

# RENAULT

## Technical Note6029A

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**X06, and JH1 - X35, and JH3 or JR5 - X44, and JH1 or JH3 or JR5 - X61, and JH3 or JR5 - X65, and JH1 or JH3 or JR5 - X74, and JH3 or JR5 - X76, and JH3 or JR5, and RENAULT BRAND - X77, and JA3 or JA5 or JH3 or JR5 - X84, and JH3 or JR5 - X85, and JA3 or JA5 or JH3 or JR5 - X90, and JH1 or JH3 or JR5 - X95, and JH3 or JR5 - X38, and JH3 or JR5 - X79, and JR5**

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**JA3 - JA5 - JH1 - JH3 - JR5 manual gearboxes**

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

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

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# JA3 - JA5 - JH1 - JH3 - JR5 manual gearboxes

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## Manual gearbox: Precautions for the repair

X06, and 5-SPEED MANUAL GEARBOX – X44, and 5-SPEED MANUAL GEARBOX – X61, and 5-SPEED MANUAL GEARBOX or 6-SPEED MANUAL GEARBOX – X65, and 5-SPEED MANUAL GEARBOX or 6-SPEED MANUAL GEARBOX – X74, and 5-SPEED MANUAL GEARBOX or 6-SPEED MANUAL GEARBOX – X76, and 5-SPEED MANUAL GEARBOX – X77, and 5-SPEED MANUAL GEARBOX or 6-SPEED MANUAL GEARBOX – X84, and 5-SPEED MANUAL GEARBOX or 6-SPEED MANUAL GEARBOX – X85, and 5-SPEED MANUAL GEARBOX or 6-SPEED MANUAL GEARBOX – X90, and 5-SPEED MANUAL GEARBOX – X95, and 5-SPEED MANUAL GEARBOX or 6-SPEED MANUAL GEARBOX – X35, and 5-SPEED MANUAL GEARBOX

### SAFETY

#### General information

This method provides information which will allow you to:

- acquire good knowledge of the component on which you will be working,
- benefit from the best repair conditions,
- obtain optimum component operation and meet customer requirements,
- optimise component repair time.

It is worth taking the time to read this method as you will gain time later on during the repairs.

#### **a - General recommendations**

Observe basic principles of vehicle repair.

The quality of repair depends first and foremost on the care exercised by the person in carrying it out.

Carry out the operation on the component on a clean working area.

To ensure good repair:

- use the recommended consumables (see **Vehicle: Parts and consumables for the repair**),
- use the recommended tools,
- observe the tightening torques,
- observe the recommendations for parts that should always be replaced after removal, refitting or replacement operations,
- clean and degrease the sections to be bonded, to ensure they bond correctly.

#### **WARNING**

To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

#### **WARNING**

Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

Use professional products and apply them with care, for example do not apply too much sealing paste to the sealing surface to prevent damaging the component.

#### **WARNING**

Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid may cause damage to some components.

Observe the chronological order of the steps:

- remove the component,
- clean the component before repairing,
- remove the part(s) concerned
- check the part(s) removed,
- replace faulty part(s) with new part(s),
- perform the necessary adjustments and/or settings so that the component operates correctly,
- observe the tightening torques.

#### Note:

Ensure you use the correct type of bearing for the gearbox. There are three types of bearing for different gearbox suffixes (**NTN - SNR - TIMKEN**). They are not interchangeable.

#### Note:

Ensure sure that the parts removed match up and ensure that they are refitted in the correct order.

#### **b - Special tooling**

Use suitable tools which are in good condition (use of « multi-purpose » tools, such as adjustable pliers, etc., should be avoided wherever possible).

## Manual gearbox: Precautions for the repair

X06, and 5-SPEED MANUAL GEARBOX – X44, and 5-SPEED MANUAL GEARBOX – X61, and 5-SPEED MANUAL GEARBOX or 6-SPEED MANUAL GEARBOX – X65, and 5-SPEED MANUAL GEARBOX or 6-SPEED MANUAL GEARBOX – X74, and 5-SPEED MANUAL GEARBOX or 6-SPEED MANUAL GEARBOX – X76, and 5-SPEED MANUAL GEARBOX – X77, and 5-SPEED MANUAL GEARBOX or 6-SPEED MANUAL GEARBOX – X84, and 5-SPEED MANUAL GEARBOX or 6-SPEED MANUAL GEARBOX – X85, and 5-SPEED MANUAL GEARBOX or 6-SPEED MANUAL GEARBOX – X90, and 5-SPEED MANUAL GEARBOX – X95, and 5-SPEED MANUAL GEARBOX or 6-SPEED MANUAL GEARBOX – X35, and 5-SPEED MANUAL GEARBOX

For good quality repairs and for working in safe conditions, use only special tooling.

### **c - Safety**

Equipment risks:

- The "Note" heading used in the description of the method indicates that particular care should be taken for the operation described.
- The "Important" heading used in the description of the method indicates that there is a risk of damage to the component.

Working safely:

- The "Warning" heading used in the description of the method indicates that particular care should be taken for the operation described and that there is a human risk,
- use supports and adopt a correct posture when performing heavy work or raising loads,
- check that the working area is clean and tidy during the operation,
- use personal protection (gloves, goggles, work shoes, masks, skin protection, etc.),
- do not use harmful products in unventilated rooms,
- do not ingest any chemicals (brake fluid, coolant, etc.).

Respecting the environment:

- sort waste according to its particular qualities,
- do not burn discarded products (tyres, etc.).

### **d - Conclusion**

Respecting the recommended methods will guarantee the best performance and reliability of the component.

# MANUAL GEARBOX

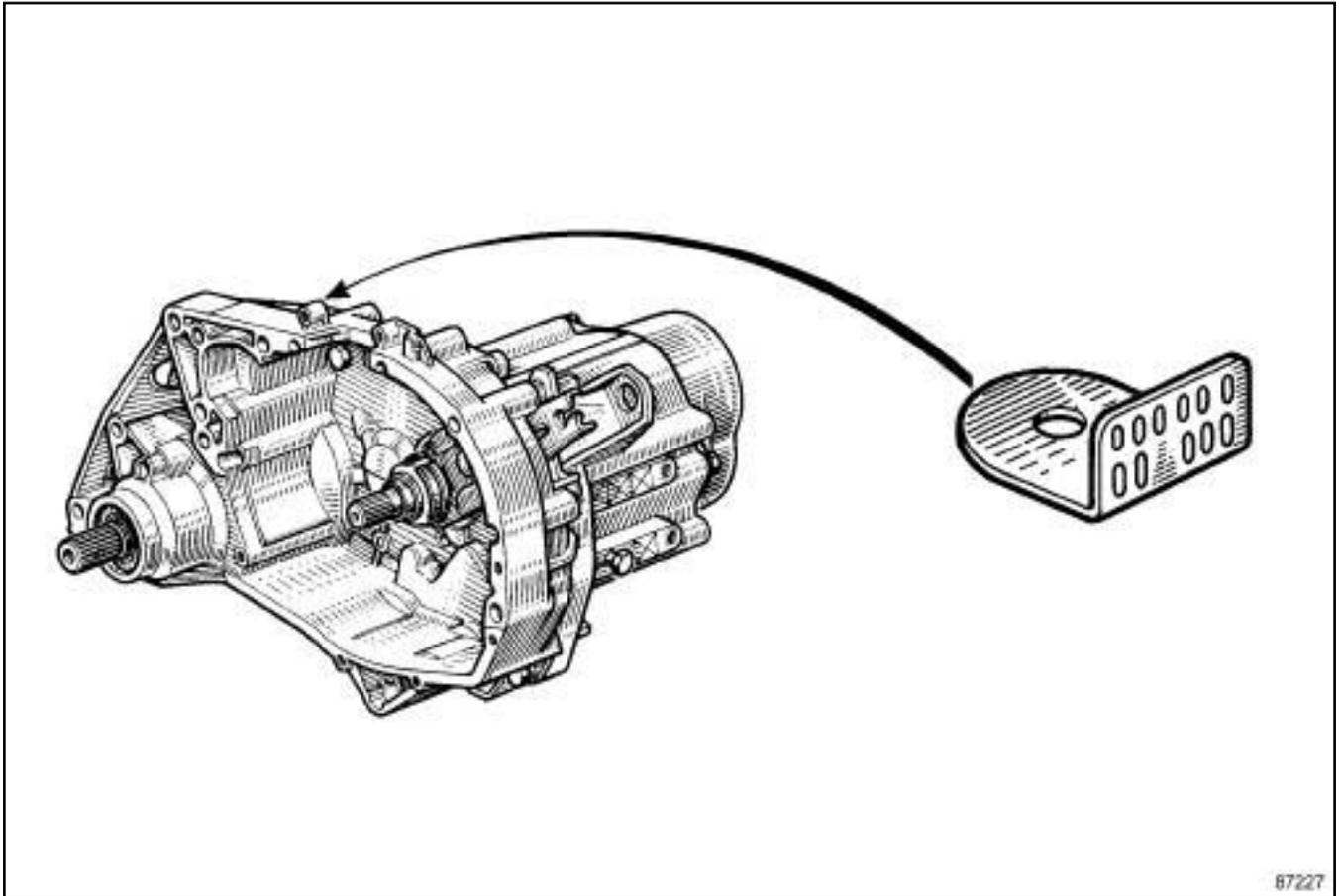
## Manual gearbox: Identification

# 21A

X65

### I - CLIO II PHASE 1

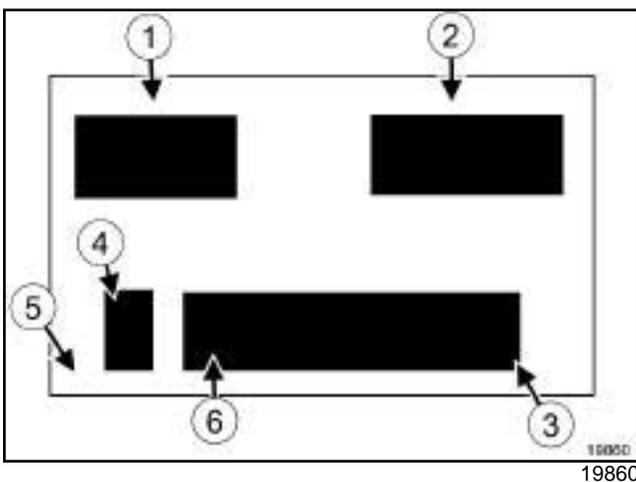
#### 1 - Location of the marking



87227

87227

#### 2 - Identification plate



- (1) Gearbox type
- (2) Gearbox suffix
- (3) Fabrication number

- (4) Factory of manufacture
- (5) Notch when the gearbox is assembled with an E engine
- (6) Letter before production numbers greater than 999999

# MANUAL GEARBOX

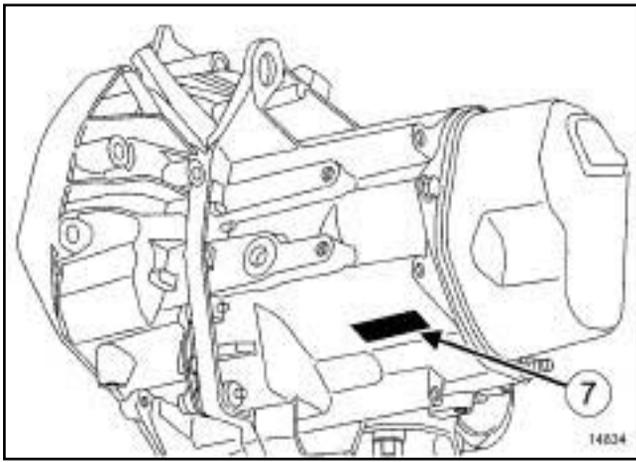
## Manual gearbox: Identification

# 21A

X65

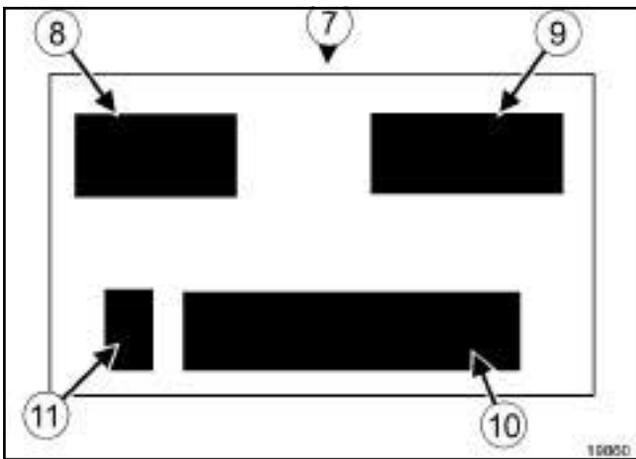
### II - CLIO II PHASE 2

#### 1 - Location of the marking



14834

#### 2 - Marking identification



19860

- (8) Type of gearbox
- (9) Gearbox suffix
- (10) Fabrication number
- (11) Factory of manufacture

# MANUAL GEARBOX

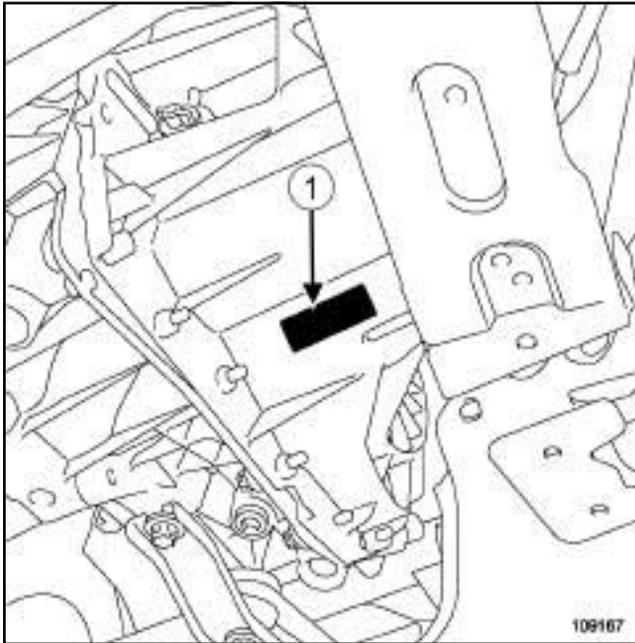
## Manual gearbox: Identification

# 21A

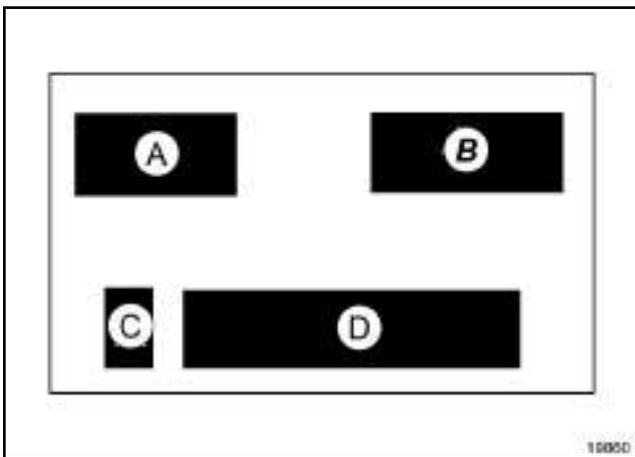
X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

K4J / K4M / K9K / D4F engines are fitted with type JH and JR manual gearboxes.

A marking (1) on the gearbox casing indicates:



109167



19860

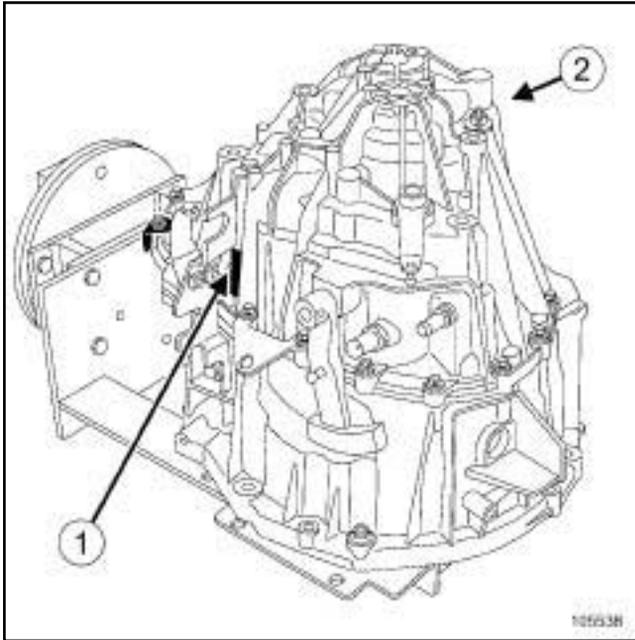
- |     |                   |
|-----|-------------------|
| (A) | Gearbox type      |
| (B) | Gearbox suffix    |
| (C) | Production plant  |
| (D) | Production number |

# MANUAL GEARBOX

## Manual gearbox: Identification

21A

X74, and DOCUMENTATION PHASE 2



105538

- (1) Identification plate
- (2) Identification label

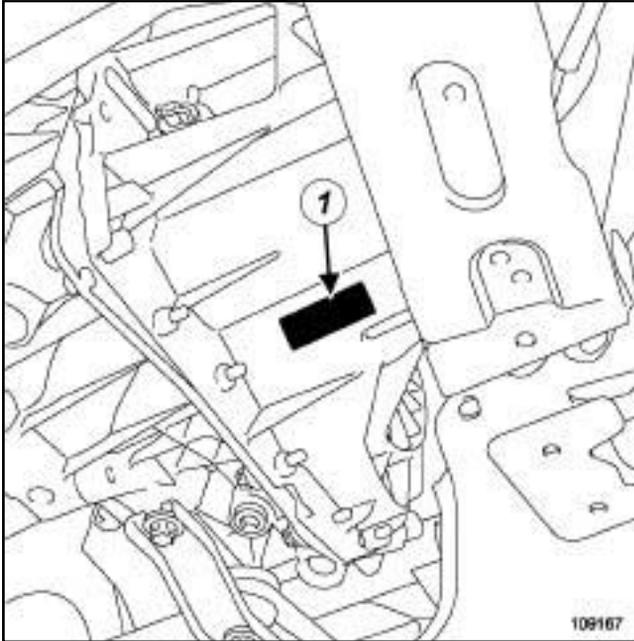
# MANUAL GEARBOX

## Manual gearbox: Identification

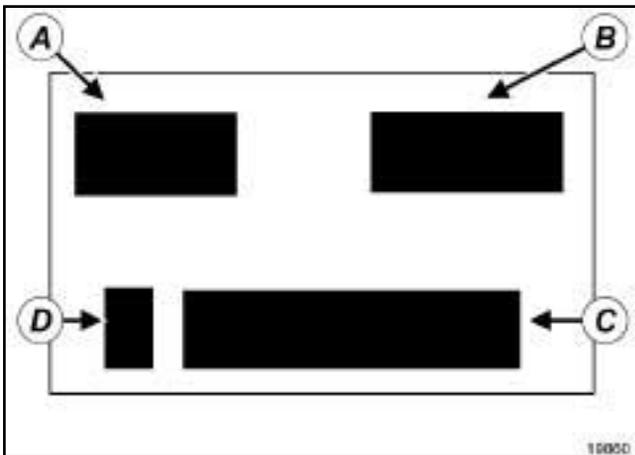
# 21A

X90

A marking (1) on the gearbox casing indicates:



109167



19860

- (A) Gearbox type
- (B) Gearbox suffix
- (C) Fabrication number
- (D) Factory of manufacture

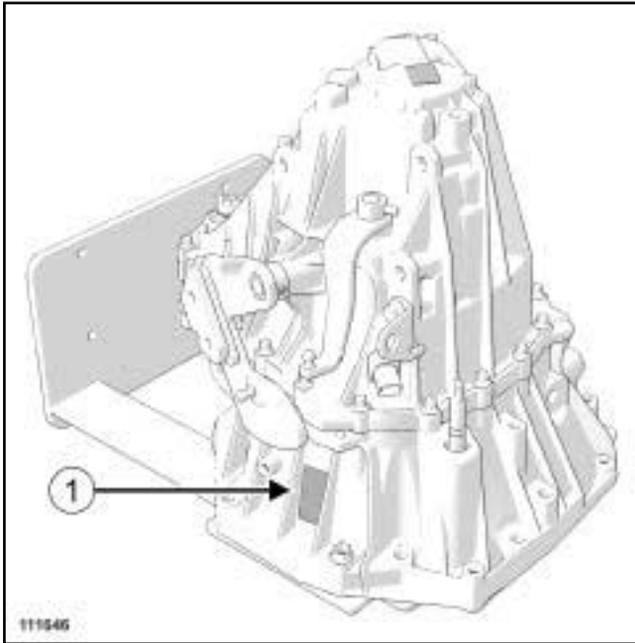
# MANUAL GEARBOX

## Manual gearbox: Identification

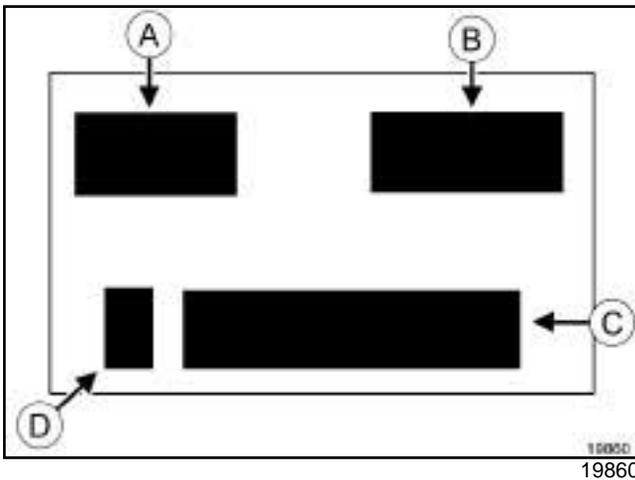
# 21A

X44, and JH1 or JH3

A marking **(1)** on the gearbox casing indicates:



111646



19860

- (A) Gearbox type
- (B) Gearbox suffix
- (C) Production number
- (D) Production plant

# MANUAL GEARBOX

## Manual gearbox: Specifications

21A

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

### GEAR RATIOS

Suffix	First	Second	Third	Fourth	Fifth	Reverse gear	Final drive	Tacho meter
<b>JA3 sequential gearbox</b>								
JA3-001	11/41	21/43	28/39	34/35	39/32	11/39	14/61	None
<b>JA5 sequential gearbox</b>								
JA5-001	11/41	21/43	28/37	35/34	41/31	11/39	16/55	None
<b>JH1 manual gearbox</b>								
JH1 -004	11/37	22/41	28/37	34/35	39/32	11/39	14/59	21/19
JH1 -013	11/37	22/41	28/37	34/35	39/32	11/39	15/61	21/19
JH1 -014	11/37	22/41	28/37	30/29	39/32	11/39	15/58	21/19
JH1 -015	11/37	22/41	28/37	30/29	41/31	11/39	15/56	21/19
JH1 -016	11/37	22/41	28/37	34/35	39/32	11/39	14/59	None
JH1 -017	11/37	22/41	28/37	34/35	39/32	11/39	15/61	None
JH1-019	11/37	22/41	28/37	34/35	39/32	14/59	14/59	21/19
JH1 -018	11/37	22/41	28/37	30/29	41/31	11/39	15/56	21/19
JH1 -020	11/41	21/43	28/39	34/35	39/31	11/39	14/59	None
JH1-021	11/41	21/43	28/39	34/35	39/31	11/39	14/59	None
JH1 -053	11/41	21/43	28/39	34/35	39/31	11/39	14/59	22/18
JH1-054	11/41	21/43	28/39	34/35	39/31	11/39	15/56	21/19
JH1-055	11/37	21/41	28/37	34/35	39/31	11/39	16/55	21/19
<b>JH3 manual gearbox</b>								
JH3-050	11/41	21/43	28/39	34/35	39/31	11/39	15/56	21/19
JH3-052	11/41	21/43	28/39	34/35	39/32	11/39	14/59	22/18
JH3-053	11/37	22/41	28/37	30/29	42/41	11/39	15/58	22/18
JH3-054	11/41	21/43	28/37	30/29	41/31	11/39	14/63	22/18
JH3-055	11/41	21/43	28/37	30/29	39/31	11/39	14/63	22/18
JH3-056	11/41	21/43	28/37	30/29	41/31	11/39	14/61	22/18
JH3-057	11/41	21/43	28/39	34/35	39/31	11/39	14/59	None
JH3-058	11/41	21/43	28/39	34/35	39/32	11/39	14/59	22/18
JH3-059	11/45	22/47	28/39	34/35	37/33	11/39	14/69	22/18

# MANUAL GEARBOX

## Manual gearbox: Specifications

# 21A

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

Suffix	First	Second	Third	Fourth	Fifth	Reverse gear	Final drive	Tacho meter
JH3-060	11/41	21/43	28/39	34/35	39/31	11/39	14/59	22/18
JH3-061	11/41	21/43	28/39	34/35	39/31	11/39	14/61	22/18
JH3-062	11/41	21/43	28/39	34/35	39/31	11/39	14/61	22/18
JH3-063	11/41	21/43	28/39	34/35	39/32	11/39	14/61	22/18
JH3-064	11/41	21/43	28/39	34/35	39/32	11/39	14/59	22/18
JH3-065	11/41	21/43	28/39	34/35	39/32	11/39	14/59	22/18
JH3-066	11/41	21/43	28/29	34/35	39/31	11/39	14/63	22/18
JH3-067	11/37	22/41	28/37	34/35	39/32	11/39	14/63	22/18
JH3-068	11/41	21/43	28/39	34/35	39/32	11/39	14/59	22/18
JH3-071	11/41	21/43	28/37	30/29	39/31	11/39	14/63	22/18
JH3-072	11/41	21/43	28/37	34/35	39/32	11/39	14/59	22/18
JH3-105	11/41	21/43	28/39	31/34	37/33	11/39	14/59	None
JH3-106	11/41	21/43	28/39	34/35	39/32	11/39	14/63	None
JH3-128	11/41	21/43	28/39	34/35	39/32	11/39	14/61	None
JH3-129	11/41	21/43	28/39	31/34	37/33	11/39	15/61	None
JH3-131	11/41	21/43	28/39	31/34	37/33	11/39	15/58	None
JH3-132	11/37	22/41	28/37	30/29	42/41	11/39	15/58	None
JH3-137	11/41	21/43	28/39	31/34	37/33	11/39	14/59	None
JH3-141	11/37	22/41	28/37	30/29	42/41	11/39	15/58	None
JH3-142	11/41	21/43	28/39	31/34	37/33	11/39	15/61	None
JH3-143	11/41	21/43	28/39	31/34	37/33	11/39	15/61	None
JH3-144	11/41	21/43	28/39	31/34	37/33	11/39	15/61	None
JH3-145	11/37	22/41	28/37	30/29	42/31	11/39	16/57	None
JH3-150	11/37	22/41	28/37	30/29	42/41	11/39	15/58	None
JH3-154	11/41	21/43	28/39	31/34	37/33	11/39	16/61	None
JH3-155	11/41	21/43	28/39	31/34	37/33	11/39	15/58	None
JH3-156								
JH3-160	11/41	22/41	28/37	30/29	42/31	11/39	15/58	22/18
JH3-166	11/41	21/43	28/37	30/29	42/31	11/39	16/55	None
JH3-169	11/41	21/43	28/39	34/35	39/31	11/39	14/59	None

# MANUAL GEARBOX

## Manual gearbox: Specifications

# 21A

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

Suffix	First	Second	Third	Fourth	Fifth	Reverse gear	Final drive	Tacho meter
JH3-170	11/41	21/43	28/39	34/35	39/32	11/39	14/63	None
JH3-171	11/37	22/41	28/37	34/35	39/31	11/39	15/61	None
JH3-172	11/41	21/43	28/39	31/34	37/33	11/39	15/61	None
JH3-173	11/41	21/43	28/39	31/34	37/33	11/39	15/61	None
JH3-174	11/37	22/41	28/37	30/29	42/31	11/39	15/68	None
JH3-175	11/37	22/41	28/37	30/29	42/31	11/39	15/68	None
JH3-176	11/41	21/43	28/39	34/35	39/32	11/39	14/61	None
JH3-177	11/41	21/43	28/39	31/34	37/33	11/39	15/61	None
JH3-179	11/41	21/43	28/39	31/34	37/33	11/39	15/68	None
JH3-183	11/41	21/43	28/39	34/35	39/32	11/39	14/59	None
JH3-184	11/41	21/43	28/39	34/35	39/32	11/39	15/58	None
JH3-185	11/41	21/43	28/39	34/35	39/32	11/39	15/58	None
JH3-186	11/41	21/43	28/39	34/35	39/32	11/39	15/58	None
JH3-187	11/41	21/43	28/39	34/35	39/32	11/39	15/58	None
JH3-189	11/37	22/41	28/37	30/29	42/31	11/39	15/56	None
JH3-190	11/37	22/41	28/37	30/29	42/31	11/39	15/56	None
JH3-193	11/41	21/43	28/37	30/29	42/31	11/39	16/55	None
JH3-199	11/41	21/43	28/39	34/35	39/32	11/39	14/59	None
JH3-309	11/41	21/43	28/39	34/35	39/32	11/39	15/58	None
JH3-312	11/41	21/43	28/37	30/29	42/31	11/39	16/57	None
JH3-313	11/41	21/43	28/37	30/29	42/31	11/39	16/57	None
JH3-315	11/41	21/43	28/37	30/29	42/31	11/39	16/57	None
JH3-321	11/41	21/43	28/39	34/35	39/31	11/39	14/59	22/18
<b>JR5 manual gearbox</b>								
JR5-003	11/37	22/41	28/37	34/35	39/32	11/39	15/61	None
JR5-004	11/41	21/43	28/37	35/34	41/31	11/39	16/55	None
JR5-008	11/41	21/43	29/39	31/34	37/33	11/39	15/58	None
JR5-015	11/41	21/43	28/39	31/34	37/33	11/39	15/58	None
JR5-016	11/41	21/43	28/37	35/34	41/31	11/39	16/55	None
JR5-017	11/41	21/43	28/39	31/34	37/33	11/39	15/61	None

# MANUAL GEARBOX

## Manual gearbox: Specifications

# 21A

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

Suffix	First	Second	Third	Fourth	Fifth	Reverse gear	Final drive	Tacho meter
JR5-018	11/37	22/41	28/37	34/35	39/32	11/39	15/61	None
JR5-113	11/41	21/43	28/37	35/34	41/31	11/39	16/57	None
JR5-116	11/41	21/43	28/37	35/34	41/31	11/39	16/55	21/19
JR5-124	11/41	21/43	28/37	35/34	41/31	11/39	16/55	None
JR5-126	11/37	21/41	28/37	35/34	42/31	11/39	15/58	21/19
JR5-144	11/37	21/41	28/37	35/34	42/31	11/39	15/58	21/18
JR5-145	11/41	21/43	28/37	35/34	41/31	11/39	16/55	21/19
JR5-147	11/41	21/43	28/37	35/34	42/31	11/39	15/58	22/18
JR5-149	11/41	21/43	28/39	31/34	42/31	11/39	15/58	22/18
JR5-151	11/41	21/43	28/37	35/34	39/31	11/39	14/63	22/18
JR5-152	11/41	21/43	28/37	35/34	39/32	11/39	14/63	None
JR5-156	11/41	21/43	28/37	35/34	39/32	11/39	15/58	None
JR5-158	11/41	21/43	28/37	35/34	42/31	11/39	15/61	22/18
JR5-165	11/41	21/43	28/37	35/34	42/31	11/39	14/69	22/18
JR5-166	11/41	21/43	28/37	35/34	42/31	11/39	16/57	22/18
JR5-168	11/41	21/43	28/37	35/34	41/31	11/39	14/69	None
JR5-169	11/41	21/43	28/37	35/34	42/31	11/39	14/73	22/18
JR5-170	11/41	21/43	28/37	35/34	42/31	11/39	14/69	22/18
JR5-171	11/41	21/43	28/37	35/34	39/32	11/39	14/63	None
JR5-172	11/41	21/43	28/39	31/34	37/33	11/39	14/63	22/18
JR5-173	11/41	21/43	28/37	35/34	39/32	11/39	14/61	None
JR5-175	11/41	21/43	28/37	34/35	39/32	11/39	15/56	None
JR5-176	11/41	22/41	28/37	35/34	42/31	11/39	15/56	None
JR5-183	11/41	21/43	28/37	35/34	39/32	11/39	14/59	None
JR5-184	11/41	21/43	28/37	35/34	39/32	11/39	15/58	None
JR5-185	11/41	21/43	28/37	35/34	41/31	11/39	17/56	None
JR5-187	11/41	21/43	28/37	35/34	39/32	11/39	14/69	None
JR5-189	11/41	21/43	28/37	35/34	41/31	11/39	14/59	None
JR5-193	11/41	21/43	28/37	35/34	41/31	11/39	1756	None
JR5-301	11/41	21/43	28/37	35/34	41/31	11/39	15/56	None

# MANUAL GEARBOX

## Manual gearbox: Specifications

# 21A

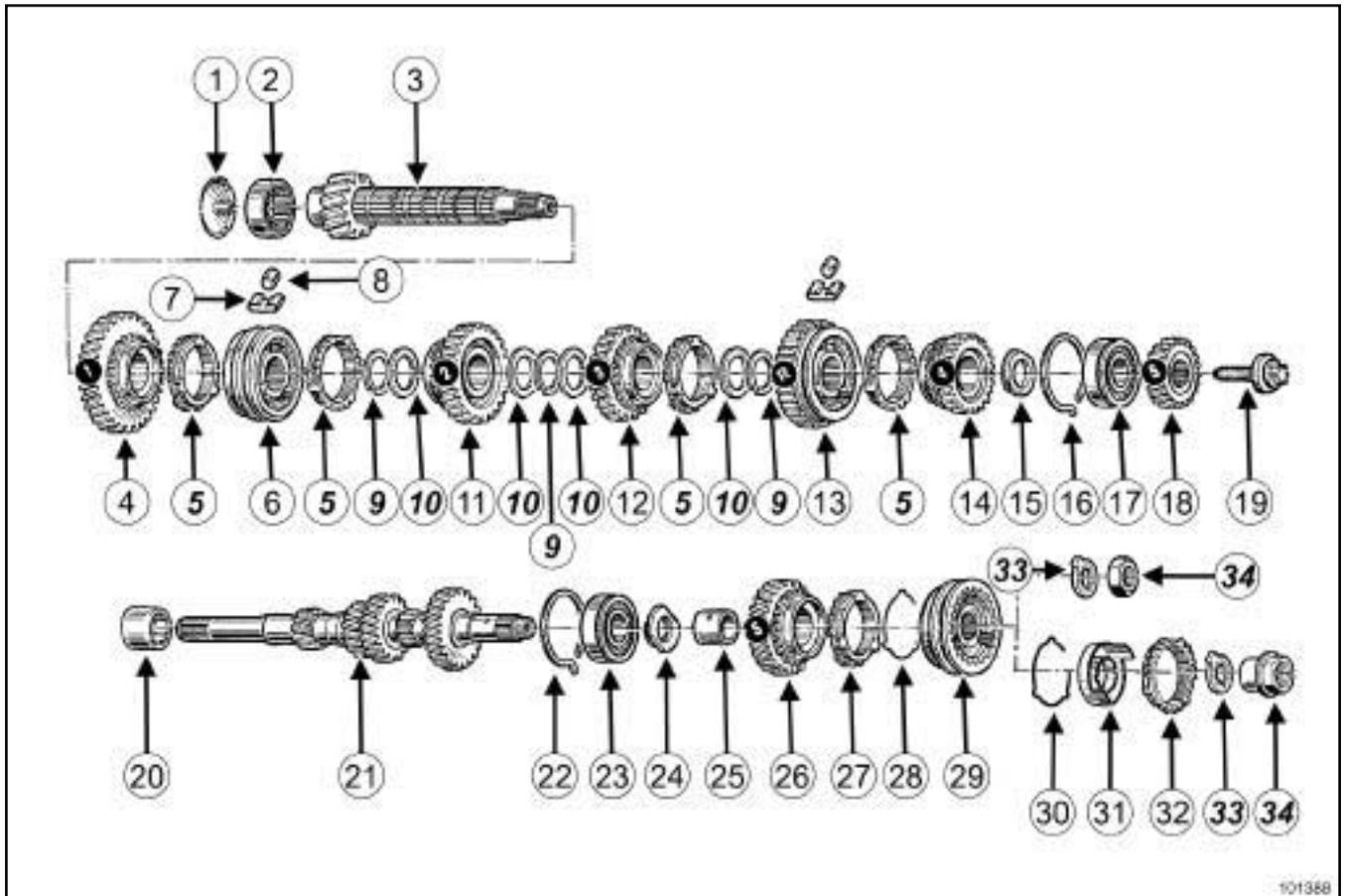
X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

Suffix	First	Second	Third	Fourth	Fifth	Reverse gear	Final drive	Tacho meter
JR5-302	11/41	21/43	28/37	35/34	41/31	11/39	14/69	None
JR5-308	11/41	21/43	28/37	31/29	45/31	11/39	18/57	None

## Manual gearbox: List and location of components

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

X06 – X35, and JH3 – X44, and JH1 or JH3 – X61, and JH3 – X65, and JH1 or JH3 – X74, and JH3 – X76, and JH3 – X77, and JA3 or JH3 – X84, and JH3 – X85, and JA3 or JH3 – X90, and JH1 or JH3 – X95, and JH3 – X38, and JH3



101388

101388

- (1) Oil deflector
- (2) Bearing
- (3) Output shaft
- (4) First gear pinion
- (5) Synchromesh ring
- (6) First-second gear synchroniser hub
- (7) Spring
- (8) Roller
- (9) Lock ring
- (10) Splined washer
- (11) Second gear pinion
- (12) Third gear pinion
- (13) Third-fourth gear synchroniser hub

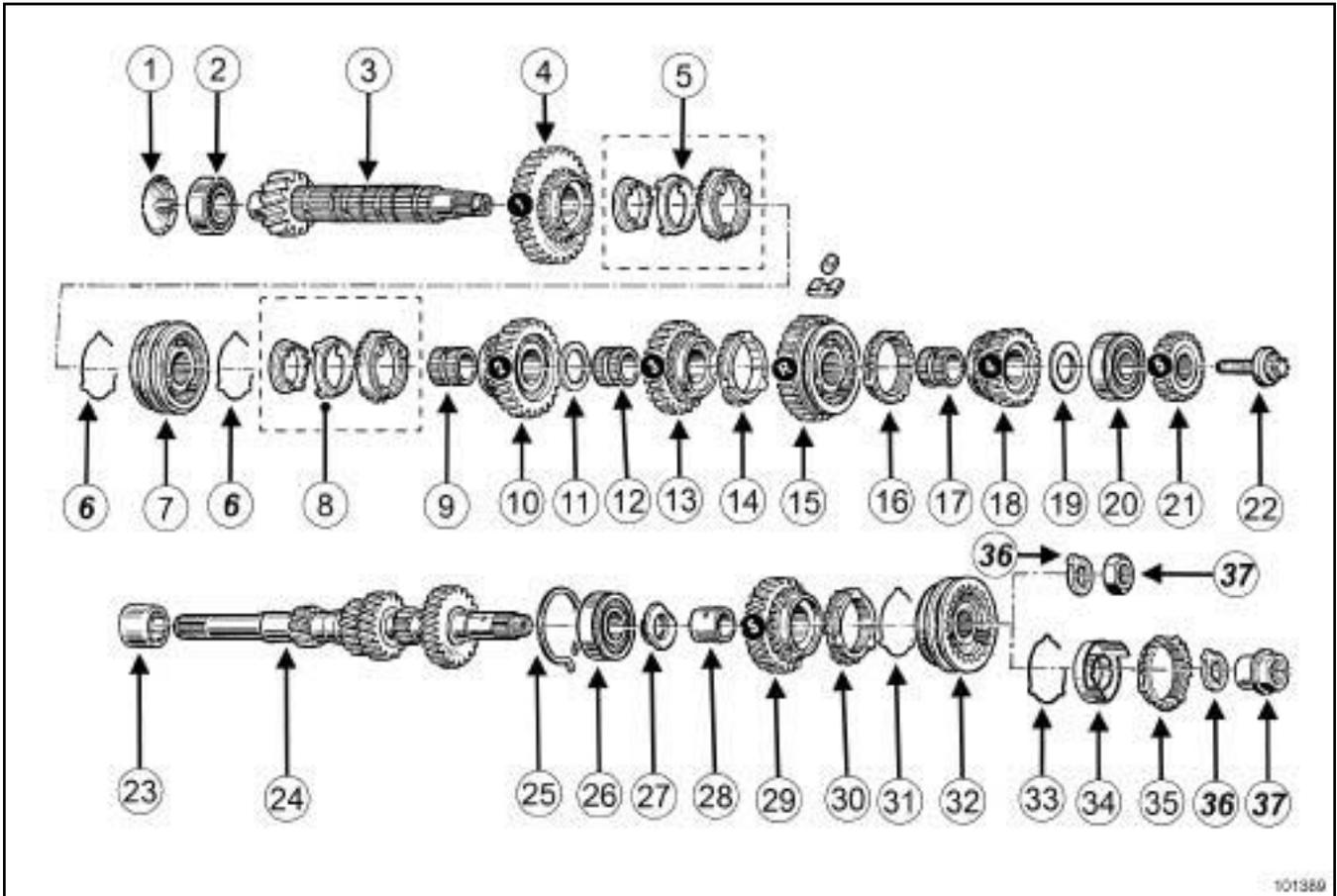
- (14) Fourth gear pinion
- (15) Lock washer
- (16) Retaining clips
- (17) Bearing
- (18) Fifth gear pinion
- (19) Output shaft bolt
- (20) Bearing guide
- (21) Primary shaft
- (22) Retaining clips
- (23) Bearing
- (24) Lock washer
- (25) Sprocket supporting ring
- (26) Fifth gear pinion
- (27) Synchromesh ring
- (28) Spring

## Manual gearbox: List and location of components

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

- (29) Synchroniser hub
- (30) Spring
- (31) Friction cone
- (32) Synchromesh ring
- (33) Washer
- (34) Input shaft nut

X35, and JR5 – X44, and JR5 – X61, and JR5 – X65, and JR5 – X74, and JR5 – X76, and JR5 – X77, and JA5 or JR5 – X84, and JR5 – X85, and JA5 or JR5 – X90, and JR5 – X95, and JR5 – X38, and JR5 – X79



101389

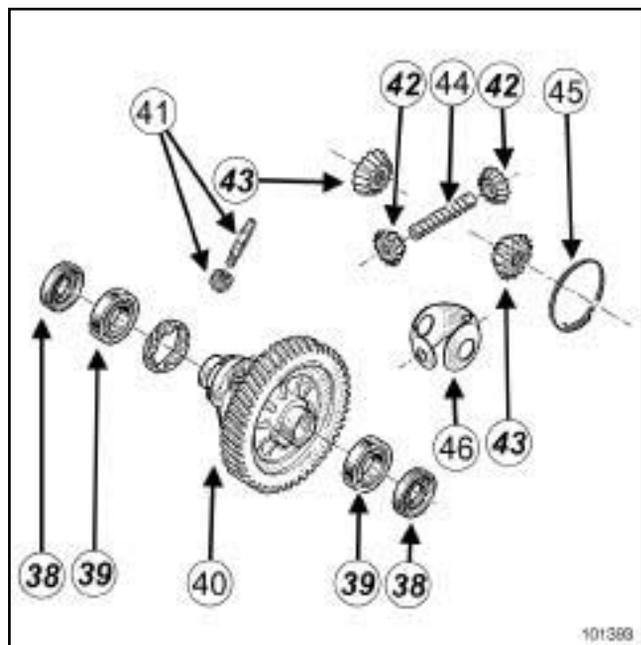
101389

- |      |                                    |      |                                    |
|------|------------------------------------|------|------------------------------------|
| (1)  | Oil deflector                      | (13) | Third gear pinion                  |
| (2)  | Bearing                            | (14) | Synchromesh ring                   |
| (3)  | Output shaft                       | (15) | Third-fourth gear synchroniser hub |
| (4)  | First gear pinion                  | (16) | Synchromesh ring                   |
| (5)  | Synchromesh ring                   | (17) | Sprocket supporting ring           |
| (6)  | Spring                             | (18) | Fourth gear pinion                 |
| (7)  | First-second gear synchroniser hub | (19) | Adjustment washer                  |
| (8)  | Synchromesh ring                   | (20) | Bearing                            |
| (9)  | Sprocket supporting ring           | (21) | Fifth gear pinion                  |
| (10) | Second gear pinion                 | (22) | Output shaft bolt                  |
| (11) | Spined washer                      | (23) | Bearing guide                      |
| (12) | Sprocket supporting ring           | (24) | Primary shaft                      |
|      |                                    | (25) | Retaining clips                    |

## Manual gearbox: List and location of components

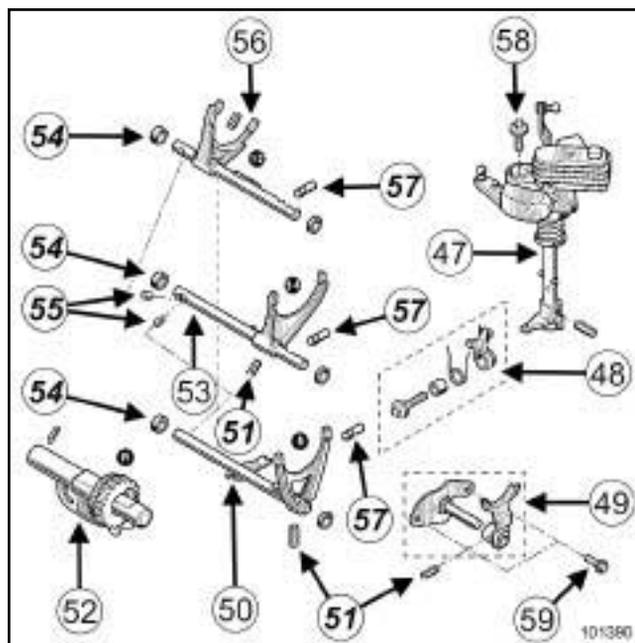
X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

- (26) Bearing
- (27) Lock washer
- (28) Sprocket supporting ring
- (29) Fifth gear pinion
- (30) Synchromesh ring
- (31) Spring
- (32) Synchroniser hub
- (33) Spring
- (34) Friction cone
- (35) Synchromesh ring
- (36) Washer
- (37) Input shaft nut



101393

- (38) Differential seal
- (39) Bearing
- (40) Differential
- (41) Tachometer sprocket (if fitted to the vehicle)
- (42) Satellite
- (43) Sunwheel
- (44) Axis
- (45) Shaft retaining spring
- (46) Friction cover

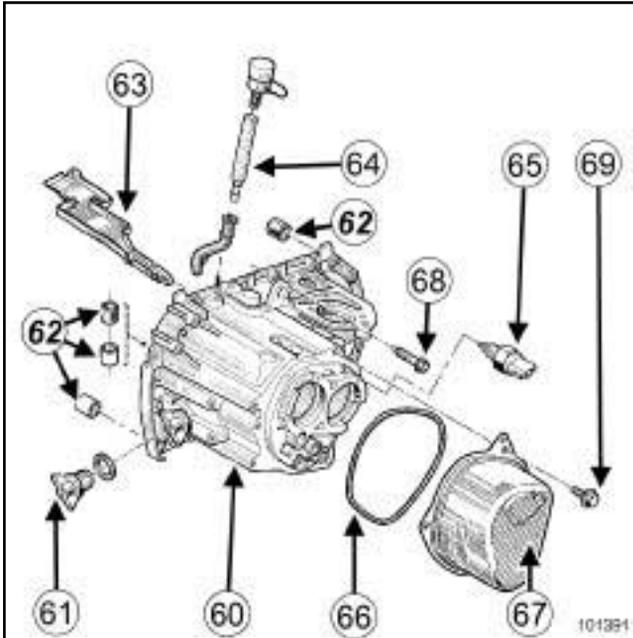


101390

- (47) Selector shaft
- (48) Gear shift catch
- (49) Reverse gear brake fork and shaft
- (50) Fifth gear fork and shaft
- (51) Pin
- (52) Reverse gear shaft
- (53) Third-fourth gear fork and shaft
- (54) Ring
- (55) Lock shaft
- (56) First-second gear fork and shaft
- (57) Retaining locating ball cartridge
- (58) Selector shaft bolt
- (59) Reverse gear fork shaft bolt

## Manual gearbox: List and location of components

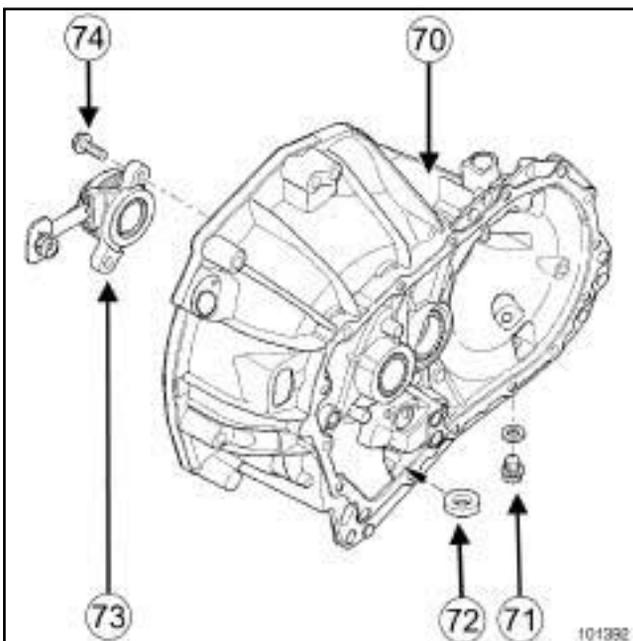
X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79



101391

- (60) Mechanism housing
- (61) Filler plug
- (62) Spacer
- (63) Oil channel
- (64) Breather pipe
- (65) Reverse gear sensor
- (66) O-ring
- (67) Fifth gear housing
- (68) Gearbox bell housing bolt
- (69) Fifth gear housing bolt

- (70) Clutch housing
- (71) Drain plug
- (72) Magnet
- (73) Hydraulic clutch release bearing
- (74) Hydraulic clutch release bearing bolt



101392

# MANUAL GEARBOX

## Manual gearbox: Repair

# 21A

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

### IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **21A, Manual gearbox, Manual gearbox: Precautions for the repair, page 21A-1**).

## REMOVAL

### I - REPAIR PREPARATION OPERATION

- Remove the gearbox (see **Manual gearbox: Removal - Refitting**).
- Position the gearbox on the component support (see **21A, Manual gearbox, Gearbox support equipment: Use, page 21A-23**).

### II - REMOVAL OPERATION

- Remove:
  - the fifth gear housing (see **5th gear housing: Removal - Refitting**),
  - the fifth gear synchroniser and pinions (see **5th gear sprockets and synchronisers: Removal - Refitting**),
  - the mechanism housing (see **21A, Manual gearbox, Mechanism housing: Removal - Refitting, page 21A-24**),
  - the gearbox shafts (see **21A, Manual gearbox, Gearbox shaft: Removal - Refitting, page 21A-31**),
  - the differential (see **21A, Manual gearbox, Manual gearbox differential: Removal - Refitting, page 21A-62**).

### III - REPAIR OPERATION

- Strip down the output shaft (see **21A, Manual gearbox, Output shaft: Stripping - Rebuilding, page 21A-39**).
- Remove:
  - the differential bearings (see **21A, Manual gearbox, Manual gearbox differential bearing: Removal - Refitting, page 21A-66**),
  - the bearings of the mechanism housing (see **21A, Manual gearbox, Mechanism housing bearing: Removal - Refitting, page 21A-28**),

- the bearings of the clutch housing (see **21A, Manual gearbox, Clutch housing bearing: Removal - Refitting, page 21A-49**),

- the gearbox selector shaft (see **21A, Manual gearbox, Manual gearbox selector shaft: Removal - Refitting, page 21A-53**).

- Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) to clean all of the removed parts.

- Check (see **21A, Manual gearbox, Manual gearbox: Check, page 21A-20**):

- the pinions (teeth, claws, friction cone, inner wall),
- the synchroniser hubs,
- the synchroniser rings,
- the bearings.

- Replace worn or damaged parts.

## REFITTING

### I - REFITTING PREPARATION OPERATION

- Parts always to be replaced:
  - the lip seals,
  - the O-rings,
  - the clutch thrust bearing guide,
  - the gear lock rings,
  - the roll pins,
  - the input and output shaft bearing circlips,
  - the selector rod hub springs,
  - the hydraulic clutch slave cylinder (if fitted),
  - the magnet,
  - the selector shaft rings,
  - the lock ring of the differential,
  - the differential retaining nut.

### II - REFITTING OPERATION

- Refit:
  - the gearbox selector shaft (see **21A, Manual gearbox, Manual gearbox selector shaft: Removal - Refitting, page 21A-53**),
  - the bearings of the clutch housing (see **21A, Manual gearbox, Clutch housing bearing: Removal - Refitting, page 21A-49**),

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

- the bearings of the mechanism housing (see **21A, Manual gearbox, Mechanism housing bearing: Removal - Refitting**, page **21A-28**) ,
  - the differential bearings (see **21A, Manual gearbox, Manual gearbox differential bearing: Removal - Refitting**, page **21A-66**) .
- Rebuild the output shaft (see **21A, Manual gearbox, Output shaft: Stripping - Rebuilding**, page **21A-39**) .

### III - REMOVAL OPERATION

- Refit:
- the differential (see **21A, Manual gearbox, Manual gearbox differential: Removal - Refitting**, page **21A-62**) ,
  - the gearbox shafts (see **21A, Manual gearbox, Gearbox shaft: Removal - Refitting**, page **21A-31**) .
- Adjust the shafts (see **21A, Manual gearbox, Gearbox shaft: Adjustment**, page **21A-46**) if replacing a shaft or housing.
- Refit:
- the mechanism housing (see **21A, Manual gearbox, Mechanism housing: Removal - Refitting**, page **21A-24**) ,
  - the fifth gear synchroniser and pinions (see **5th gear sprockets and synchronisers: Removal - Refitting**) ,
  - the fifth gear housing (see **5th gear housing: Removal - Refitting**) .

### IV - FINAL OPERATION

- Remove the gearbox from the component support (see **21A, Manual gearbox, Gearbox support equipment: Use**, page **21A-23**) .
- Refit the gearbox (see **Manual gearbox: Removal - Refitting**) .

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

### IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **21A, Manual gearbox, Manual gearbox: Precautions for the repair**, page 21A-1) .

### I - PREPARATION OPERATION FOR CHECK

Remove the gearbox (see **Manual gearbox: Removal - Refitting**) .

Position the gearbox on the component support (see **21A, Manual gearbox, Gearbox support equipment: Use**, page 21A-23) .

Remove:

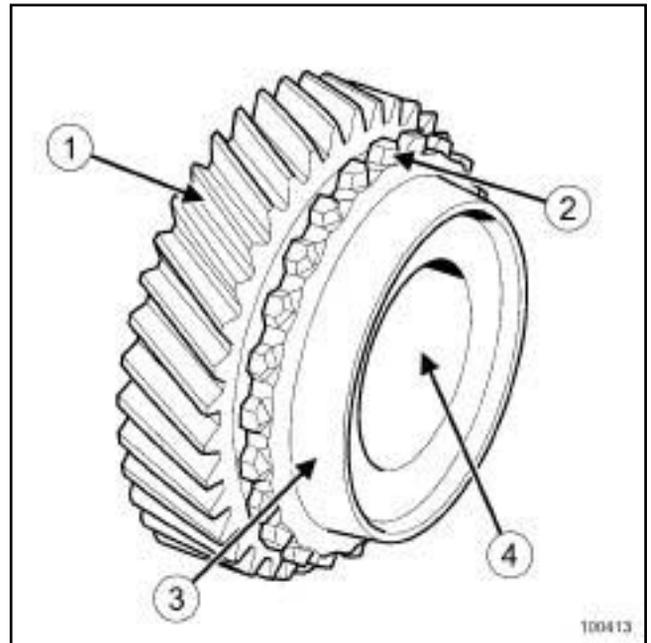
- the fifth gear housing (see **5th gear housing: Removal - Refitting**) ,
- the fifth gear synchroniser and pinions (see **5th gear sprockets and synchronisers: Removal - Refitting**) ,
- the mechanism housing (see **21A, Manual gearbox, Mechanism housing: Removal - Refitting**, page 21A-24) ,
- the gearbox shafts (see **21A, Manual gearbox, Gearbox shaft: Removal - Refitting**, page 21A-31) .

Strip down the output shaft (see **21A, Manual gearbox, Output shaft: Stripping - Rebuilding**, page 21A-39) .

Before any checks, clean the parts concerned (see **21A, Manual gearbox, Manual gearbox: Precautions for the repair**, page 21A-1) .

### II - TEST OPERATION

#### 1 - Gearing



100413

When checking, make sure that you pay particular attention to the appearance of the teeth, especially that of the chamfers and claws.

Check that:

- the teeth **(1)** are not broken or chipped,
- the claws **(2)** are not broken, chipped or worn,
- the friction cone **(3)** shows no sign of scratches or blue stains,
- the inner wall **(4)** shows no sign of sticking or wear.

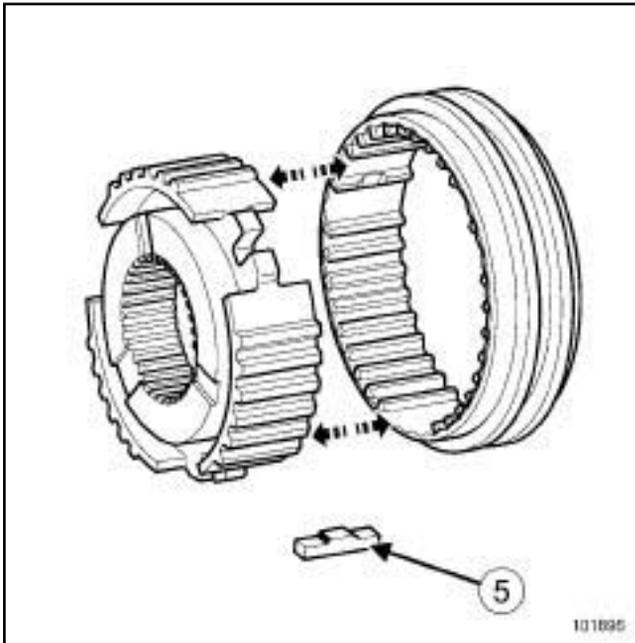
# MANUAL GEARBOX

## Manual gearbox: Check

# 21A

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

### 2 - Selector rod hub

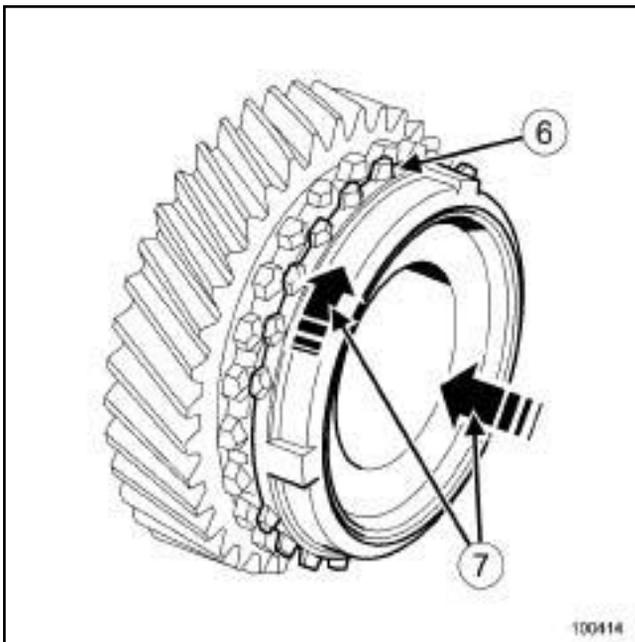


101896

Check:

- the selector rod slides into the hub without any problem,
- that the collets (5) are in good condition.

### 3 - Synchromesh ring

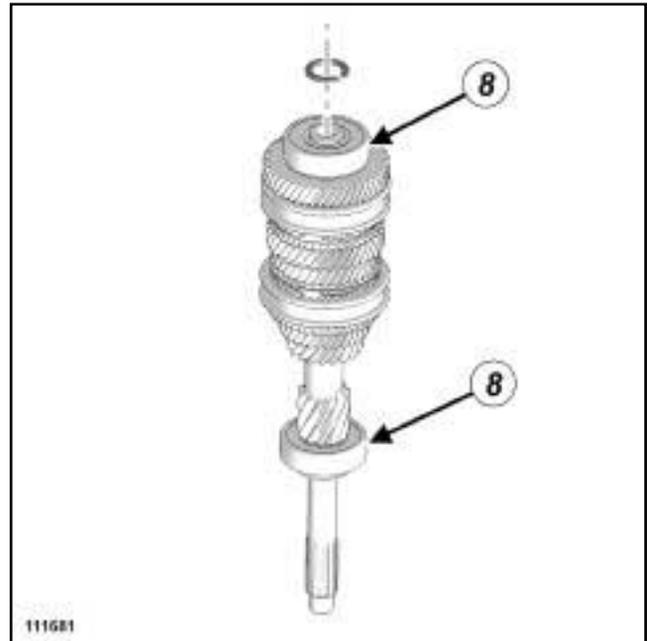


100414

Check that the claw teeth (6) show no sign of wear or any fractures.

To check that the synchroniser ring is working correctly, push the ring on the friction cone and rotate (7) : the ring should not turn. Otherwise, replace the synchroniser ring.

### 4 - Bearings



111681

Make sure the bearings (8) are rotating properly.

If a bearing rotates unevenly or noisily, it must be replaced.

### III - FINAL OPERATION

Rebuild the output shaft (see 21A, **Manual gearbox, Output shaft: Stripping - Rebuilding**, page 21A-39) .

Adjust the output shaft (see 21A, **Manual gearbox, Gearbox shaft: Adjustment**, page 21A-46) .

Refit:

- the gearbox shafts (see 21A, **Manual gearbox, Gearbox shaft: Removal - Refitting**, page 21A-31) ,
- the mechanism housing (see 21A, **Manual gearbox, Mechanism housing: Removal - Refitting**, page 21A-24) ,
- the fifth gear synchroniser and pinions (see **5th gear sprockets and synchronisers: Removal - Refitting**) ,
- the fifth gear housing (see **5th gear housing: Removal - Refitting**) .

Remove the gearbox from the component support (see 21A, **Manual gearbox, Gearbox support equipment: Use**, page 21A-23) .

# MANUAL GEARBOX

## Manual gearbox: Check

# 21A

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

Refit the gearbox (see **Manual gearbox: Removal - Refitting**).

# MANUAL GEARBOX

## Gearbox support equipment: Use

# 21A

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

### Equipment required

workshop hoist

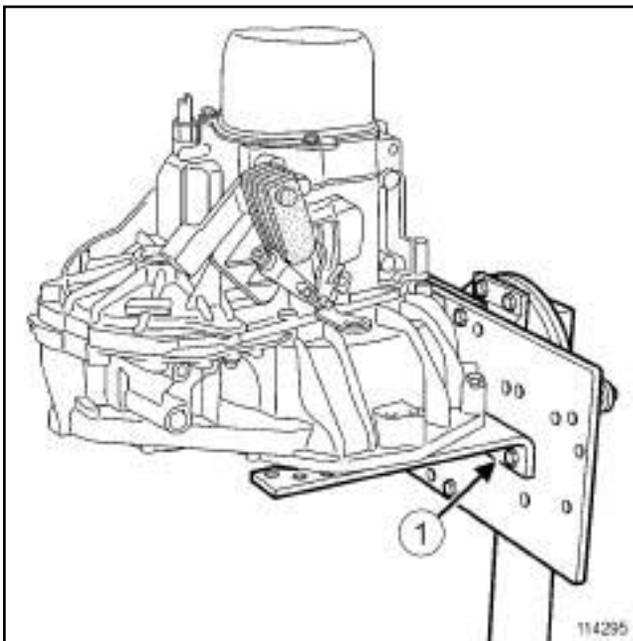
### IMPORTANT

To work in complete safety, it is essential to use a component stand.

### I - PREPARATION OPERATION FOR FITTING THE GEARBOX ON THE COMPONENT SUPPORT

- Remove the gearbox (see **Manual gearbox: Removal - Refitting**) .

### II - OPERATION FOR FITTING THE GEARBOX ON THE COMPONENT SUPPORT



114295

- Position the stand plate (1) on the DESVIL tool or on the component support tool.
- Fit the gearbox on the stand plate using the **workshop hoist**.
- Secure the gearbox on the stand plate using bolts and nuts.

### III - OPERATION FOR REMOVING THE GEARBOX FROM THE COMPONENT SUPPORT

- Remove:
  - the gearbox mountings on the stand plate,
  - the gearbox using the **workshop hoist**,

- the stand plate from the component support.

### IV - FINAL OPERATION

- Refit the gearbox (see **Manual gearbox: Removal - Refitting**) .

## Mechanism housing: Removal - Refitting

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

### Special tooling required

<b>Bvi. 1934</b>	Socket for removing/refitting reverse gear switch
<b>Bvi. 1570</b>	Tools for fitting the fork shaft locking bearings.

### Tightening torques

mechanism housing bolts	<b>25 N.m</b>
reverse gear switch	<b>25 N.m</b>

### IMPORTANT

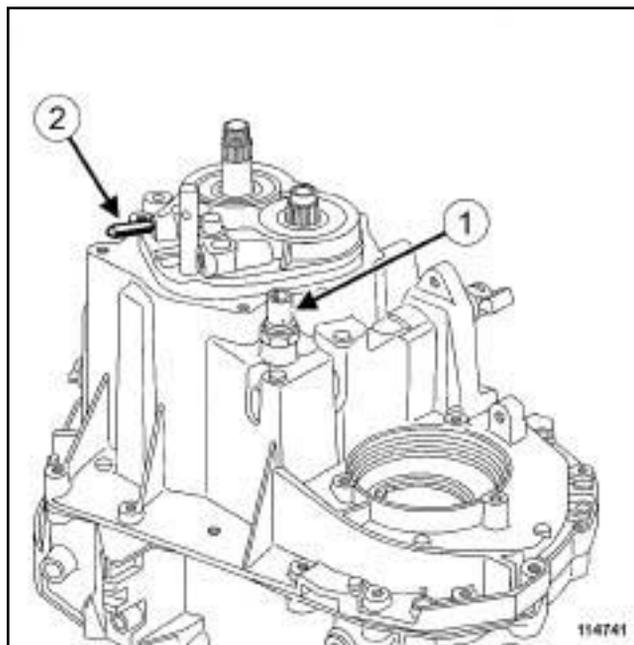
To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **21A, Manual gearbox, Manual gearbox: Precautions for the repair, page 21A-1**).

## REMOVAL

### I - REMOVAL PREPARATION OPERATION

- Remove the gearbox (see **Manual gearbox: Removal - Refitting**).
- Position the gearbox on the component support (see **21A, Manual gearbox, Gearbox support equipment: Use, page 21A-23**).
- Remove:
  - the fifth gear housing (see **5th gear housing: Removal - Refitting**),
  - the fifth gear synchroniser and pinions (see **5th gear sprockets and synchronisers: Removal - Refitting**).

### II - OPERATION FOR REMOVAL OF PART CONCERNED



114741

- Remove:
  - the mechanism housing bolts,
  - the reverse gear switch (1) using the tool (**Bvi. 1934**),
  - the retaining pin (2) of the reverse gear shaft (if equipped).
- Engage third gear.
- Detach and remove the mechanism housing.

## Mechanism housing: Removal - Refitting

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

### REFITTING

#### I - REFITTING PREPARATION OPERATION

- ❑ Clean the joint faces of the mechanism housing using **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) .

#### WARNING

Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

- ❑ Remove the residue using a plastic spatula.
- ❑ Finish cleaning the joint faces using a **GREY ABRASIVE PAD** part number **77 01 405 943**.
- ❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) to clean:
  - the joint face of the mechanism housing and the clutch housing,
  - the mechanism housing.

#### WARNING

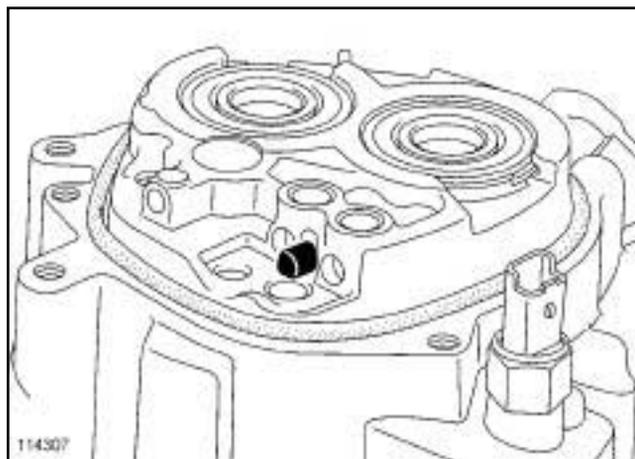
To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

#### WARNING

Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid may cause damage to some components.

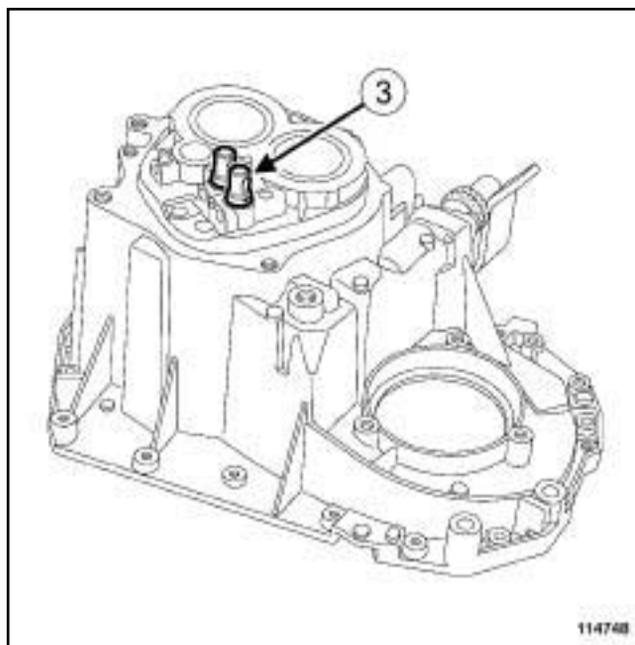
- ❑ Parts always to be replaced:
  - the lip seals,
  - the O-rings,
  - the clutch thrust bearing guide
  - the gear lock rings,
  - the roll pins,
  - the input and output shaft bearing circlips,
  - the selector rod hub springs,
  - the hydraulic clutch slave cylinder (if fitted),
  - the magnet.

#### II - REFITTING OPERATION FOR PART CONCERNED



114307

- ❑ Fit the first-second, third-fourth and fifth gear shaft locating ball cartridges into the gearbox housing.



114748

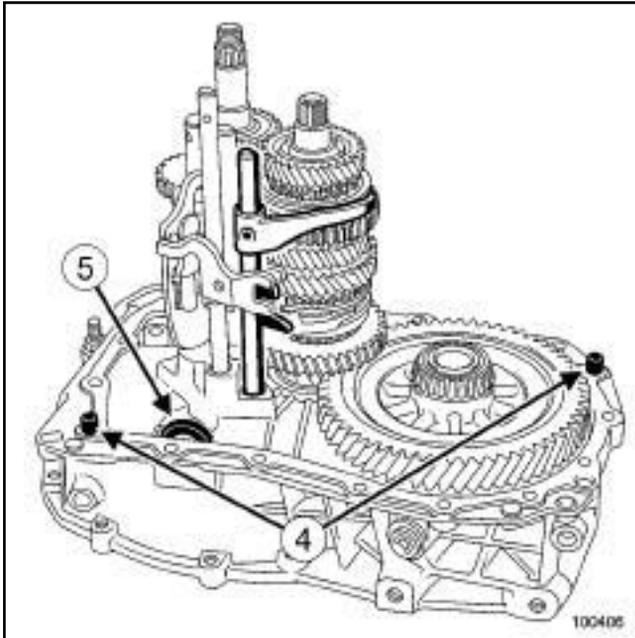
- ❑ Fit the springs and balls for gearboxes which are not fitted with a locating ball cartridge.
- ❑ Engage the ball assemblies using the **(Bvi. 1570) (3)**

# MANUAL GEARBOX

## Mechanism housing: Removal - Refitting

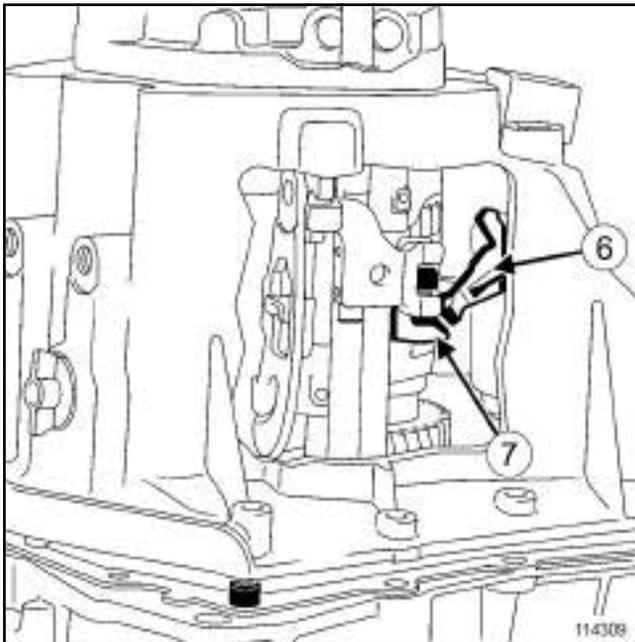
# 21A

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79



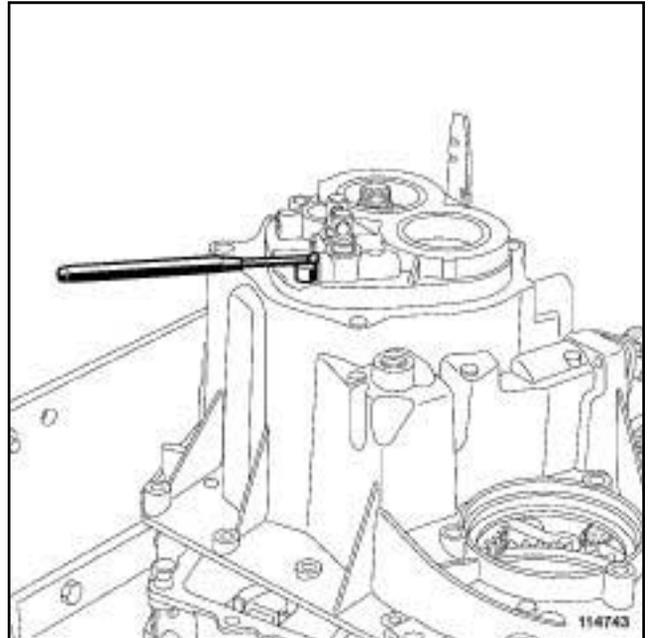
100406

- Engage third gear.
- Check the positioning:
  - of the centring dowels (4) ,
  - of the magnet (5) .



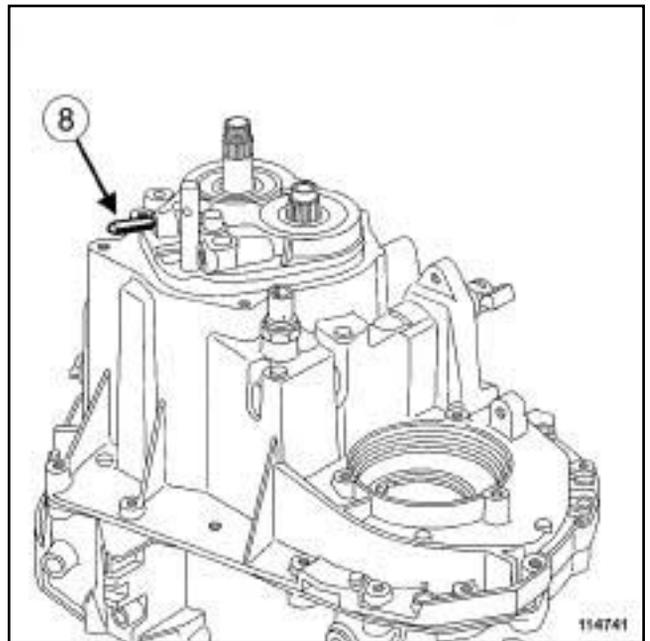
114309

- Apply a bead of **RESIN ADHESIVE** (see **Vehicle: Parts and consumables for the repair**) to the joint face of the mechanism housing.
- Refit the gearbox housing, guiding the shift finger (6) into the fork of the third gear (7) .



114743

- Engage the locating ball for the fifth gear shaft for gearboxes not fitted with a locating ball cartridge.



114741

- Insert the reverse gear shaft retaining pin (8) (if fitted).
- Pretighten the mechanism housing bolts.
- Turn the input shaft to ensure correct engagement of the bearings.
- Torque tighten the **mechanism housing bolts (25 N.m)**.
- Refit the reverse gear switch with the tool (**Bvi. 1934**).

# MANUAL GEARBOX

## Mechanism housing: Removal - Refitting

# 21A

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

- Torque tighten the **reverse gear switch (25 N.m)**.

### III - FINAL OPERATION

- Refit:
  - the fifth gear synchroniser and pinions (see **5th gear sprockets and synchronisers: Removal - Refitting**) ,
  - the fifth gear housing (see **5th gear housing: Removal - Refitting**) .
- Remove the gearbox from the component support (see **21A, Manual gearbox, Gearbox support equipment: Use**, page 21A-23) .
- Refit the gearbox (see **Manual gearbox: Removal - Refitting**) .

## Mechanism housing bearing: Removal - Refitting

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

### IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **21A, Manual gearbox, Manual gearbox: Precautions for the repair, page 21A-1**) .

## REMOVAL

### I - REMOVAL PREPARATION OPERATION

- Remove the gearbox (see **Manual gearbox: Removal - Refitting**) .
- Position the gearbox on the component support (see **21A, Manual gearbox, Gearbox support equipment: Use, page 21A-23**) .
- Remove:
  - the fifth gear housing (see **5th gear housing: Removal - Refitting**) ,
  - the fifth gear synchroniser and pinions (see **5th gear sprockets and synchronisers: Removal - Refitting**) ,
  - the mechanism housing (see **21A, Manual gearbox, Mechanism housing: Removal - Refitting, page 21A-24**) .

### II - OPERATION FOR REMOVAL OF PART CONCERNED

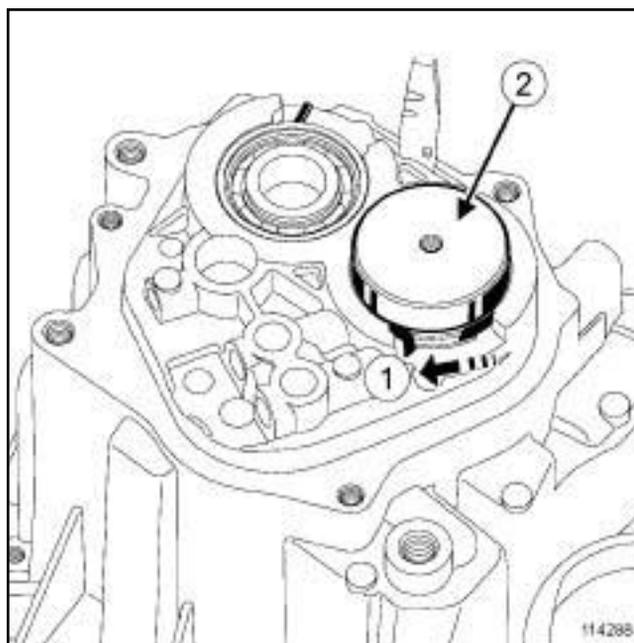
X06 – X35, and JH3 – X44, and JH1 or JH3 – X61, and JH3 – X65, and JH1 or JH3 – X74, and JH3 – X76, and JH3 – X77, and JA3 or JH3 – X84, and JH3 – X85, and JA3 or JH3 – X90, and JH1 or JH3 – X95, and JH3 – X38, and JH3

Note:

A press should be used to remove and refit the bearings.

Note:

The operation described is identical for both bearings.



114288

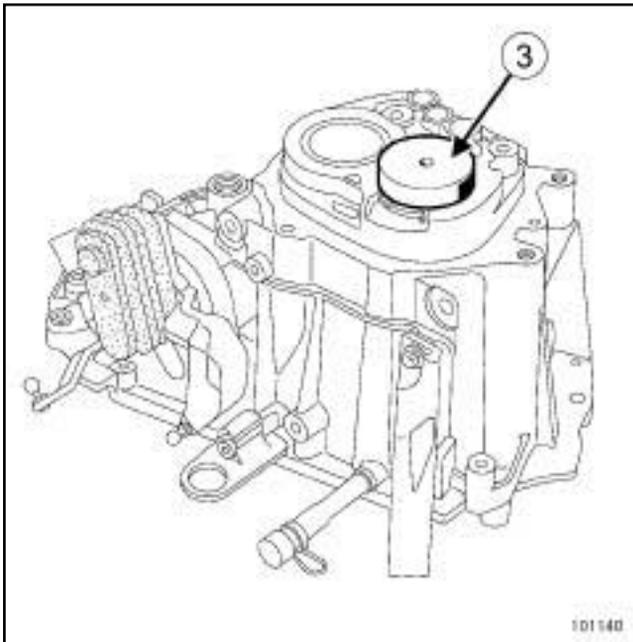
- Separate the circlip (1) .
- Remove the bearing towards the inside of the mechanism housing using the tool (2) .

## Mechanism housing bearing: Removal - Refitting

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

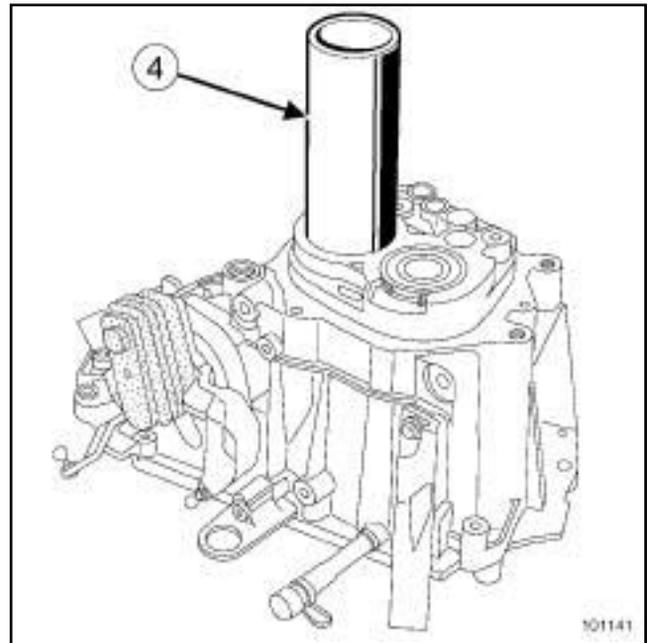
X35, and JR5 – X44, and JR5 – X61, and JR5 – X65, and JR5 – X74, and JR5 – X76, and JR5 – X77, and JA5 or JR5 – X84, and JR5 – X85, and JA5 or JR5 – X90, and JR5 – X95, and JR5 – X38, and JR5 – X79

### 1 - Input shaft side bearing



- Separate the circlip.
- Remove the bearing towards the inside of the mechanism housing using the tool (3).

### 2 - Output shaft side bearing



- Remove the bearing cup on the output shaft side using a tube (4) with a diameter of 55 mm.

## REFITTING

### I - REFITTING PREPARATION OPERATION

- Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) to clean:
  - the bearing mating faces in the mechanism housing,
  - the mechanism housing.
- Parts always to be replaced:
  - the removed bearings,
  - the lip seals,
  - the O-rings,
  - the clutch thrust bearing guide,
  - the roll pins,
  - the input and output shaft bearing circlips,
  - the mechanism housing bearing circlips,
  - the hydraulic clutch slave cylinder (if fitted),
  - the magnet.

## Mechanism housing bearing: Removal - Refitting

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

### II - REFITTING OPERATION FOR PART CONCERNED

X06 – X35, and JH3 – X44, and JH1 or JH3 – X61, and JH3 – X65, and JH1 or JH3 – X74, and JH3 – X76, and JH3 – X77, and JA3 or JH3 – X84, and JH3 – X85, and JA3 or JH3 – X90, and JH1 or JH3 – X95, and JH3 – X38, and JH3

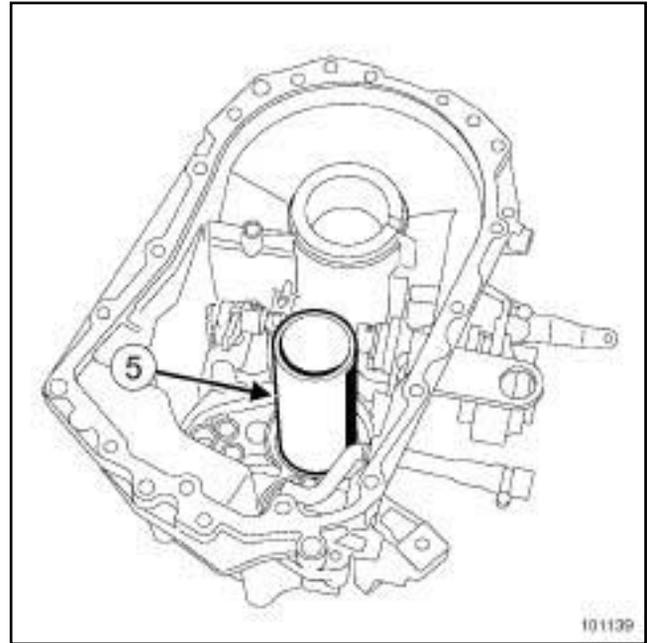
- Place:
  - the new circlip in its housing,
  - the bearing in the tool.
- Knock the tool with the bearing using the press. The shape of the tool enables the circlip to be opened in the housing and the bearing to be inserted.
- Check that the circlip has been positioned correctly in the bearing channel.

X35, and JR5 – X44, and JR5 – X61, and JR5 – X65, and JR5 – X74, and JR5 – X76, and JR5 – X77, and JA5 or JR5 – X84, and JR5 – X85, and JA5 or JR5 – X90, and JR5 – X95, and JR5 – X38, and JR5 – X79

#### 1 - Input shaft side bearing

- Fit a new circlip.
- Refit the bearing using the tool.

#### 2 - Output shaft side bearing



101139

- Refit the bearing cup using a **60 mm** diameter tube (5) .

### III - FINAL OPERATION

- Refit:
  - the mechanism housing (see **21A, Manual gearbox, Mechanism housing: Removal - Refitting, page 21A-24**) ,
  - the fifth gear synchroniser and pinions (see **5th gear sprockets and synchronisers: Removal - Refitting**) ,
  - the fifth gear housing (see **5th gear housing: Removal - Refitting**) .
- Remove the gearbox from the component support (see **21A, Manual gearbox, Gearbox support equipment: Use, page 21A-23**) .
- Refit the gearbox (see **Manual gearbox: Removal - Refitting**) .

# MANUAL GEARBOX

## Gearbox shaft: Removal - Refitting

# 21A

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

### Special tooling required

**Bvi. 949** Tool for removal - refitting of the Mecanindus pins from the fork shafts.

### IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **21A, Manual gearbox, Manual gearbox: Precautions for the repair, page 21A-1**).

## REMOVAL

### I - REMOVAL PREPARATION OPERATION

- Remove the gearbox (see **Manual gearbox: Removal - Refitting**).
- Position the gearbox on the component support (see **21A, Manual gearbox, Gearbox support equipment: Use, page 21A-23**).
- Remove:
  - the fifth gear housing (see **5th gear housing: Removal - Refitting**),
  - the fifth gear synchroniser and pinions (see **5th gear sprockets and synchronisers: Removal - Refitting**),
  - the mechanism housing (see **21A, Manual gearbox, Mechanism housing: Removal - Refitting, page 21A-24**).

X06 – X35, and JH3 – X44, and JH1 or JH3 – X61, and JH3 – X65, and JH1 or JH3 – X74, and JH3 – X76, and JH3 – X77, and JA3 or JH3 – X84, and JH3 – X85, and JA3 or JH3 – X90, and JH1 or JH3 – X95, and JH3 – X38, and JH3

- Remove the lock washer.

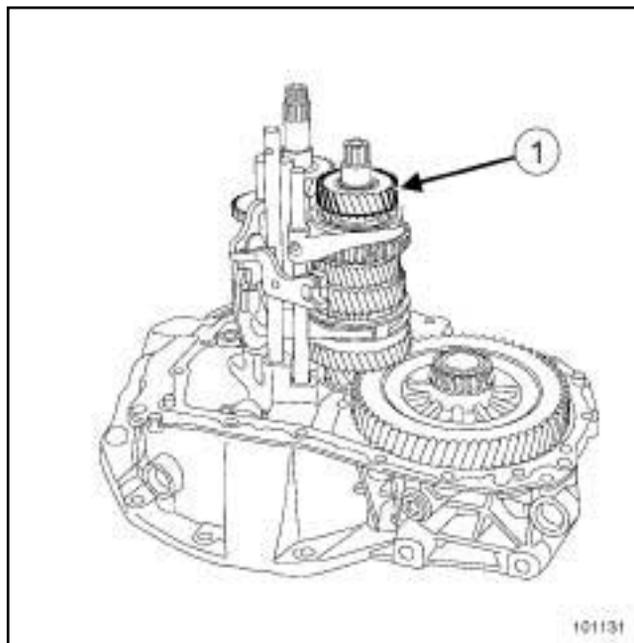
X35, and JR5 – X44, and JR5 – X61, and JR5 – X65, and JR5 – X74, and JR5 – X76, and JR5 – X77, and JA5 or JR5 – X84, and JR5 – X85, and JA5 or JR5 – X90, and JR5 – X95, and JR5 – X38, and JR5 – X79

- Remove:
  - the tapered bearings,

- the adjusting washer.

## II - OPERATION FOR REMOVAL OF PART CONCERNED

### 1 - Closed differential gearbox



101131

101131

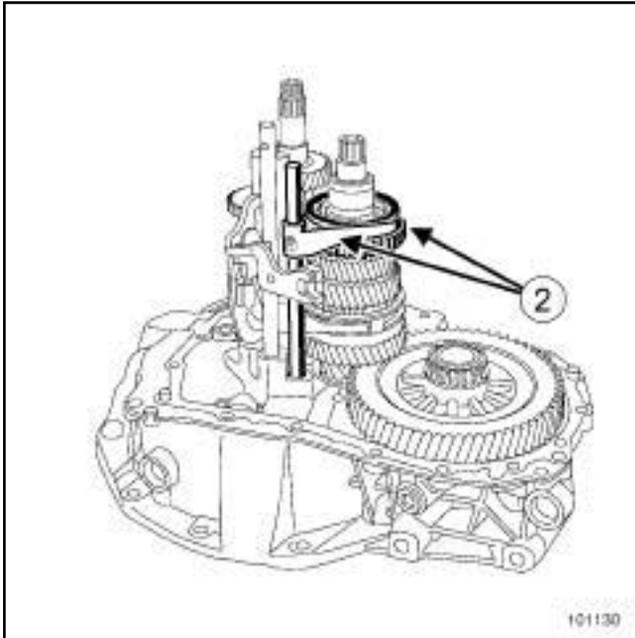
- Remove the fourth gear pinion (1).

# MANUAL GEARBOX

## Gearbox shaft: Removal - Refitting

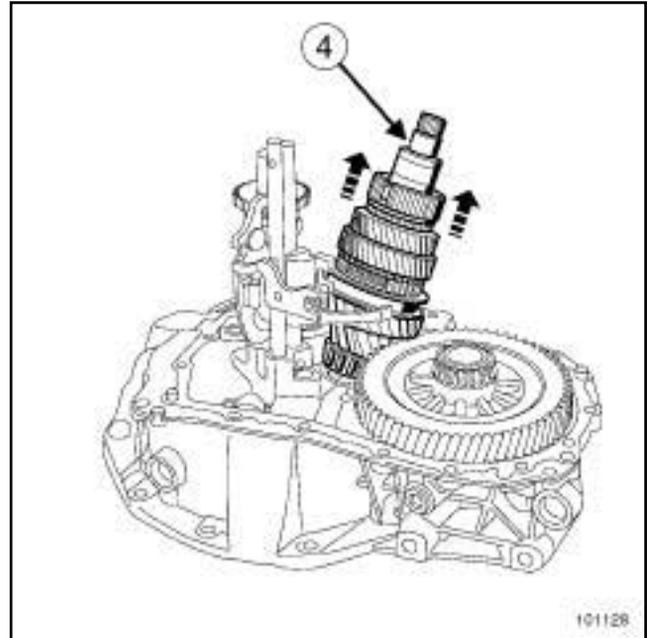
# 21A

X06 - X35 - X44 - X61 - X65 - X74 - X76 - X77 - X84 - X85 - X90 - X95 - X38 - X79



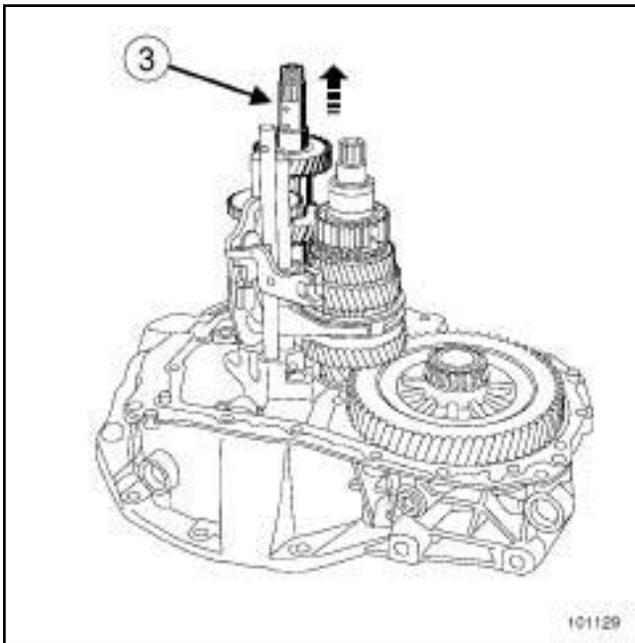
101130

- ❑ Remove the third-fourth gear "shaft - fork and selector rod" assembly (2) by lifting the primary axle slightly.



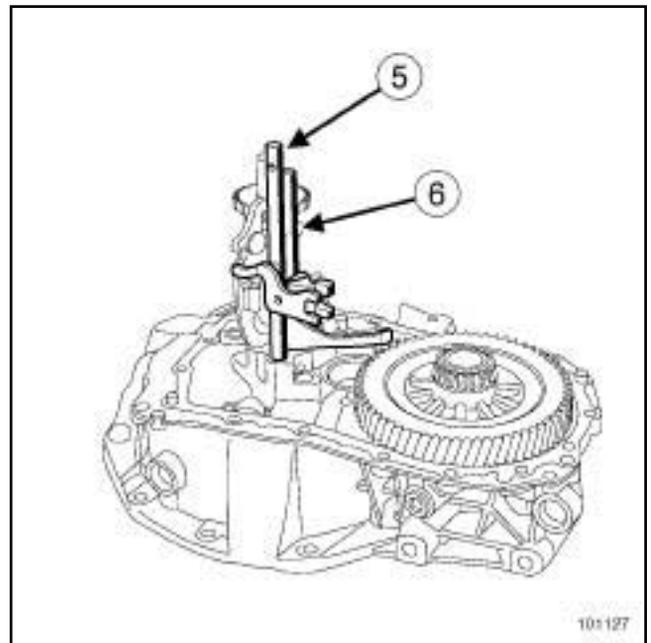
101128

- ❑ Remove the output shaft (4) .



101129

- ❑ Remove the input shaft (3) .



101127

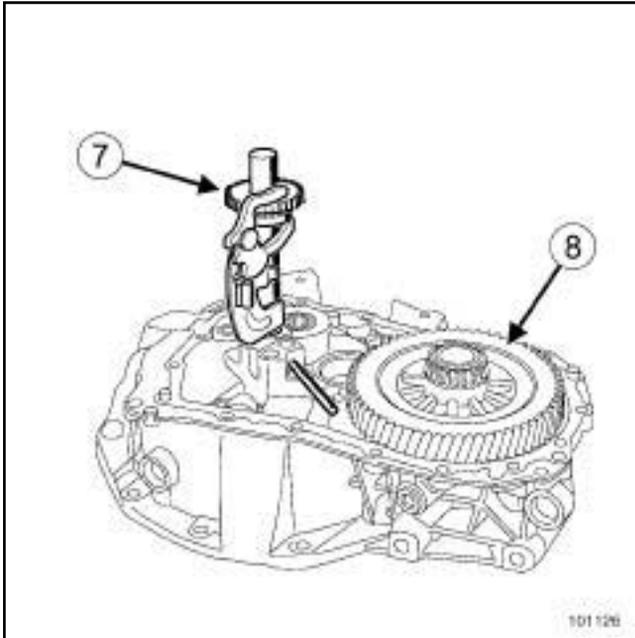
- ❑ Remove:
  - the first-second gear shaft and fork (5) ,
  - the fifth gear shaft (6) .

# MANUAL GEARBOX

## Gearbox shaft: Removal - Refitting

# 21A

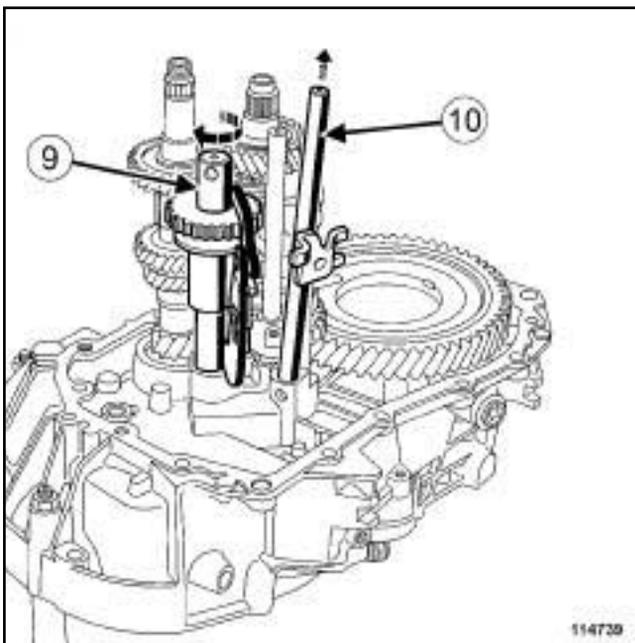
X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79



101126

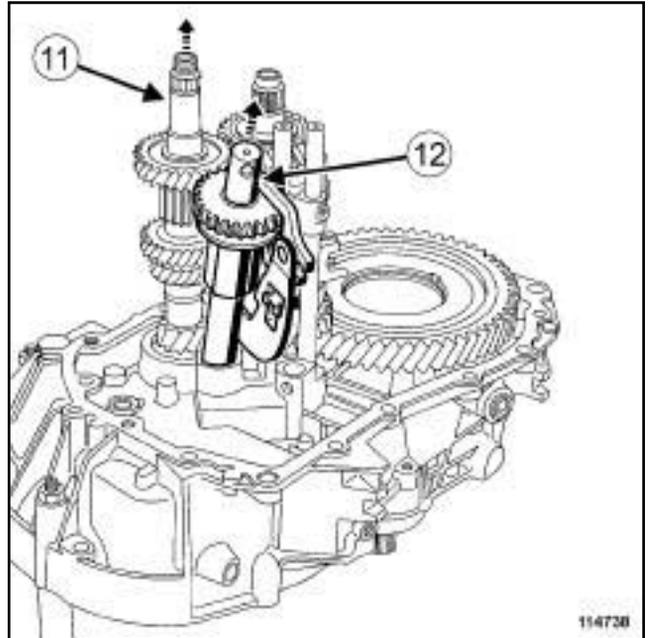
- Unpin the reverse gear assembly.
- Remove:
  - the reverse gear assembly (7) ,
  - the differential (8) .

### 2 - Open differential gearbox



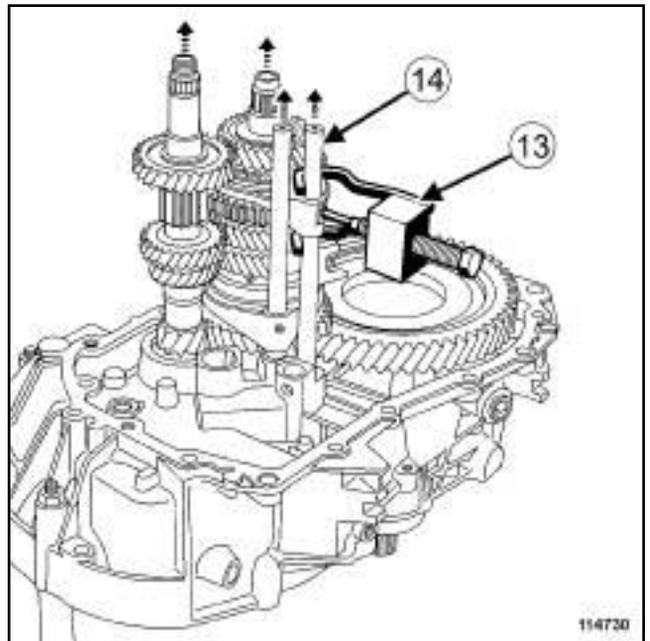
114739

- Turn the reverse gear shaft (9) in the direction of the arrow.
- Remove the fifth gear shaft (10) .



114738

- Lift the input shaft slightly (11) .
- Remove the reverse gear shaft (12) .



114730

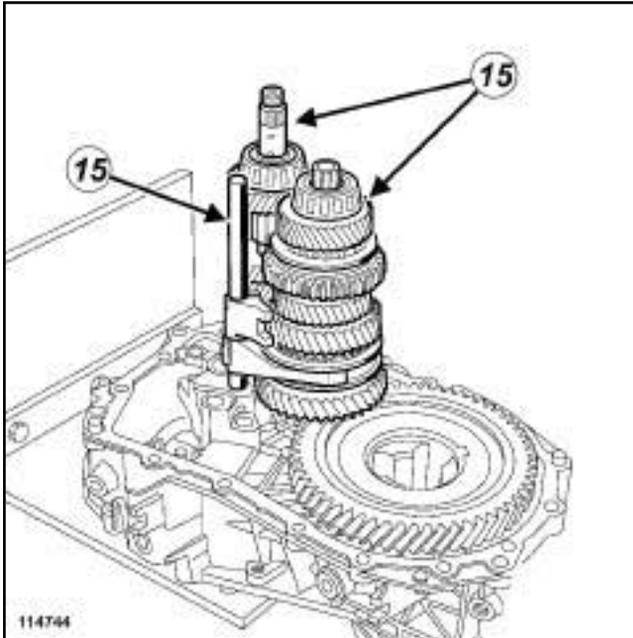
- Remove:
  - the roll pin of the "third-fourth" gear fork using the tool (Bvi. 949) (13) ,
  - the "third-fourth gear shaft and fork" assembly (14)

# MANUAL GEARBOX

## Gearbox shaft: Removal - Refitting

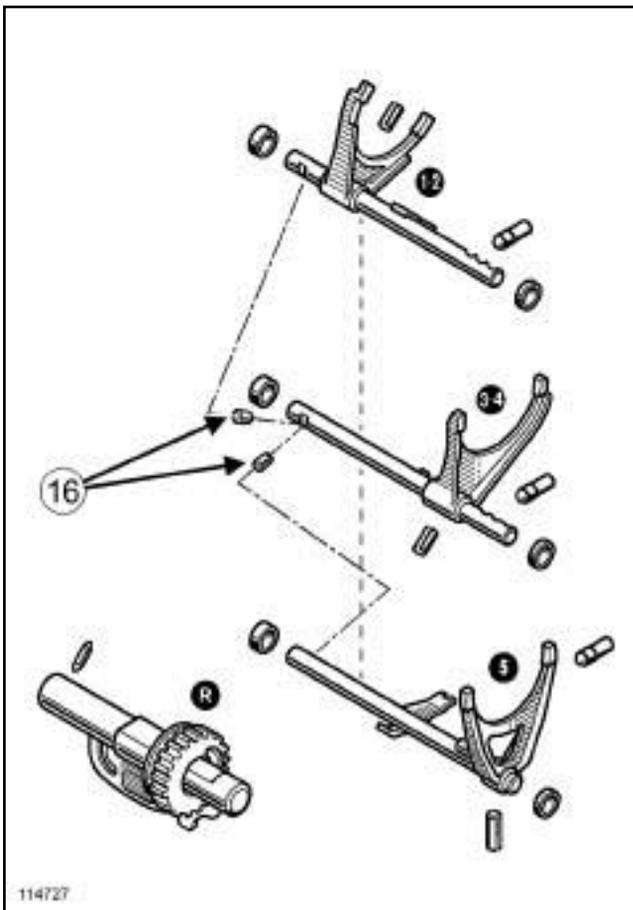
# 21A

X06 - X35 - X44 - X61 - X65 - X74 - X76 - X77 - X84 - X85 - X90 - X95 - X38 - X79



114744

- Simultaneously remove the "input shaft - output shaft - first-second gear fork" assembly (15) .



114727

- Recover the safety stops (16) .

### REFITTING

#### I - REFITTING PREPARATION OPERATION

- Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) to clean:
  - the shafts,
  - the shaft mating surfaces,
  - the mechanism housing.
- Parts always to be replaced:
  - the lip seals,
  - the O-rings,
  - the clutch thrust bearing guide
  - the gear lock rings,
  - the roll pins,
  - the input and output shaft bearing circlips,
  - the selector rod hub springs,
  - the hydraulic clutch slave cylinder (if fitted),
  - the magnet.

#### II - REFITTING OPERATION FOR PART CONCERNED

X35, and JR5 - X44, and JR5 - X61, and JR5 - X65, and JR5 - X74, and JR5 - X76, and JR5 - X77, and JA5 or JR5 - X84, and JR5 - X85, and JA5 or JR5 - X90, and JR5 - X95, and JR5 - X38, and JR5 - X79

- Adjust the shafts (see **21A, Manual gearbox, Gearbox shaft: Adjustment**, page **21A-46**) if replacing a shaft or housing.

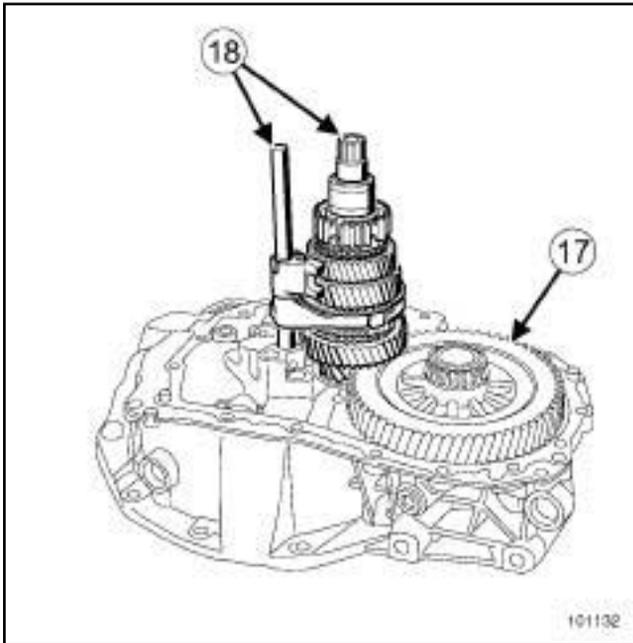
# MANUAL GEARBOX

## Gearbox shaft: Removal - Refitting

# 21A

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

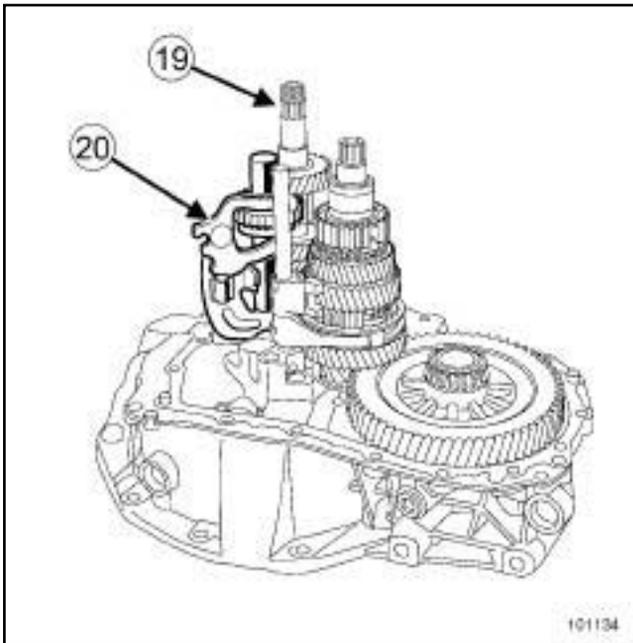
### 1 - Closed differential gearbox



101132

#### □ Refit:

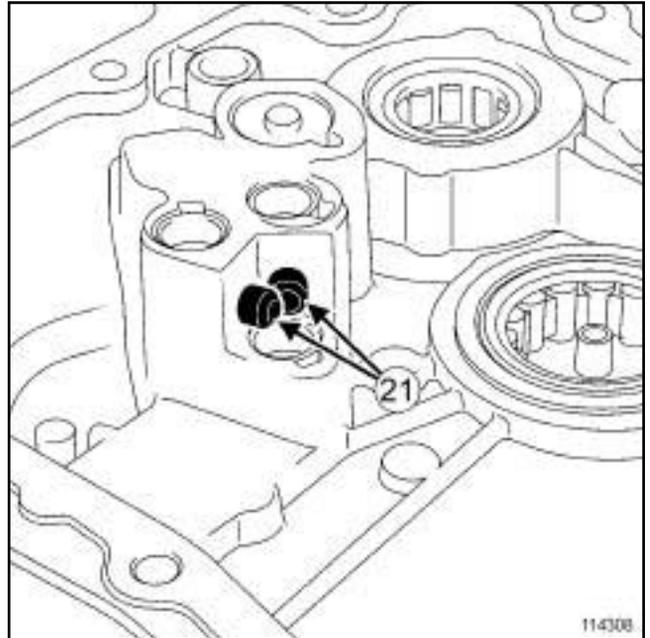
- the differential (17) ,
- the output shaft fitted with the first-second fork (18)



101134

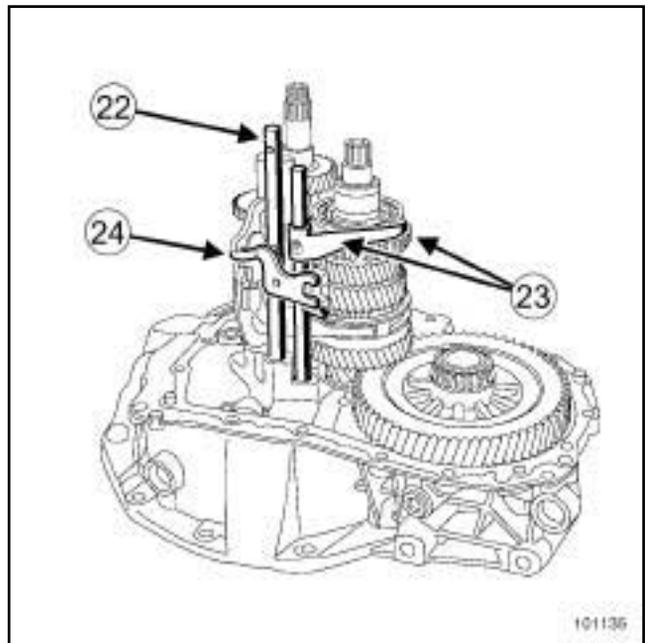
#### □ Refit:

- the input shaft (19) ,
- the reverse gear assembly (20) .



114308

- Refit the inhibitor shafts (21) .



101135

#### □ Refit:

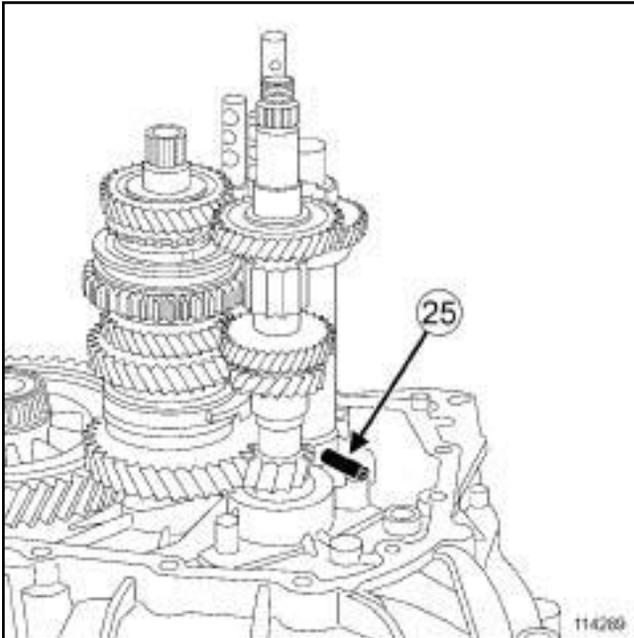
- the fifth gear shaft (22) ,
- the third-fourth gear "selector rod - fork" assembly (23) ,
- turn the reverse gear shaft to position the fifth gear fork in the reverse gear shaft recess (24) .

# MANUAL GEARBOX

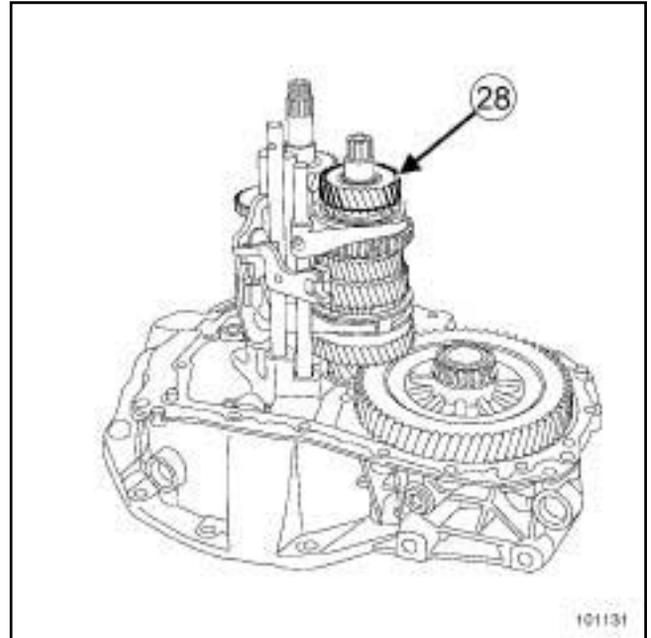
## Gearbox shaft: Removal - Refitting

# 21A

X06 - X35 - X44 - X61 - X65 - X74 - X76 - X77 - X84 - X85 - X90 - X95 - X38 - X79



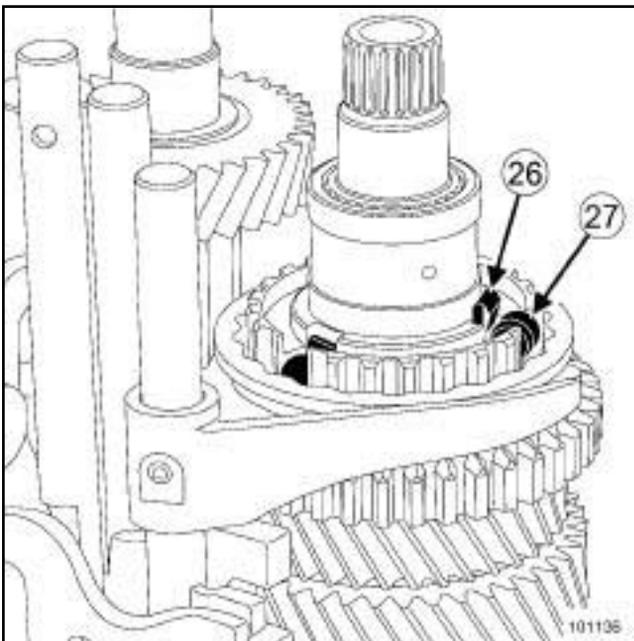
- Pin the reverse gear shaft (25) .



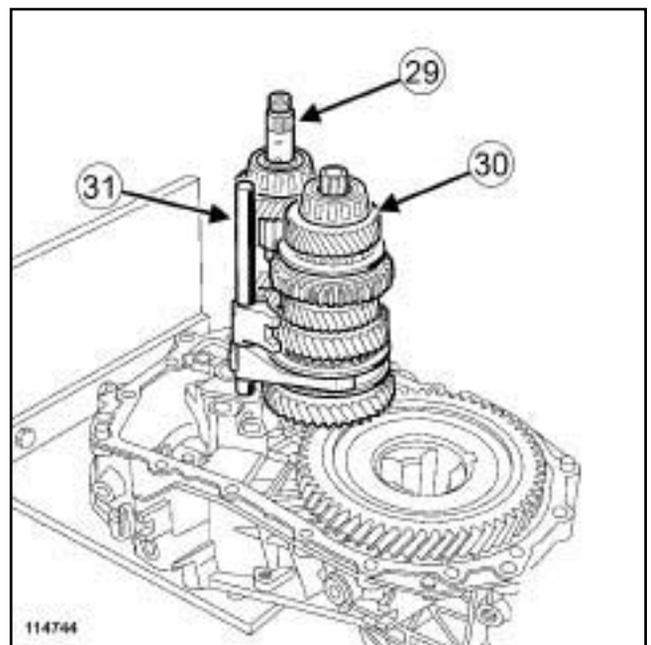
- Refit:

- the fourth gear pinion (28) with its synchroniser,
- the setting washer,
- the output shaft bearing.

### 2 - Open differential gearbox



- Engage third gear.
- Insert:
  - the springs (26) ,
  - the rollers (27) .



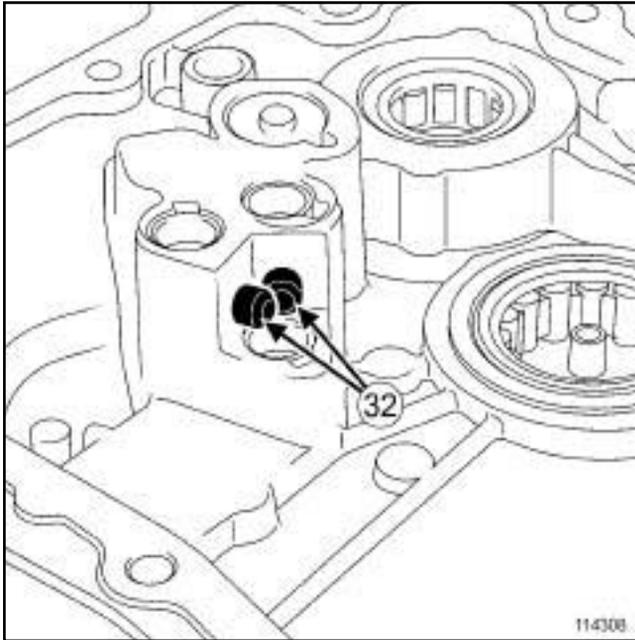
- Simultaneously fit the input shaft (29) and the output shaft (30) equipped with the first-second gear fork (31) .

# MANUAL GEARBOX

## Gearbox shaft: Removal - Refitting

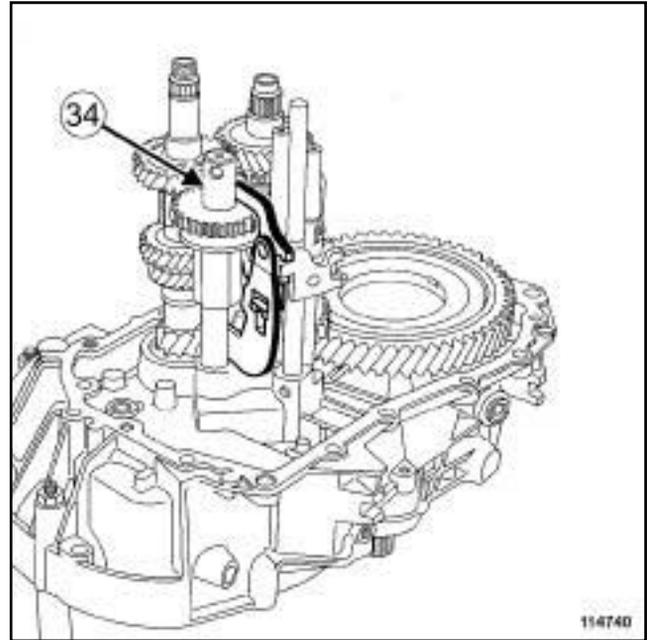
# 21A

X06 - X35 - X44 - X61 - X65 - X74 - X76 - X77 - X84 - X85 - X90 - X95 - X38 - X79



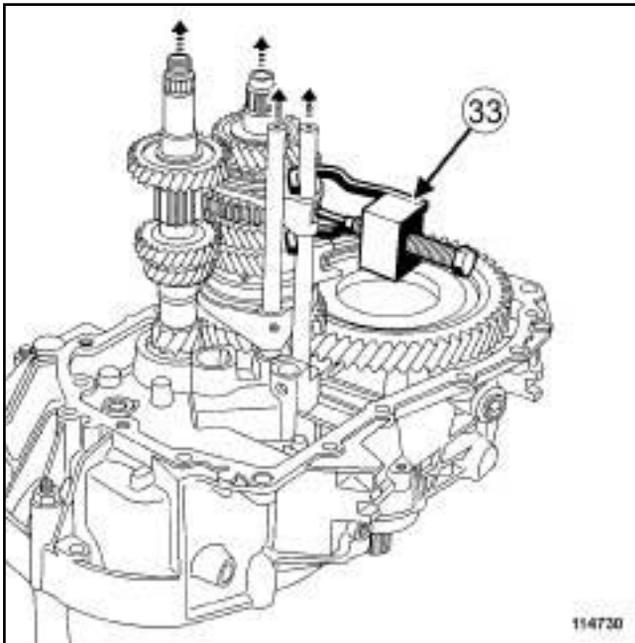
114308

- Refit the inhibitor shafts (32) .



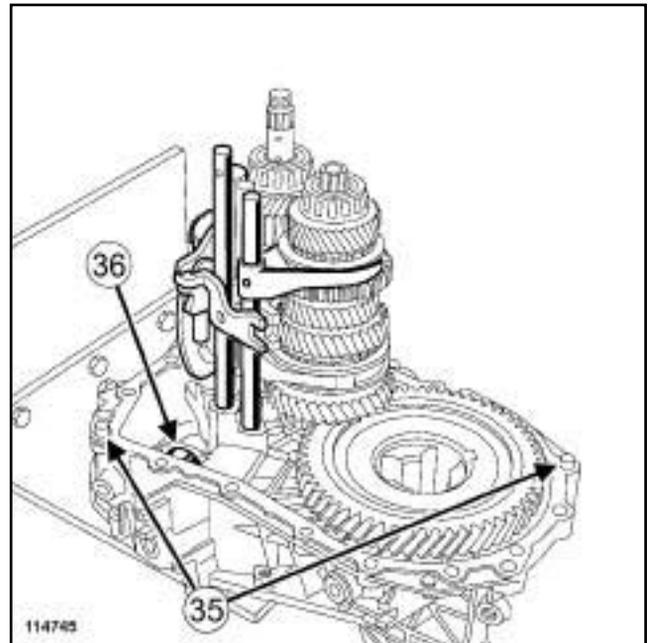
114740

- Refit the reverse gear shaft (34) by lifting the input shaft.



114730

- Lift the input and output shafts slightly and refit the third-fourth gear fork.
- Pin the fork using tool (Bvi. 949) (33) .



114745

- Be sure to fit:
  - of the centring dowels (35) ,
  - of the magnet (36) .
-

# MANUAL GEARBOX

## Gearbox shaft: Removal - Refitting

# 21A

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

### III - FINAL OPERATION

X06 – X35, and JH3 – X44, and JH1 or JH3 – X61, and JH3 – X65, and JH1 or JH3 – X74, and JH3 – X76, and JH3 – X77, and JA3 or JH3 – X84, and JH3 – X85, and JA3 or JH3 – X90, and JH1 or JH3 – X95, and JH3 – X38, and JH3

- Refit the washer.

X35, and JR5 – X44, and JR5 – X61, and JR5 – X65, and JR5 – X74, and JR5 – X76, and JR5 – X77, and JA5 or JR5 – X84, and JR5 – X85, and JA5 or JR5 – X90, and JR5 – X95, and JR5 – X38, and JR5 – X79

- Refit:

- the adjusting washer,
- the tapered bearings.

- Refit:

- the mechanism housing (see **21A, Manual gearbox, Mechanism housing: Removal - Refitting, page 21A-24**),
- the fifth gear synchroniser and pinions (see **5th gear sprockets and synchronisers: Removal - Refitting**),
- the fifth gear housing (see **5th gear housing: Removal - Refitting**).

- Remove the gearbox from the component support (see **21A, Manual gearbox, Gearbox support equipment: Use, page 21A-23**).

- Refit the gearbox (see **Manual gearbox: Removal - Refitting**).

## Output shaft: Stripping - Rebuilding

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

### IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **21A, Manual gearbox, Manual gearbox: Precautions for the repair, page 21A-1**) .

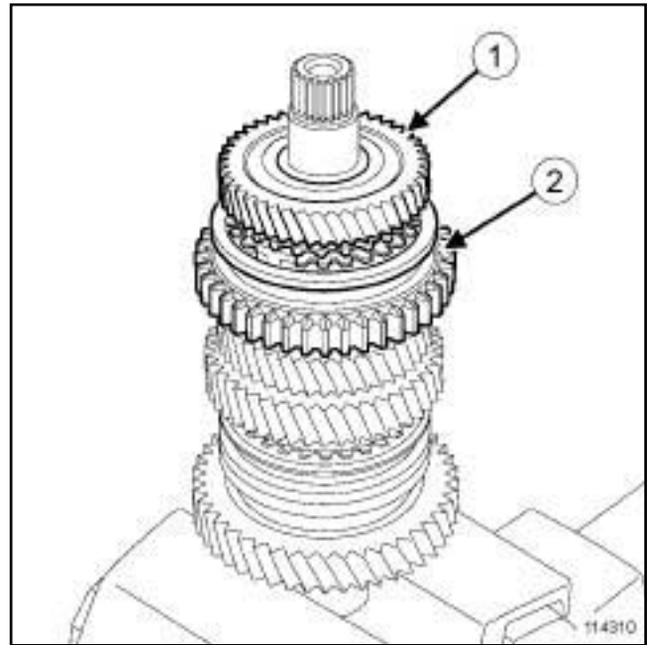
## STRIPPING

### I - STRIPPING PREPARATION OPERATION

- Remove the gearbox (see **Manual gearbox: Removal - Refitting**) .
- Position the gearbox on the component support (see **21A, Manual gearbox, Gearbox support equipment: Use, page 21A-23**) .
- Remove:
  - the fifth gear housing (see **5th gear housing: Removal - Refitting**) ,
  - the fifth gear synchroniser and pinions (see **5th gear sprockets and synchronisers: Removal - Refitting**) ,
  - the mechanism housing (see **21A, Manual gearbox, Mechanism housing: Removal - Refitting, page 21A-24**) ,
  - the gearbox shafts (see **21A, Manual gearbox, Gearbox shaft: Removal - Refitting, page 21A-31**) .

### II - OPERATION FOR STRIPPING THE OUTPUT SHAFT

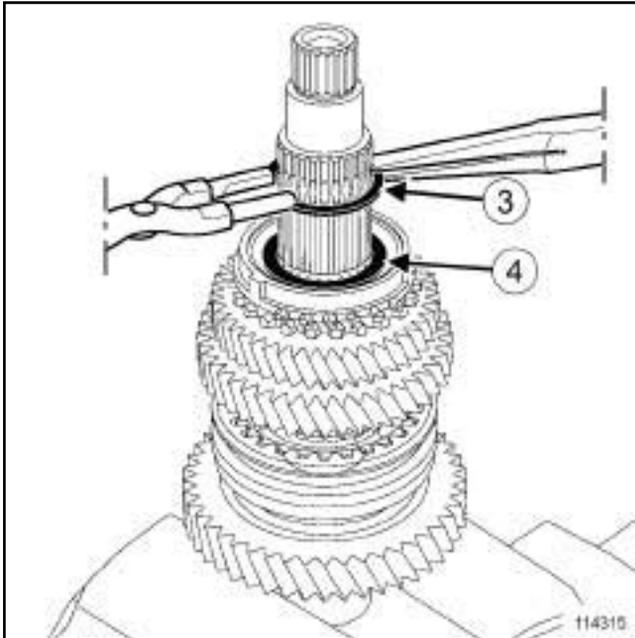
X06 – X35, and JH3 – X44, and JH1 or JH3 – X61, and JH3 – X65, and JH1 or JH3 – X74, and JH3 – X76, and JH3 – X77, and JA3 or JH3 – X84, and JH3 – X85, and JA3 or JH3 – X90, and JH1 or JH3 – X95, and JH3 – X38, and JH3



- Position the output shaft in a vice fitted with jaws.
- Remove:
  - the fourth gear pinion (**1**) ,
  - the third/fourth gear synchroniser hub (**2**) .

## Output shaft: Stripping - Rebuilding

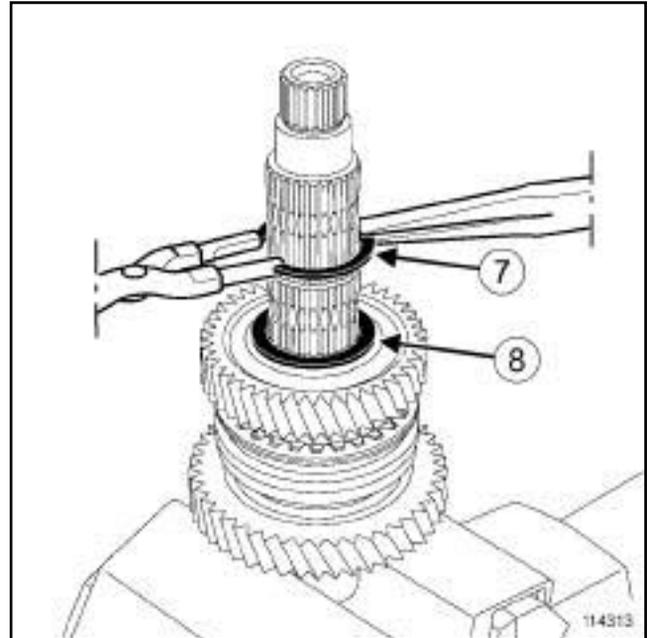
X06 - X35 - X44 - X61 - X65 - X74 - X76 - X77 - X84 - X85 - X90 - X95 - X38 - X79



114315

❑ Remove:

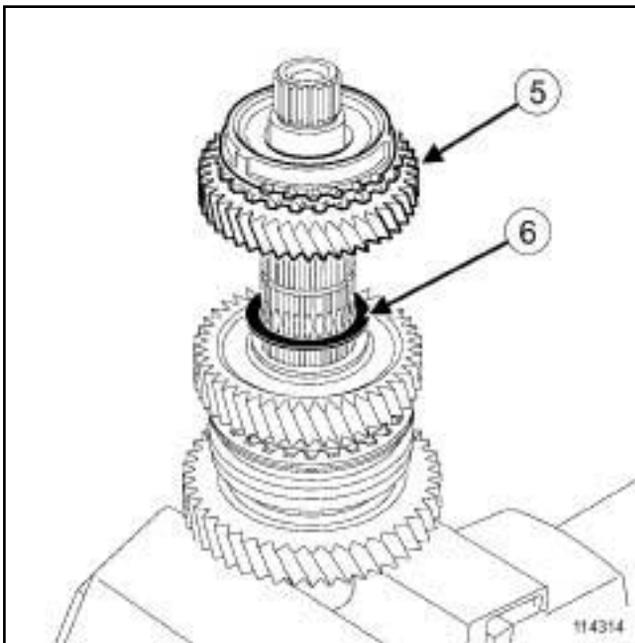
- the lock ring (3) using circlip pliers and tweezers,
- the splined washer (4) .



114313

❑ Remove:

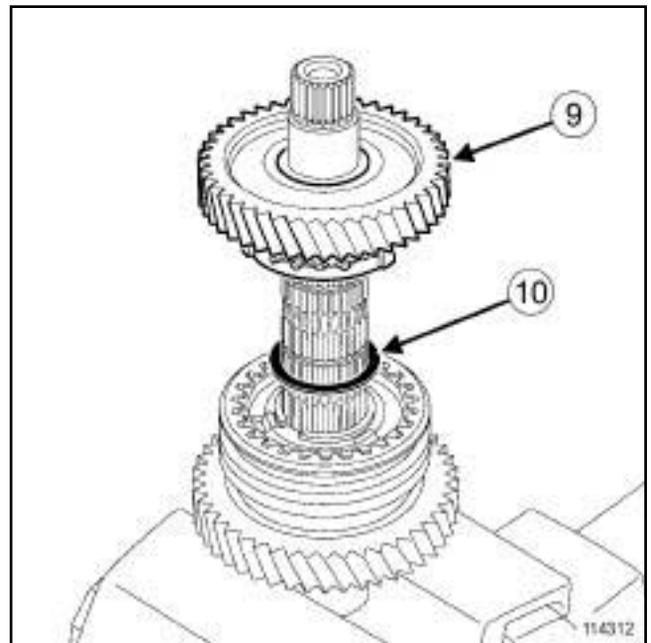
- the lock ring (7) using circlip pliers and tweezers,
- the splined washer (8) .



114314

❑ Remove:

- the third gear pinion (5) ,
- the splined washer (6) .



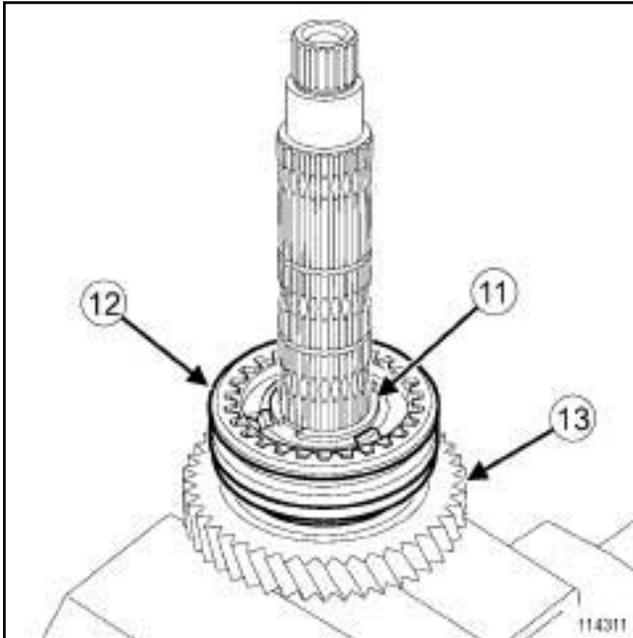
114312

❑ Remove:

- the second gear pinion (9) ,
- the splined washer (10) .

## Output shaft: Stripping - Rebuilding

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79



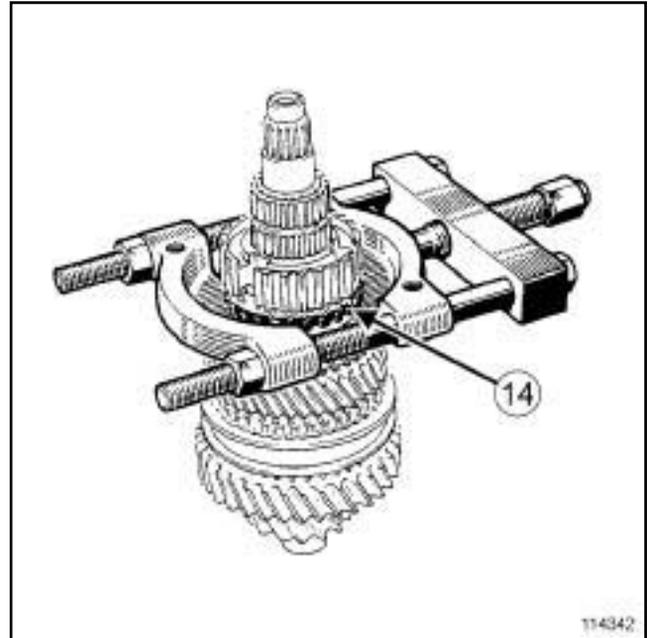
114311

Remove:

- the locking ring (11) ,
- the first-second gear synchroniser hub (12) ,
- the first gear pinion (13) .

X35, and JR5 – X44, and JR5 – X61, and JR5 – X65, and JR5 – X74, and JR5 – X76, and JR5 – X77, and JA5 or JR5 – X84, and JR5 – X85, and JA5 or JR5 – X90, and JR5 – X95, and JR5 – X38, and JR5 – X79

- The rings supporting the second, third and fourth gears are fitted tightened. These must always be replaced during refitting.



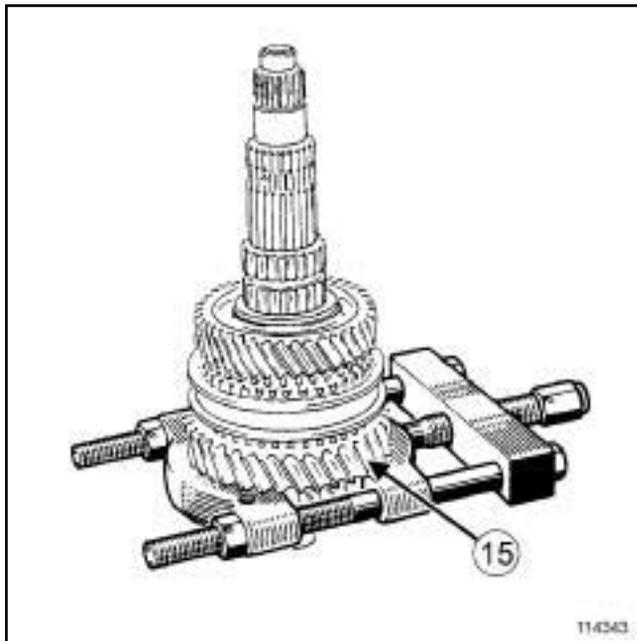
114342

Remove:

- the bearing,
- the setting washer,
- the fourth gear pinion,
- the third-fourth gear selector rod,
- the "gear supporting ring, hub and third gear pinion" assembly using an extractor and a press and lifting it from underneath the claw teeth of the third gear pinion (14) .

## Output shaft: Stripping - Rebuilding

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79



114343

- Remove the "gear supporting ring, first and second gear pinions - hub - selector rod" assembly using an extractor and a press and lifting it from underneath the first gear pinion (15) .

## REBUILDING

### I - REBUILDING PREPARATION OPERATION

- Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) to clean:
  - the shafts,
  - the shaft mating surfaces,
  - the mechanism housing.
- Parts always to be replaced:
  - the lip seals,
  - the O-rings,
  - the clutch thrust bearing guide
  - the gear lock rings,
  - the roll pins,
  - the input and output shaft bearing circlips,
  - the selector rod hub springs,
  - the hydraulic clutch slave cylinder (if fitted),
  - the magnet,

X35, and JR5 – X44, and JR5 – X61, and JR5 – X65, and JR5 – X74, and JR5 – X76, and JR5 – X77, and JA5 or JR5 – X84, and JR5 – X85, and JA5 or JR5 – X90, and JR5 – X95, and JR5 – X38, and JR5 – X79

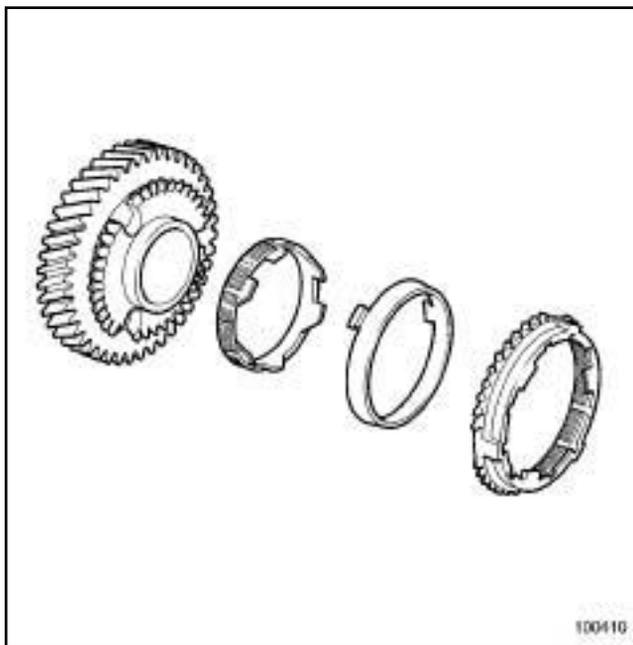
- Always replace the gear supporting rings.

- Check all of the parts (see **21A, Manual gearbox, Manual gearbox: Check**, page **21A-20**) .

### II - OPERATION FOR REBUILDING THE OUTPUT SHAFT

X06 – X35, and JH3 – X44, and JH1 or JH3 – X61, and JH3 – X65, and JH1 or JH3 – X74, and JH3 – X76, and JH3 – X77, and JA3 or JH3 – X84, and JH3 – X85, and JA3 or JH3 – X90, and JH1 or JH3 – X95, and JH3 – X38, and JH3

- Position the output shaft in a vice fitted with jaws.



100410

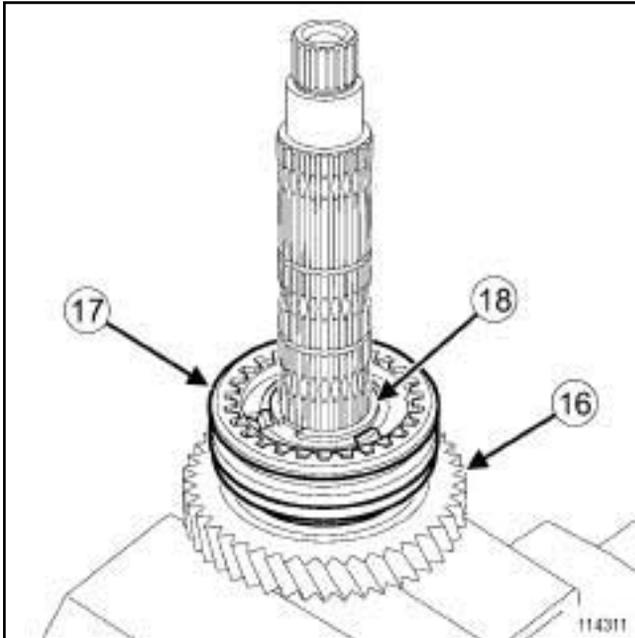
- Oil the synchroniser rings.

#### Note:

Make sure that the notches on the double cone synchroniser are correctly positioned.

## Output shaft: Stripping - Rebuilding

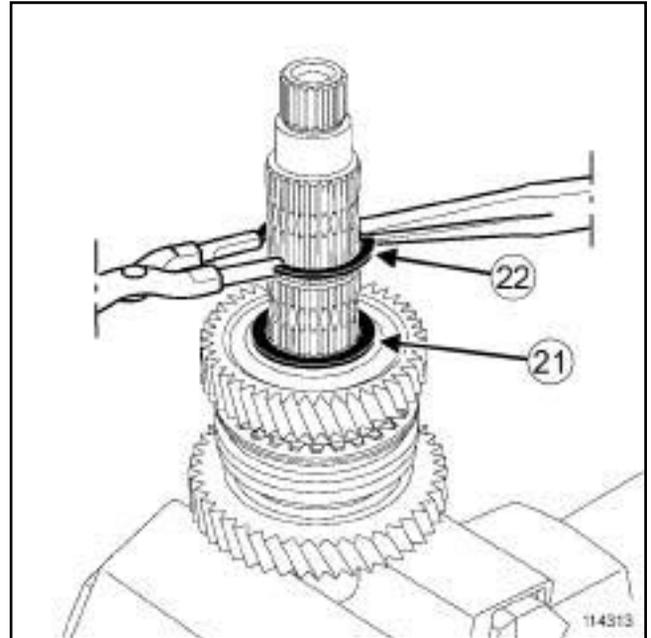
X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79



114311

□ Refit:

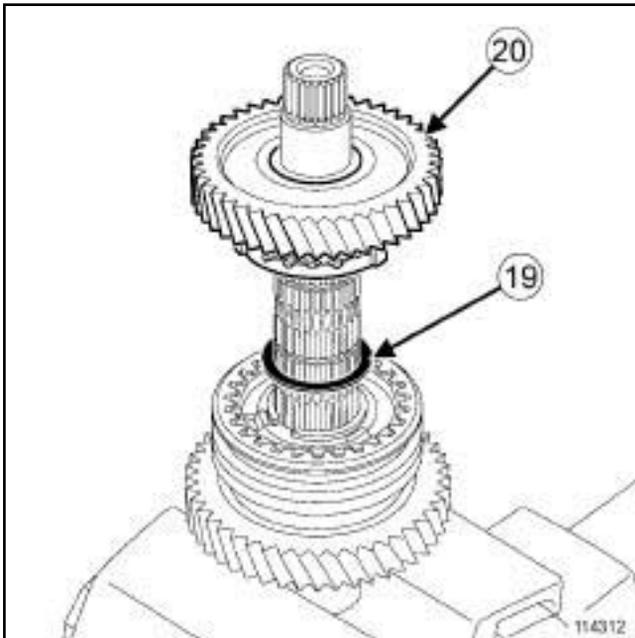
- the first gear pinion (16) ,
- the first-second gear synchroniser hub (17) ,
- the lock ring (18) .



114313

□ Refit:

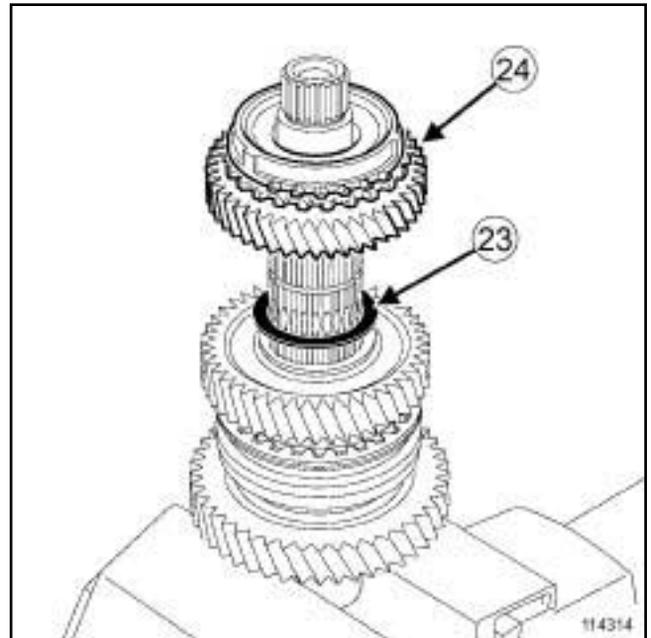
- the splined washer (21) using circlip pliers and tweezers,
- the lock ring (22) .



114312

□ Refit:

- the splined washer (19) ,
- the second gear pinion (20) .



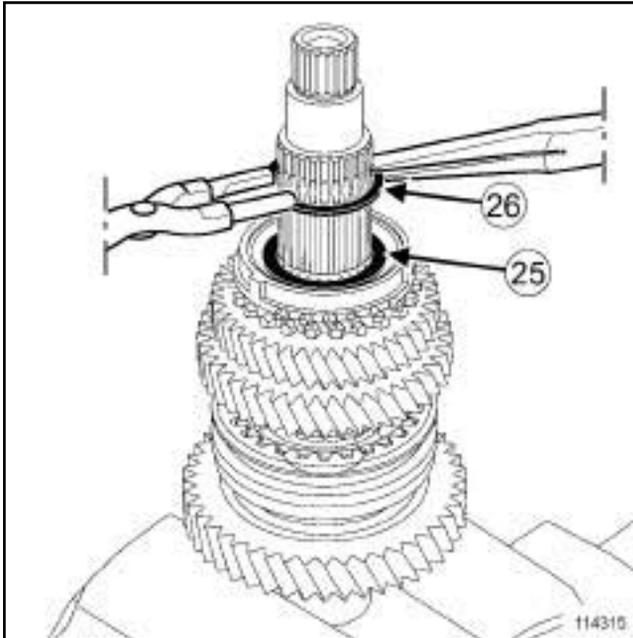
114314

□ Refit:

- the splined washer (23) ,
- the third gear pinion (24) .

## Output shaft: Stripping - Rebuilding

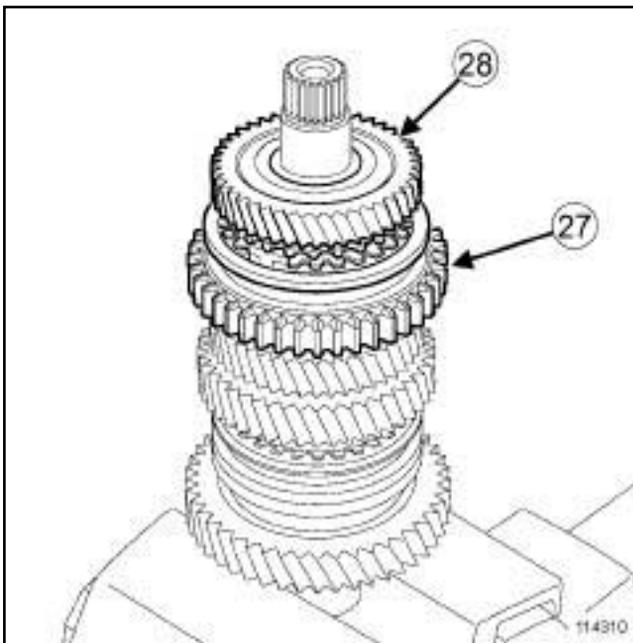
X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79



114315

Refit:

- the splined washer (25) using circlip pliers and tweezers,
- the lock ring (26) .



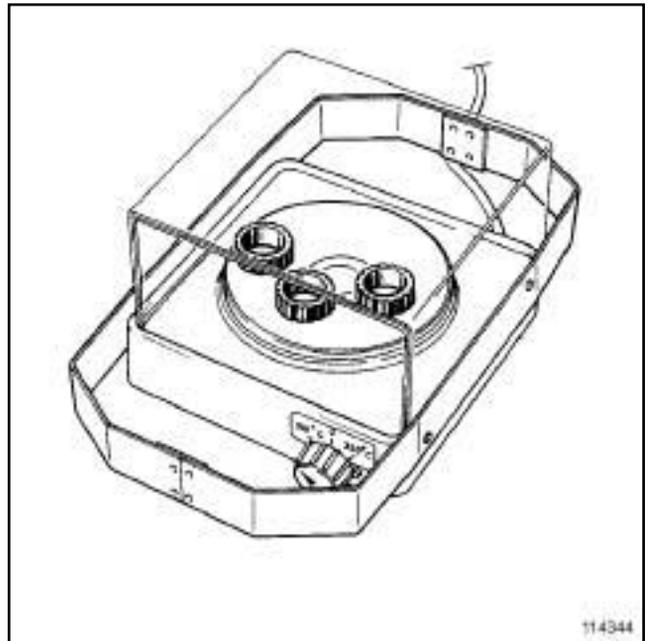
114310

Refit:

- the third-fourth gear synchroniser hub (27) ,
- the fourth gear pinion (28) .

X35, and JR5 – X44, and JR5 – X61, and JR5 – X65, and JR5 – X74, and JR5 – X76, and JR5 – X77, and JA5 or JR5 – X84, and JR5 – X85, and JA5 or JR5 – X90, and JR5 – X95, and JR5 – X38, and JR5 – X79

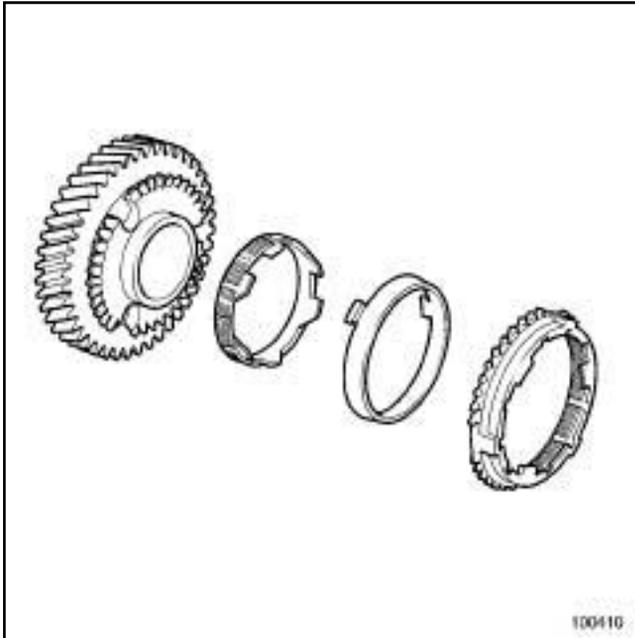
- When reassembling, use a hot plate set at **150°C**.



114344

- Place the new rings on the hot plate.
- Heat the rings for **15 minutes**, with the thermostat set at **150°C**.

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79



100410

- Oil the synchroniser rings.

**Note:**

Make sure that the notches on the double cone synchroniser are correctly positioned.

- Refit in the following order:
  - the first gear idler gear with its synchroniser,
  - the first-second gear synchroniser hub and align the notches of the hub with those on the synchroniser ring,
  - the ring under the second gear idler gear using a tube with an internal diameter of **33 mm** until they are resting on the hub,
  - the second idle gear,
  - the splined washer between the second and third gears,
  - the ring under the third gear idler gear using a tube with an internal diameter of **33 mm** until they are resting on the splined washer,
  - the third gear idler gear,
  - the third-fourth gear synchroniser hub and align the notches of the hub with those on the synchroniser ring,
  - the ring under the fourth gear idler gear using a tube with an internal diameter of **33 mm** until they are resting on the hub,
  - the fourth gear idler gear,
  - the setting washer,

- the bearing.

- Adjust the output shaft (see **21A, Manual gearbox, Gearbox shaft: Adjustment**, page 21A-46) .

### III - FINAL OPERATION

- Refit:
  - the gearbox shafts (see **21A, Manual gearbox, Gearbox shaft: Removal - Refitting**, page 21A-31) ,
  - the mechanism housing (see **21A, Manual gearbox, Mechanism housing: Removal - Refitting**, page 21A-24) ,
  - the fifth gear synchroniser and pinions (see **5th gear sprockets and synchronisers: Removal - Refitting**) ,
  - the fifth gear housing (see **5th gear housing: Removal - Refitting**) .
- Remove the gearbox from the component support (see **21A, Manual gearbox, Gearbox support equipment: Use**, page 21A-23) .
- Refit the gearbox (see **Manual gearbox: Removal - Refitting**) .

# MANUAL GEARBOX

## Gearbox shaft: Adjustment

# 21A

X35, and JR5 – X44, and JR5 – X61, and JR5 – X65, and JR5 – X74, and JR5 – X76, and JR5 – X77, and JA5 or JR5 – X84, and JR5 – X85, and JA5 or JR5 – X90, and JR5 – X95, and JR5 – X38, and JR5 – X79

### Special tooling required

<b>Bvi. 1161</b>	Support plate for magnetic stand and 0.6 and 1.6 calibration shims.
<b>Bvi. 1527</b>	Backing plate for adjusting Primary and Secondary shaft play.

### IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **21A, Manual gearbox, Manual gearbox: Precautions for the repair, page 21A-1**).

### I - ADJUSTMENT PREPARATION OPERATION

- Remove the gearbox (see **Manual gearbox: Removal - Refitting**).
- Position the gearbox on the component support (see **21A, Manual gearbox, Gearbox support equipment: Use, page 21A-23**).
- Remove:
  - the fifth gear housing (see **5th gear housing: Removal - Refitting**),
  - the fifth gear synchroniser and pinions (see **5th gear sprockets and synchronisers: Removal - Refitting**),
  - the mechanism housing (see **21A, Manual gearbox, Mechanism housing: Removal - Refitting, page 21A-24**),
  - the gearbox shafts (see **21A, Manual gearbox, Gearbox shaft: Removal - Refitting, page 21A-31**).
- Strip down the output shaft (see **21A, Manual gearbox, Output shaft: Stripping - Rebuilding, page 21A-39**).
- Use **SURFACE CLEANER** to clean (see **Vehicle: Parts and consumables for the repair**):
  - the shafts,
  - the shaft mating surfaces.
  - the mechanism housing

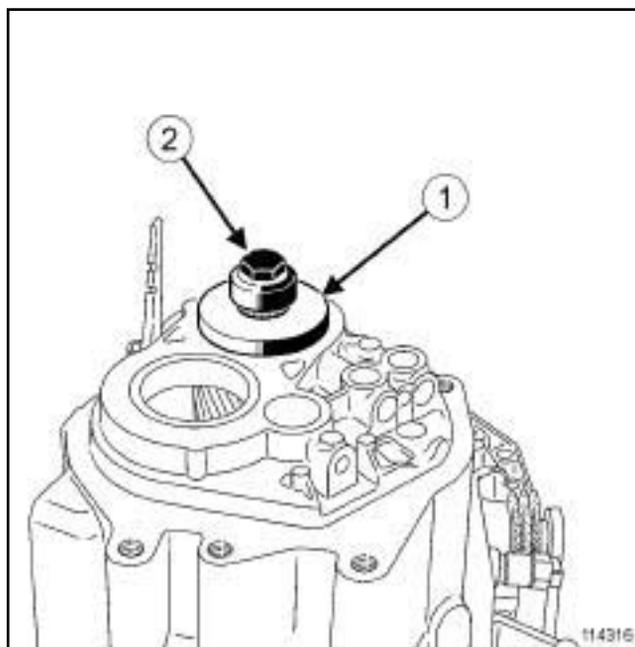
### II - ADJUSTMENT OPERATION

#### 1 - Adjusting the pretension of the tapered bearings of the output shaft

Note:

This adjustment only needs to be carried out when replacing the housings or output shaft.

- Position the output shaft only in the clutch housing together with its bearings and the pretensioning washer of the tool (**Bvi. 1161**) (1.60 mm in size - large outer diameter).
- Position the mechanism housing.
- Refit the mechanism housing bolts.
- Torque tighten the mechanism housing bolts (see **21A, Manual gearbox, Mechanism housing: Removal - Refitting, page 21A-24**).



Fit:

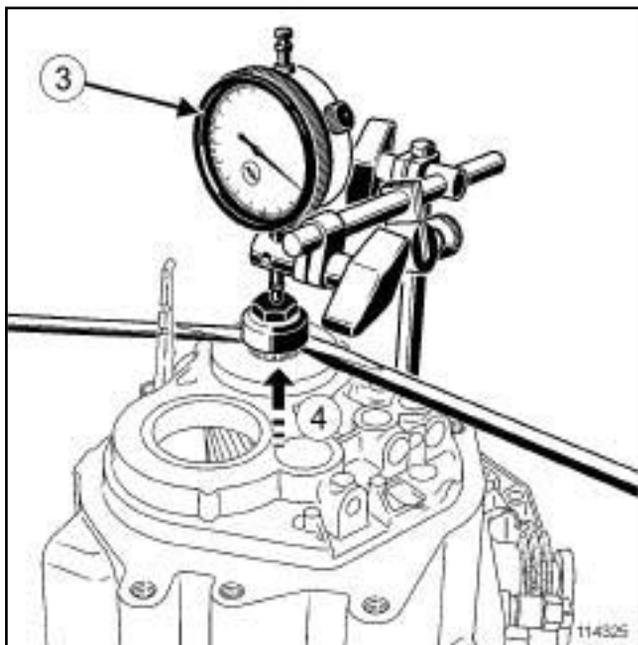
- the back plate (**Bvi. 1527**) (1),
- the bolt (2).

# MANUAL GEARBOX

## Gearbox shaft: Adjustment

# 21A

X35, and JR5 – X44, and JR5 – X61, and JR5 – X65, and JR5 – X74, and JR5 – X76, and JR5 – X77, and JA5 or JR5 – X84, and JR5 – X85, and JA5 or JR5 – X90, and JR5 – X95, and JR5 – X38, and JR5 – X79



- Fit the back plate of the tool (Bvi. 1161) secured with two bolts and fit a dial gauge (3) .
- Rotate the output shaft several times to fit the bearings.
- Set the dial gauge to zero.
- Pull the output shaft upwards (4) using two screwdrivers as levers.
- Take a reading from the dial gauge.
- Repeat this operation three times.
- Calculate the average of the readings.

### Calculating the thickness of the bearing pretensioning setting washer

- Prescribed value + value of the pretensioning washer + average of the readings on the dial gauge = value of the pretensioning setting washer.

Example (value in mm):  $0.26 + 1.60 + 0.49 = 2.35$

#### Note:

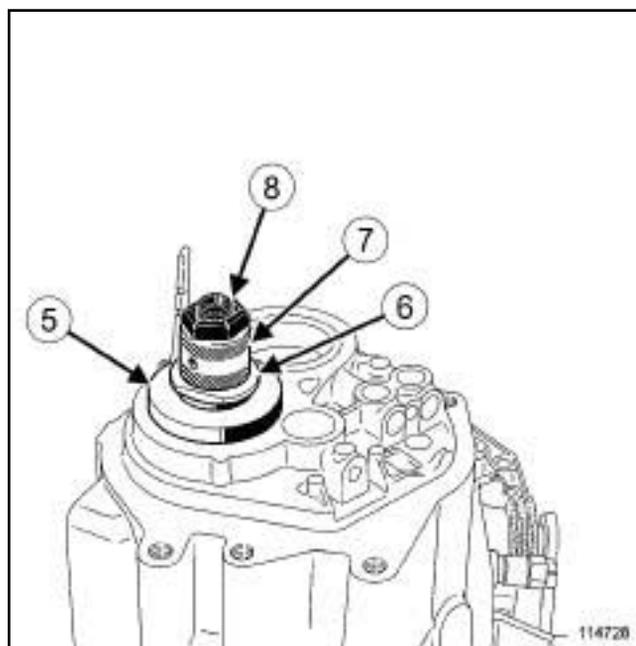
A set of adjustment washers with a thickness of **2.15 mm to 2.43 mm** in gradations of **0.04 mm** is supplied as a spare part .

### 2 - Adjusting the pretension of the tapered bearings of the input shaft

#### Note:

This adjustment only needs to be carried out when replacing the housings or output shaft.

- Position the input shaft only in the clutch housing together with its bearings and the pretensioning washer of the tool (Bvi. 1161) (0.62 mm in size - small outer diameter).
- Position the mechanism housing.
- Refit the mechanism housing bolts.
- Torque tighten the mechanism housing bolts (see **21A, Manual gearbox, Mechanism housing: Removal - Refitting**, page 21A-24) .



Fit:

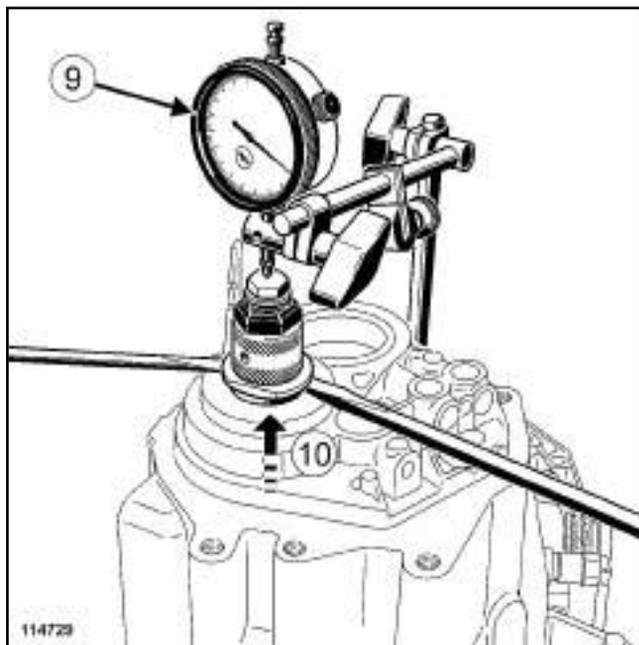
- the back plate (Bvi. 1527) (5) ,
- the lock washer (6) ,
- the gear supporting ring (7) ,
- the fully tightened nut (8) .

# MANUAL GEARBOX

## Gearbox shaft: Adjustment

# 21A

X35, and JR5 – X44, and JR5 – X61, and JR5 – X65, and JR5 – X74, and JR5 – X76, and JR5 – X77, and JA5 or JR5 – X84, and JR5 – X85, and JA5 or JR5 – X90, and JR5 – X95, and JR5 – X38, and JR5 – X79



114729

- Fit the back plate of the tool (**Bvi. 1161**) secured with two bolts and fit a dial gauge (9) .
- Rotate the input shaft several times to fit the bearings.
- Set the dial gauge to zero.
- Pull the input shaft upwards (4) using two screwdrivers as levers.
- Take a reading from the dial gauge.
- Repeat this operation three times.
- Calculate the average of the readings.

### **Calculating the thickness of the bearing pretensioning setting washer**

- Prescribed value + value of the pretensioning washer + average of the readings on the dial gauge = value of the pretensioning setting washer.

Example (value in mm):  $0 + 0.62 + 0.48 = 1.10$

#### Note:

A set of adjustment washers with a thickness of **0.86 mm to 1.30 mm** in gradations of **0.04 mm** is supplied as a spare part .

### III - FINAL OPERATION

- Rebuild the output shaft (see **21A, Manual gearbox, Output shaft: Stripping - Rebuilding**, page 21A-39) .

#### Refit:

- the gearbox shafts (see **21A, Manual gearbox, Gearbox shaft: Removal - Refitting**, page 21A-31) ,
- the mechanism housing (see **21A, Manual gearbox, Mechanism housing: Removal - Refitting**, page 21A-24) ,
- the fifth gear synchroniser and pinions (see **5th gear sprockets and synchronisers: Removal - Refitting**) ,
- the fifth gear housing (see **5th gear housing: Removal - Refitting**) .

- Remove the gearbox from the component support (see **21A, Manual gearbox, Gearbox support equipment: Use**, page 21A-23) .

- Refit the gearbox (see **Manual gearbox: Removal - Refitting**) .

## Clutch housing bearing: Removal - Refitting

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

### Special tooling required

**Bvi. 1601** Tool for fitting the primary shaft seal.

### IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **21A, Manual gearbox, Manual gearbox: Precautions for the repair, page 21A-1**).

## REMOVAL

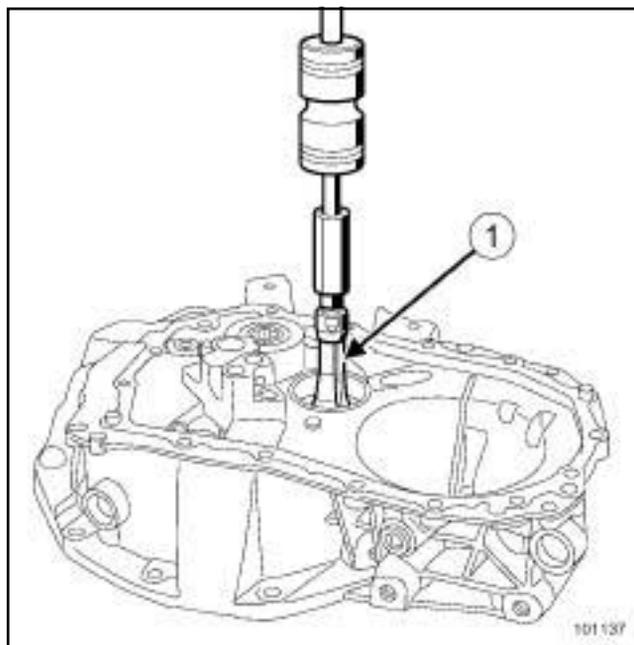
### I - REMOVAL PREPARATION OPERATION

- Remove the gearbox (see **Manual gearbox: Removal - Refitting**).
- Position the gearbox on the component support (see **21A, Manual gearbox, Gearbox support equipment: Use, page 21A-23**).
- Remove:
  - the fifth gear housing (see **5th gear housing: Removal - Refitting**),
  - the fifth gear synchroniser and pinions (see **5th gear sprockets and synchronisers: Removal - Refitting**),
  - the mechanism housing (see **21A, Manual gearbox, Mechanism housing: Removal - Refitting, page 21A-24**),
  - the gearbox shafts (see **21A, Manual gearbox, Gearbox shaft: Removal - Refitting, page 21A-31**),
  - the differential (see **21A, Manual gearbox, Manual gearbox differential: Removal - Refitting, page 21A-62**).

### II - OPERATION FOR REMOVAL OF PART CONCERNED

#### 1 - Removing the output shaft bearing

X06 – X35, and JH3 – X44, and JH1 or JH3 – X61, and JH3 – X65, and JH1 or JH3 – X74, and JH3 – X76, and JH3 – X77, and JA3 or JH3 – X84, and JH3 – X85, and JA3 or JH3 – X90, and JH1 or JH3 – X95, and JH3 – X38, and JH3



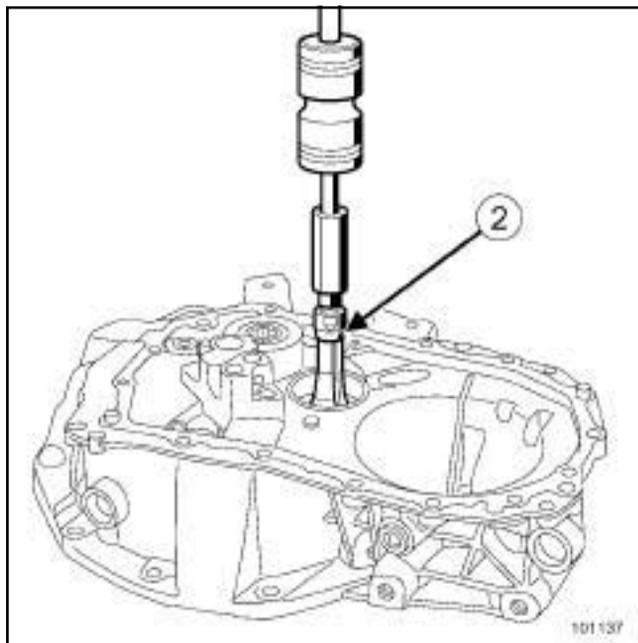
101137

- Cut the base of the plastic hollow tube located at the centre of the bearing.
- Extract the bearing from the clutch housing output shaft using a slide hammer (**1**) with a diameter of **40 mm**.

## Clutch housing bearing: Removal - Refitting

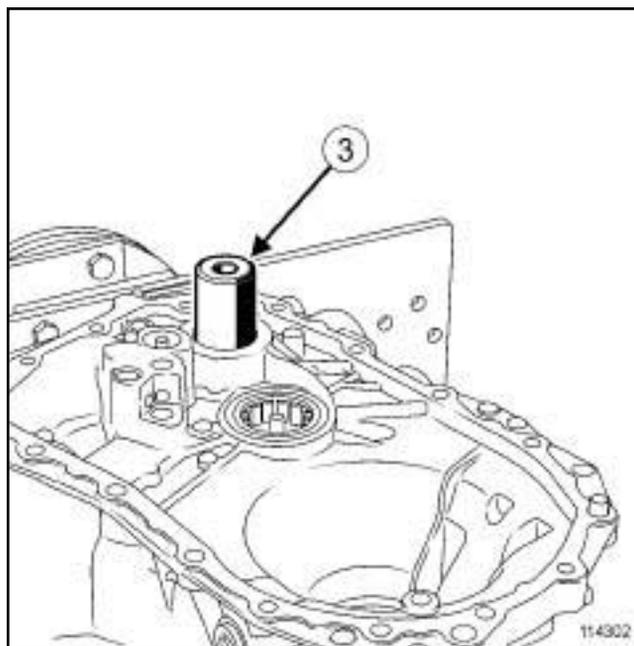
X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

X35, and JR5 – X44, and JR5 – X61, and JR5 – X65, and JR5 – X74, and JR5 – X76, and JR5 – X77, and JA5 or JR5 – X84, and JR5 – X85, and JA5 or JR5 – X90, and JR5 – X95, and JR5 – X38, and JR5 – X79



- Cut the base of the plastic hollow tube located at the centre of the bearing.
- Remove the output shaft bearing cup from the clutch housing using a slide hammer (2).

### 2 - Removing the input shaft bearing



- Use a press to remove the input shaft bearing using a 38 mm diameter tube (3).

## REFITTING

### I - REFITTING PREPARATION OPERATION

- Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) to clean:
  - the shafts,
  - the shaft mating surfaces,
  - the differential,
  - the mechanism housing,
  - the differential housing.
- Parts always to be replaced:
  - the lip seals,
  - the O-rings,
  - the clutch thrust bearing guide
  - the gear lock rings,
  - the roll pins,
  - the input and output shaft bearing circlips,
  - the selector rod hub springs,
  - the hydraulic clutch slave cylinder (if fitted),
  - the magnet,
  - the lock ring of the differential,

## Clutch housing bearing: Removal - Refitting

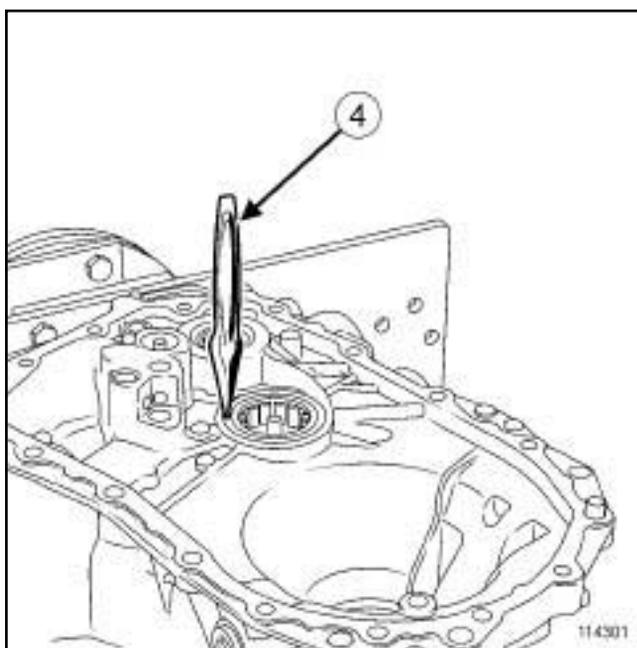
X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

- the differential retaining nut.

### II - REFITTING OPERATION FOR PART CONCERNED

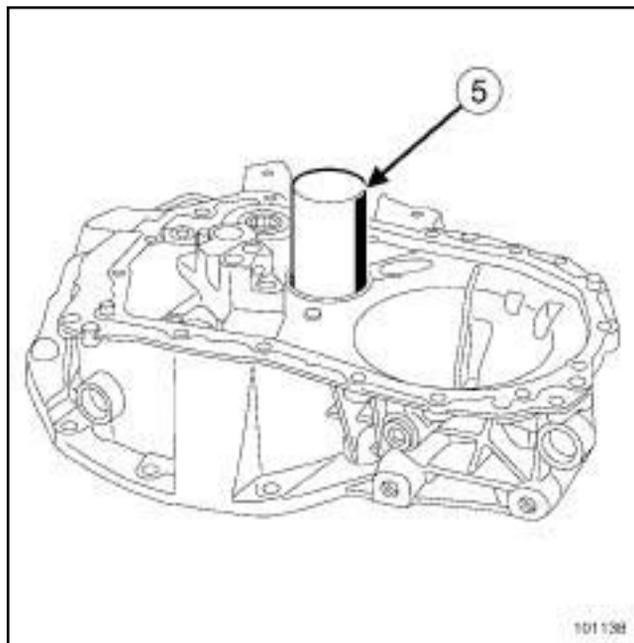
#### 1 - Refitting the output shaft bearing

X06 – X35, and JH3 – X44, and JH1 or JH3 – X61, and JH3 – X65, and JH1 or JH3 – X74, and JH3 – X76, and JH3 – X77, and JA3 or JH3 – X84, and JH3 – X85, and JA3 or JH3 – X90, and JH1 or JH3 – X95, and JH3 – X38, and JH3



- Position a new deflector.
- Refit the output shaft bearing so that it is flush with the inner surface of the clutch housing.
- Crimp the output shaft bearing on the clutch housing using a chisel (4).

X35, and JR5 – X44, and JR5 – X61, and JR5 – X65, and JR5 – X74, and JR5 – X76, and JR5 – X77, and JA5 or JR5 – X84, and JR5 – X85, and JA5 or JR5 – X90, and JR5 – X95, and JR5 – X38, and JR5 – X79



101138

- Position a new deflector.
- Refit the output shaft bearing cup using a **55 mm** diameter tube (5).

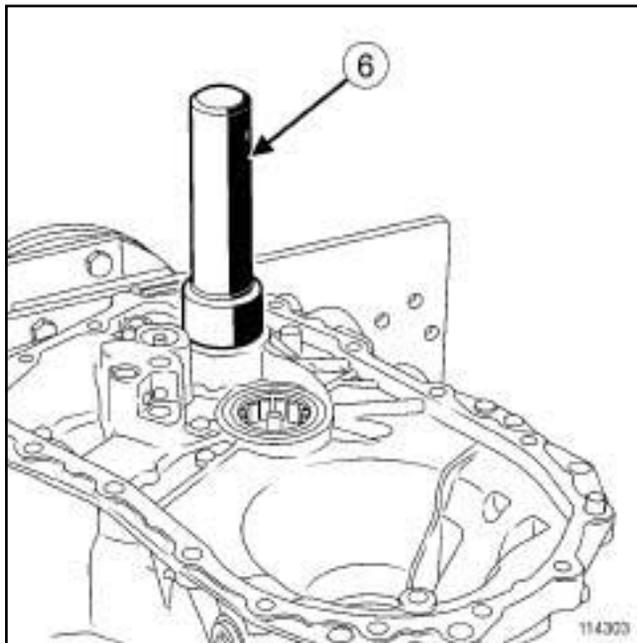
# MANUAL GEARBOX

## Clutch housing bearing: Removal - Refitting

# 21A

X06 - X35 - X44 - X61 - X65 - X74 - X76 - X77 - X84 - X85 - X90 - X95 - X38 - X79

### 2 - Refitting the input shaft bearing



114303

- Use the press to refit the input shaft bearing using tool (Bvi. 1601) (6) .

### III - FINAL OPERATION

- Refit:
  - the differential (see **21A, Manual gearbox, Manual gearbox differential: Removal - Refitting**, page **21A-62**) ,
  - the gearbox shafts (see **21A, Manual gearbox, Gearbox shaft: Removal - Refitting**, page **21A-31**) ,
  - the mechanism housing (see **21A, Manual gearbox, Mechanism housing: Removal - Refitting**, page **21A-24**) ,
  - the fifth gear synchroniser and pinions (see **5th gear sprockets and synchronisers: Removal - Refitting**) ,
  - the fifth gear housing (see **5th gear housing: Removal - Refitting**) .
- Remove the gearbox from the component support (see **21A, Manual gearbox, Gearbox support equipment: Use**, page **21A-23**) .
- Refit the gearbox (see **Manual gearbox: Removal - Refitting**) .

## Manual gearbox selector shaft: Removal - Refitting

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

### Tightening torques

control assembly bolts	21 N.m
------------------------	--------

### IMPORTANT

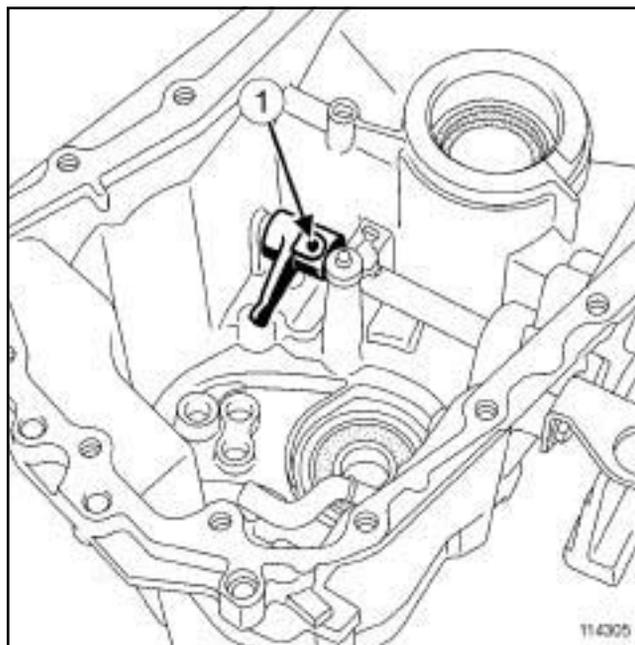
To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **21A, Manual gearbox, Manual gearbox: Precautions for the repair, page 21A-1**).

## REMOVAL

### I - REMOVAL PREPARATION OPERATION

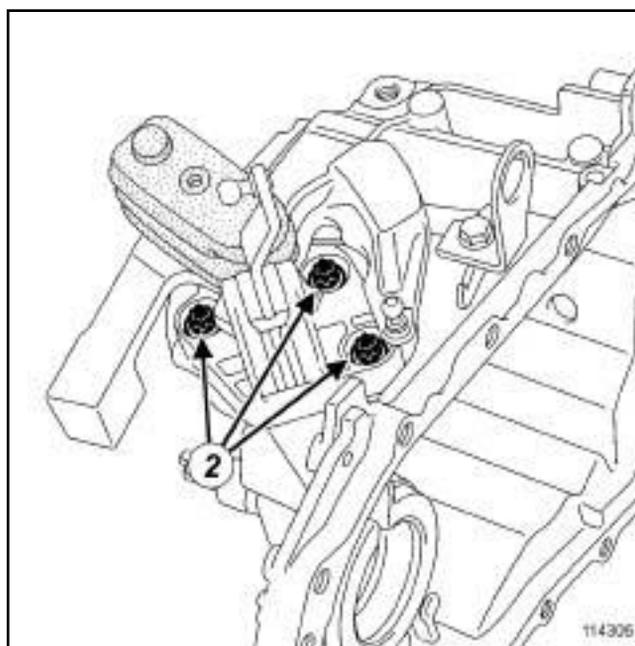
- Remove the gearbox (see **Manual gearbox: Removal - Refitting**).
- Position the gearbox on the component support (see **21A, Manual gearbox, Gearbox support equipment: Use, page 21A-23**).
- Remove:
  - the fifth gear housing (see **5th gear housing: Removal - Refitting**),
  - the fifth gear synchroniser and pinions (see **5th gear sprockets and synchronisers: Removal - Refitting**),
  - the mechanism housing (see **21A, Manual gearbox, Mechanism housing: Removal - Refitting, page 21A-24**),
  - the gearbox shafts (see **21A, Manual gearbox, Gearbox shaft: Removal - Refitting, page 21A-31**),
  - the differential (see **21A, Manual gearbox, Manual gearbox differential: Removal - Refitting, page 21A-62**).

### II - OPERATION FOR REMOVAL OF PART CONCERNED



114305

- Unpin the selector finger (1).

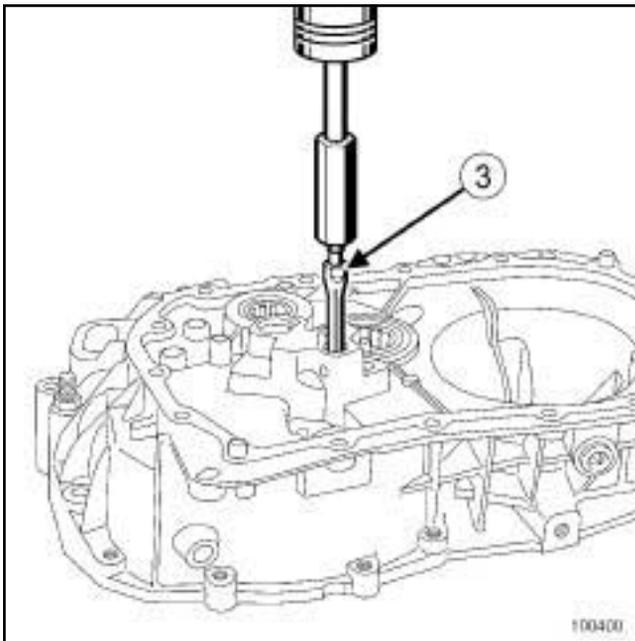


114306

- Remove:
  - the bolts (2) of the control assembly,
  - the control assembly.

## Manual gearbox selector shaft: Removal - Refitting

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79



100400

- Extract the gearbox selector shaft rings using a slide hammer (3) .

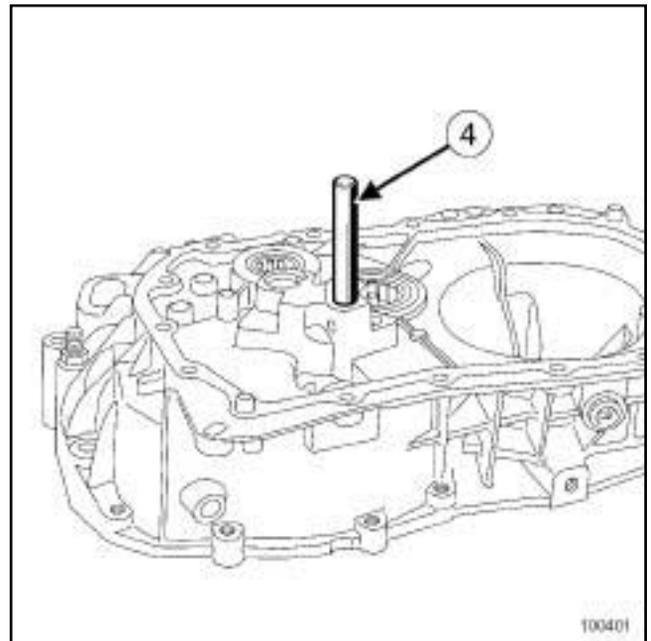
### REFITTING

#### I - REFITTING PREPARATION OPERATION

- Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) to clean:
  - the mating surfaces of the two rings for the gearbox selector shaft in the mechanism housing,
  - the shafts,
  - the shaft mating surfaces,
  - the differential,
  - the mechanism housing,
  - the differential housing.
- Parts always to be replaced:
  - the rings of the gearbox selector shaft,
  - the lip seals,
  - the O-rings,
  - the clutch thrust bearing guide,
  - the gear lock rings,
  - the roll pins,
  - the input and output shaft bearing circlips,
  - the selector rod hub springs,
  - the hydraulic clutch slave cylinder (if fitted),

- the magnet,
- the lock ring of the differential,
- the differential retaining nut.

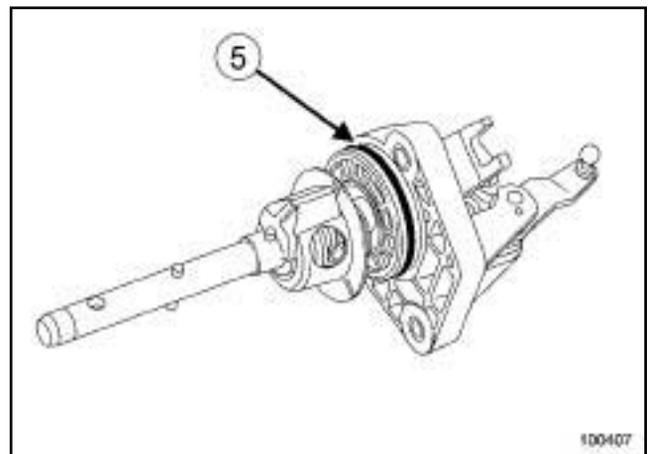
#### II - REFITTING OPERATION FOR PART CONCERNED



100401

100401

- Refit the gearbox selector shaft rings properly using a tube (4) with a diameter of **14.5 mm**.



100407

100407

- Refit:
  - the control assembly equipped with a new O-ring (5) ,
  - the bolts of the control assembly.
- Torque tighten the **control assembly bolts (21 N.m)**.
- Pin the selector finger.

## Manual gearbox selector shaft: Removal - Refitting

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

## III - FINAL OPERATION

- Refit:
  - the differential (see **21A, Manual gearbox, Manual gearbox differential: Removal - Refitting**, page **21A-62**) ,
  - the gearbox shafts (see **21A, Manual gearbox, Gearbox shaft: Removal - Refitting**, page **21A-31**) ,
  - the mechanism housing (see **21A, Manual gearbox, Mechanism housing: Removal - Refitting**, page **21A-24**) ,
  - the fifth gear synchroniser and pinions (see **5th gear sprockets and synchronisers: Removal - Refitting**) ,
  - the fifth gear housing (see **5th gear housing: Removal - Refitting**) .
- Remove the gearbox from the component support (see **21A, Manual gearbox, Gearbox support equipment: Use**, page **21A-23**) .
- Refit the gearbox (see **Manual gearbox: Removal - Refitting**) .

## Reverse gear shaft: Removal - Refitting

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

### IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **21A, Manual gearbox, Manual gearbox: Precautions for the repair, page 21A-1**).

## REMOVAL

### I - REMOVAL PREPARATION OPERATION

- Remove the gearbox (see **Manual gearbox: Removal - Refitting**).
- Position the gearbox on the component support (see **21A, Manual gearbox, Gearbox support equipment: Use, page 21A-23**).
- Remove:
  - the fifth gear housing (see **5th gear housing: Removal - Refitting**),
  - the fifth gear synchroniser and pinions (see **5th gear sprockets and synchronisers: Removal - Refitting**),
  - the mechanism housing (see **21A, Manual gearbox, Mechanism housing: Removal - Refitting, page 21A-24**).

X06 – X35, and JH3 – X44, and JH1 or JH3 – X61, and JH3 – X65, and JH1 or JH3 – X74, and JH3 – X76, and JH3 – X77, and JA3 or JH3 – X84, and JH3 – X85, and JA3 or JH3 – X90, and JH1 or JH3 – X95, and JH3 – X38, and JH3

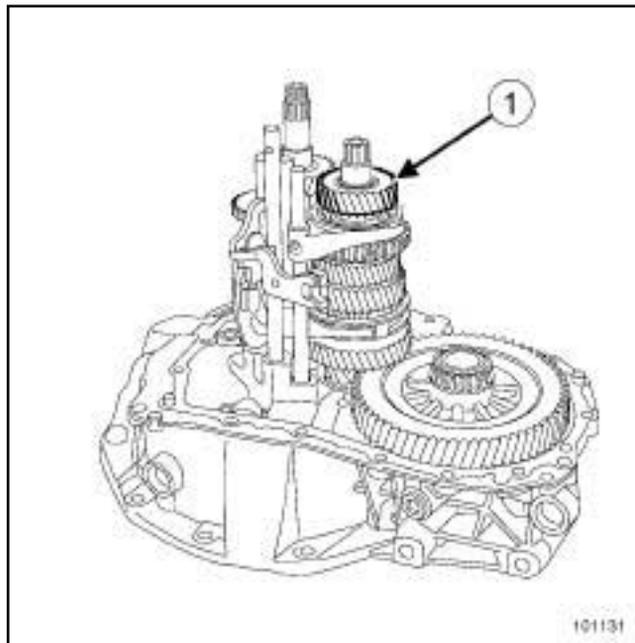
- Remove the lock washer.

X35, and JR5 – X44, and JR5 – X61, and JR5 – X65, and JR5 – X74, and JR5 – X76, and JR5 – X77, and JA5 or JR5 – X84, and JR5 – X85, and JA5 or JR5 – X90, and JR5 – X95, and JR5 – X38, and JR5 – X79

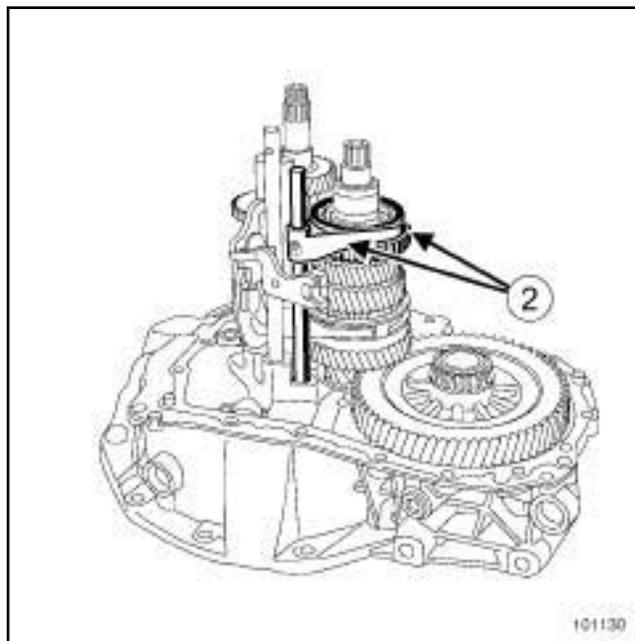
- Remove:
  - the tapered bearings,
  - the adjusting washer.

### II - OPERATION FOR REMOVAL OF PART CONCERNED

#### 1 - Closed differential gearbox



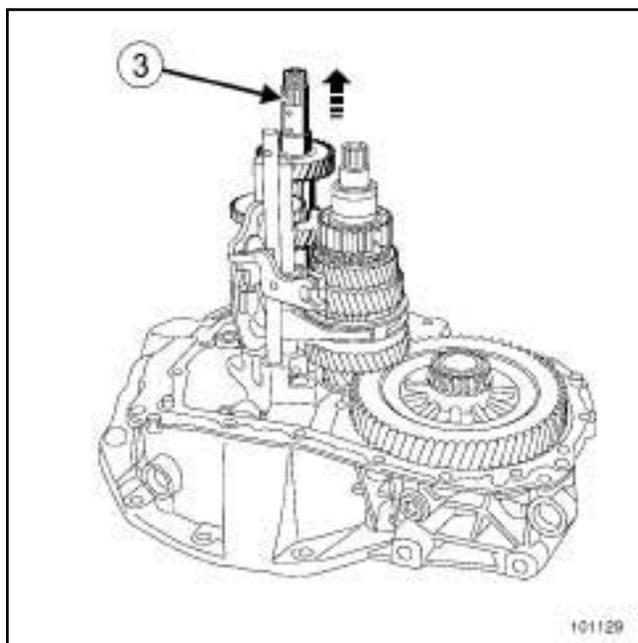
- Remove the fourth gear pinion (1).



- Remove the third-fourth gear "shaft - fork and selector rod" assembly (2) by lifting the input shaft slightly.

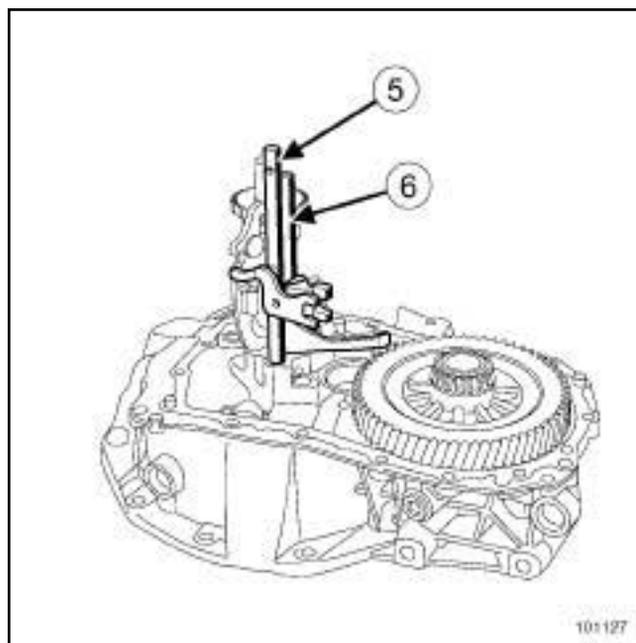
## Reverse gear shaft: Removal - Refitting

X06 - X35 - X44 - X61 - X65 - X74 - X76 - X77 - X84 - X85 - X90 - X95 - X38 - X79



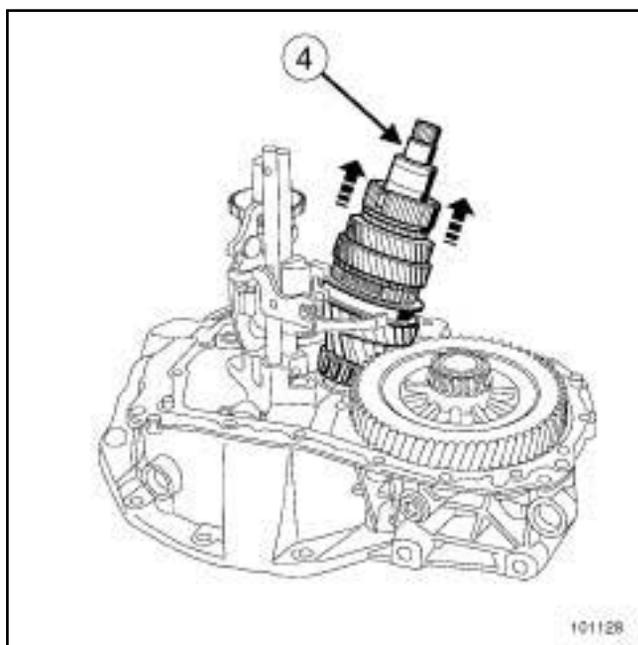
101129  
101129

- ❑ Remove the input shaft (3) .



101127  
101127

- ❑ Remove:
  - the first-second gear shaft and fork (5) ,
  - the fifth gear shaft (6) .



101128  
101128

- ❑ Remove the output shaft (4) .



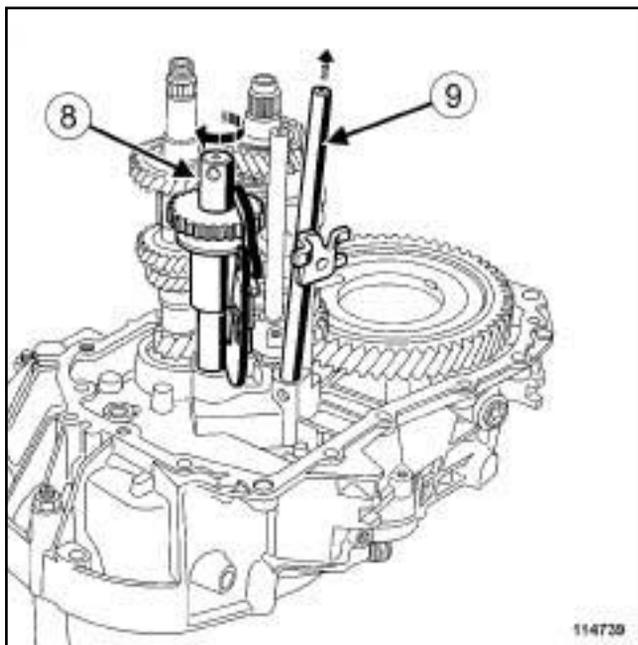
101126  
101126

- ❑ Unpin the reverse gear assembly.
- ❑ Remove the reverse gear assembly (7) .

## Reverse gear shaft: Removal - Refitting

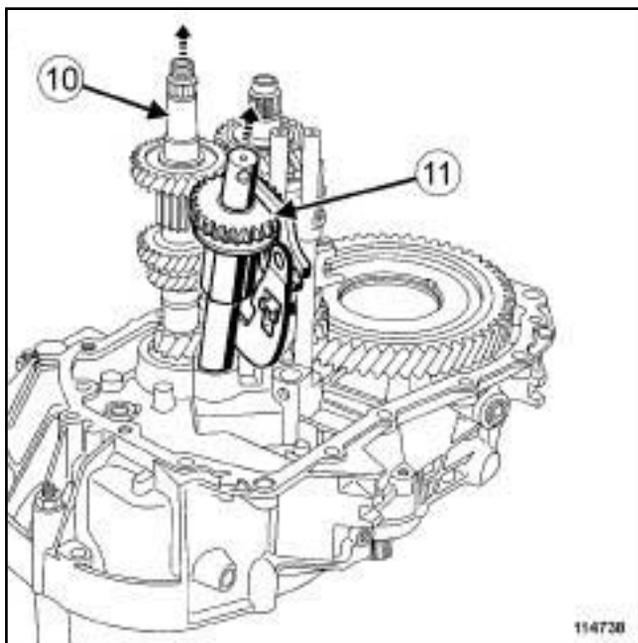
X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

### 2 - Open differential gearbox



114739

- Turn the reverse gear shaft (8) in the direction of the arrow.
- Remove the fifth gear shaft (9) .



114738

- Lift the input shaft slightly (10) .
- Remove the reverse gear shaft (11) .

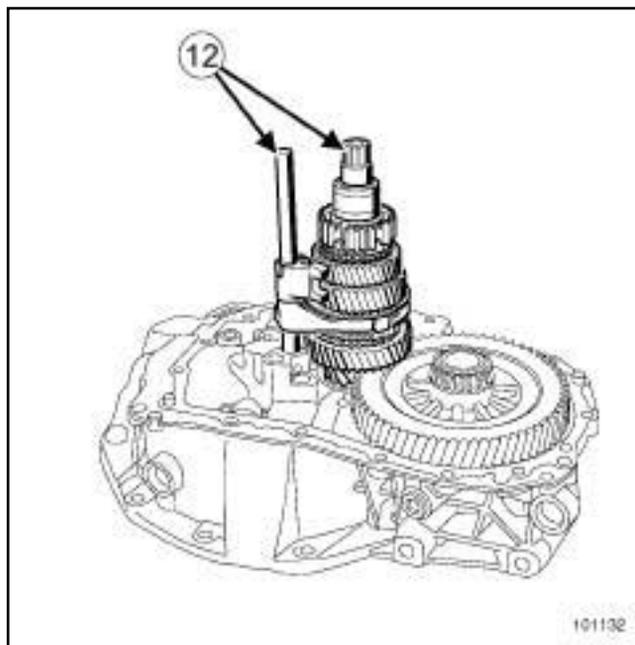
### REFITTING

#### I - REFITTING PREPARATION OPERATION

- Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) to clean:
  - the shafts,
  - the shaft mating surfaces,
  - the mechanism housing.
- Parts always to be replaced:
  - the lip seals,
  - the O-rings,
  - the clutch thrust bearing guide,
  - the gear lock rings,
  - the roll pins,
  - the input and output shaft bearing circlips,
  - the selector rod hub springs,
  - the hydraulic clutch slave cylinder (if fitted),
  - the magnet.

#### II - REFITTING OPERATION FOR PART CONCERNED

##### 1 - Closed differential gearbox



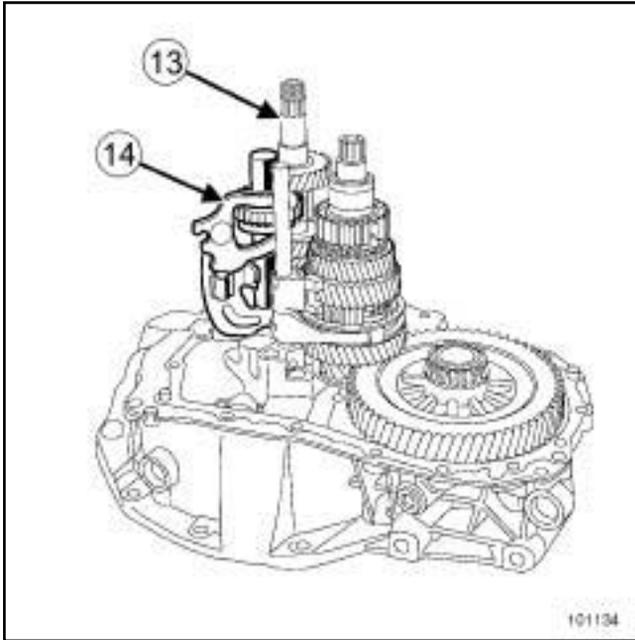
101132

101132

- Refit the output shaft equipped with the first-second" gear fork (12)

## Reverse gear shaft: Removal - Refitting

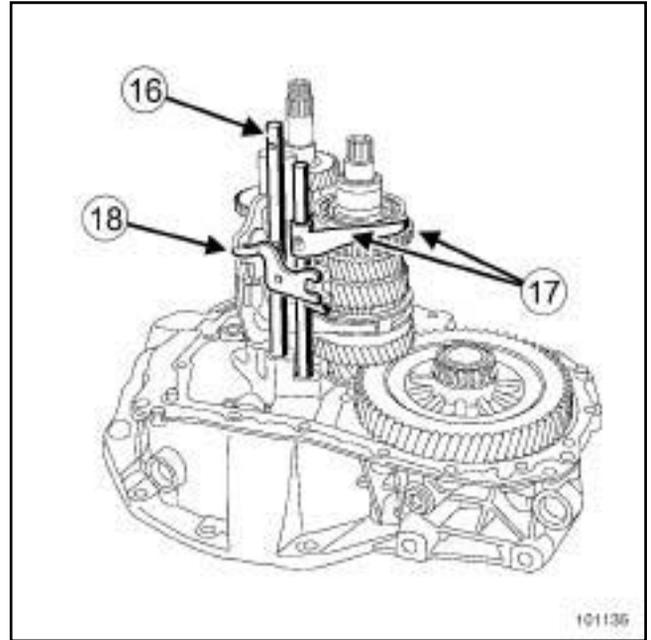
X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79



101134

□ Refit:

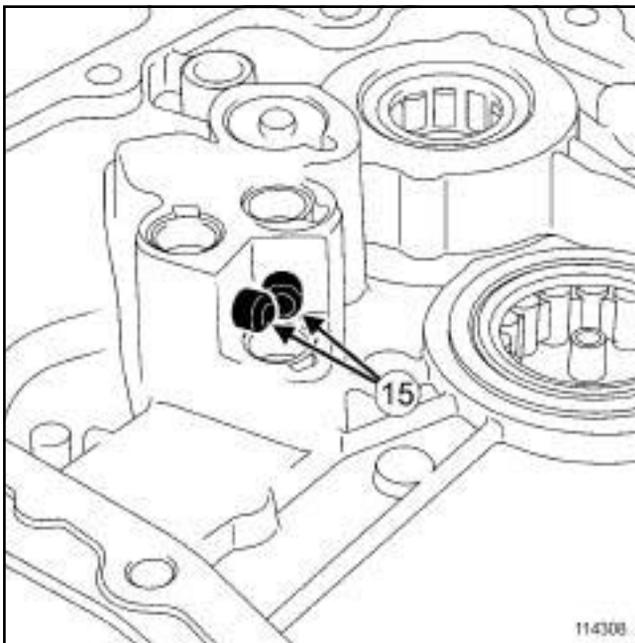
- the input shaft (13) ,
- the reverse gear assembly (14) .



101135

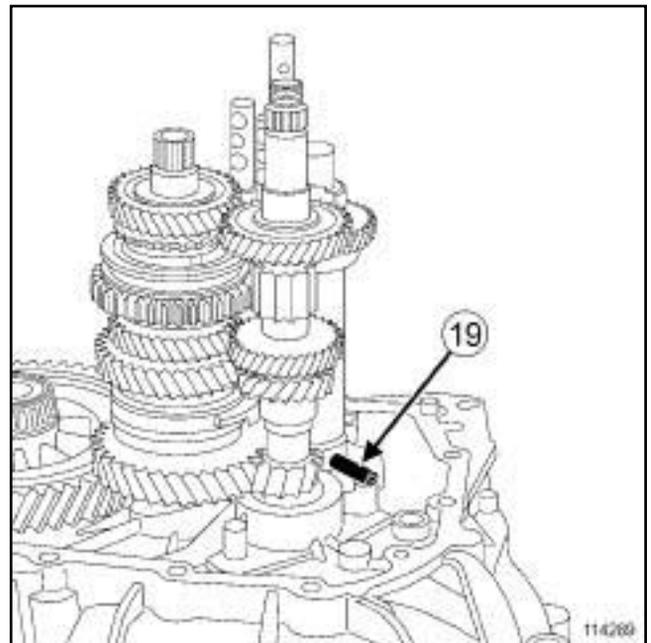
□ Refit:

- the fifth gear shaft (16) ,
- the third-fourth gear "selector rod - fork" assembly (17) ,
- turn the reverse gear shaft to position the fifth gear fork in the reverse gear shaft recess (18) .



114308

□ Refit the inhibitor shafts (15) .

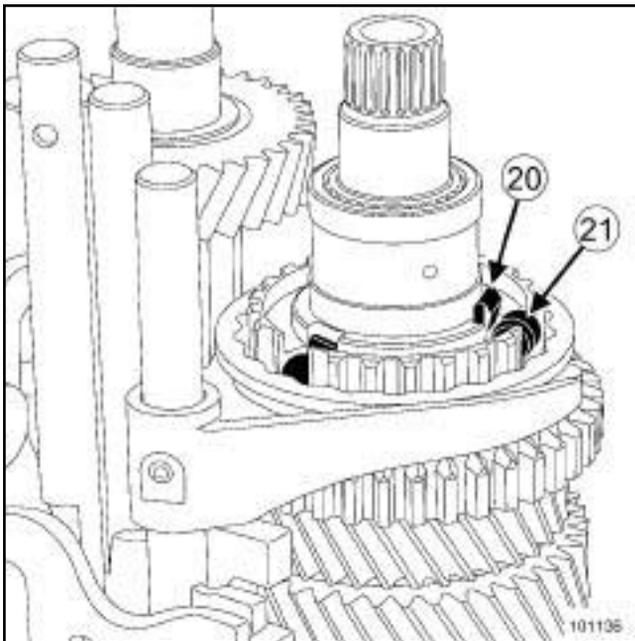


114289

□ Pin the reverse gear shaft (19) .

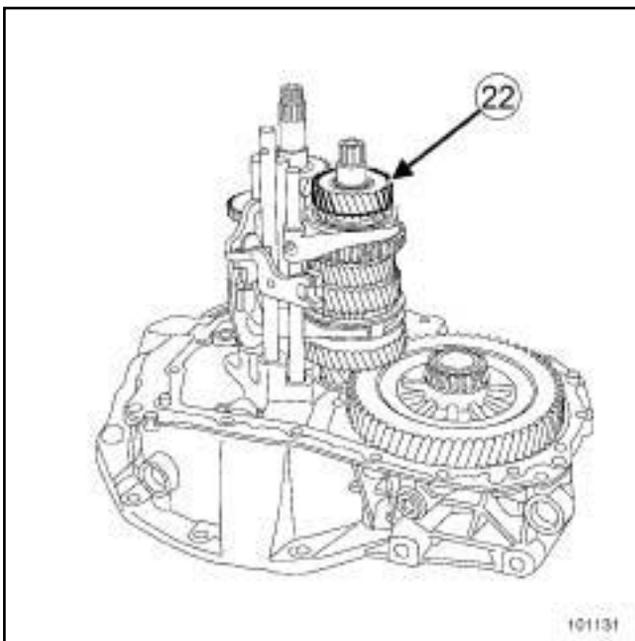
## Reverse gear shaft: Removal - Refitting

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79



101136

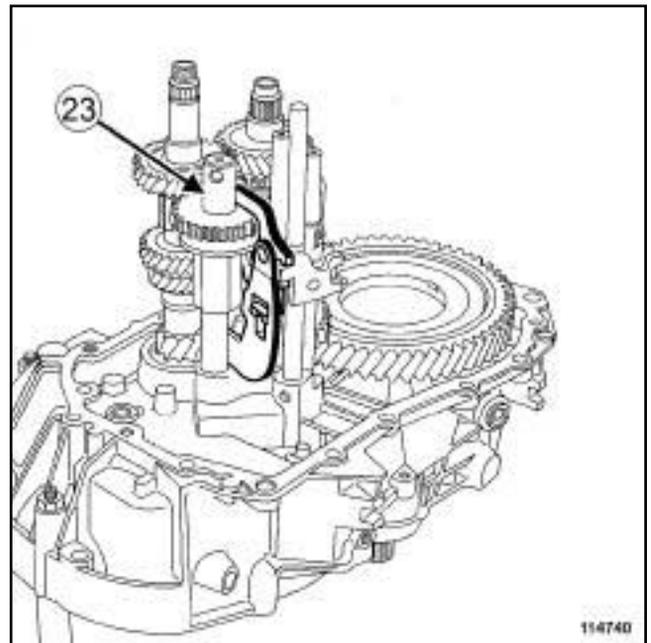
- Engage third gear.
- Insert:
  - the springs (20) ,
  - the rollers (21) .



101131

- Refit:
  - the fourth gear pinion (22) with its synchroniser,
  - the setting washer,
  - the output shaft bearing.

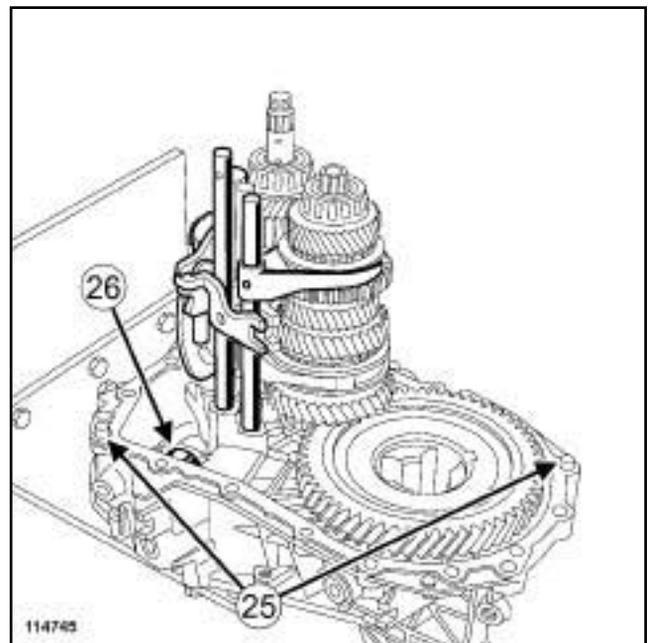
### 2 - Open differential gearbox



114740

114740

- Refit the reverse gear shaft (23) by lifting the input shaft.



114745

- Be sure to fit:
  - of the centring dowels (25) ,
  - of the magnet (26) .
-

## Reverse gear shaft: Removal - Refitting

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

### III - FINAL OPERATION

X06 – X35, and JH3 – X44, and JH1 or JH3 – X61, and JH3 – X65, and JH1 or JH3 – X74, and JH3 – X76, and JH3 – X77, and JA3 or JH3 – X84, and JH3 – X85, and JA3 or JH3 – X90, and JH1 or JH3 – X95, and JH3 – X38, and JH3

- Refit the washer.

X35, and JR5 – X44, and JR5 – X61, and JR5 – X65, and JR5 – X74, and JR5 – X76, and JR5 – X77, and JA5 or JR5 – X84, and JR5 – X85, and JA5 or JR5 – X90, and JR5 – X95, and JR5 – X38, and JR5 – X79

- Refit:
  - the adjusting washer,
  - the tapered bearings.

- Refit:
  - the mechanism housing (see **21A, Manual gearbox, Mechanism housing: Removal - Refitting, page 21A-24**),
  - the fifth gear synchroniser and pinions (see **5th gear sprockets and synchronisers: Removal - Refitting**),
  - the fifth gear housing (see **5th gear housing: Removal - Refitting**).
- Remove the gearbox from the component support (see **21A, Manual gearbox, Gearbox support equipment: Use, page 21A-23**).
- Refit the gearbox (see **Manual gearbox: Removal - Refitting**).

## Manual gearbox differential: Removal - Refitting

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

### Special tooling required

<b>Bvi. 1057</b>	Differential rotation locking tool.
<b>Bvi. 946</b>	Mandrel for fitting locking spring ring to the sunwheel.

### Tightening torques

differential retaining nut (initial torque)	<b>20 N.m</b>
differential retaining nut	<b>130 N.m</b>

### IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **21A, Manual gearbox, Manual gearbox: Precautions for the repair, page 21A-1**).

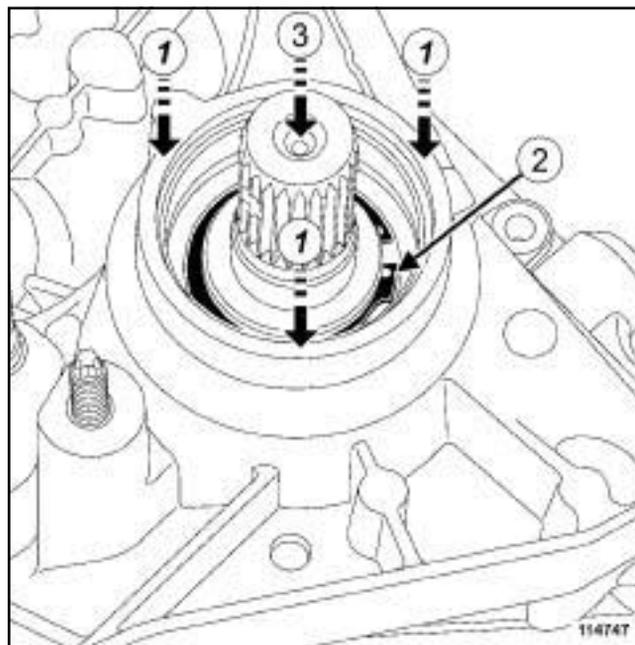
## REMOVAL

### I - REMOVAL PREPARATION OPERATION

- Remove the gearbox (see **Manual gearbox: Removal - Refitting**).
- Position the gearbox on the component support (see **21A, Manual gearbox, Gearbox support equipment: Use, page 21A-23**).
- Remove:
  - the fifth gear housing (see **5th gear housing: Removal - Refitting**),
  - the fifth gear synchroniser and pinions (see **5th gear sprockets and synchronisers: Removal - Refitting**),
  - the mechanism housing (see **21A, Manual gearbox, Mechanism housing: Removal - Refitting, page 21A-24**),
  - the gearbox shafts (see **21A, Manual gearbox, Gearbox shaft: Removal - Refitting, page 21A-31**).

### II - OPERATION FOR REMOVAL OF PART CONCERNED

#### 1 - JH open differential gearbox



114747

#### Note:

A press should be used in order to release the strain between the lock ring and the housing.

Fit:

- a rubber or wooden block on the press plate,
- the crownwheel side of the differential on the rubber or wooden block.

Take a tube suitable for the outer diameter of the differential output housing and push the housing at (1) using the press to release any strain in the lock ring.

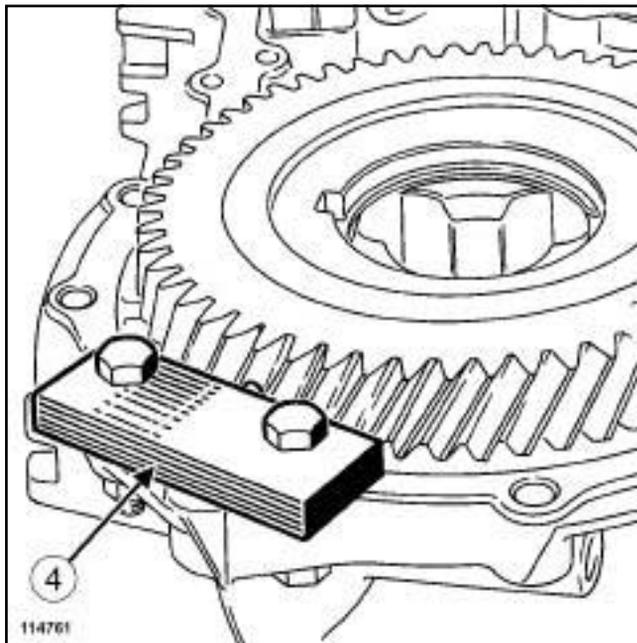
Remove:

- the lock ring (2) using circlip pliers,
- the differential by pushing it with the sunwheel (3).

## Manual gearbox differential: Removal - Refitting

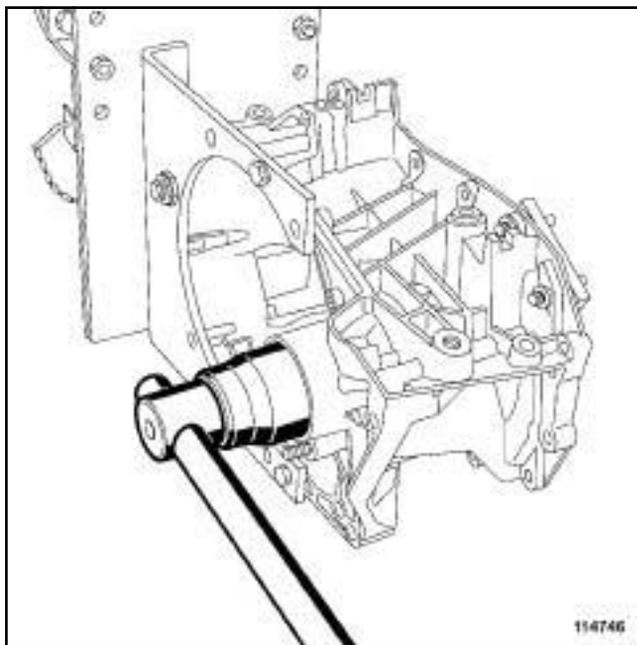
X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

### 2 - JR open differential gearbox



114761

- Immobilise the differential using the tool (**Bvi. 1057**) (4) .



114746

- Remove:
  - the differential retaining nut,
  - the differential using the sunwheel for support.

### REFITTING

#### I - REFITTING PREPARATION OPERATION

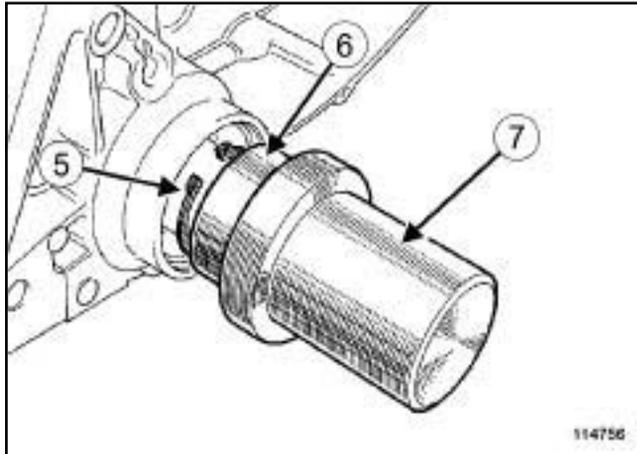
- Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) to clean:
  - the shafts,
  - the shaft mating surfaces,
  - the differential,
  - the mechanism housing,
  - the differential housing.
- Parts always to be replaced:
  - the lip seals,
  - the O-rings,
  - the clutch thrust bearing guide,
  - the gear lock rings,
  - the roll pins,
  - the input and output shaft bearing circlips,
  - the selector rod hub springs,
  - the hydraulic clutch slave cylinder (if fitted),
  - the magnet,
  - the lock ring of the differential,
  - the differential retaining nut.

## Manual gearbox differential: Removal - Refitting

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

### II - REFITTING OPERATION FOR PART CONCERNED

#### 1 - JH open differential gearbox



114756

□

Note:

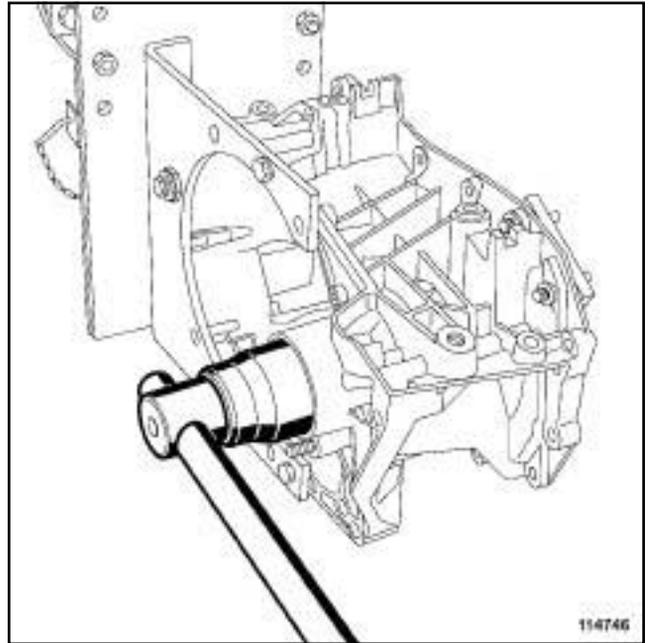
A press should be used to refit the lock ring.

□ Fit:

- the crownwheel side of the differential on the rubber or wooden block,
- the box casing on the differential.

- Position the lock ring (5) on the cone (6) of the tool (Bvi. 946) (7).
- Fit the tool (Bvi. 946) (7) and its cone (6) on the differential output shaft.
- Push the assembly using the press until the lock ring is positioned.

#### 2 - JR open differential gearbox



114746

114746

□ Refit:

- the differential in the housing,
- the bearing (slightly oiled).

□ Place the pretensioning adjusting washer.

□ Refit a new differential retaining nut.

□ Torque tighten the **differential retaining nut (initial torque) (20 N.m)**.

□ Rotate the differential several times to fit the bearings.

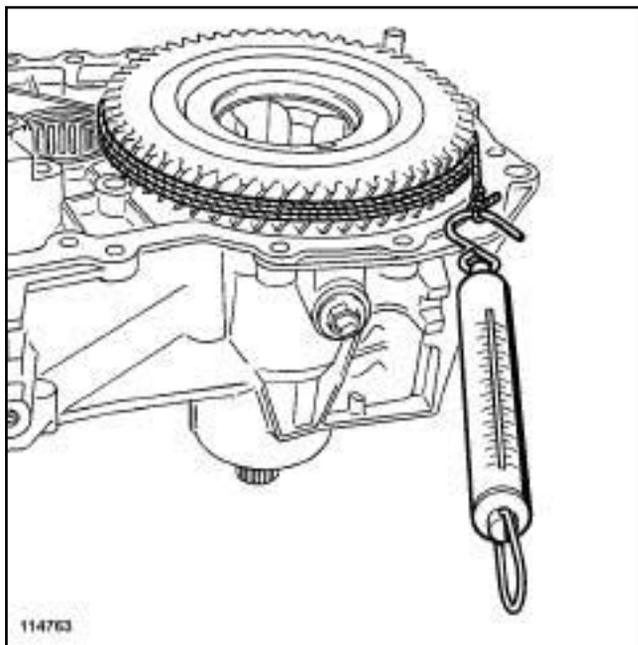
□ Refit the (Bvi. 1057).

□ Torque tighten the **differential retaining nut (130 N.m)**.

□ Remove the tool (Bvi. 1057) and rotate the differential several times.

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

### III - ADJUSTING THE BEARING PRETENSIONING TORQUE



114763

- The differential must rotate under a load between:
  - **5 N.m** and **20 N.m** for reused bearings,
  - **16 N.m** and **32 N.m** for new bearings.
- If the adjustment is not correct, determine the thickness of the adjusting shim, given that the pretensioning torque increases by **7 to 8 N.m** when the thickness of the adjustment washer decreases **0.05 mm** and vice versa.

### IV - FINAL OPERATION

- Refit:
  - the gearbox shafts (see **21A, Manual gearbox, Gearbox shaft: Removal - Refitting**, page **21A-31**),
  - the mechanism housing (see **21A, Manual gearbox, Mechanism housing: Removal - Refitting**, page **21A-24**),
  - the fifth gear synchroniser and pinions (see **5th gear sprockets and synchronisers: Removal - Refitting**),
  - the fifth gear housing (see **5th gear housing: Removal - Refitting**).
- Remove the gearbox from the component support (see **21A, Manual gearbox, Gearbox support equipment: Use**, page **21A-23**).
- Refit the gearbox (see **Manual gearbox: Removal - Refitting**).

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

### Special tooling required

<b>Bvi. 1554</b>	Tool kit for repairing JC7 gearboxes.
<b>Bvi. 1059</b>	Differential bearing fitting rings.

### IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **21A, Manual gearbox, Manual gearbox: Precautions for the repair, page 21A-1**).

## REMOVAL

### I - REMOVAL PREPARATION OPERATION

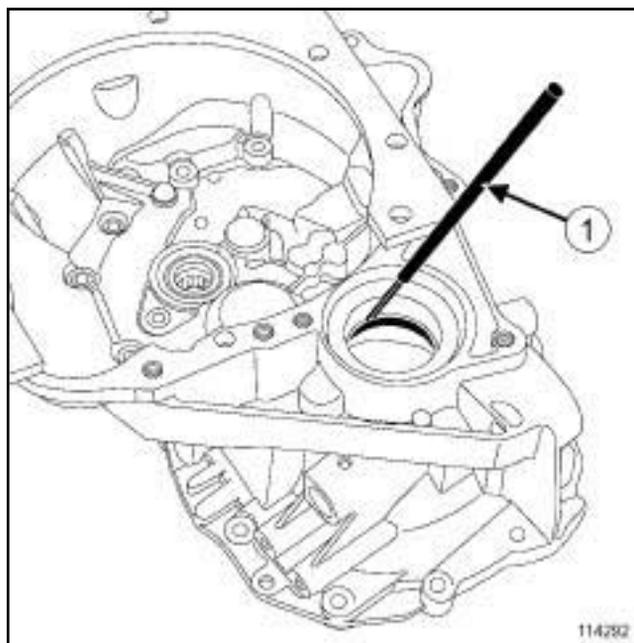
- Remove the gearbox (see **Manual gearbox: Removal - Refitting**).
- Position the gearbox on the component support (see **21A, Manual gearbox, Gearbox support equipment: Use, page 21A-23**).
- Remove:
  - the fifth gear housing (see **5th gear housing: Removal - Refitting**),
  - the fifth gear synchroniser and pinions (see **5th gear sprockets and synchronisers: Removal - Refitting**),
  - the mechanism housing (see **21A, Manual gearbox, Mechanism housing: Removal - Refitting, page 21A-24**),
  - the gearbox shafts (see **21A, Manual gearbox, Gearbox shaft: Removal - Refitting, page 21A-31**),
  - the differential (see **21A, Manual gearbox, Manual gearbox differential: Removal - Refitting, page 21A-62**).

### II - OPERATION FOR REMOVAL OF PART CONCERNED

#### 1 - Removing the bearings from a closed differential gearbox

Note:

The operation described is identical for both bearings.

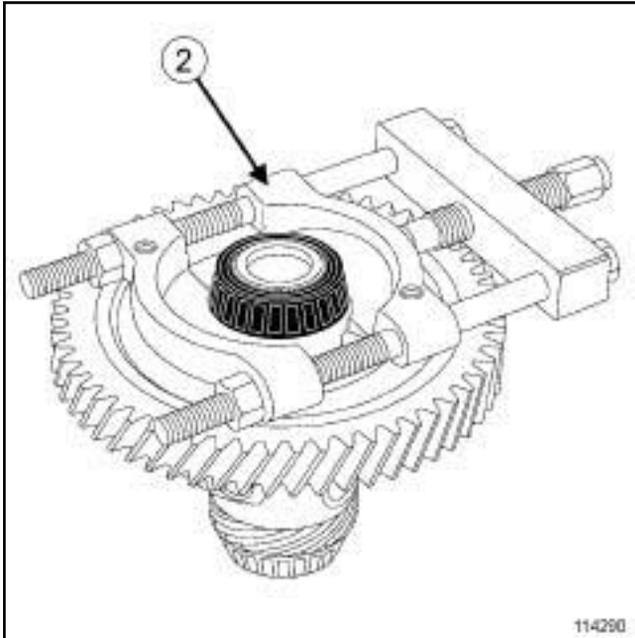


114292

- Remove the bearing cup using a roll pin punch (1).

## Manual gearbox differential bearing: Removal - Refitting

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79



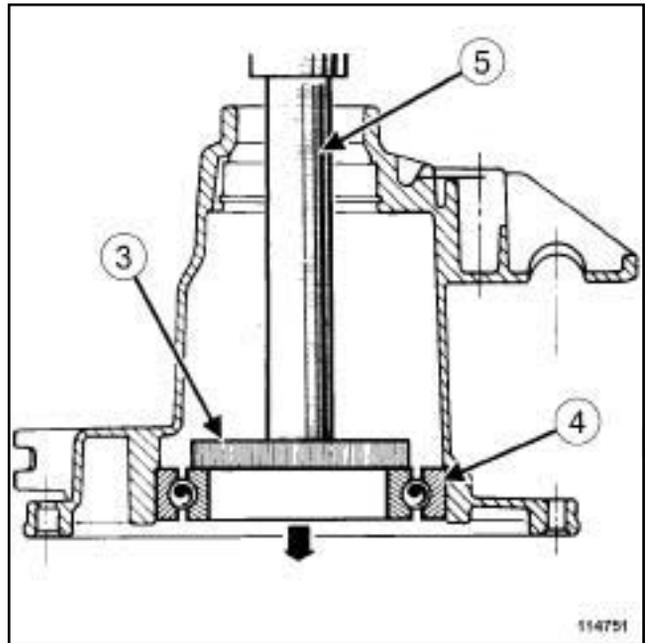
114290  
114290

- ❑ Remove the bearing with an extractor (2) .

### 2 - Removing the bearings from an open differential gearbox

X06 – X35, and JH3 – X44, and JH1 or JH3 – X61, and JH3 – X65, and JH1 or JH3 – X74, and JH3 – X76, and JH3 – X77, and JH3 – X84, and JH3 – X85, and JH3 – X90, and JH1 or JH3 – X95, and JH3 – X38, and JH3

#### a - Crownwheel side



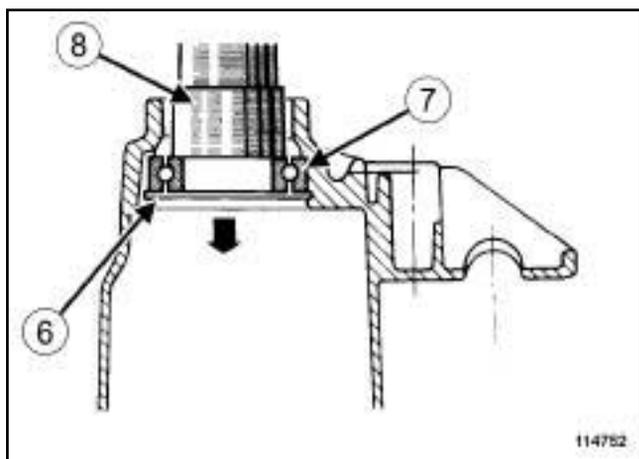
114751  
114751

- ❑ Insert a small bar (3) in the casing and place it flat on the bearing (4) .
- ❑ Extract the bearing (4) using the press and a tube (5)

## Manual gearbox differential bearing: Removal - Refitting

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

### b - Sunwheel side

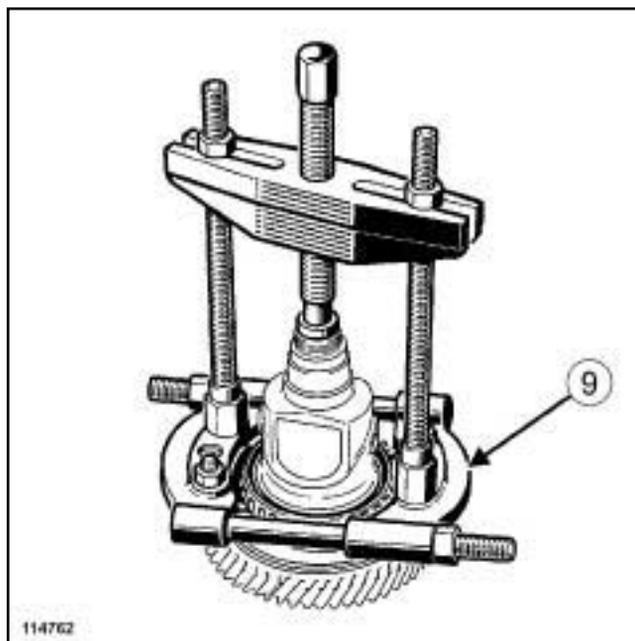


Remove:

- the lock ring (6) of the bearing (7) ,
- the bearing (7) using the press and a 50 mm diameter tube (8) , towards the housing interior.

X35, and JR5 – X44, and JR5 – X61, and JR5 – X65, and JR5 – X74, and JR5 – X76, and JR5 – X77, and JR5 – X84, and JR5 – X85, and JR5 – X90, and JR5 – X95, and JR5 – X38, and JR5 – X79

### c - Crownwheel side



Remove:

- the bearing with an extractor (9) ,
- the bearing cup using a drift punch via the inside of the housing.

### d - Sunwheel side

Remove:

- the bearing with an extractor,
- the bearing cup using a drift punch.

## REFITTING

### I - REFITTING PREPARATION OPERATION

Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) to clean:

- the shafts,
- the shaft mating surfaces,

## Manual gearbox differential bearing: Removal - Refitting

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

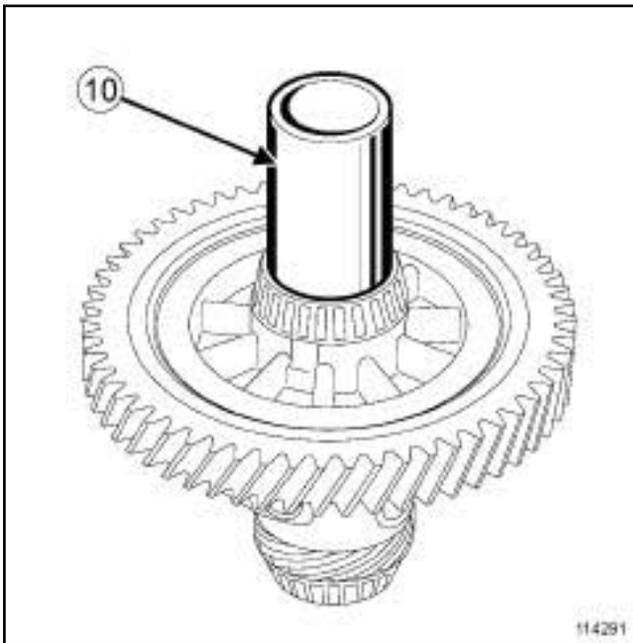
- the differential,
- the mechanism housing,
- the differential housing.

Parts always to be replaced:

- the lip seals,
- the O-rings,
- the clutch thrust bearing guide,
- the gear lock rings,
- the roll pins,
- the input and output shaft bearing circlips,
- the selector rod hub springs,
- the hydraulic clutch slave cylinder (if fitted),
- the magnet,
- the lock ring of the differential,
- the differential retaining nut.

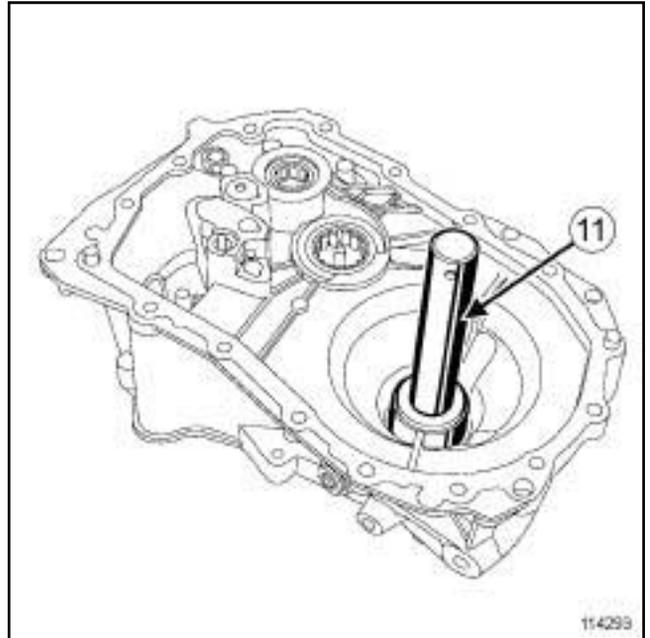
### II - REFITTING OPERATION FOR PART CONCERNED

#### 1 - Refitting the bearings of a closed differential gearbox



114291

- Refit the bearings with a press using a tube (10) with a diameter of **40 mm**.



114293

- Refit the bearing cups using tools **C** and **F** from the kit (Bvi. 1554) (11) .

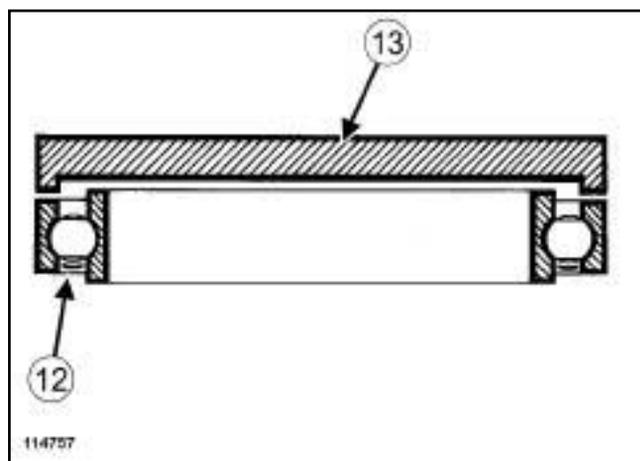
## Manual gearbox differential bearing: Removal - Refitting

X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

### 2 - Refitting the bearings of an open differential gearbox

X06 – X35, and JH3 – X44, and JH1 or JH3 – X61, and JH3 – X65, and JH1 or JH3 – X74, and JH3 – X76, and JH3 – X77, and JH3 – X84, and JH3 – X85, and JH3 – X90, and JH1 or JH3 – X95, and JH3 – X38, and JH3

#### a - Crownwheel side



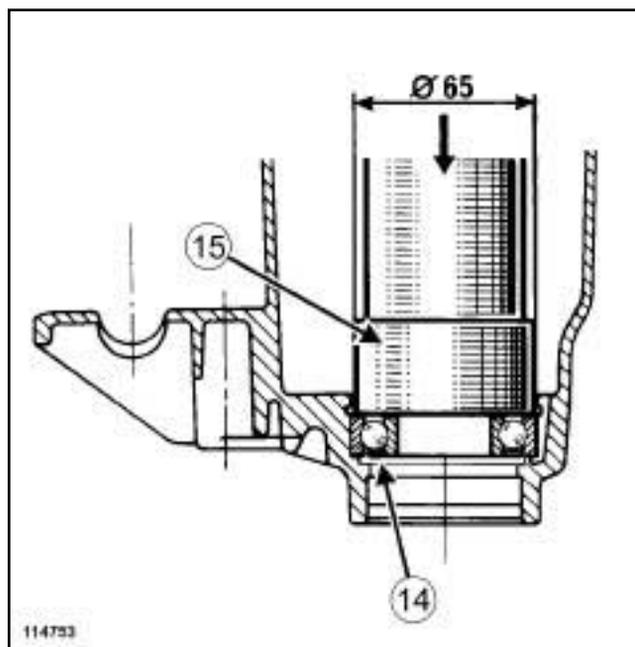
□

#### Note:

The bearing's sealing race (12) must be facing the side opposite the crownwheel.

- Refit the bearing using the press and the tool (Bvi. 1059) (13), using the external bearing bush as a support.

#### b - Sunwheel side



□

#### Note:

The bearing's sealing race (14) must be facing the side opposite the crownwheel.

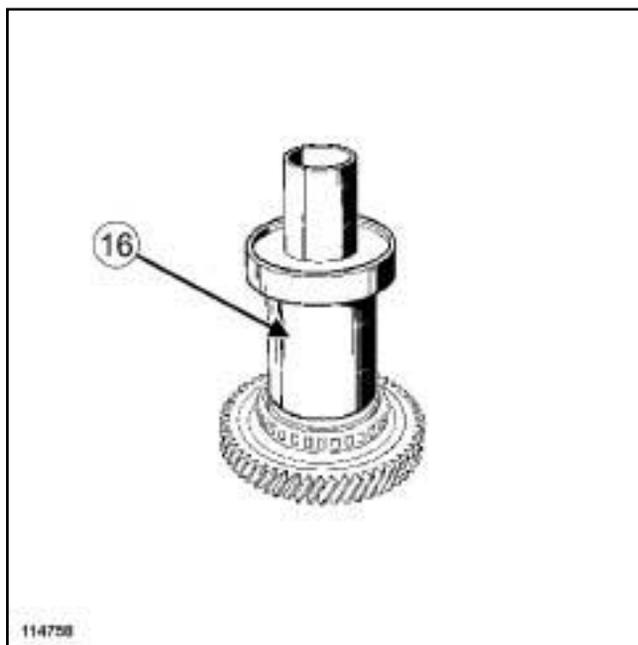
□ Refit:

- the bearing using the press and a tube with a diameter of 65 mm (15), using the external bearing bush as a support,
- a new lock ring.

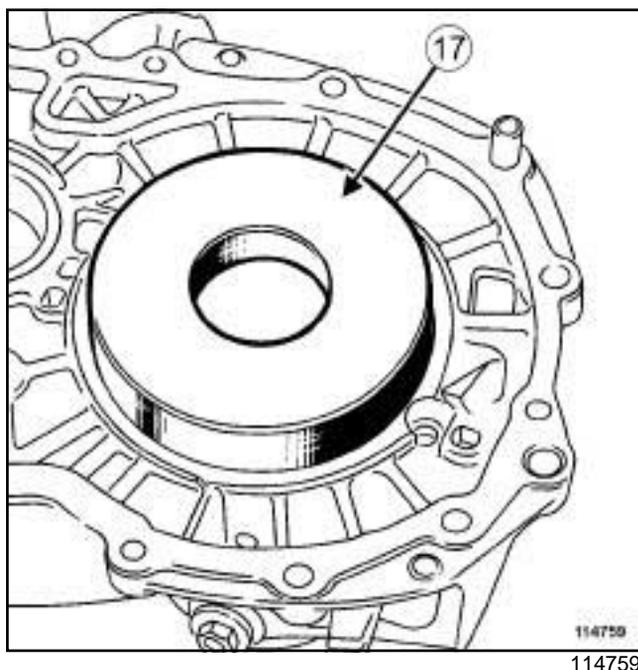
X06 – X35 – X44 – X61 – X65 – X74 – X76 – X77 – X84 – X85 – X90 – X95 – X38 – X79

X35, and JR5 – X44, and JR5 – X61, and JR5 – X65, and JR5 – X74, and JR5 – X76, and JR5 – X77, and JR5 – X84, and JR5 – X85, and JR5 – X90, and JR5 – X95, and JR5 – X38, and JR5

### c - Crownwheel side



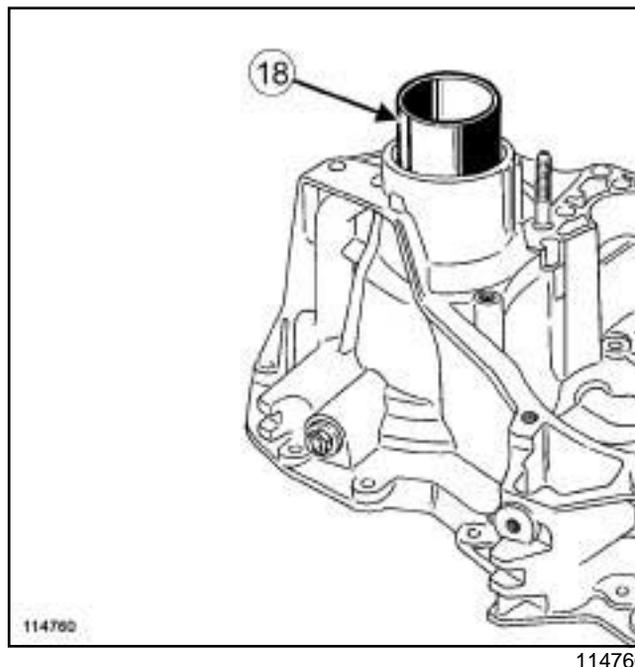
- Refit the bearing using the press and the tool (**Bvi. 1059**) (16) .



- Refit the large bearing cup using the press and the tool (**Bvi. 1059**) (17) .

### d - Sunwheel side

- Refit the bearing using the press and the tool (**Bvi. 1059**) .



- Refit the small bearing cup using the press and the tool (**Bvi. 1059**) (18) .

### III - FINAL OPERATION

- Refit:
  - the differential (see **21A, Manual gearbox, Manual gearbox differential: Removal - Refitting**, page 21A-62) ,
  - the gearbox shafts (see **21A, Manual gearbox, Gearbox shaft: Removal - Refitting**, page 21A-31) ,
  - the mechanism housing (see **21A, Manual gearbox, Mechanism housing: Removal - Refitting**, page 21A-24) ,
  - the fifth gear synchroniser and pinions (see **5th gear sprockets and synchronisers: Removal - Refitting**) ,
  - the fifth gear housing (see **5th gear housing: Removal - Refitting**) .
- Remove the gearbox from the component support (see **21A, Manual gearbox, Gearbox support equipment: Use**, page 21A-23) .
- Refit the gearbox (see **Manual gearbox: Removal - Refitting**) .