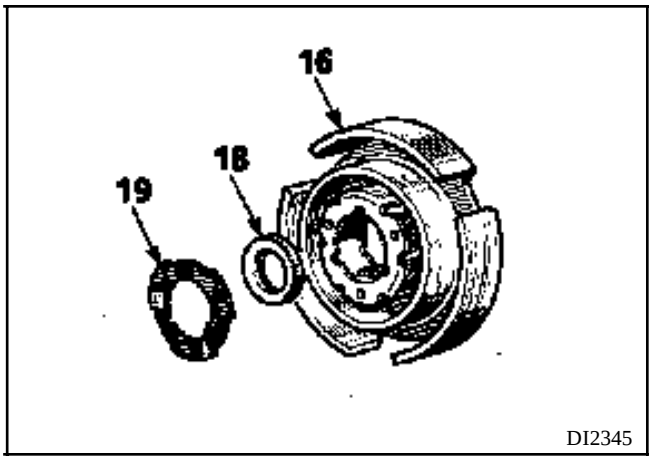
The average clearance should be **0.4 mm**.

The adjustment is made in two stages:

1 - At the gear section casing end

Check that stop (18) is on the sunwheel and that there is no plastic shim (19).

Position tool **B. Vi.715** and measure:

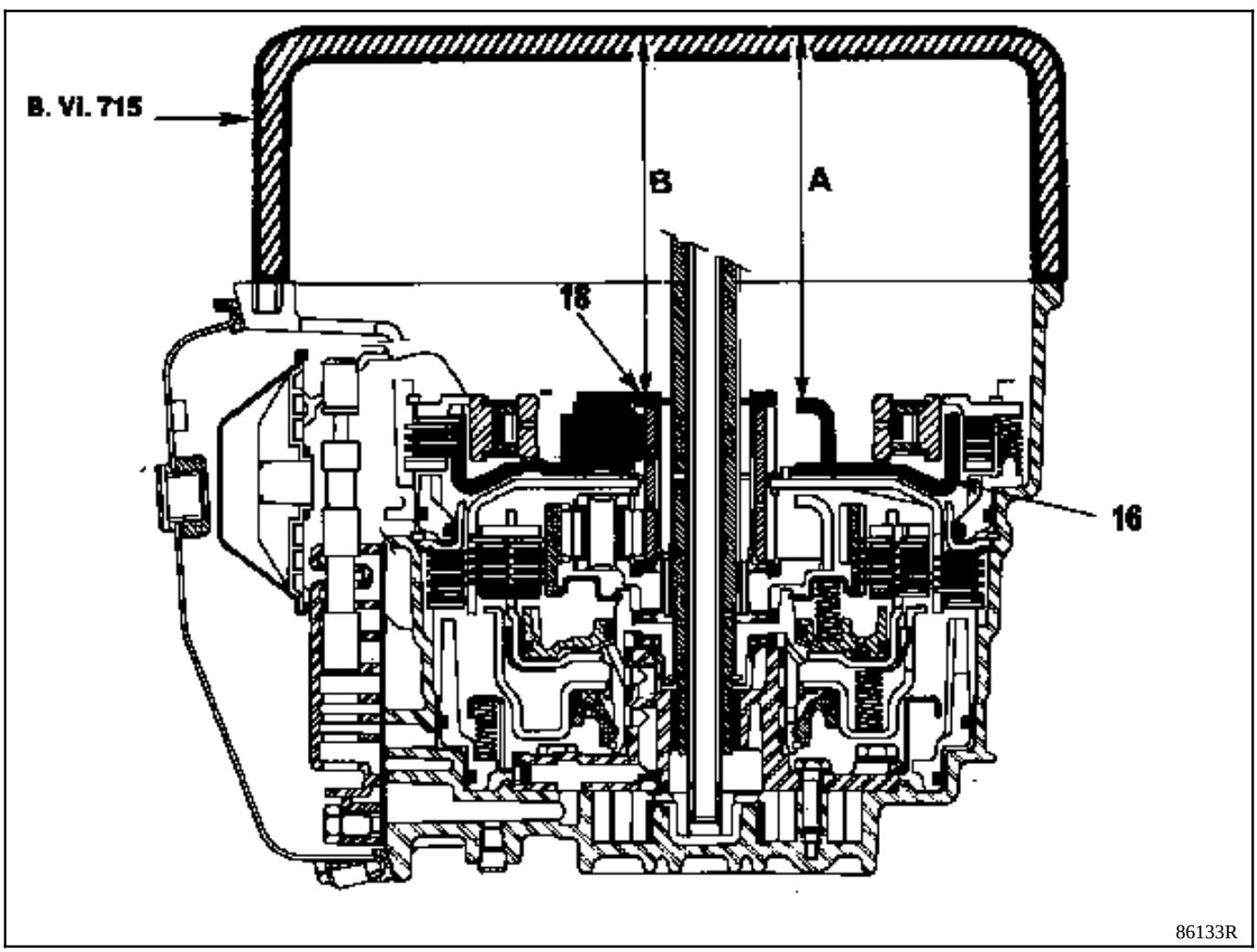


DI2345

- the dimension **A** between the tool and the planet wheel carrier (16).
- the dimension **B** between the stop (18) and the tool.

Calculate the dimension **X**:

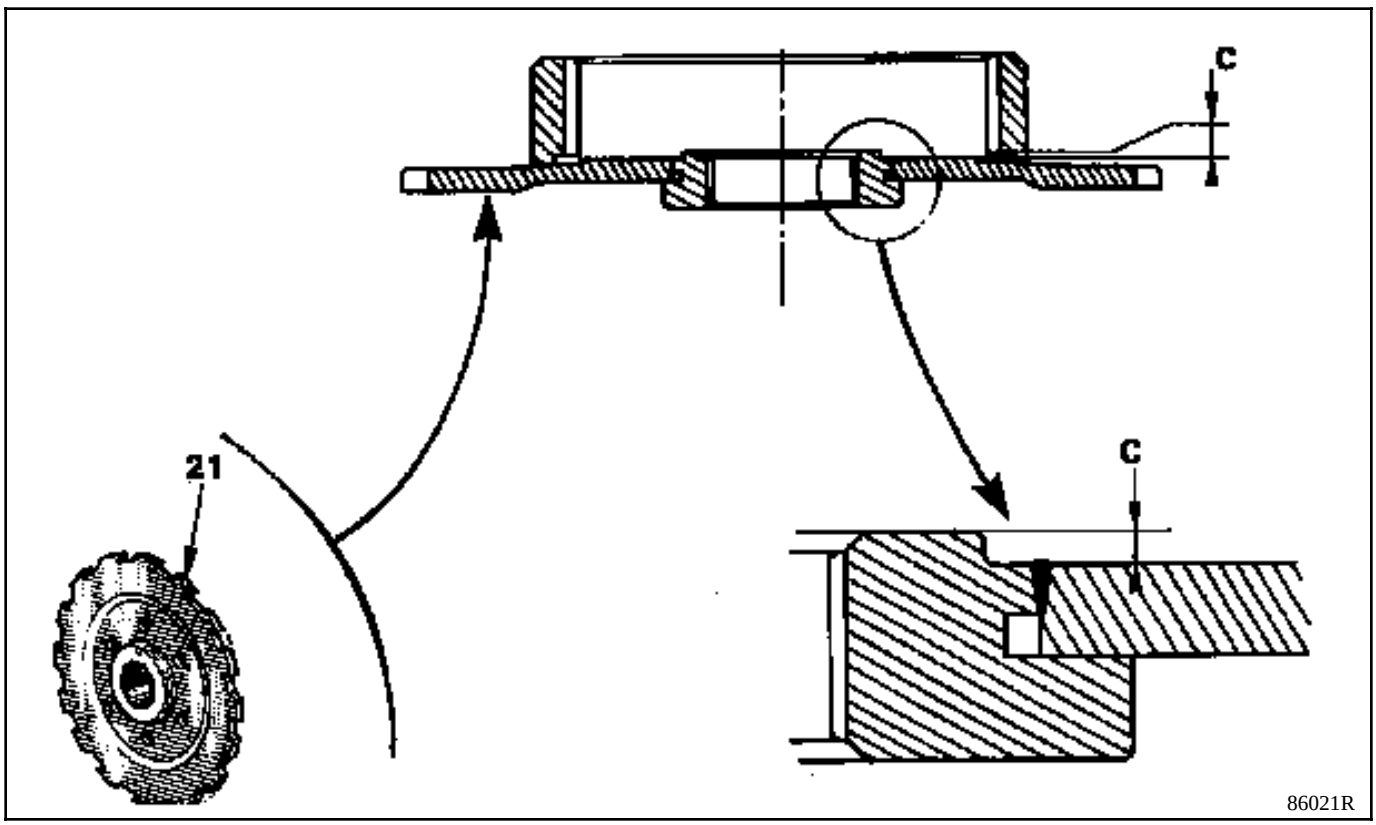
X = A - B



86133R

2 - On the park wheel (21)

Measure the dimension **C**.



Calculate the thickness **E** of shim (19).

The total clearance is equal to: JT = X + C

The thickness of the shim is equal to: E = JT - 0.4

Example:

A = 158.2 mm

B = 156.9 mm

C = 1.3 mm

X = A - B = 158.2 - 156.9 = 1.3 mm

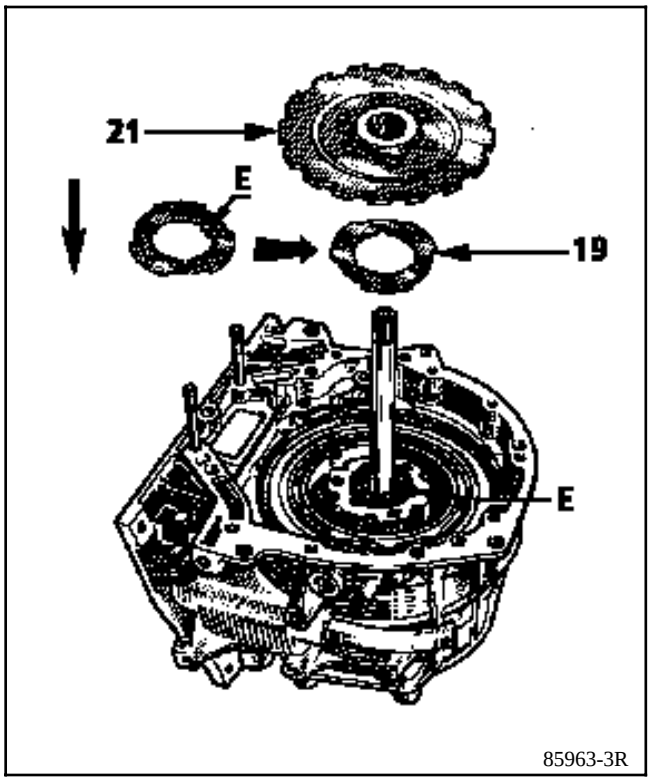
JT = X + C = 1.3 + 1.3 = 2.6 mm

Shim thickness: **E = 2.6 - 0.4 = 2.2 mm**

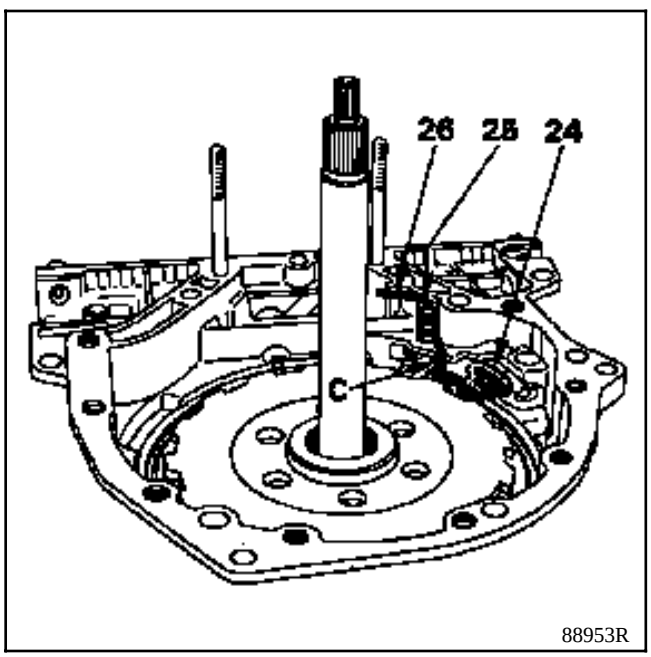
Thickness of shims available: **1.5 mm ; 2 ; 2.6 ; 3.2**

In this case, select the **2 mm** shim which should give the clearance closest to **0.4 mm**.

Fit plastic shim, (19) whose thickness has already been determined and park wheel (21).

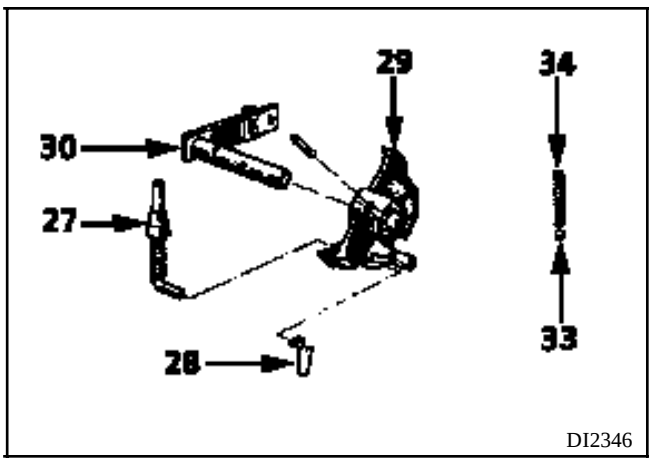


Fit park pawl (24) and its spring (26) on shaft (25).

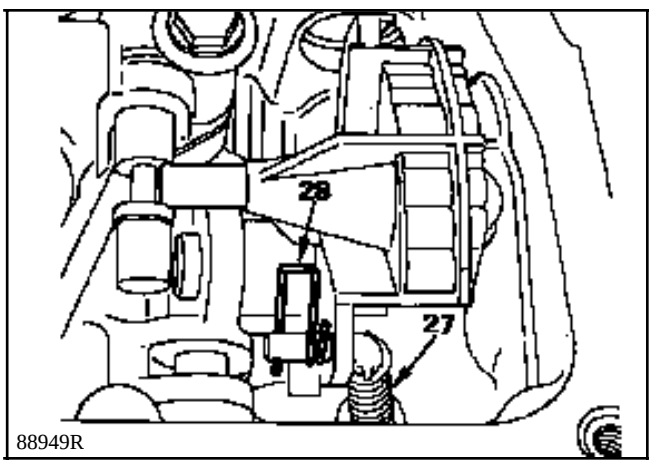


NOTE: to limit the movement of the park pawl (24), there is a shim which is placed between the park pawl and the gear section at (C).

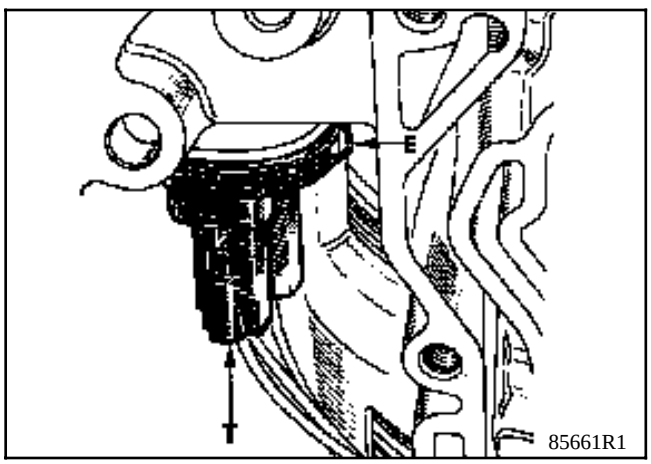
REFITTING



Refit:
- 34 - 33 - 29 - 30 simultaneously fitted with a new seal and its roll pin,
- 27 and 28.

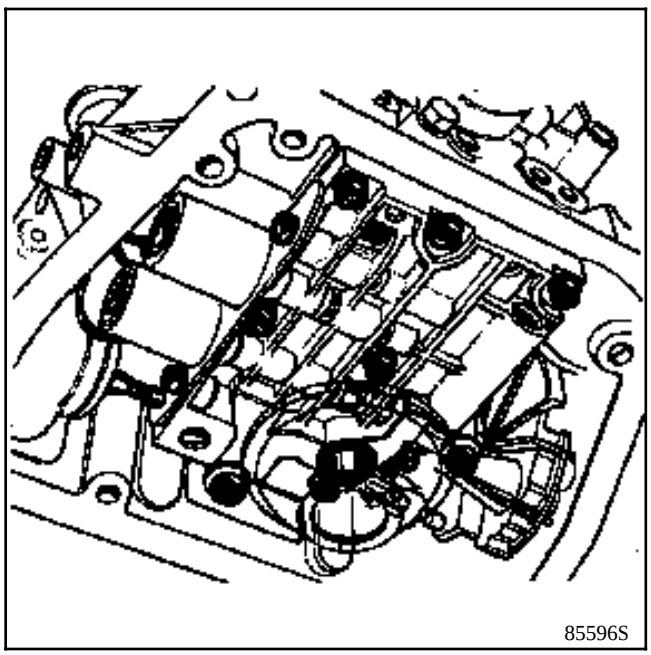


Fit clip (E) to the sealed connector (T) and connect it.



Refit the hydraulic distributor and its two seals and plate. Tighten the hydraulic distributor bolts to the correct torque in the order given (see "**Hydraulic distributor**" section).

Fit a new strainer.



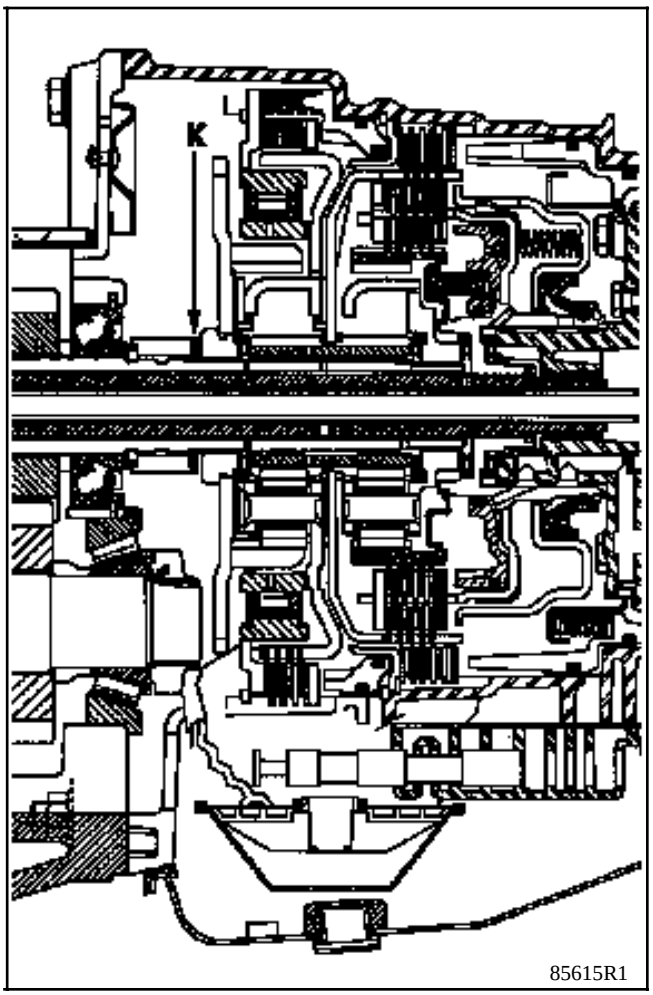
Fit the sump and tighten the bolts to a torque of **0.6 daN.m** (except on **ML**).

ADJUSTING THE END FLOAT

The end float is the operating clearance of the gear section of the automatic transmission.

The average clearance (J) must be **0.8 mm**.

The end float is adjusted by shim (K) which is a ground shim.



The adjustment is made in two stages.

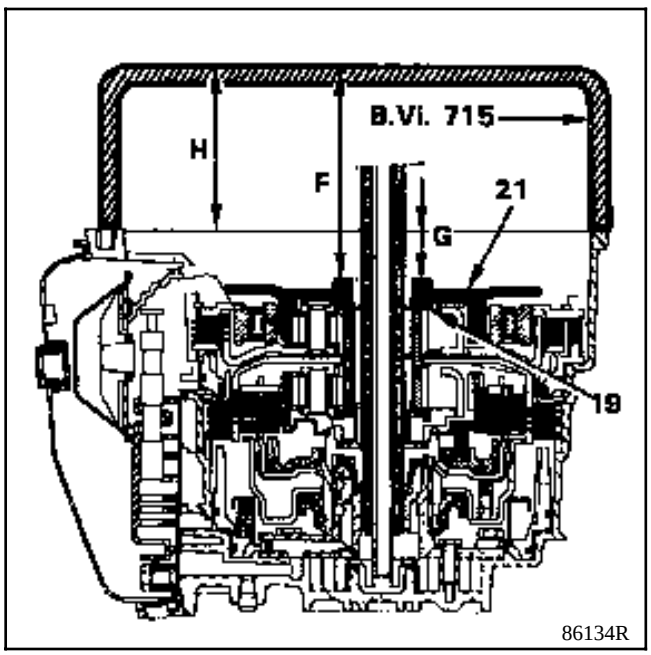
1 - Gear section casing end

The park wheel (21) must be fitted correctly (With the notch in the plastic washer (19) in place).

Fit tool **B. Vi.715** and measure:
- the dimension of the tool (H)
- the dimension (F) measured between the tool and the park wheel (21).

Calculate dimension **G**.

G = F - H



2 - Final drive housing end

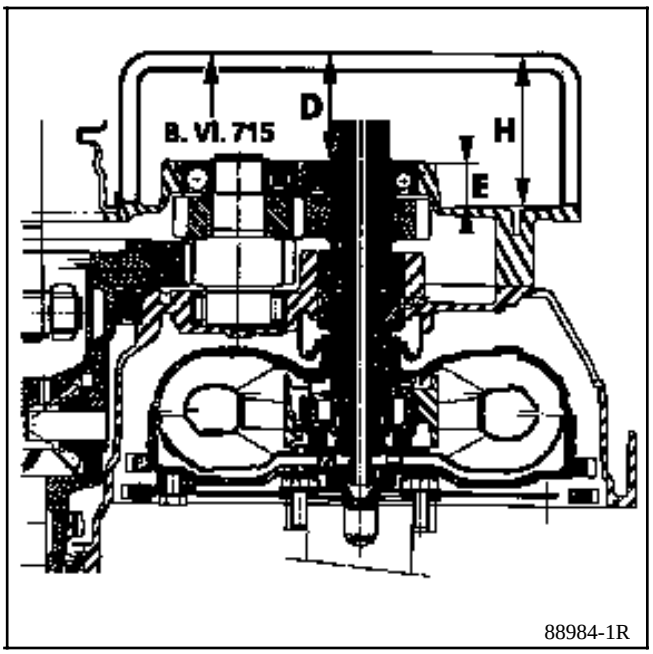
The shims must be removed and the paper seal in place.

Fit tool **B. Vi.715** and measure:
- the dimension of the tool (H),
- the dimension (D) measured between the circlip and the tool.

Calculate dimension **E**.

E = H - D

MB



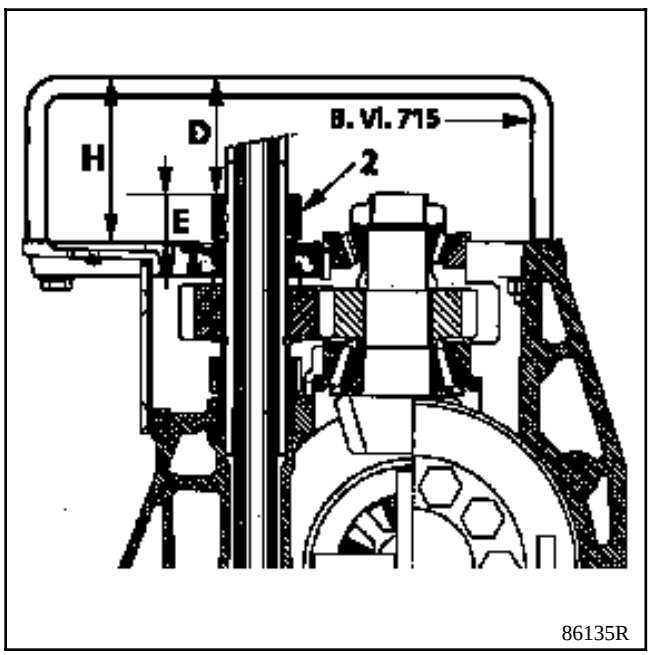
Position the paper seal.

Fit tool **B. Vi.715** and measure:
- the dimension of the tool (H).
- the dimension (D) measured between the spacer (2) and the tool.

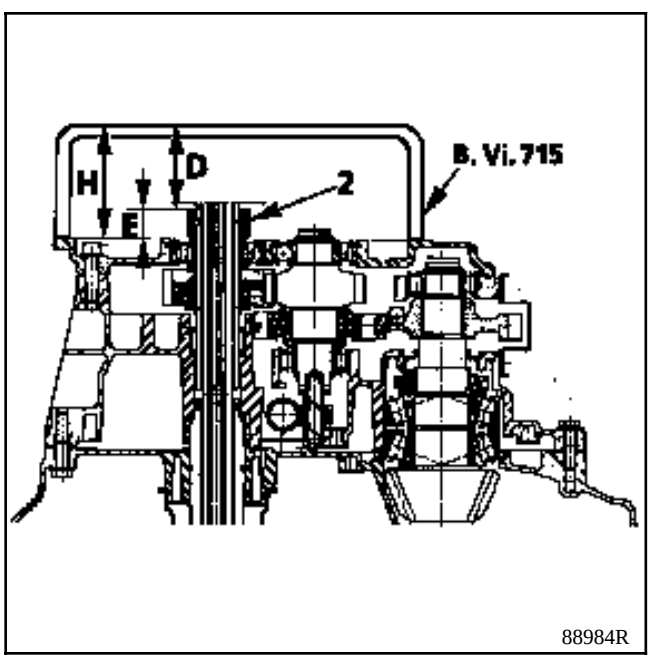
Calculate dimension **E**.

E = M - D

MJ



ML



3 - Calculating the thickness of the shim (K).

The clearance (L) is equal to:

L = G - E

The thickness of the shim (K) is equal to:

K = L - 0.8 mm

Example:

H = 120 mm

F = 145.3 mm

D = 97.6 mm

G = 145.3 - 120 = 25.3 mm

E = 120 - 97.6 = 22.4 mm

Total end float: 25.3 - 22.4 = 2.9 mm

K = 2.9 - 0.8 = 2.1 mm

Thickness of shims available:

0.25 - 0.7 - 1.1 - 1.7 - 2.3 mm

In this case, select a **2.3 mm** thick shim which will give the clearance closest **0.8 mm**.

Once the adjustment has been made, set the mechanism in the "**Park**" position.

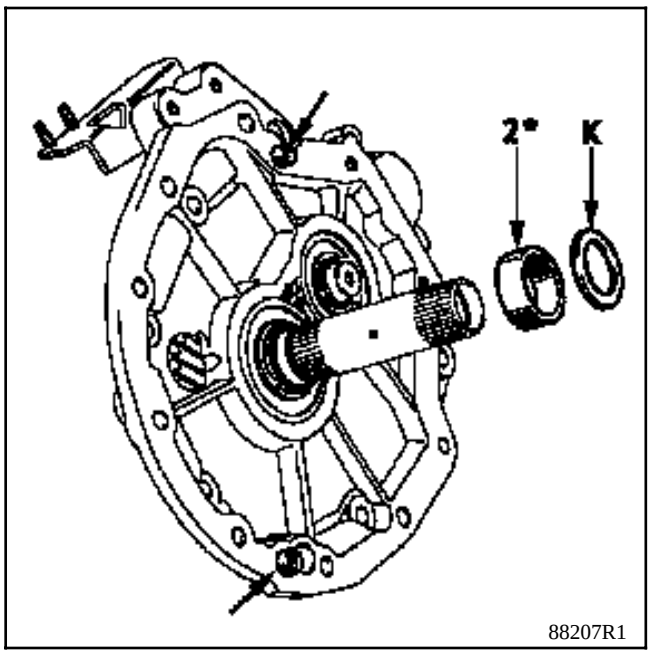
IMPORTANT:

The end float must also be adjusted when a service exchange gear section casing is fitted.

FITTING THE GEAR SECTION CASING TO THE FINAL DRIVE CASING

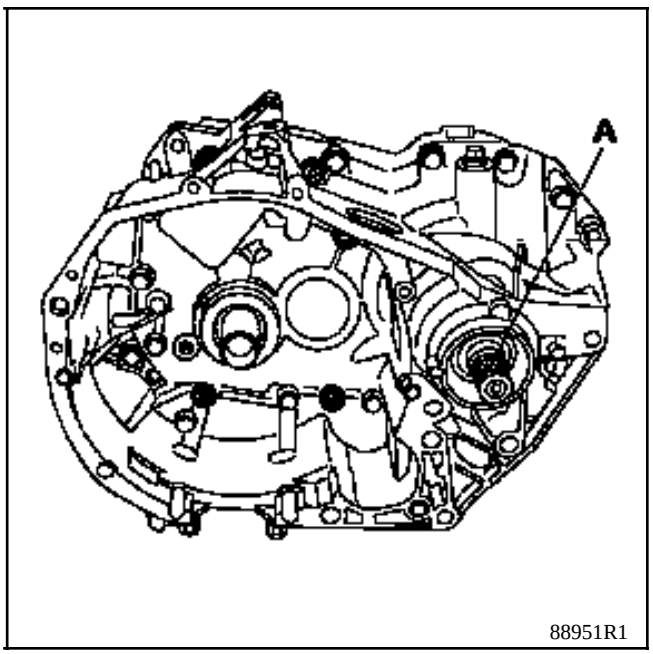
Refit:
- the spacer (2) (except on **MB**).
- the shim (K) whose thickness has been previously determined.

Check that the two locating dowels are present and also check the condition of their seats.



* Depending on automatic transmission.

Clean the casing faces and coat them with "Loctite FORMAJOINT "paste and fit a "**special exchange**" paper seal.
Couple the gear section casing to the final drive casing (lock one sunwheel of the differential). Put a pin in hole (A) of the driveshaft roll pin and rotate using small movements in order to engage the splines of the various shafts. Tighten the bolts to a torque of **2 daN.m.**



Special feature (ML):

Refit the sump and tighten the bolts to a torque of **0.6 daN.m**.

IMPORTANT:

The casing must fit perfectly - if it does not, this means that notches (E) of the plastic shim (19) are not in the correct place (**see page 126**).

Fit the oil pump driveshaft.

SPECIAL TOOLING REQUIRED	
B. Vi. 945	**Mandrel for fitting sunwheel seal**
B. Vi. 946	**Mandrel for fitting stop ring to sunwheel**
B. Vi. 947	**Mandrel for fitting bearings in separator housing.**
B. Vi. 1402	**Tool for centring converter seal (from kit B. Vi. 1400-01).**

TIGHTENING TORQUES (in daN.m)	
Bolts (∅ 8 mm) for assembling the gear section casing on the final drive casing	**2.5**
Bolts (∅ 8 mm) for assembling the converter and differential casing on the separator housing	**2.5**
Bolts for mounting stator shaft	**2.5**

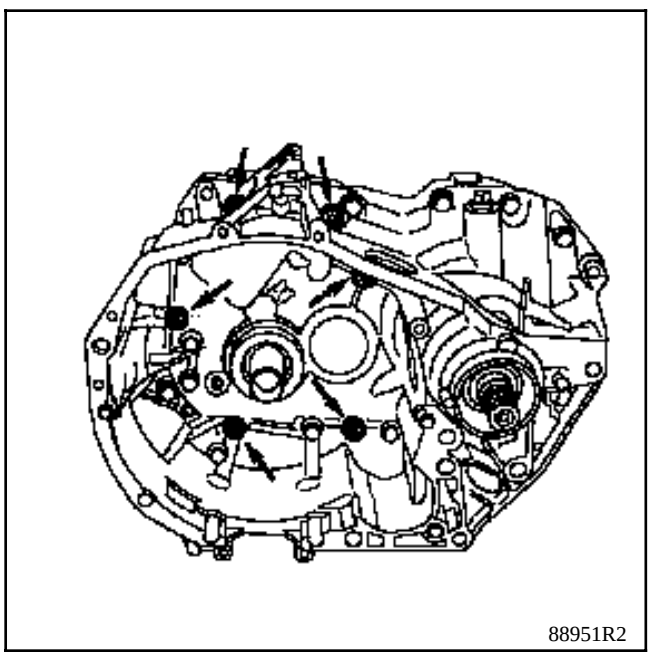
REMOVAL

The parts must be removed and handled on a bench with a padded top (rubber or thick plastic).

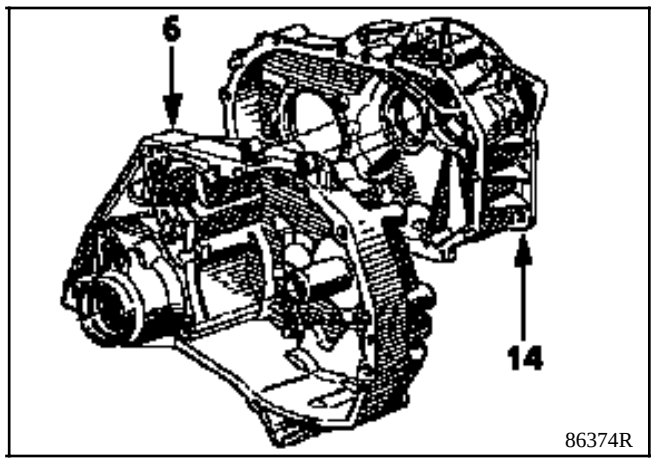
- **Separating the casings**

Remove:
- the converter,
- the oil pump driveshaft.

Separate the final drive casing from the gear section casing.
REMEMBER THE NUT AT THE LEFTHAND SUNWHEEL END.


88951R2

Separate the separator housing from the converter and differential casing.



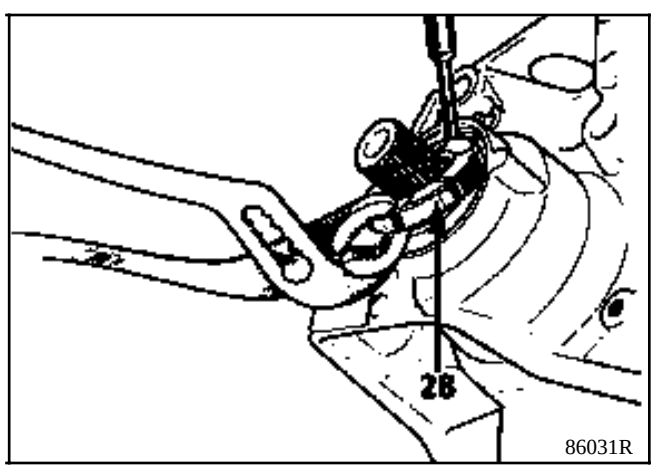
86374R

- **Converter and differential casing**

Remove the O-ring (29) from the sunwheel.

Tap the base of the lip seal (28) with a pin drift and a small mallet so that it turns in its seat.

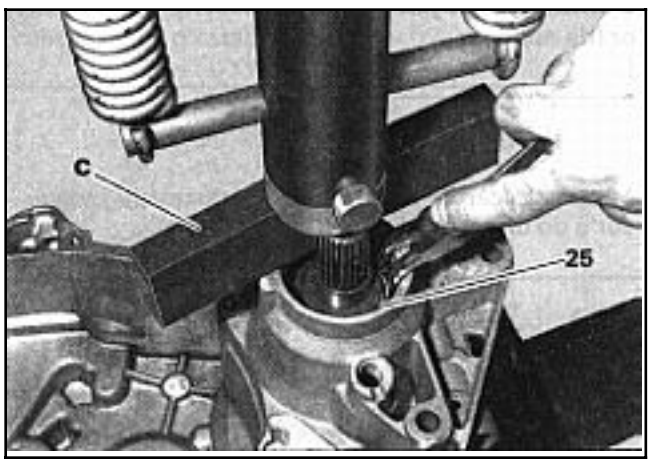
Once the seal is dislodged, remove it with a pair of pliers, taking care not to damage the sunwheel splines.



86031R

On the press:

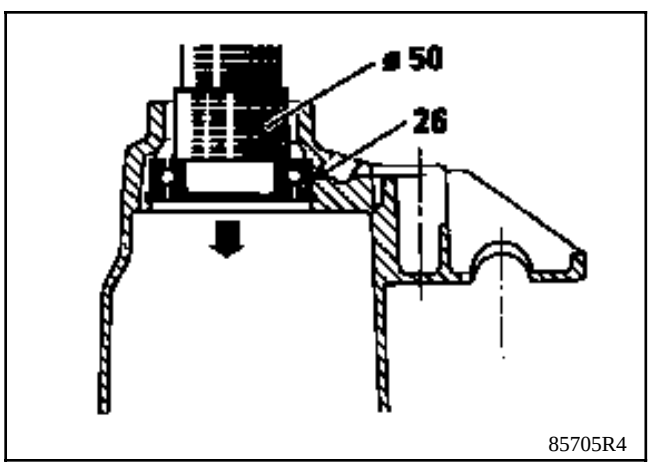
Place a piece of wood under the differential crown wheel to support it.
Place a spacer bar (C) between the casing and the press and push so that circlip (25) comes free and remove it.



Remove the differential on the press via the sun-wheel with its washer or washers.

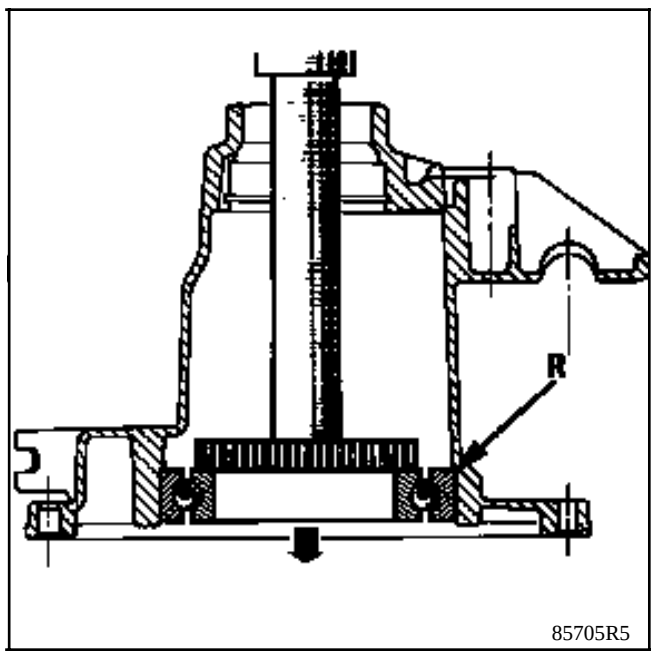
- **Differential bearing**

Extract the circlip holding the bearing in its seat then, on the press, remove bearing (26) with a diameter **50** sleeve, moving it towards the inside of the casing.



Insert a small bar inside the housing and place it flat against the bearing (R).

On the press, apply a load using an extension tube and extract the bearing (R).

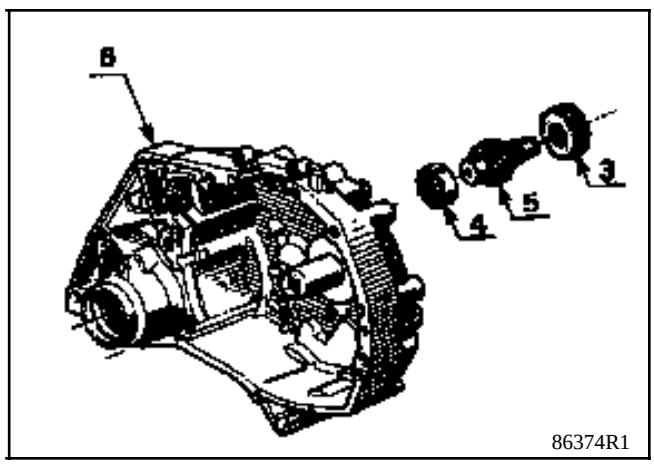


- **Bearing (4) on intermediate shaft (5)**

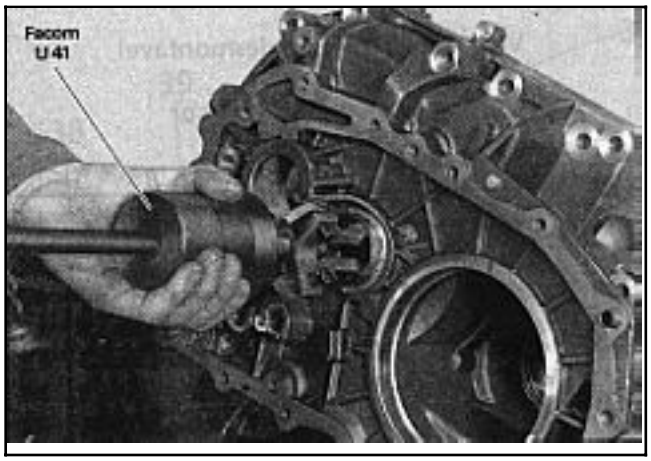
Bearing (4) is crimped in place in the casing.

Remove the crimping points using a small grinder or a sharp cold chisel.

Remove the inner track ring (by destroying it) and the bearing rollers (4).



Extract the bearing using an extractor (example FACOM U49).



CLEANING

Clean off the crimping burrs using abrasive paper.

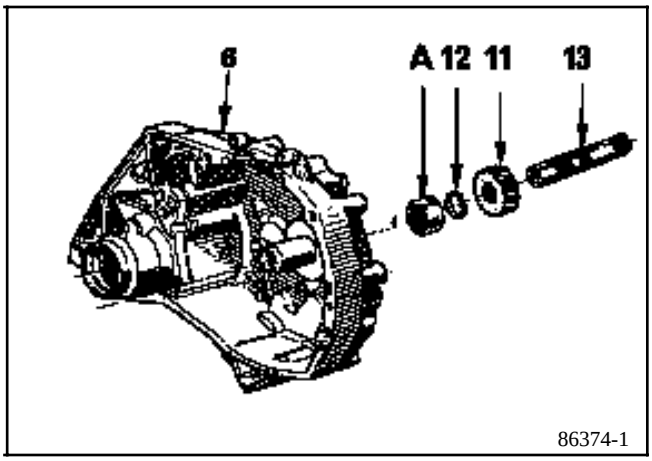
Remove any dust using an air gun or a clean cloth.

- **Needle bearing (A) on output shaft (13)**

Bearing (A) is either mounted on a stator shaft which can be dismantled (diameter **227** converter) or which cannot be dismantled (diameter **216** converter).

- Stator shaft which can be dismantled:

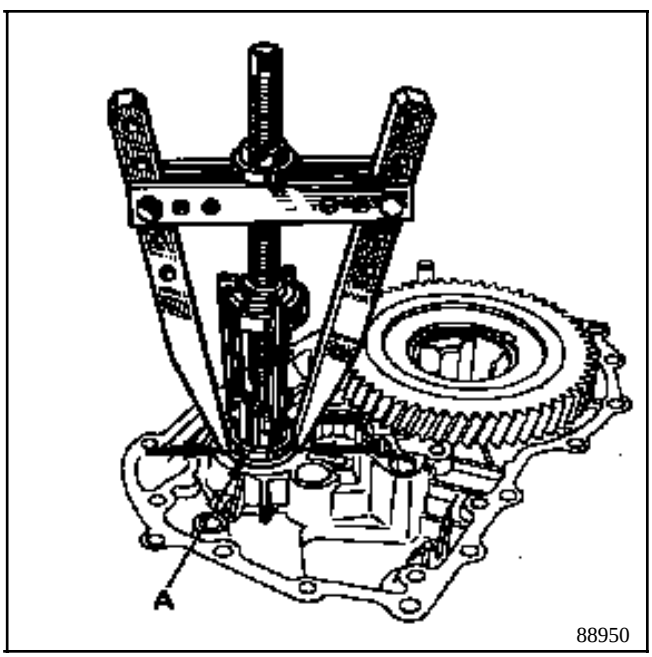
  Use tool FACOM U 40 - U 50 and extract the bearing (A).



- Stator shaft which cannot be dismantled.

ATTENTION: this must only be removed in exceptional cases as the bearing is mounted in the stator shaft and press fitted onto the converter casing, there is a risk of loosening the stator shaft if the following method is not followed.

Using tool FACOM U 40 - U 50 (dowel **n**° **7**), place the tool so that it is pressing on the stator shaft and extract the bearing (A).

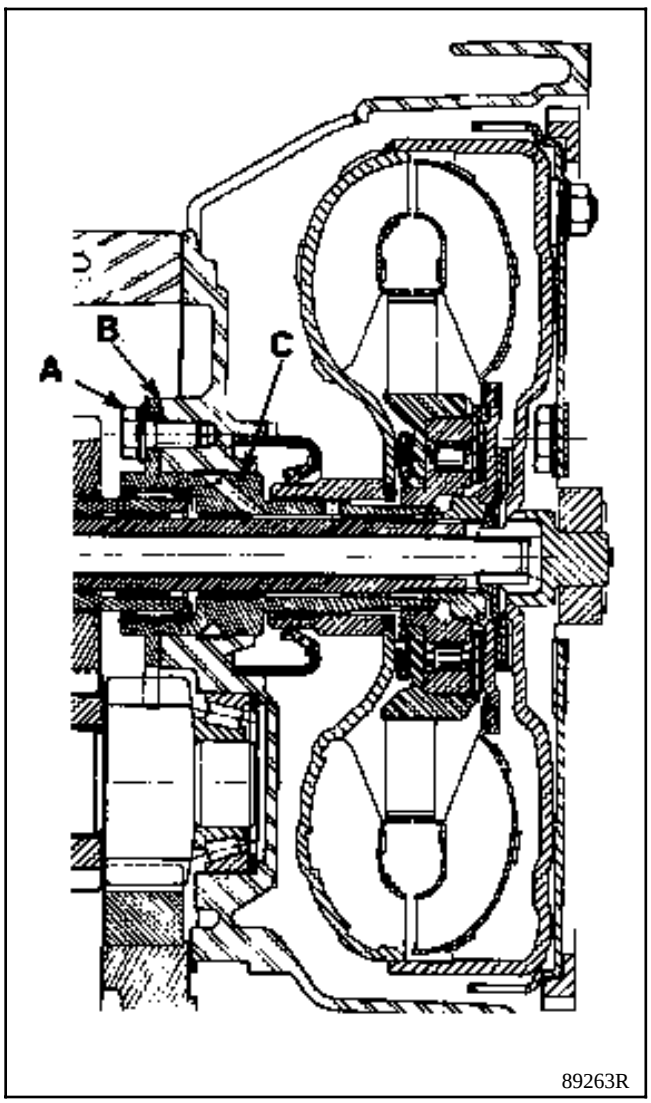


- **Stator shaft**

IDENTIFICATION

Stator shaft which can be dismantled

Assembly with
Renault diameter 227 converter



89263R

Pump shaft length ..... **324 mm**

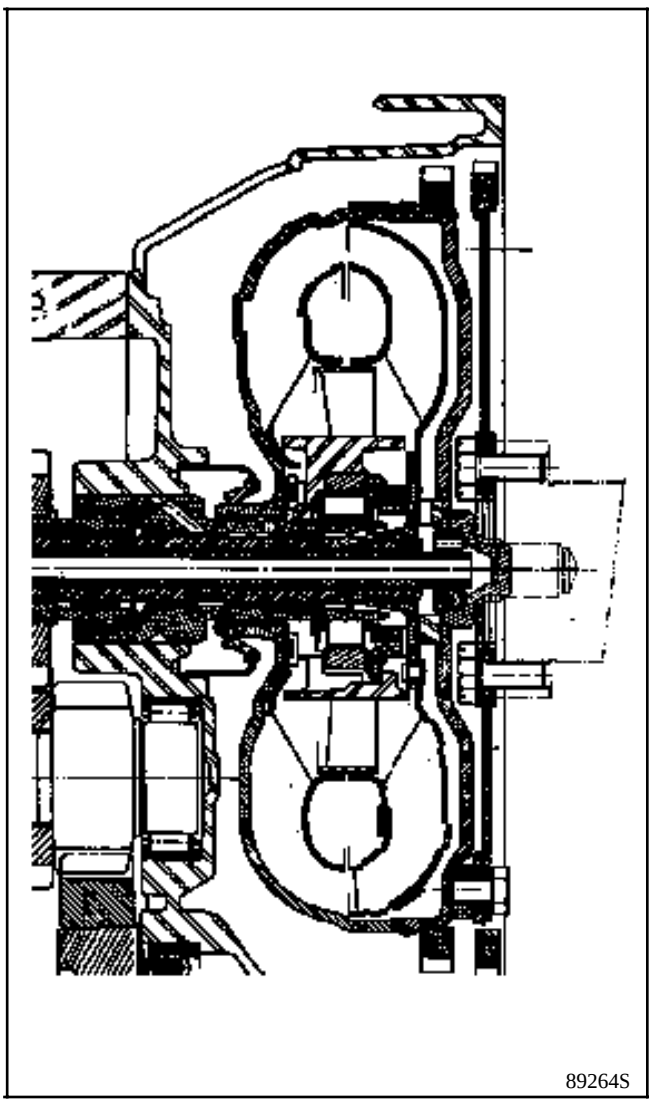
Turbine shaft length ..... **284 mm**

Remove the bolts (A) and extract the shaft.

When refitting, ensure that the paper seal (B) is fitted and that the O-ring (C) is in good condition. Tighten the bolts to a torque of **2.5 daN.m**.

Stator shaft which cannot be dismantled

Assembly with
Verto diameter 216 converter

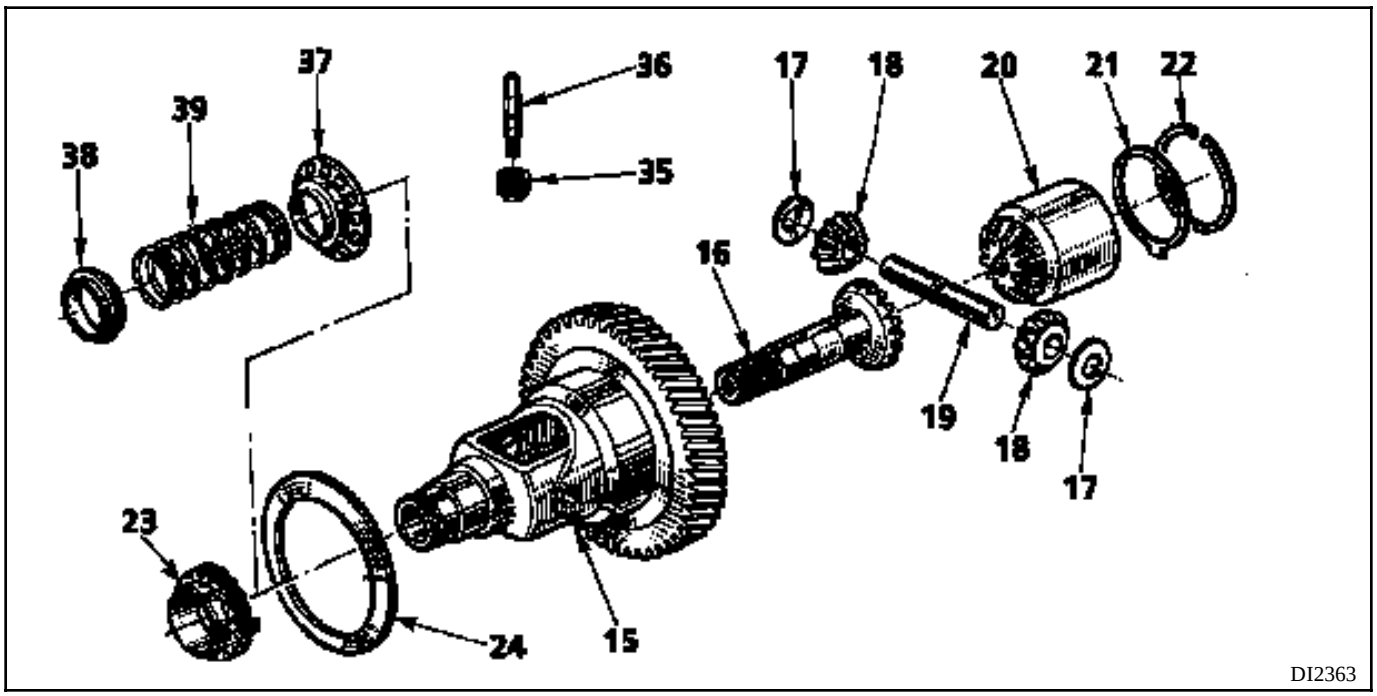


89264S

Pump shaft length ..... **334 mm**

Turbine shaft length ..... **294 mm**

- **Differential**



Remove 23 or 37, 38, 39.

Clamp the casing (15) in a vice fitted with soft jaws and remove parts 22 to 16.

Attach the washers (17) to their respective planet wheels (18).

CHECKING THE COMPONENTS

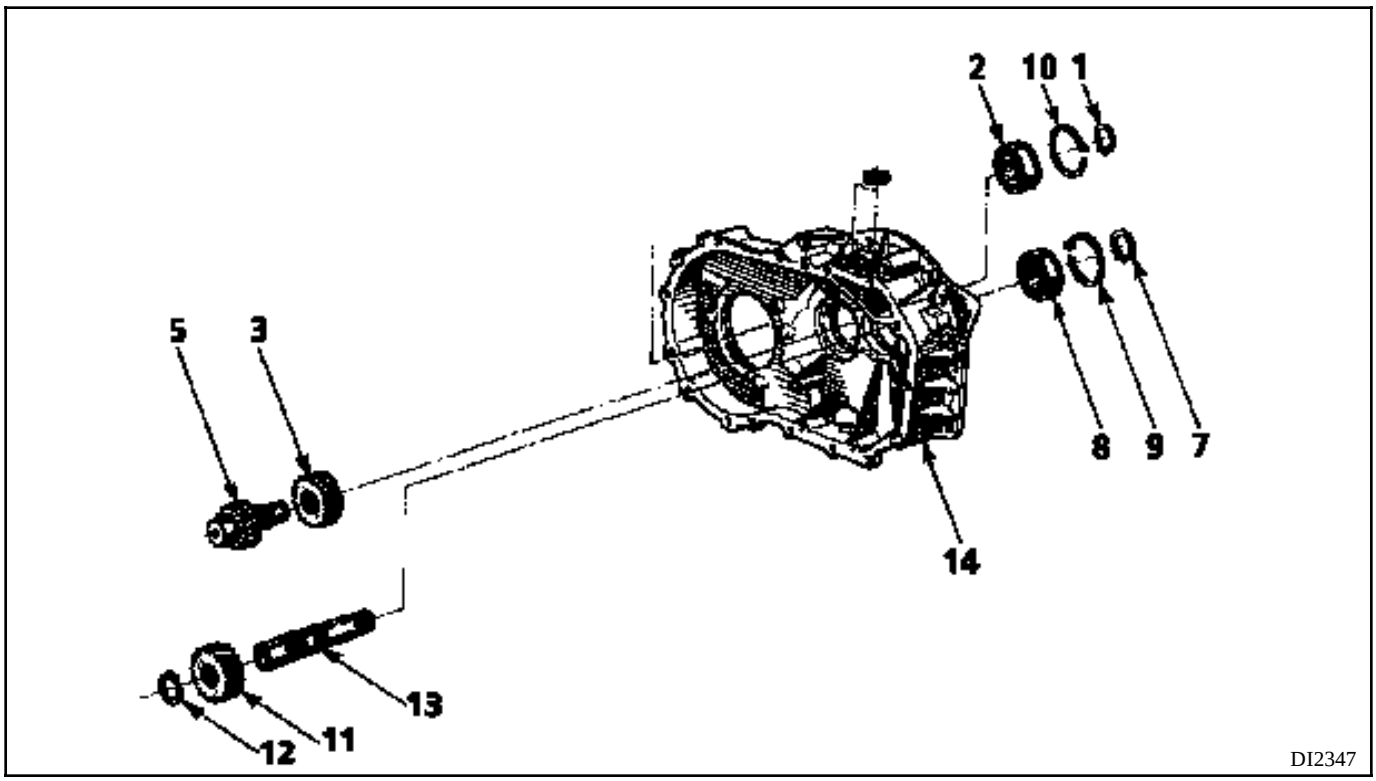
Check the condition of:
- the teeth,
- the bearing locating areas,
- the washers (17),
- the speedometer crown wheel (23), or the sensor ring (37),
- the splines

- **Speedometer drive pinion**

Remove the speedometer pinion driveshaft (36) using flat-nose pliers.

Allow the speedometer pinion (35) to drop into the casing and remove it

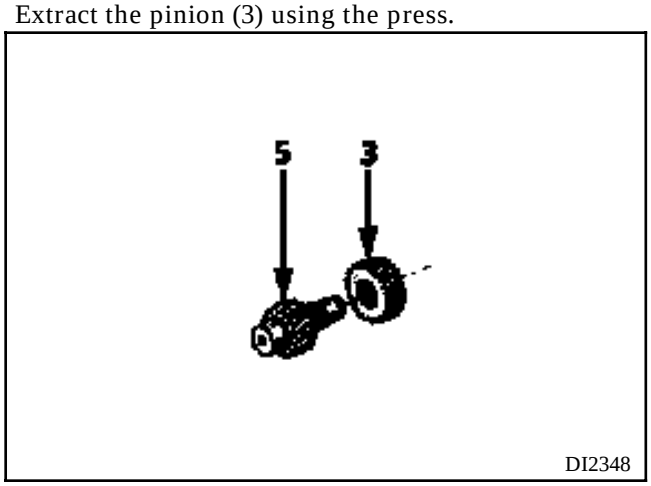
SEPARATOR HOUSING



Remove:
- circlips (1) and (7),
- the output shaft (13) fitted with the pinion gear (11) and the circlip (12),
- the secondary shaft (5) together with the pinion (3),
- the bearings (2) and (8), separating spring rings (9) and (10).

Secondary shaft (5)

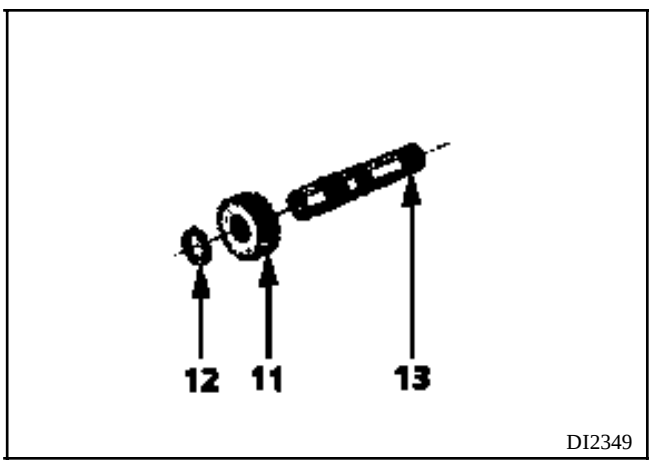
Mark the position of pinion (3) on (5).
Extract the pinion (3) using the press.



NOTE: do not mark the bearing faces.

Output shaft (13)

Mark the position of pinion (11) on (13).
Remove the circlip (12) and extract the pinion (11) using the press.

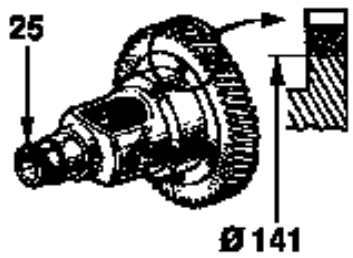
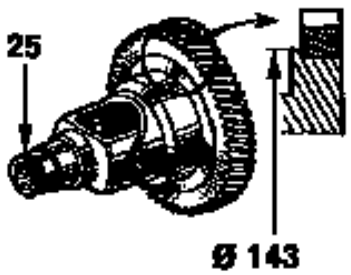


CHECKING THE COMPONENTS

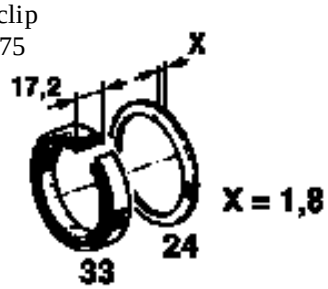
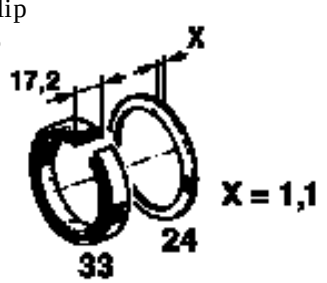
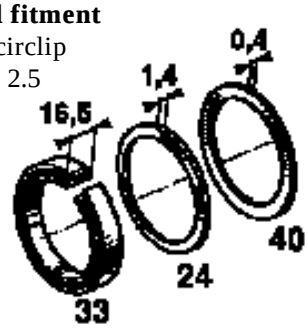
Check the condition of:
- the teeth,
- the white metal faced bushes on (13),
- the splines,
- the general condition of the casing.

REASSEMBLY

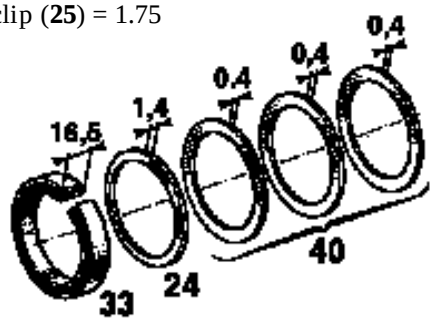
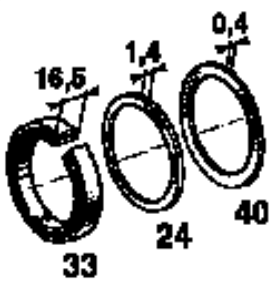
TORQUE CONVERTER AND DIFFERENTIAL CASING
Fitting the differential and its bearings

CROWN WHEEL WITHOUT SHOULDER	CROWN WHEEL WITH SHOULDER
	

SOLUTION DURING PRODUCTION

Original fitment with circlip (**25**) = 1.75	**Second fitment** with circlip (**25**) = 2.5	**Third fitment** with circlip (**25**) = 2.5
		

REPAIR SOLUTION (if replacing bearing)

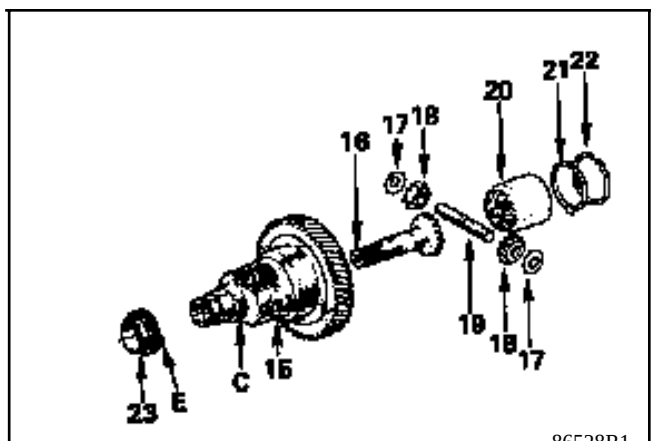
With circlip (**25**) = 1.75	With circlip (**25**) = 2.5
	

Differential

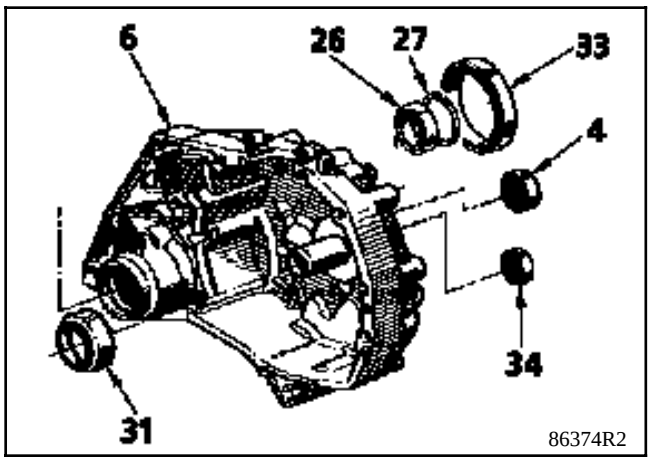
There are no special points concerning refitting, however, the parts must be immersed in automatic transmission oil.

Ensure that notch (E) on part (23) is in groove (C) on (15) (except for "**electronic**" versions).

Check that the planet wheels rotate properly.



REASSEMBLY

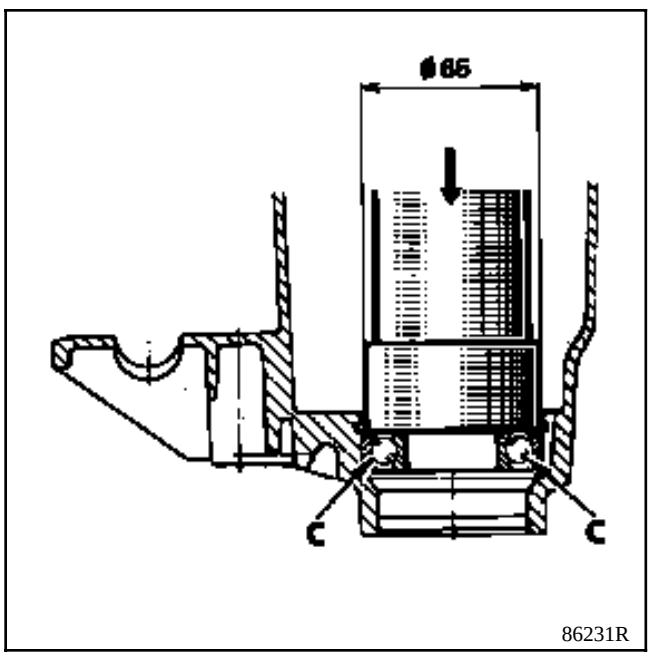


Differential bearings

- Bearing (26).

Offer up the bearing, with bearing track ring (C) at the bottom end of the casing (end opposite operator).

Use a **diameter 65 mm** sleeve to press on the **outer** bearing track only

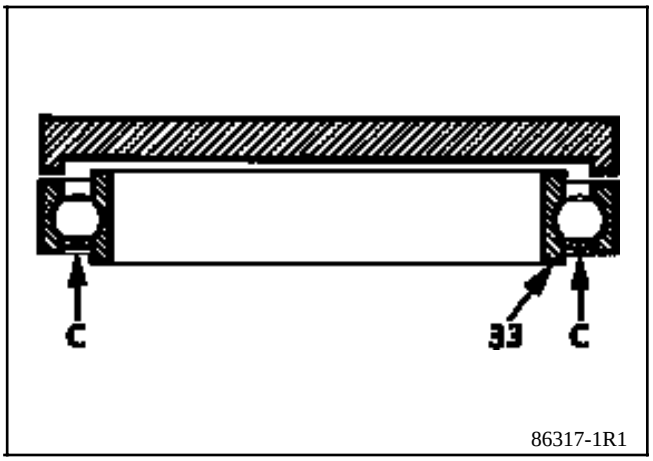


Replace the circlip which holds the bearing.

- Bearing (33).

Offer up the bearing with bearing track ring (C) at the casing end (end opposite operator).

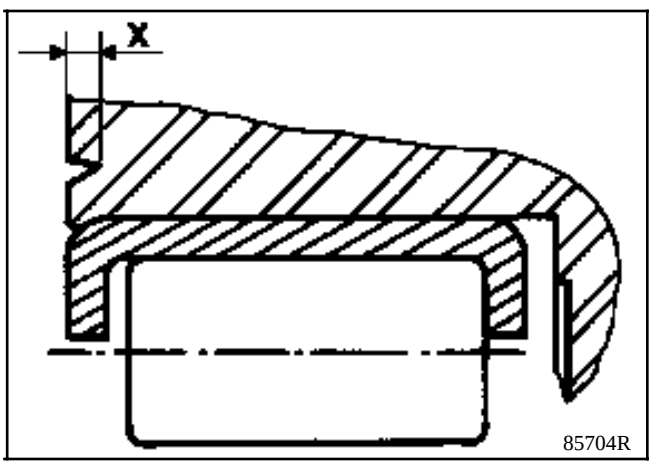
Press on the bearing, with the press, using a shouldered bar or sleeve with a diameter of **diameter 125 minimum** and **diameter 128 maximum** to press on the outer bearing ring.



Shaft bearing

- Secondary shaft bearing (4).

Fit the bearing using the press so that it is flush with the casing face.



A Crimping depth = **0.9** to **1.3 mm**.

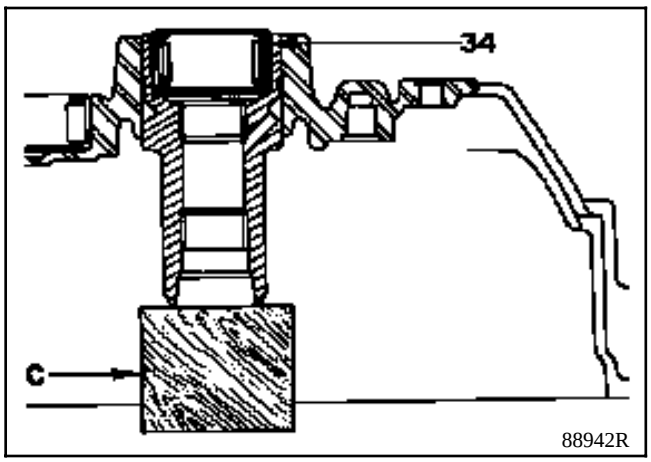
Crimp the bearing using a cold chisel, paying attention to the crimping depth.

- Output bearing shaft (34).

NEVER USE THE CONVERTER CASING AS A SUPPORT

Fit a block (C) under the stator shaft.

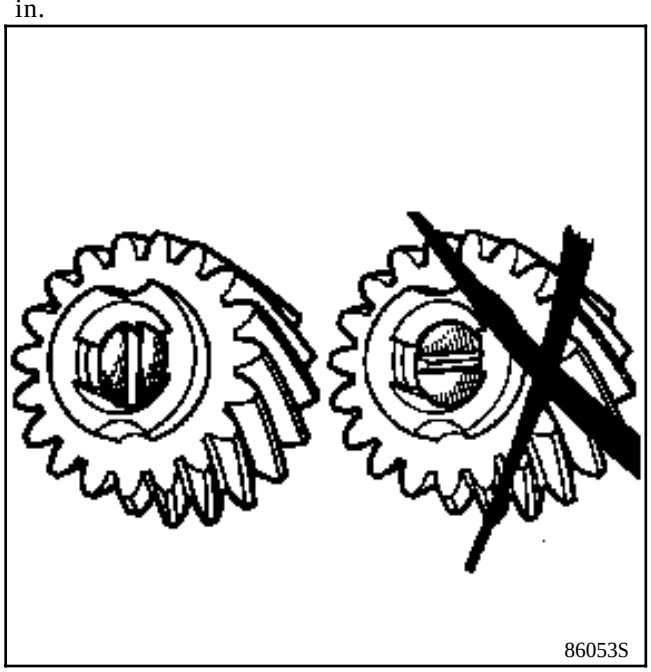
Offer up the needle bearing (34) and push it on, using the press, so that it is flush with the stator shaft face.



Speedometer drive gear (35)

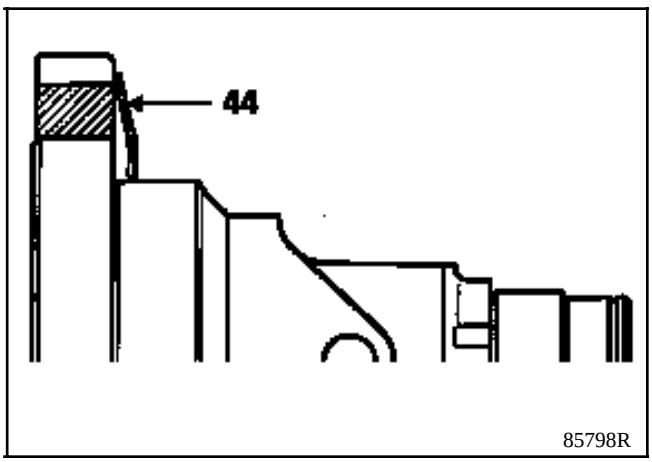
The drive gear and its shaft are refitted by hand. The shaft must be correctly positioned in relation to the gear locating spigots, owing to the elasticity of the lips of the shaft.

Using a mallet, ensure they are properly clipped in.



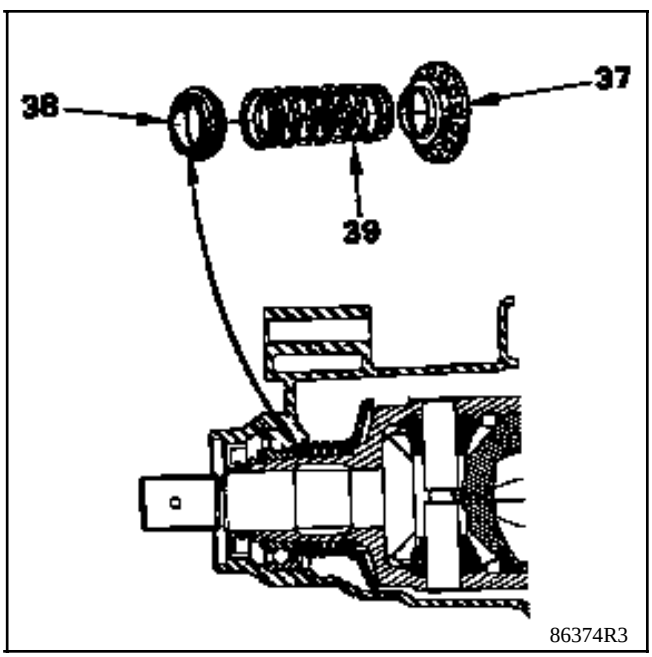
Fitting the differential in the casing.

In all assemblies where washers (40) are required (**see page 137**), place them in front of the spring washer (24) and ensure (24) is the right way round.



Electronic version

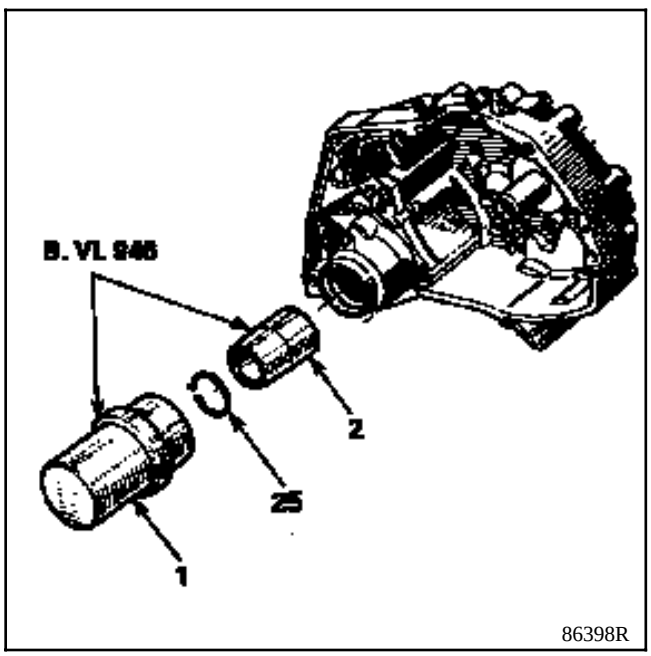
Fit sensor wheel (37) and (39 - 38).



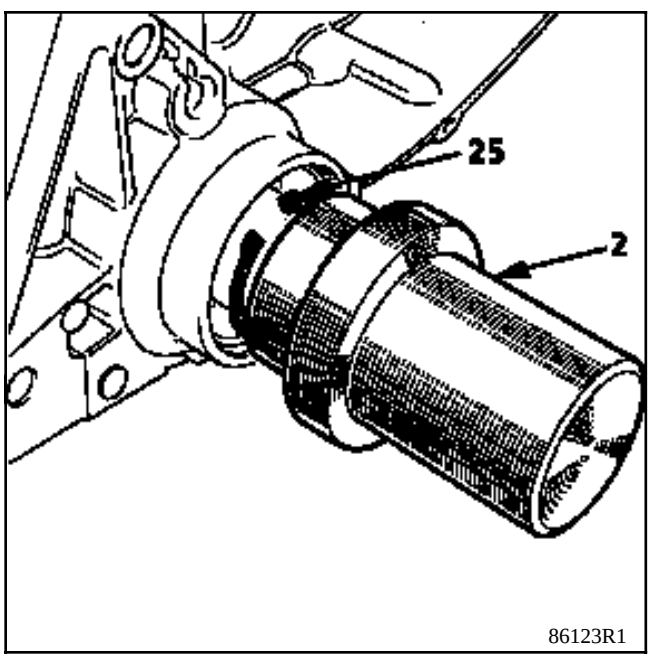
Place the differential in the converter and differential casing and fit it on the press.

On the press:

- Place a wooden block under the crown wheel.
- Ensure that the circlip is the correct thickness for the grooves (see previous page).
- Place circlip (25) on nose (1) of tool **B. Vi. 946**, then place the nose on the sunwheel.
- Fit tool (2) **B. Vi. 946** onto nose (1) and push on the press until the circlip fits in its groove. Remove tool **B. Vi. 946**.



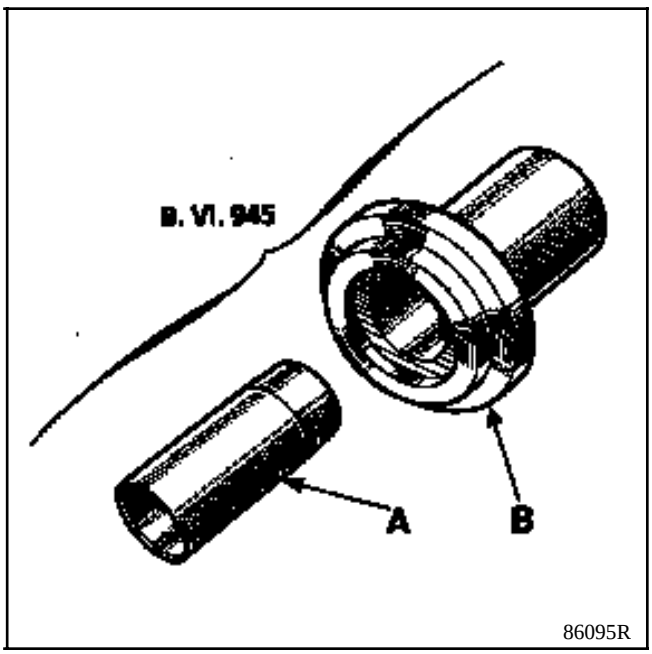
86398R



86123R1

Seal (28) is refitted using tool **B. Vi. 945** which consists of:

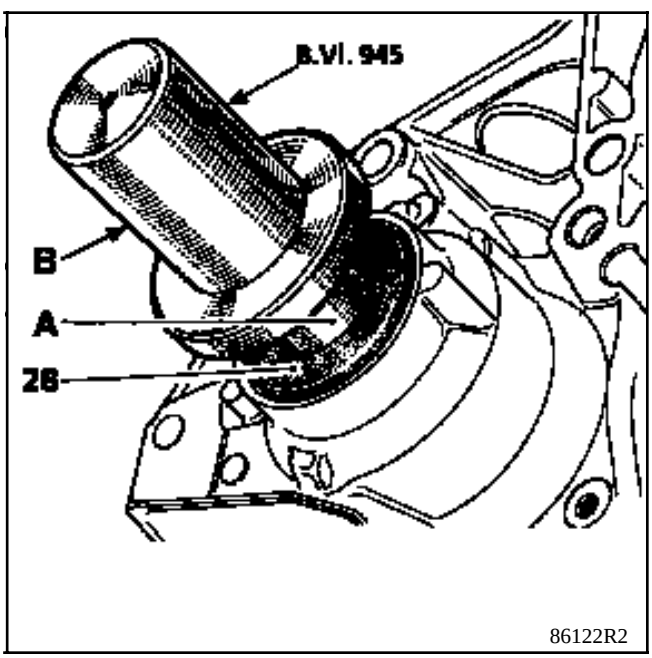
- a seal protector (A),
- a tool used for fitting the seal (B).



86095R

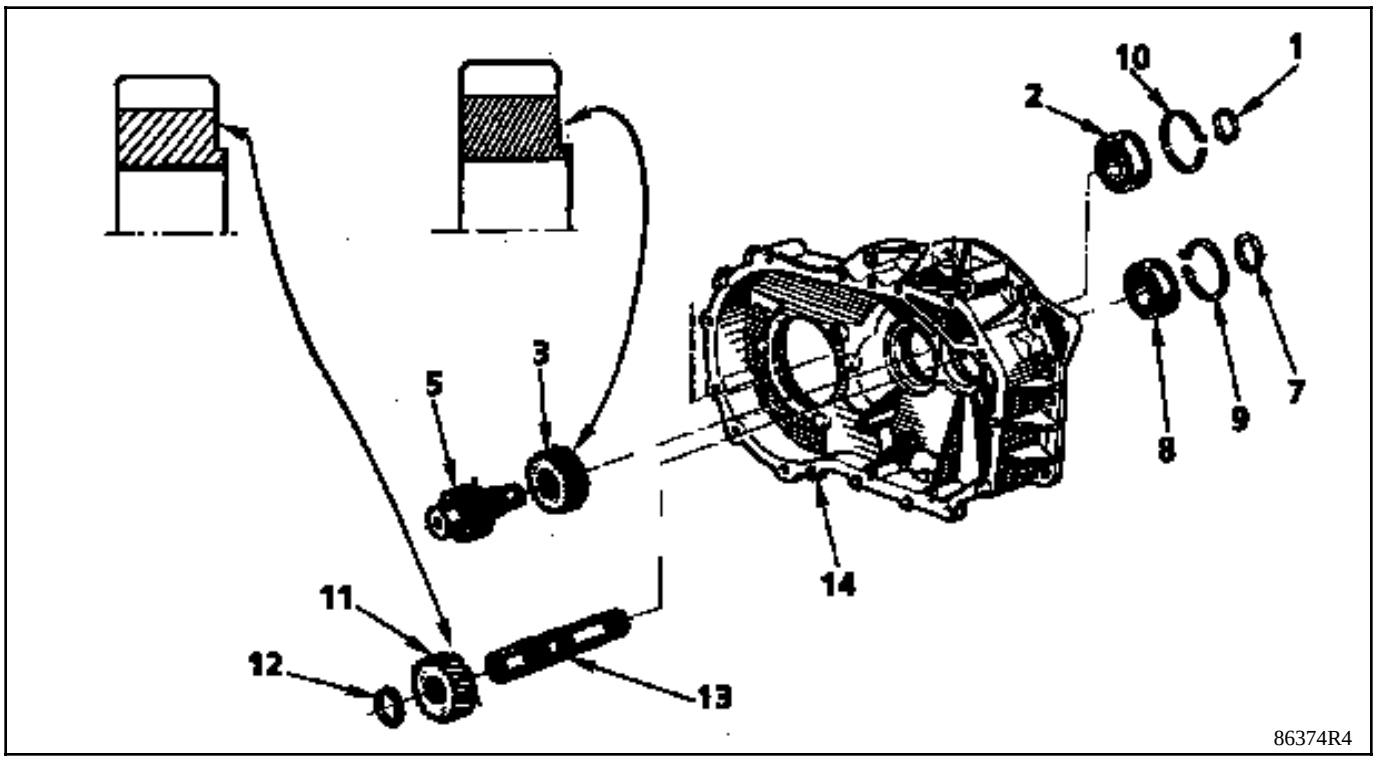
Method:

Fit the greased protector (A) on the sunwheel and position the seal using tool (B).



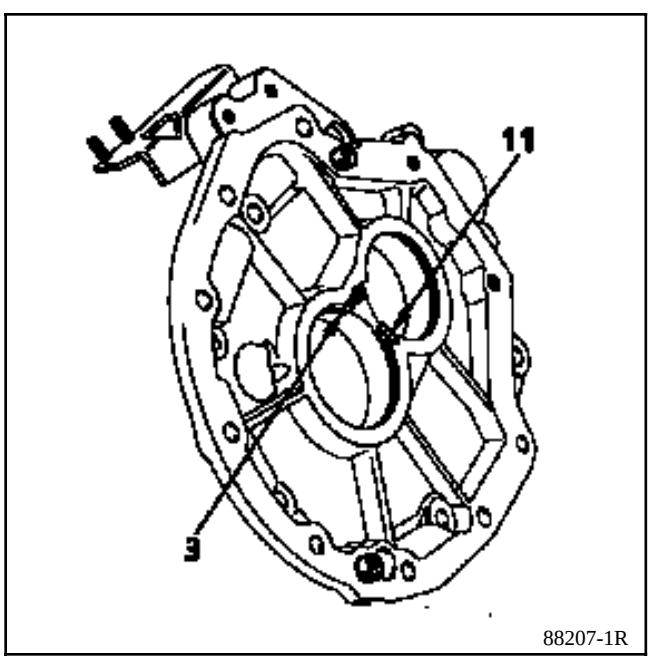
86122R2

SEPARATOR HOUSING

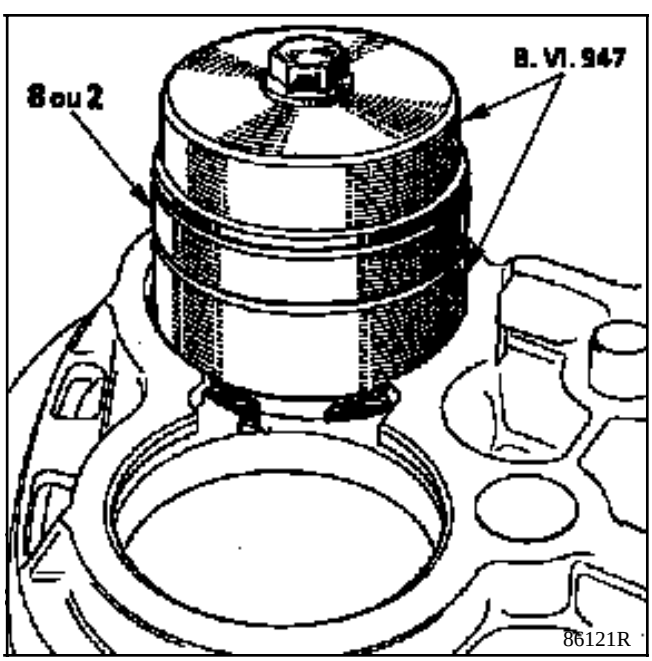


Shaft bearing

Bearings (2) and (8).
Refit:
- the circlips (3) and (11) with the notches on the same side,



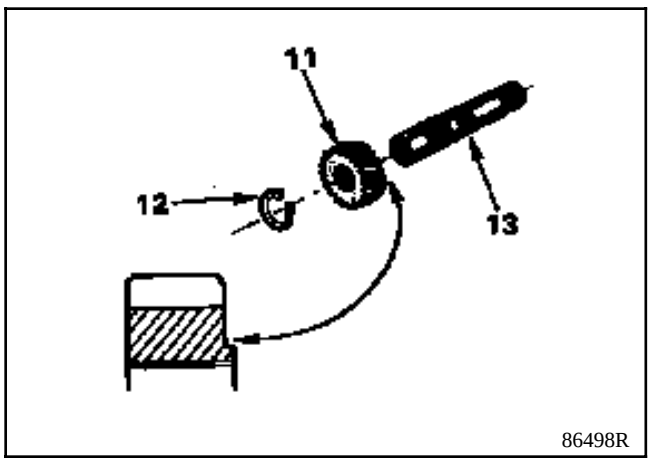
- bearings (2) and (8) using tool **B. Vi. 947** (bearing (8) has a larger internal diameter than bearing (2), so tool **B. Vi. 947** must be centred on the bearing).



Ensure that the circlips are correctly positioned in the bearing grooves.

Output shaft (13)

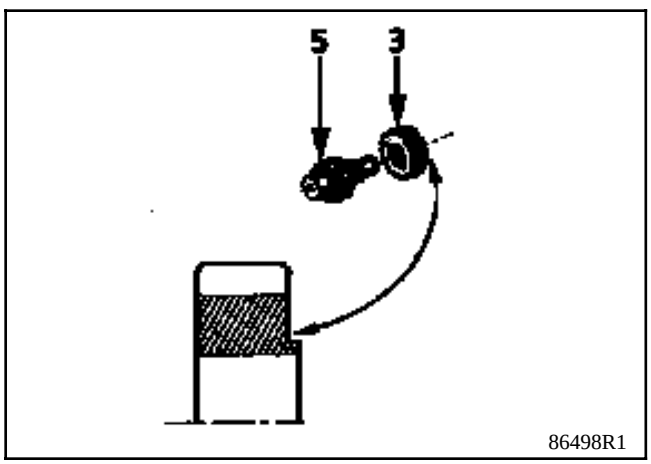
On (13), fit pinion (11) aligning the mark on the shoulder on the opposite side to circlip (12) on the press so that it is flush with circlip (12).



86498R

Secondary shaft (5)

On (5) fit pinion (3) with the mark on the shoulder at the outer end of the shaft (5), using the press.

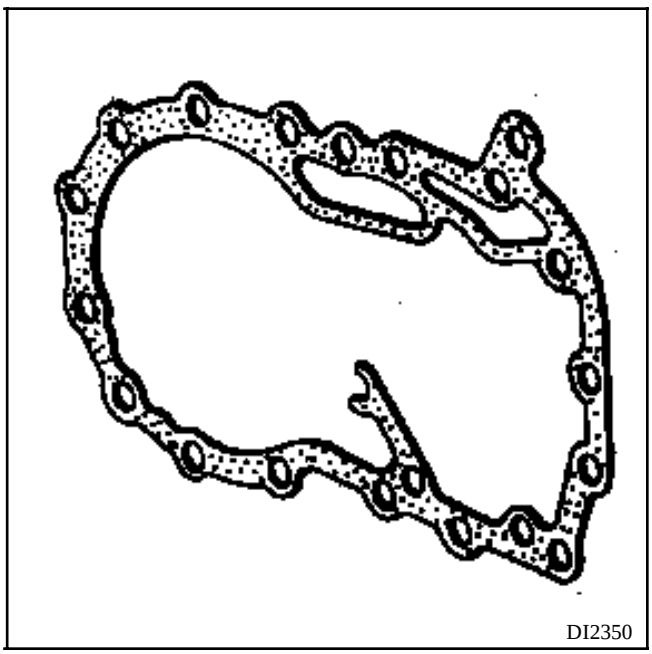


86498R1

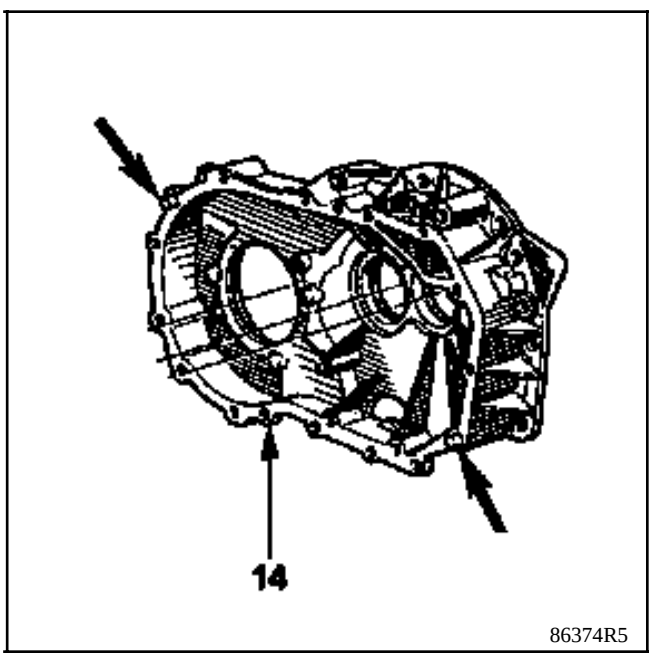
Fit the shafts on the separator housing and fit circlips (1) and (7).

COUPLING THE SEPARATOR HOUSING TO THE CONVERTER AND DIFFERENTIAL CASING

A seal must be fitted, regardless of the original type of assembly.


DI2350

Check that the two locating dowels are on the separator housing (14).



86374R5

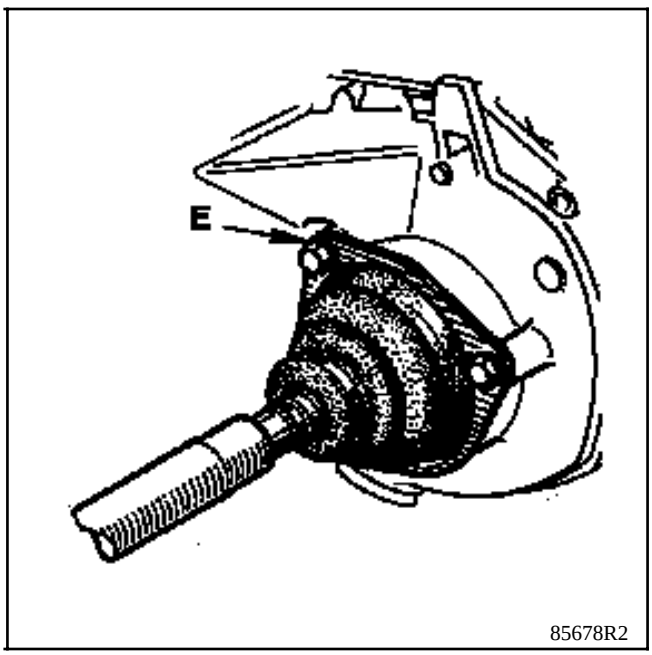
Lubricate the seal and fit it on the separator housing (14).

Tighten the bolts to a torque of **2.5 daN.m**.

See the relevant section for fitting the converter seal.

See the previous chapter for fitting the gear section casing on the separator housing.

NOTE: the separator housing (14) and the converter and differential housing (6) are matched by their machining.



SPECIAL FEATURE

There are two types of assembly for stud (E) securing the lefthand driveshaft gaiter.

Original fitment:

The stud is **smooth**, it is essential to fit a driveshaft gaiter **with a welded spacer**.

Second fitment:

This is a **shouldered** stud, it is essential to fit a driveshaft gaiter **without a welded spacer.**.

In all cases, fit the appropriate type of stud to the gaiter clamp on the vehicle.

REMOVAL

SPECIAL TOOLING REQUIRED		
Mot.	**587**	**Seal extractor**
B.Vi.	**31-01**	**Set of drifts for fitting Ø 5 mm roll pins**
B.Vi.	**39**	**Drift for fitting Ø4 and 10 mm roll pins**
B.Vi.	**465**	**Tool for replacing converter seal**
B.Vi.	**883**	**Tool for replacing differential band ring**
B.Vi.	**905**	**Tool for replacing speedometer driveshaft seal**
B.Vi.	**951**	**Tool for fitting differential seal**
B.Vi.	**953**	**Tool for locking secondary gear**
B.Vi.	**955**	**Tool for measuring preload**
B.Vi.	**959**	**Tool for fitting circlip on output shaft**
B.Vi.	**961**	**Tool for fitting final drive pinion bearing track rings**

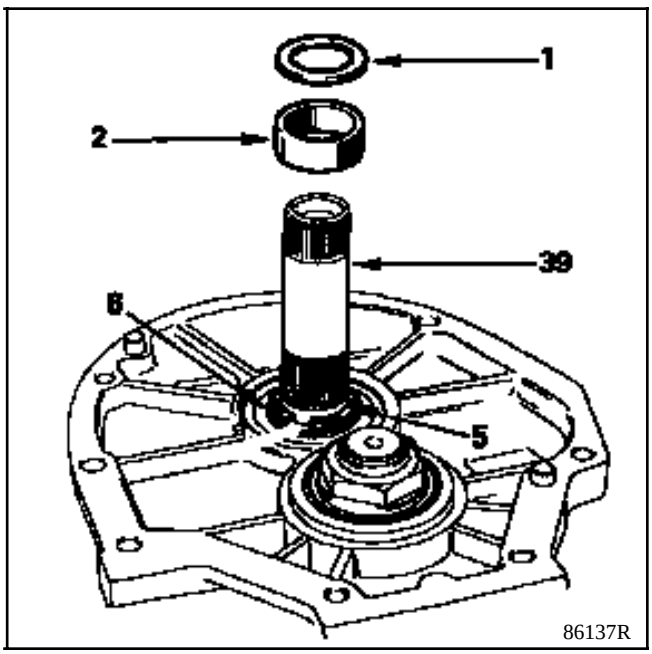
TIGHTENING TORQUES (in daN.m)	
Differential crown wheel bolts	**12 to 14**
Differential crown wheel bolts (2 planet wheels)	**9 to 11**
Differential cover plate bolts	**2**
Final drive pinion nuts	**16**
Inspection cover bolts	**1.5**

The parts must be removed and handled on a bench with a padded top (rubber or thick plastic).

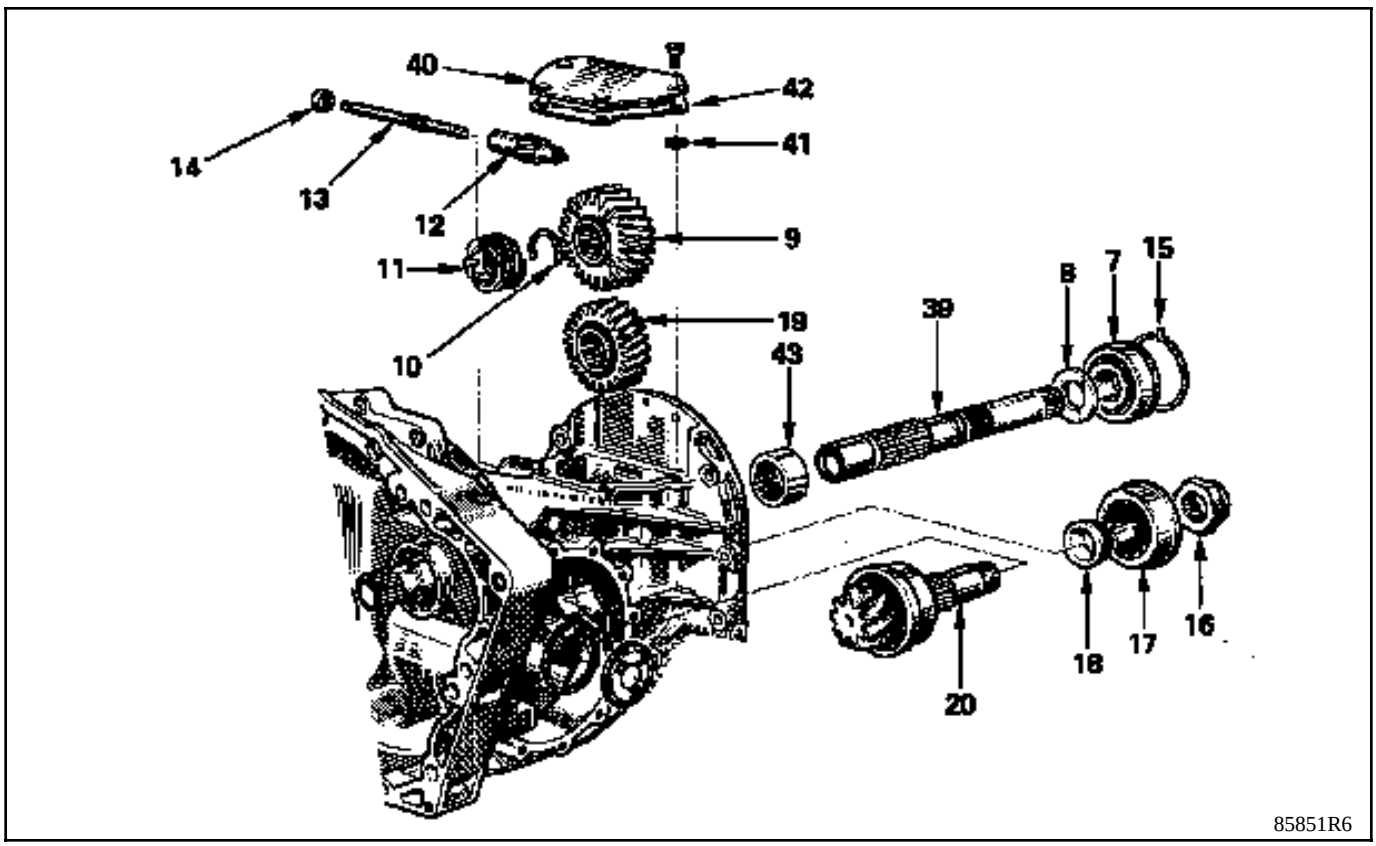
SEPARATING THE CASINGS

Remove:
- the converter,
- the oil pump shaft.

Separate the final drive casing from the gear section casing.
- the O-rings from the sunwheels.,

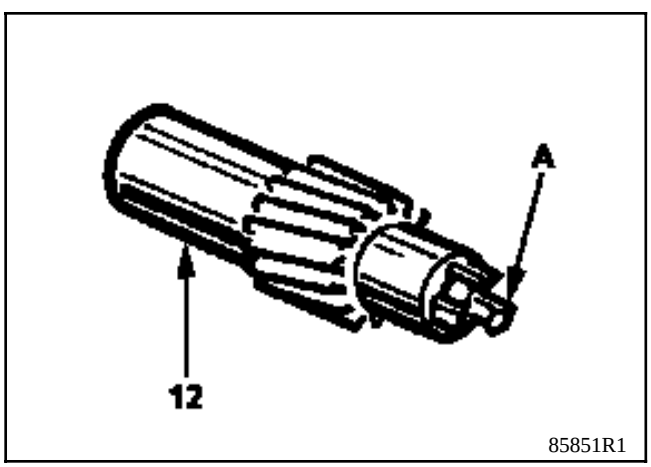


- the shim(s) (1) and the spacer (2),
- the circlip (5) and the washer (6),
- the differential cover plate.
  (DO NOT ALLOW THE DIFFERENTIAL TO FALL),
- the differential.



- the inspection cover (40) and its seal (42), take care not to lose spacers (41), depending on version.

Break off notches (A) on (12) and recover them.



Pull on the speedometer driveshaft (13).

Move the step-down drive (9) back so as to release the half-clip (10), then remove it.

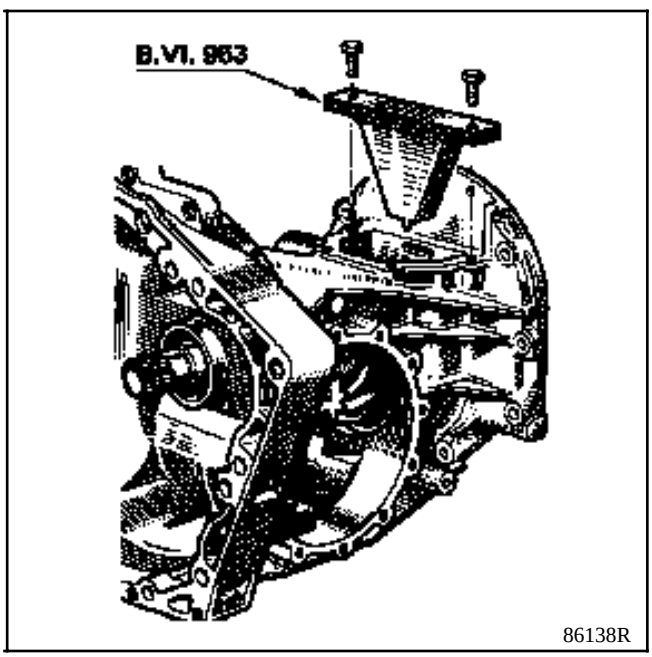
Push the speedometer drive gear (11) back towards the converter.

Open the spring ring (15) and simultaneously extract shaft (39) with bearing (7).

Recover the speedometer drive wheel (11) and the drive pinion (9).

Extract the bearing (7) and the washer (8) from (39).

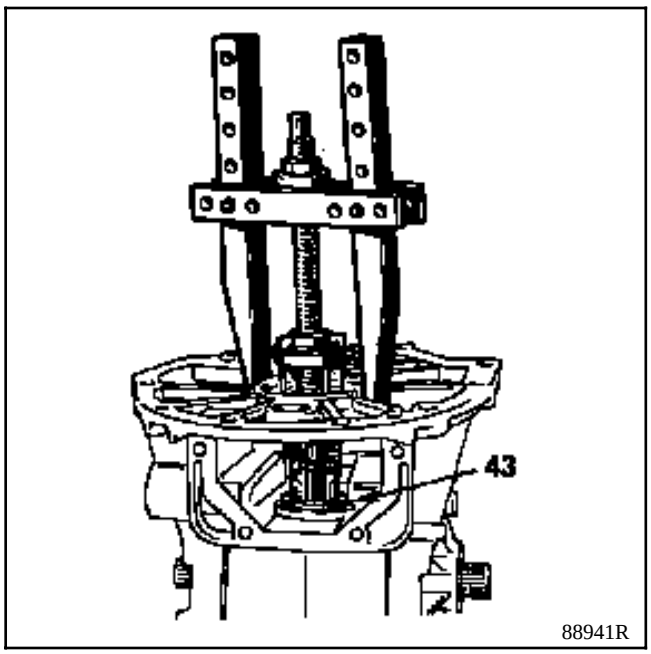
Lock the final drive pinion (20) using tool **B. Vi. 953** on the pinion (19).



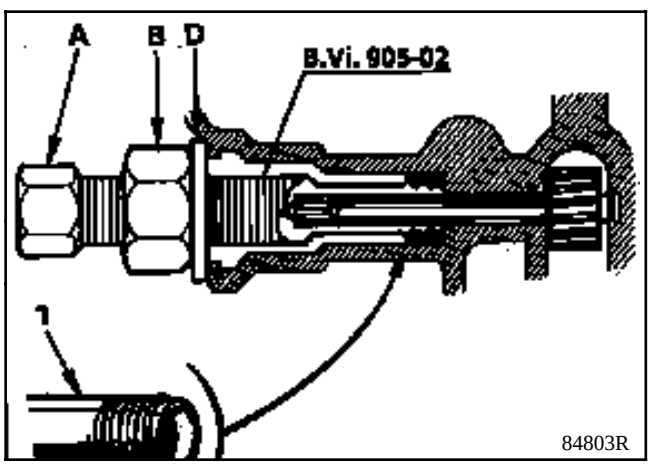
Unlock nut (16) and remove it.

Remove the tool and knock out the output shaft (20) using a mallet, recover bearing (17), spacer (18) and drive pinion (19).

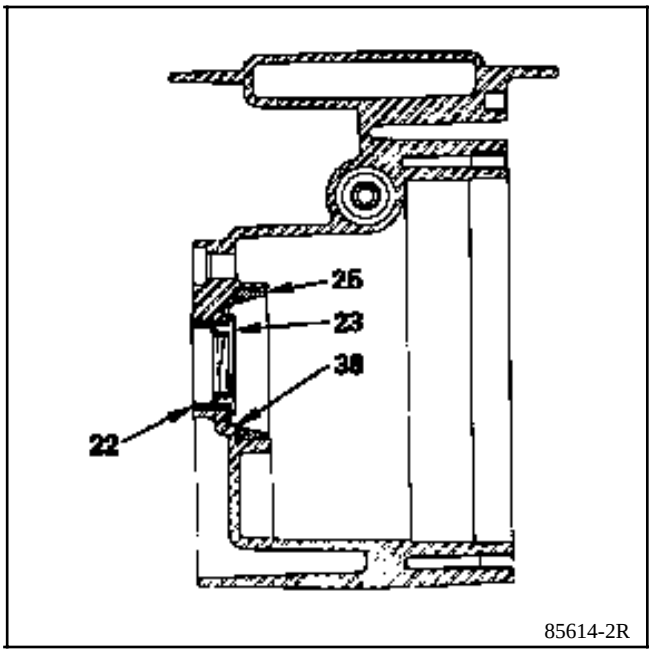
Remove:
- the final drive pinion outer bearing track rings using a copper hammer,
- the needle race (43) from the output shaft using an extractor such as a FACOM U40 - U51B (dowel **n° 7**),



- speedometer drive seal with tool **B. Vi. 905**.

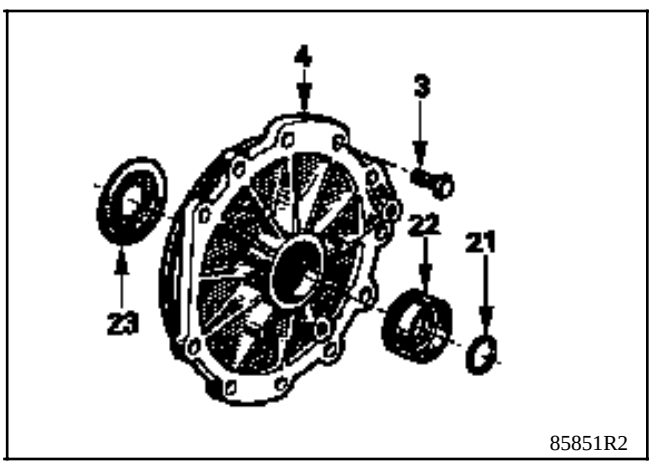


From the final drive casing, remove:
- the baffle (23),
- the seal (22) using a **diameter 41 mm** sleeve.



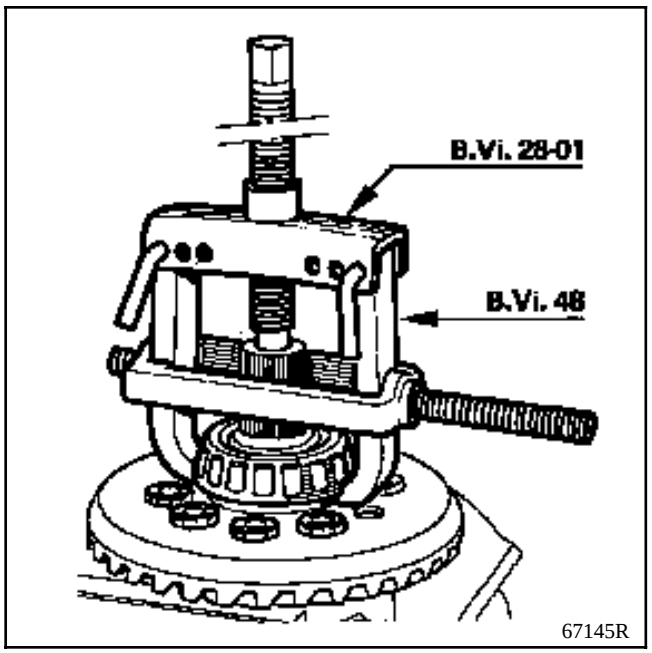
With a small lever, release the outer track ring (25) and use tool **Mot. 587** to finish the operation.
- the adjusting shim (38).

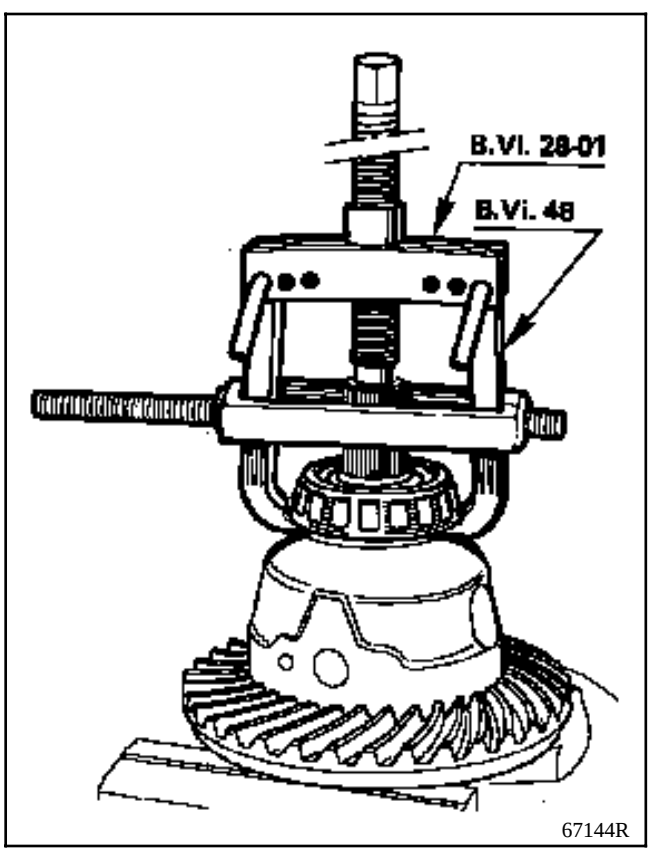
From the differential cover plate (4), remove
- the baffle (23),
- the seal (22),
- the outer track ring.



DIFFERENTIAL

Remove two of the bolts securing the crown wheel.
Extract the bearings on the crown wheel end and casing end using tool **B. Vi. 28-01** fitted with jaws **B. Vi. 48** or similar type of extractor.

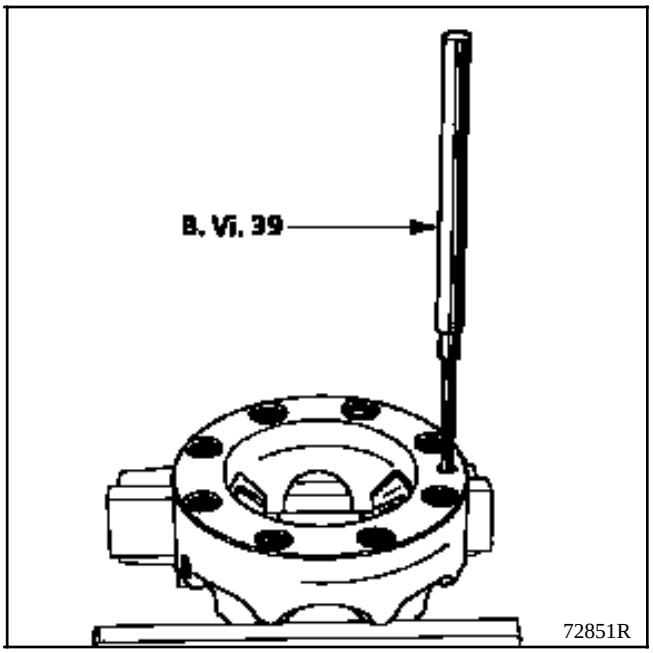




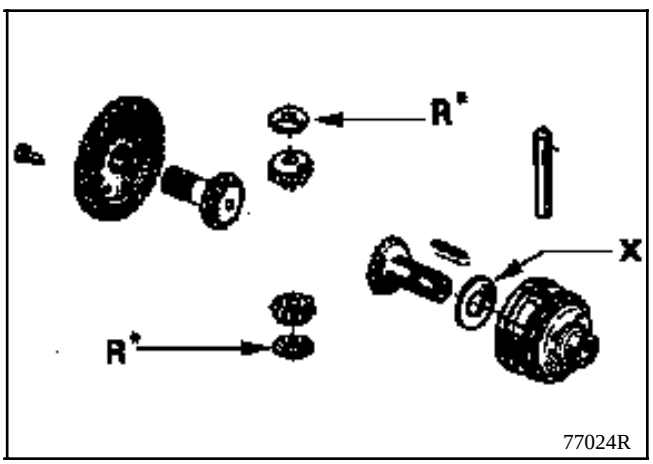
Remove the bolts securing the crown wheel to the casing (**bolts cannot be reused**).

Differential with 2 planet wheels

Remove the roll pin holding the planet wheel shaft using drifts **B. Vi. 31-01** or **B. Vi. 39.**



Separate the various parts.

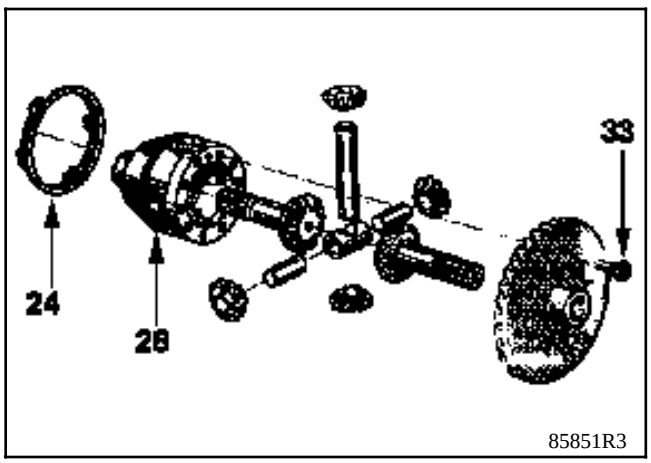


Attach the washers (R) to their respective planet wheels and recover the adjusting shim (X).

* Depending on type of assembly.

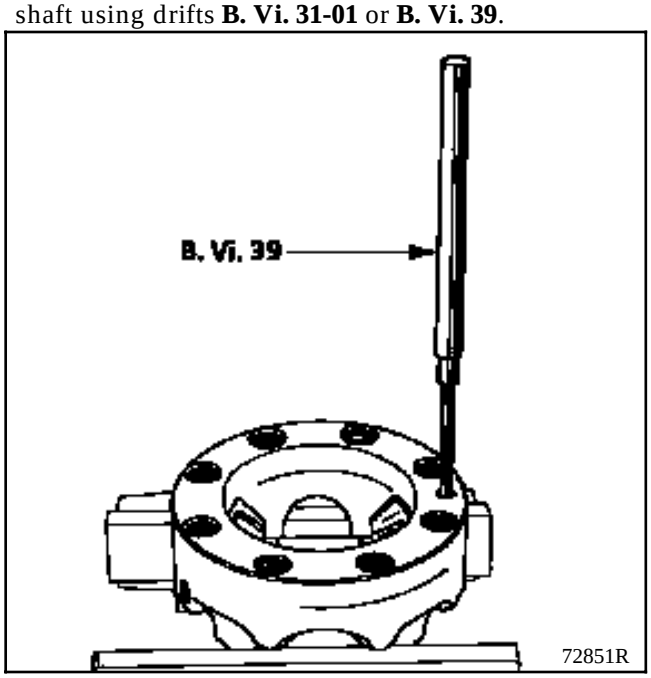
Differential with 4 planet wheels (with band ring)

Break the band ring (24) with a cold chisel and separate the various parts.

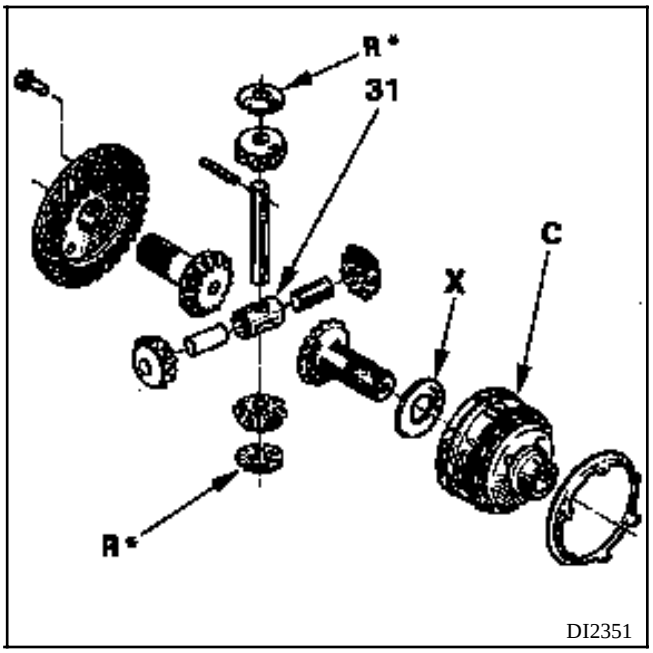


Differential with 4 planet wheels (with roll pin and band ring)

Remove the roll pin holding the planet wheel shaft using drifts **B. Vi. 31-01** or **B. Vi. 39**.



Break the band ring (24) with a cold chisel and separate the various parts.



Attach the washers (R) to their respective planet wheels and recover the adjusting shim (X).

* Depending on type of assembly.

NOTE: The speedometer sensor target (C) cannot be dismantled.

REASSEMBLY

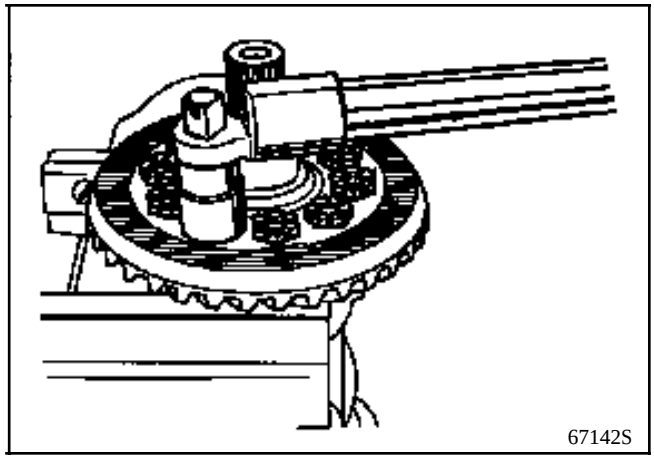
Checking the parts

Check the condition of:
- the teeth,
- the bearing faces,
- the washers (on the planet wheels),
- the splines,
- the casing.

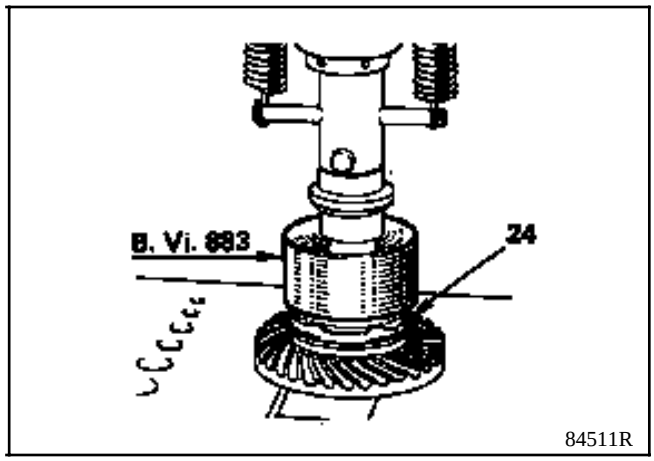
REASSEMBLING THE DIFFERENTIAL

Differential with 2 planet wheels and 4 planet wheels and a roll pin.

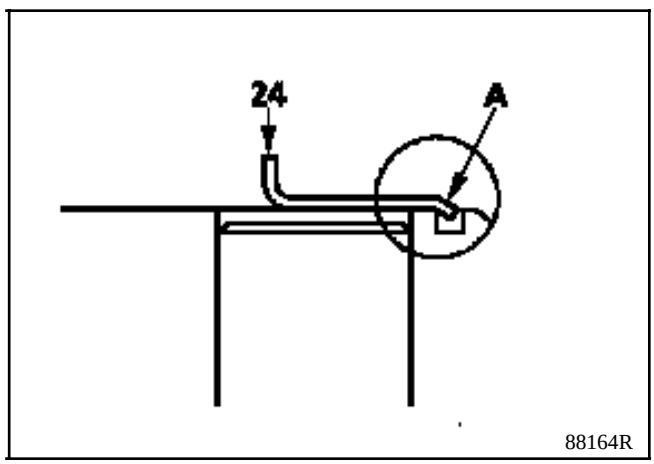
In the casing, place
- the bakelite washer with the oilway at the sunwheel end: use a **1.96 mm** thick shim. If the mesh clearance of the sunwheel with the planet wheels is too large, use the **2.02 mm** thick shim.
- a sunwheel (immerse it in the recommended oil).
- the planet wheels and their washers (locking notch in the casing hole).
- engage the planet wheel shaft fitted with the hub (31) (depending on vehicle), aligning the hole in the shaft with the one in the casing,
- fit the roll pin: push it down by approximately **5 mm** inside the housing using drift **B. Vi. 31-01** or **B. Vi. 39**.
- fit the other two planet wheels and insert their shafts (depending on vehicle).
- immerse the second sunwheel in the recommended oil and fit it to the crown wheel.
- assemble the crown wheel on the casing **using new bolts which cannot be loosened.**
- Tighten the bolts to a torque of:
  - **2 planet wheels 9 to 11 daN.m**,
  - **4 planet wheels 12 to 14 daN.m**.



The band ring (24) is refitted on the press using tool **B.Vi. 883**, without the bearing fitted.



Check that the edges (A) of the band ring (24) are correctly positioned in the differential casing groove.



If they are not, move the band ring down slightly using a copper hammer.

If necessary, accentuate the curve of the edge at (A) very slightly.

When the bearings are refitted on the press, take care **not to change** them over since **they do not have the same internal diameter**. The bearing with the larger diameter should be at the crown wheel end.

- **Differential with four plant wheels without roll pin**

Proceed in the same way.
Do not fit washers or shims to the planet wheels.

ADJUSTING THE DIFFERENTIAL PRELOAD

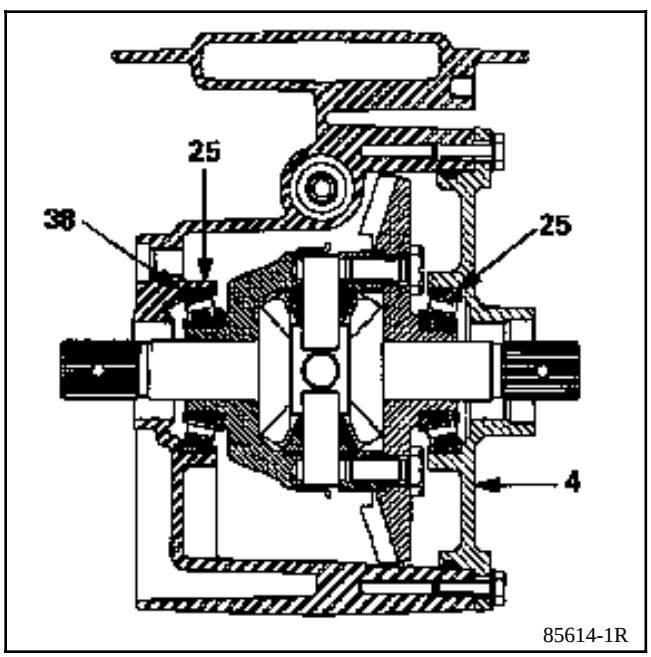
The differential preload readings are taken **before the seal (22) and the final drive pinion are fitted**.

It is obtained using a shim (38).

In the casing refit:
- the shim (38), removed during dismantling,
- the outer bearing track ring (25).

Place a piece of string around the differential and fit it in place.

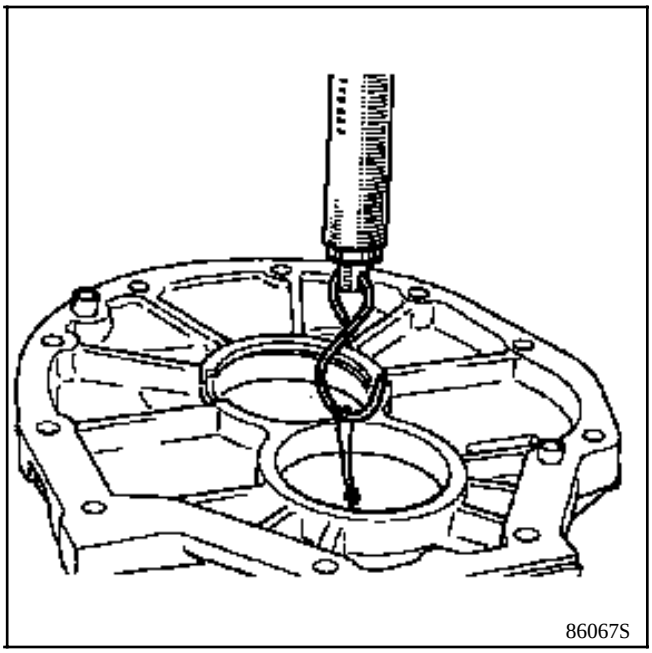
On the cover plate (4), fit:
- the outer bearing track ring,



85614-1R

- the cover plate to the differential casing and tighten to a torque of **2 daN.m**.

Attach a spring balance to the string and measure the load.


86067S

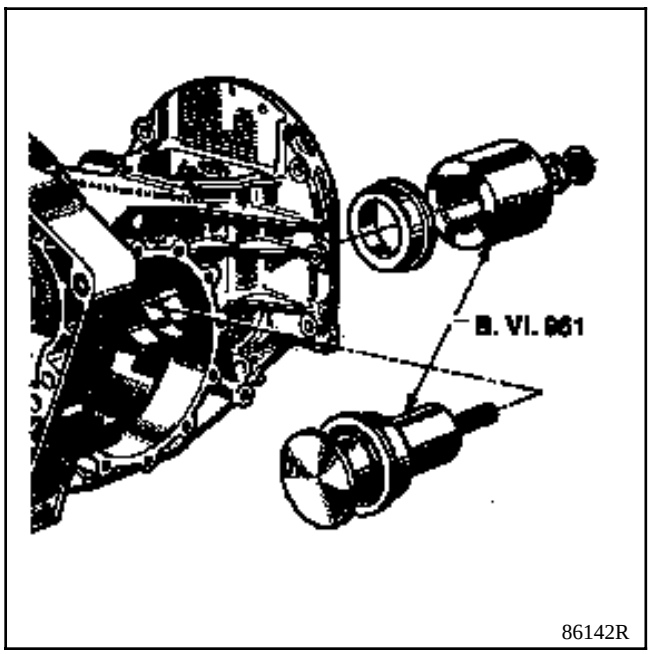
The differential should rotate under a load of between **3** and **6 daN.m**, in the case of new bearings and freely, without play, when the original bearings are refitted.

By increasing the thickness of the shim (38), the preload increases and vice versa.

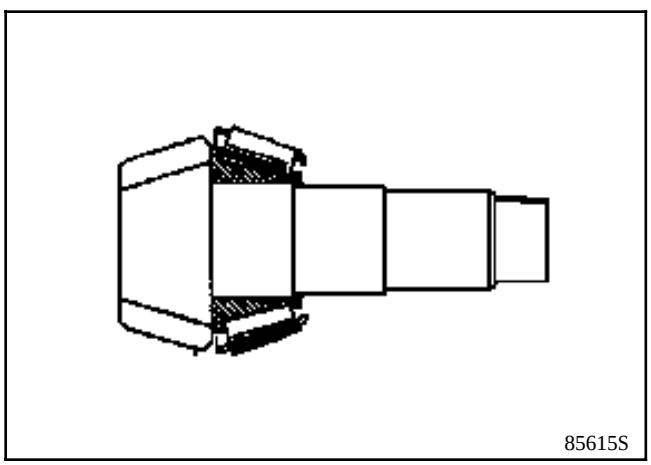
Remove the cover plate (4) and the differential.

REASSEMBLING THE FINAL DRIVE PINION

The final drive pinion outer bearing track rings are refitted using tool **B. Vi. 961**.

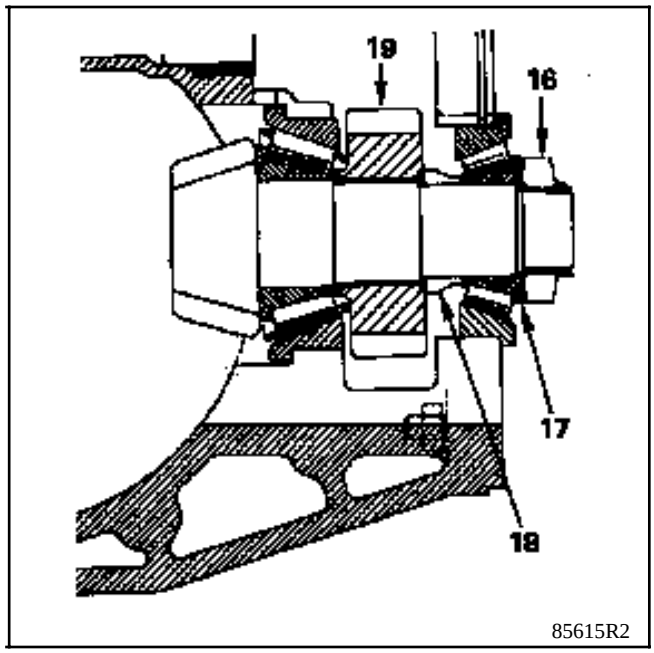


Refit the inner bearing track ring to the final drive pinion (20).

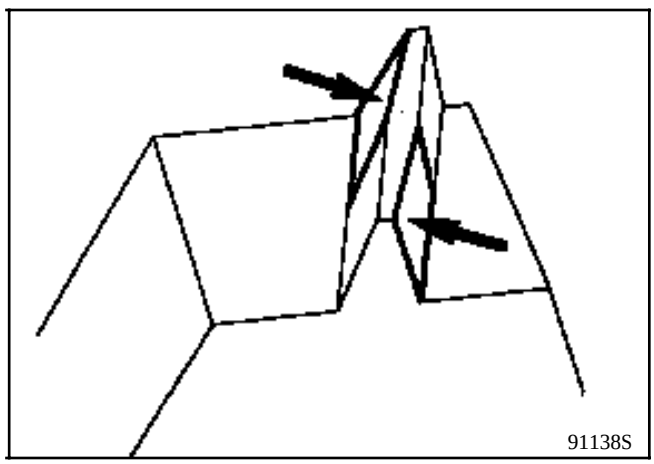


Offer up the final drive pinion (2) to its location on the final drive casing and fit:
- the step-down gear (19) with the shoulder at the final drive pinion end,
- the spacer (18) recovered during dismantling (see diagram for direction of fitting),
- the inner bearing track ring (17),
- the new nut (16).

Fit tool **B. Vi. 953** and tighten the nut to a torque of **16 daN.m** (see NOTE).



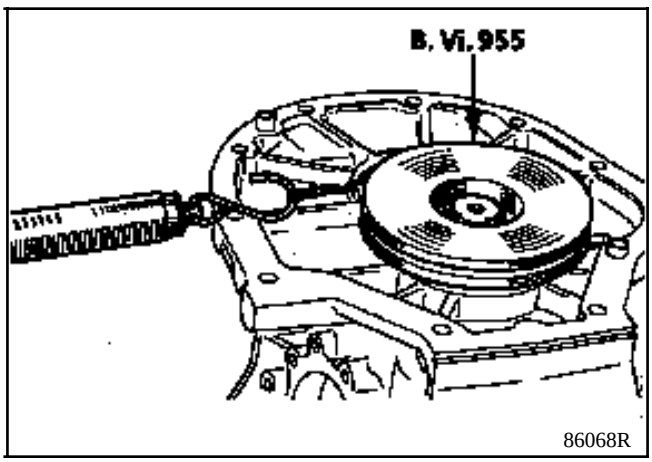
NOTE: For some automatic transmissions, the helical angle of the secondary pinion has been modified thus **B. Vi. 953** must be ground to modify it.



FINAL DRIVE PINION PRELOAD

The final drive pinion preload is adjusted **without the differential in place**. It is obtained using spacer (18).

Fit tool **B. Vi. 955** to the final drive pinion nut (16), and attach a piece of string and a balance.

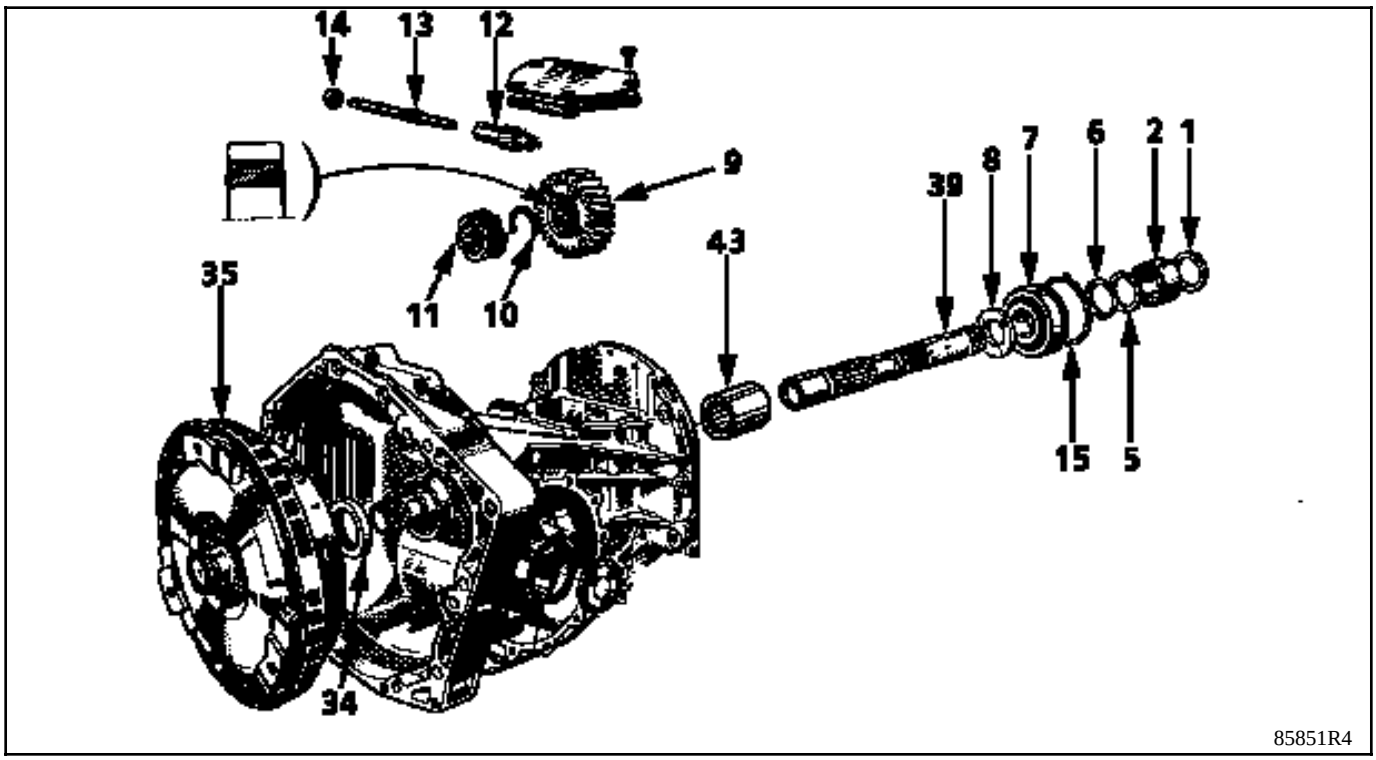


The final drive pinion should rotate under a load of between **2** and **3.5 daN.m**. if the bearings are new and freely, without play, when the original bearings are refitted.

The preload is reduced by fitting a thicker shim (18) and vice versa.

Once the adjustment has been made, tighten the nut (16) to a torque of **16 daN.m**. and lock it.

Fitting the output shaft (39)



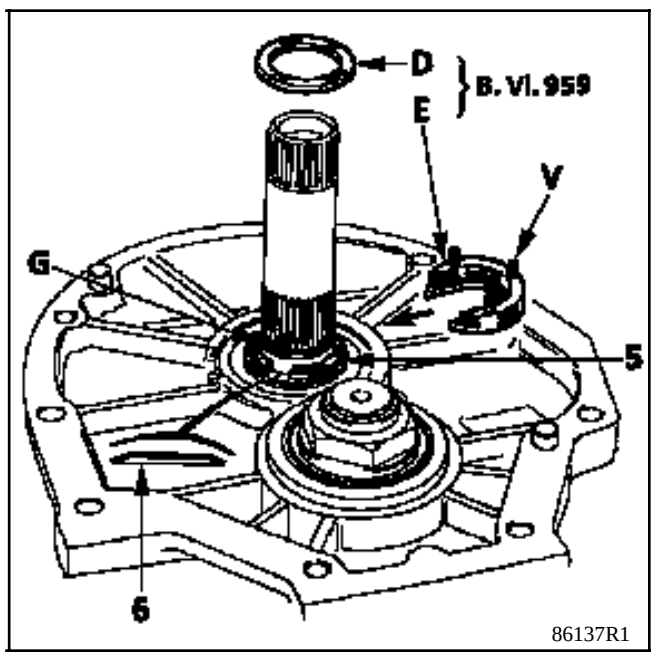
In the final drive fit:
- the needle bearing (43) on the press,
- the spring ring (15).

Place pinion (9) in the final drive (shoulder at converter end).
At the same time, thread onto the output shaft (39), the step-down gear (9) and the speedometer drive wheel (11) (with the notch towards the converter). Fit the half circlip (10) (check that (11) is properly clipped in place).

On the output shaft (39), fit:
- the washer (8),
- the bearing (7) with the groove opposite the converter and spread spring ring (15) apart,
- the belleville washer (6) (see diagram for direction of fitting),
- the circlip (5), fitting it under groove (G).

When fitting circlip (5) into its groove, use tool **B. Vi. 959**:
- fit the washer (D) from the tool onto the circlip,
- place the crescent piece (E) from the tool in the groove (G) and tighten the three bolts (V) until the circlip (5) enters its groove.

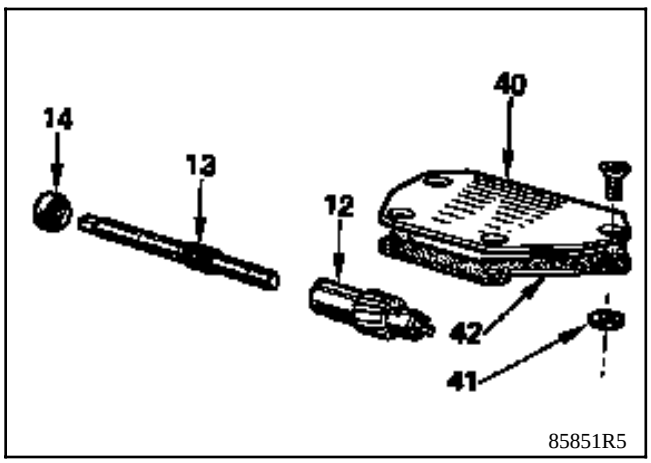
Ensure that (5) is in the correct position.



Fit the spacer (2) and the adjusting shim (1).

Speedometer drive pinion

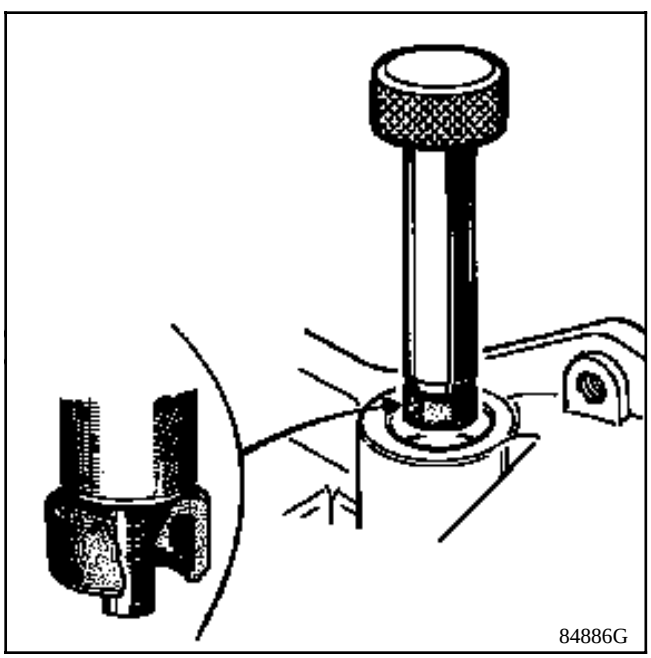
Fit a new speedometer drive pinion (12) and its shaft (13).



Check that (12) is properly clipped on (13).

Refit the inspection cover (4) equipped with seal (42) and its spacers (41) (depending on version).

Fit seal (14) on the speedometer drive pinion using tool **B. Vi. 905**.



Dipstick tube

Fit a new O-ring and refit the dipstick tube.

Differential and its seals

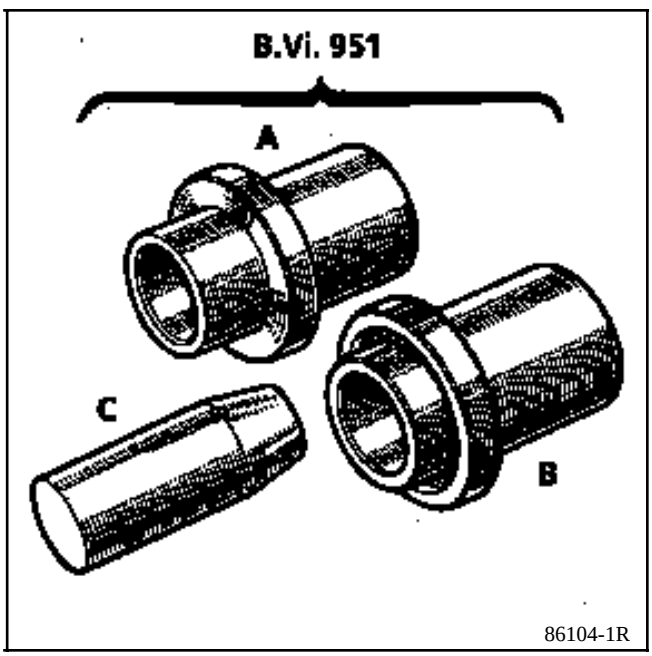
These are reassembled when the differential bearing and final drive pinion preloads have been adjusted.

Fit the baffle (23) at the final drive and cover plate end.

When the final drive pinion is in place, fit the final drive assembly and the cover plate fitted with its O-ring. Tighten the plate securing the bolts to a torque of **2 daN.m**.

Fitting the sunwheel seals

The seals are refitted using the following tools:



A Tool for fitting the seal on the cover plate end.

B Tool for fitting the seal on the final drive casing end.

C Protective sleeve.

Grease the outside of sleeve C before using it.

Method:

- **Cover plate end**:

Fit sleeve C to the sunwheel, fit the seal to the sleeve and position the seal using tool A.

- **Final drive casing end**:

Proceed in the same way but use tool B to fit the seal.

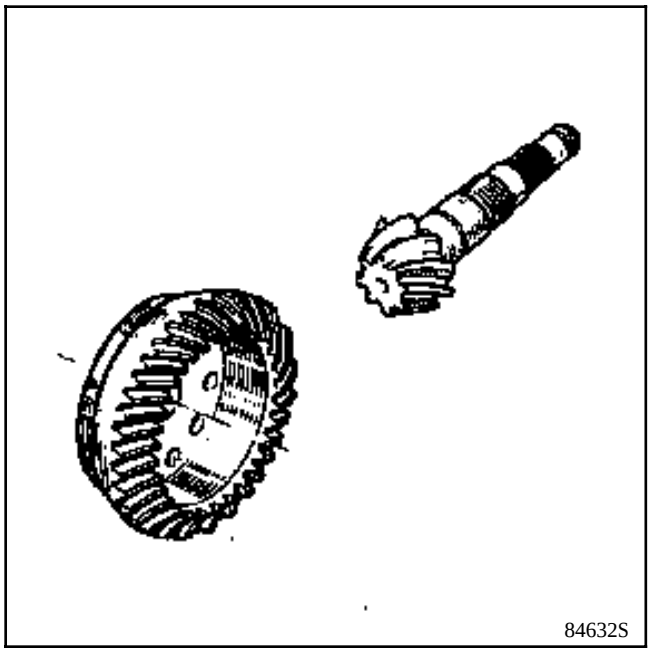
Fit the O-rings to the sunwheels.

Refer to page 108 for assembling the torque converter (34).

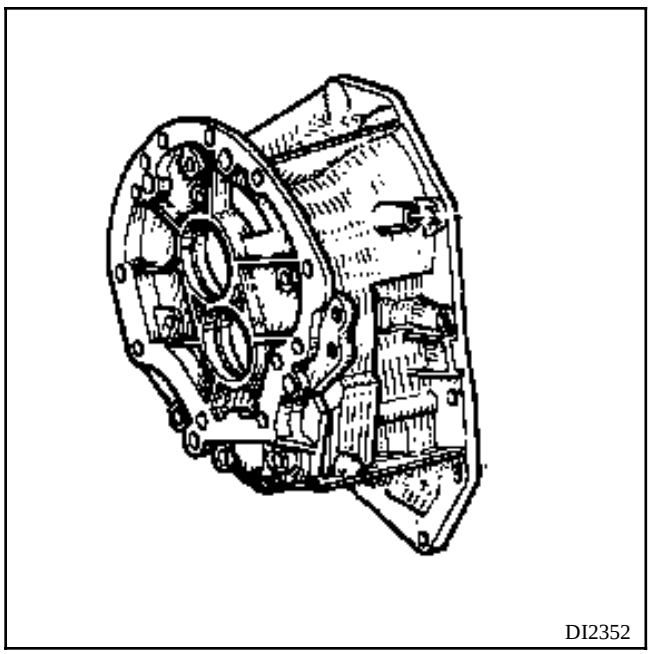
Refer to page 130 for assembling the gear section to the final drive casing.

MATCHING PARTS

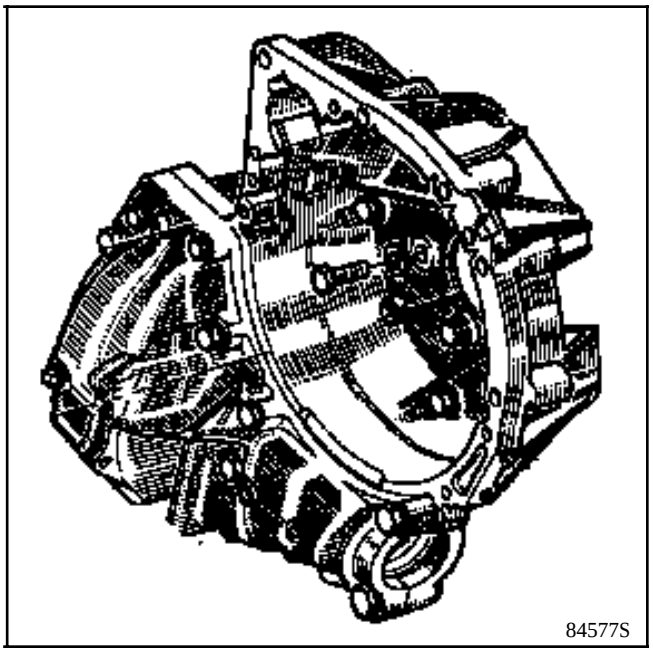
The final drive pinion and crown wheel.


84632S

The separator housing and the step-down housing.


DI2352

The final drive casing and the converter casing.

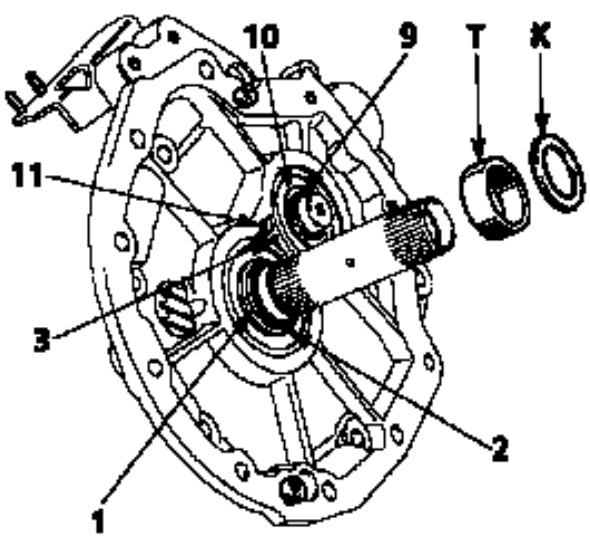

84577S

SPECIAL TOOLING REQUIRED		
B. Vi.	**28-01**	**Tool for extracting interchangeable grids.**
B. Vi.	**465**	**Tooling for replacing converter seal**
B. Vi.	**645**	**Castellated wrench for adjusting differential clearance**
B. Vi.	**715**	**Tool from kit B. Vi. 710**
B. Vi.	**805**	**Spanner for differential nut.**
B. Vi.	**902-01**	**Tool for fitting circlips**
B. Vi.	**903**	**Ring spanner for final drive pinion nut**
B. Vi.	**905-02**	**Tool for replacing speedometer drive shaft.**
B. Vi.	**906**	**Tool for measuring torque**
B. Vi.	**947**	**Mandrel for fitting bearings in the housing**
B. Vi.	**959**	**Tool for fitting circlip to output shaft**
B. Vi.	**1402**	**Tool for centring converter seal**
Rou.	**15-01**	**Shaft protecting end-piece.**

TIGHTENING TORQUES (in daN.m)	
Bearing nut on final drive pinion	**22**
Bolt securing separator casing to step-down casing	**2.5**
Bolt securing step-down casing to converter casing	**2.5**

REMOVAL

SEPARATOR HOUSING

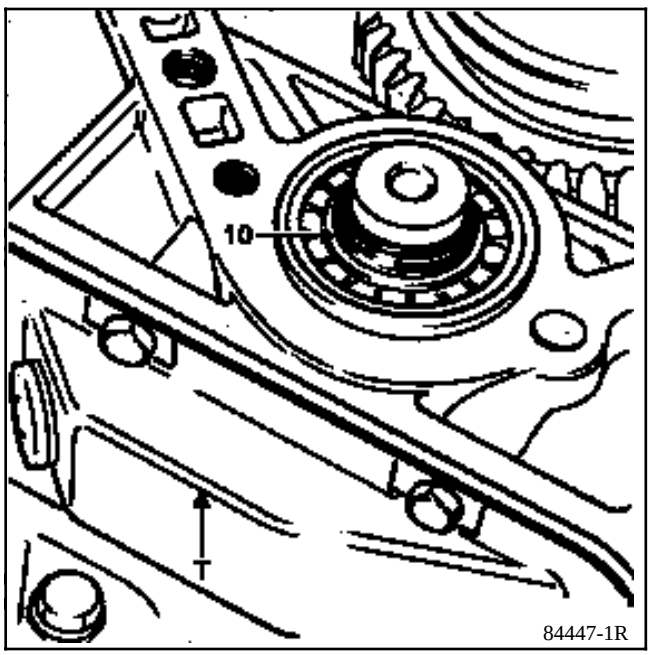


88207R2

Remove:
- the shim (K) and the spacer (T),
- circlips (1) and (9),
- the bolts mounting the separator housing and separate it from the step-down casing,
- bearings (2) and (10) by separating circlips (3) and (11).

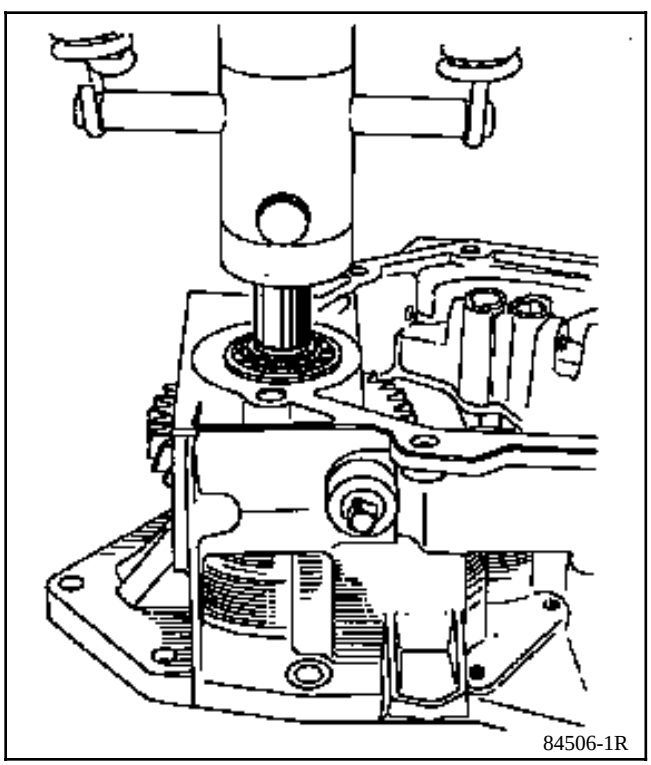
STEP-DOWN CASING

Remove:
- the circlip (21),

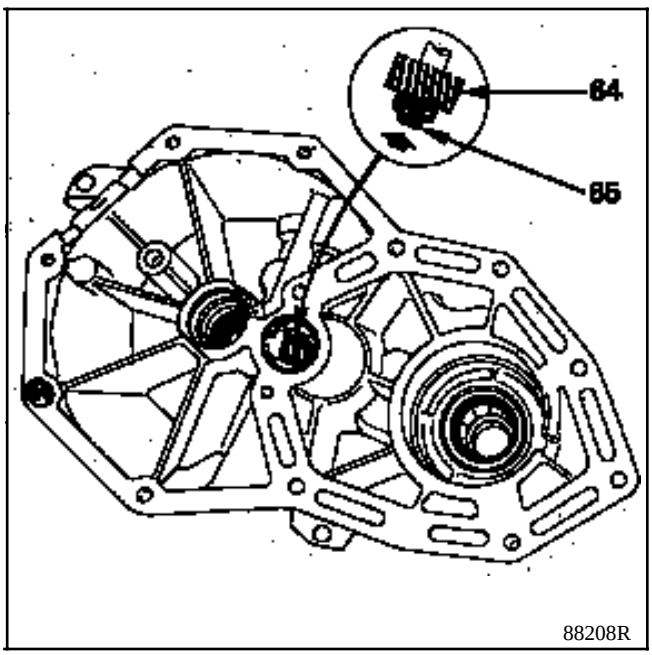


- the casing (26),
- the mounting bolts and separate the step-down casing from the final drive casing.

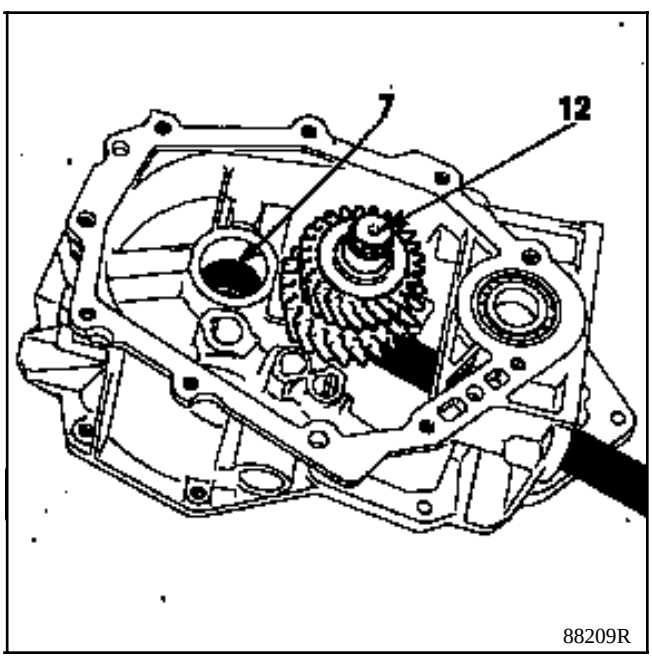
Remove the final drive pinion on the press.



Remove:
- the output shaft and its pinion,
- the speedometer drive gear (18) and and its shaft (19) using a small screwdriver,

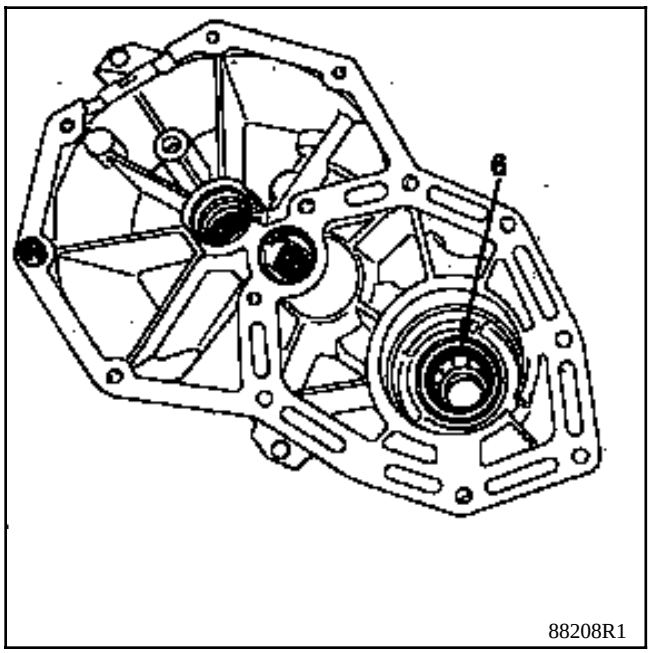


- the speedometer drive seal using tool **B. Vi. 905-02** if the seal is stuck, remove it using an angled tool,
- the step-down shaft (12) using a tool through the inspection cover for leverage,



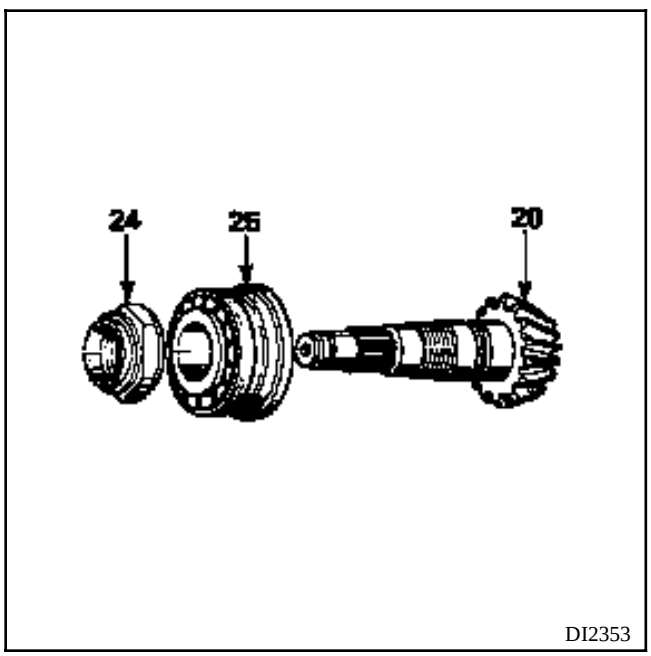
- the needle bearing (7) using tool FACOM U40 and U51B or similar,

- the lip seal (23) using tool **B. Vi. 465**.

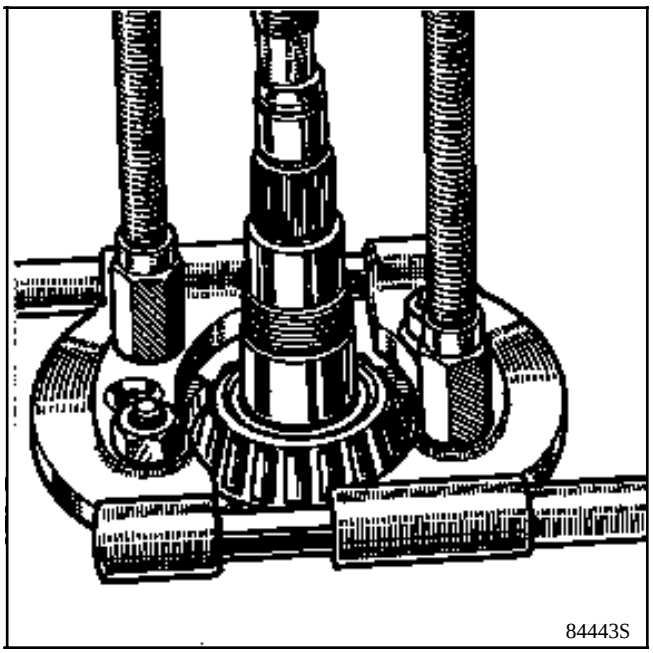


Dismantling the final drive pinion (20)

Unlock the nut (24) and remove it using **B. Vi. 903**.

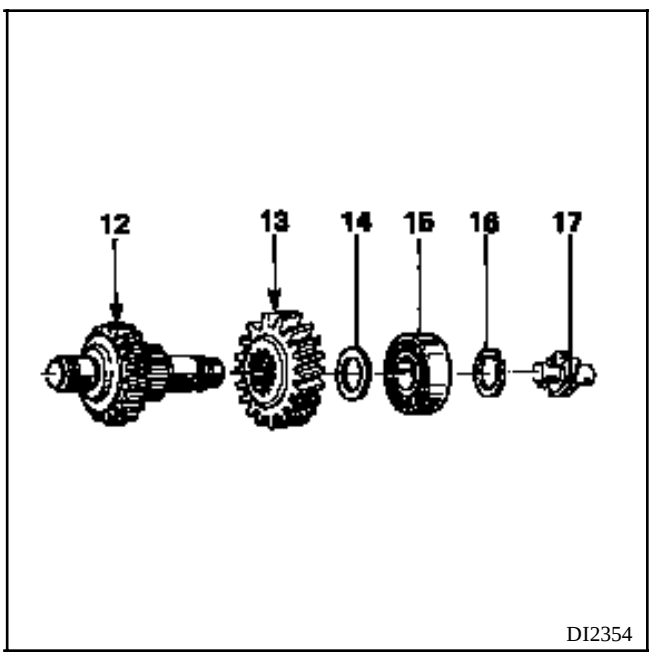


Using an extractor, extract the bearing

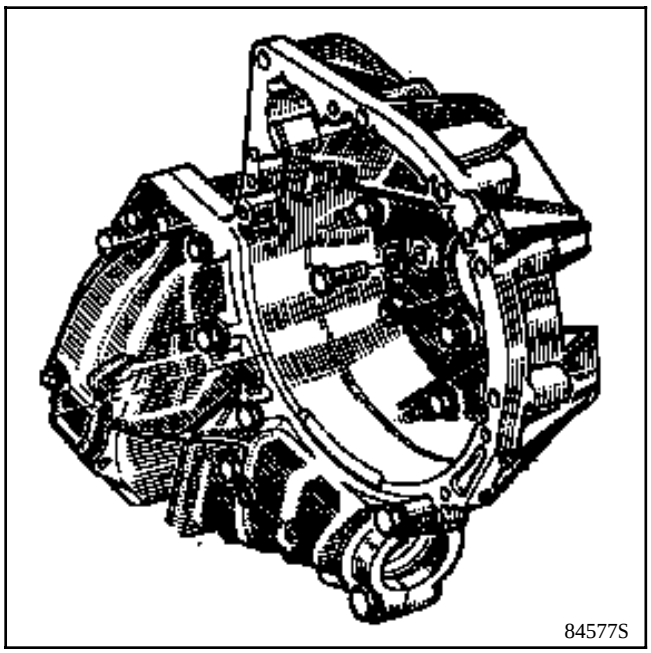


Dismantling the step-down drive shaft (12)

Remove parts 12 to 17 (13 and 15 using the press).



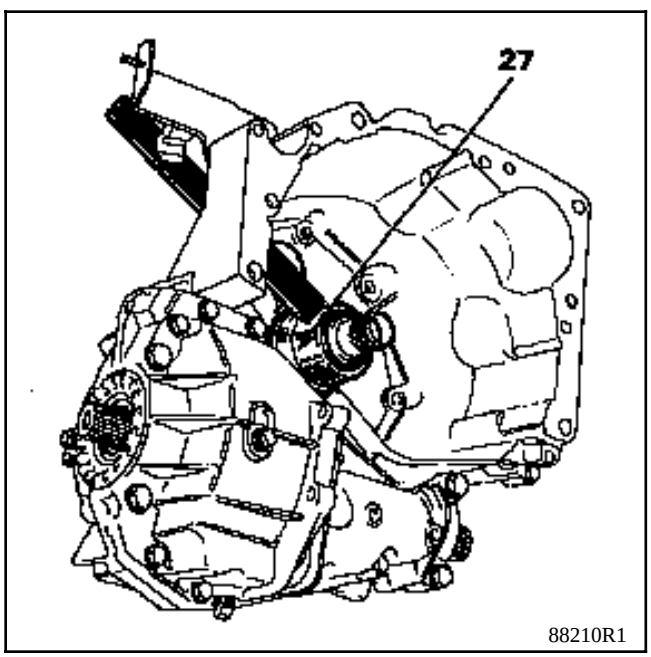
TORQUE CONVERTER/FINAL DRIVE CASING


84577S

See M.R. 222 for instructions on dismantling the final drive.

Dismantling the torque converter seal.

Remove the seal (27) using a chisel or an extractor.

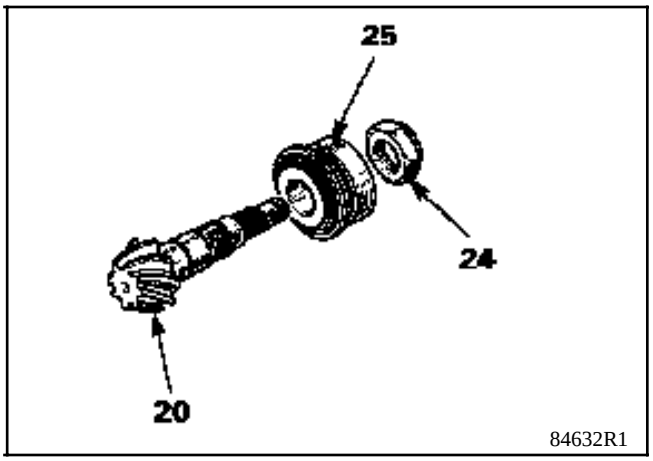


88210R1

ADJUSTING - REASSEMBLY

REASSEMBLING THE SHAFTS

Final drive pinion (20)



84632R1

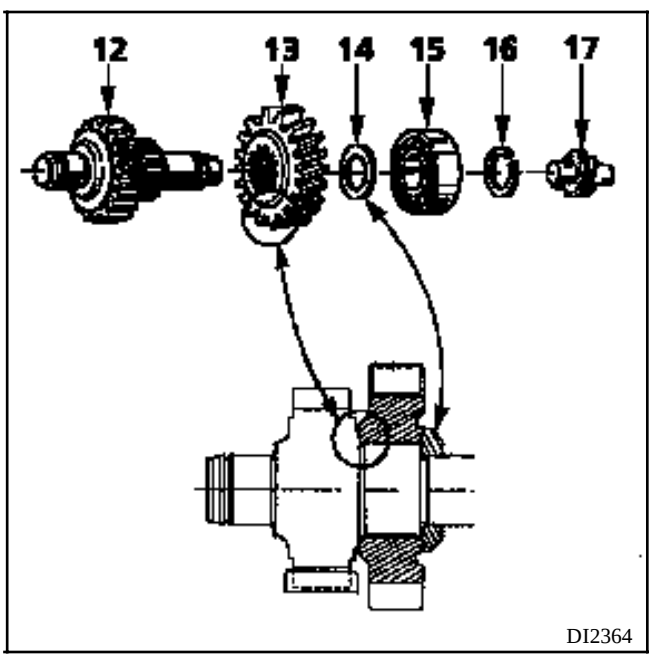
Fit the bearing (25) using the press with the mark at the final drive pinion end.

Put three drops of "Loctite SCELBLOC"on the threads of the nut.

With the final drive pinion vertical, tighten nut (24) and then tighten to a torque of **4 daN.m** using **B. Vi. 903**.

Rotate the bearing by hand then tighten the nut to a torque of **22 daN.m**.

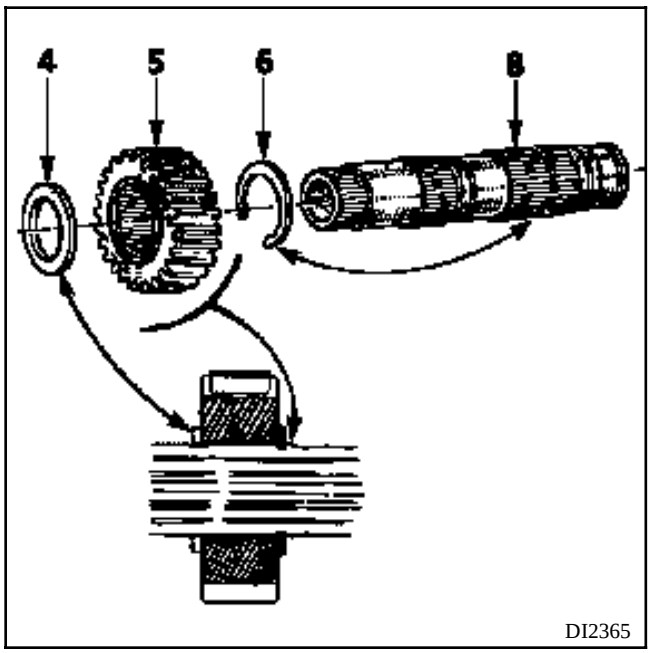
Step-down drive shaft (12)



DI2364

Refit parts 12 to 17 (15 and 13 using the press). **Ensure pinion** (13) **is fitted the correct way round**.

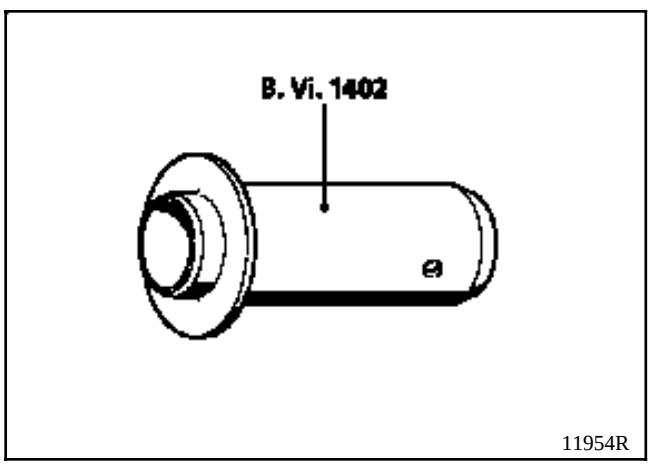
Output shaft (8)



Refit part 8 and parts 4 to 6. **Ensure the pinion** (5) **is the correct way round**.

REASSEMBLING THE TORQUE CONVERTER/FINAL DRIVE CASING

Lubricate the seal and push it on straight using tool **B.Vi. 1402**.



Replace the converter after having oiled the face of the seal.

NOTE: check the condition of the O-ring (28) on the stator shaft and oil it (see next page).

Refitting (see M.R. 222) and adjusting the final drive

Before refitting, lubricate all the parts

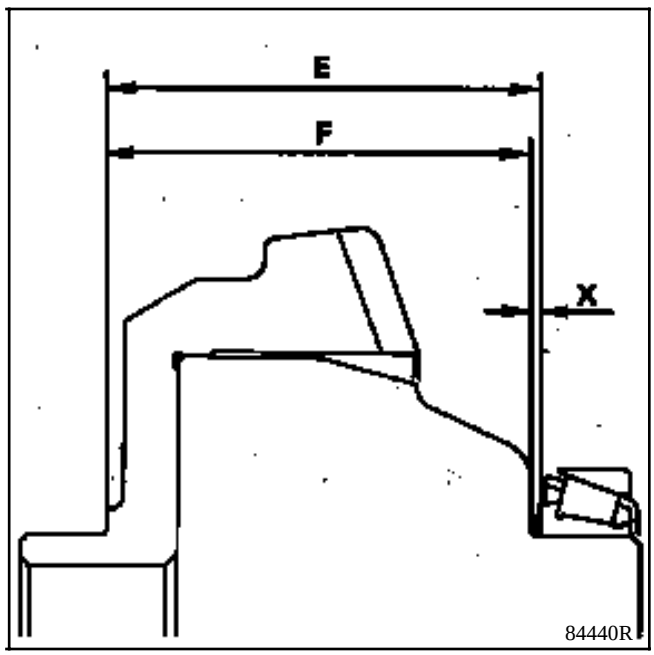
a) Adjusting the backlash

Since the backlash cannot be measured once the transmission has been assembled, it is adjusted when the differential bearings are fitted, by measuring the following dimensions:

Dimension E: Theoretical dimension 93.93 $^{+0.07}_{+0}$

Dimension F: Dimension between the bearing faces of the differential.

Dimension X: Thickness of the shim to be placed between the bearing and the differential casing.



Assemble the casing and the crown wheel using three bolts.

Measure dimension **F** (using a vernier with **90 mm** slide gauge).

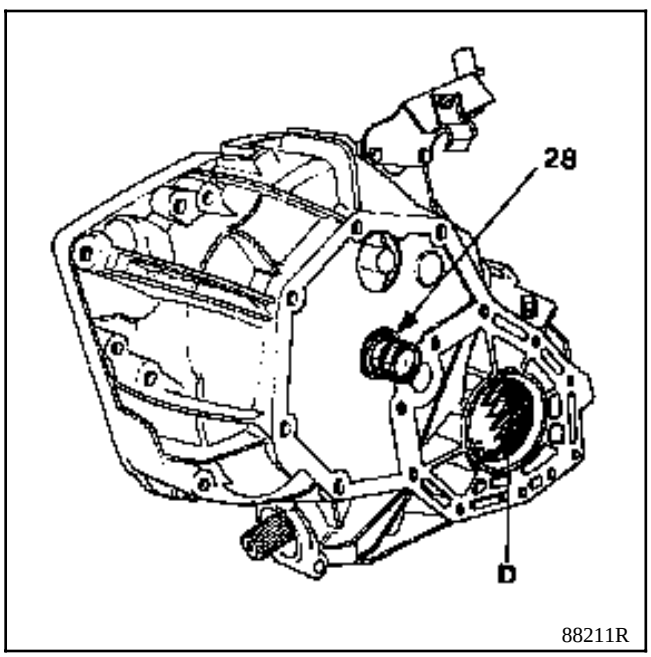
X = E - F

Shims are available in thicknesses from **0.8** to **1.4 mm** in **0.05 mm** steps.

b) Adjusting the differential bearing preload

Ensure that the differential bearings are correctly positioned by rotating them in a clockwise direction.

Using tool **B. Vi. 906**, press on one tooth of the crown wheel to make the differential turn in a clockwise direction (in the direction of **D**).

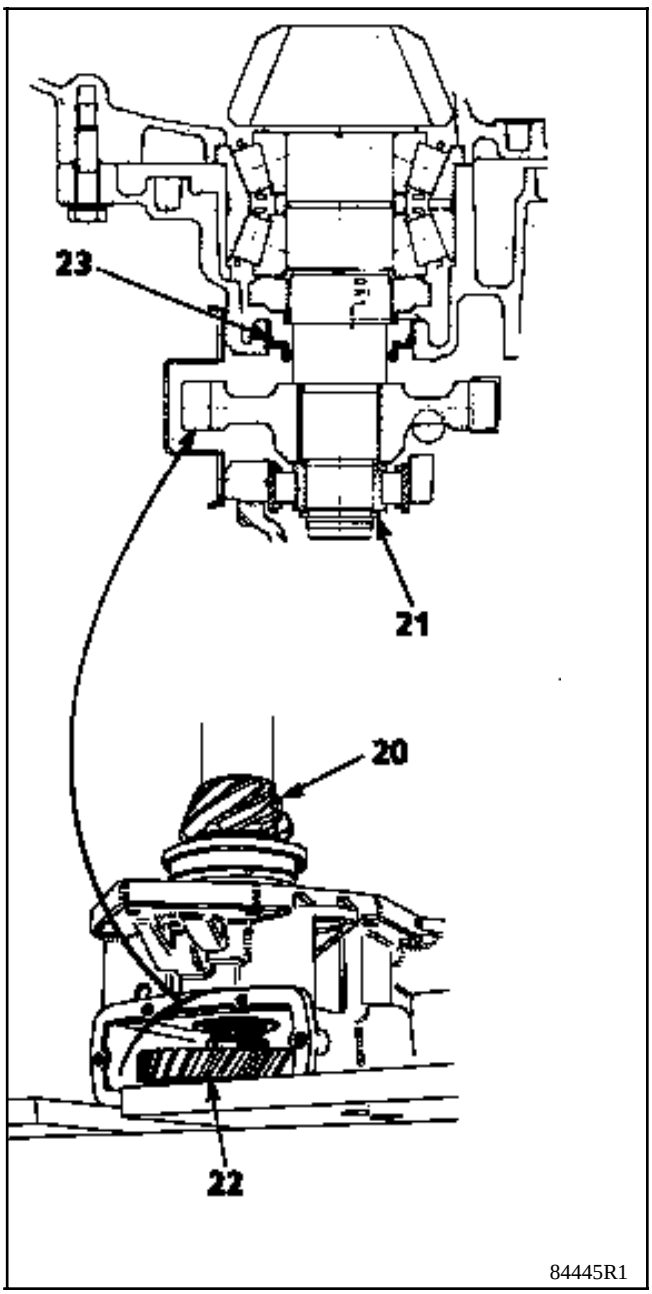


The value should be between 2 and 2.5 daN.m.

If it is not, slacken or tighten the differential using tool **B. Vi. 645** and **B. Vi. 805-02**.

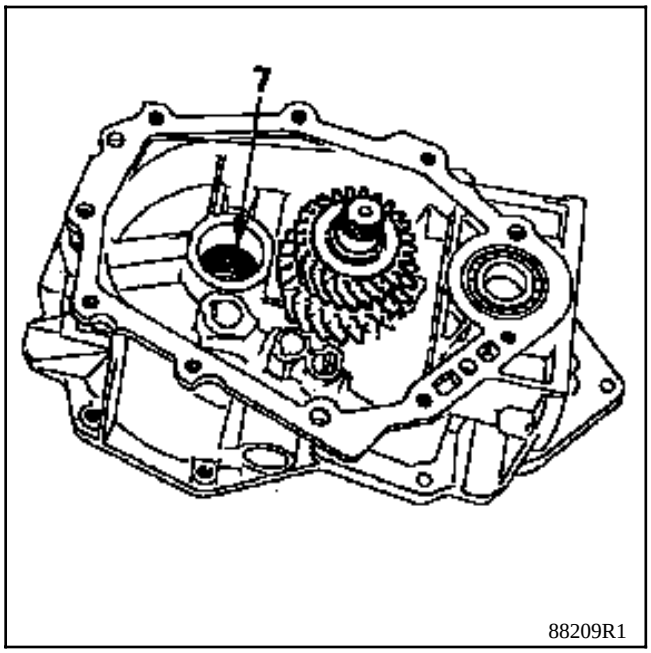
REASSEMBLING THE STEP-DOWN CASING

Refit:

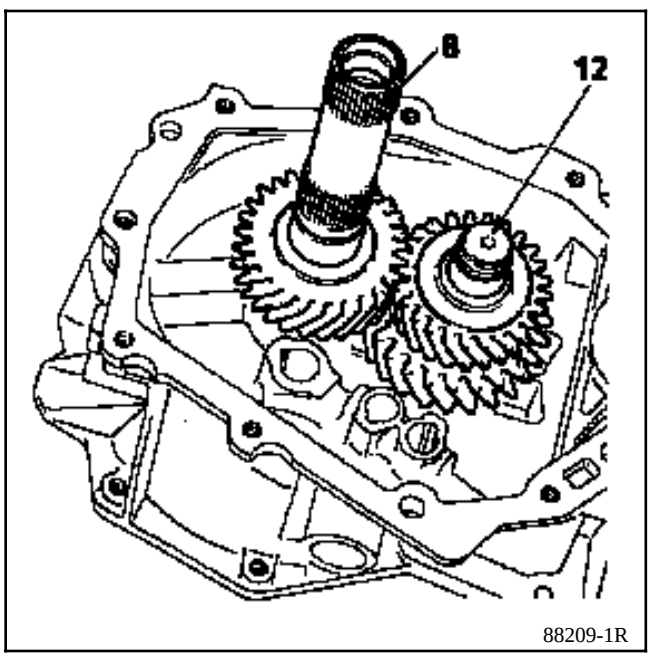


- the lubricated seal (23), using tool **B. Vi. 465**,
- position the pinion (22) and fit the final drive pinion (20) using the press,
- the circlip (21) with tool **B. Vi. 902-01**.

- the needle bearing (7) on the press, fitting dimension **37 mm**,

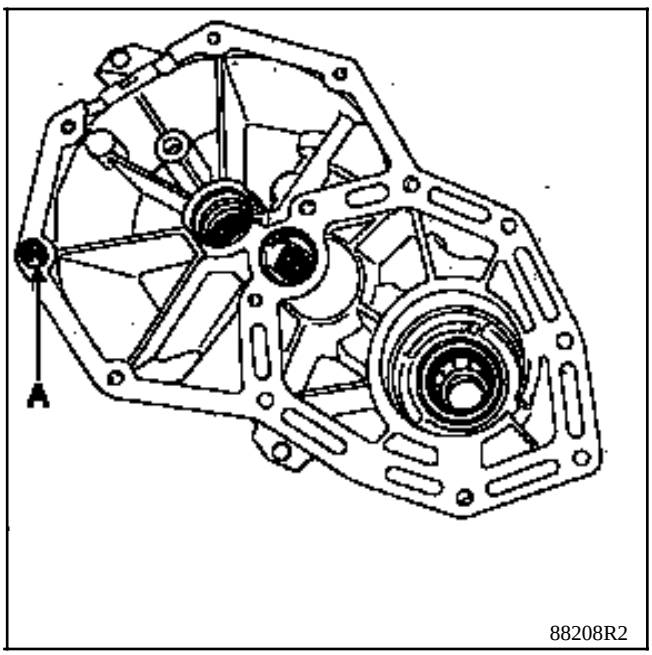


- the step-down shaft (12),
- the output shaft (8),



- the speedometer seal using tool **B. Vi. 905-02**,
- a new speedometer drive gear with its shaft. (Check that the speedometer drive clips correctly into its shaft).

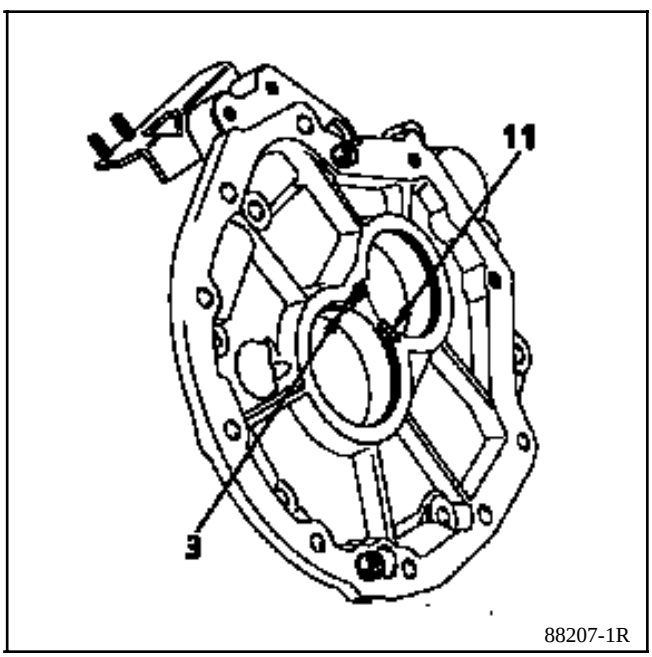
Before coupling the step-down casing to the converter / final drive casing, check that the locating dowel (A) is in position and coat the faces of the casings with "**Loctite FORMAJOINT** ".



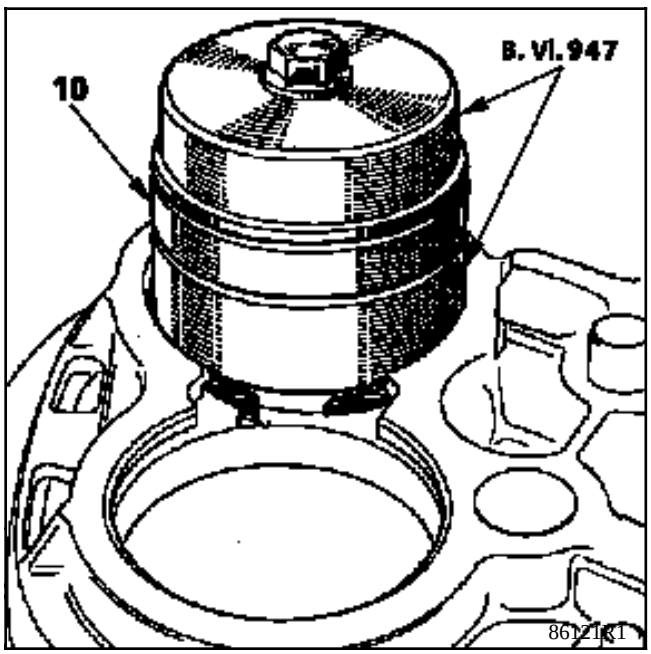
IMPORTANT: the two bolts under the stator shaft must be coated with "**Loctite FORMAJOINT** ".

REASSEMBLING THE SEPARATOR HOUSING

Refit:
- circlips (3) and (11), with the notches on the same side,

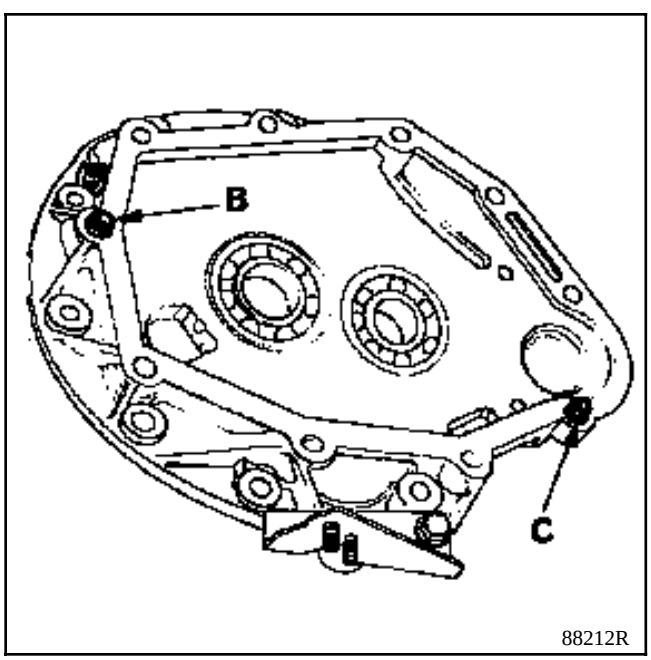


- the bearing (10) using tool **B. Vi. 947**,
- the bearing (2) inserting a piece of strap-iron so as to keep the circlip open.



Ensure that the circlips are correctly positioned in the bearing grooves.

Before coupling the separator housing to the step-down casing, check that the two location dowels (B) and (C) are present and fit the paper seal (it must be fitted dry).

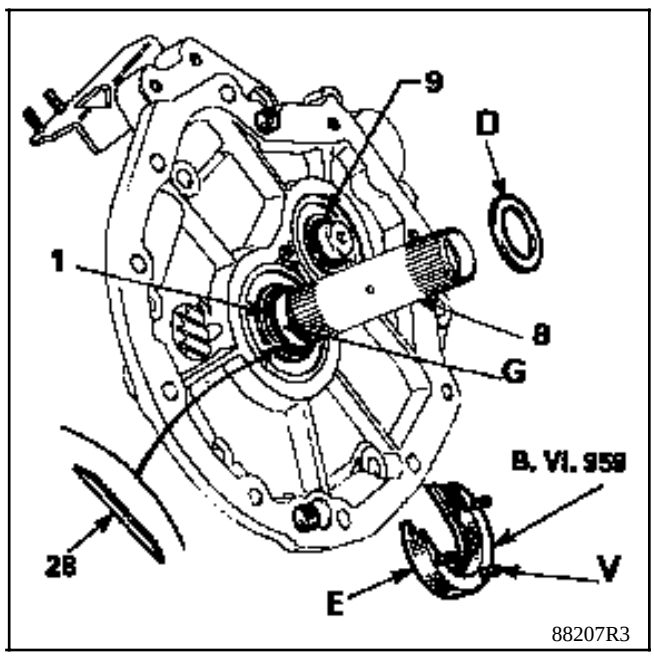


ATTENTION: all bolts mounting the separator housing must be coated with "**Loctite FORMAJOINT**" before being fitted.

On the output shaft, refit (8):
- the washer (28),
- the circlip (1), and bring it under groove (G).

To position the circlip (1) in its groove, use tool **B. Vi. 959**:
- fit the washer (D) from the tool onto the circlip,
- place the crescent piece (E) from the tool in groove (G) and tighten the three bolts (V) until circlip (1) enters its groove.

Ensure that (1) is correctly positioned.



Refit:
- the circlip (9) with tool **B. Vi. 902-01** (keep the output shaft in position through the inspection cover),
- the casing (26) fitted with its seal (cap towards the bottom) and its magnet.

See the relevant section for fitting the gear section casing to the separator casing.

DIAGRAM N° 1

1 Mechanism housing
2 Oil pump
3 F2 piston
4 F2 piston return cup
5 Drive hub
6 Needle thrust race
7 F2 discs
8 F1 piston support
9 Circlip
10 E1-E2 clutch
11 Forward planet wheel carrier
12 F1 piston
13 F1 discs
14 E2 bell housing
15 Plastic washer (thickness 1.5)
16 Reverse planet wheel carrier
17 Free wheel
18 Needle thrust race
19 Plastic washer (thickness to be determined)
20 Circlip
21 Park wheel
22 Vacuum capsule
23 Hydraulic distributor
24 Park pawl
25 Park pawl pivot pin
26 Park pawl spring
27 Park linkage
28 Clip
29 Quadrant
30 Gear liner pin
31 Strainer seal
32 Strainer
33 Quadrant ball
34 Quadrant spring
35 Sump gasket
36 Needle thrust race
37 Plastic washer (thickness 1.5)
38 Pump shaft
39 Turbine shaft
40 End float adjusting shim
41 Washer

Disc	F2		F1	
	MB	MJ	MB	MJ
Undulated	1	1	1	1
Flat	4	5	3	4
Lined	3	4	3	4

DIAGRAM N° 2

1 End float adjusting shim
2 Spacer
3 Cover plate bolt
4 Cover plate
5 Circlip
6 Taper washer
7 Ball bearing
8 Thick washer
9 Primary gear
10 Snap ring
11 Speedometer drive wheel
12 Speedometer drive pinion
13 Speedometer drive shaft
14 Speedometer drive seal
15 Spring ring
16 Final drive pinion nut
17 Taper bearing
18 Spacer
19 Secondary gear
20 Final drive pinion
21 O-ring
22 Lip seal
23 Baffle
24 Band ring
25 Taper roller bearing
26 Housing
27 Sunwheels
28 Long shaft
29 Short shafts
30 Planet wheels
31 Hub
32 Crown wheel
33 Crown wheel bolt
34 Torque converter seal
35 Torque converter
38 Shim for adjusting differential preload
39 Output shaft
40 Inspection cover
41 Plate seal
42 Spacer (depending on version)
43 Needle bearing

DIAGRAM N° 3

1 Circlip
2 Ball bearing
3 Step-down gear on secondary shaft
4 Roller bearing
5 Secondary shaft
6 Torque converter and differential casing
7 Circlip
8 Ball bearing
9 Spring ring
10 Spring ring
11 Step-down gear on primary shaft
12 Circlip
13 Output shaft
14 Separator housing
15 Differential housing
16 Tail shafted sunwheel
17 Planet wheel washers
18 Planet wheels
19 Planet wheel shaft
20 Spider housing sunwheel
21 Washer
22 Stop ring
23 Speedometer drive crown wheel
24 Spring washer
25 Circlip
26 Ball bearing
27 Circlip
28 Lip seal
29 O-ring
30 Converter
31 Converter seal
32 End float adjusting shim
33 Differential bearing
34 Needle bearing
35 Speedometer drive pinion
36 Speedometer driveshaft
37 Speedometer sensor target (electronic version)
38 Spacer (electronic version)
39 Spring (electronic version)
40 Adjusting washer

DIAGRAM N° 1

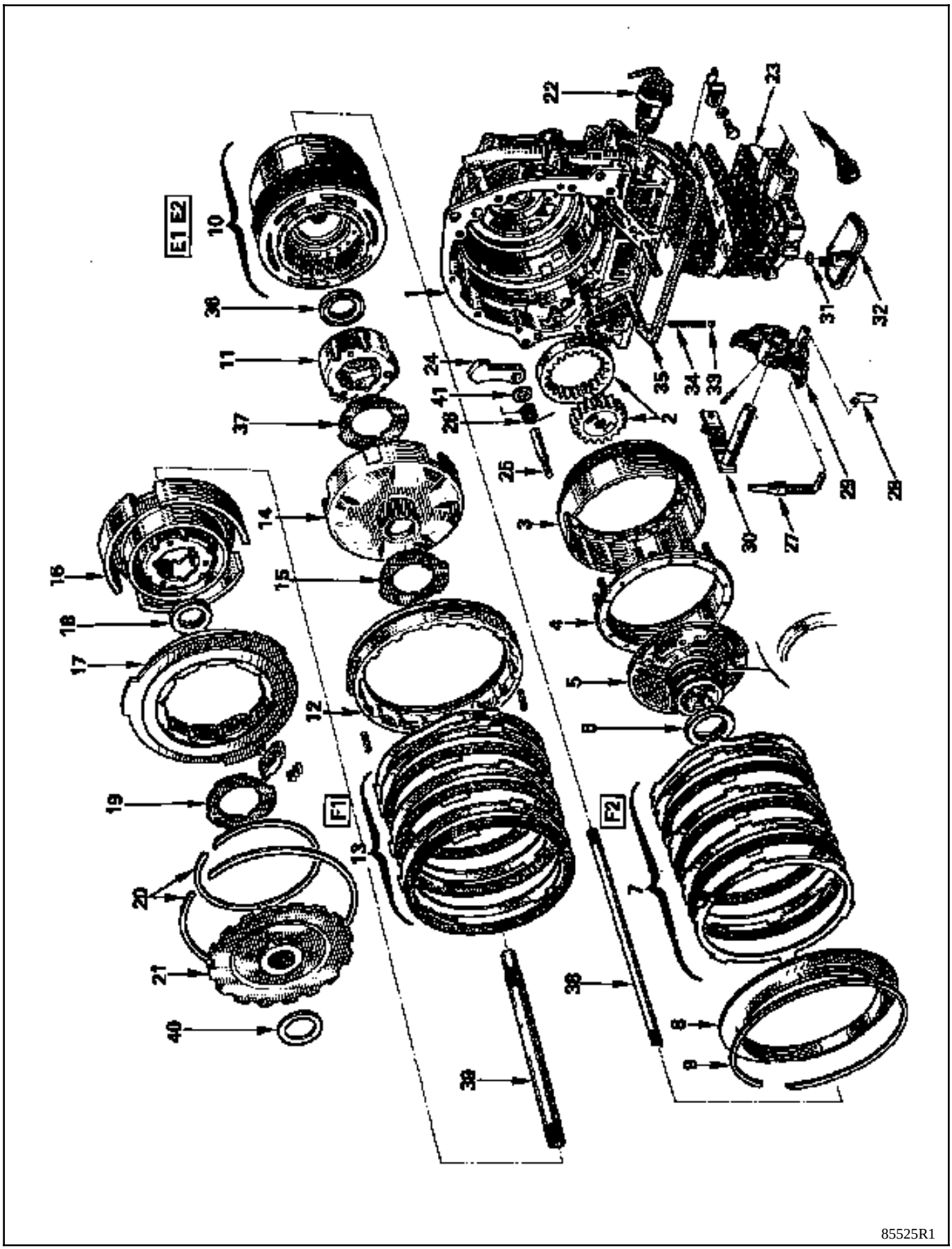
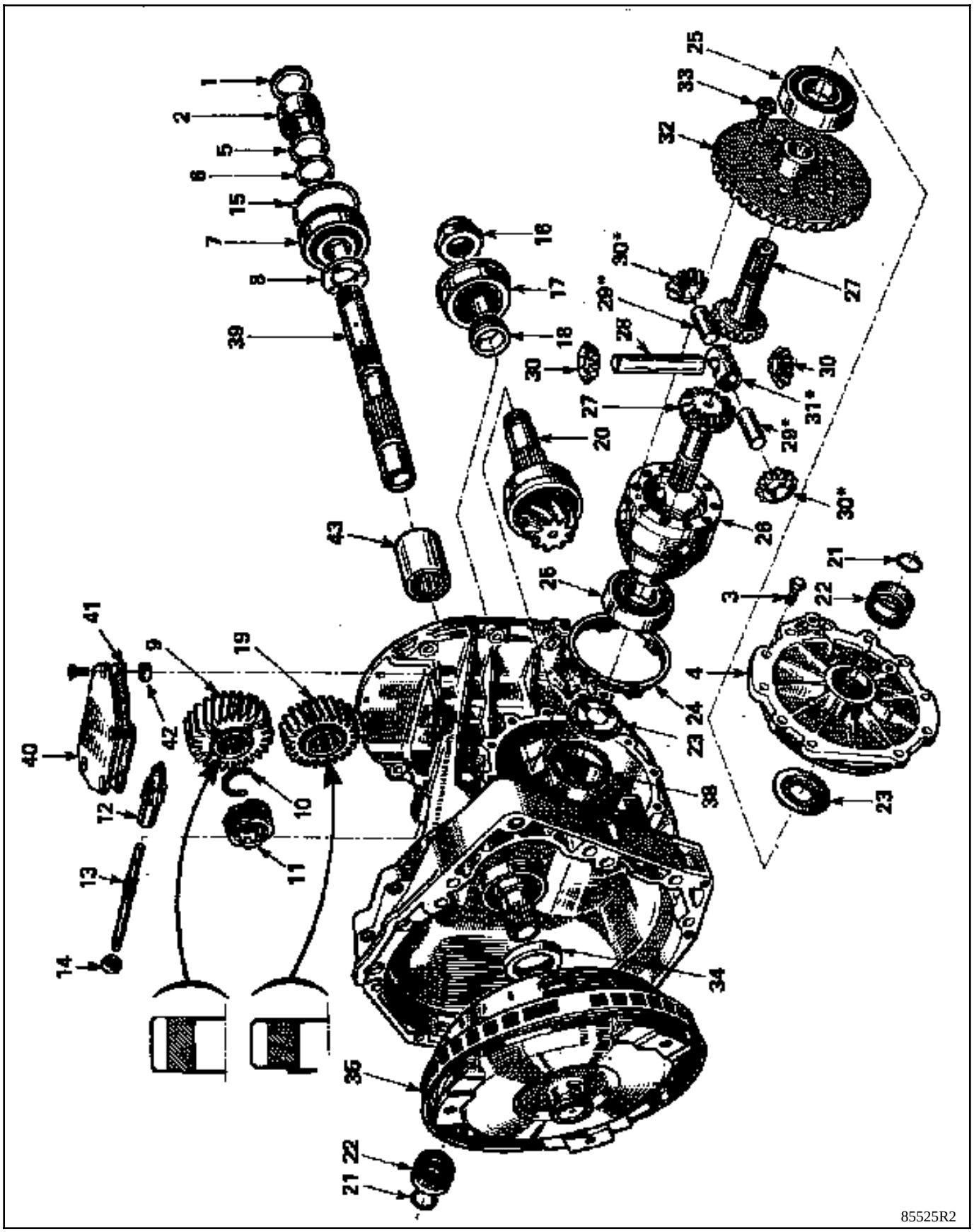
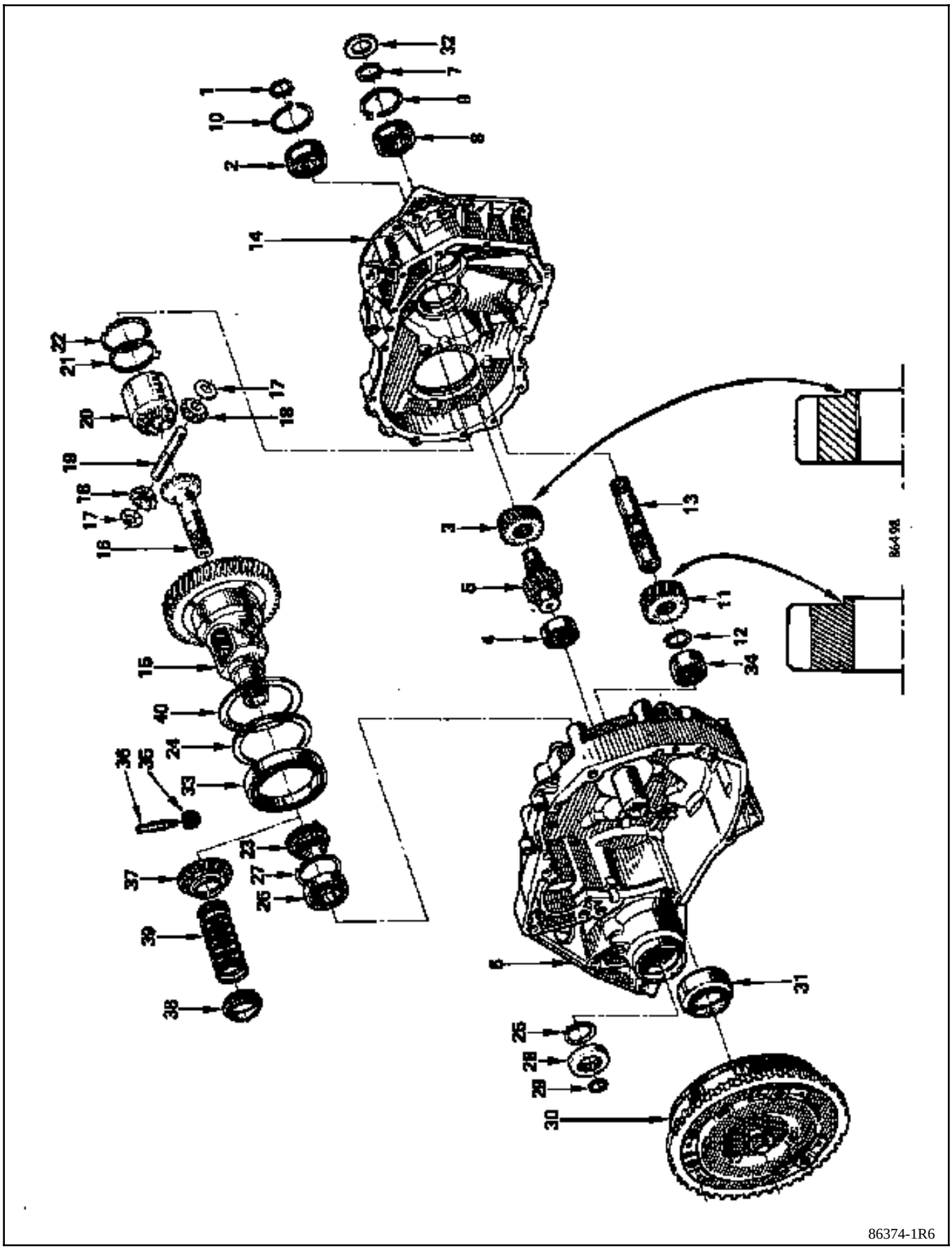


DIAGRAM N° 2



* Parts not on a differential with two planet wheels.

DIAGRAM N° 3


32
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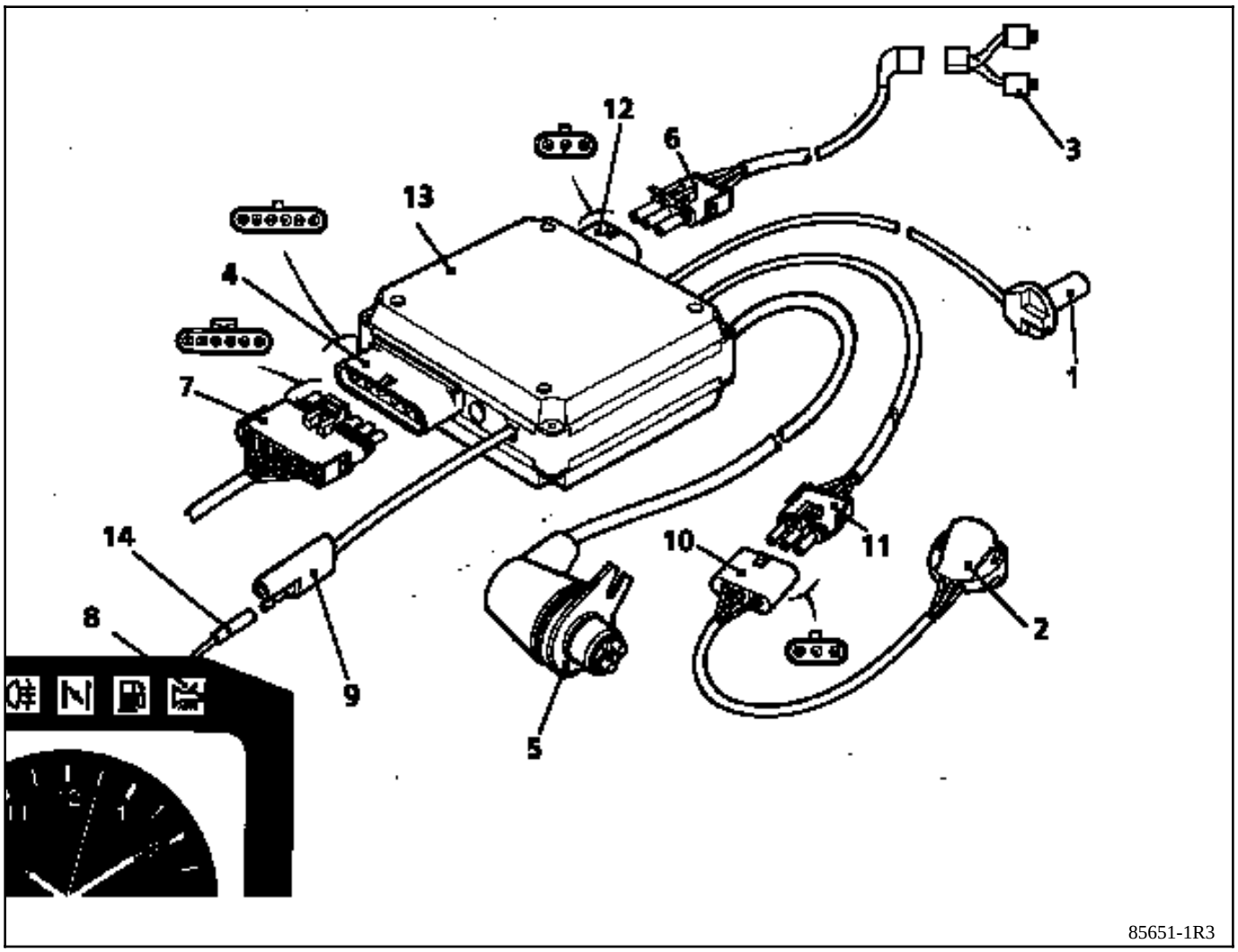
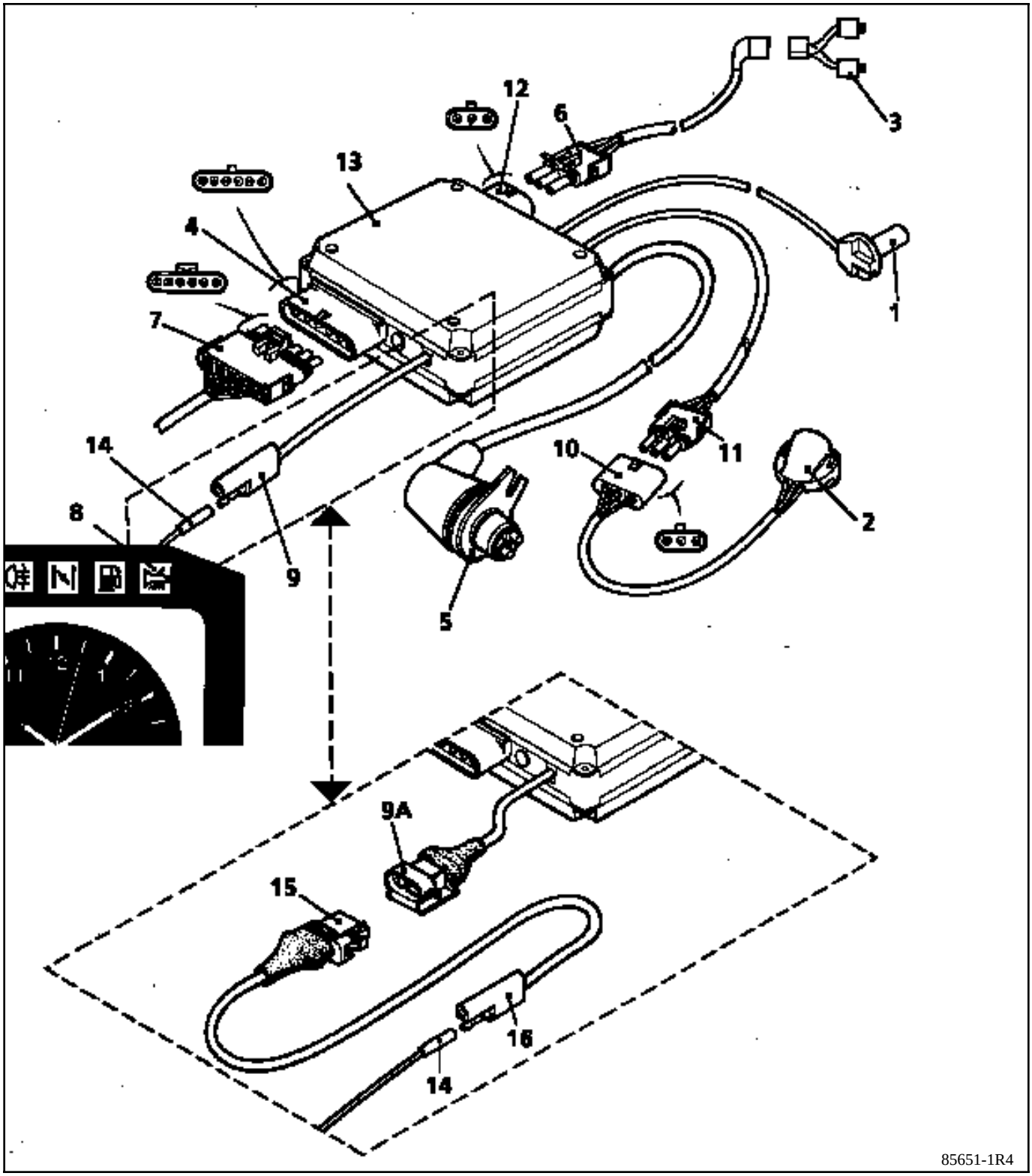
86374-1R6

Original fitment (XR fiche N° 1)



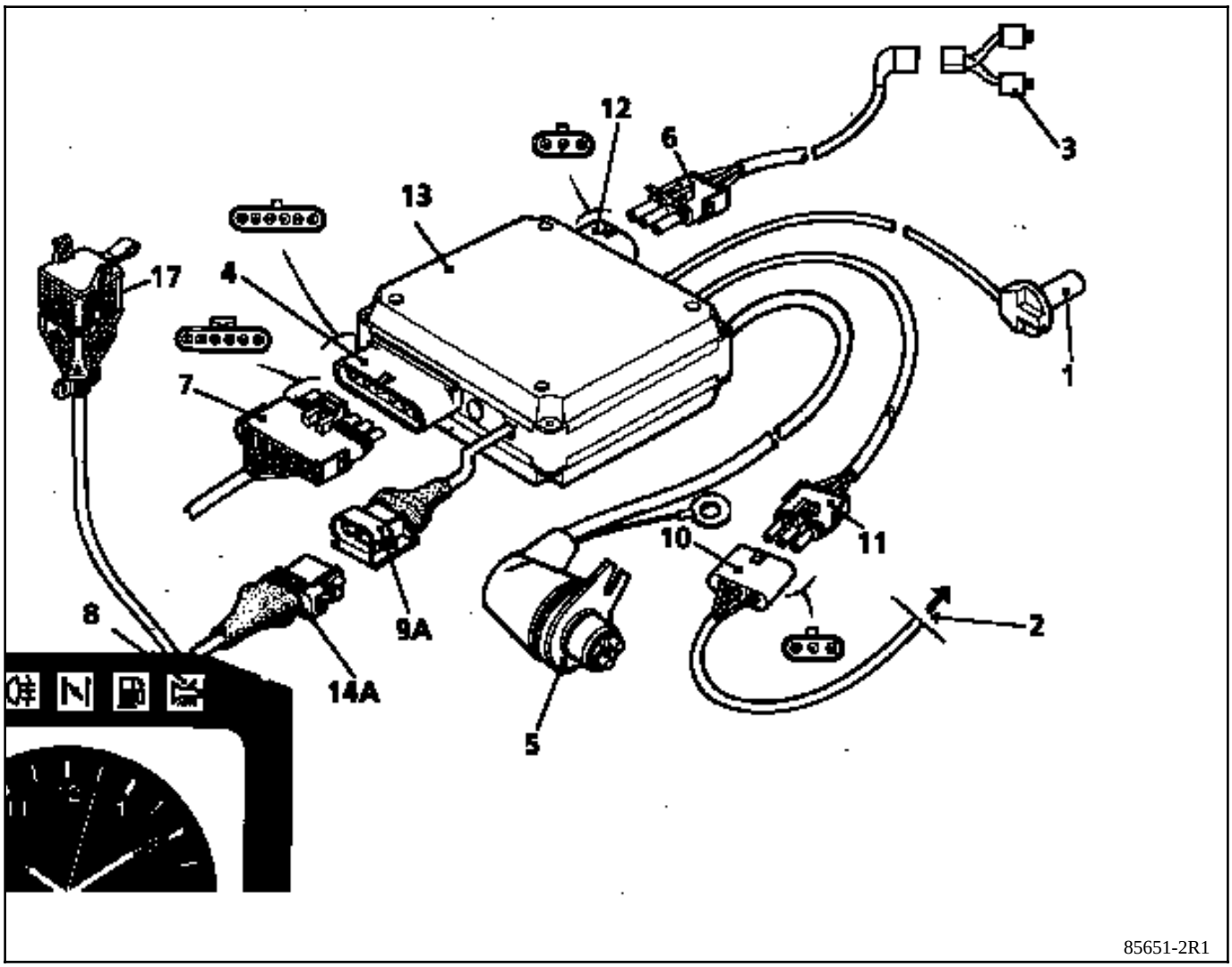
1	Vehicle speed sensor
2	Load potentiometer
3	Solenoid pilot valves
4 and 7	Six track connector
5	Multifunction switch
6 and 12	Solenoid pilot valve connector
8	Fault warning light
9 and 14	Fault warning light connector and XR25 connection
10 and 11	Load potentiometer connector
13	Computer

2nd fitment (XR fiche N° 24)



1	Vehicle speed sensor
2	Load potentiometer
3	Solenoid pilot valves
4 and 7	Six track connector
5	Multifunction switch
6 and 12	Solenoid pilot valve connector
8	Fault warning light
9 and 14	Fault warning light connector
9A	Fault warning light connector and XR25 connection
10 and 11	Load potentiometer connector
13	Computer
15 and 16	Adaptor lead connector

2nd fitment (XR fiche N° 26)

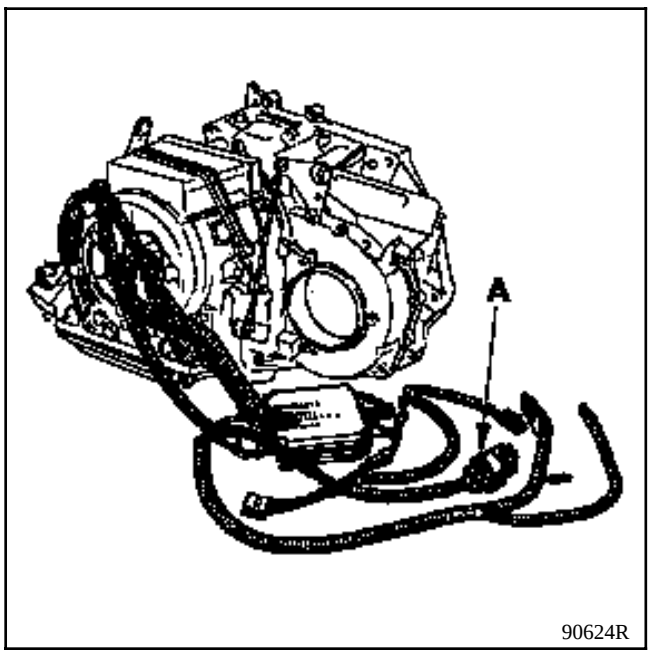


1	Vehicle speed sensor
2	Connection between injection computer and automatic transmission
3	Solenoid pilot valves
4 and 7	Six track connector
5	Multifunction switch and earth
6 and **12**	Solenoid pilot valve connector
8	Fault warning light
9A and 14A	Fault warning light connector and diagnostic socket
10 and 11	Intercomputer connector
13	Computer
17	Diagnostic socket

Wiring modification after replacing MB1 automatic transmission

A modification to the wiring on **L42**, **B57**, **C37** vehicles (**C2J** engine up to year **1986**) had led to the starter motor relay being moved from the relay plate into the engine compartment.

MB automatic transmissions are delivered by the Parts Department either as a replacement transmission or as a service replacement fitted with the computer and the wiring on the vehicle for the starter prevention relay located in the engine compartment.

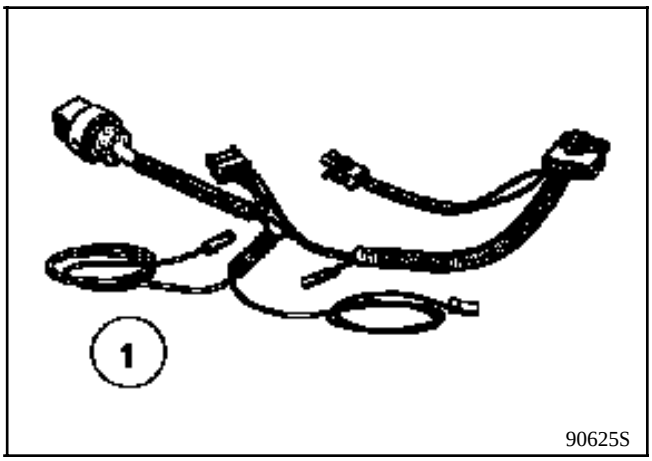


A Vehicle wiring

To install these computers on these vehicles, the connection wiring (1) has to be separated from the computer and the existing wiring on the vehicle used.

In all cases, the computer must remain on the automatic transmission.

Modification to the computer earth and consequences for fault finding (see section on "**Fault finding**" **B. Vi. 958**).

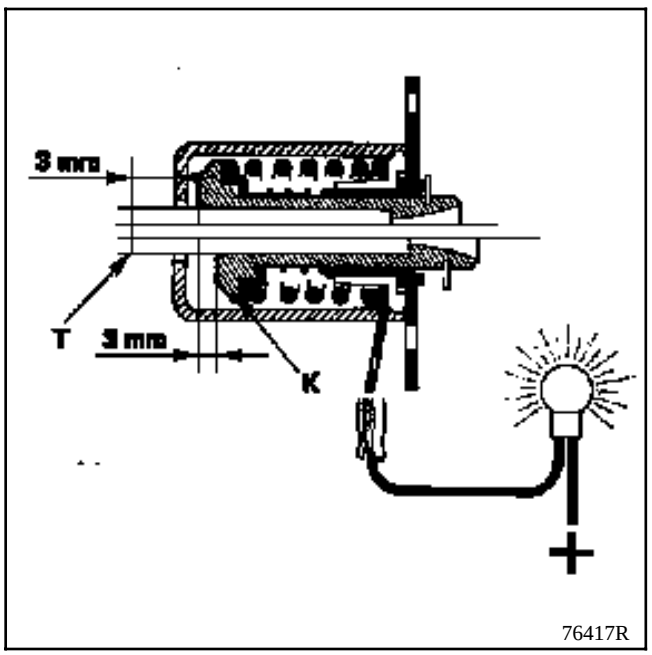


After refitting the transmission on the vehicle, ensure that the wiring is correctly positioned and protected in the sheaths.

NOTE: all wiring items of the automatic transmission should be at least **150 mm** away from high voltage sources. All high voltage cables should be properly connected, well sleeved and should not be touching any metal objects.

THE AUTOMATIC TRANSMISSION CONTROL MAY BE SUBJECT TO INTERFERENCE IF THIS IS NOT THE CASE

Located at the end of the accelerator pedal travel, this earths a circuit of the computer which, in certain cases, changes down to a lower gear.



The kickdown tends to be removed and incorporated into the end of travel of the load potentiometer (no wire at D on the 6 track connector). It is adjusted by adjusting the load potentiometer (see "**Fault finding**" section, checking **B. Vi.958**).

CHECKING

Disconnect the kickdown wire and connect a test bulb in its place connected to the + battery feed.

Accelerate fully and the light should illuminate:
- check the black earth wire,
- adjust if necessary.

NOTE: control units are used to check the kickdown without removing the wiring.

ADJUSTING

The end stop (K) should move by **3 mm** in the full load position.

Method:
- draw a line **T** on the sleeve **3 mm** from the kickdown cover,
- in the full load position, the line should line up with the edge of the cover. If it does not, move the sleeve stop clip or the stop device to obtain this result,
- carry out the check using the light or control units,
- check that the wire allows the idle end stop to be reached.

REMOVAL - REFITTING

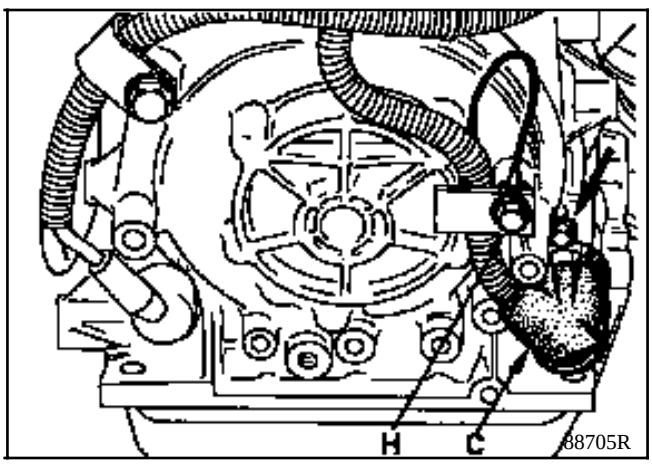
The computer controls the earthing of the solenoid pilot valve as a function of the peripheral information and checks that all the electrical components of the automatic transmission are working correctly.

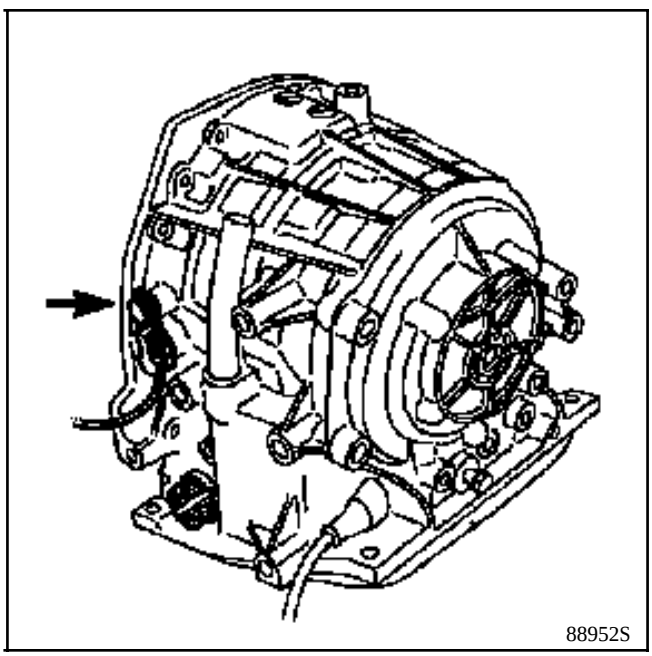
Before removing the computer and its speed sensor and multifunction switch, carefully note the routing of the wiring and disconnect the battery.

REMOVAL

Remove from the automatic transmission:
- the multifunction switch (C) and its earth wire H (depending on version) and its seal,
- the speed sensor with its seal; disconnect the connectors and that of the load potentiometer (depending on version).

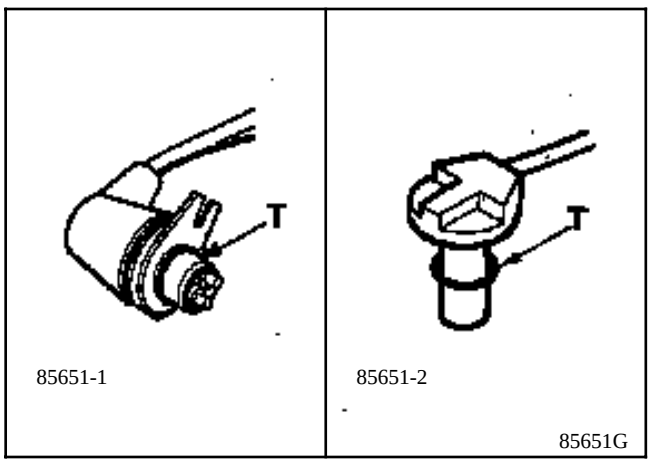
Remove the computer.





REFITTING

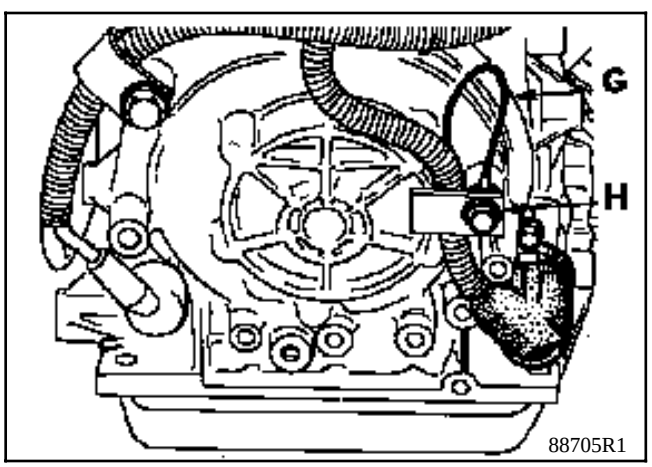
Check for the presence of the O-rings (T) on the **speed sensor** and the **multifunction switch**.



On the automatic transmission, refit:
- the speed sensor,
- the multifunction switch and the earth wire (G) (depending on version) at (H).

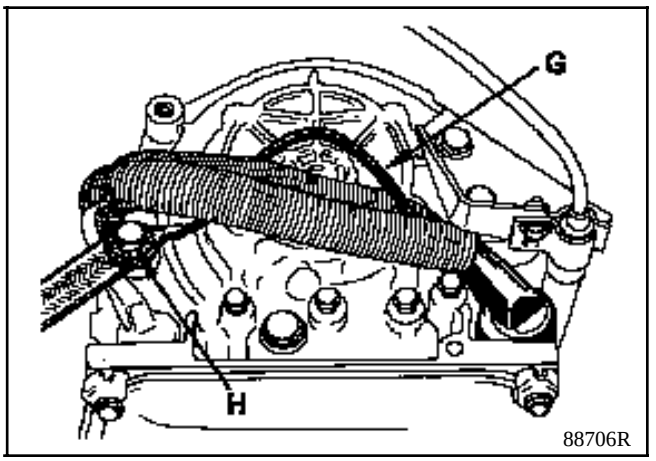
NOTE: vehicles which do not have an earth wire (G) on the multifunction switch, have one on the 6 track connector of the computer.

MB

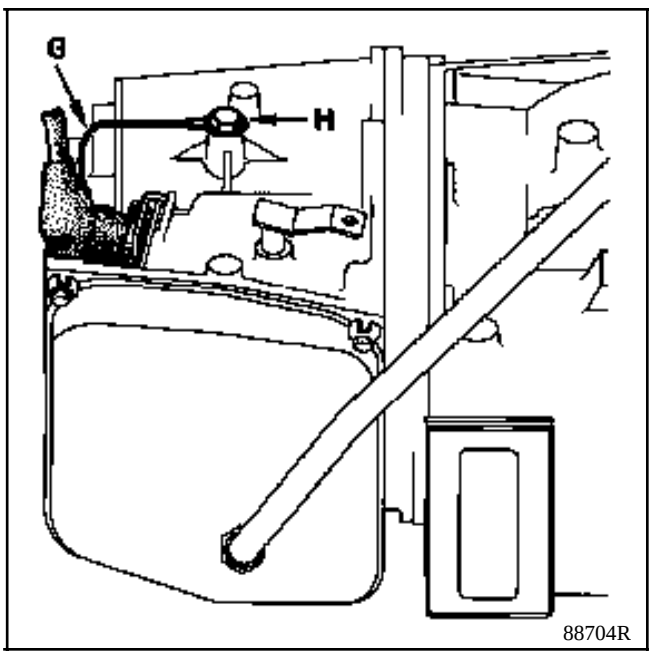


(various locations depending on version)

MJ



ML



Replace the wires in their ringed sleeve.

Reconnect the connectors (depending on version).

Put the computer on its mounting using the strap.

REPLACEMENT

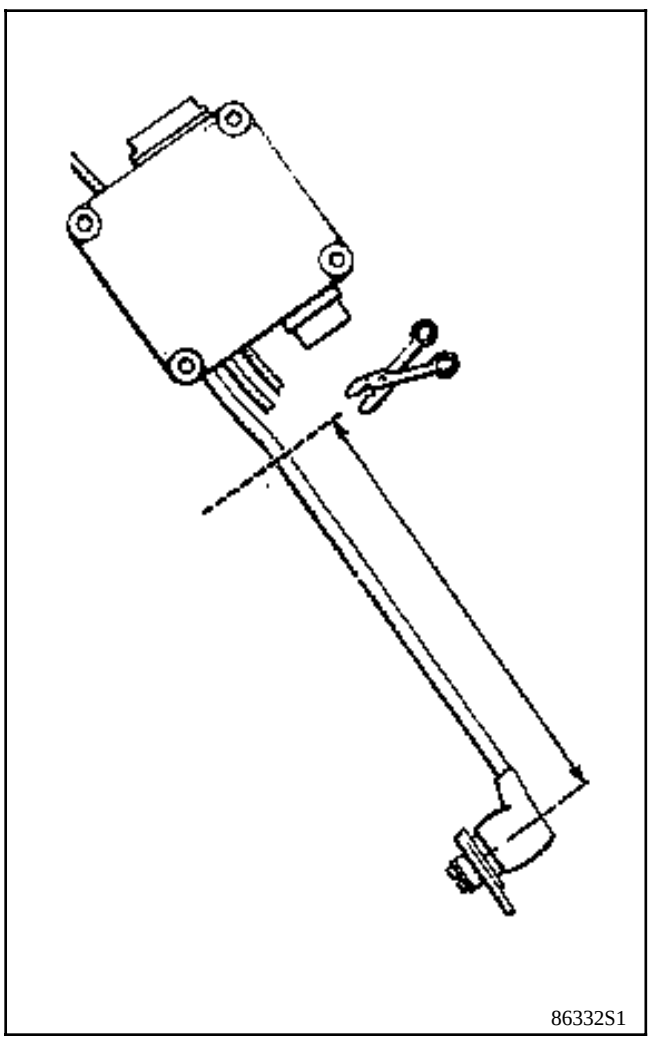
This operation consists of cutting the wire connecting the computer to the multifunction switch and replacing the switch with a new one.

Before cutting the wire, check the multifunction switch.

Composition of the replacement kit
- 1 multifunction switch with earth wire fitted with a cable and a male connector,
- 1 female connector,
- 6 male pins,
- 6 seals.

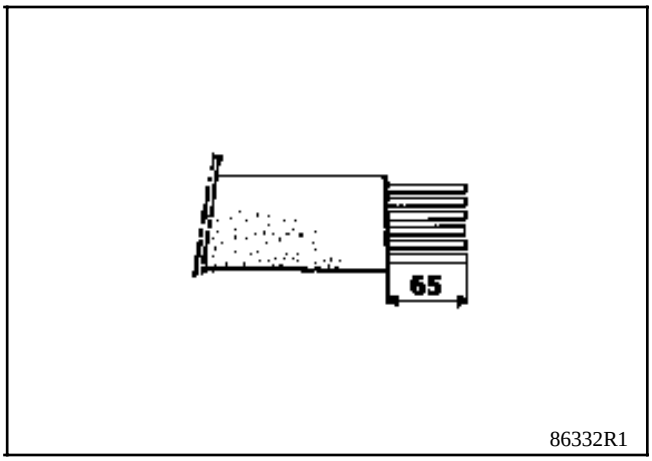
Method:

Remove the multifunction switch from the automatic transmission and cut the wire to the same length as the replacement wire.



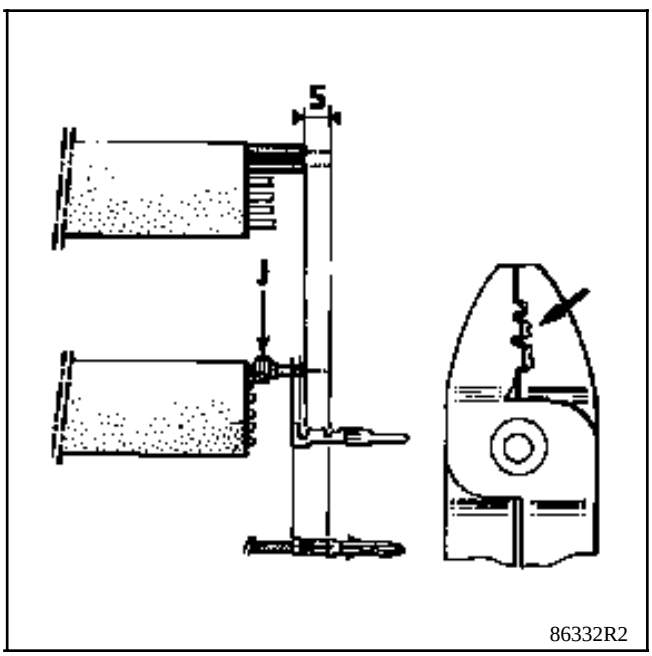
86332S1

Computer side
- strip back **65 mm** of protective sleeve,



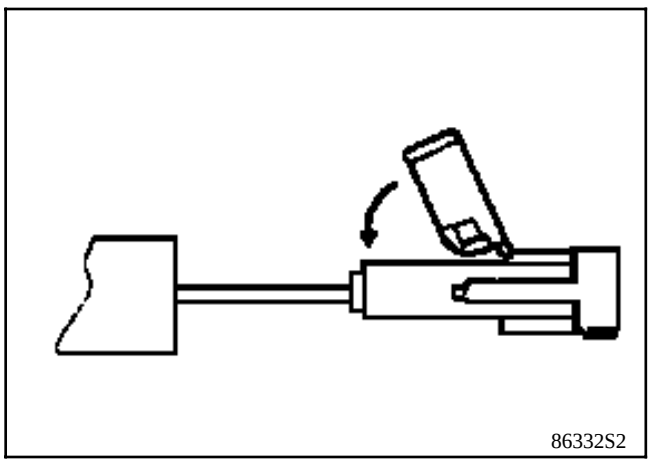
86332R1

- strip the wires over **5 mm**,
- put a seal (J) on each wire,
- crimps the connectors.



86332R2

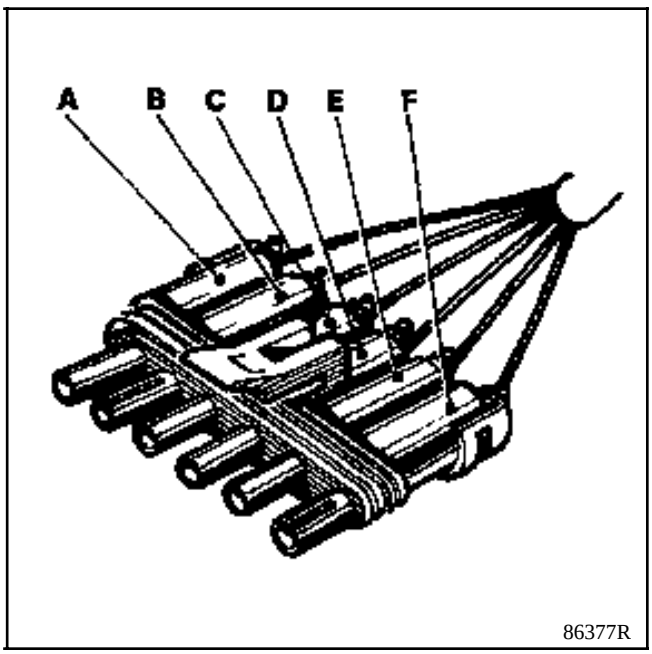
When refitting the wires in the connector **ensure the same colours wires are connected opposite each other.**
Push back the connector lock piece.



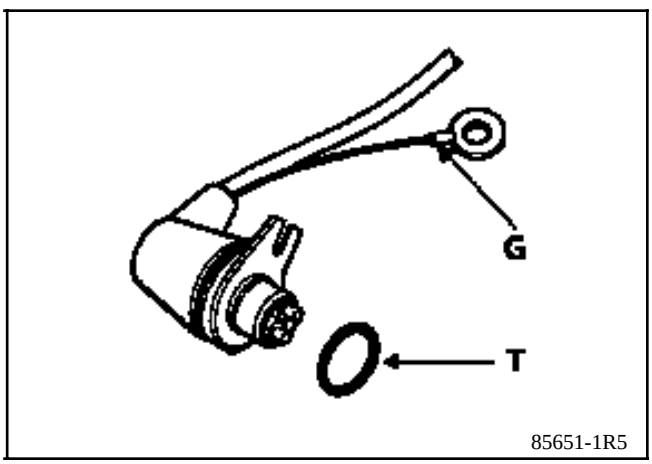
There are computers connected to multifunction switches by seven wires and, in this case, cut the 7th wire (yellow or white) level with the sleeve on the computer side.

FITTING

a) Replacing a multifunction switch without an earth wire with a multifunction switch with an earth wire.



CUT THE EARTH WIRE (E) LEVEL WITH THE COMPUTER FEED 6 TRACK CONNECTOR (more than one earth must not be present).



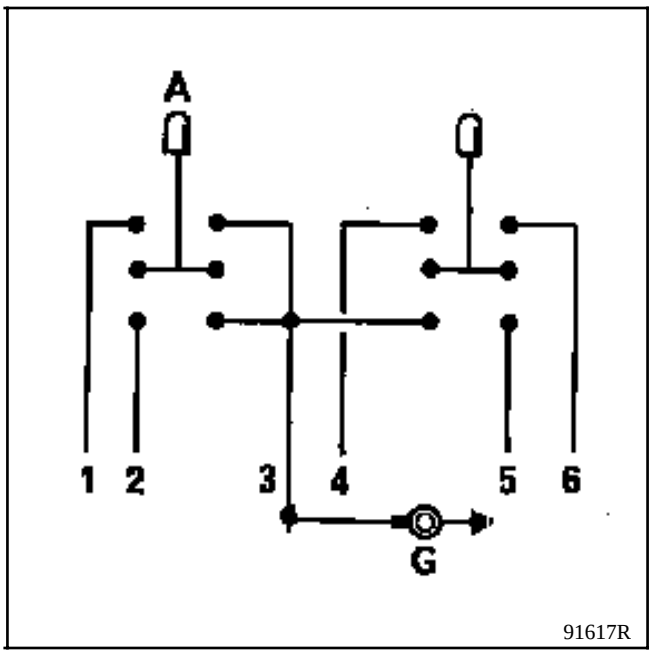
Check the presence of the O-ring (T) and fit the multifunction switch on the automatic transmission.

b) Replacing a multifunction switch with earth wire.

There is no earth wire (E) on the computer feed connector.

REMEMBER TO REFIT THE EARTH WIRE ON THE AUTOMATIC TRANSMISSION HOUSING (see page **23-119**) IN BOTH CASES (G).

OPERATING DIAGRAM OF THE MULTIFUNCTION SWITCH



The control pins are represented in the mid position (position D at the lever)

1 Starter motor authorisation . . . Red

2 1st gear hold engine braking . . Salmon or orange

3 Earth . . . . . Brown

4 Reversing lights . . . . . Grey

5 2nd gear hold engine braking . Blue

6 Reversing lights . . . . . Green

A Control pins on mounting plate side.

REPLACEMENT

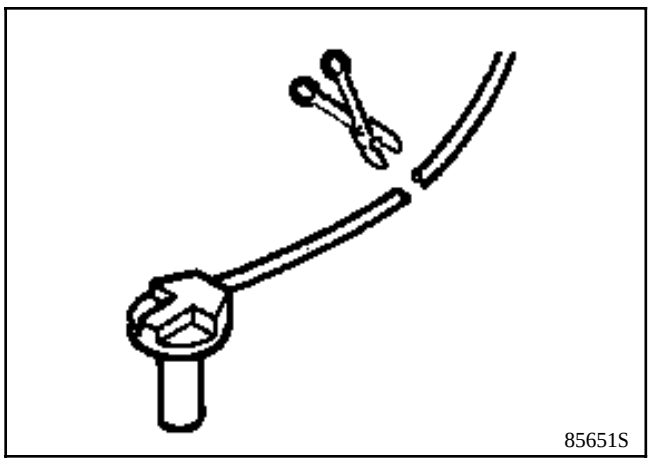
This operation consists of cutting the wire linking the computer to the speed sensor and replacing the sensor with a new one.

Before cutting the wire, check the speed sensor

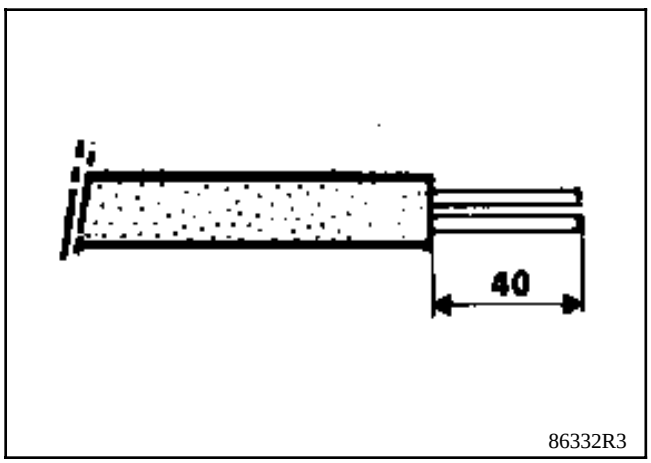
Composition of the replacement kit :
- 1 speed sensor fitted with a cable and a male connector,
- 1 female connector,
- 2 male pins,
- 2 seals.

Method:

Remove the speed sensor from the automatic transmission and cut the wire to the same length as the replacement wire.

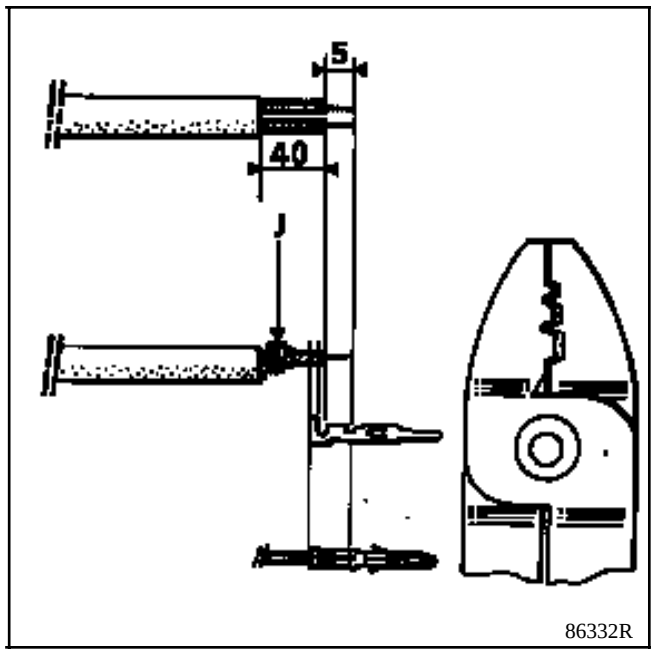

85651S

On the computer side
- remove **40 mm** of protective sleeve and screening,



86332R3

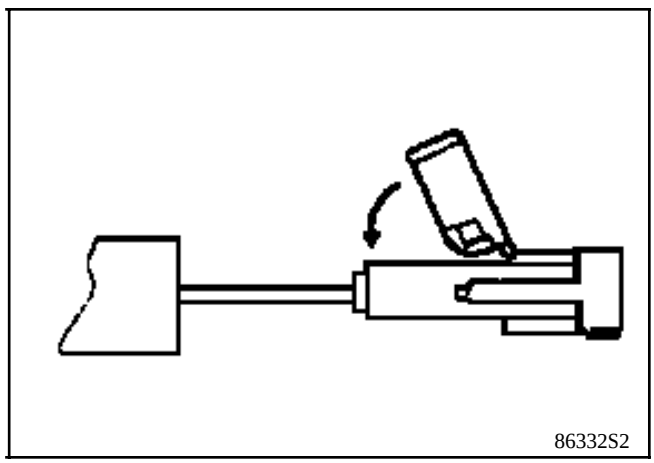
- strip both wires by **5 mm**,
- put a seal on each wire,
- crimp the connectors.



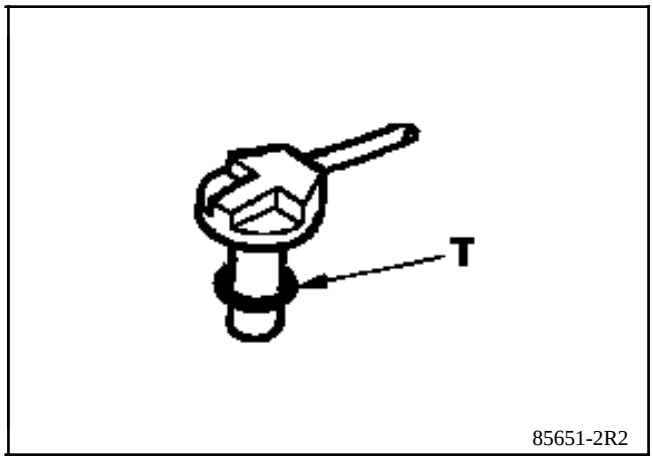
86332R

When fitting the wires in the connector, ensure that the same colours are put opposite each other.

Fold down the connector lock piece.


86332S2

Before refitting, check for the presence of the O-ring (T).



Setting the oil pressure correctly ensures good quality gear changes and increases the life length of the automatic transmission (mechanism part).

SPECIAL TOOLING REQUIRED	
B.Vi. 466-07	**Oil pressure gauge**

CHECKING

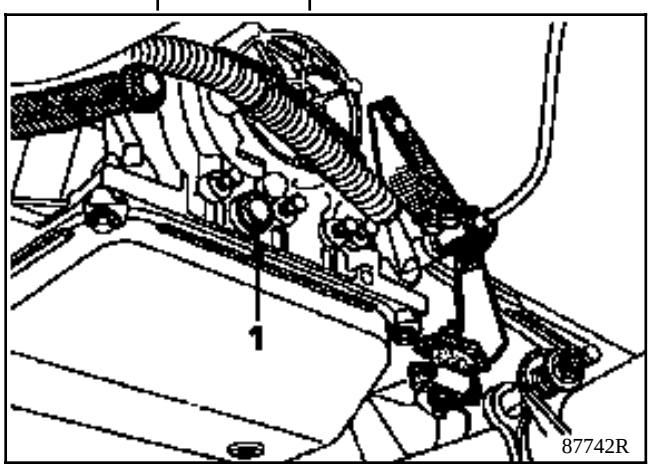
The check is performed with the transmission warm (**80°C**) and only during a road test (the oil pressure varies with temperature).

Check the oil level of the automatic transmission.

Ensure that the engine is correctly adjusted.

Identify the type of oil pressure plug (1):

Distance across flats	Plug	Tooling to be used
11	Tapered	Tapered end piece in **B. Vi. 466-04**
17	Cylindrical	Cylindrical end piece **B. Vi. 466-06**



Connect pressure gauge **B. Vi. 1215-01** (before using the device, **reset the pressure gauge to zero)**.

Drive for a few miles in order to increase the oil to approximately **80°C**.

Put the selector lever in the 2nd gear hold position.

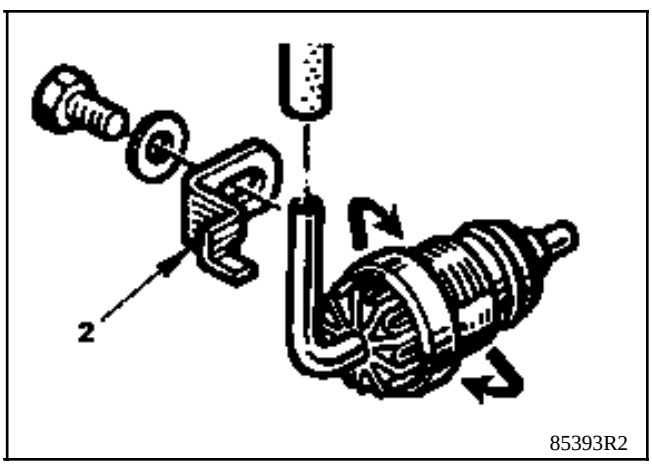
Accelerate fully and brake at the same time in order to stabilise the speed to **50 mph** (80 km / h) and read the value on the pressure gauge.

Refer to the value of pressure (see section on "**identification**").

ADJUSTING

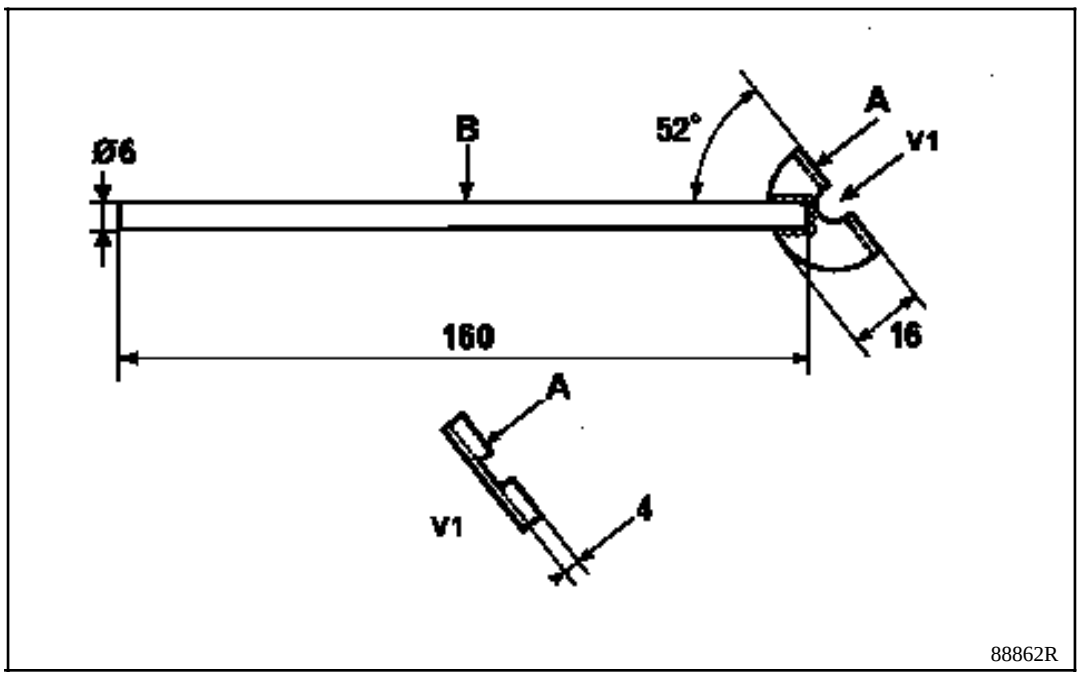
Remove the clip (2) and rotate the capsule. The pressure is increased by tightening the capsule and vice versa.

NOTE : 2 notches = approximately **0.08 bar**.
= **0,.01 bar** for **X 06 (Twingo)**.



ADJUSTING

A tool can be made to make this operation easier.



A Washer **diameter 8/30**, thickness **1.5 mm**
B Bar **diameter 6 mm**
V1 View on 1

Alter the length of the rod (B) depending on the usage.

Vacuum capsule

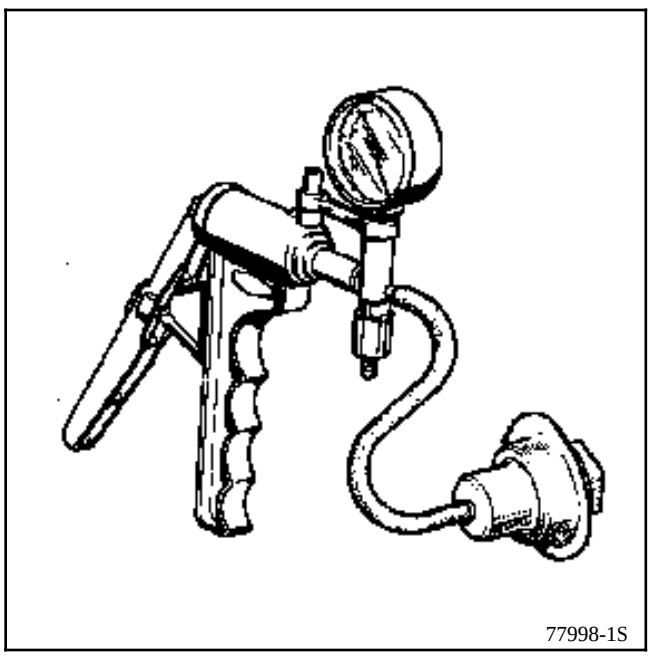
The vacuum capsule modulates the oil pressure as a function of engine load.

CHECKING

Engine switched off.

Check the routing of the vacuum hose.

Connect the manual vacuum pump to the vacuum hose which has been disconnected from the inlet manifold already.



Vacuum to be applied	Needle	
	Stable	Drops
525 mbar or **400 mmHg**	CORRECT	INCORRECT

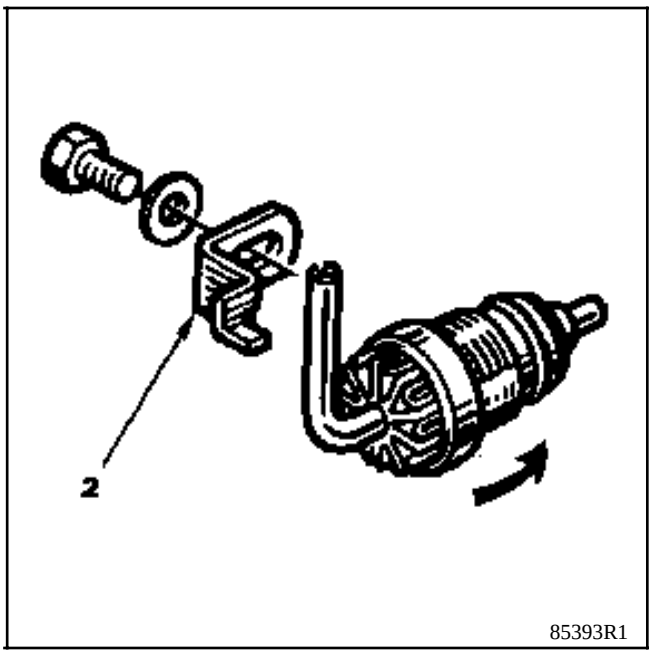
If this is not correct, perform the check again directly on the capsule. If correct, replace the hose; if incorrect, replace the capsule.

Also ensure that the inlet manifold connector is in good condition.

REMOVAL

Secure the automatic transmission and remove the automatic transmission mounting if necessary.

Disconnect the hose, remove the clip (2) and unscrew the capsule.



REFITTING

Grease or oil the capsule (black rubber).

Tighten the capsule by 2.5 to 3 turns and fit the clip (2).

CHECK THE OIL LEVEL AND ADJUST THE OIL PRESSURE (see section on "**Oil pressure**")

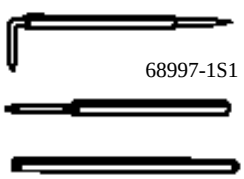
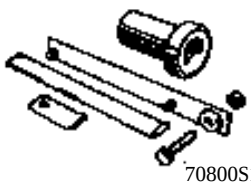
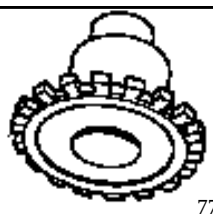
Illustration	Methods reference	Part number	Description
 71625S1	**B. Vi. 28-01**	00 01 227 301	Extractor with interchangeable jaws
 68997-1S1	**B. Vi. 31-01**	00 01 259 401	Set of 3 drifts for fitting ∅ 5 mm roll pins.
 69001S1	**B. Vi. 39**	00 01 322 500	Drift for fitting ∅ 4 and 10 mm roll pins.
 70800S1	**B. Vi. 465**	00 00 046 500	Tool for replacing converter seal. Bracket for holding converter
 76302S1	**B. Vi. 1215-01**	00 00 121 501	Oil pressure checking kit.
 77746S1	**B. Vi. 645**	00 00 064 500	Castellated spanner for adjusting differential play.
	B. Vi. 715	Locally made tool in accordance with drawing on page 23-131	
 80545S2	**B. Vi. 805**	00 00 080 500	Spanner for differential nut.

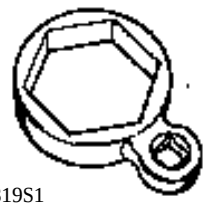
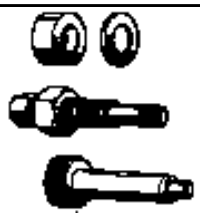
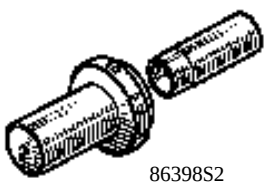
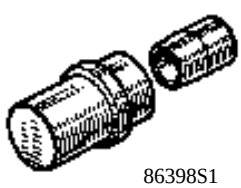
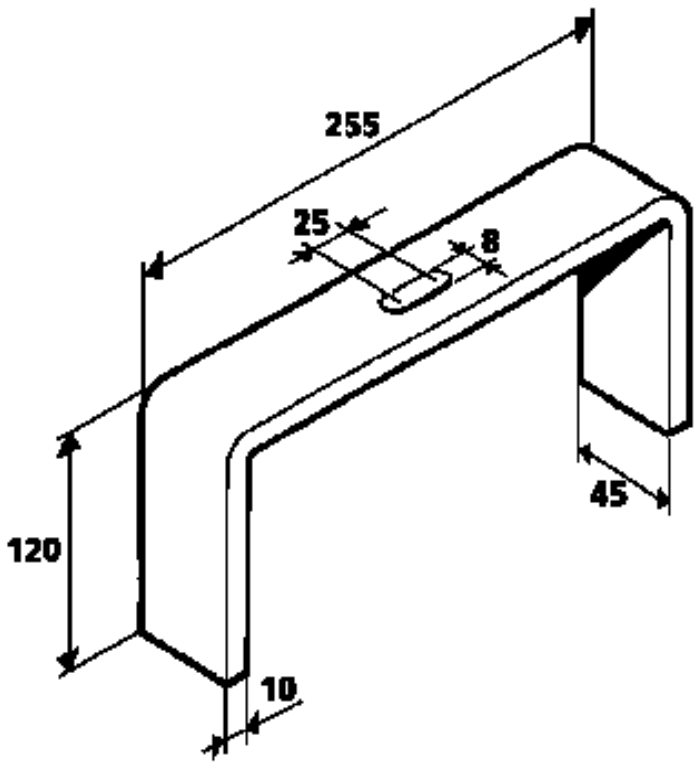
Illustration	Methods reference	Part number	Description
 84912S1	**B. Vi. 883**	00 00 088 300	Tool for fitting differential band ring.
 84519-1S	**B. Vi. 902-01**	00 00 090 201	Tool for fitting circlips
 84819S1	**B. Vi. 903**	00 00 090 300	Ring spanner for final drive pinion nut
 84817S1	**B. Vi. 905-02**	00 00 090 500	Tool for replacing speedometer drive shaft seal (boxed set)
 84863S1	**B. Vi. 906**	00 00 090 600	Tool for measuring torque
 86398S2	**B. Vi. 945**	00 00 094 500	Mandrel for fitting sunwheel seal
 86398S1	**B. Vi. 946**	00 00 094 600	Mandrel for fitting spring ring on sunwheel
 86097S	**B. Vi. 947**	00 00 094 700	Mandrel for fitting bearings in separator casing.

Illustration	Methods reference	Part number	Description
 86104-1S	**B. Vi. 951**	00 00 095 100	Tool for fitting differential seal
	B. Vi. 952	Locally made tool in accordance with drawing on page 23-131	
 86105S1	**B. Vi. 955**	00 00 095 500	Tool for measuring the preload in the final drive pinion bearings
 86424R	**B. Vi. 958**	00 00 095 800	Test kit
 86137S1	**B. Vi. 959**	00 00 095 900	Tool for fitting the circlip on the output shaft.
 12142S1	**B. Vi. 1400-01**	00 00 140 001	Tool kit for working on automatic transmission.
 69306-1S1	**Rou. 15-01**	00 01 331 601	Protective end piece for shaft with internal diameter of 16 mm.
 90028S	**M.S. 1019-10**	00 00 101 910	XR25 test kit for checking microprocessor systems.

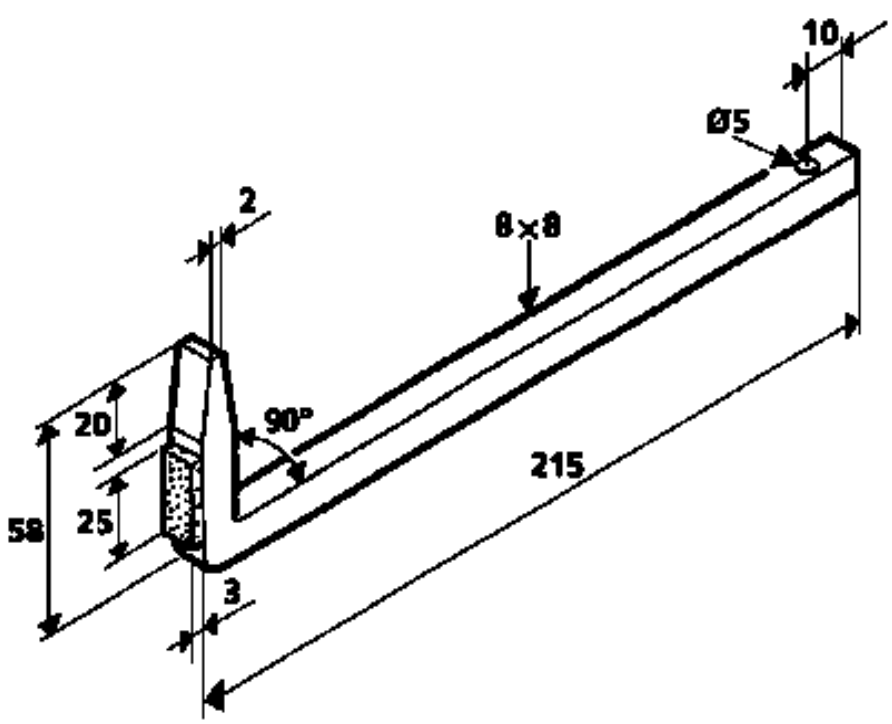
Illustration	Methods reference	Part number	Description
 77669S1	**Mot. 587**	00 00 058 700	Tool for extracting seals.

B. Vi. 715



11939R

B. Vi. 952



11938R

HOW TO USE THE DOCUMENT

There are two types of computer fitted to T.A.M.

This document is divided into three parts.

To each part corresponds:
-- a computer assembly on the vehicle,
-- a fault finding fiche.

HOW TO KNOW WHICH PART TO USE

There are two possibilities:

- **1st possibility:**
  You can identify the type of assembly on the vehicle

- **2nd possibility:**
  Refer to the vehicle tables in question (see following pages); they will give you the number of the fault finding fiche to use as a function of:
  -- the vehicle type,
  -- the engine type,
  -- the automatic transmission type,
  -- the "old generation" computer reference,
  -- the "new generation" computer reference.

1st PART:

This involves an "old generation" computer (M 4/2) fitted to the vehicle during production.

You must use fault finding fiche N° 1.

In this part you will find:
- a presentation of the layout of the computer on the vehicle,
- a fault finding method to be carried out using the XR 25,
- fault finding charts to be used with the bar-graphs.

2nd PART:

This involves a "new generation" computer (M 4/3) fitted to the vehicle in after sales.

You must use fault finding fiche N° 24.

In this part you will find
- a presentation of the layout of the computer on the vehicle,
- a fault finding method to be carried out using the XR 25,
- fault finding charts to be used with the bar-graphs . (They are common to the 2nd and 3rd part).

3rd PART:

This involves a "new generation" computer (M 4/3) fitted to the vehicle during production.

You must use fault finding fiche N° 26.

In this part you will find
- a presentation of the layout of the computer on the vehicle,
- a fault finding method to be carried out using the XR 25,
- fault finding charts to be used with the bar-graphs . (They are common to the 2nd and 3rd part)

The fault finding charts to be used as a function of the customer complaints are common to all three parts.

Each part of the document will be identified in the top left hand corner by the number of the fault finding fiche to be used.

The following table will give you the number of the fault finding fiche to use as a function of:

-- the vehicle type,
-- the engine type,
-- the automatic transmission type,
-- the "old generation" computer reference,
-- the "new generation" computer reference.

IMPORTANT :
The identification number of an "old generation" computer is the same as the identification number of the corresponding "new generation" computer

NOTE: as part numbers may change, you are advised to check the part numbers given in the parts catalogue of the vehicle involved when ordering.

Vehicle type	Engine type	"M" AT type	"Old generation" computer part no. M4/2	"New generation" computer part no. M4/3	Identification number	Fault finding fiche n°. to be used with M4/3 computer
1344 / 1354	J8S 711	MJ3 201	77 00 711 234	77 00 865 134	014	24
1277	J6R 702	MJ3 500	77 00 707 652	77 00 864 120	102	24
1277	J6R 703	MJ3 002				
1279	J7T 701	MJ3 102				
1343 / 1353 / 1363	J6R 711 J6R 713 J6R 715 J6R 781	MJ3 301 MJ3 301 MJ3 301 MJ3 352	77 00 733 522	77 00 864 121	103	24
1342	A6M 726	MJ1 001	77 00 708 846	77 00 864 122	104	24
1352	A6M 726	MJ1 001				
1362	A6M 726	MJ1101				
1343 / 1353 / 1363	J6R 713	MJ3 351	77 00 733 529	77 00 864 123	107	24
135B	J7T 719	MJ3 600				
136B	J7T 719	MJ3 700				
1341	A2M 796	MJ1 500	77 00 714 822	77 00 864 124	110	24
C 403	C2J 781 C2J 789	MB1 601 MB1 601	77 00 733 532	77 00 864 136	221 replaced by 135	24
C 403	C2J 781 C2J 789	MB1 602 MB1 602	77 00 737 599	77 00 864 136	229 replaced by 135	24

Vehicle type	Engine type	"M" AT type	"Old generation" computer part no. M4/2	"New generation" computer part no. M4/3	Identification number	Fault finding fiche n°. to be used with M4/3 computer
X 408	F3N 717	MB3 001	77 00 739 205	77 00 864 135	134	24
X 403	C2J 781	MB1 603	77 00 741 077	77 00 864 136	135	24
B 40J	C2J 789	MB1 603				
L 423 - X 373	C2J	MB1 017	77 00 733 717	77 00 864 128	224	24
L 423 - X 373	C2J 718 C2J 767	MB1 501 MB1 501	77 00 733 530	77 00 864 129	125	24
L 423 - X 373	C2J 718 C2J 718 C2J 718	MB1 007 MB1 021 MB1 025	77 00 737 597	77 00 864 131	228	24
L 423 - X 373	C2J 797 C2J 797	MB1 504 MB1 505	77 00 737 600	77 00 858 901	129	24
L 426 - X 376	F2N 791	MB3 356	77 00 739 204	77 00 864 134	133	24
X 48A	J7T 727 J7T 727	MJ3 760 MJ3 761	77 00 736 164	77 00 864 130	126	24
X 483	J7R 750	MJ3 801	77 00 737 997	77 00 864 130	130 replaced by 126	24
X 489	J6R 759	MJ3 801				
X 48K	J7T 755	MJ3 801				

Vehicle type	Engine type	"M" AT type	"Old generation" computer part no. M4/2	"New generation" computer part no. M4/3	Identification number	Fault finding fiche n°. to be used with M4/3 computer
B 297 LH drive	J6R 707	MJ3 122	77 00 733 533	77 00 864 126	113	24
B 297 RH drive	J6R 707	MJ3 112				
B 29E	J7T 707	MJ3 012				
B 29E	J7T 715	MJ3 012				
TRAFIC LH drive	A1M 708	ML1 005	77 00 733 531	77 00 864 127	120	24
TRAFIC RH drive	A1M 708	ML1 006				
TRAFIC LH drive	J5R	ML1 007				
TRAFIC RH drive	J5R	ML1 008				
X 53B	F3N 741 F3N 741	MB3 003 MB3 005	77 00 744 853	77 00 858 900	137	24
X 537	E6J 701 E6J 701 E6J 701	MB1 023 MB1 300 MB1 031	77 00 748 726	77 00 864 138	138	24
X 53A	E7J	MB1	-	-	140	26
X 573	E6J 713 E6J 713 E6J 713	MB1 024 MB1 029 MB1 030	77 00 851 224	77 00 864 139	139	24
X 57B - X57T - X57J	E7J	MB1	-	-	142 - 145	26
F40S - F40U - F40V	E7J	MB1	-	-	141	26
C066/7	D7F	MB1	-	-	143	26

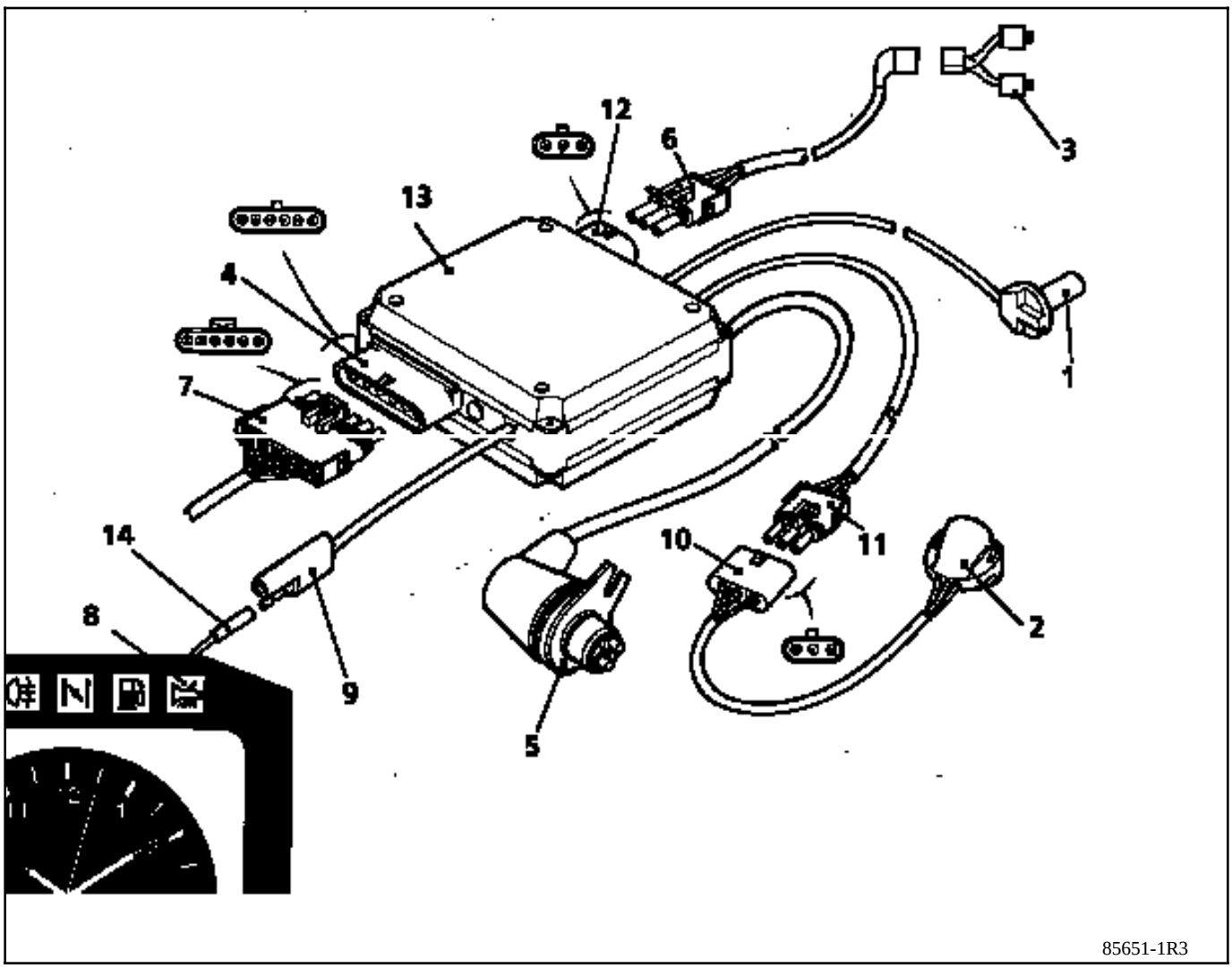
THIS PART DEALS WITH VEHICLES FITTED AS STANDARD WITH AN "OLD GENERATION" COMPUTER

PRESENTATION

The computer (13) has a system for self checking the electrical components which is shown by the fault warning light (8) illuminating on the instrument panel. The fault warning light (8) should illuminate when the vehicle's ignition is turned on and should extinguish either when driving at more than **1.8 mph** (3 km / h) or after **3 seconds** (depending on version).

If the fault warning light (8) illuminates when driving the vehicle DO NOT TURN OFF THE IGNITION in order to memorise the type of fault to be searched for and connect the XR 25 test kit.

NOTE: it is normal for the fault warning light (8) to flash very slightly during normal operation.



1	Vehicle speed sensor
2	Load potentiometer
3	Solenoid pilot valves
4 and **7**	Six track connector
5	Multifunction switch
6 and **12**	Solenoid valve connector
8	Fault warning light
9 and **14**	Fault warning light connector and XR 25 connection
10 and 11	Load potentiometer connector
13	Computer

ESTABLISHING THE CONNECTION BETWEEN THE COMPUTER AND THE XR25

In order to be able to make the connection between the computer and the XR25, you must have the adaptor wire (18) supplied with cassette N° 12.

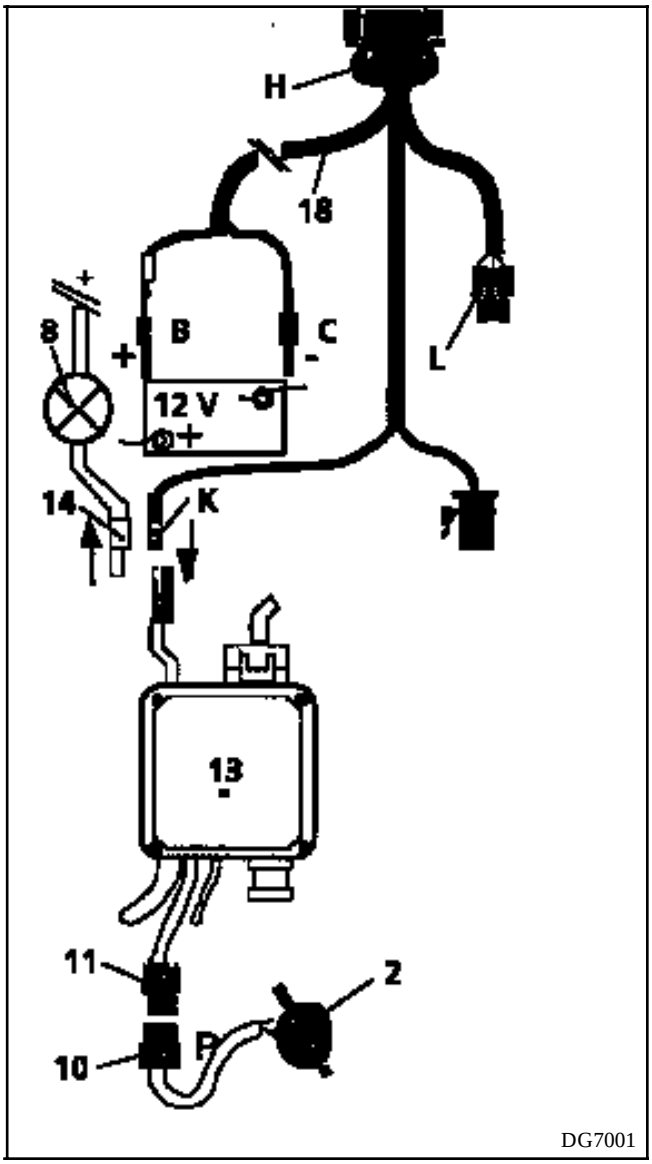
Connect connector (K) to connector (9) of the computer.

Connect connectors (B) and (C) to the plus and minus terminals of the battery in order to feed the XR25.

Connect connector (H) to the XR25.

To adjust the load potentiometer, connect connector (L) to connector (10) of the load potentiometer.

Carry out the fault finding and to do this refer to the section on "Using the XR25".



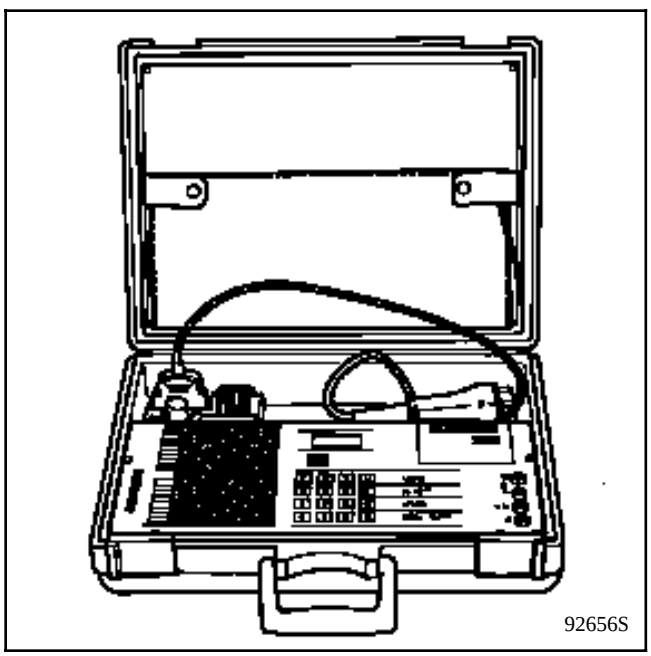
USING THE XR25

The XR25 is essential for all faults on the automatic transmission, regardless of the origin of the problems.

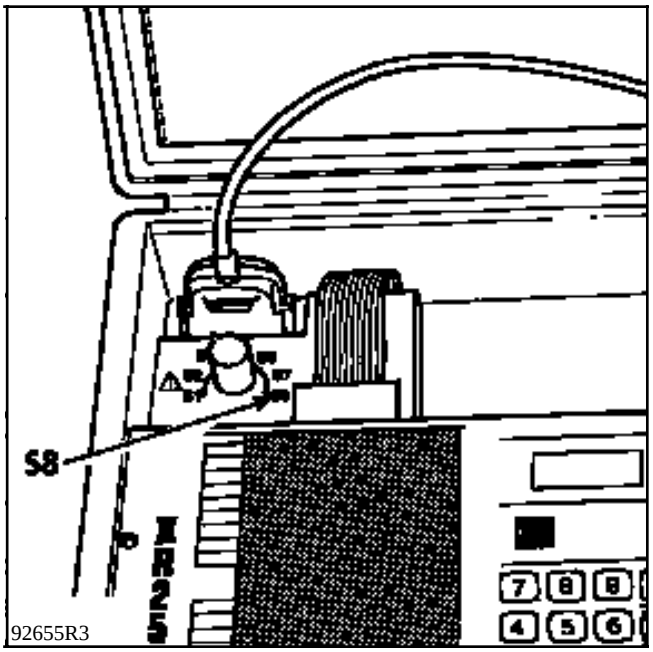
It is fitted with a microprocessor which allows:

- access to all information supplied by the various sensors,
- the fault messages supplied by the computer to be read.

After a road test with the vehicle stationary, ignition on and engine running, connect the XR25.



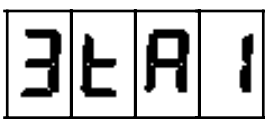
- Turn the selector to S8.

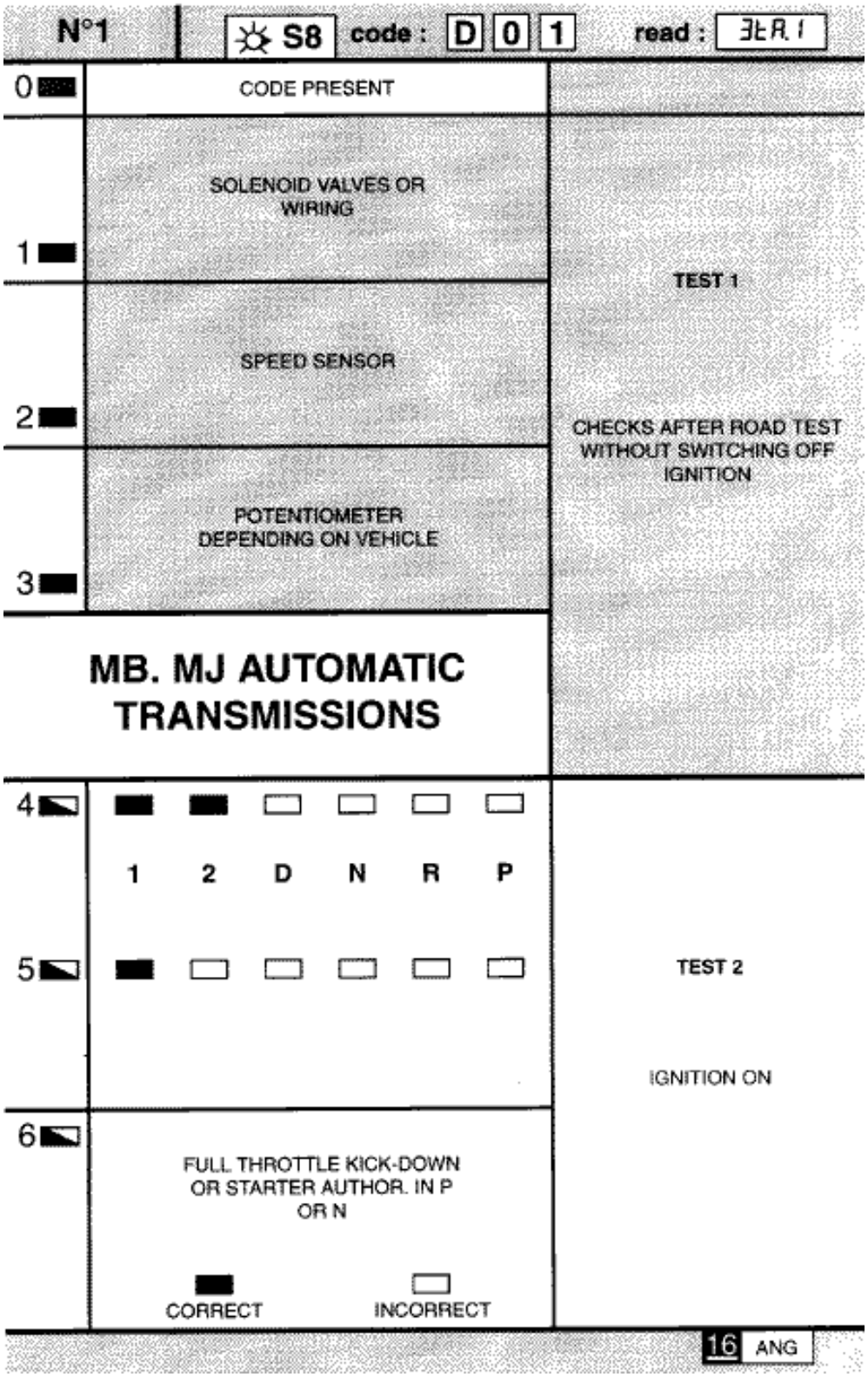


- Enter the code of the automatic transmission

D	0	1

The following will appear on the display:





FI21601

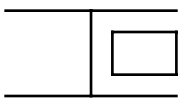
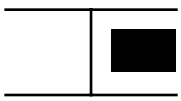
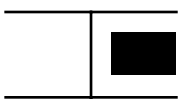
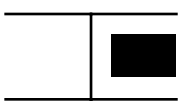
- Bargraphs on a red background represent a fault.
- Bargraphs on a white background represent a status.

DISPLAY and MEANING OF THE BARGRAPHS

IMPORTANT: The information given below is only valid for computers found in the "Vehicles involved" section.

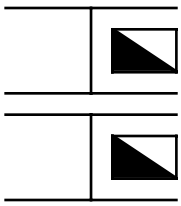
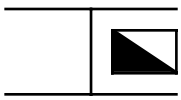
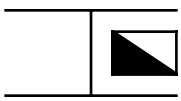
TEST N ° 1:

After a road test with the vehicle stationary, ignition on and engine running.

 0	Illuminated with the ignition on when the communication between the automatic transmission computer and the XR25 is established.
 1	Illuminated when the circuit of solenoid pilot valve N° 1 or N° 2 is faulty
 2	Illuminated when the vehicle speed information supplied to the automatic transmission computer is wrong or absent
 3	Illuminated when the load information received by the automatic transmission computer is incoherent or absent. **IMPORTANT:** Vehicles : (B297, B294, X40 Switzerland), and (X537, X53B, X573 before 04/91) have no fault finding signal relating to the load potentiometer. The bargraphs will never illuminate for these vehicles. - If the potentiometer circuit is broken, the vehicle will remain in 1st gear, - If the potentiometer circuit is short circuited, gear changes will be delayed.

TEST N ° 2 :

Engine off, ignition on

 4 5	Bargraphs 4 and 5 represent the position of the gear selector lever as a function of the information supplied by the multifunction switch. - Selector in 1st gear hold: Bargraphs 4RH and 5RH are illuminated. - Selector in 2nd gear hold: Bargraph 4RH is illuminated, bargraph 5RH is extinguished. - Selector in P, R, N, D: Bargraphs 4RH and 5RH are extinguished.
 6 vehicle with kickdown compensator	Illuminated when the kickdown supplies information to the automatic transmission computer. There are two types of kickdown: - Opening kickdown: Accelerator cable at rest and contacts closed. - Closing kickdown: Accelerator cable at rest and contacts open.
 6 vehicle without kickdown compensator	Illuminated when the gear selector lever is in the P or N position. Starting is authorised.

NOTE : *To determine a fault, refer to the "Fault finding charts to be used from the bargraphs" section.*

Connect connector (L) of the adaptor lead (18) to connector (10) of the load potentiometer.

Do not enter the automatic transmission code.

On the keypad enter:

V 1

Adjustments are performed at full load.

On the upper part of the bargraphs:
- the bargraph located in the left hand column is moving
- bargraph 5 RH is fixed.

In the full load position, the bargraph of the left hand column must be aligned with the bargraph of the right hand column thus illuminating bargraphs 5RH and 5LH.

In the full load position, a value between 0 and 3 should be read on the central display (0 being the optimum setting).

FAULT FINDING CHART TO BE USED FROM THE BARGRAPHS

ONE OF THE BARGRAPH INDICATES A FAULT

BARGRAPH 0 RH EXTINGUISHED OR NO COMMUNICATION WITH THE COMPUTER

Check that the battery voltage is > **10.5 V**.
Check that the fuse of the automatic transmission is not blown.
After these checks, does the fault persist?

no → Success

yes ↓

Check the 2 track connector connecting the diagnostic socket and the computer is correctly connected. (If the vehicle does not have a diagnostic socket, check the special wiring is correctly connected: red terminal to battery +, black terminal to battery - and green terminal to fault warning light output).
Check / ensure the continuity of the line between the 2 track connector and track 7 of the diagnostic socket.
Check / ensure that track 2 of the diagnostic socket is earthed and the presence of battery + on track 6.
After this operation, does the fault persist?

no → Success

yes ↓

Check the computer feed is correct:
- Earth through wire on multifunction switch (earth on track E of the 6 track connector on the first version) .
- + after ignition on track F of the 6 track connector on the wiring side.

After checking / repairing, does the fault persist?

no → Success

yes ↓

Replace the computer if the fault persists after checking the wiring on the 6 track connector. Erase the computer memory if an M4-3 computer is fitted.

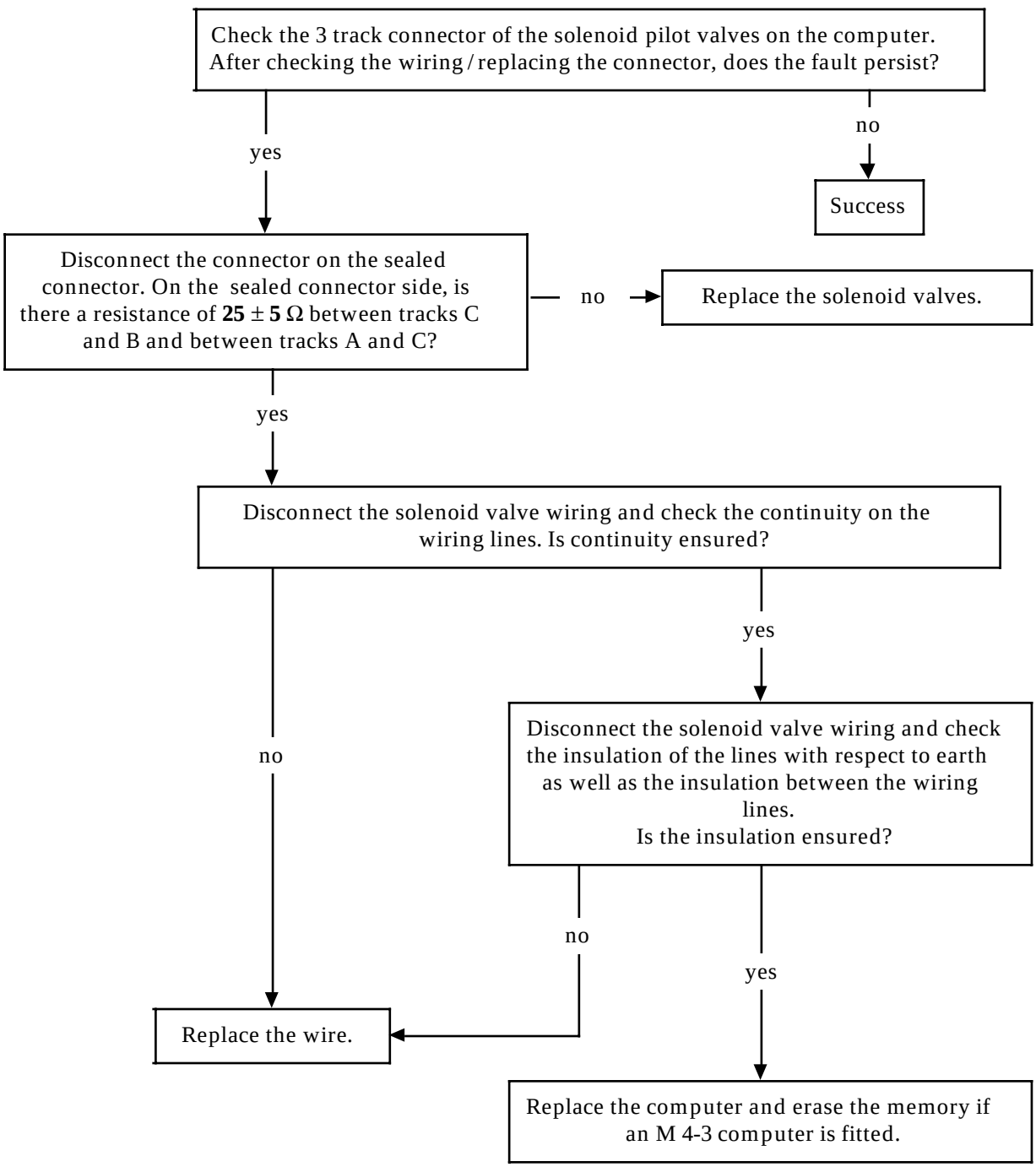
1DMXTT1.0

BARGRAPH 1 RH ILLUMINATED: Fault on solenoid pilot valve(s).

This solenoid pilot valve fault may be stored due to the drop in supply voltage (5 volts) of the load potentiometer supplied by the automatic transmission computer.
In the event of a short circuit between tracks B and C of the load potentiometer, the 1st fault considered by the computer will be a solenoid valve fault. It is therefore necessary to test the circuit of the load potentiometer before searching for a possible solenoid pilot valve fault:

- Disconnect the 3 track connector of the load potentiometer.
- Turn the ignition off then on again.
- Replace the load potentiometer if the solenoid pilot valve fault has disappeared and if the potentiometer fault is confirmed (short circuit test using multimeter).

If however the fault persists, apply the fault finding procedure associated to this solenoid pilot valve fault.



1DMXTT1.0

BARGRAPH 2 RH ILLUMINATED:

Fault on vehicle speed information

After a road test, if the warning light is still illuminated without having turned off the ignition, replace the vehicle speed sensor. Refer to the replacing instructions in MR T.A.M..
If the fault persists, replace the computer.
(Erase the computer memory if the new one is an M 4-3).

BARGRAPH 3 RH ILLUMINATED:
Load potentiometer fault

Check that the potentiometer is correctly connected to the harness and check the condition of the wiring.
Check the **5 volt** feed to the potentiometer:
Is there a voltage of **4.5 ± 0.5 volts** on track B of the potentiometer connector (C on the Trafic)?

no → Replace the computer if the wiring between the computer and the connector is not faulty.
Erase the memory if the new computer is an M 4-3.

yes → Check / adjust the load potentiometer (refer to MR T.A.M..
After the repair, does the fault persist?

no → Success

yes → Change and adjust the potentiometer (Refer to MR T.A.M.).
Does the fault persist?

no → Success

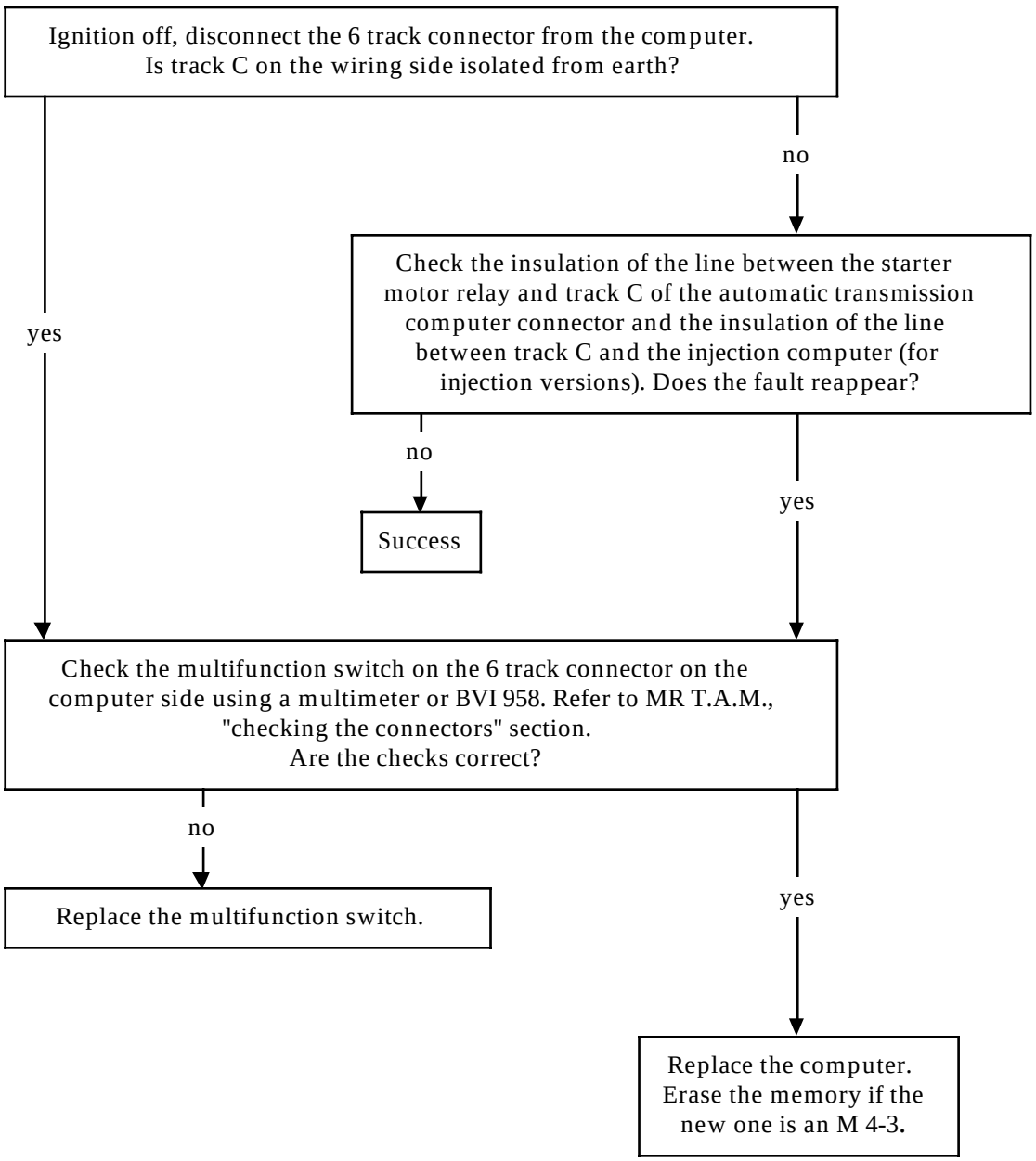
yes → Check the condition under the bonnet of the automatic transmission wiring but also of the high voltage leads.
After the repair, does the fault persist?

yes → Replace the computer and erase the memory if fitting an M 4-3 computer.

no → Success

1DMXTT1.0

BARGRAPH 4/5 RH ILLUMINATED: Coherence fault between the lever position and the XR25 display.



1DMXTT1.0

BARGRAPH 6 RH ILLUMINATED: Operating check of the kickdown switch (for vehicles with kickdown) or starting authorisation check in P / N for vehicles without kickdown.

1) VEHICLES FITTED WITH A KICKDOWN SWITCH

A) Bargraph 6 illuminated on RH at no load

Vehicles with open contact kickdown switch:

No earth on track D of the computer.

Check that the connector is correctly connected on the kickdown switch.
Is there continuity between the 2 tracks of the switch in the No Load position?

— no → Replace the kickdown switch.

yes ↓

Check / ensure the following continuities:
- Between the engine earth and one track of the kickdown switch connector.
- Between the other track of the switch connector and track D of the computer.

If the fault persists, replace the computer.
(Erase the memory if an M 4-3 computer is fitted).

Vehicles with closed contact kickdown switch:

Presence of earth on track D of the computer.

Is there continuity between the 2 tracks of the kickdown switch in the No Load position?

— yes → Replace the kickdown switch.

no ↓

Check / ensure the insulation of the line between the track of the kickdown switch connector and track D of the computer. If the fault persists, replace the computer.
(Erase the memory if an M 4-3 computer is fitted).

1DMXTT1.0

BARGRAPH 6 RH ILLUMINATED (cont): Operating check of the kickdown switch (for vehicles with kickdown) or starting authorisation check in P / N for vehicles without kickdown.

B) Bargraph 6 extinguished in the Full Load position

Vehicles with open contact kickdown switch:

Earth still present on track D of the computer.

Check the adjustment of the accelerator pedal. Is there continuity between the 2 tracks of the kickdown switch in the Full Load position?

yes → Replace the kickdown switch.

no ↓

Check / ensure the insulation of the line between the kickdown switch connector and track D of the computer.

Vehicles with closed contact kickdown switch:

No earthing on track D of the computer.

Check the adjustment of the accelerator pedal.
Check that the connector is correctly connected on the kickdown switch.
Is there continuity between the 2 tracks of the kickdown switch in the Full load position?

no → Replace the kickdown switch.

yes ↓

Check / ensure the following continuities:
- Between a track of the kickdown switch connector and earth.
- Between the other track of the kickdown switch connector and track D of the computer.

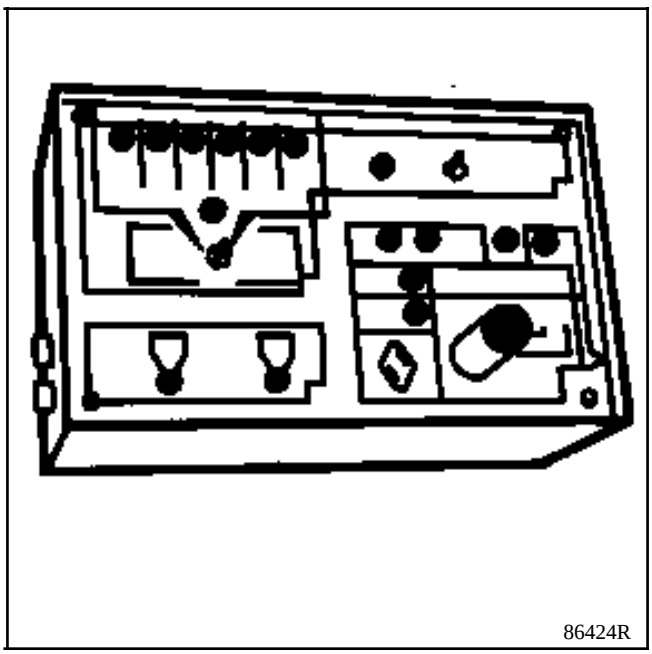
2) VEHICLE NOT FITTED WITH A KICKDOWN SWITCH

Bargraph 6 extinguished in P / N position.

Check all components of the control and adjust.
Check the multifunction switch. Refer to MR T.A.M., "checking the connectors" section.

1DMXTT1.0

THE TEST KIT B. Vi. 958 ONLY DETECTS FAULTS OF ELECTRICAL OR ELECTRONIC ORIGIN



86424R

COMPONENTS TESTED	+ FEED TO COMPUTER SPEED SENSOR SOLENOID VALVES LOAD POTENTIOMETER MULTIFUNCTION SWITCH KICKDOWN
SETTING	LOAD POTENTIOMETER
MEASURE-MENTS	FEED VOLTAGE CONTINUITY OF SOLENOID VALVES

DESCRIPTION OF THE KIT

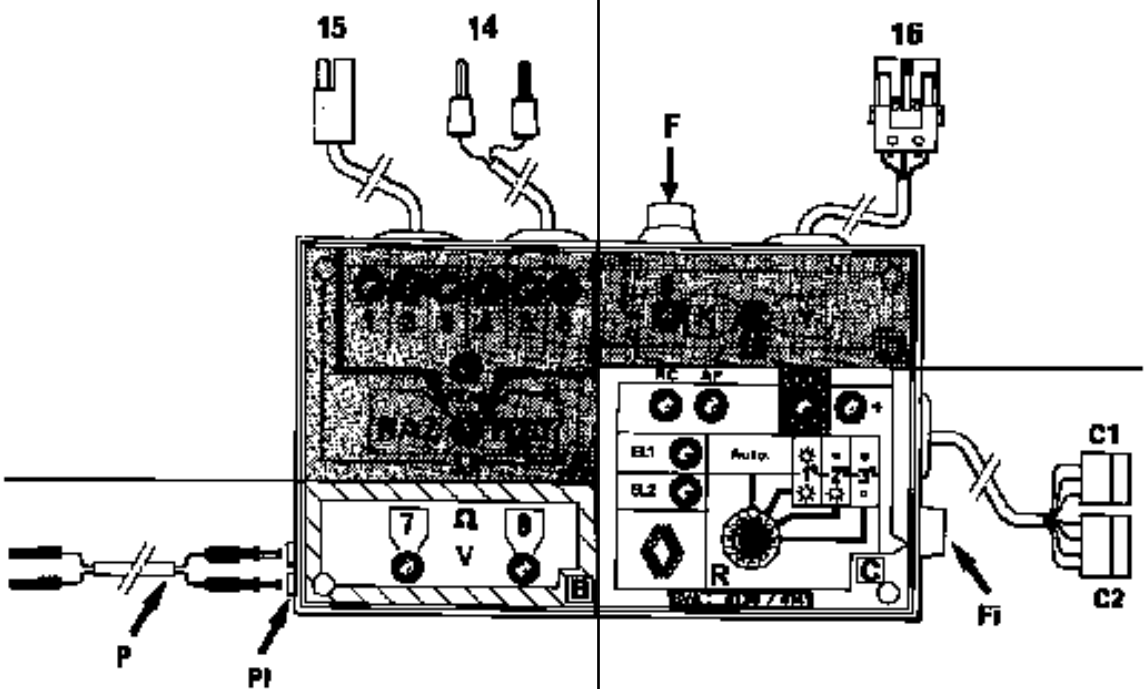
ZONE A: used for checking transmissions of type **- MB - MJ - ML**

1 Solenoid valves
2 Speed sensor
3 Potentiometer
4 1st gear hold } Gear
5 2nd gear hold } lever
6 Kickdown or starter motor check*
15 Diagnostic socket
14 Unit feed
RAZ Reset warning lights 1 to 6
TEST Test B. Vi. 958
DIAG Instrument panel warning light information.

* Depending on vehicle.

ZONE D: used for checking / adjusting the load potentiometer (transmissions of type **MB - MJ - ML**)

I2 Inverter
9 Adjusting light
⊕ Feed light (MB-MJ-ML)
F Fuse (3, 15 A)
16 Measuring connector



DI2367

ZONE B: used for measuring the continuities of the solenoid valves and measuring the voltage - multifunction switch (all types of automatic transmission).

7-8 Measuring lights
P Measuring wiring
P1 Measuring socket

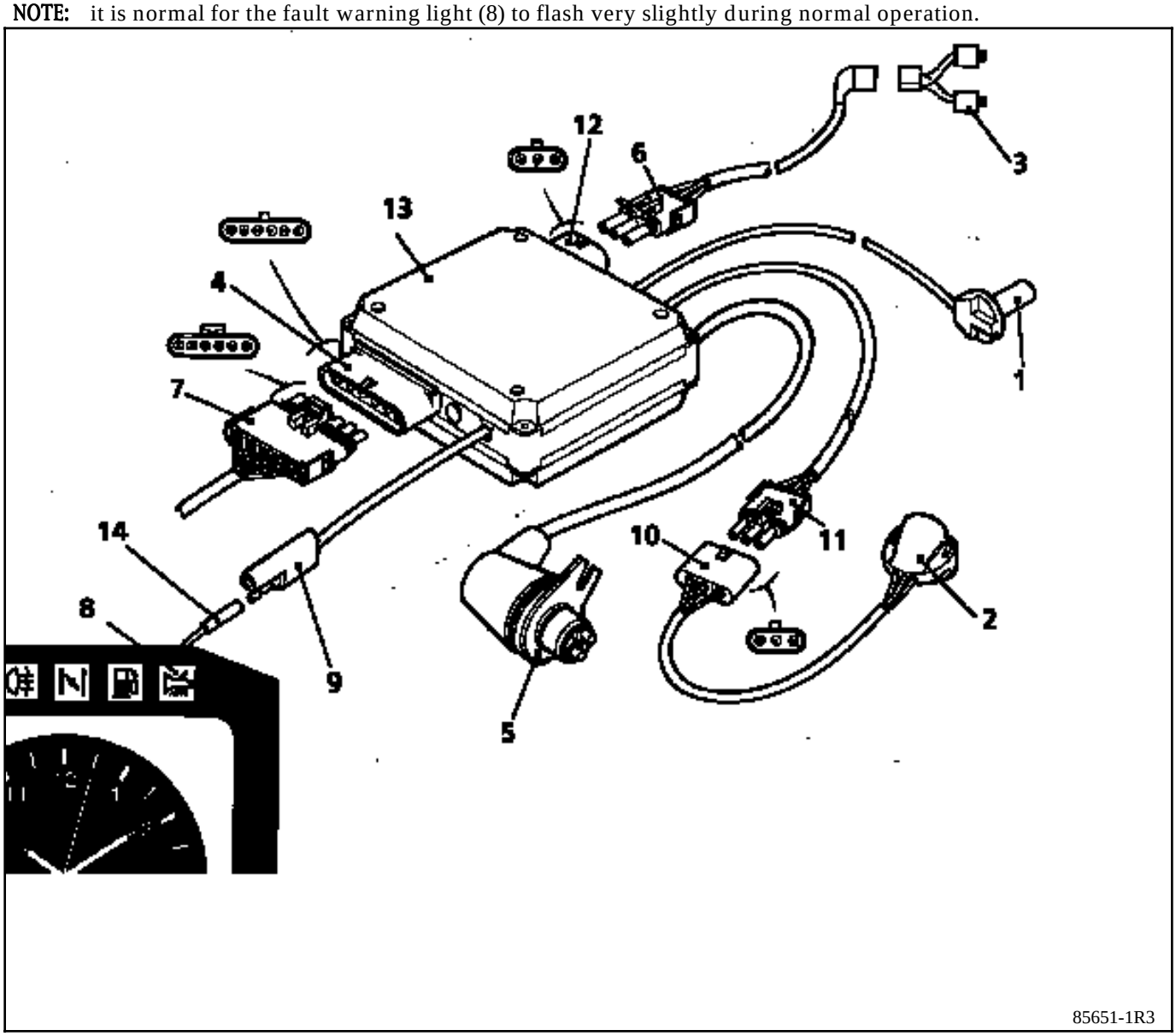
ZONE C: used for automatic transmissions **4139-4141** and possibly **MB - MJ - ML** (see-pages **23-64**).

INTERPRETATION OF THE AUTOMATIC TRANSMISSION WARNING LIGHT

The computer (13) has a system for self checking the electrical components which is shown by the fault warning light (8) on the instrument panel. The warning light (8) should illuminate when the vehicle's ignition is turned on a extinguish either after driving at more than **1.8 mph** (3 km / h), or after **3 seconds** (depending on version).

If the fault warning light (8) illuminates whilst driving, DO NOT TURN OFF THE IGNITION in order to store the type of fault to be searched for and connect the test kit **B. Vi. 958**.

NOTE: it is normal for the fault warning light (8) to flash very slightly during normal operation.



1	Speed sensor
2	Load potentiometer
3	Solenoid valves
4 and 7	6 track socket
5	Multifunction switch
6 and 12	Sealed connector socket
8	Fault warning light
9 and 14	Diagnostic socket
10 and 11	Load potentiometer socket
13	Computer

UTILISATION

CONNECTION CONDITION ZONE A

If the fault warning light on the instrument panel remains illuminated or illuminates during a test, DO NOT TURN OFF THE IGNITION .

Intermittent illumination of the fault warning light

The fault warning light remains extinguished when the ignition is turned on.

No gear imposed.

No kickdown or wrong gear change threshold.

Checking starter motor function (depending on version).

CONNECTION

1) Connect the plugs (14) to the battery.

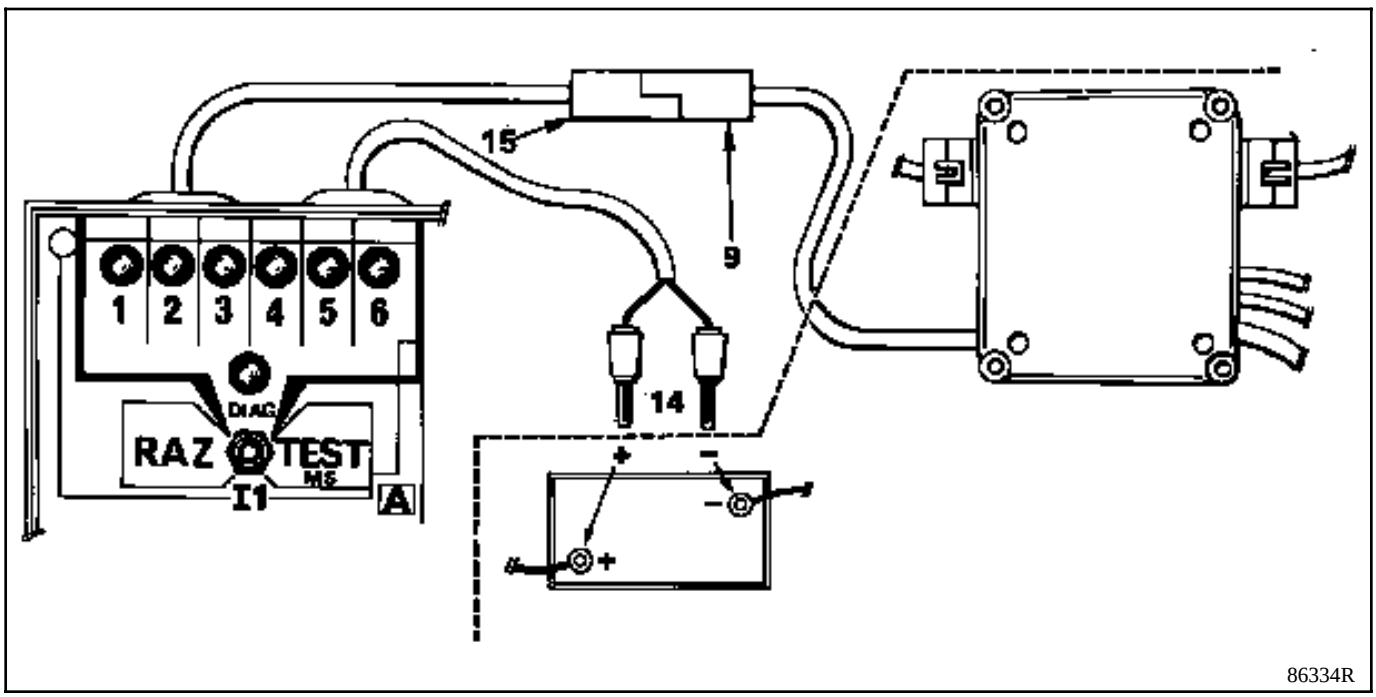
2) Checking the **B. Vi. 958**:
Switch **I1** to the TEST position, lights **1** to **6**, DIAG, **7**, **8**, **9** and **+** should be illuminated.
Otherwise, the **B. Vi. 958** is faulty.

Contact your After Sales Head Office for further details.

3) Release **I1** and and switch it to **RAZ**, only the DIAG and ⊕ lights should be illuminated.

4) Release **I1**, only the ⊕ light is illuminated.

5) Connect the diagnostic socket (15) to the connector of the (9) automatic transmission computer (instrument panel warning light feed).



86334R

GENERAL FAULT FINDING

AFTER ROAD TEST - VEHICLE STATIONARY - IGNITION ON
(ENGINE RUNNING)

Checks	Light number	Light status		Components which might be faulty	For repair see section
		Correct	Incorrect		
Pilot valves	1	○	⊛	- Solenoid valves - Wiring	Checking the solenoid valves
Speed sensor	2	○	⊛	- Speed sensor faulty	Speed sensor
Potentiometer	3	○	⊛	- Load potentiometer - Wiring	Adjusting the potentiometer

VEHICLE STATIONARY - IGNITION ON

Selector lever position	Light 2 and DIAG illuminate: ignore them*			
	Light number	Light status	Components which might be faulty	Repair
		Correct		
2nd gear hold	4 and 5	4 ⊛ 5 ○	- Gear control - Wiring - Multifunction switch	After having adjusted the control, if still faulty, wash the multifunction switch with soapy water and blow thoroughly. If still faulty, replace the multifunction switch
1st gear hold	4 and 5	4 ⊛ 5 ⊛		
PRND	4 and 5	4 ○ 5 ○		
P-N (Check starter function)**	6	⊛		
Press accelerator fully down	6	⊛	- Kickdown - Wiring	Adjust the kickdown

* Extinguishes after 3 seconds on some versions.
** Vehicle with kickdown incorporated into the computer.

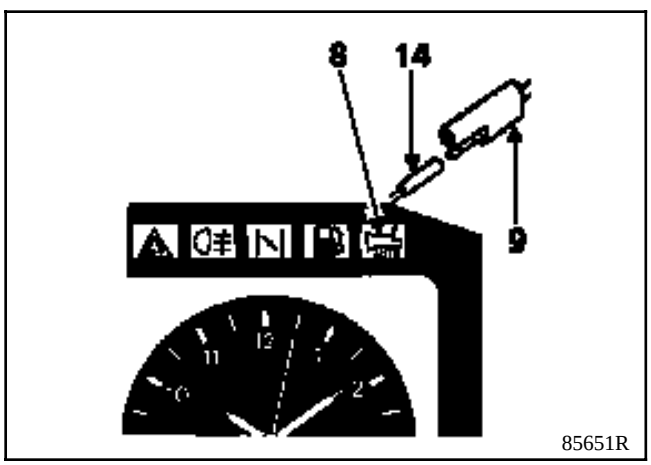
SPECIFIC FAULT FINDING

I - The fault warning light (8) on the instrument panel remains extinguished when the vehicle ignition is switched on.
Check the connection of the warning light and if correct, connect the **B. Vi. 958**.

A) The "DIAG" light (**B. Vi. 958**): check the warning light (8) on the instrument panel.

Action on the vehicle	Result	
- Turn on ignition.	Warning light (8) illuminates: CORRECT.	Warning light (8) is extinguished: INCORRECT .
- Separate (14) from (9) and connect (14) to earth.		Check: - the instrument panel fuse , - the wiring, - the light.

NOTE: a **1344** or **1354** with a **N° S.100 250 008** computer must have the warning light (8) disconnected.



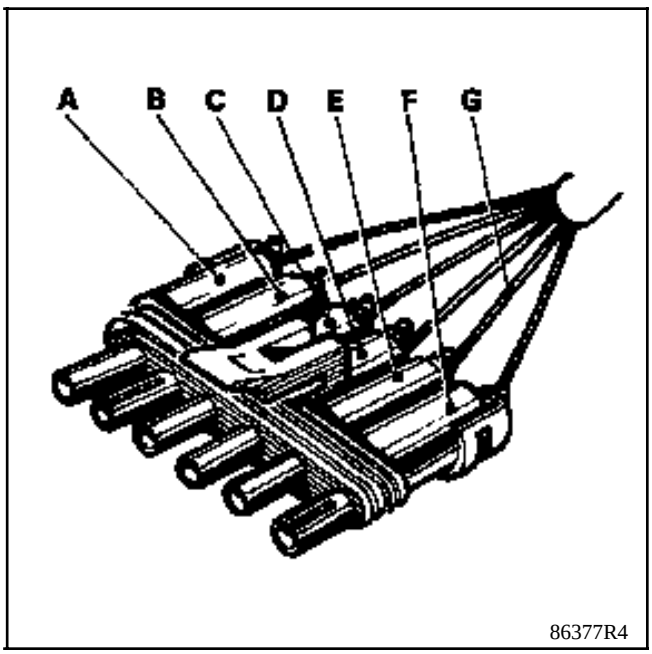
85651R

B) The "DIAG" light and lights **1** to **6** extinguished (**B. Vi. 958**).
Vehicle behaviour: remains in 3rd or random gear changes (may cause starter motor not to work), reverse normal without light illuminating.
FAULT: COMPUTER NOT EARTHED CORRECTLY

a) Identification of the earth

1st version:

On the 6 track connector on track **E** through wire **G**.



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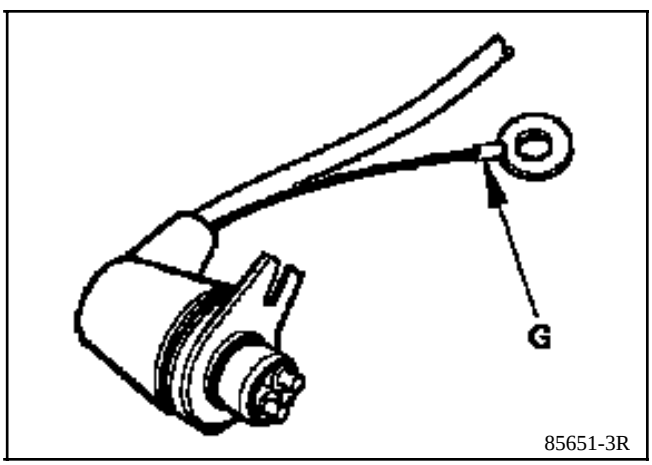
2nd version:

On the multifunction switch through wire **G** secured to the automatic transmission.



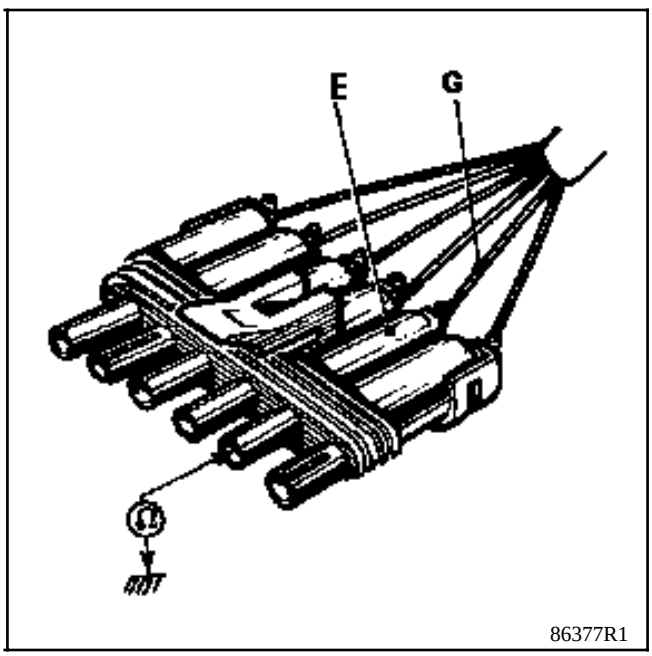
85651-3R

b) Checking

1st version:
Take the following measurement using an ohm-meter

Measuring point	Result	Fault finding
E and earth	0 to 0.5 Ω	CORRECT
	OTHER	INCORRECT See 1

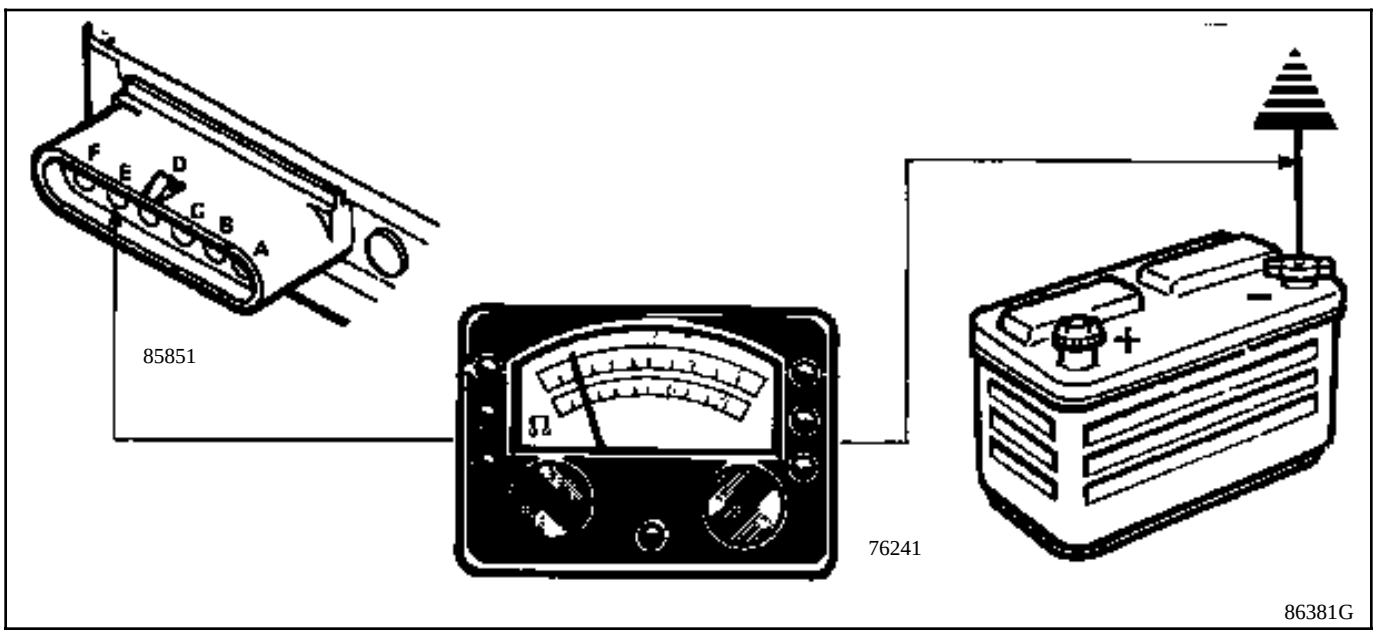
Check:
- the continuity of wire **G**,
- the earths.



2nd version:

Disconnect the 6 track connector and isolate the computer from the vehicle earth (do not let it touch the vehicle bodywork).

Take the following measurement using an ohmmeter:



Measuring points	Result	Fault finding
Between the battery - (- terminal) and point E on the computer connector.	0 to 0.5 Ω	CORRECT
	OTHER	INCORRECT See 1 - 2 - 3

1) The correct assembly of the automatic transmission earth strap to the chassis.
2) The correct assembly and the condition of the terminal (G) of the earth wire on the automatic transmission housing
3) The continuity of the earth wire (ohmmeter) placed between the terminal (G) and point E of the connector on the computer. Correct result = **0** to **0.5** Ω. If incorrect, replace the multifunction switch or the computer depending on where the wire is cut.

II - The "DIAG" ligh  and lights 1 to 6 extinguished (on the B. Vi. 958), regardless of the lever position.

Vehicle behaviour: remains in 3rd or random gear changes, reverse normal and warning light illuminated (normal or intermittently).

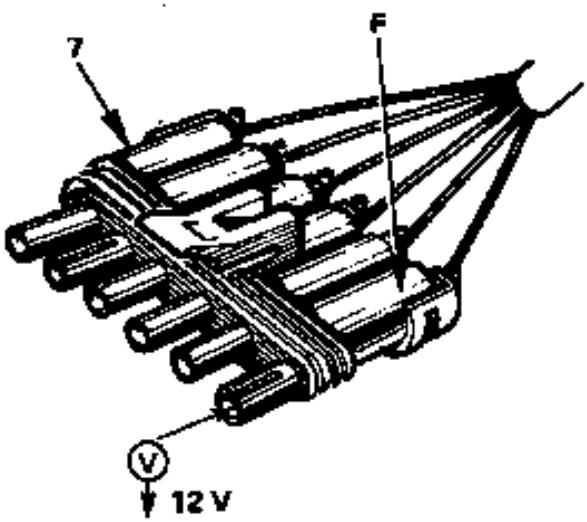
FAULT: INCORRECT FEED VOLTAGE TO COMPUTER

a) Components which might be faulty:
1.5 A or 2 A automatic transmission **fuse** on the relay plate **broken, oxidised, poorly clipped in.**
After ignition relay on relay plate.
6 track connector of computer or vehicle wiring connectors: poor contact, wires poorly crimped or broken...
Earth wire oxidised, incorrectly tightened, painted.
Alternator or battery faulty.

b) Repairs:

1) Check:
- the condition of the fuse and the fuse holder,
- the battery voltage and its wires (earth and +)
- the after ignition relay,
- the feed voltage on the six track connector (7) and (F), ignition on.

2) Check the following are correctly clipped in::
- the fuse,
- the six track connector (7) on the computer and its wires,
- the vehicle wiring connectors involved.



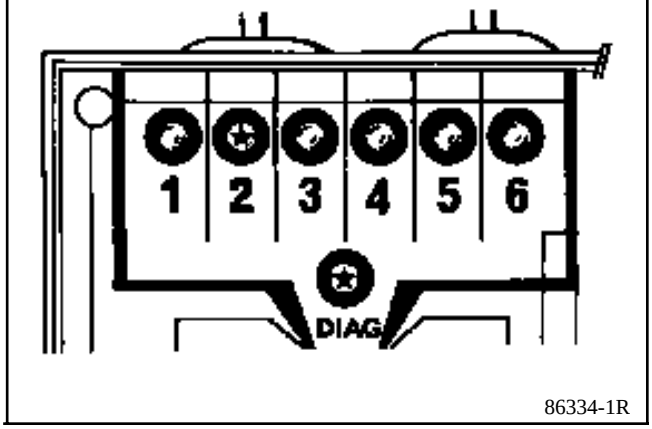
86377R2

TO DISPLAY A RETURN TO A NORMAL FEED VOLTAGE.

IMPORTANT

On vehicles where the warning light extinguishes after **3 seconds**, the vehicle warning light and lights "DIAG" and **2** of **B. Vi. 958** will extinguish after **3 seconds**.

The status of lights **1** to **6** must be (in **P** or **N**)**



86334-1R

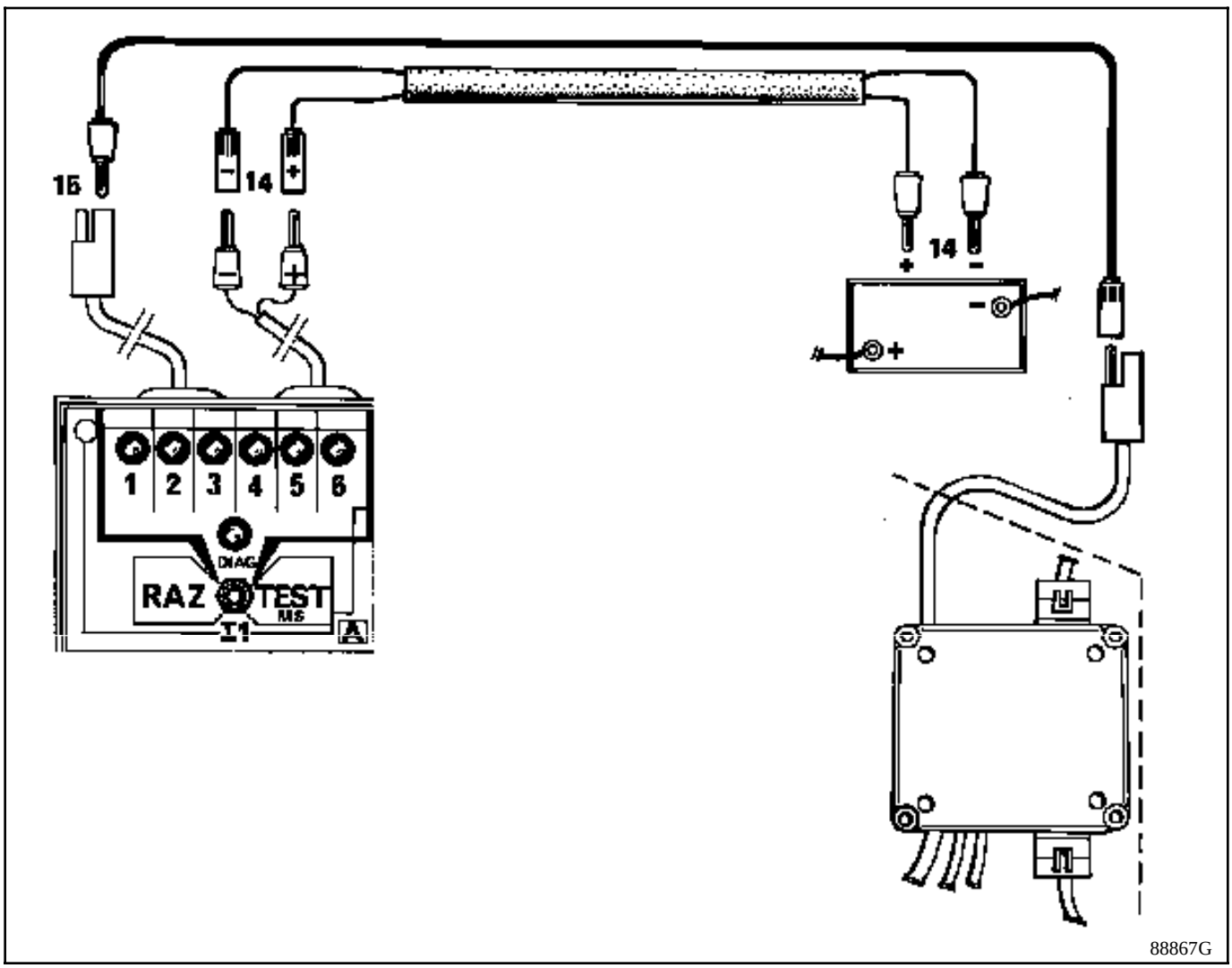
** (6) illuminated for vehicles with integrated kickdown.

SPECIFIC FAULT FINDING (cont)

III - If the instrument panel warning light illuminates intermittently when driving

1) Refer to section"**COMPUTER, general instructions**" and check that the earths and feeds are in perfect condition.

2) Make two extension leads so as to be able to put the **B. Vi. 958** in the passenger compartment.



Carry out a road test and determine the faulty component depending on the illumination of lights **1** to **6** .

IMPORTANT:

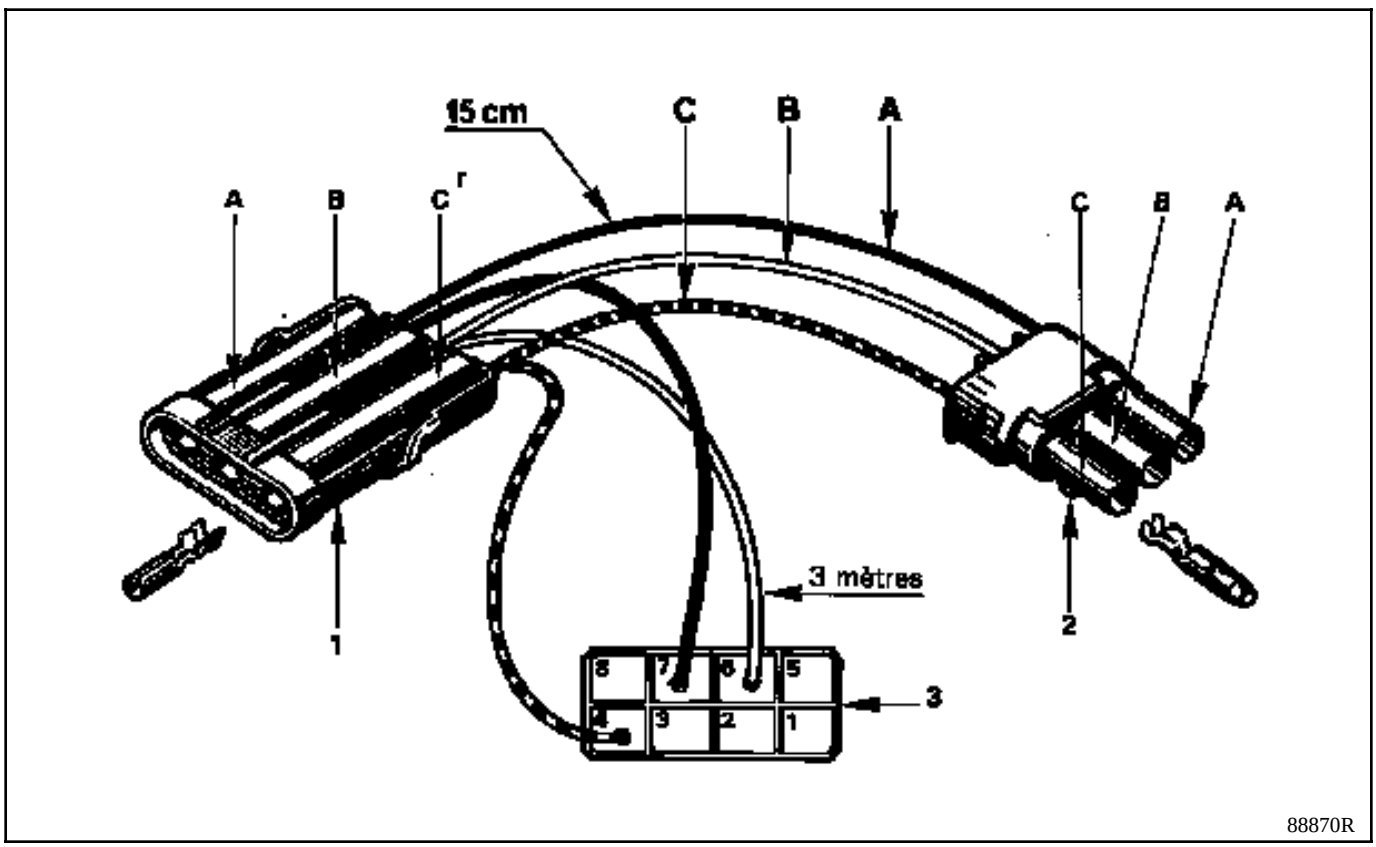
If lights **1** to **6** of **B. Vi. 95** operate in a random fashion, **there is an interference problem**.

NOTE: it is normal for the "DIAG" light to flash very slightly during normal operation.

FAULT FINDING ON THE HYDRAULIC FUNCTION

In order to view the electrical operation of the solenoid valves, part **4139-4141** of **B. Vi. 958** (**zone C**) can be used after making some adaptor leads.

This type of test can differentiate between an electrical problem and an hydraulic problem. This lead is inserted between the sealed connector and the computer.



1) Order sockets:
1 (Part No: **77 01 996 008**),
2 (Part No: **77 01 996 003**),
3 (Part No: **77 03 097 244**),

their plugs:
(Part No: **77 01 997 016 x 3**,
77 01 997 017 x 3,
77 03 097 255 x 3),

and their seals:
(Part No: **77 01 999 021 x 6**).

Some **1 mm²** cross section wire in **3 lots of 3 metre lengths.**

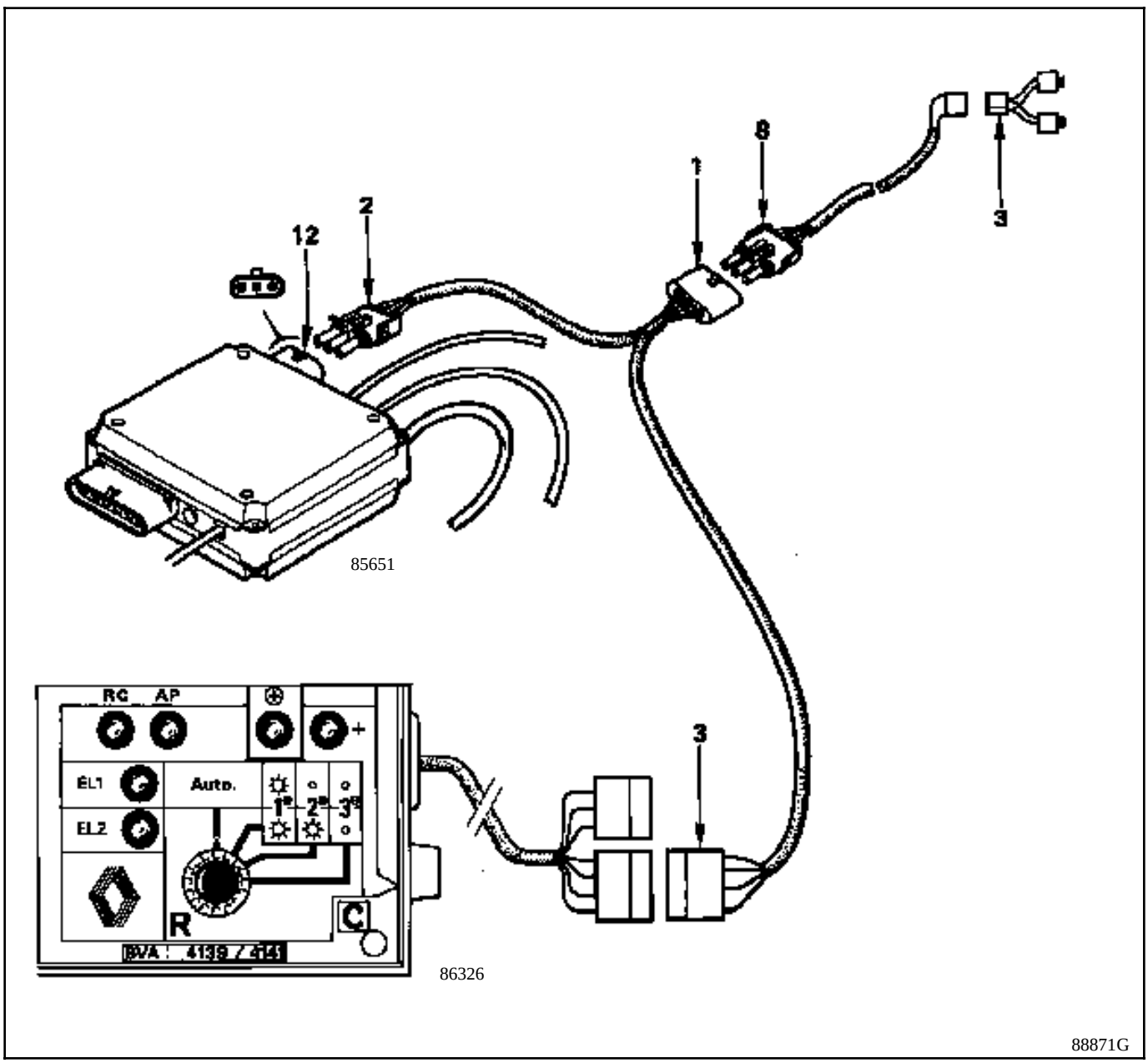
2) Assemble the sockets and their wires as shown in the diagram and melt the end of the plug (2) at (B) in the same way as (A) and (C).

FAULT FINDING OF THE HYDRAULIC FUNCTION (cont)

3) Assembly on vehicle

Disconnect (8) and (12) and fit connector (1) to (8) and (2) to (12).

Connect connector (3) to the **B. Vi. 958**.



4) Test

Put dial (R) of the **B. Vi. 958** on Auto.

Carry out a road test and check that the solenoid valves operate correctly (see page **23-22**). Check that the gears change simultaneously as a function of the electrical command and if incorrect, the hydraulic distributor is faulty.

CHECKING-ADJUSTING THE LOAD POTENTIOMETER

Check that the accelerator cable and kickdown are correctly adjusted beforehand.

Vehicle stationary.

Ignition off.

Disconnect the three track connector (10) of the wiring connecting the automatic transmission computer to the carburettor.

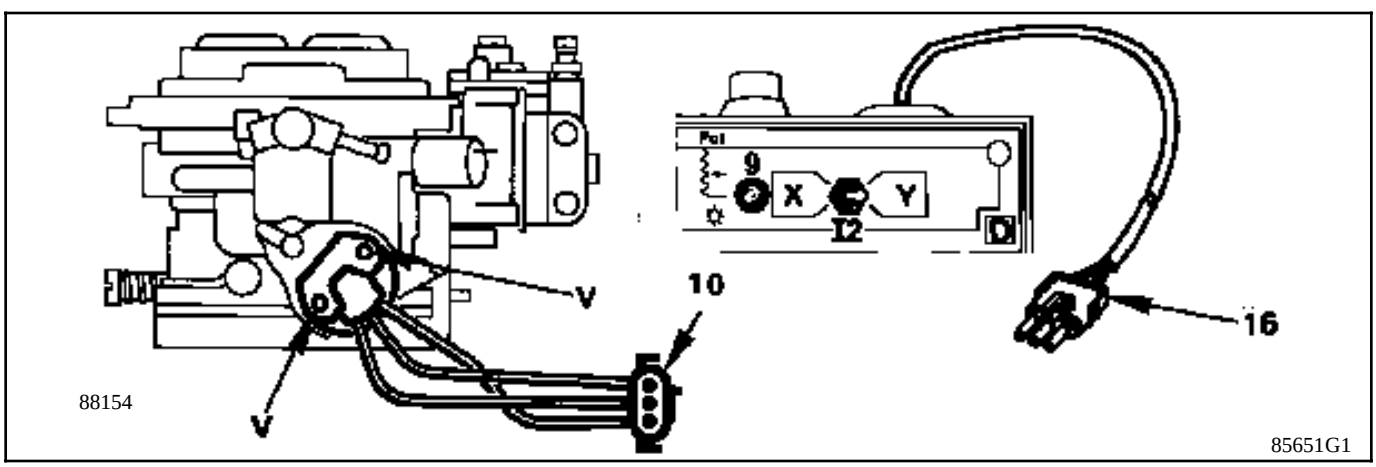
Connect the three track connector (1) of the potentiometer to that of the **B. Vi. 958** (16).

Connect the plugs (14) to the battery.

Dial I2 on Y.

1 - CHECKING THE ADJUSTMENT OF THE LOAD POTENTIOMETER, I2 on Y

Press accelerator down fully	LIGHT 9
CORRECT	(*)
INCORRECT or not adjusted	( )



2 - ADJUSTING THE POTENTIOMETER

Slacken the two potentiometer mounting bolts (V) slightly (on the carburettor).

Keep the carburettor throttle valve fully open using the accelerator pedal and turn the potentiometer slightly to illuminate the light (9). Then retighten the bolts (V) in the position where (9) remains illuminated (throttle valve still fully open).

If the warning light (9) does not illuminate, check its wiring and the potentiometer.

Replace it if faulty.

Adjust the potentiometer after replacing or removing it.

IMPORTANT : When washing a carburettor, remove the load potentiometer.

CHECKING - ADJUSTING THE LOAD POTENTIOMETER (cont)

3 - SPECIFIC CASE

- **1344 1354**

Same connection.

Adjust the angular position of the quadrant **using the sleeve stops (1) on the potentiometer and injection pump side** so that the **light (9) illuminates in the full load position.**

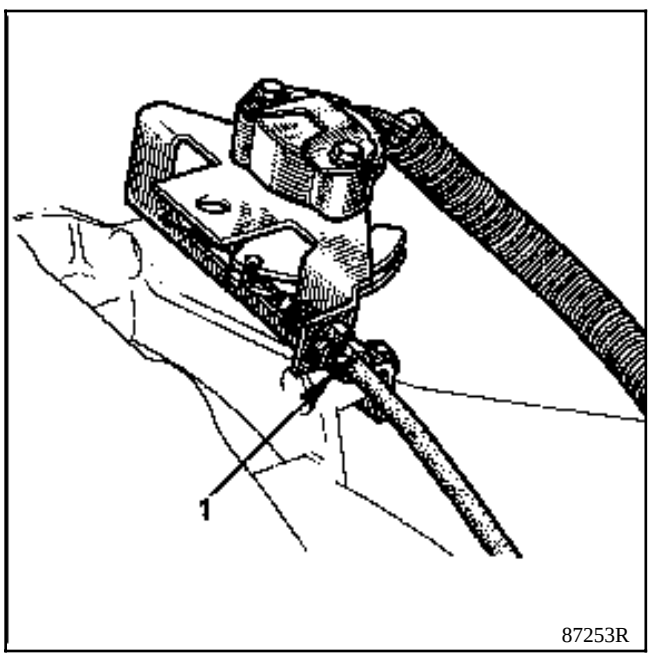
Perform the test again in the full load position and readjust if necessary.

If light (9) does not illuminate during this adjustment, check its wiring and the potentiometer and replace if faulty.

A fault on the potentiometer leads to fixed gear changing thresholds.

1 ‰ 2 Ê 1		2 ‰ 3 Ê 2	
60	**45**	**105**	**90**

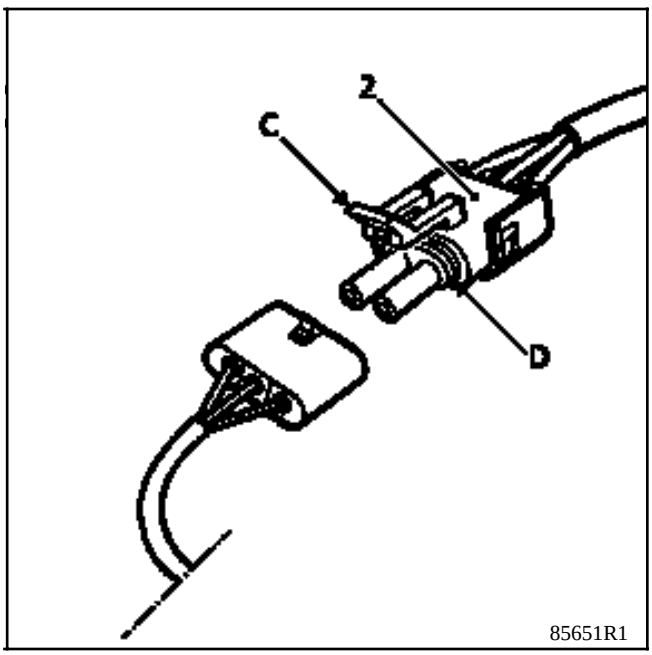
Regardless of the position of the accelerator pedal.



- **Trafic (ML 1)**

Same connection.

Dial I2 on X.



CHECK

Press accelerator fully down	LIGHT 9
CORRECT	(*)
INCORRECT or poorly adjusted	◯

ADJUSTING

Slacken the two potentiometer mounting bolts (V) slightly.

Keep the carburettor throttle valve fully open using the accelerator pedal and turn the potentiometer slightly to illuminate the light (9). Then retighten the two bolts (V) .

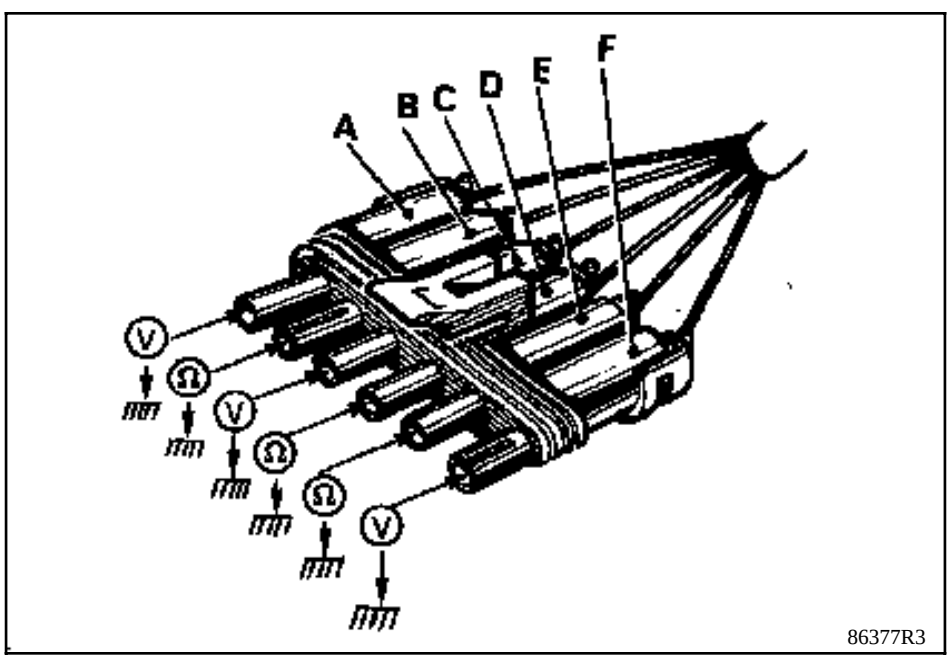
If the warning light (9) does not illuminate, check its wiring and the potentiometer. Replace it if faulty.

Adjust the potentiometer after replacing or removing it.

SIX TRACK CONNECTOR

CHECK USING AN OHMMETER - VOLTMETER

Measuring conditions	Component checked	Measuring point and values	Operations to be performed if values are incorrect
Ignition on	Computer feed	F and earth: 12 ± 2 V	Check feed (fuse, wiring).
	Reversing lights feed	A and earth: 12 ± 2 V	Check the fuse and the wiring.
Starter motor operating	Starter motor authorisation feed	C and earth: 12 ± 2 V	Check the relay and the starter motor wiring.
Ignition off	Computer earth*	E and earth: 0 to 0.5 Ω	Check the wiring and the earthing on the vehicle.
	To reversing light bulbs	B and earth: 4 ± 3 Ω	Check the reversing lights (bulbs, wiring).
Press the accelerator pedal fully down	Kickdown**	D and earth: 0 to 0,5 Ω	Check the kickdown. Check the adjustment and the operation of the accelerator cable. Check the wiring.
Foot removed from accelerator pedal		D and earth: infinity ∞	



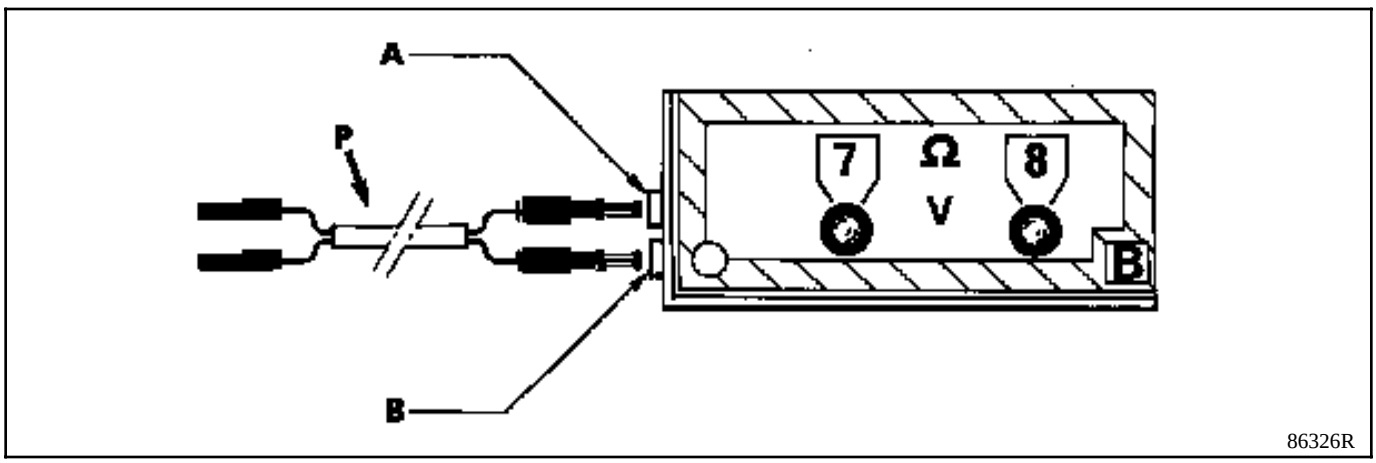
* If there is no wire at (E), the earth of the computer is in the multifunction switch (see page **23-157**).
** If there is no wire at (D), the kickdown is incorporated into the load potentiometer.

SIX TRACK CONNECTOR (cont)

CHECK WITH THE B. Vi. 958

Connect the **B. Vi. 958** to the battery.

Connect the wiring **P** following the colours.



A =Red
B =Blue

TEST using a single wire on the tested component

Voltmeter function

Measuring points using the blue wire only	**Action on the vehicle**	**Results***
		B. Vi. 958
C	Operate the starter motor	◯ 7 (*) 8
A	Ignition on	◯ 7 (*) 8
F	Ignition on	◯ 7 (*) 8

* If not correct, measuring point using red wire.

Result	**7**	**8**	**Check**
Presence of voltage less than 10V	(*)	◯	- Battery voltage. - Fuse. - Condition of terminals (oxidation).
No voltage present	◯	◯	- Fuse. - Wiring connection. - Continuity of wires.

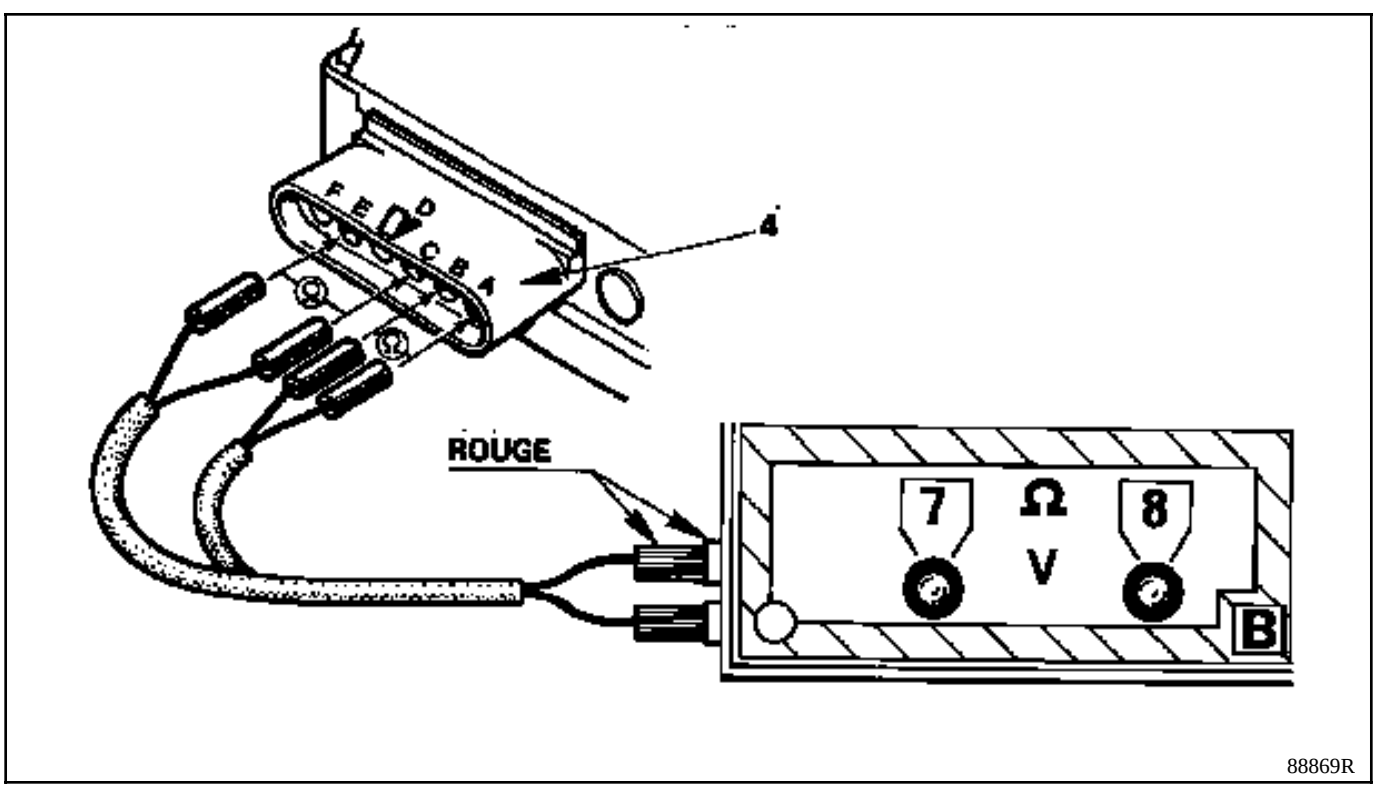
Multifunction switch

Disconnect the 6 track connector and check on the computer side with an ohmmeter or the **B. Vi. 958** zone B, having disconnected the battery beforehand.

During the test, check that the ignition is off and that the computer is isolated from the vehicle earth (do not touch the bodywork of the vehicle).

Measuring points	Selector lever position	Correct value	Light on B. Vi. 958		If value not correct:
			7	8	
A → B	R	0 to 0.5 Ω	○	(*)	Replace the multifunction switch
	P / N / D / 2 / 1	∞ (infinity)	○	○	
A → B	P / N	0 to 3000 Ω	○	(*)	
	R / D / 2 / 1	∞ (infinity)*	○*	○*	

* Value not equal to ∞ or (*) (*) for vehicles with kickdown incorporated into the load computer.



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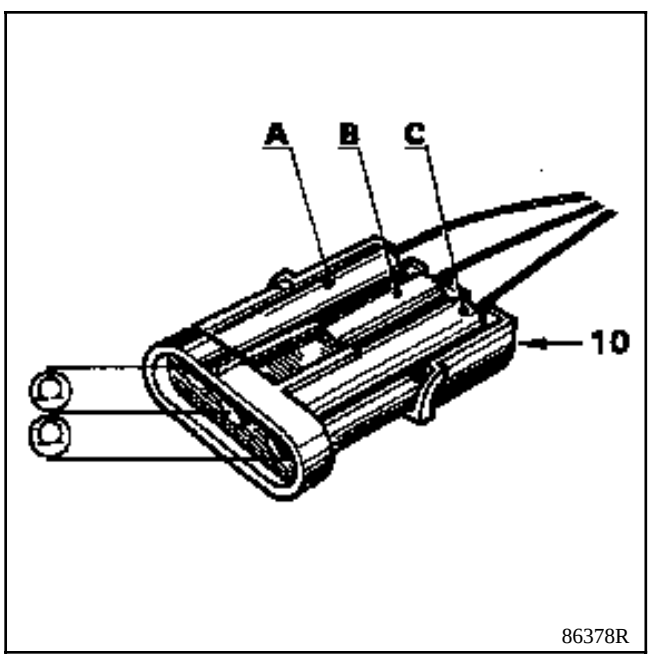
CHECKING THE LOAD POTENTIOMETER (with an **ohmmeter)**

Disconnect connector (10) from (11) and using an ohmmeter, check:

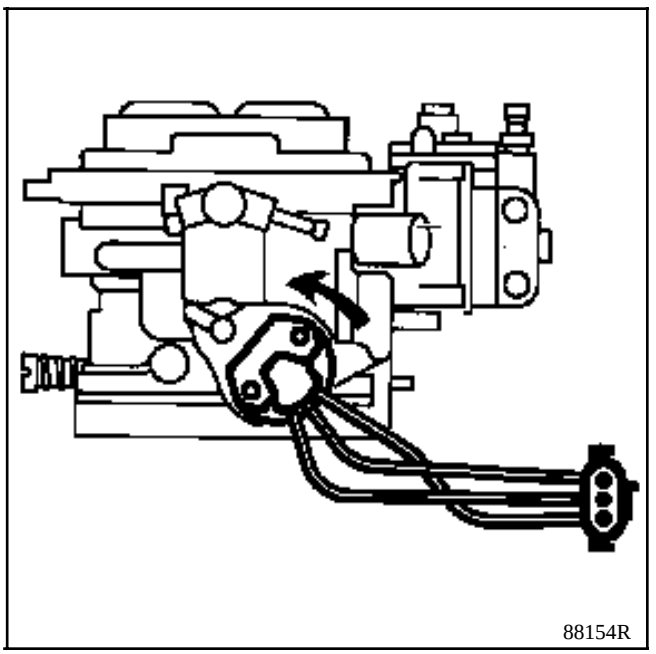
Measuring points	Correct value	Fault finding
C - B	4 k Ω ± 1	If the measurements are different, the potentiometer is faulty or poorly adjusted (see **B. Vi. 958**).
A - B	2.5 k Ω ± 1	
A - B	Open the carburettor throttle slightly, the ohmmeter should never indicate an infinite resistance.	



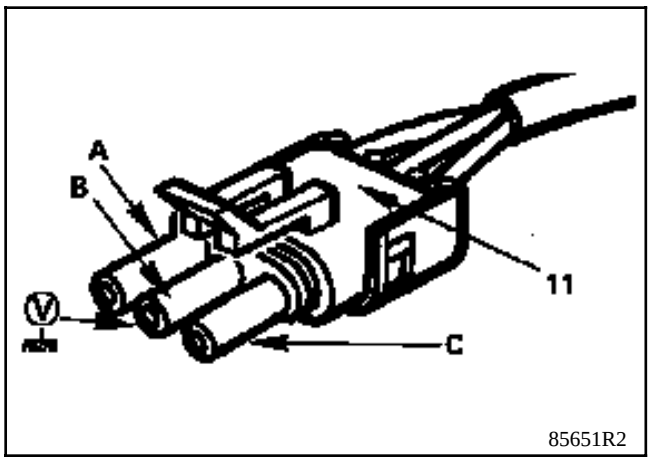
CHECKING THE THREE TRACK CONNECTOR (11) FEEDING THE POTENTIOMETER (with a voltmeter)

INSTRUCTION: Look at the carburettor on the potentiometer mounting side.

1st case: Throttle opens **in an anti-clockwise direction (except Trafic)**.

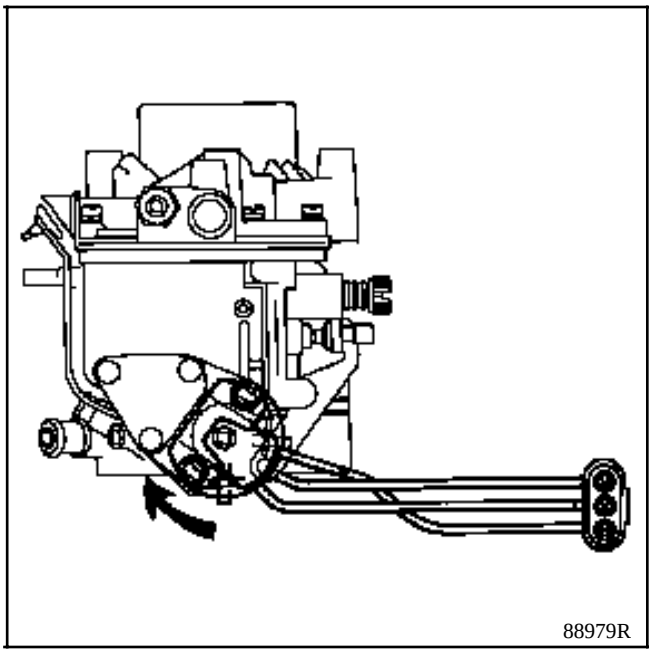


Action on the vehicle	Measuring points	Correct value	Fault finding
Ignition on	B → earth	4.3 V ± 0.5	If incorrect, check the 6 track connector (see page **23-167**).

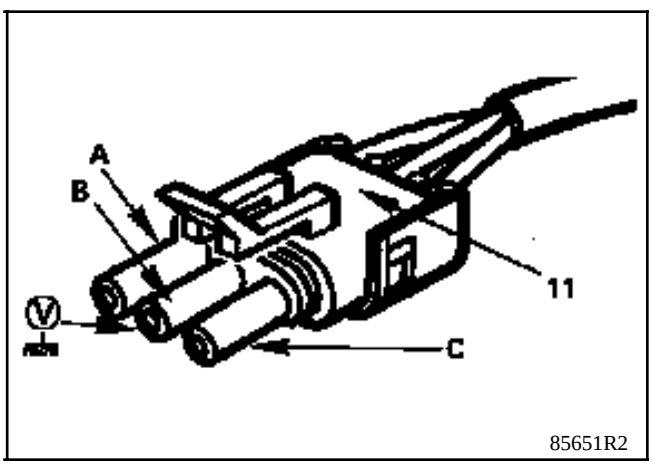


A Potentiometer information
B Potentiometer feed
C Earth

2nd case: Throttle opens **in a clockwise direction (Trafic)**

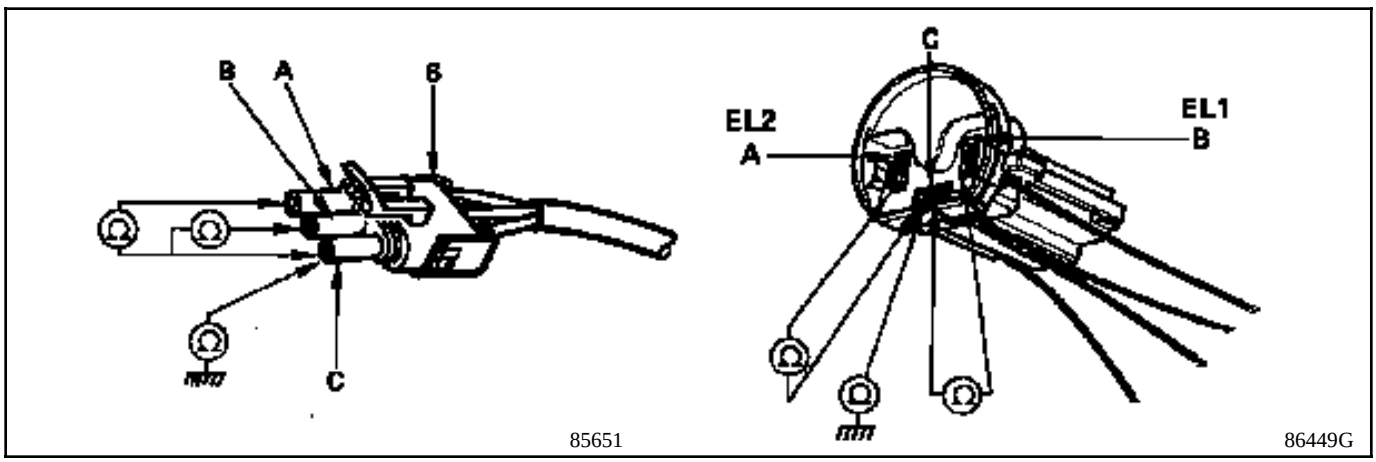


Action on the vehicle	Measuring points	Correct value	Fault finding
Ignition on	C → earth	4.3 V ± 0.5	If incorrect, check the 6 track connector (see page **23-167**).



A Potentiometer information
B Earth
C Potentiometer feed

CHECKING THE SEALED CONNECTOR FITTED WITH SOLENOID VALVES AND SOLENOID VALVES ON THEIR OWN (for the position of the solenoid pilot valves, see page 23-37)



With the **B. Vi. 958** connected to the battery.

Red wire of the **B. Vi. 958** on C.

Blue wire of the B. Vi. 958	Result		Fault finding
	7	8	
B	(*)	(*)	CORRECT (C)
A			
B	○	(*)	Short circuit (C)
A			
B	○	○	Break or earthed (C)
A			
B	(*)	○	Earthed (C)
A			

Or with a multimeter (ohmmeter function)

Measuring point	Result	Fault finding
Between B and C	30 Ω ± 10 Ω	If 0 Ω : replace the wiring or the solenoid valves 60 Ω ± 2 Ω : wrong connection ∞ : replace the wiring or the solenoid valves
Between A and C	30 Ω ± 10 Ω	
Between C and earth	∞	If different to: ∞ - short circuit between earth and the solenoid valve coil: replace the wiring or the solenoid valves.

THIS PART RELATES TO VEHICLES FITTED WITH THE NEW COMPUTER IN AFTER-SALES

PRESENTATION AND IDENTIFICATION

- Of the new computer.
- Of the adaptor lead.

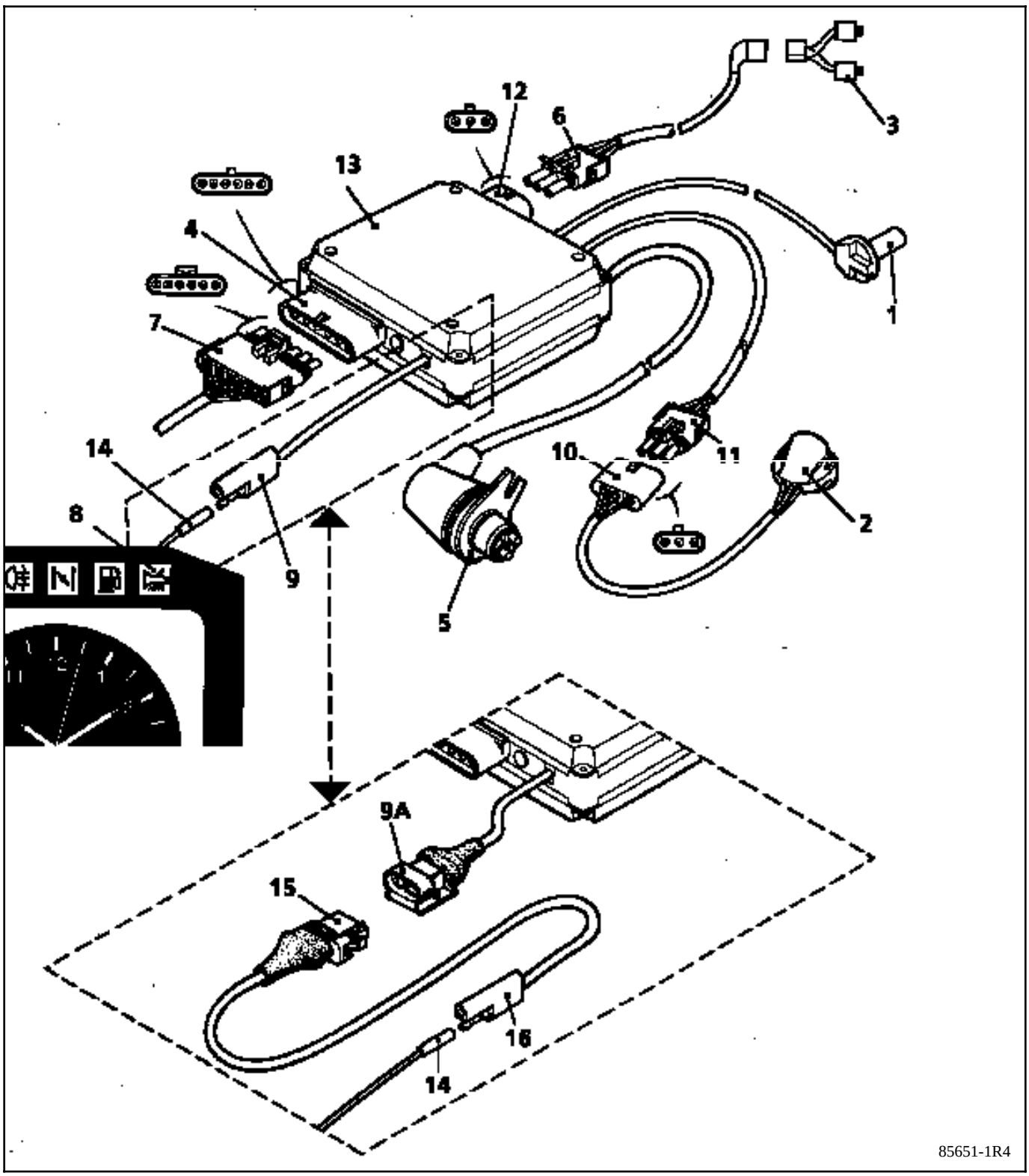
The "new generation" computer comes in the same format as the "old generation" computer.

It has:
- a vehicle speed sensor (1),
- a multifunction switch (5) and an earth wire
- a load potentiometer connector (11),
- a solenoid valve connector (12),
- a six track connector (4).

THE MAJOR DIFFERENCE visible from the outside allowing a "new generation" computer (M 4/3) to be distinguished from an "old generation" computer (M 4/2) is that the two track connector (9) has been replaced by a three track connector (9A).

This new connector means that communications can be set up between the computer and the XR25.

To carry this out on the vehicle, an **adaptor lead** part number 77 01 367 618 is required. At its ends this lead has:
- a three track connector (15),
- a two track connector (16).



1 Vehicle speed sensor
2 Load potentiometer
3 Solenoid pilot valves
4 and **7** Six track connector
5 Multifunction switch
6 and **12** Solenoid valve connector
8 Fault warning light
9 and **14** Fault warning light connector
9A Fault warning light, connector and XR25 connection
10 and **11** Load potentiometer connector
13 Computer
15 and **16** Adaptor lead connector

DEFECT MODES IN THE EVENT OF PROBLEMS

If one of the peripheral transmission components or the feed (+12V) develops a fault, the computer causes the warning light to illuminate and implements defect modes for the transmission, which can vary depending on the faulty components.

Fault	Warning light illuminated	Memorised	Forward gears	Other gears possible	Comments
+12V feed	yes	no	3rd	N.R.P.	Change to 3rd when fault appears
Earth feed	no	no	3rd	N.R.P.	Change to 3rd when fault appears
Solenoid valves 1 and 2	yes	yes	3rd	N.R.P.	Change to 3rd when fault appears
Computer	yes	yes	3rd	N.R.P.	Change to 3rd when fault appears
Vehicle speed	yes	yes	3rd	N.R.P.	Change to 3rd when fault appears
Multifunction switch	yes	yes	DRIVE	N.R.P.	No longer recognises imposed gears
Potentiometer All types except: (B297, B29E, X40 Switzerland) and (X537, X53B, X573 before 04/91)	yes	yes	ALL	N.R.P.	The load is set to 50 %

SETTING UP THE CONNECTION BETWEEN THE COMPUTER AND THE XR25

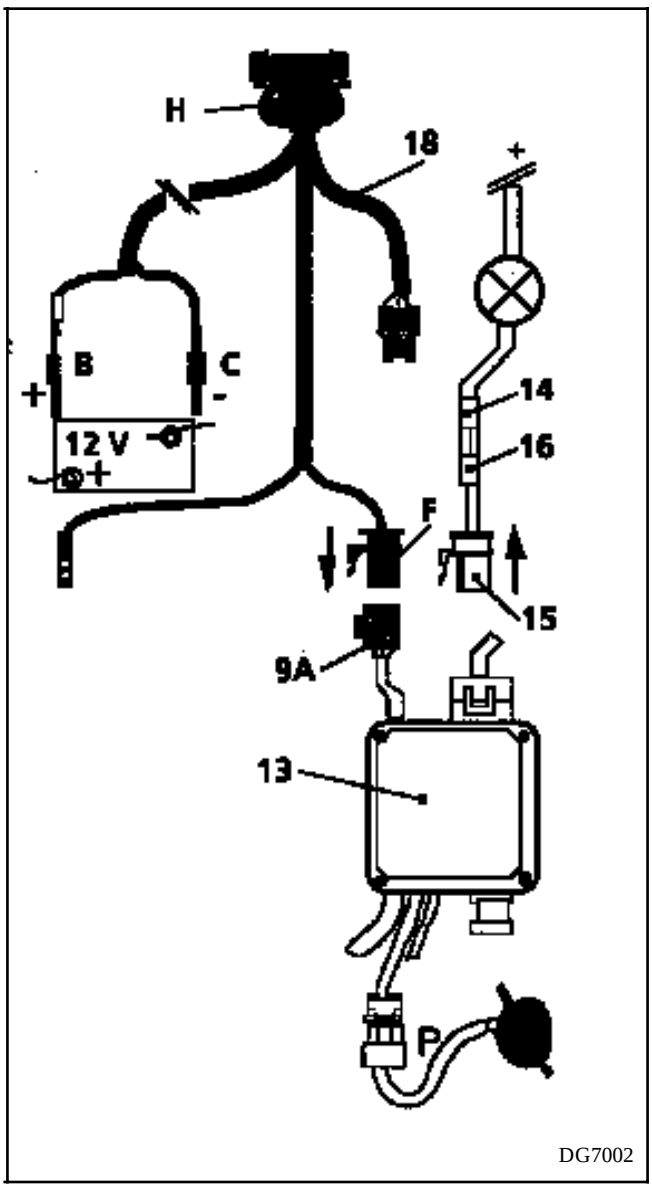
To be able to make the connection between the computer and the XR25, you must have an adaptor lead (18) supplied with cassette N° 12.

Connect the connector (F) to the computer connector (9A).

Connect connectors (B) and (C) to the positive and negative terminals of the battery to feed the XR25.

Connect the connector (H) to the XR25.

Carry out a fault finding procedure. To do this, refer to the "using the XR25" section.



USING THE XR25 ("new generation" computer fitted to a vehicle in after sales)

The XR25 is essential for all faults on the automatic transmission, regardless of the origin of the faults.

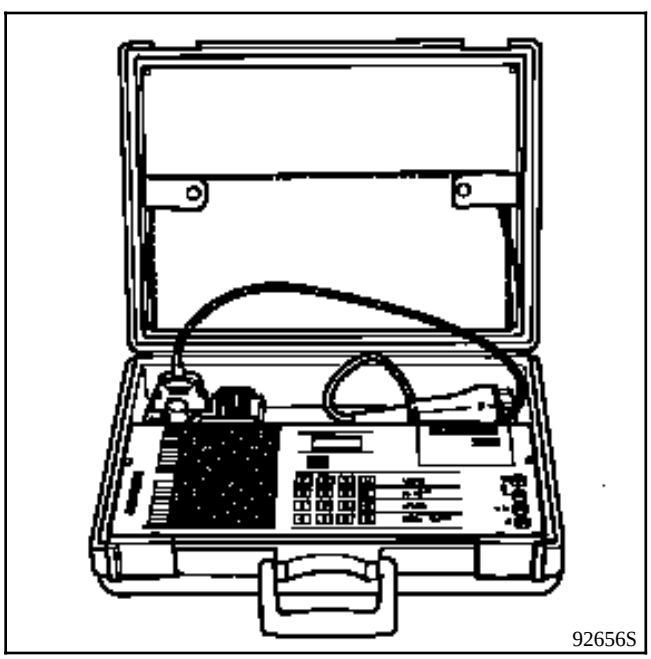
It has a microprocessor which:

- provides access to all the information supplied by the various sensors,
- Fault finding messages to be read supplied by the computer,
- the non read only memory of the computer to be erased.

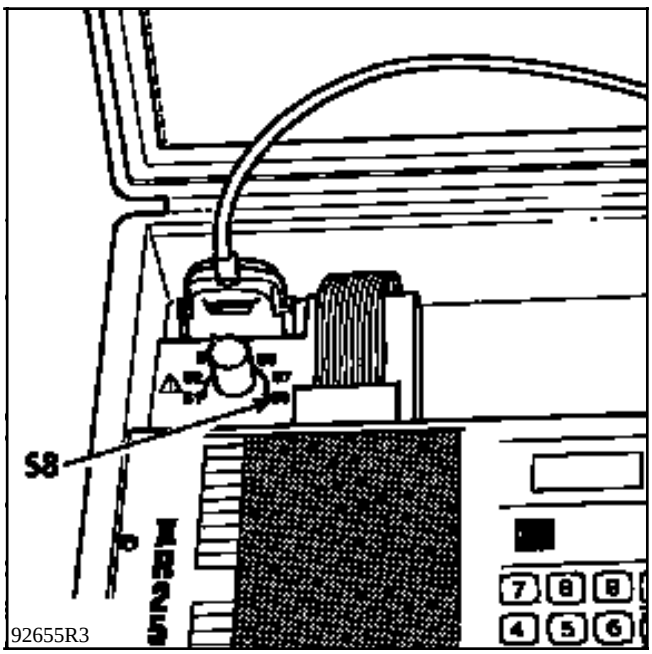
Use fault finding fiche N° 24.

If you are in doubt, the fault finding fiche to be used can be ascertained using the XR25.

Connect the XR25:



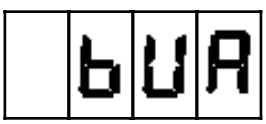
- Turn on the ignition but do not start the engine.
- Turn the selector to S8.



- Enter the code of the automatic transmission on the keypad

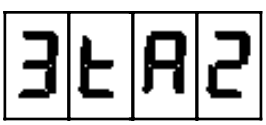
D | 1 | 4

The following appears on the display:



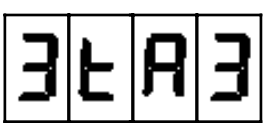
then

either :



You should use fault finding fiche N° 24.

or:

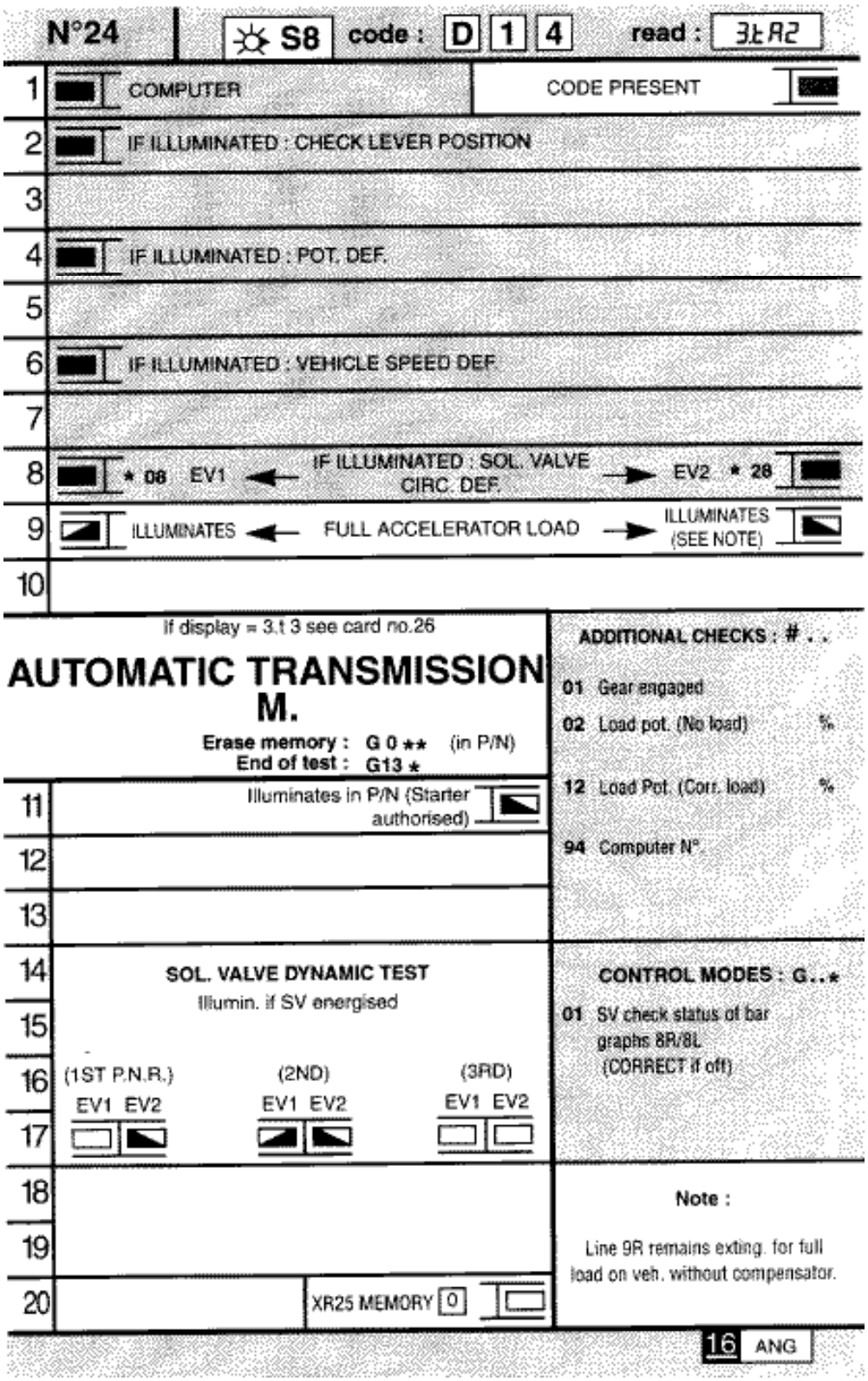


You should use fault finding fiche N° 26.

MEMORY FUNCTION USING THE XR25

The memory function using the XR25 is used to store the values of the various parameters in the memory in order to read them one after the other and to check the coherence of them all.

Once XR25 --> computer communications have been established, to obtain this function, enter,
☐ at the moment chosen by the user.**0**

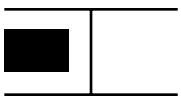
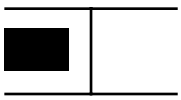
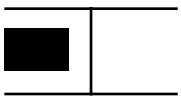
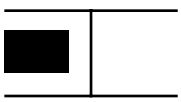


FI21624

- Bargraphs on a red background represent a fault.
- Bargraphs on a white background represent a status.

DISPLAY AND MEANING OF THE BARGRAPHS.

IMPORTANT : The information given below is only valid for computers given in the "Vehicles concerned" section.

 1	Illuminated when the computer no longer performs its function
 1	Illuminates when the ignition is turned on, when the communication between the automatic transmission computer and the XR25 is established.
 2	Illuminated when the computer cannot identify the position of the gear lever.
 4	Illuminated when the load information received by the automatic transmission computer is incoherent. IMPORTANT : Vehicles: B297, B29E, X40 Switzerland and X537, X53B and X573 before 04/91have no fault finding signal relating to the load potentiometer. The bargraph will never illuminate for these vehicles. - If the potentiometer circuit is broken, the vehicle will remain in 1st gear, - If the potentiometer circuit is short circuited, gear changes will be delayed.
 6	Illuminated when the vehicle speed information supplied to the automatic transmission computer is wrong or absent.

8

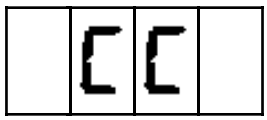
Illuminated when the circuit of solenoid valve No 1is faulty.

- On the keypad enter:

  * 0 8

- The following will appear on the display:

either:

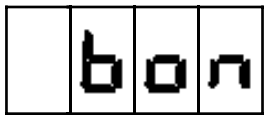


The circuit of solenoid valve N° 1 is short circuited.

or:

The circuit of solenoid valve N° 1 is broken.

or:



The circuit of solenoid valve N° 1 is operating correctly (the bargraph should not be illuminated).

8

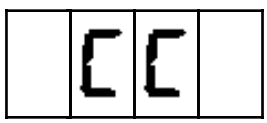
Illuminated when the circuit of solenoid valve N° 2 is faulty.

- On the keypad enter:

  * 2 8

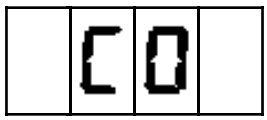
- The following will appear on the display:

either:



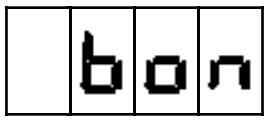
The circuit of solenoid valve N° 2 is short circuited.

or:



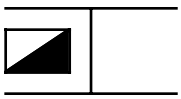
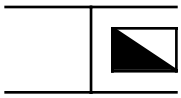
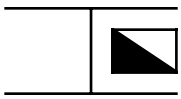
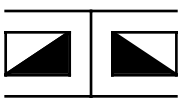
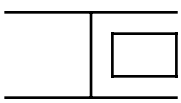
The circuit of solenoid valve N° 2 is broken.

or:



The circuit of solenoid valve N° 2 is operating correctly (the bargraph should not be illuminated).

AUTOMATIC TRANSMISSION
Meaning of the bargraphs

 9	Illuminated when the full load (PF) position is recognised by the automatic transmission computer.
 9	Illuminated when the kickdown compensator supplies its information to the automatic transmission computer IMPORTANT : This bargraph is always extinguished for automatic transmissions which do not have a kickdown compensator.
 11	Illuminated when the gear selector lever is in the P or N position. Starting is authorised.
 17	- The LH bargraph represents the electrical feed of solenoid valve N°1. - The RH bargraph represents the electrical feed of solenoid valve N°2. When the vehicle is stationary and regardless of the position of the gear lever, only the RH bargraph should be illuminated. When in 1st or reverse gear, only the RH bargraph should be illuminated. When in 2nd gear, the RH and LH bargraphs should be illuminated. When in 3rd gear, no bargraphs should be illuminated.
 20	Illuminated when using the memory of the XR25.

NOTE : To determine faults, refer to the "Fault finding charts to be used from the bargraphs" section.

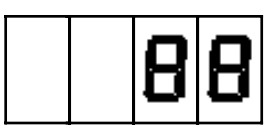
READING THE VARIOUS [#]

- Connect the XR25 to the diagnostic socket.
- Put the selector on S8.
- Switch on the ignition
- Enter the specific automatic transmission code [D] [1] [4]
- Then enter [#] followed by 2 figures in order to gain access to the various items of information supplied by the computer
- [#] [0] [1] **Gear engaged:** The following can be read when the transmission is operating normally:

Lever position	Ignition on, engine off	Vehicle moving
P	O . P	
R	I . r d	I . r d
N	O . P	O . P * *
D	I . r d	I . r d
		2 . r d
		3 . r d
2	I . 2	I . 2
		2 . 2
1	I . I	I . I

** Manoeuvre to be performed with care only when fault finding on the automatic transmission

[#] [0] [2] **Load potentiometer.** Value expressed in % of accelerator control at rest.



Value of 89 ± 1, no load on accelerator pedal (PL) and in test conditions

- # 1 2 **Load potentiometer** (transformed load).
  Value expressed in %, accelerator control in full load position (PF).

For vehicles not fitted with kickdown compensators:

- Value less than 6.25 % full load on accelerator pedal (for kickdown function)

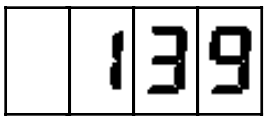
For vehicles fitted with kickdown compensator:

- Value less than 12.5 % full load on accelerator pedal (for kickdown function).

- # 9 4 **Computer identification**

The identification number of the computer appears on the central display.

Example :



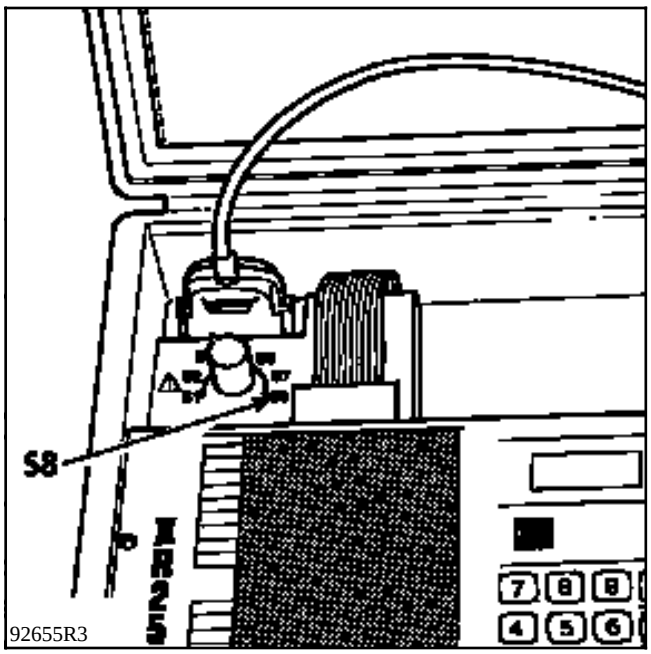
The identification number of an "old generation" computer is the same as the identification number of the corresponding "new generation" computer.

NOTE: All information displayed, other than that described here, cannot be used for fault finding the "M" automatic transmission.

ADJUSTING THE LOAD POTENTIOMETER (at No load)

Connect the XR25.

Turn the selector to S8.

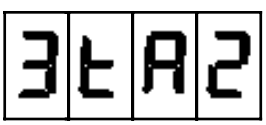


Switch on the ignition.

On the keypad enter the code of the automatic transmission

D	1	4

The following will appear on the display:

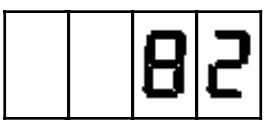


On the keypad enter:

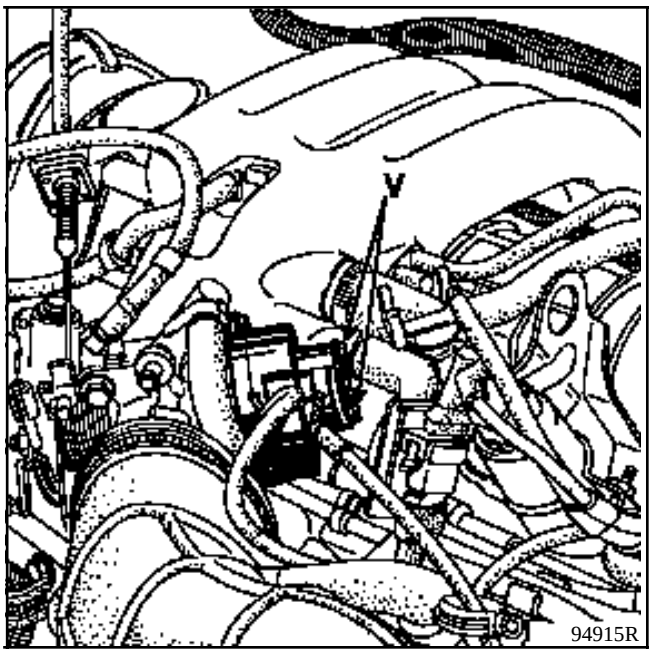
#	0	2

On the display will appear the value in % of the potentiometer setting.

Example :



Slacken the mounting bolts (V) of the potentiometer.



Accelerator control at rest, rotate the body of the potentiometer until a value of 89 ± 1 is obtained on the display.

Retighten the mounting bolts (V).

If it is not possible to adjust the potentiometer, check its drive.

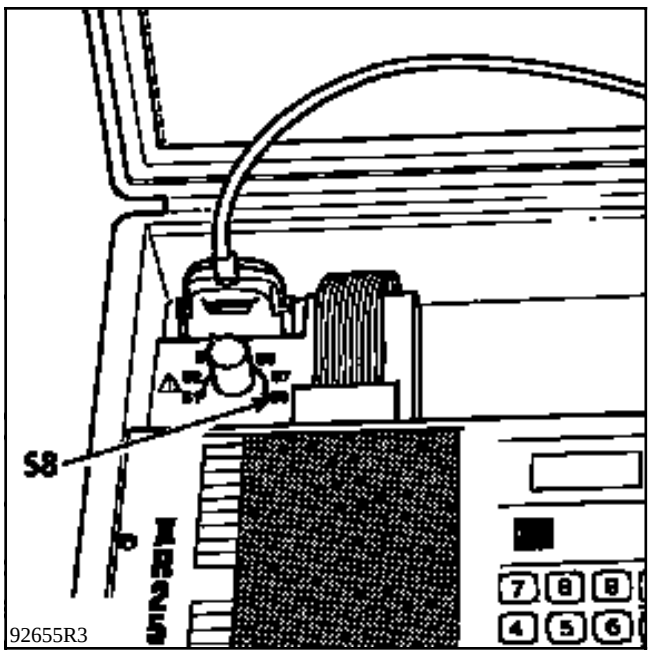
Check that the transformed load is correct at full load on # 12 (see "reading the various #" section).

COMMAND MODE

Command mode is used to test the operation of the solenoid valve statically.

Connect the XR25.

Turn the selector to S8.

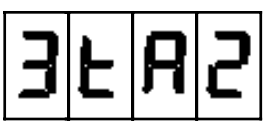


Turn on the ignition.

Engine not running, vehicle stationary, on the keypad enter the code of the automatic transmission.

D 1 4

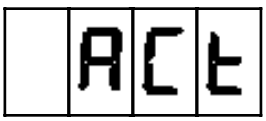
The following will appear on the display:



On the keypad enter:

G 0 1 *

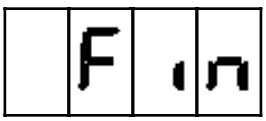
The following will appear on the display:



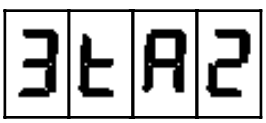
Bargraphs 17RH and 17LH will illuminate when the components are tested (Bargraph 13RH also illuminates - ignore).

At the end of the test, the XR25 makes a noise.

The following will appear on the display:



then:



If faults have been detected, bargraphs 8RH and / or 8LH will illuminate.

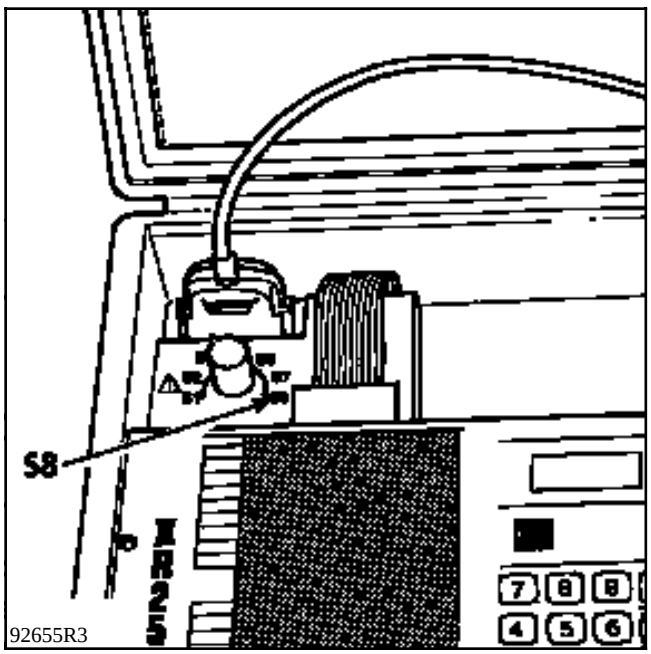
Locate the fault using the fault finding charts.

ERASING THE MEMORY

Operation to be performed at the end of each fault finding procedure.

Connect the XR25.

Turn the selector to S8.



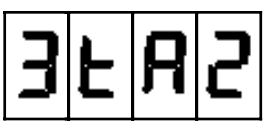
Turn on the ignition.

Put the gear selector in position N or P.

Vehicle stationary, enter the code of the automatic transmission.

D 1 4

The following will appear on the display:



On the keypad enter:

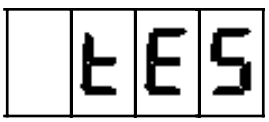
G 0 *

The following will appear on the display:

Validate the erasing request by pressing

*

The following will appear on the display:

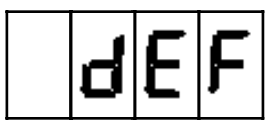


Two cases may arise from this point:

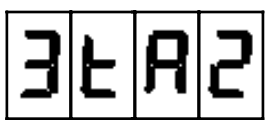
- **1st CASE:**

You have not fulfilled the conditions given previously

The following will appear on the display:



then:



Please follow the conditions given previously.

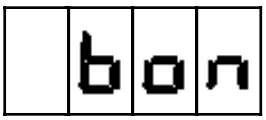
Repeat the whole erasing procedure.

2nd CASE :

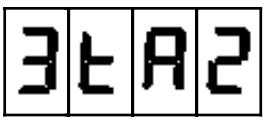
You have complied with the previously given conditions

The following will appear on the display:

then:



then:



The memory has been erased.

The only bargraphs illuminated should be 1RH - 11RH - 17RH.

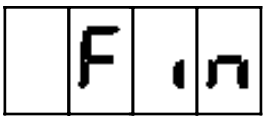
You may continue your fault finding procedure.

END OF TEST

On the keypad enter:

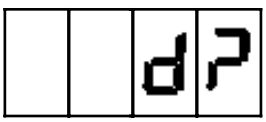
G	1	3	*

The following will appear on the display:



The XR25 makes a noise.

The following will appear on the display:



Turn off the ignition.

You may disconnect the XR25.

THIS PART RELATES TO VEHICLES FITTED AS STANDARD WITH A NEW COMPUTER

PRESENTATION

This "new generation" computer has:

- A vehicle speed sensor (1).

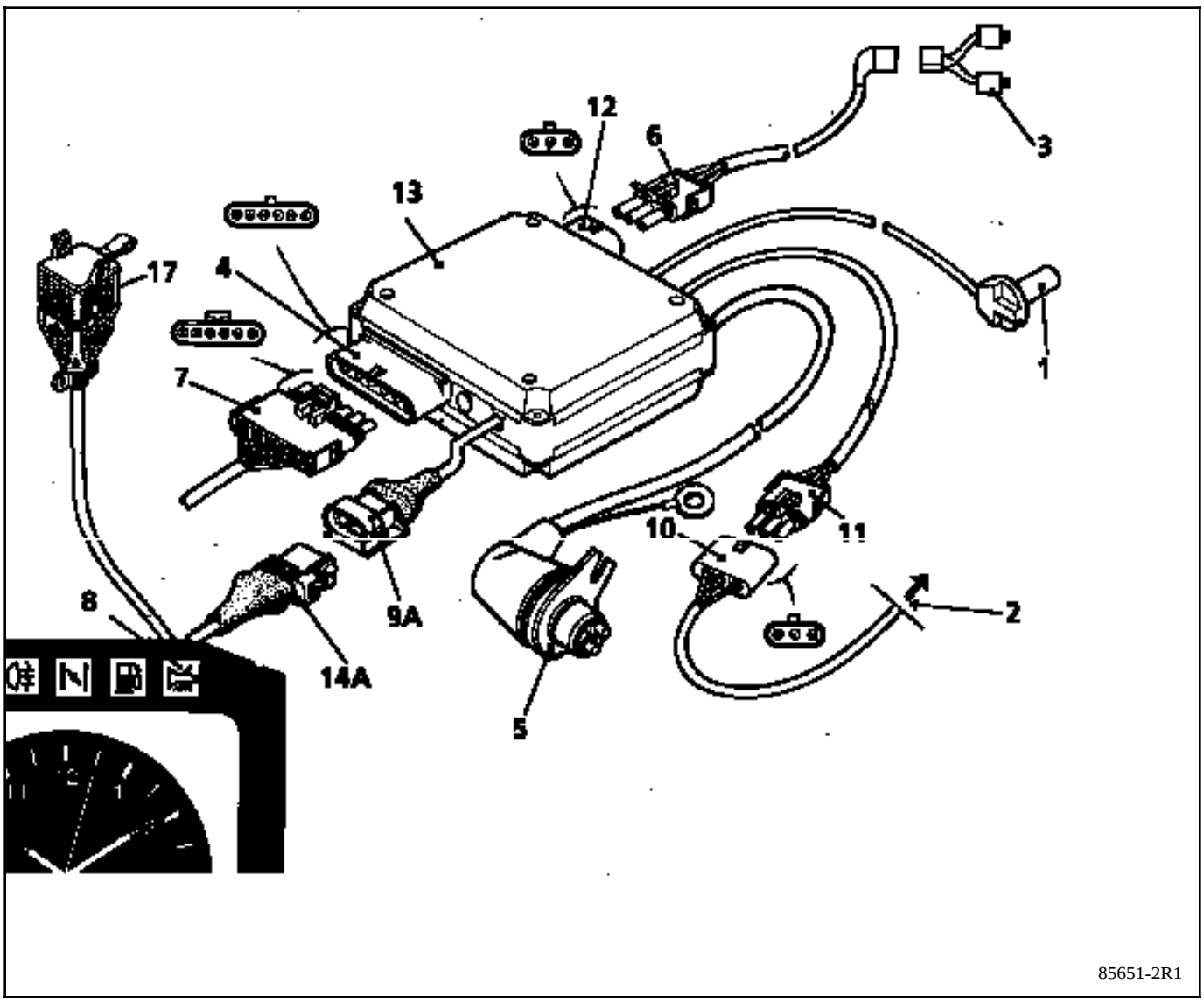
- A multifunction switch and an earth (5).

- A connector (11) making the connection between the injection and automatic transmission computers:
  . on track A, load information,
  . on track B, torque reduction in position N and P,
  . on track C, engine speed information.

- A solenoid pilot valve connector (12) :
  . on track A, solenoid valve 1,
  . on track B, solenoid valve 2,
  . on track C, solenoid valves positive feed.

- A six track connector (4) :
  . on track A, reversing lights feed,
  . on track B, reversing lights,
  . on track C, starting prohibition,
  . on track D, kickdown information,
  . on track E, air conditioning information,
  . on track F, positive after ignition.

- A three track connector (9A) :
  . on track A, instrument panel fault warning light,
  . on track B, diagnostic connection,
  . on track C, diagnostic connection



1 - Vehicle speed sensor
2 - Connection between injection and automatic transmission computer
3 - Solenoid valves
4 and **7** - Six track socket
5 - Multifunction switch and earth
6 and **12** - Solenoid valve connector
8 - Fault warning light
9A and **14A** - Warning light and diagnostic socket connector
10 and **11** - Intercomputer connector
13 - Computer
17 - Diagnostic socket

DEFECT MODES IN THE EVENT OF PROBLEMS

If one of the peripheral transmission components or the feed (+12V) develops a fault, the computer causes the warning light to illuminate and implements defect modes for the transmission, which can vary depending on the faulty components.

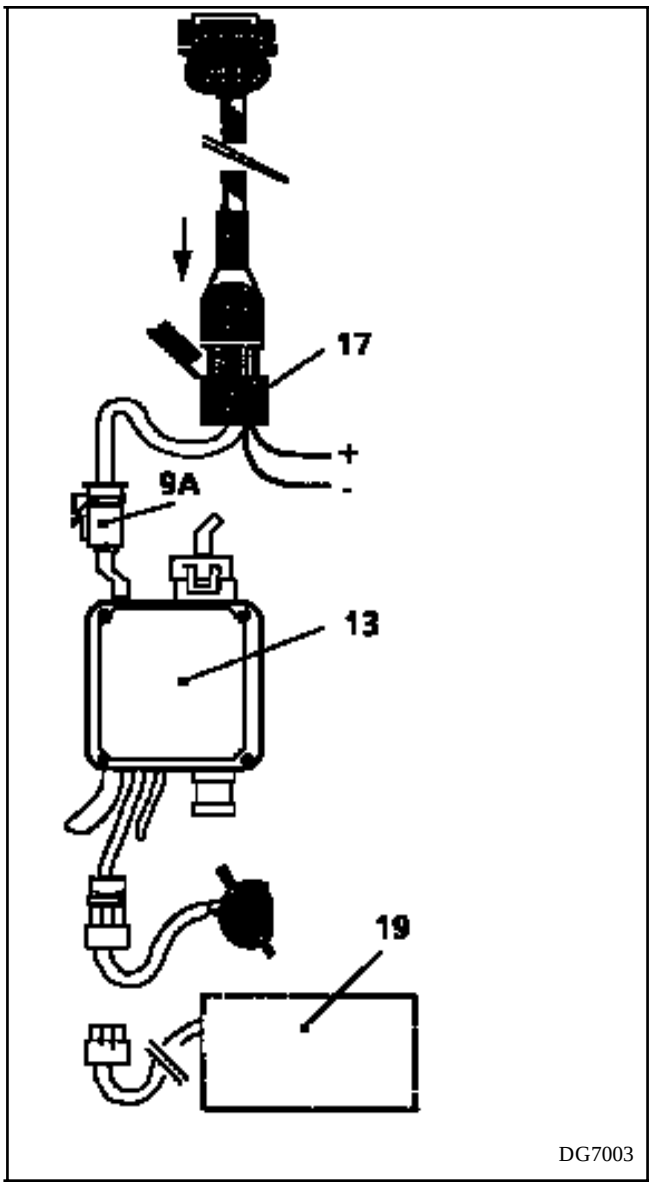
Fault	Warning light illuminated	Memorised	Forward gears	Other gears possible	Comments
+12V feed	yes	no	3rd	N.R.P.	Change to 3rd when fault appears
Earth feed	no	no	3rd	N.R.P.	Change to 3rd when fault appears
Solenoid valves 1 and 2	yes	yes	3rd	N.R.P.	Change to 3rd when fault appears
Computer	yes	yes	3rd	N.R.P.	Change to 3rd when fault appears
Vehicle speed	yes	yes	3rd	N.R.P.	Change to 3rd when fault appears
Multifunction switch	yes	yes	DRIVE	N.R.P.	No longer recognises imposed gears
Potentiometer	yes	yes	ALL	N.R.P.	The load is set to 50 %
Engine speed	yes	no	ALL	N.R.P.	

SETTING UP THE CONNECTION BETWEEN THE COMPUTER AND THE XR25

The computer is connected to the diagnostic socket (17) through the connector (9A).

To establish the connection, connect the XR25 to the diagnostic socket (17).

Carry out a fault finding procedure. To do this, refer to the "using the XR25" section.



19 - Injection computer

USING THE XR25 ("new generation" computer fitted to a vehicle in production)

The XR25 is essential for all faults on the automatic transmission, regardless of the origin of the faults.

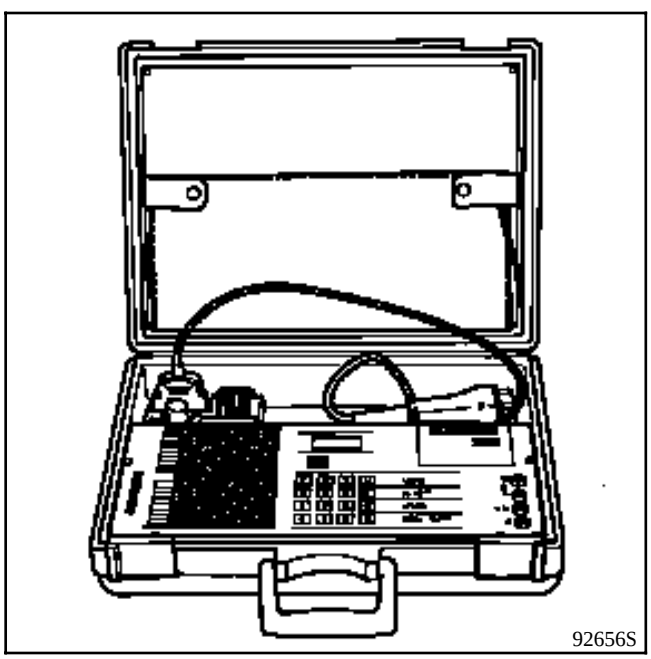
It has a microprocessor which:

- provides access to all the information supplied by the various sensors,
- Fault finding messages to be read supplied by the computer,
- the non read only memory of the computer to be erased.

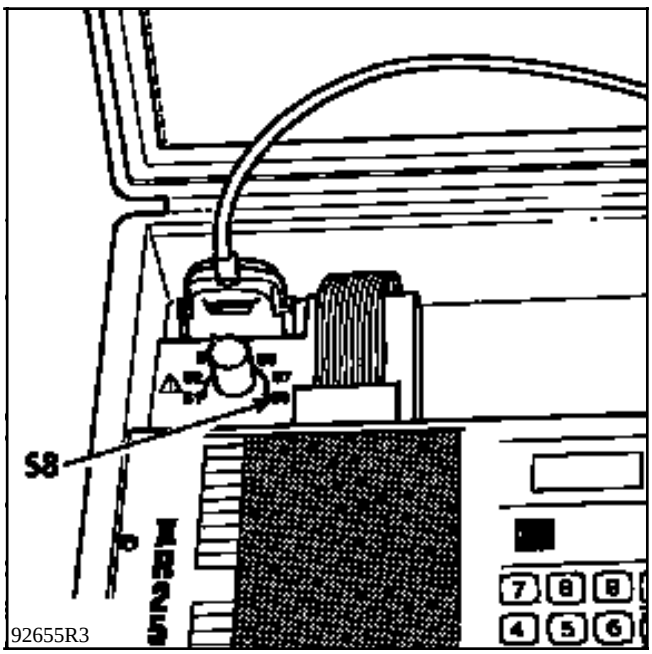
Use fault finding fiche N° 26.

If you are in doubt, the fault finding fiche to be used can be ascertained using the XR25.

Connect the XR25:



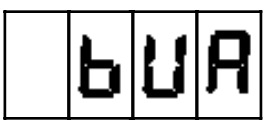
- Turn on the ignition but do not start the engine.
- Turn the selector to S8.



- Enter the code of the automatic transmission on the keypad

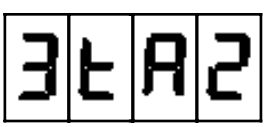
D 1 4

The following appears on the display:



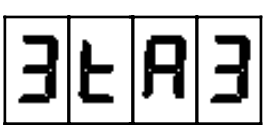
then

either:



You should use fault finding fiche N° 24.

or:

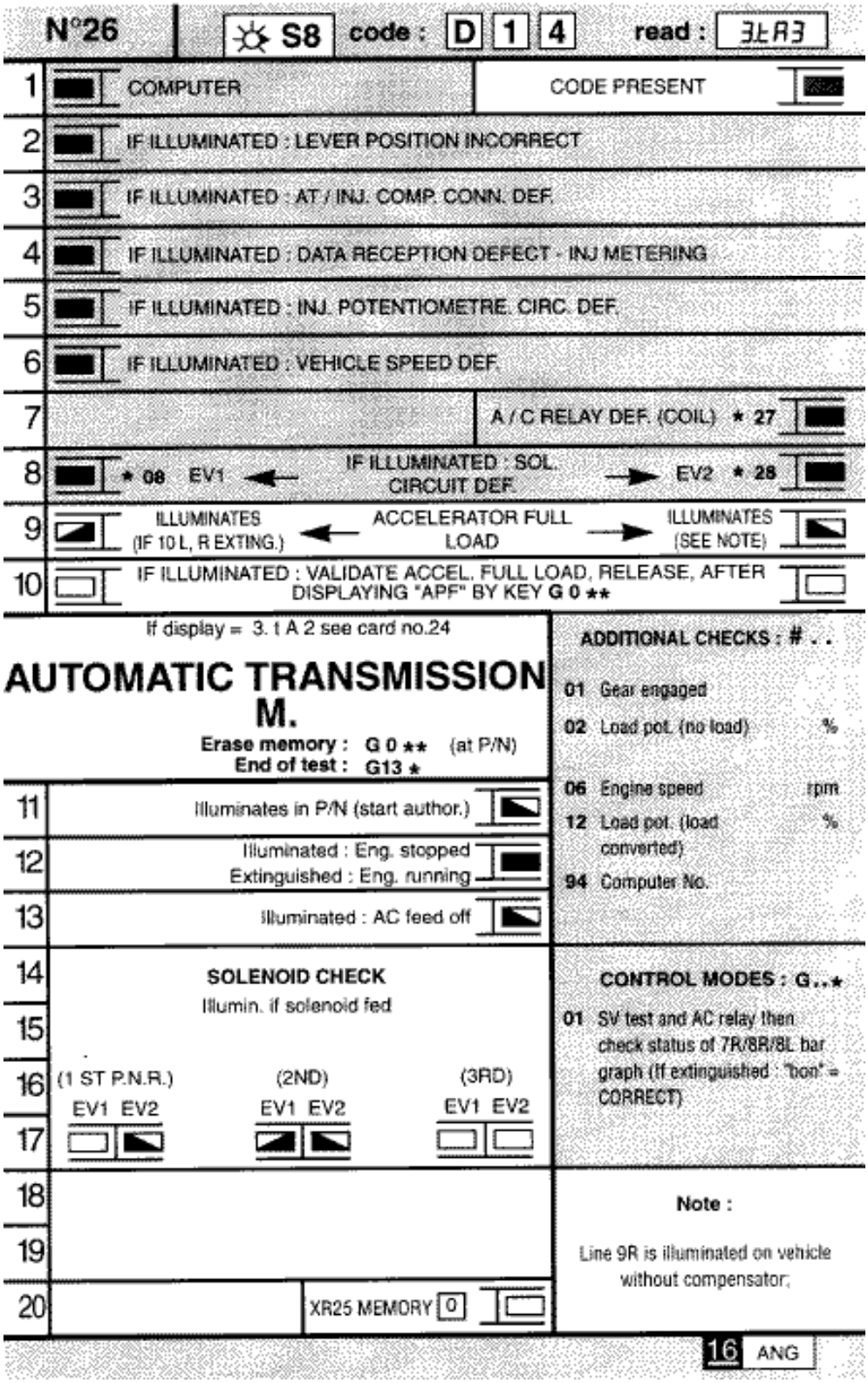


You should use fault finding fiche N° 26.

MEMORY FUNCTION USING THE XR25

The memory function using the XR25 is used to store the values of the various parameters in the memory in order to read them one after the other and to check the coherence of them all.

Once XR25 --> computer communications have been established, to obtain this function, enter **0** at the moment chosen by the user.



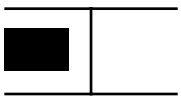
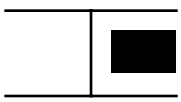
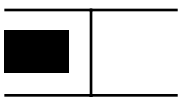
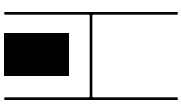
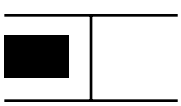
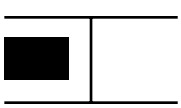
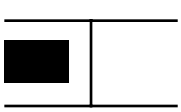
FI21626

- Bargraphs on a red background represent a fault.
- Bargraphs on a white background represent a status.

AUTOMATIC TRANSMISSION
Meaning of the bargraphs

DISPLAY AND MEANING OF THE BARGRAPHS.

IMPORTANT : The information given below is only valid for computers given in the "Vehicles concerned" section.

 1	Illuminated when the computer no longer performs its function
 1	Illuminates when the ignition is turned on, when the communication between the automatic transmission and the XR25 is established.
 2	Illuminated when the computer cannot identify the position of the gear lever.
 3	Illuminated when the connection transporting the load information from the injection computer to the automatic transmission computer is faulty.
 4	Illuminated when the load information received by the automatic transmission computer is incoherent.
 5	Illuminated when the load potentiometer belonging to the injection is faulty
 6	Illuminated when the vehicle speed information supplied to the automatic transmission computer is wrong or absent.

7

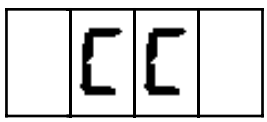
Illuminated when the control circuit of the air conditioning relay cut-off is faulty

- On the key pad enter:

  * 2 7

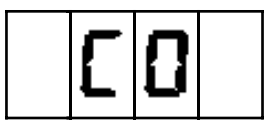
- The following will appear on the display:

either:



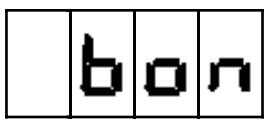
The control circuit is short circuited.

or:



The control circuit is broken.

or:



The control circuit is operating correctly (the bargraph should not be illuminated)

8

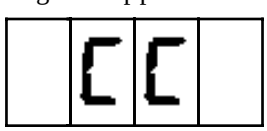
Illuminated when the circuit of solenoid valve No 1is faulty.

- On the keypad enter:

  * 0 8

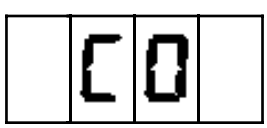
- The following will appear on the display:

either:



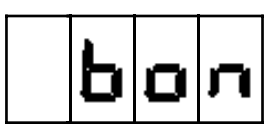
The circuit of solenoid valve N° 1 is short circuited.

or:



The circuit of solenoid valve N° 1 is broken.

or:



The circuit of solenoid valve N° 1 is operating correctly (the bargraph should not be illuminated).

8

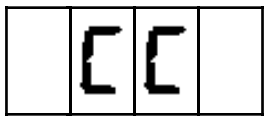
Illuminated when the circuit of solenoid valve N° 2 is faulty.

- On the keypad enter:

  * 2 8

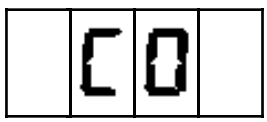
- The following will appear on the display:

either:



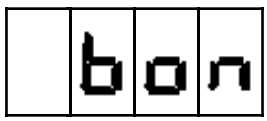
The circuit of solenoid valve N° 2 is short circuited.

or:



The circuit of solenoid valve N° 2 is broken.

or:



The circuit of solenoid valve N° 2 is operating correctly (the bargraph should not be illuminated).

9

Illuminated when the full load (PF) position is recognised by the automatic transmission computer.

9

Illuminated when the kickdown compensator supplies its information to the automatic transmission computer

IMPORTANT : This bargraph is always illuminated for automatic transmissions which do not have a kickdown compensator.

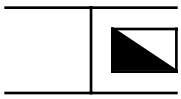
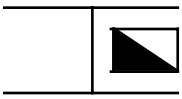
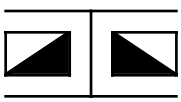
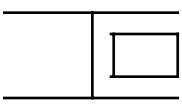
10

Illuminated when the no load position (PL) is not validated
(see "erasing the memory and programming the no load and full load positions" section).

10

Illuminated when the full load position (PF) is not validated
(see "erasing the memory and programming the no load and full load positions" section).

AUTOMATIC TRANSMISSION
Meaning of the bargraphs

 11	Illuminated when the gear selector lever is in the P or N position. Starting is authorised.
 12	Illuminated when the engine is stopped. If the bargraph is illuminated when the engine is running, this means that the engine speed information is faulty or absent.
 13	Illuminated when the air conditioning compressor clutch feed cut-off is active.
 17	- The LH bargraph represents the electrical feed of solenoid valve N°1. - The RH bargraph represents the electrical feed of solenoid valve N°2. When the vehicle is stationary and regardless of the position of the gear lever, only the RH bargraph should be illuminated. When in 1st or reverse gear, only the RH bargraph should be illuminated. When in 2nd gear, the RH and LH bargraphs should be illuminated. When in 3rd gear, no bargraphs should be illuminated.
 20	Illuminated when using the memory of the XR25.

NOTE : To determine faults, refer to the "Fault finding charts to be used from the bargraphs" section.

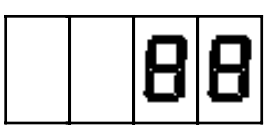
READING THE VARIOUS [#]

- Connect the XR25 to the diagnostic socket.
- Put the selector on S8.
- Turn on the ignition
- Enter the specific automatic transmission code [D] [1] [4]
- Then enter [#] followed by 2 figures in order to gain access to the various items of information supplied by the computer
- [#] [0] [1] **Gear engaged:** The following can be read when the transmission is operating normally:

Lever position	Ignition on, engine off	Vehicle moving
P	O . P	
R	I . r d	I . r d
N	O . P	O . P * *
D	I . r d	I . r d
		2 . r d
		3 . r d
2	I . 2	I . 2
		2 . 2
1	I . I	I . I

** Manoeuvre to be performed with care only when fault finding on the automatic transmission

[#] [0] [2] **Load potentiometer.** Value expressed in % of accelerator control at rest.



Value of 89 ± 1, no load on accelerator pedal (PL) and in test conditions

- # 0 6 **Engine speed.** Value expressed in rpm.

It varies from **0 to 6000** approximately (depending on version).

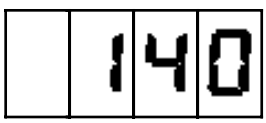
- # 1 2 **Load potentiometer** (transformed load).
Value expressed in %, accelerator control in full load position (PF).

Value less than 6.25 % full load on accelerator pedal (for kickdown function)

- # 9 4 **Computer identification**

The identification number of the computer appears on the central display.

Example:



NOTE: All information displayed, other than that described here, cannot be used for fault finding the "M" automatic transmission.

COMMAND MODE

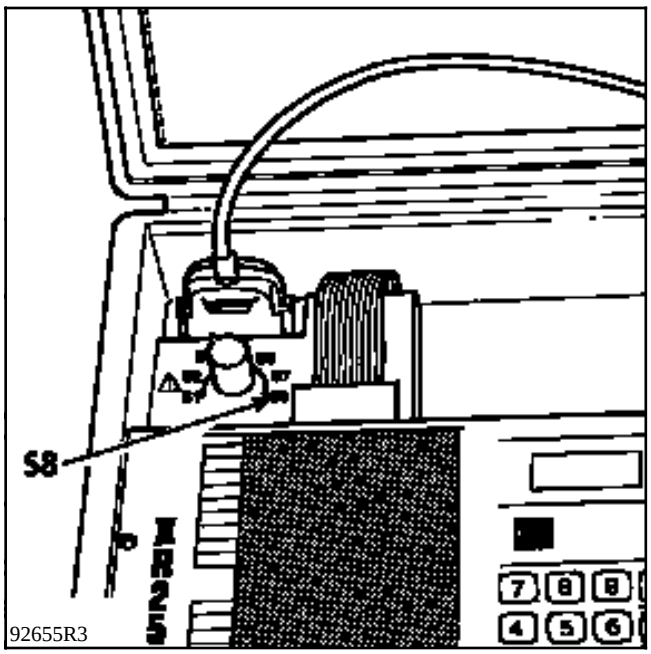
Command mode is used to statically test the operation of:

- the air conditioning compressor clutch cut-off relay
- the solenoid valves

.

Connect the XR25.

Turn the selector to S8.

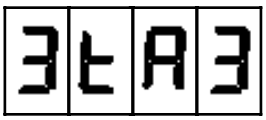


Turn on the ignition.

Engine not running, vehicle stationary, on the keypad enter the code of the automatic transmission.

D 1 4

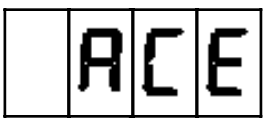
The following will appear on the display:



On the keypad enter:

G 0 1 *

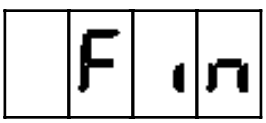
The following will appear on the display:



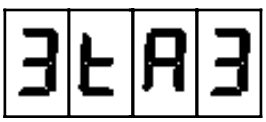
Bargraphs 13RH, 17RH and 17LH will illuminate when the components are tested.

At the end of the test, the XR25 makes a noise.

The following will appear on the display:



then:



If faults have been detected, bargraphs 7RH and / or 8RH and / or 8LH will illuminate.

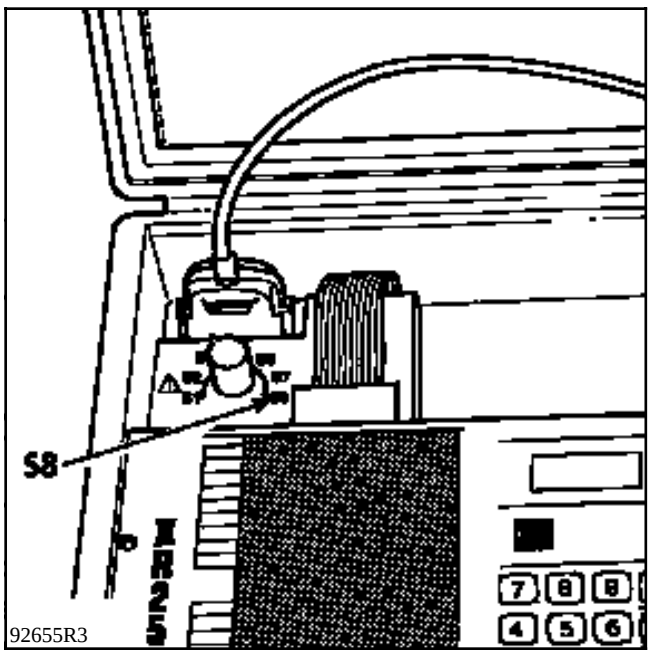
Locate the fault using the fault finding charts.

ERASING THE MEMORY AND PROGRAMMING THE NO LOAD - FULL LOAD POSITIONS

Operation to be performed at the end of each fault finding procedure.

Connect the XR25.

Turn the selector to S8.



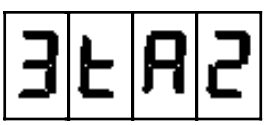
Turn on the ignition.

Put the gear selector in position N or P.

Vehicle stationary, enter the code of the automatic transmission.

D 1 4

The following will appear on the display:



On the keypad enter:

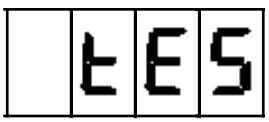
G 0 *

The following will appear on the display:

Validate the erasing request by pressing

*

The following will appear on the display:

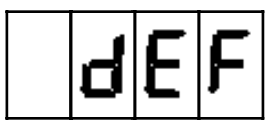


Two cases may arise from this point:

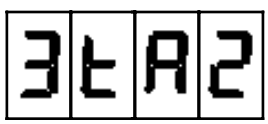
- **1st CASE:**

You have not fulfilled the conditions given previously

The following will appear on the display:



then:



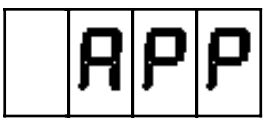
Please follow the conditions given previously.

Repeat the whole procedure for erasing and for programming the no load and full load positions.

2nd CASE :

You have complied with the previously given conditions

The following will appear on the display:



The memory has been erased.

The no load and full load positions must be validated.

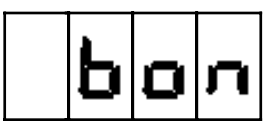
Validate the full load position by pressing the accelerator pedal fully down for five seconds.

Bargraph 10RH extinguishes.

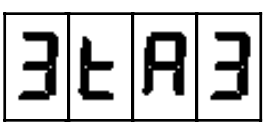
Validate the no load position by releasing the accelerator pedal.

Bargraph 10LH will extinguish:

The following will appear on the display:



then:



The only bargraphs illuminated should be 1RH, 12RH, 17RH (9RH for vehicles not fitted with a kickdown compensator).

IMPORTANT :

Turn off the ignition.

Turn the ignition on again.

Enter the automatic transmission code.

Check that the no load-full load positions have been validated. Bargraphs 10RH and 10LH should be extinguished. If this is not the case, repeat the operation for erasing and for programming the no load and full load positions. If the no load and full load positions cannot be validated, refer to the "Fault finding charts to be used from the bargraphs" section.

IMPORTANT :

An incorrectly validated full load position may cause:

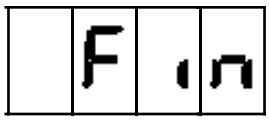
- the warning light to be permanently illuminated .
- Anomalies when changing gears.
- Incorrect gear changing thresholds..
- Kickdown problems.
- Uncomfortable driving.

END OF TEST

On the keypad enter:

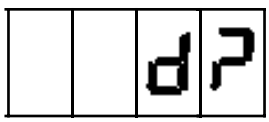
G	1	3	*

The following will appear on the display:



The XR25 makes a noise.

The following will appear on the display:



Turn off the ignition.

You may disconnect the XR25.

FAULT FINDING CHARTS TO BE USED FROM THE BARGRAPHS

(Fault finding fiches N° 24 and 26)

ONE OF THE BARGRAPHS INDICATES A FAULT

BARGRAPH 1 RH EXTINGUISHED OR NO COMMUNICATION WITH THE COMPUTER

Check that the battery voltage is > **10.5 V**.
Check that the fuse of the automatic transmission is not blown.
After these checks, does the fault persist?

no → Success

yes ↓

If the XR25 is connected directly to the diagnostic socket, check that the 3 track connector is correctly connected between the diagnostic socket and the computer
Check / ensure the continuity of the line between the 3 track connector and the diagnostic socket.
Check / ensure that track 2 of the diagnostic socket is earthed and the presence of battery + on track 6.
After this operation, does the fault persist?

no → Success

yes ↓

Check the computer feed is correct:
- Earth through wire on multifunction switch.
- + after ignition on track F of the 6 track connector on the wiring side.

After checking / repairing, does the fault persist?

no → Success

yes ↓

Replace the computer if the fault persists after checking the wiring on the 6 track connector. Erase the computer memory.
On E7J* version, erasing the memory requires the no load and full load values to be reprogrammed.

* And vehicles with load information supplied by the injection computer.
(Without load potentiometer specific to the automatic transmission).

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BARGRAPH 1 LH ILLUMINATED

Replace the automatic transmission computer.
Erase the computer memory.
Program the no load and full load values on version E7J*.

* And vehicles with load information supplied by the injection computer. (Without load potentiometer specific to the automatic transmission).

BARGRAPH 2 LH ILLUMINATED:
Electrical coherence fault on the lever position (illuminated = illuminated or flashing).

Ignition off, disconnect the 6 track connector from the computer.
Is track C on the wiring side isolated from earth?

yes

Check the multifunction switch on the 6 track connector, computer side using a multimeter.
Refer to MR T.A.M., checking the connectors section.
Are the checks correct?

no

Replace the multifunction switch.

yes

Replace the computer and erase its memory..
On E7J* version, erasing the memory requires the no load and full load values to be reprogrammed.

no

Ensure the isolation of the line between the starter motor relay and track C of the automatic transmission computer connector and that between track C and the injection computer (for injection versions).
Erase the memory of the automatic transmission computer.
On version E7J*, program the no load and full load positions.
Does the fault reappear?

no

Success

yes

Check the multifunction switch on the 6 track connector, computer side using a multimeter.
Refer to MR T.A.M., checking the connectors section.
Are the checks correct?

no

Replace the multifunction switch.

yes

Replace the computer and erase its memory..
On E7J* version, erasing the memory requires the no load and full load values to be reprogrammed.

* And vehicles with load information supplied by the injection computer.
(Without load potentiometer specific to the automatic transmission).

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BARGRAPH 3 LH ILLUMINATED: Connection fault between the automatic transmission computer and the injection computer (load information)

Check / ensure the continuity and the isolation of the connection between track A of the automatic transmission computer connector and the injection computer connector (track 22 for E7J engine, track 41 for the D7F engine). Does the fault persist after checking / repairing?

no → Success

yes ↓

Check the condition of the wiring on the injection computer side and the automatic transmission computer side.
IF the wiring is not faulty, replace the automatic transmission computer and erase the memory (M 4-3).
On E7J* version, erasing the memory requires the no load and full load values to be reprogrammed.

* And vehicles with load information supplied by the injection computer. (Without load potentiometer specific to the automatic transmission).

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BARGRAPH 4 LH ILLUMINATED: Reception fault of the load information provided by the injection computer or automatic transmission load potentiometer fault.

A) <u>Vehicle without automatic transmission potentiometer</u>

- Bargraph 4 illuminated.

Is bargraph 3 also illuminated?
- yes → Deal with bargraph 3 illuminated.
- no ↓

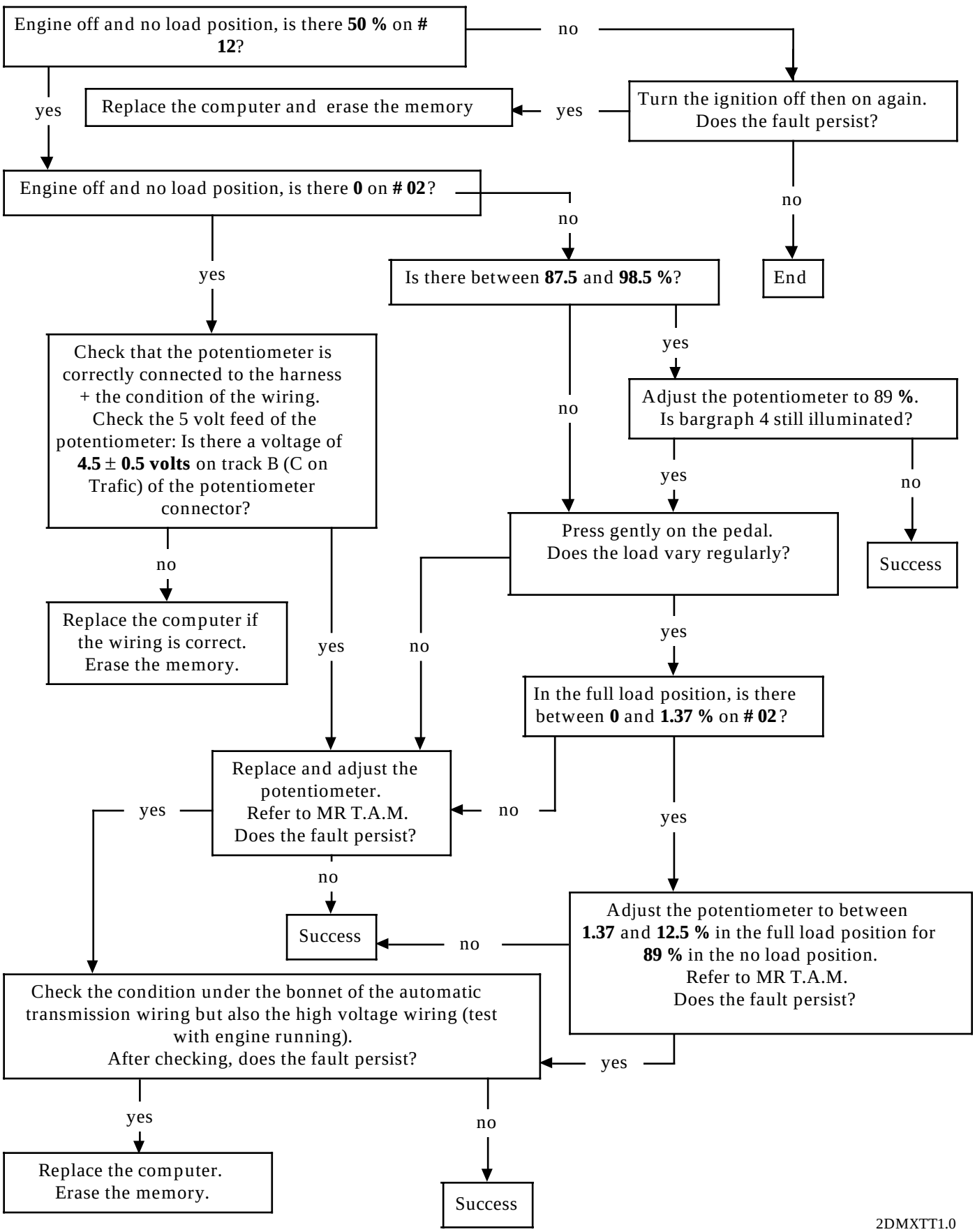
Turn the ignition off then on again. Is the fault confirmed?
- no → Success
- yes ↓

Check the injection potentiometer on the injection side. After repairing on the injection side, erase the memory of the automatic transmission computer and program the no load and full load values.

- Bargraph 4 flashing.

Erase the computer memory and program the no load and full load values.
Check the battery voltage (too low a voltage may memorise a fault in the starting phase).
Check the condition under the bonnet of the automatic transmission wiring and also the high voltage wiring (test with engine running).

B) Vehicle with automatic transmission potentiometer



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BARGRAPH 5 LH ILLUMINATED:

Injection potentiometer circuit fault

The injection potentiometer fault information is transmitted by the injection computer to the automatic transmission computer
→ the automatic transmission operates the with the emergency value.

Refer to the fault finding of the injection section then erase the memory of the automatic transmission computer and validate the no load and full load values.

BARGRAPH 6 LH ILLUMINATED:

Vehicle speed sensor fault.

Replace the vehicle speed sensor following the instructions given in MR T.A.M., speed sensor section
Does the fault persist?

no → Success

yes → Replace the computer and erase the memory.
Validate the no load and full load values for version E7J*.

* And vehicles with load information supplied by the injection computer.
(Without load potentiometer specific to the automatic transmission).

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BARGRAPH 7 RH ILLUMINATED: Air conditioning authorisation relay control circuit fault.

Enter ***27** on the XR25 keypad. What is displayed?

CO | BON | CC

BON → No fault

CO → Check the presence and the condition of the feed fuse of the air conditioning relay. After the operation, does the fault persist?

- no → Success
- yes → Measure the resistance of the coil of the relay (terminals 1 and 2) Is the coil broken? (R = ∞)
  - yes → Replace the relay
  - no → Check / ensure the following continuities:
    - Between track E of the computer 6 track connector and terminal 2 of the relay base.
    - Between the relay fuse and terminal 1 of the relay base.

    After the repair, does the fault persist?
    - no → Success
    - yes → Replace the relay and remove the computer 6 track connector. Connect terminal E to earth on the wiring side and turn on the ignition. Does the relay work?
      - no → Recheck your diagnosis
      - yes → Check the wiring on the computer 6 track connector and the wires. After the operation, does the fault persist?
        - no → Success
        - yes → Replace the automatic transmission computer and erase the memory. Validate the full load and no load positions on version E7J*.

CC → Measure the resistance of the coil of the AC relay (terminals 1 and 2) Is the coil short circuited? (R = **0** Ω)

- yes → Replace the relay
- no → Ensure the insulation of the line between terminal 2 of the relay base and track E of the automatic transmission computer 6 track connector. Does the fault persist?
  - no → Success
  - yes → Replace the computer and erase the memory. Validate the full load and no load positions on version E7J*.

* And vehicles with load information supplied by the injection computer. (Without load potentiometer specific to the automatic transmission).

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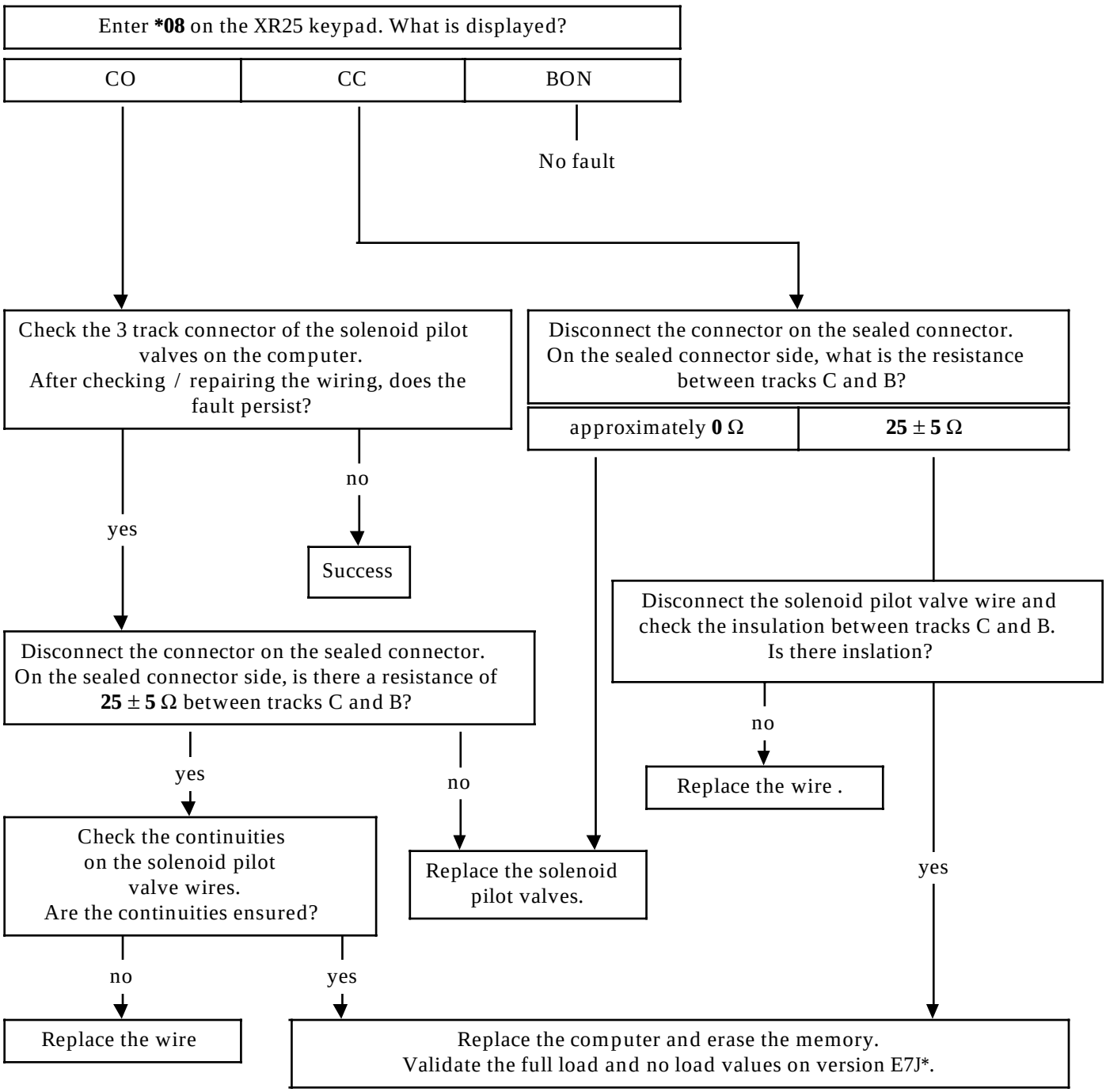
BARGRAPH 8 RH and / or LH ILLUMINATED:

Solenoid pilot valve fault.

Bargraph 8 LH: EL1:

Before starting to work on a vehicle with a load potentiometer specific to the automatic transmission, look for any short circuits between tracks B and C of the potentiometer. (This fault causes a drop in overall 5 volts feed voltage and a solenoid pilot valve fault to be memorised).



* And vehicles with load information supplied by the injection computer. (Without load potentiometer specific to the automatic transmission).

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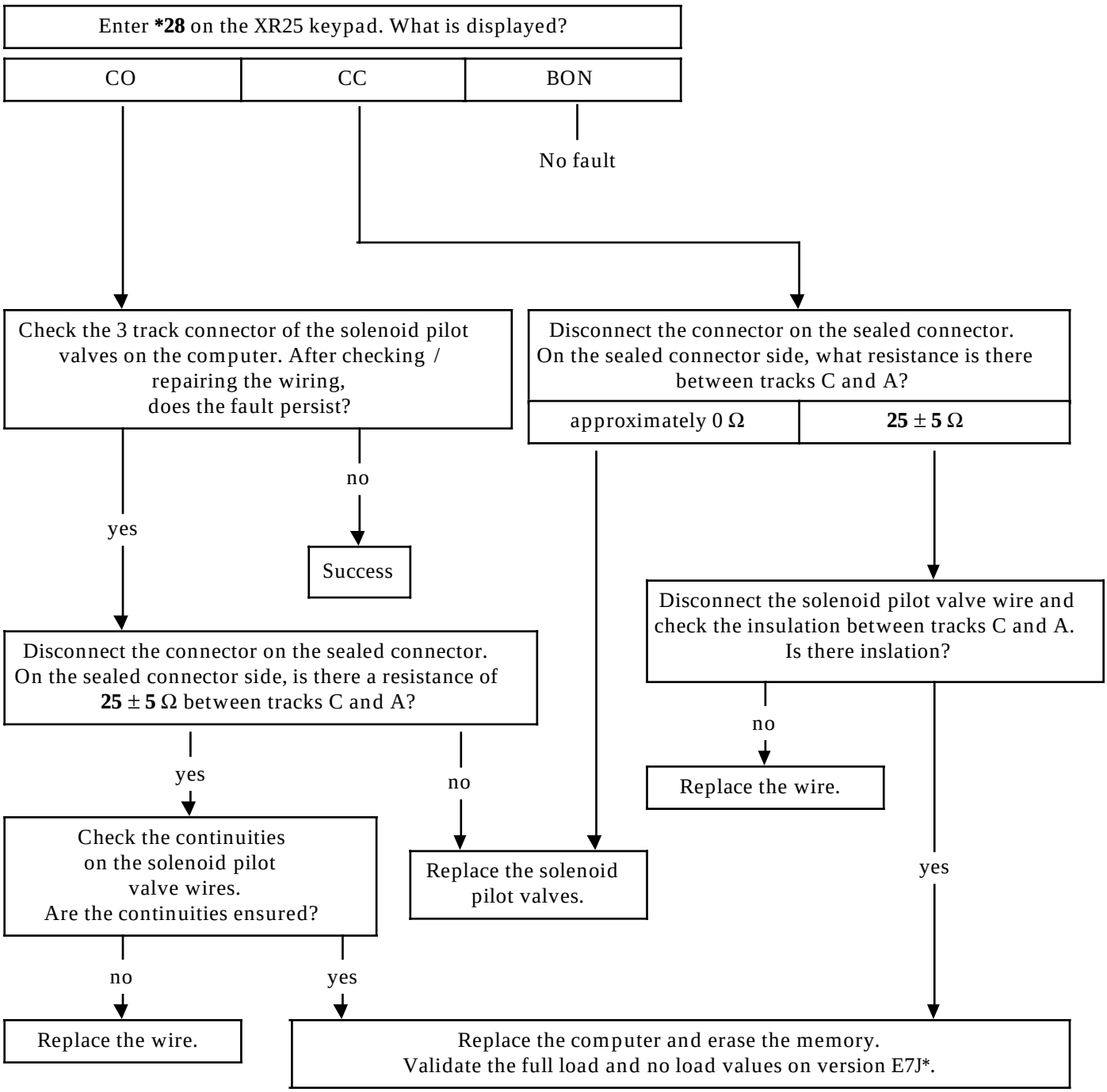
Bargraph 8RH: EL2:

Before starting to work on a vehicle with a load potentiometer specific to the automatic transmission, look for any short circuits between tracks B and C of the potentiometer. (This fault causes a drop in overall 5 volts feed voltage and a solenoid pilot valve fault to be memorised).



* And vehicles with load information supplied by the injection computer. (Without load potentiometer specific to the automatic transmission).

2DMXTT1.0

BARGRAPH 9 RH ILLUMINATED:

Checking the operation of the kickdown switch

1) Bargraph 9 RH illuminated in no load position:
Versions with E7J and D7F engines have no kickdown switch :
Bargraph 9 RH always illuminated.

Vehicles fitted with an open contact kickdown switch:
No earth on track D of the computer.

Check that the connector is correctly connected to the kickdown switch.
Is there continuity between the 2 tracks of the switch in the no load position?

no → Replace the kickdown switch.

yes ↓

Check / ensure the following continuities:
- Between the engine electrical earth and a track of the kickdown switch connector.
- Between the other track of the kickdown switch connector and track D of the computer.

Vehicles fitted with a closed contact kickdown switch:
Presence of earth on track D of the computer.

Is there continuity between the 2 tracks of the kickdown switch in the no load position?

yes → Replace the kickdown switch

no ↓

Check / ensure the insulation of the line between the track of the kickdown switch connector and track D of the computer

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2) Bargraph 9 RH extinguished in full load position:

Vehicles fitted with an open contact kickdown switch::
Earth maintained on track D of the computer.

Check the adjustment of the accelerator pedal.
Is there continuity between the 2 tracks of the kickdown switch in the full load position?

yes → Replace the kickdown switch.

no ↓

Check / ensure the insulation of the line between the kickdown switch connector and track D of the computer.

Vehicles fitted with a closed contact kickdown switch:
Track D of the computer not earthed.

Check the adjustment of the accelerator pedal.
Check that the connector on the kickdown switch is correctly connected.
Is there continuity between the 2 tracks of the kickdown switch in the full load position

no → Replace the kickdown switch.

yes ↓

Check / ensure the following continuities:
- Between a track of the kickdown switch connector and earth
- Between the other track of the kickdown switch connector and track D of the computer.

BARGRAPH 9 LH EXTINGUISHED IN THE FULL LOAD POSITION

If, in addition to this bargraph, bargraph 4 is also illuminated, deal with bargraph 4 first.

Vehicle with kickdown switch:

Does bargraph 9 RH illuminate in the full load position?

no → Deal with bargraph 9 extinguished in the full load position.

yes ↓

Check the accelerator cable control. Check the change in load on **# 12** and replace the automatic transmission potentiometer if necessary.

Kickdown function performed if RC = **1 + # 12 ≤ 12.5 %**.

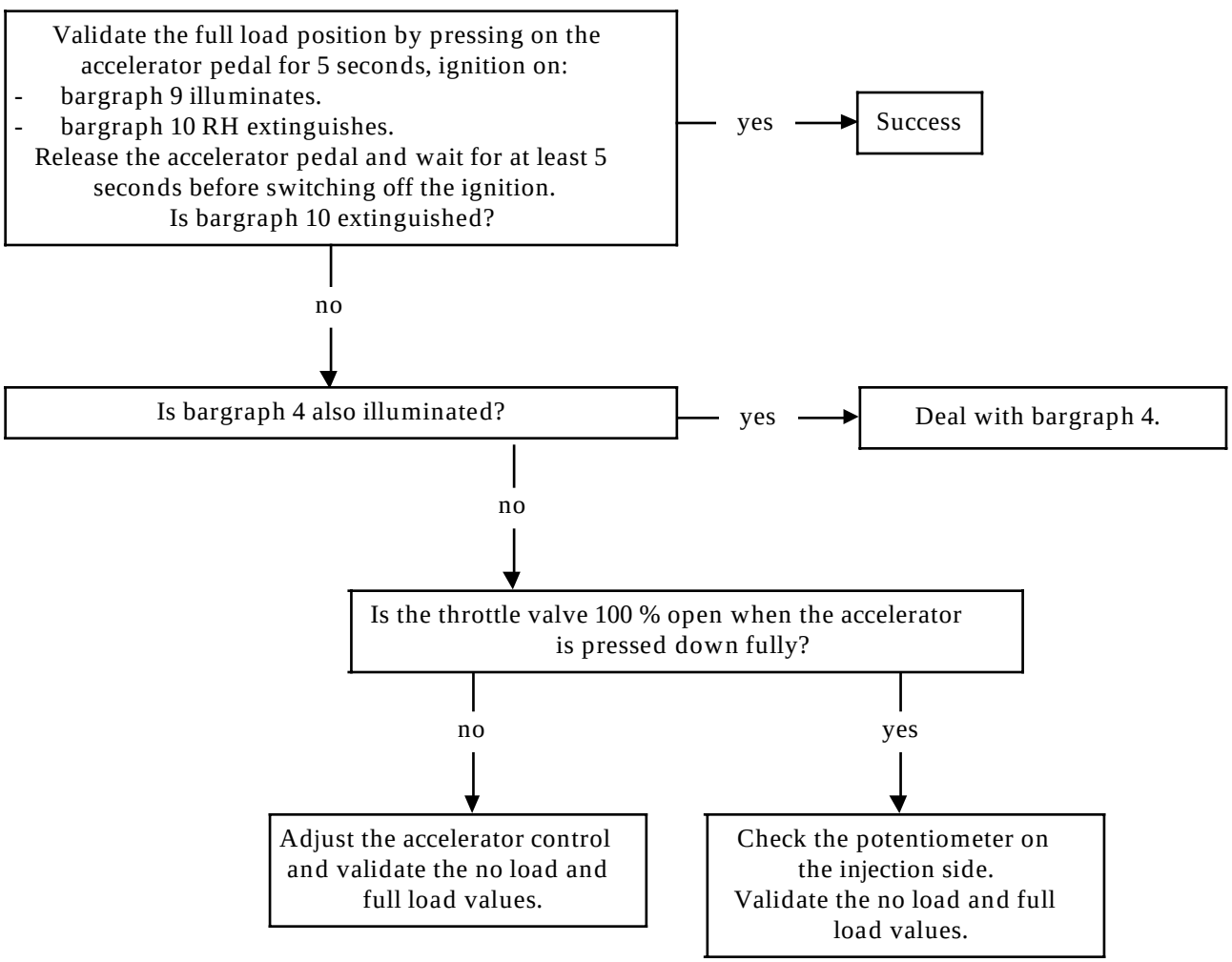
Vehicle without kickdown switch:

Check the accelerator cable control. Check the change in load on **# 12** and replace the automatic transmission potentiometer if necessary (for versions fitted with it). On versions E7J and D7F, program the no load and full load values after having erased the computer memory

Kickdown function performed if **# 12 ≤ 6.25 %**.

BARGRAPH 10 RH and / or LH ILLUMINATED

Program the no load and full load values (only on version E7J*).
Failure to program (bargraph 10 remains illuminated after programming) is normal if the values programmed are not between **1.37** and **37.5 %** in the full load position and / or greater than **60 %** in the no load position.



* And vehicles with load information supplied by the injection computer.
(Without load potentiometer specific to the automatic transmission).

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BARGRAPH 11 RH EXTINGUISHED IN P/N :

Starting authorisation selector in position P / N.

Check all control components and adjust them.

BARGRAPH 12 RH ILLUMINATED ENGINE RUNNING:

Engine speed information fault.

Check / ensure the continuity and the insulation of the connection between track C of the automatic transmission computer connector and the injection computer connector (track 12 for E7J engine, track 48 for D7F engine).
After checking / repairing, does the fault persist?

no → Success

yes ↓

Check the condition of the wiring on the injection computer side and the automatic transmission computer side.
If the wiring is not faulty, check the engine speed information on the injection side.
After repair, erase the computer memory and program the no load and full load values.

BARGRAPH 13 RH ILLUMINATED:

Air conditioning reduction requested.

BARGRAPH 17 RH and LH ILLUMINATED:

Dynamic test of solenoid pilot valves.

This test is used to display the electrical operation of the 2 solenoid pilot valves and may also confirm a hydraulic or mechanical problem.

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LIST OF PROBLEMS TO BE USED AS A FUNCTION OF CUSTOMER COMPLAINTS

A - PROBLEMS WITHOUT THE FAULT WARNING LIGHT ILLUMINATING

(with the knowledge that the warning light is working correctly)

PROBLEM WHICH CAN BE NOTICED WITHOUT DRIVING

- **Poor operation of the starter motor or reversing lights**
  - Reversing lights do not work
    - But the starter motor works (reverse gear correct) — Chart 22
    - And the starter motor does not work — Chart 23
  - Starter motor does not work
    - But the reversing lights work — Chart 21
    - And the reversing lights do not work — Chart 23
  - Starting possible in all selector lever positions — Chart 25
  - Starting possible in position N but not in P — Chart 43
- **Selector lever operating incoherence**
  - Starting possible in all selector lever positions — Chart 25
  - Other cases of incorrect operation of the selector lever
    - Parking difficult to engage lever in P — Chart 18
    - Lever difficult to move or lever blocked — Chart 37
  - Starting possible in N but not in P — Chart 43
- **Abnormal noise or vibrations**
  - Buzzing type noise in P and N when cold — Chart 31
  - Metallic noise when idling from the converter housing — Chart 32
  - Noise when operating the starter motor — Chart 33
  - Drive plate keeps breaking — Chart 34
- **Oil leaks**
  - After replacing the computer — Chart 35
  - Other cases — Chart 36
- **No drive in forward or reverse gear**
  - No forward drive (permanent)
    - No drive with lever in D or 2 but drive in 1 only — Chart 30
    - The vehicle does not move forward in D, 2 and 1 but neutral park and reverse are correct — Chart 20
  - No reverse drive (permanent)
    - And the engine races when changing from 2/3 and the automatic transmission seems to change into neutral — Chart 28
    - No engine braking in 1st gear hold / normal operation of reversing lights — Chart 29
  - Vehicle does not drive in forward gear or reverse gear — Chart 44
  - Periodic absence of drive in forward gear and reverse gear
    - Vehicle does not drive in R, D, 2 and 1 when warm only; the vehicle starts again after being stopped for a few minutes (fault which can be repetitive) — Chart 26
    - No reverse gear when warm or bang when engaging reverse when reaccelerating — Chart 47

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A - PROBLEMS WITHOUT THE FAULT WARNING LIGHT ILLUMINATING (cont)
(with the knowledge that the warning light is working correctly)

cont

PROBLEMS STARTING OR OPERATING THE VEHICLE

In forward gears

- No forward drive
  - No forward drive (permanent)
    - No drive with lever in D or 2 but drive in 1 only — Chart 30
    - The vehicle does not move forward in D, 2 and 1 but neutral, park and reverse are correct — Chart 20
  - Vehicle does not drive in forward gear or reverse gear — Chart 44
  - Vehicle does not drive in R, D, 2 and 1 when warm only; the vehicle starts again after being stopped for a few minutes (fault which can be repetitive) — Chart 26
  - No reverse gear when warm or bang when engaging reverse when reaccelerating — Chart 47
- Starting possible in all selector lever positions — Chart 25
- The vehicle moves forward or backwards in N
  - The vehicle moves forwards or backwards with the lever in N and starter motor position and reversing lights offset — Chart 17
  - The vehicle moves forwards or backwards with the lever in N / P position operational / starter motor action normal — Chart 19
- Slipping when starting
  - In forward or reverse gear but operating normal above 12.5 mph (20 km / h) in forward gear — Chart 2
  - For all forward gear lever selections without engine racing (normal operation above 45-55 mph (70-80 km / h) in no load position + no sensation when changing gear) — Chart 1
- Skidding with engine racing when starting
  - In position D or 2 but not in 1 (sometimes intermittently) — Chart 4
  - Lever in D and juddering in reverse — Chart 7
- Banging when starting with lever in D, 2 and 1 (with engaging delay) — Chart 15
- Banging when changing from position N to D / 2 / 1 or R — Chart 16

3DMXTT1.0

A - PROBLEMS WITHOUT THE FAULT WARNING LIGHT ILLUMINATING (cont)
(with the knowledge that the warning light is working correctly)

cont

PROBLEMS STARTING OR OPERATING THE VEHICLE (cont)

In reverse gear

- No reverse drive
  - No reverse drive (permanent)
    - And the engine races when changing from 2/3 and the automatic transmission seems to change into neutral — Chart 28
    - No engine braking in 1st gear hold / normal operation of reversing lights — Chart 29
  - Vehicle does not drive in forward gear or reverse gear — Chart 44
  - Vehicle does not drive in R, D, 2 and 1 when warm only; the vehicle starts again after being stopped for a few minutes (fault which can be repetitive) — Chart 26
  - No reverse gear when warm or bang when engaging reverse when reaccelerating — Chart 47
- Juddering in reverse gear
  - Juddering in reverse gear — Chart 5
  - Juddering in reverse gear and skidding when starting with lever in D — Chart 7
  - Juddering in reverse and skidding when changing from 2 to 3 — Chart 7
- Slipping in reverse gear
  - Slipping in reverse gear — Chart 3
  - Slipping in reverse gear and no engine braking in 1st gear hold — Chart 47
- Banging when starting or when engaging reverse gear
  - Banging when starting in R (with engaging delay) — Chart 47
  - Banging when engaging position N to D, 2, 1 or R — Chart 16
  - Banging when engaging reverse gear when accelerating or no reverse gear when warm — Chart 47

3DMXTT1.0

A - PROBLEMS WITHOUT THE FAULT WARNING LIGHT ILLUMINATING (cont)
(with the knowledge that the warning light is working correctly)

cont

PROBLEM LINKED TO THE GEARS

- **Problem changing gears**
  - When changing from 2/3 or 3/2
    - Juddering in reverse and skidding when changing from 2 to 3 — Chart 7
    - Slipping when changing from 2/3 only — Chart 8
    - The engine races in full load position when changing from 2/3 and 3/1 (the automatic transmission seems to change into neutral) — Chart 6
    - The engine races when changing from 2/3 and the automatic transmission seems to change to neutral + no drive in reverse — Chart 28
    - Cannot change 2/3 in full load but can change in no load — Chart 49
  - Random gear changes
    - Up to 60 / 75 mph (100/125 km/h) — Chart 11
    - And hesitation except in 3rd — Chart 12
  - Banging when changing gears
    - In no load when changing lever from 2 to D — Chart 13
    - The engine speed increases in 1st and 2nd changes above 37 mph (60 km/h). When pedal is released, the A.T. seems to change to neutral and there is a bang when reaccelerating — Chart 24
    - Banging when changing gears — Chart 50
  - Slipping when changing gears
    - When changing from 2/3 only — Chart 8
    - In full load position — Chart 14
    - When changing from 1/2 with lever in D or 2 — Chart 27
  - Gear changing thresholds incorrect
    - The engine speed increases in 1st and 2nd changes above 37 mph (60 km/h). When pedal is released, the A.T. seems to change to neutral and there is a bang when reaccelerating — Chart 24
    - Will not change into second, the engine speed increases in 1st above 31 mph (50 km/h), changes to 3rd after releasing pedal — Chart 27
- **Lack of one or several gears**
  - Will not change into second, the engine speed increases in 1st above 31 mph (50 km/h), changes to 3rd after releasing pedal — Chart 27
  - No drive in D and 2 but drive in 1 only — Chart 30
  - Third missing with racing of engine in 2nd (reverse gear correct) — Chart 10
  - No 1st gear after operation on distributor — Chart 45
  - No 1st gear hold after operation on hydraulic distributor — Chart 48

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A - PROBLEMS WITHOUT THE FAULT WARNING LIGHT ILLUMINATING (cont)

(with the knowledge that the warning light is working correctly)

cont

PROBLEMS LINKED TO THE GEARS (cont)

Page

- **The automatic transmission remains locked in one gear**
  - Remains in 1st — Chart 9
  - Remains locked in 3rd — Chart 46
- **No kickdown at full load or kickdown threshold abnormal at full load** — Chart 51

PROBLEM FOLLOWING SEVERE BRAKING OR A SHARP BEND

- **Surging after braking** — Chart 38
- **Engine races after a bend** — Chart 38

OTHER

- **Banging**
  - Banging when starting or when engaging
    - Banging when starting with lever in D, 2, 1 — Chart 15
    - Banging when engaging from position N to D, 2, 1 or R — Chart 16
    - Banging when engaging reverse when accelerating or lack of reverse when warm — Chart 47
    - Banging when starting in R (with engaging delay) — Chart 47
  - Banging when changing gears
    - In no load and when moving lever from 2 to D — Chart 13
    - The engine speed increases in 1st and 2nd changes above 37 mph (60 km / h). When pedal is released, the A.T. seems to change to neutral and there is a bang when reaccelerating — Chart 24

3DMXTT1.0

A - PROBLEMS WITHOUT THE FAULT WARNING LIGHT ILLUMINATING (cont)
(with the knowledge that the warning light is working correctly)

cont

OTHER

- **Slipping**
  - Slipping when starting
    - In forward or reverse gear but operating normal above 12.5 mph (20 km / h) in forward gear — Chart 2
    - For all forward gear lever selections without engine racing (normal operation above 45-55 mph (70-80 km / h) in no load position + no sensation when changing gear) — Chart 1
    - Slipping in reverse gear and no engine braking in 1st gear hold — Chart 47
    - Slipping in reverse gear — Chart 3
  - Slipping when changing gears
    - When changing from 2 / 3 only — Chart 8
    - In full load position — Chart 14
    - When changing from 1 / 2 with lever in D or 2 — Chart 27
- **Slipping**
  - Slipping with engine racing when starting
    - In position D or 2 but not in 1 (sometimes intermittently) — Chart 4
    - Lever in D and juddering in reverse — Chart 7
  - Slipping when changing from 2 / 3 + juddering in reverse — Chart 7
- **Juddering**
  - Juddering in reverse — Chart 5
  - Juddering in reverse and skidding when starting with lever in D — Chart 7
  - Juddering in reverse and skidding when changing from 2 / 3 — Chart 7
- **Abnormal noises or vibrations**
  - Buzzing type noise in P and N when cold — Chart 31
  - Metallic noise when idling from the converter housing — Chart 32
  - Noise when operating the starter motor — Chart 33
  - Drive plate keeps breaking — Chart 34
  - Vibration at 37- 50 mph (60- 80 km / h) or humming on flat road — Chart 39
- **Drive plate keeps breaking** — Chart 34

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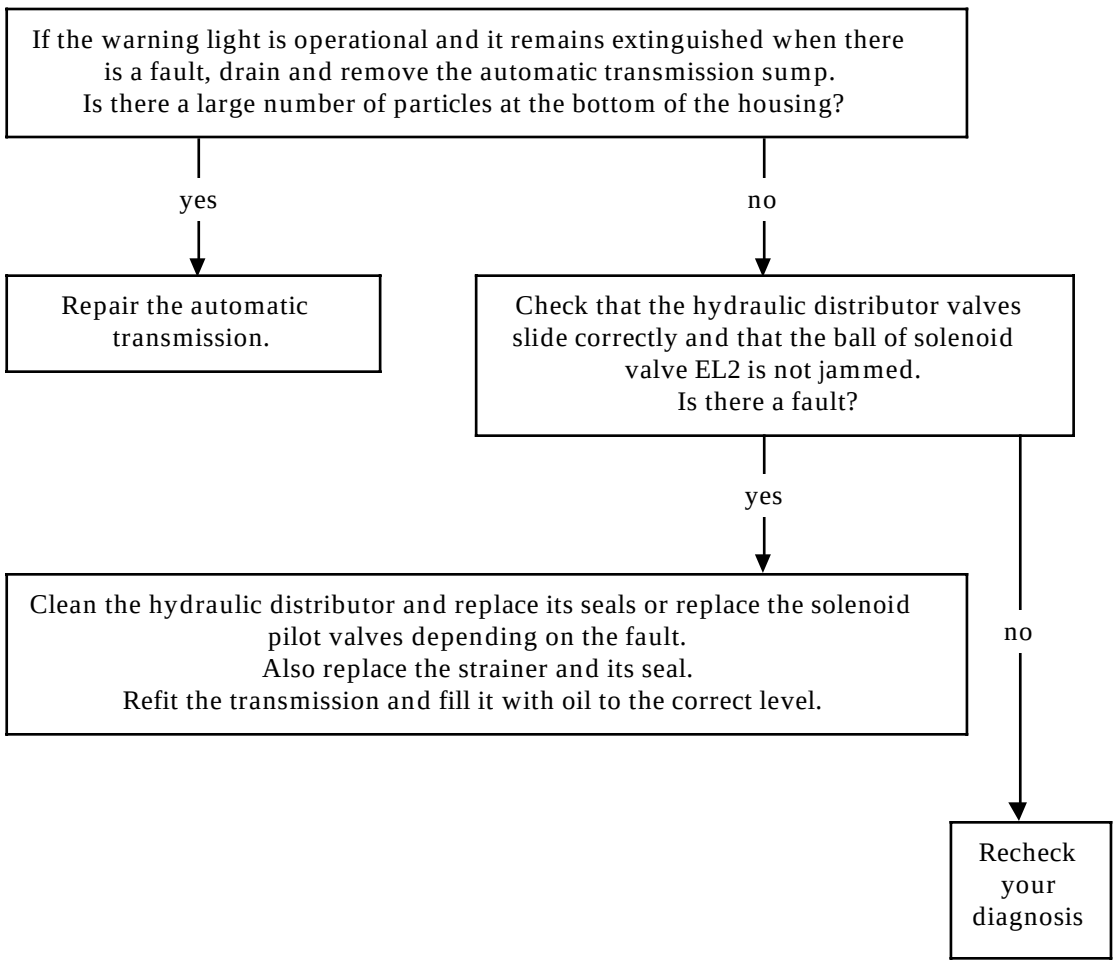
B - PROBLEM WITH ILLUMINATION OF THE FAULT WARNING LIGHT

- FAULT FINDING WITH THE XR25 (see display and meaning of the bargraphs -
- NO COMMUNICATION BETWEEN THE XR25 AND THE COMPUTER Chart 52
- RANDOM GEAR CHANGES Chart 41
- FAULT WARNING LIGHT ILLUMINATES AND EXTINGUISHES AT RANDOM Chart 40
- GEAR CHANGING THRESHOLDS DELAYED AND WARNING LIGHT ILLUMINATES (vehicles fitted with on-board computer) Chart 42

C - FAULT WARNING LIGHT DOES NOT ILLUMINATE WHEN IGNITION TURNED ON Chart 53

Chart 1 : Slipping when starting for all forward gear lever selections without engine racing

normal operation above 45 - 55 mph (70 / 80 km / h)
in no load position + no sensation when changing gear.

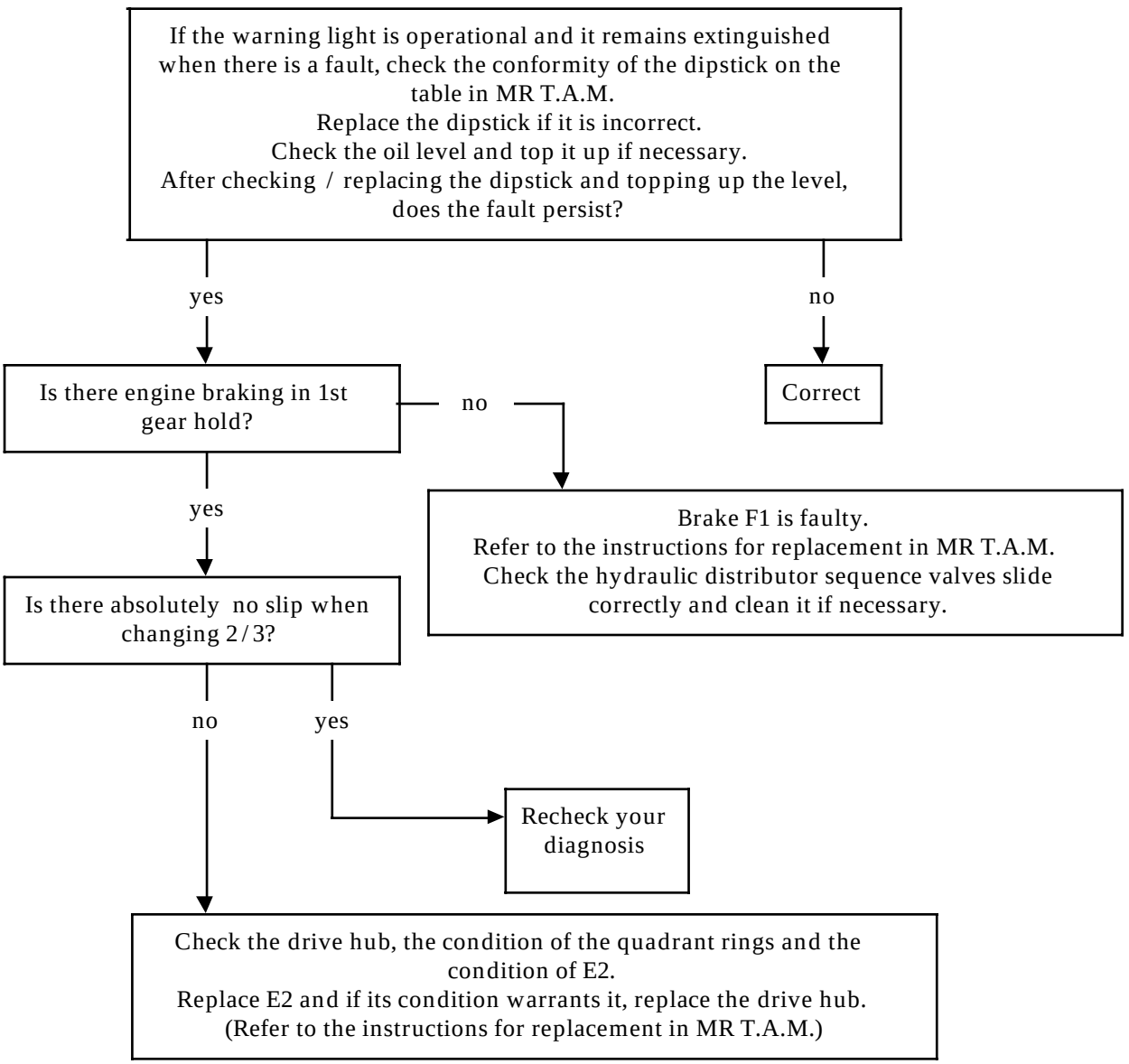


3DMXTT1.0

Chart 2 : Slipping when starting in forward or reverse gear but operating normal above 12.5 mph (20 km/h) in forward gear.

If the warning light is operational and it remains extinguished when there is a fault, the fault is due to the converter freewheel which is no longer engaging.
Replace the converter and check the condition of the ignition target.

Chart 3 : Slipping in reverse gear.



3DMXTT1.0

Chart 4 : Skidding with engine racing when starting in position D or 2, but not in 1

(sometimes intermittently)

If the warning light is operational and it remains extinguished when there is a fault, the freewheel is damaged.
Refer to the instructions for replacement in MR T.A.M.

Chart 5 : Juddering in reverse.

If the warning light is operational and it remains extinguished when there is a fault, check the conformity of the dipstick on the table in MR T.A.M.
Replace the dipstick if it is incorrect.
Check the oil level and top it up if necessary.
After checking / replacing the dipstick and topping up the level, does the fault persist?

yes

no → Correct

Under the conditions where the fault appears, adjust the idle speed to the maximum tolerance level (lever in D).
Does the vehicle still show the fault?

no → Correct

yes

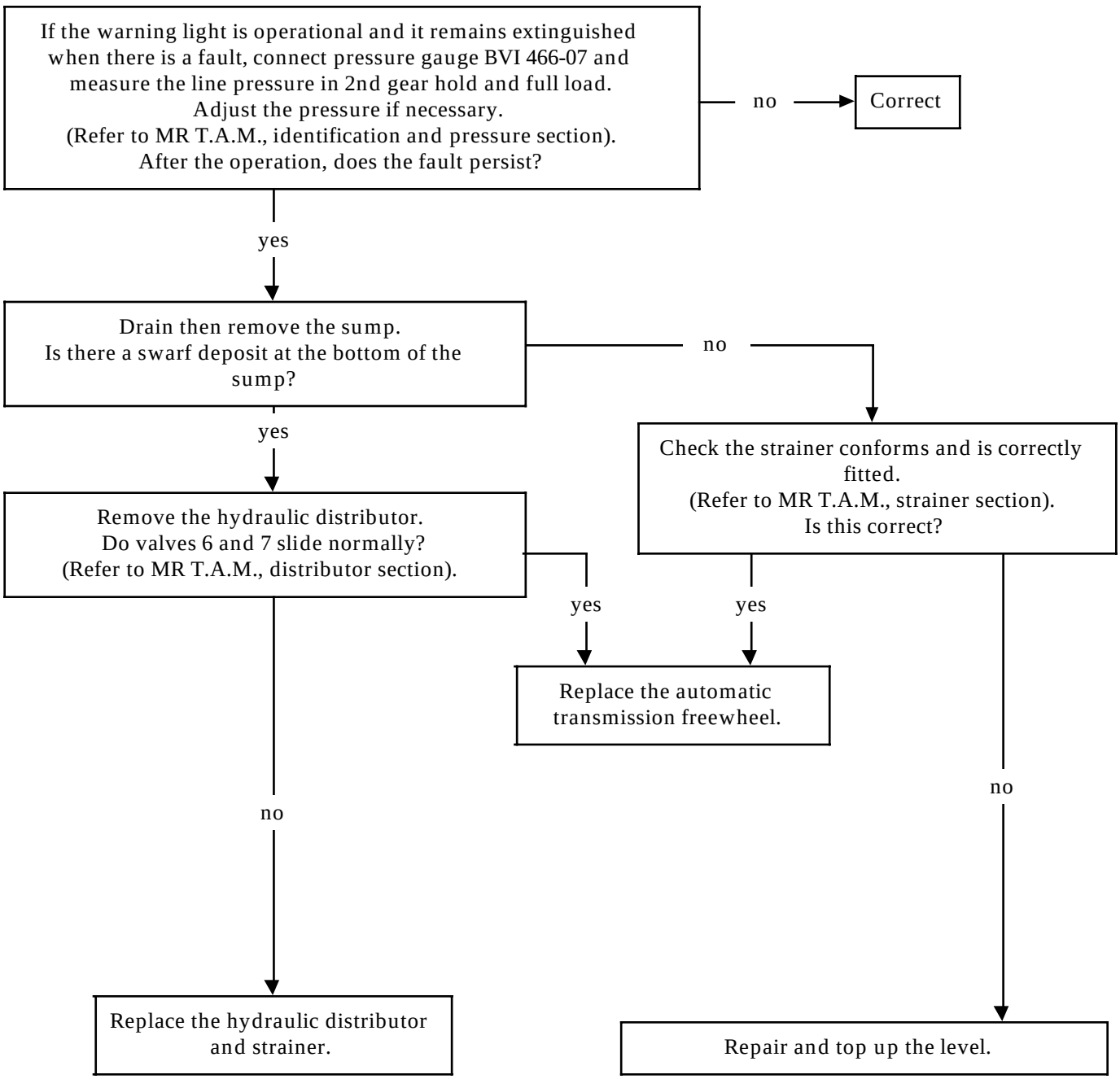
Check the oil pressure in reverse gear when the AT is warm.
(Refer to MR T.A.M., oil pressure section).
Is the pressure greater than **2 bars** ?

no → Leak from the quadrant rings.
Replace the drive hub and its quadrant rings.
Also check the oil pump.

yes

Check the general condition of brake F1 and clutch E2.
Carry out a check referring to MR T.A.M.
Check the hydraulic distributor sequence valves slide correctly and clean it if necessary.

Chart 6 : The engine races in full load position when changing from 2/3 and 3/1. The automatic transmission seems to change into neutral.



3DMXTT1.0

Chart 7 : Skidding when starting, lever in D, juddering in reverse.

If the warning light is operational and it remains extinguished when there is a fault, check the conformity of the dipstick on the table in MR T.A.M.
Replace the dipstick if it is incorrect.
Check the oil level and top it up if necessary.
After checking / replacing the dipstick and topping up the level, does the fault persist?

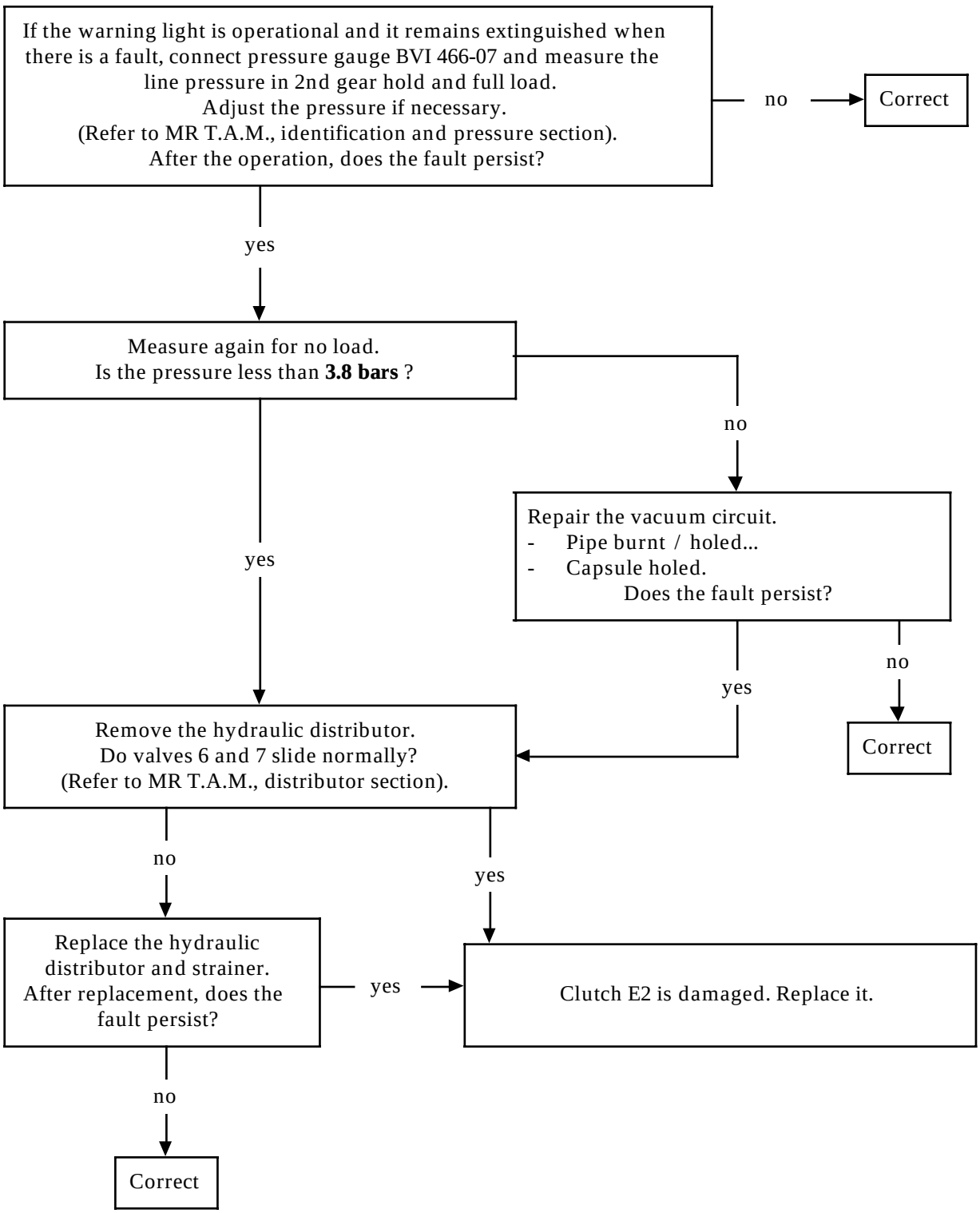
yes

Check the condition of the drive hub, the condition of the quadrant rings and E2.
Replace any parts as necessary.
(Refer to MR T.A.M.).

no

Correct

Chart 8 : Slipping when changing from 2 to 3 only.



3DMXTT1.0

Chart 9 : Remains in 1st, warning light extinguished.

If the warning light is operational and it remains extinguished when there is a fault, warm up the automatic transmission and carry out the following road test: Lever in 2nd gear hold, start off under full load to reach a speed greater than 43 mph (70 km / h).
Does the transmission change to 2nd gear?

no → Repeat the previous road test, lifting off the accelerator at 43 mph (70 km / h) and moving the selector lever from 2 to D.
Does the transmission change to 3rd gear?

- no → Replace the hydraulic distributor (valves VP1 and VP2 are seized).
- yes → Consult Chart 27.

yes for vehicle with kickdown switch → Check the operation of the kickdown switch on the XR25 or using BVI 958.
Check the insulation of its line in relation to earth.
(The kickdown function may be permanently active).
Does the fault persist?

- yes → Check the potentiometer bridging plate is present and tightened to the correct torque (if the plate is missing, the potentiometer may be blocked and damaged when it is tightened).
Replace the potentiometer if the control is jammed.
- no → Correct

yes for vehicle without kickdown switch → Check the potentiometer bridging plate is present and tightened to the correct torque (if the plate is missing, the potentiometer may be blocked and damaged when it is tightened).
Replace the potentiometer if the control is jammed.

3DMXTT1.0

Chart 10 : 3rd gear missing with racing of engine in 2nd (reverse gear correct).

If the warning light is operational and it remains extinguished when there is a fault, remove the hydraulic distributor.Does valve VP2 slide normally?
(Refer to MR T.A.M., hydraulic distributor section).

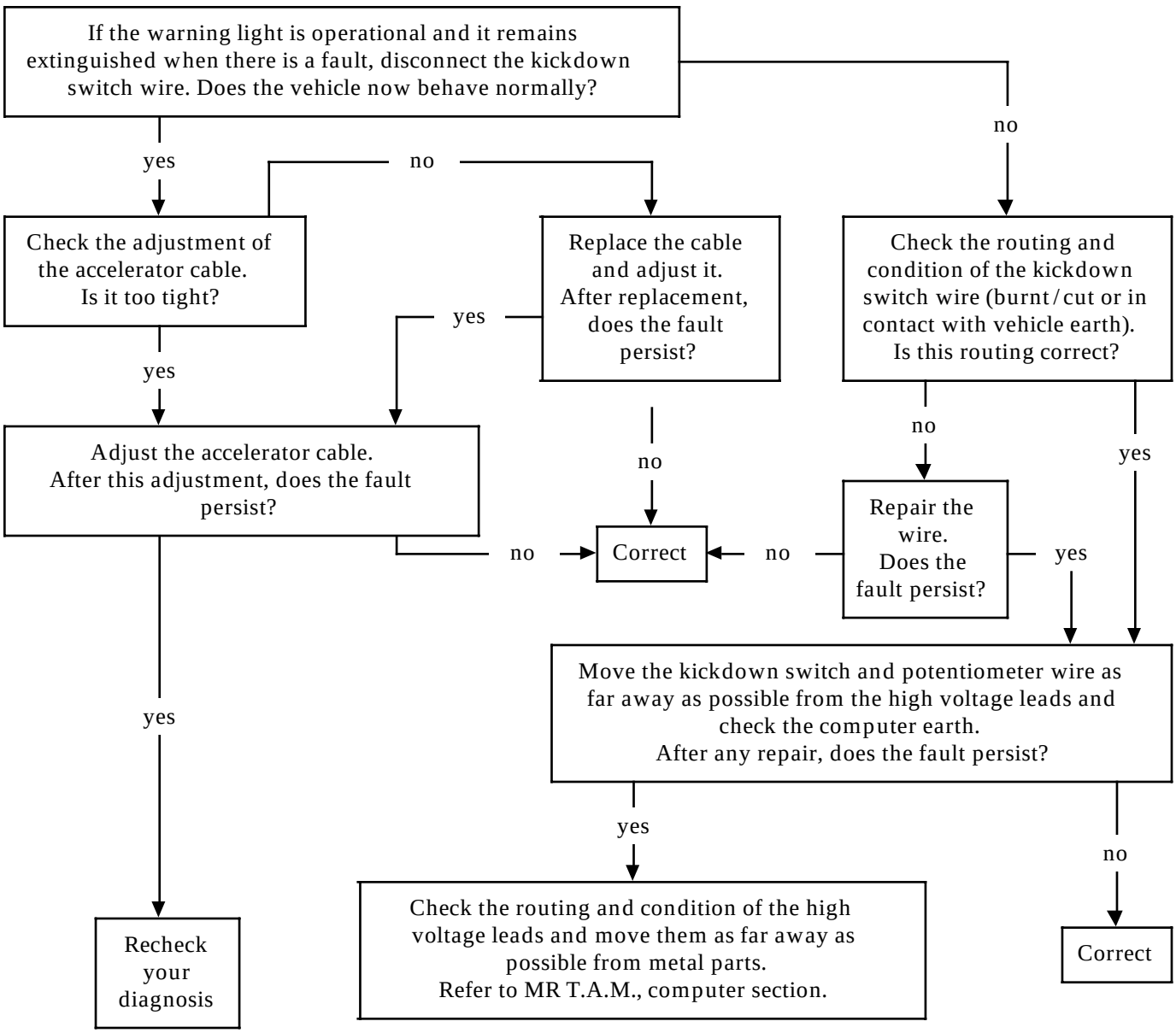
yes → Replace the solenoid valves and strainer.

no → Replace the hydraulic distributor and strainer

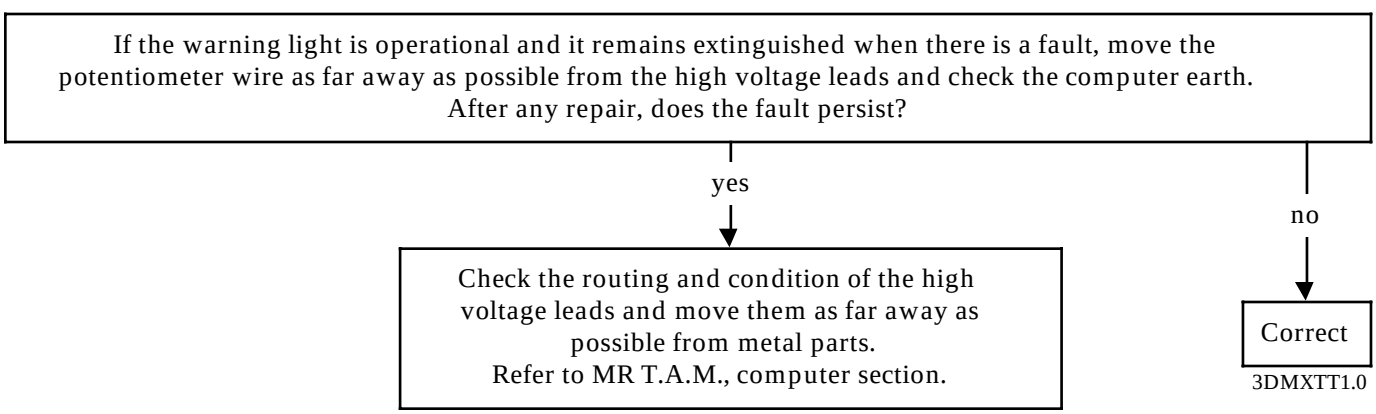
3DMXTT1.0

Chart 11 : Random gear changes up to 60 / 75 mph (100/125 km/h).

Vehicle with kickdown switch:



Vehicle without kickdown switch:

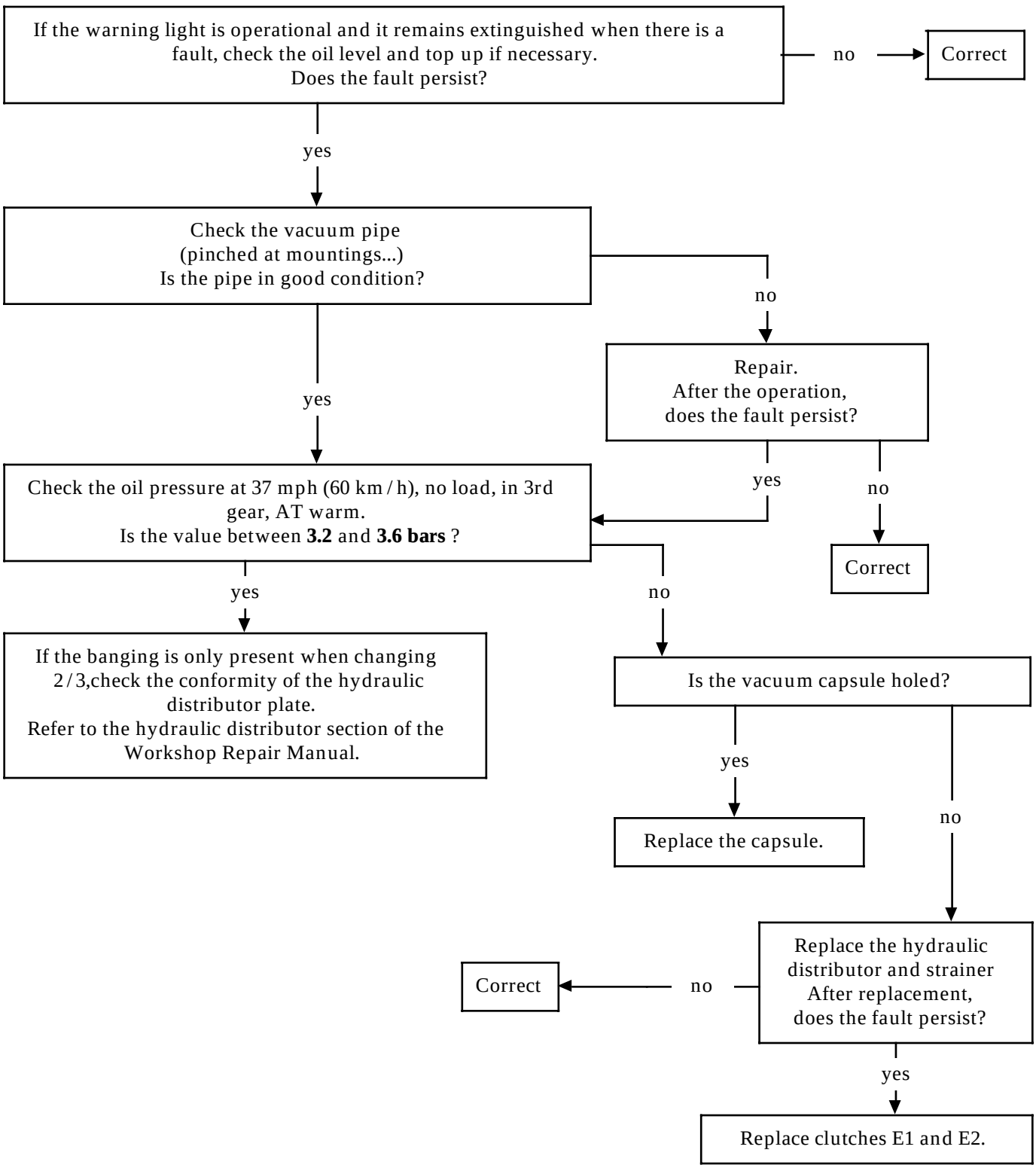


3DMXTT1.0

Chart 12 : Random gear changes and hesitation except in 3rd

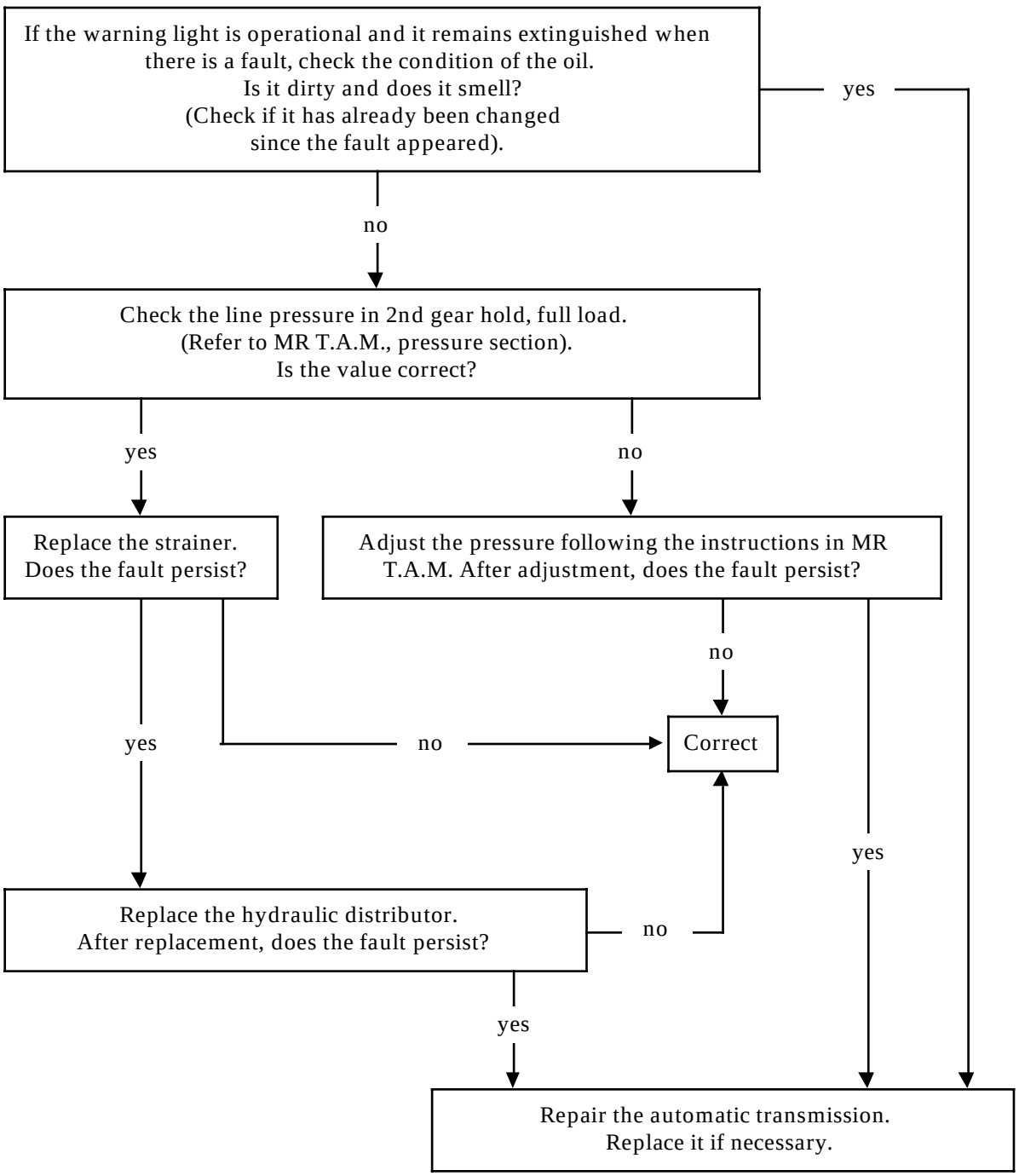
If the warning light is operational and it remains extinguished when there is a fault, check the computer earth:
Tightness of the earth wire of the multifunction switch on the housing or the wire on track E of the 6 track computer connector for the first versions.

Chart 13 : Banging when changing gears in no load when changing lever from 2 to D.



3DMXTT1.0

Chart 14 : Slipping when changing gears in full load position



3DMXTT1.0

Chart 15 : Banging when starting with lever in D - 2 - 1.

(with engaging delay)

When warm :

If the warning light is operational and it remains extinguished when there is a fault, check the conformity of the dipstick on the table in MR T.A.M.
Replace the dipstick if it is incorrect.
Check the oil level and top it up if necessary.
After checking / replacing the dipstick and topping up the level, does the fault persist?

yes

Adjust the idle speed, lever in position D.
Is the vehicle still showing the fault?

no → Correct

yes

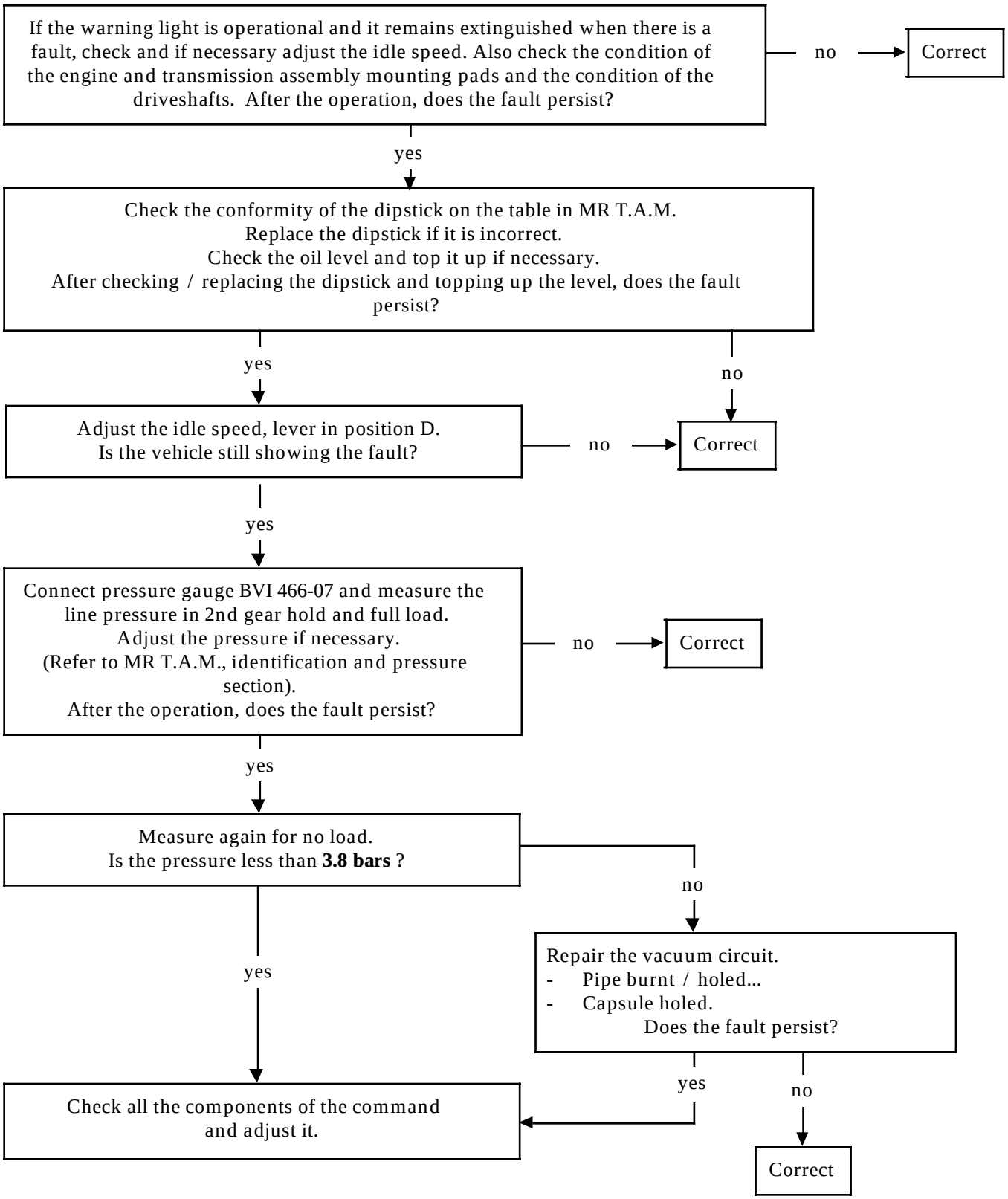
Carry out a general check of the condition of the automatic transmission:
- sealing of the piston of E1.
- sealing of the piston of E2.

no

When cold:

If the warning light is operational and it remains extinguished when there is a fault, check the conformity of the dipstick on the table in MR T.A.M.
Replace the dipstick if it is incorrect.
Check the oil level and top it up if necessary.

Chart 16 : Banging when changing from position N to D - 2 - 1 or R.



3DMXTT1.0

Chart 17 : The vehicle moves forwards or backwards with the lever in N and the starter motor and reversing lights positions are offset.

If the warning light is operational and it remains extinguished when there is a fault,
the fault is due to the selection mechanism being offset.
Adjust the selector lever. After repair, does the fault persist?

yes → Check the complete command.

no → Correct

Chart 18 : Parking difficult to engage lever in P.

Check the park system.
Adjust and repair if necessary as described in MR T.A.M., gear section casing section.

Chart 19 : The vehicle moves forwards, lever in N, position P operational. Normal starter action.

If the warning light is operational and it remains extinguished when there is a fault and it is not a case of creeping when the oil is cold (**less than 60 °C**), the clutches have been damaged (also check the brakes)
Refer to the instructions for replacement in MR T.A.M.
Remember to clean the oil cooler circuit carefully.

Chart 20 : The vehicle does not move forward in D, 2 and 1 but neutral, park and reverse are correct.

If the warning light is operational and it remains extinguished when there is a fault, check the conformity of the dipstick on the table in MR T.A.M.
Replace the dipstick if it is incorrect.
Check the oil level and top it up if necessary.
After checking / replacing the dipstick and topping up the level, does the fault persist?

yes

Clutch E1 is burnt out or heavily damaged.
Refer to the instructions for replacement in MR T.A.M.

no

Correct

3DMXTT1.0

Chart 21 : The starter motor does not work but the reversing lights work.

If the warning light is operational and it remains extinguished when there is a fault, move the selector lever, while operating the starter.
Does the vehicle start?

yes

Adjust the control according to the Workshop Repair Manual. After the operation, does the fault persist?

no → Correct

yes → Repeat the adjustment

no

Disconnect the 6 track computer connector and check the condition of the connections.
In the starting phase, is there+Battery feed on track C, wiring side?

no → Ensure continuity between track C on the 6 track connector and the ignition switch. If there is continuity, check the operation of the switch.

yes

Turn the ignition off and check the operation of the multifunction switch between tracks C and E of the 6 track connector, computer side

- Lever in P / N : R = **0 to 3000 Ω**
- Lever in R / D / 2 / 1 : R = **infinity**. (or a high value on vehicles without a kickdown switch)

Do you note these values on testing?

yes

Check the wiring and the condition of the starter relay.
Repair if necessary.

no

Cut the multifunction switch cable as if a replacement were being made.
With the switch still in position on the automatic transmission, repeat the previous tests at the switch side between the brown and red wires.
Are the measurements still incorrect?

yes

Replace the multifunction switch.
Does the fault persist?

yes ← Check the wiring and the condition of the starter relay. Repair if necessary.

no → Correct

no

Replace the computer.
Erase the memory if M 4-3.
Validate the no load and full load values for the E7J version*.

* And vehicles where load information and TDC information is given by the injection computer.

3DMXTT1.0

Chart 22 : Reversing lights do not work but the starter motor works.

If the warning light is operational and it remains extinguished when there is a fault, check the condition of the reversing lights bulbs and check the earth on the rear lights units.
After the operation, does the fault persist?

no → Correct

yes ↓

Check the reversing lights fuse.
Disconnect the 6 track computer connector and check the condition of the connections.
Ignition on, is there
+ Battery feed on track A on the wiring side ?

no → Turn the ignition off and ensure the continuity between track A on the 6 track connector and the ignition switch.
If continuity is ensured, check the operation of the switch.
After the operation, does the fault persist?

no → Correct

yes ↓

Check / ensure continuity between track B of the 6 track connector and the reversing lights. After the operation, does the fault persist?

no → Correct

yes ↓

Test the multifunction switch between tracks A and B on the 6 track connector, computer side:

- Lever in R : R = **0 to 0,5 Ω**.
- Lever in P / N / D / 2 / 1 : R = **infini**ty.

Do you note these values when testing?

yes → Recheck your diagnosis

no ↓

Cut the multifunction switch cable as if a replacement were being made.
With the switch still in position on the automatic transmission, repeat the previous tests at the switch side between the grey and green wires.
Are the measurements still incorrect?

yes ↓

Replace the multifunction switch.

no ↓

Replace the computer.
Erase the memory if M 4-3.
Validate the no load and full load values for the E7J version*.

* And vehicles where load information and TDC information is given by the injection computer.

3DMXTT1.0

Chart 23 : The starter motor and the reversing lights do not work

Check the connection of the 6 track connector on the computer and the condition of its connections.

Chart 24 : The engine speed increases in 1st (2nd changes above 37 mph (60 km/h)). When the pedal is released, the AT seems to change to neutral and there is a bang when reaccelerating

Vehicle with kickdown switch:

If the warning light is operational and it remains extinguished when there is a fault, connect the XR25 and check the operation of the kickdown switch.
Is the kickdown function active at times other than full load?

no → Check the load potentiometer sector rotates freely and check the bridging plate is present which prevents damage to the potentiometer when it is tightened. Replace and adjust the potentiometer if necessary.
Validate the no load and full load values for the E7J version*.

yes → Check the routing and condition of the kickdown switch wire (burnt / cut or in contact with vehicle earth) and repair if necessary.
Does the fault persist?

yes → Replace the cable.

no → Correct

Vehicle without kickdown switch:

If the warning light is operational and it remains extinguished when there is a fault, check the load potentiometer sector rotates freely and check the bridging plate is present which prevents damage to the potentiometer when it is tightened. Replace and adjust the potentiometer if necessary.
Validate the no load and full load values for the E7J version*.

* And vehicles where load information and TDC information is given by the injection computer.

3DMXTT1.0

Chart 25 : Starting possible in all selector lever positions

If the warning light is operational and it remains extinguished when there is a fault, turn the ignition off and disconnect the 6 track computer connector.
Carry out a starting test.
Does the vehicle start?

no

The fault is due to a permanent earth on track C of the 6 track connector on the computer side:
Turn the ignition off and check the operation of the multifunction switch between tracks C and E of the 6 track connector, computer side
- Lever in P / N : R = 0 to 3000 Ω
- Lever in R / D / 2 / 1 : R = infinity

(or a high value on vehicles without a kickdown switch)
Do you note these values on testing?

yes

Recheck your diagnosis

no

Cut the multifunction switch cable as if a replacement were being made.
With the switch still in position on the automatic transmission, repeat the previous tests at the switch side between the brown and red wires.
Are the measurements still incorrect?

yes

Replace the multifunction switch.

no

Replace the computer.
Erase the memory if M 4-3.
Validate the no load and full load values for the E7J version*.

yes

The fault is due to a non-conformity in the starter motor relay wiring:
- Shunt as for manual gearbox version in place of the relay.
- Insulation fault in relation to earth on the line between track C on the 6 track connector and track 2 on the starter motor relay base.

Repair if necessary.

* And vehicles where load information and TDC information is given by the injection computer.

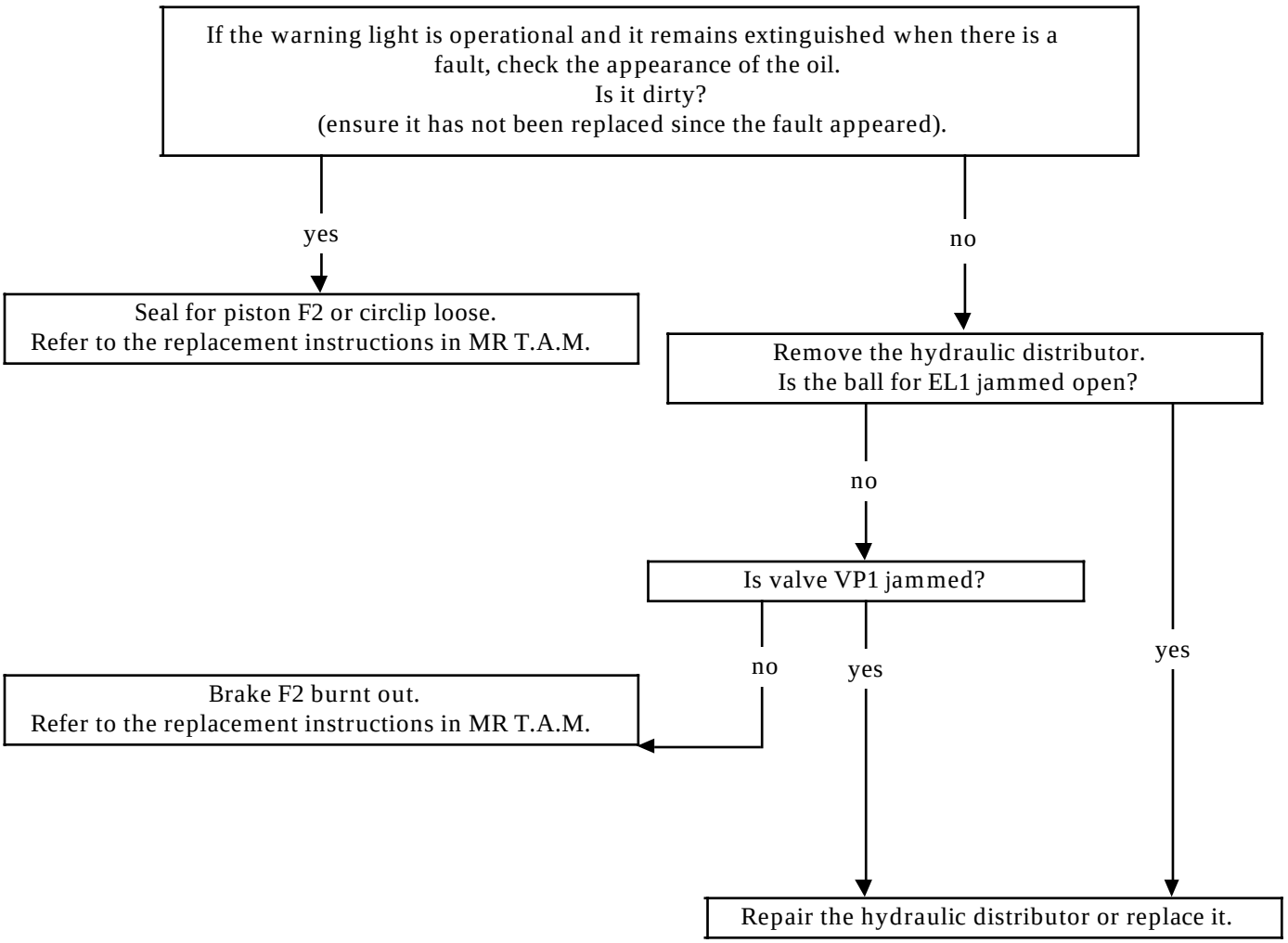
3DMXTT1.0

Chart 26 : No vehicle drive in R, D, 2 and 1 when warm only; the vehicle starts again after being stopped for a few minutes

(fault which can be repetitive)

If the warning light is operational and it remains extinguished when there is a fault, the strainer is blocked and the automatic transmission is burnt out.
Repair the faulty components (Refer to MR T.A.M.).

Chart 27 : Will not change into 2nd, the engine speed increases in 1st above 31 mph (50 km/h), changes to 3rd after releasing pedal.



3DMXTT1.0

Chart 28 : The engine races when changing from 2/3. the automatic transmission seems to change to neutral + no drive in reverse.

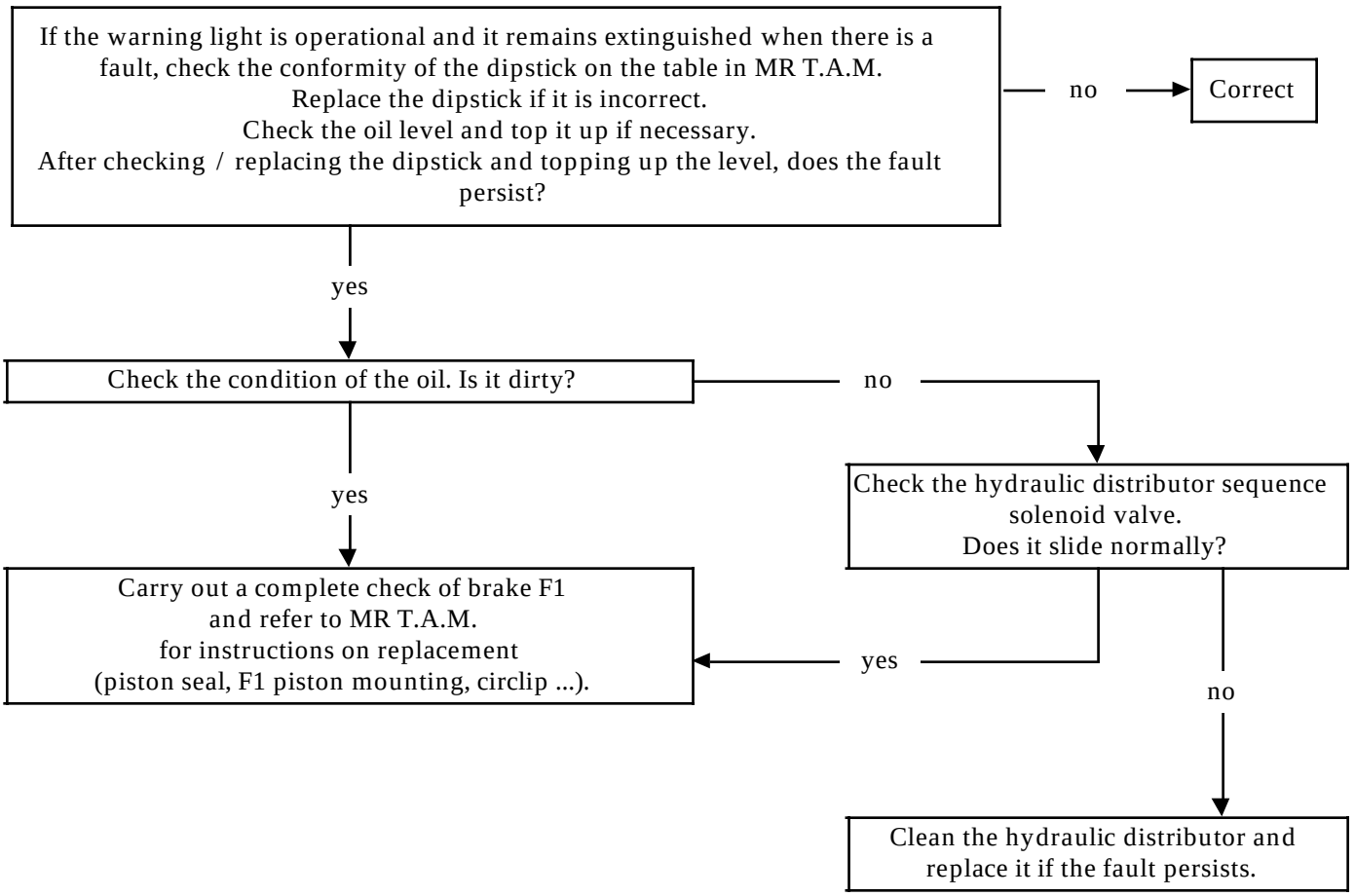
If the warning light is operational and it remains extinguished when there is a fault, check the hydraulic distributor.
Check that valve VP2 slides correctly and replace it if necessary.
After cleaning / replacement, does the fault persist?

no → Correct

yes ↓

Carry out a complete check of clutch E2
(Refer to MR T.A.M.).

Chart 29 : No reverse gear or engine braking in 1st gear hold. Reversing lights operate normally.



3DMXTT1.0

Chart 30 : No drive with lever in D and 2 but drive in 1 only.

If the warning light is operational and it remains extinguished when there is a fault, the freewheel is damaged.
Refer to the instructions for replacement in MR T.A.M.

Chart 31 : Buzzing type noise in P and N when cold.

If the warning light is operational and it remains extinguished when there is a fault, it often occurs following an oil change, as not enough oil was refilled.
Check the conformity of the dipstick on the table in MR T.A.M.
Replace the dipstick if it is incorrect. Check the oil level (engine running) and top it up if necessary. After checking / replacing the dipstick and topping up the level, does the fault persist?

no → Correct

yes ↓

Vibration of the pressure regulating valve.
Replace the plate and its seals (on the hydraulic distributor).
Adjust the line pressure.

3DMXTT1.0

Chart 32 : Metallic noise when idling from the converter housing.

If the warning light is operational and it remains extinguished when there is a fault, the drive plate is split.
Refer to the instructions for replacement in MR T.A.M.

Chart 33 : Noise when operating the starter motor.

If the warning light is operational and it remains extinguished when there is a fault, check the tightness of the plate on the converter.
Check that the starter mounting bracket and the centring dowel are present.
Check that the converter housing has not split.

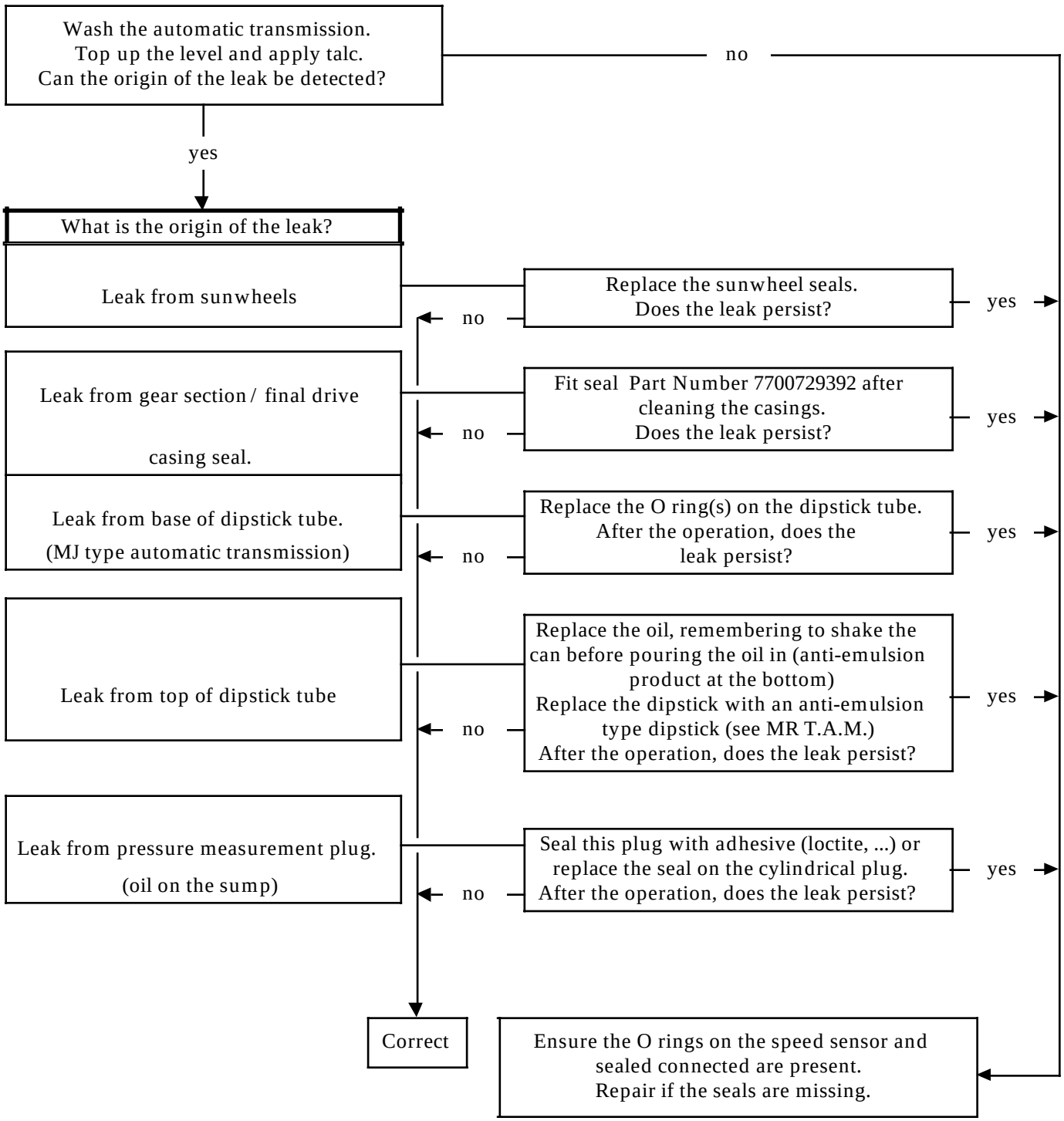
Chart 34 : Drive plate keeps breaking.

If the warning light is operational and it remains extinguished when there is a fault, the engine / automatic transmission centring dowels were not refitted when the drive plate was replaced (Refer to MR T.A.M.).

Chart 35 : Oil leaks after replacing the computer.

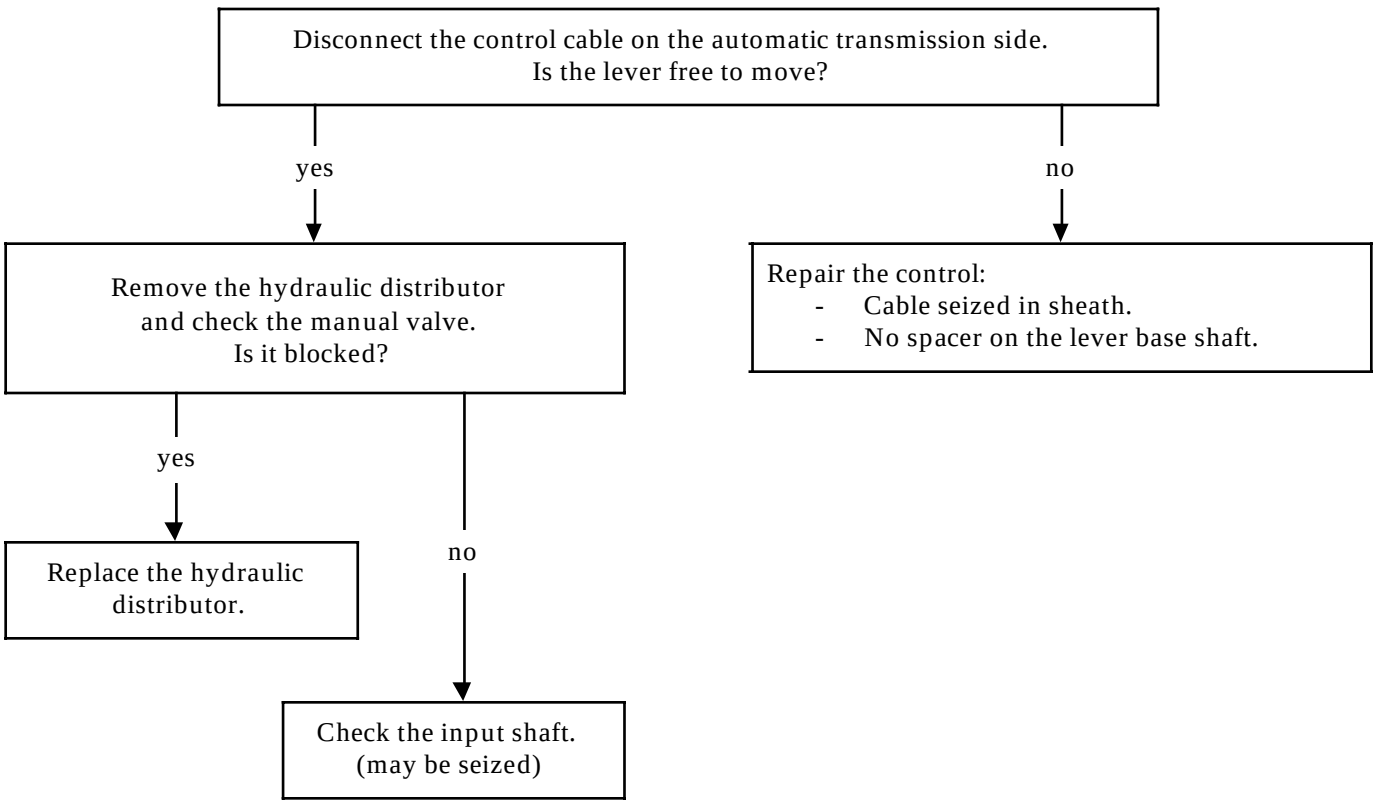
Replace or fit the O rings on the speed sensor and the multifunction switch.

Chart 36 : Oil leak



3DMXTT1.0

Chart 37 : Lever difficult to move or lever blocked.



3DMXTT1.0

**Chart 38 : Engine races after a bend.
Surging after braking**

Check the conformity of the dipstick on the table in MR T.A.M.
Replace the dipstick if it is incorrect.
Check the oil level and top it up if necessary.
After checking / replacing the dipstick and topping up the level, does the fault persist?

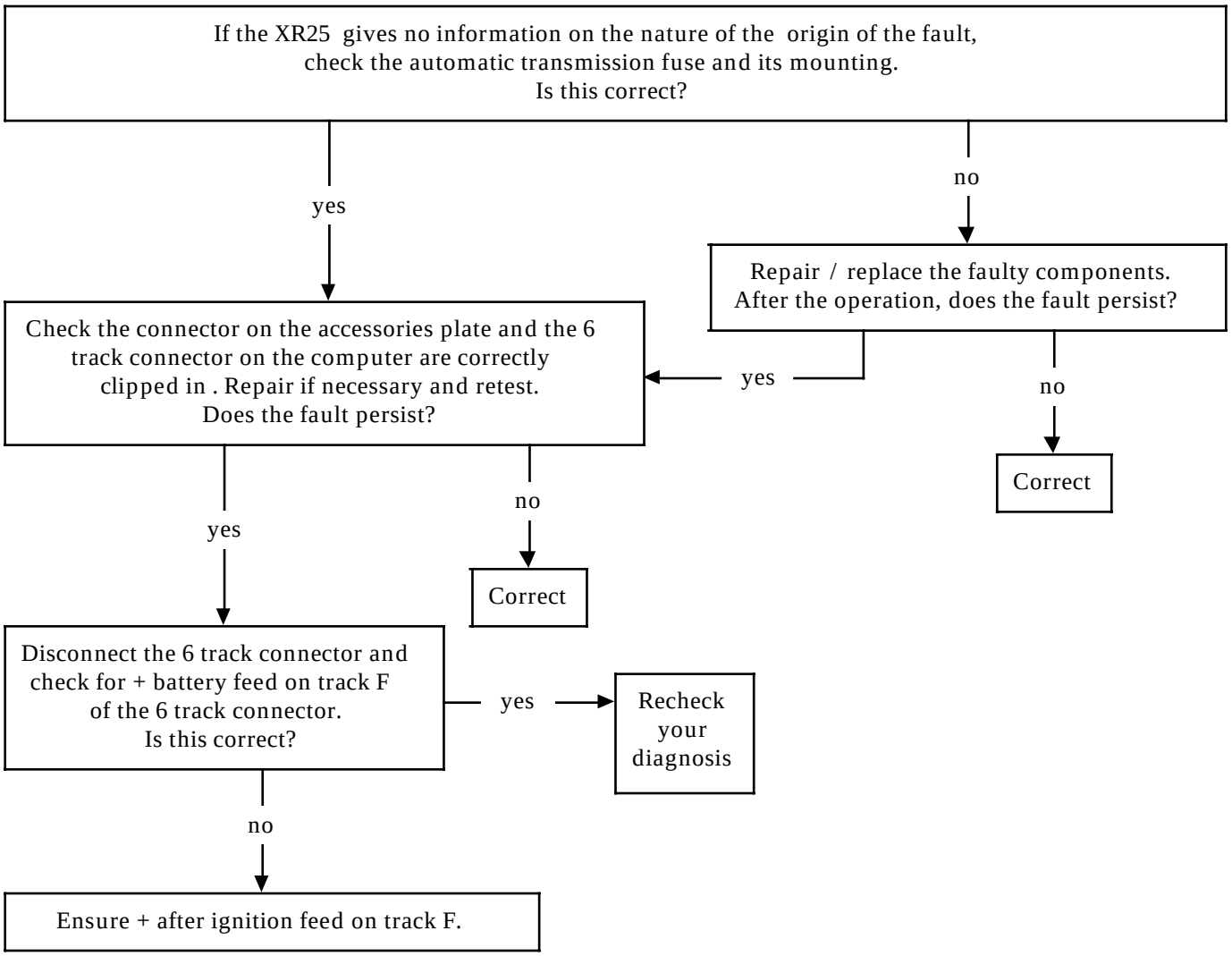
yes → Check the position of the strainer as shown in MR T.A.M., strainer section.

no → Correct

Chart 39 : Vibration at 37 - 50 mph (60 - 80 km/h) or humming on flat road.

Check the balancing and tyre inflation pressure of the wheels.
Replace the stepdown gears (Refer to MR T.A.M.).

Chart 40 : Fault warning light illuminates and extinguishes at random.

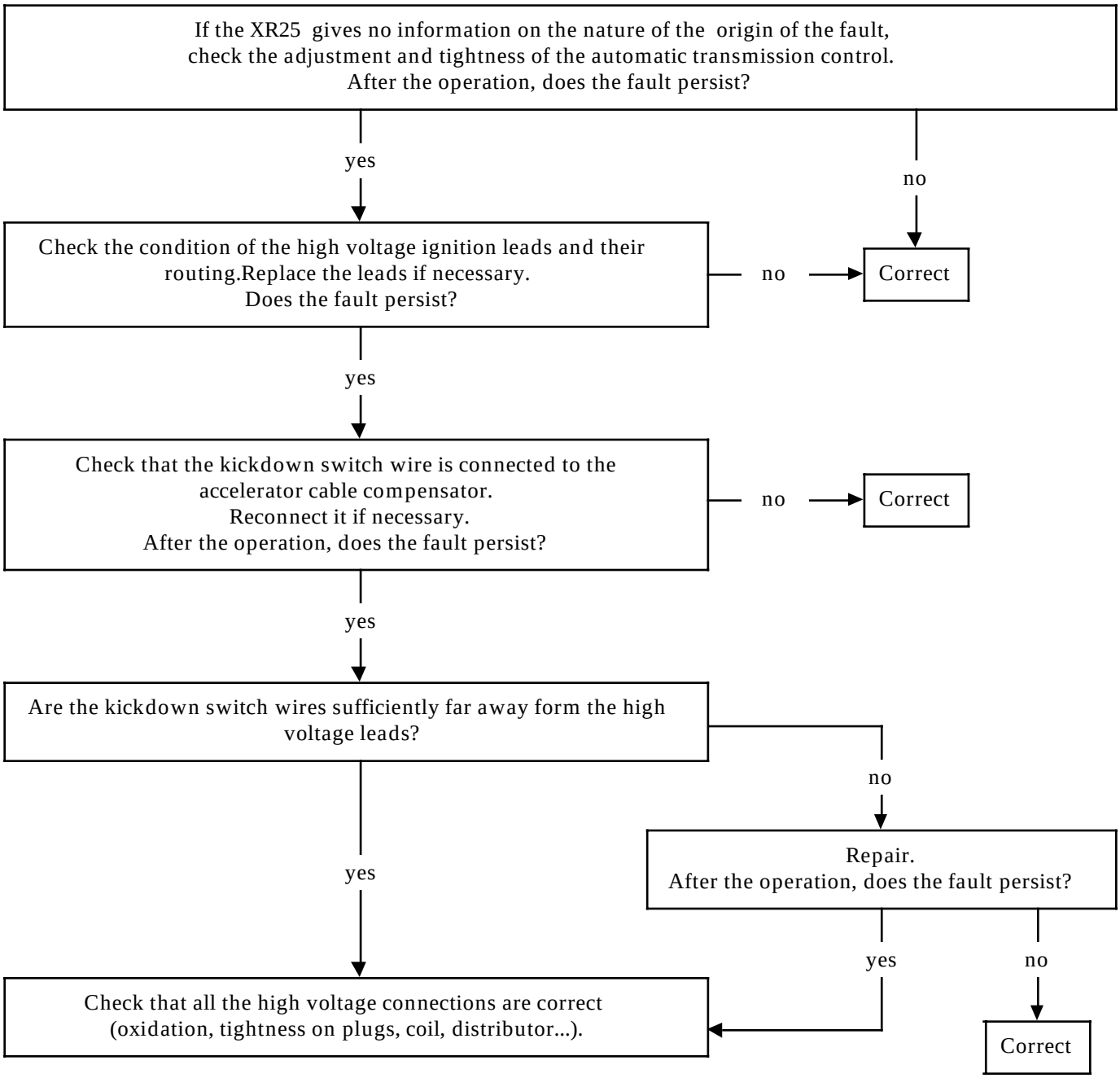


NOTE : For E7J* engines, the fault may be caused by a break in TDC information.
Check using #06 if the engine speed information changes to 0 when the fault occurs.
Repair the wiring if necessary.

* And vehicles where load information and TDC information is given by the injection computer.

3DMXTT1.0

Chart 41 : Random gear changes.



3DMXTT1.0

Chart 42 : Gear changing thresholds delayed and warning light illuminates.

(vehicles fitted with on-board computer)

If the XR25 gives no information on the nature of the origin of the fault, check that the potentiometer wire is not incorrectly connected in place of the on-board computer wire. Reconnect if necessary.

Chart 43 : Starting possible in N but not in P.

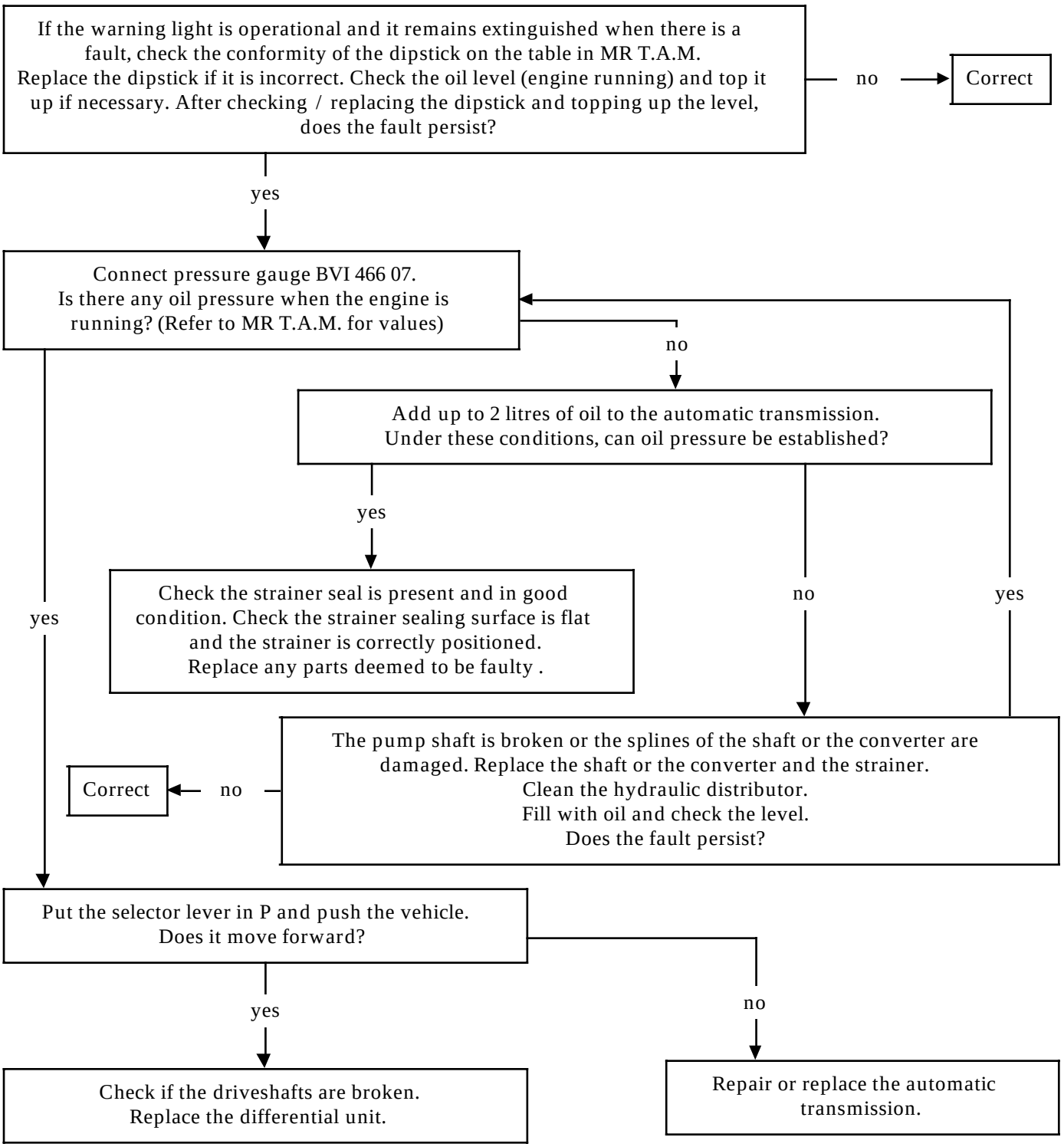
If the warning light is operational and it remains extinguished when there is a fault, adjust the control following the Workshop Repair Manual for the vehicle. After the operation, does the fault persist?

no → Correct

yes → Adjust again.

3DMXTT1.0

Chart 44 : Vehicle does not drive in forward gear or reverse gear.



3DMXTT1.0

Chart 45 : No 1st gear after operation on distributor

If the warning light is operational and it remains extinguished when there is a fault, the solenoid pilot valves are incorrectly connected.
Only solenoid pilot valve EL1 has a reference mark to correspond with valve VP1.

Chart 46 : Automatic transmission remains locked in 3rd gear and warning light remains extinguished.

If the warning light is operational and it remains extinguished when there is a fault, check the computer earth:
- Multifunction switch earth wire (mounted on automatic transmission housing) or earth at terminal E on 6 track connector on 1st version.

After checking / repair, does the fault persist?

no → Correct

yes → Check the connections of the solenoid valves and the vehicle wiring on the computer.

Chart 47 : No reverse gear when warm or bang when engaging reverse when reaccelerating.

If the warning light is operational and it remains extinguished when there is a fault, check the condition of the engine and transmission assembly mounting pads. Check and if necessary adjust the idle speed, selector lever in position D. After the operation, does the fault persist?

no → Correct

yes ↓

Check the condition of the seals for the piston and the piston mounting for F1. Replace any parts deemed to be faulty.

Chart 48 : No 1st gear hold after operation on hydraulic distributor.

If the warning light is operational and it remains extinguished when there is a fault, the fault is certainly due to the absence of the sequence valve spring in the hydraulic distributor (reference mark VS).

Chart 49 : Cannot change 2/3 in full load but can change in no load.

If the warning light is operational and it remains extinguished when there is a fault, check the adjustment of the accelerator cable.
Also check the condition of the air filter.

Chart 50 : Banging when changing gears.

If the warning light is operational and it remains extinguished when there is a fault, check the conformity of the dipstick on the table in MR T.A.M.
Replace the dipstick if it is incorrect.
Check the oil level and top it up if necessary.
After checking / replacing the dipstick and topping up the level, does the fault persist?

yes

Connect pressure gauge BVI 466-07 and measure the line pressure in 2nd gear hold and full load.
Adjust the pressure if necessary.
(Refer to MR T.A.M., identification and pressure section).

no

Correct

Chart 51 : No kickdown at full load or kickdown threshold abnormal at full load.

Versions fitted with M4-2 type computer with kickdown switch:

If the warning light is operational and it remains extinguished when there is a fault, use the XR25 to check the operation of the kickdown switch. (Refer to MR T.A.M., checking the connectors section). Repair if necessary. After the operation, does the fault persist?

yes

Adjust the load potentiometer and adjust the accelerator control if the throttle is not at the stop for full load.

no

Correct

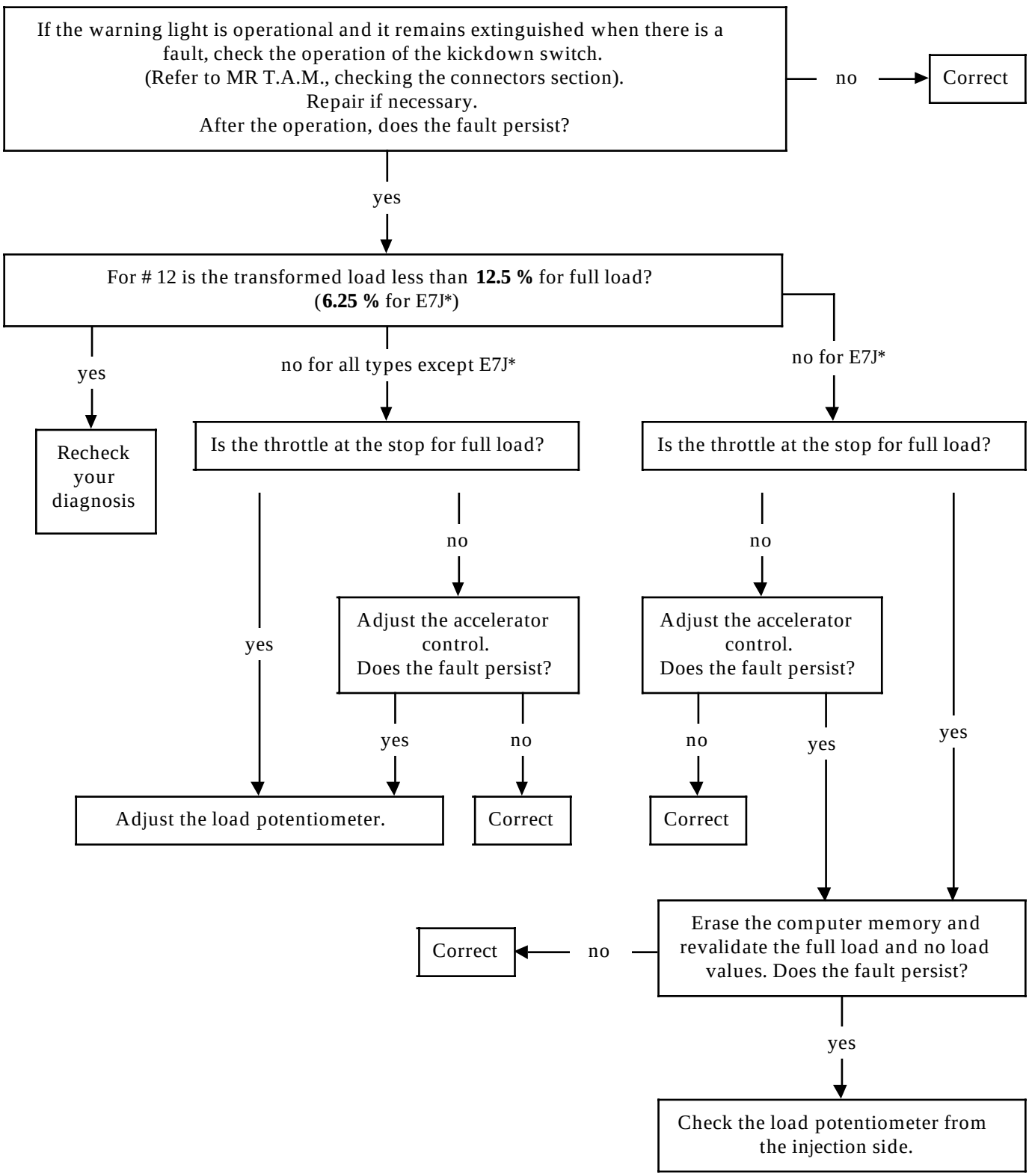
Versions fitted with M4-2 type computer without kickdown switch:

Adjust the load potentiometer and adjust the accelerator control if the throttle valve is not at the stop for full load.

3DMXTT1.0

Chart 51 : No kickdown at full load or kickdown threshold abnormal at full load (cont)

Versions fitted with M4-3 type computer with kickdown switch:

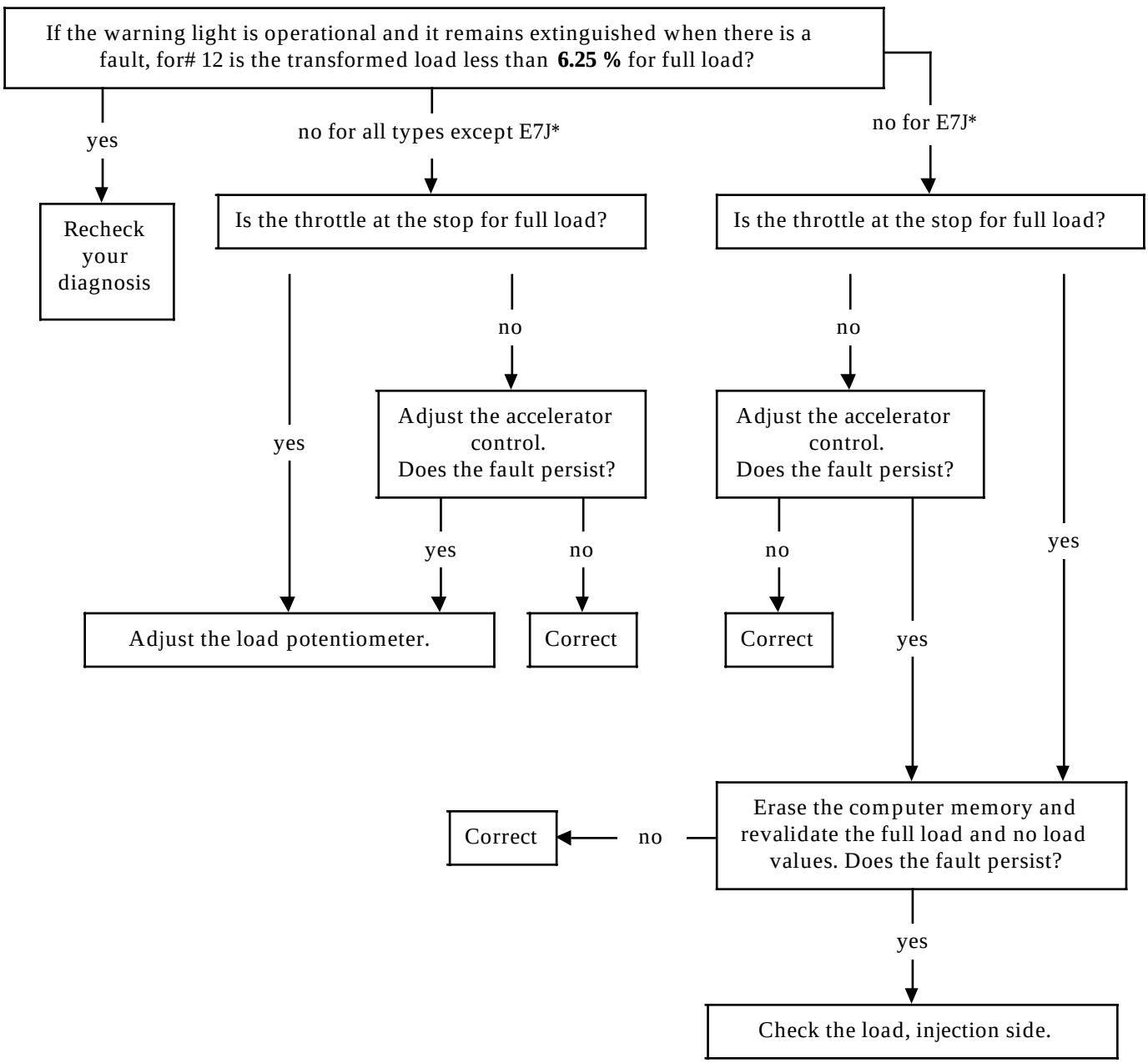


* And vehicles where load information and TDC information is given by the injection computer.

3DMXTT1.0

Chart 51 : No kickdown at full load or kickdown threshold abnormal at full load (cont)

Versions fitted with M4-3 type computer without kickdown switch:



* And vehicles where load information and TDC information is given by the injection computer.

3DMXTT1.0

Chart 52 : No communication between the XR25 and the computer.

Versions with an M 4-2 computer :

Check that the battery voltage > **10.5 V**.
Check that the automatic transmission fuse has not blown.
After these checks, does the fault persist?

no → Correct

yes ↓

Check the connection of the 2 track connector making the connection between the diagnostic socket and the computer. (If the vehicle has no diagnostic socket, check that the special wiring is correctly connected: red plug to + Battery, black plug to - Battery and green plug to warning light output).
Check / ensure the continuity of the line between the 2 track connector and track 7 of the diagnostic socket.
Check / ensure the earthing of track 2 of the diagnostic socket and the presence of + Battery feed on track 6.
After this operation, does the fault persist?

yes ↓

no ↓

Check the computer is correctly fed:
- Earth via wire on multifunction switch. (Earth on track E of 6 track connector on first version).
- + after ignition feed on track F of the 6 track connector, wiring side.

After checking / repair, does the fault persist?

no → Correct

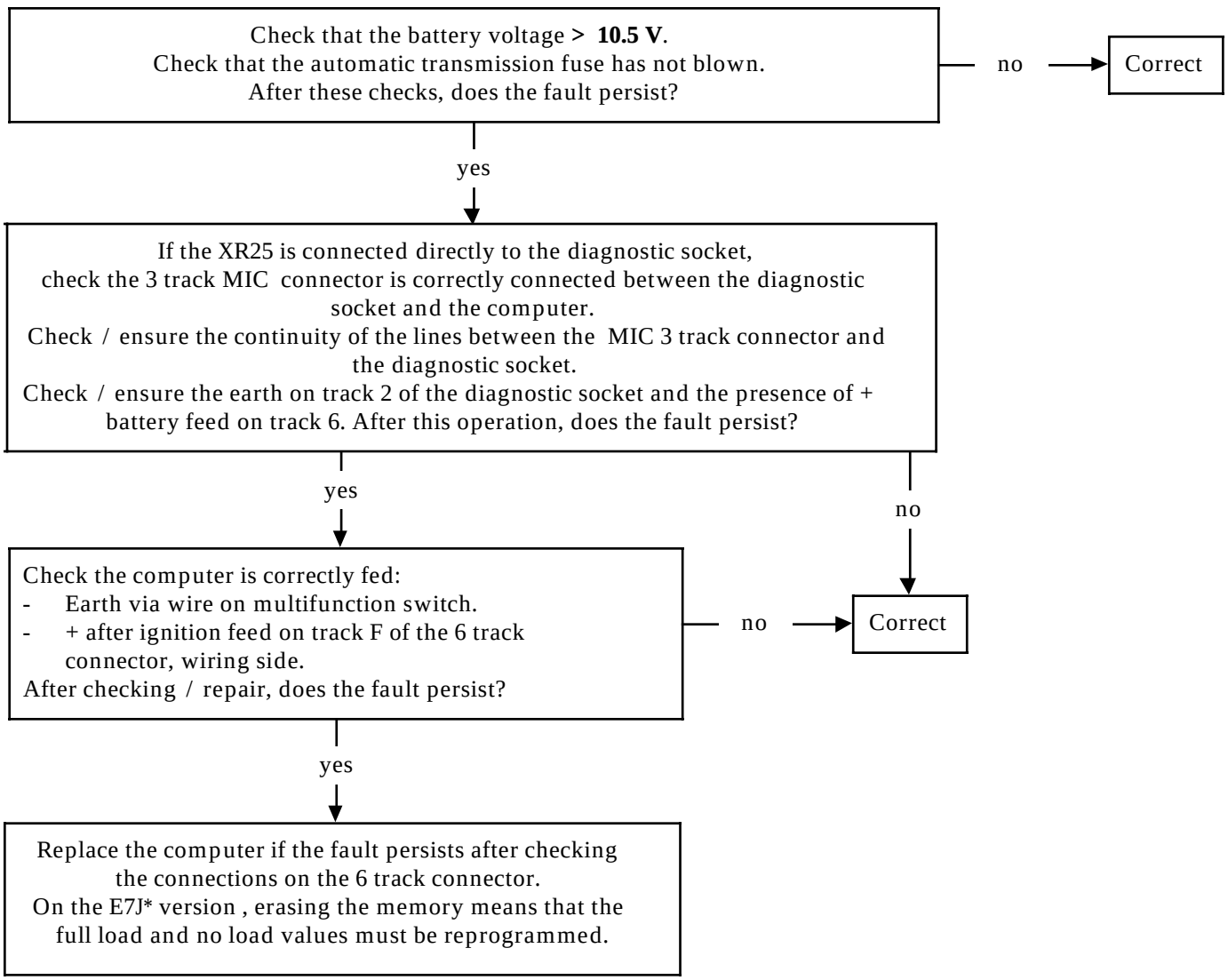
yes ↓

Replace the computer if the fault persists after checking the connections on the 6 track connector.
Erase the computer memory if it is an M 4-3 computer.

3DMXTT1.0

Chart 52 : No communication between the XR25 and the computer (cont).

Versions with an M 4-3 computer :



* And vehicles where load information and TDC information is given by the injection computer.

3DMXTT1.0

Chart 53 : Warning light does not illuminate when ignition turned on.

Disconnect the 3 track MIC connector or the 2 track connector (depending on computer version) supplying the warning light and earth track A of the MIC connector or the warning light output on the 2 track connector.
Does the warning light illuminate when the ignition is turned on?

yes

Replace the computer if the fault persists after checking the connections on the warning light connector and the computer earth.

no

Check the condition of the instrument panel fuse. If the vehicle has a diagnostic socket, check its condition and the presence of the shunt in the cover. Check the warning light bulb and the continuity between the computer output and the warning light.