Ferrari North America
Technical Information

Date: January 2020
Bulletin #: 2621
Campaign #:
Supersedes:
Section: 3

Model Type:

Model Year: All

Subject: Gearbox speed sensor replacement

This Technical Information Cancels and Replaces
the previous TIs 2153, 2328 and 2398.

Subject: **Gearbox speed sensor replacement**

The procedure for **replacing the gearbox speed sensor** on the DCT gearbox of the aforementioned models is described herein. The part numbers of the kits necessary for this procedure are indicated in the following table, organized by model. Note that these kits are only applicable for vehicles with valid warranty coverage.

Models	Speed Sensor Kit Part No.
458 Italia 458 Spider 458 Speciale 458 Speciale A California FF	70003275
California T	70003853
F12berlinetta	70003276
F12 TDF 488 GTB 488 Spider 488 Pista 488 Pista Spider F8 Tributo	70003919

GTC4 Lusso GTC4 Lusso T 812 Superfast Portofino Monza SP1/SP2	70004784

- The Dealer must duly compile the "DCT Gearbox Pre-Diagnosis Form" on pages **62** to **64** of this document and attach it to a new ROL.
- Replaced parts must be kept for at least 60 days, so that they may be returned if requested or authorized for scrapping by SAT.

- IMPORTANT -

After completing the repair procedures, you are required to complete the "DCT Gearbox Pre-Diagnosis Form" on page 62 to 64 of this document, and attach it to a new ROL.

Tools and equipment necessary for replacement of speed sensor

The following tools and equipment are necessary to carry out the specified procedures:

- Extractor cup for 7th gear wheel needle bearing cage **Part No. 95978627 (AV 8627)**;
- Extractor cup for 1st, 2nd and Reverse gear wheel needle bearing cage **Part No. 95978628 (AV 8628)**;
- Punch for installing 1st, 2nd and Reverse gear wheel needle bearing cage bush **Part No. 95978630 (AV 8630)**;
- Punch for 7th gear wheel needle bearing cage bush **Part No. 95978816 (AV 8816)**;
- Conical guide tip for installing synchronizer rod in oil seal **Part No. 95978817 (AV 8817)**;
- Cone for gear set housing assembly rods **Part No. 95978820 (AV 8820)**;
- Park Lock locking tool **Part No. 95978823 (AV 8823)**;
- Reverse shaft height measuring tool **Part No. 95978824 (AV 8824)**.

- IMPORTANT -

If not already in your possession, these tools must be ordered by you directly from our Spare Parts Department in the quantities needed.

Removing the gearbox speed sensor

- IMPORTANT -

During disassembly, we recommend stacking the gears/rings/synchronizers removed from each shaft in the original working sequence and to keep the specific shims and circlips separate. This will help facilitate reassembly and help ensure that the components are reinstalled in the correct order, and prevent the risk of swapping or inverting shims or other components.

- Remove the complete E-Diff pipe.
- Remove the SAP (as indicated in Technical Information 2619).
- Remove the rear cover.
- Move the indicated control rods into the neutral position, with all of the rods protruding relative to the plate by the same distance – Fig. 1.

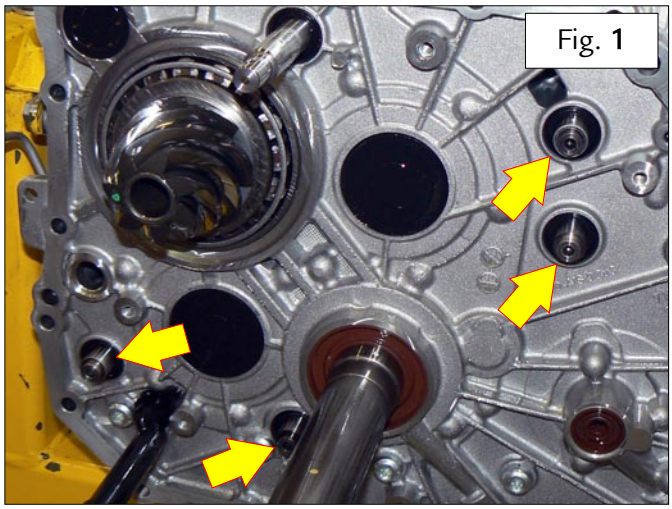
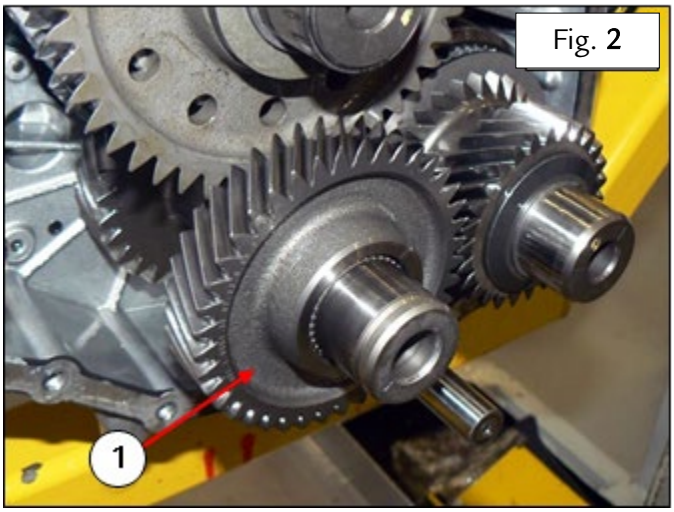
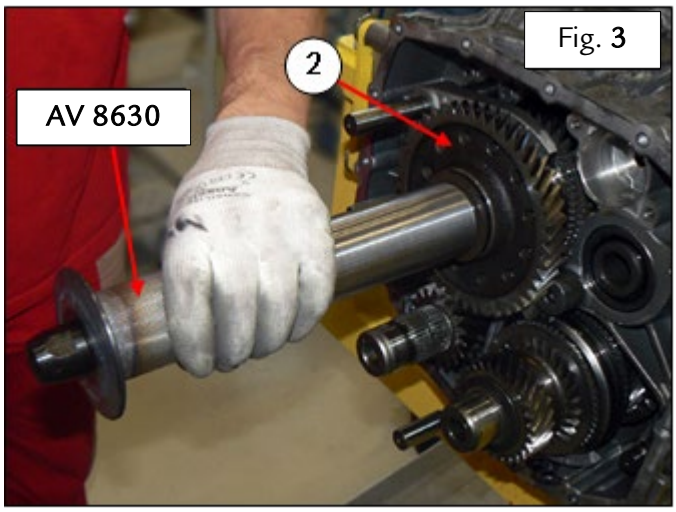


Fig. 1

- Remove the **7th** speed primary gear **(1)** from the odd gear primary shaft – Fig. **2**.



- Using the punch **AV 8630**, tap the shim of the **1st** speed gear **(2)** off the **R-4th-3rd-1st** speed secondary shaft to help facilitate removal of the relative seeger ring – Fig. **3**.



- Using the punch **AV 8816**, tap the shim of the **7th** speed gear **(3)** off the **2nd-6th-5th-7th** speed secondary shaft to help facilitate removal of the relative seeger ring – Fig. **4**.

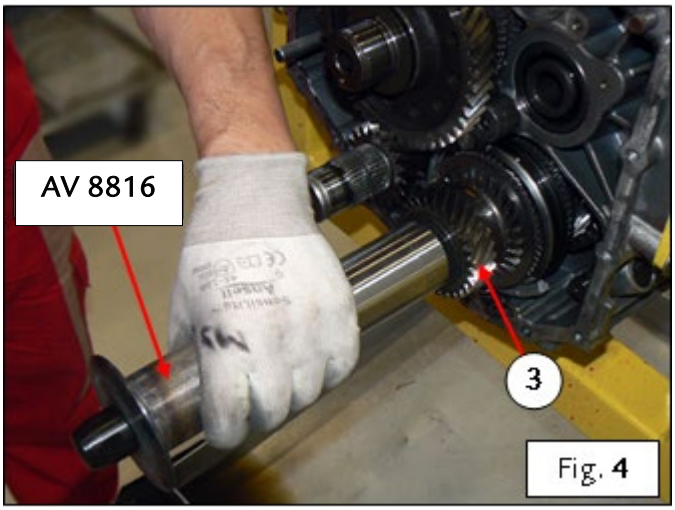


Fig. **4**

- Remove the retainer seeger ring **(4)** on the **1st** speed gear from the secondary shaft – Fig. **5**.

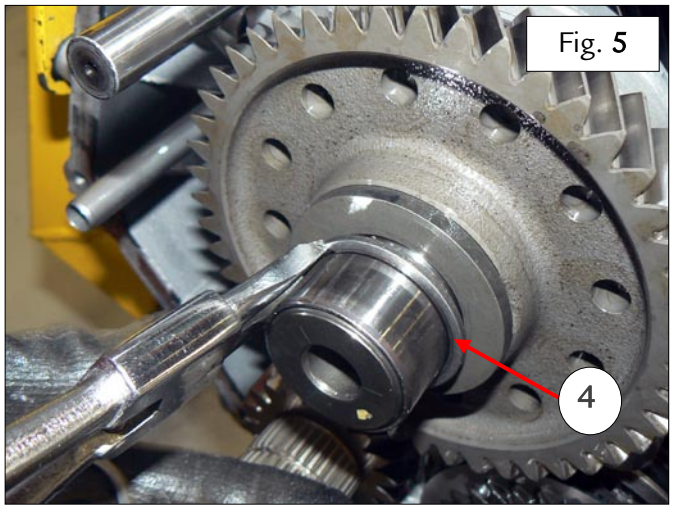


Fig. **5**

- Remove the retainer seeger ring (5) on the **7th** speed gear from the secondary shaft – Fig. **6**.

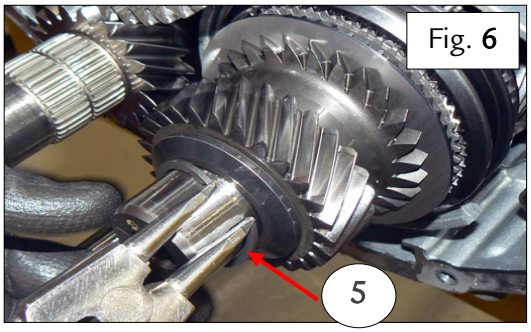


Fig. **6**

- Fit the cap **AV 8613** on the shaft then fit the extractor tool **USAG 454N/3** on the **1st** speed gear (2) – Fig. **7**.
- Release the **1st** speed gear (2) – Fig. **7**.

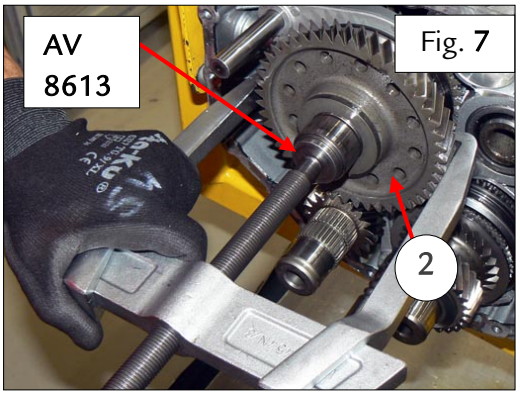


Fig. **7**

- Remove the extractor tool with the relative striker shim.
- Retrieve the shim (6) and the **1st** speed gear (2) – Fig. **8**.

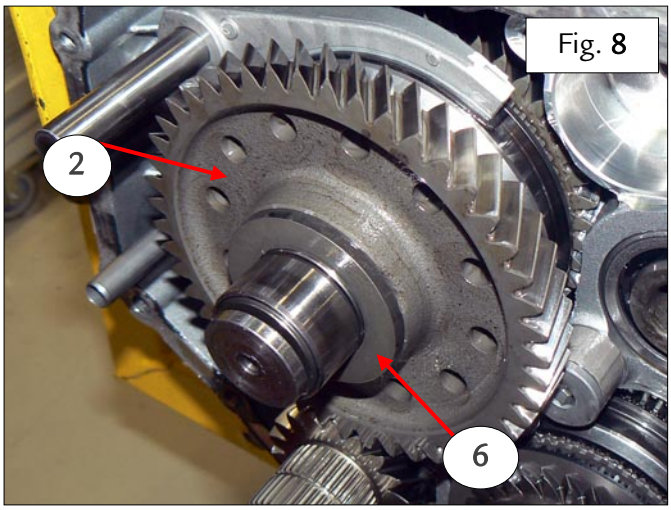


Fig. **8**

- Retrieve the roller bearing cage (7) and the rings (8) – Fig. 9.

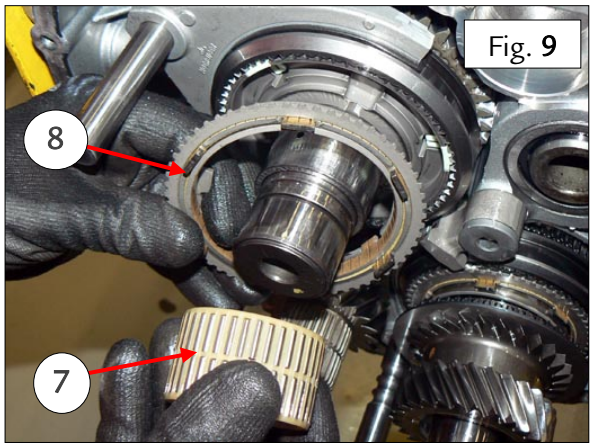


Fig. 9

- Fit the roller bearing cage and rings on the 1st speed gear (2) – Fig. 10.

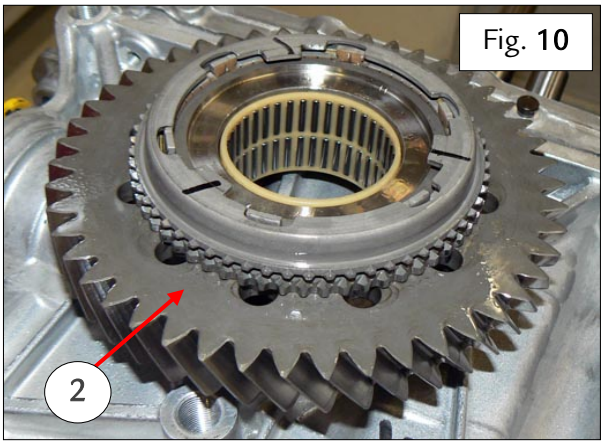


Fig. 10

- Fit the cap AV 8613 on the shaft then fit the extractor tool USAG 454N/3 on the 7th speed gear (3) – Fig. 11.
- Release the 7th speed gear (3) – Fig. 11.

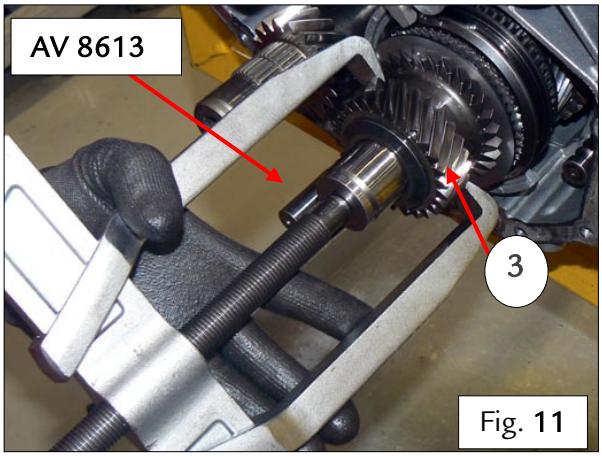


Fig. 11

- Remove the extractor tool with the relative striker shim.
- Retrieve the shim (9) and the **7th** speed gear (3) – Fig. **12**.

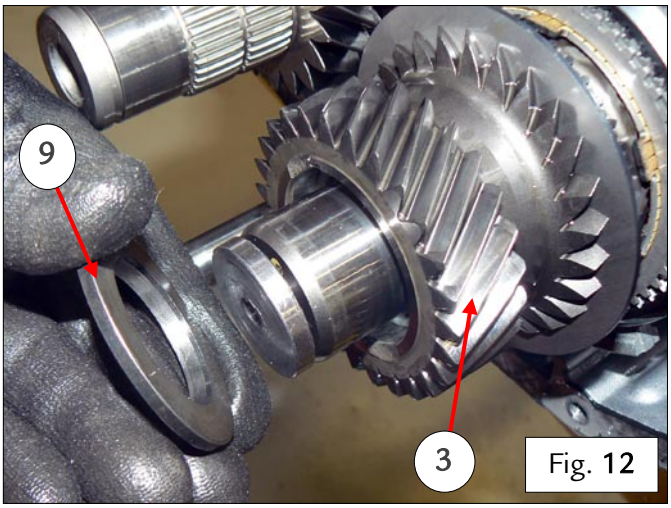


Fig. **12**

- Retrieve the roller bearing cage (**10**) and the rings (**11**) – Fig. **13**.

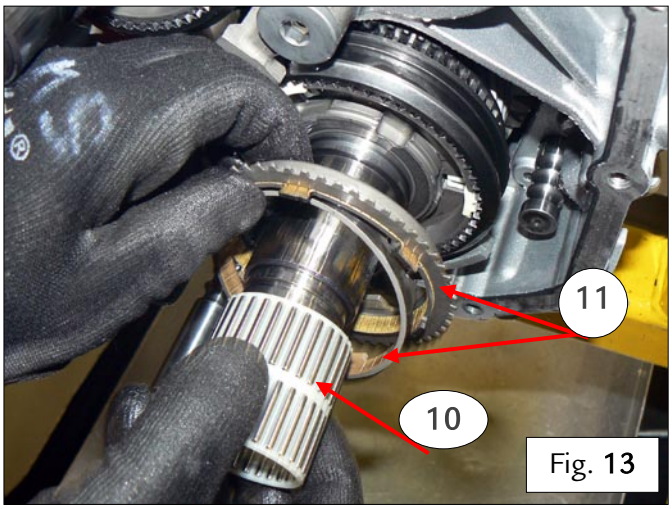


Fig. **13**

- Fit the roller bearing cage and rings on the **7th** speed gear (**3**) – Fig. **14**.

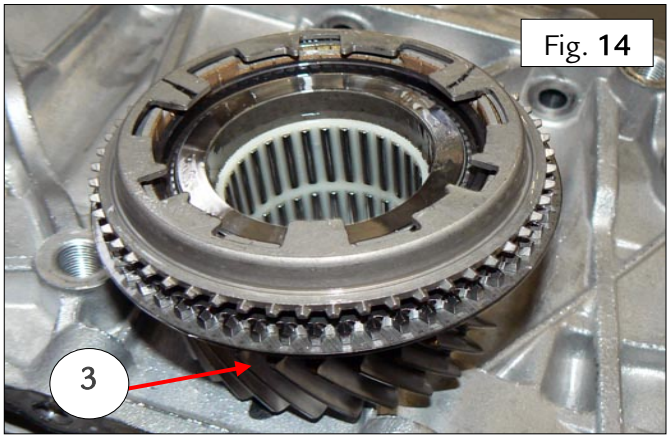


Fig. **14**

- The next step consists of removing the bushes (12) on the two secondary shafts – Fig. 15.

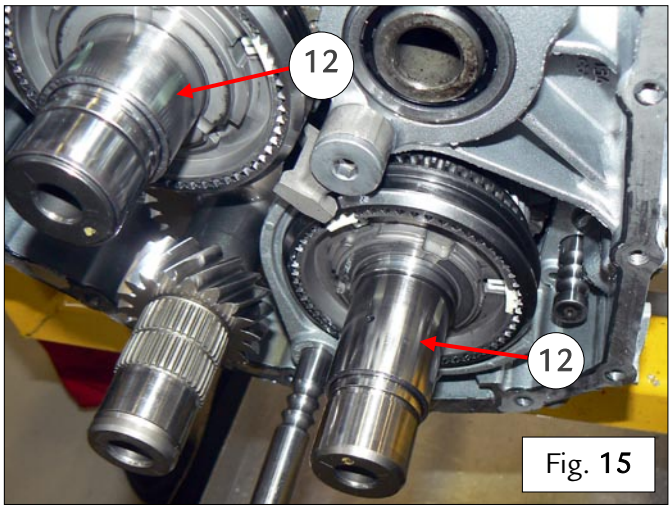


Fig. 15

- To remove the bush (12) on the **2nd-6th-5th-7th** speed secondary shaft, the end of the extractor tool **AV 8627** must be installed in the recess of the shim (13) as shown below – Fig. 16.

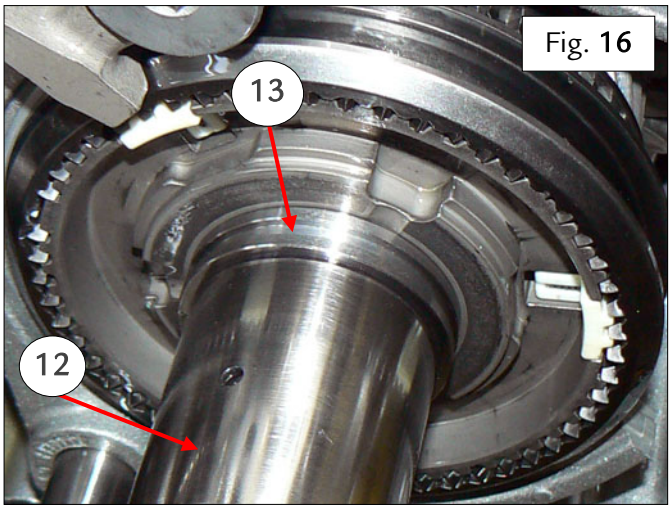


Fig. 16

- Loosen the indicated screws in order to insert the edge of the extractor tool **AV 8627** in the recess on the shim (13) – Fig. **17**.
- Tighten the indicated screws by equal amounts, then check that the extractor tool **AV 8627** is locked securely in place – Fig. **17**.

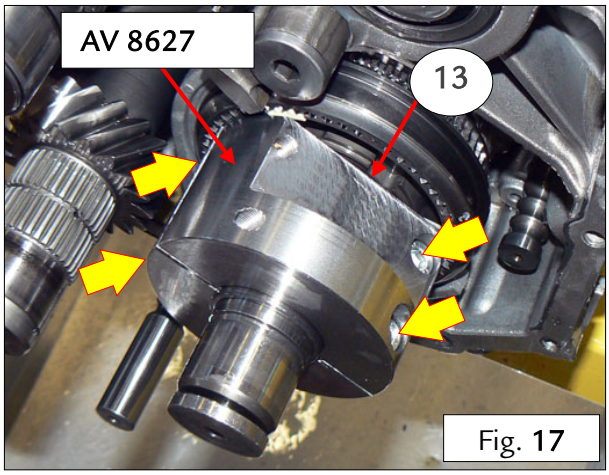


Fig. 17

- Fit the cap **AV 8613** on the shaft then fit the extractor tool **USAG 454N/3** on tool **AV 8627** – Fig. **18**.
- Detach the bush **(12)** on the **2nd-6th-5th-7th** gear secondary shaft and remove from the secondary shaft – Fig. **18**.

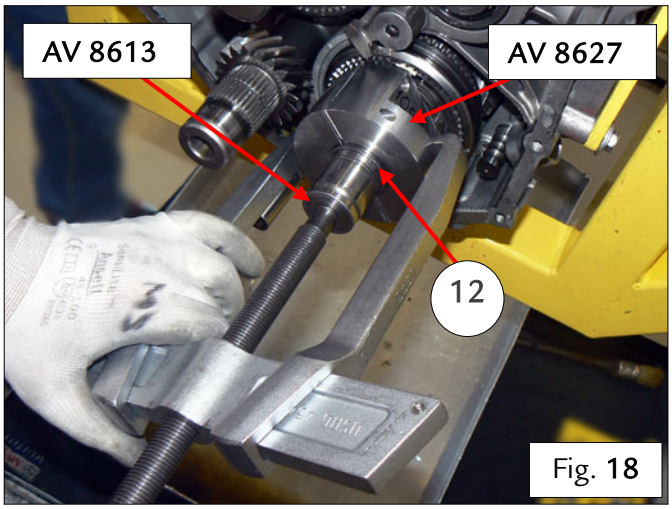


Fig. **18**

- Loosen the screws fastening the tool by just enough to retrieve the shim **(13)** and the bush **(12)** – Fig. **19**.

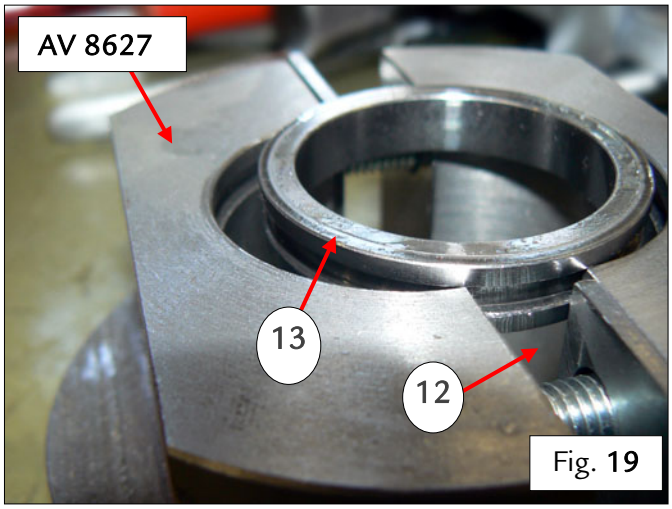


Fig. **19**

- Turn the gearbox into a horizontal position – Fig. **20**.
- Wrap the entire **1st-3rd** gear synchronizer and the relative fork with clean paper or cover with an unused/clean bag – Fig. **20**.

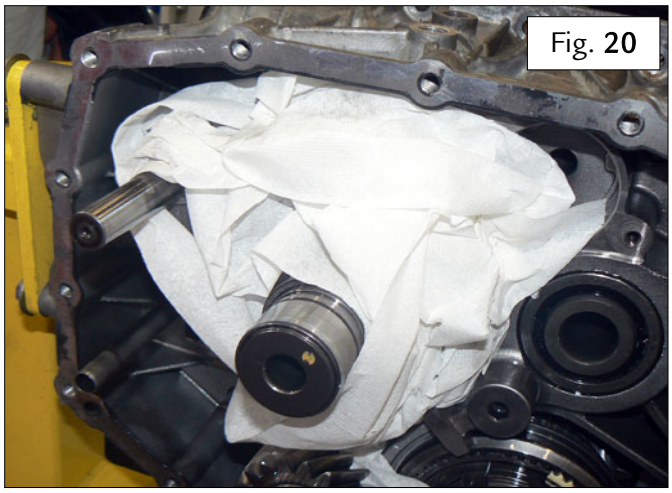


Fig. **20**

- Use a plastic mallet to push the control rod **(14)** of the **1st-3rd** gear synchronizer towards the rear of the gearbox – Fig. **21**.

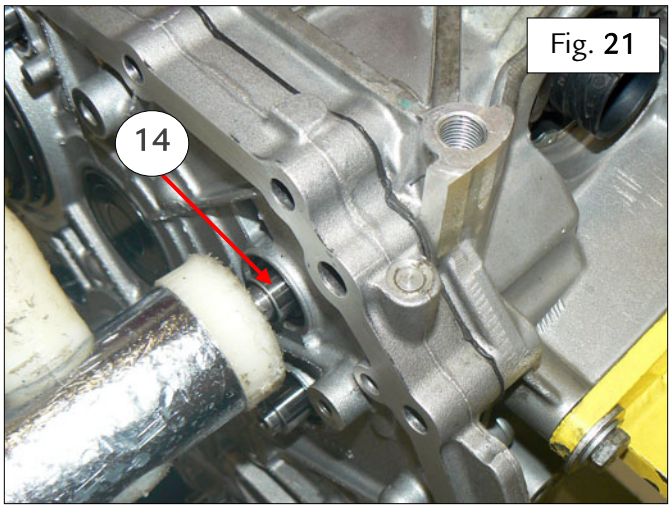


Fig. **21**

- Working carefully, ease the **1st-3rd** gear synchronizer and the relative rod **(14)** out by a few centimeters – Fig. **22**.

  Note: Watch for parts of the assembly falling out of the paper wrapping, and retrieve any parts which may drop out.

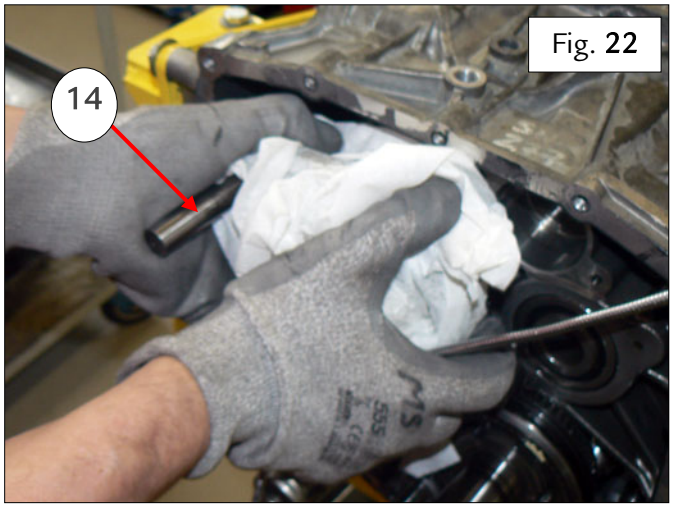


Fig. **22**

- Remove the paper wrapping, taking care not to drop any parts – Fig. **23**.

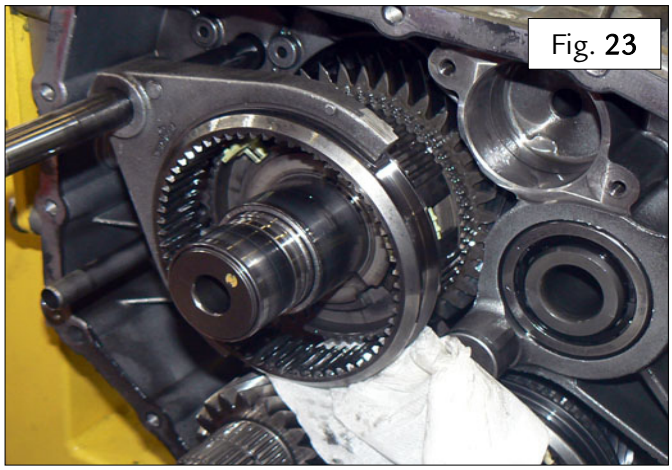
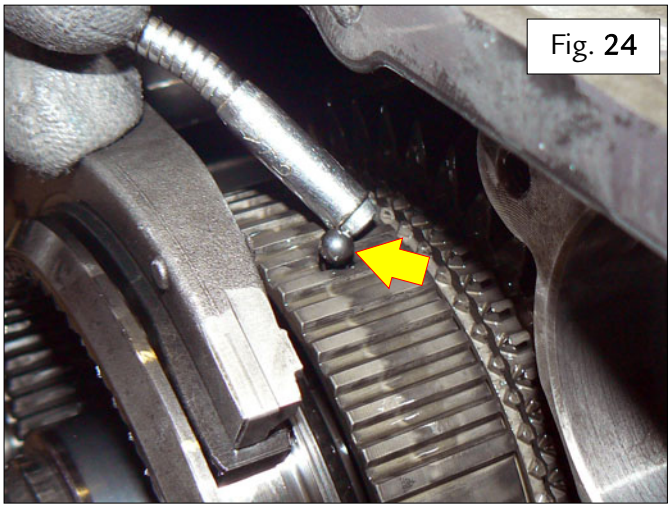
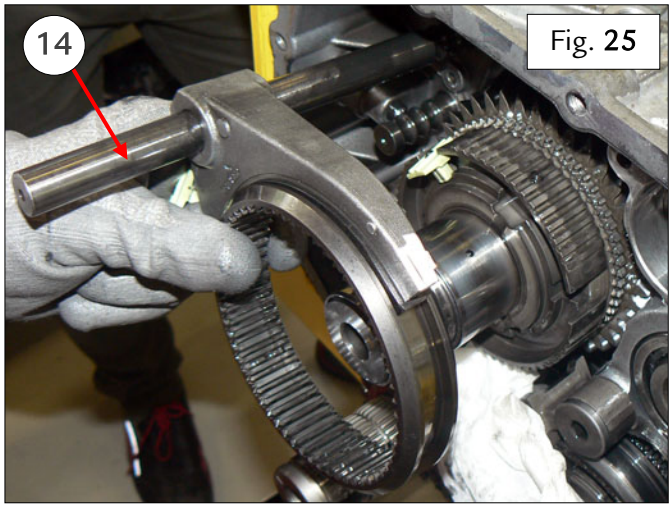


Fig. **23**

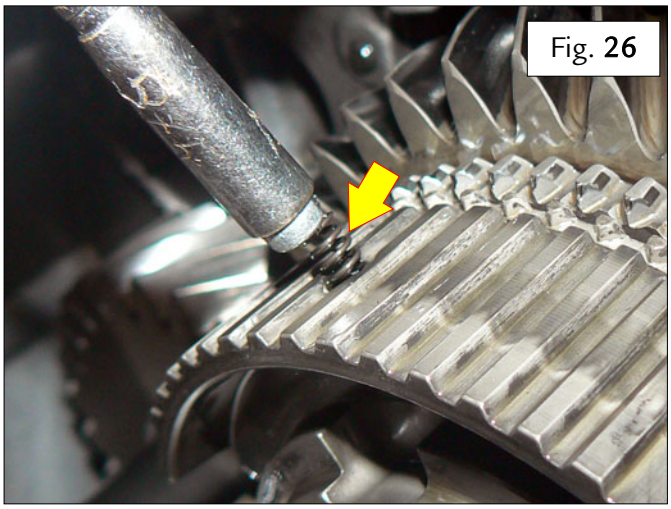
- Use a magnet to retrieve the indicated balls still on the synchronizer hub – Fig. 24.



- Remove the synchronizer complete with control rod (14) – Fig. 25.



- Use a magnet to retrieve the indicated springs still on the synchronizer hub – Fig. 26.



- Retrieve the blocks **(15)** still on the synchronizer hub – Fig. **27**.

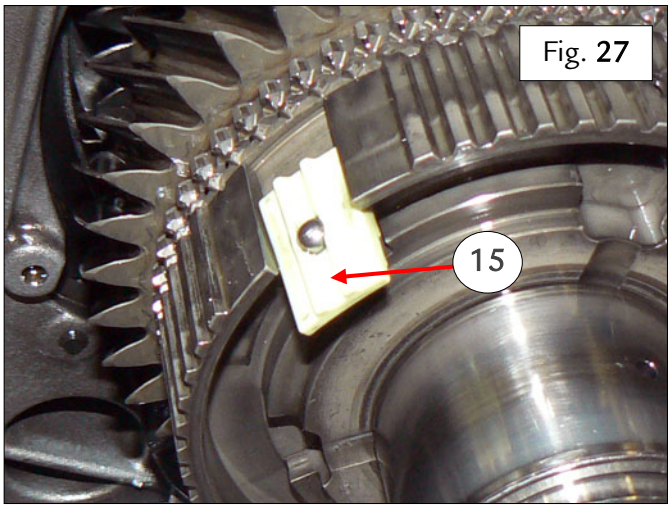


Fig. **27**

- The following parts must be retrieved during disassembly of the synchronizer, as shown in the photo aside (Fig. **28**)::
  - 1 synchronizer ring;
  - 3 blocks;
  - 3 balls;
  - 3 springs.

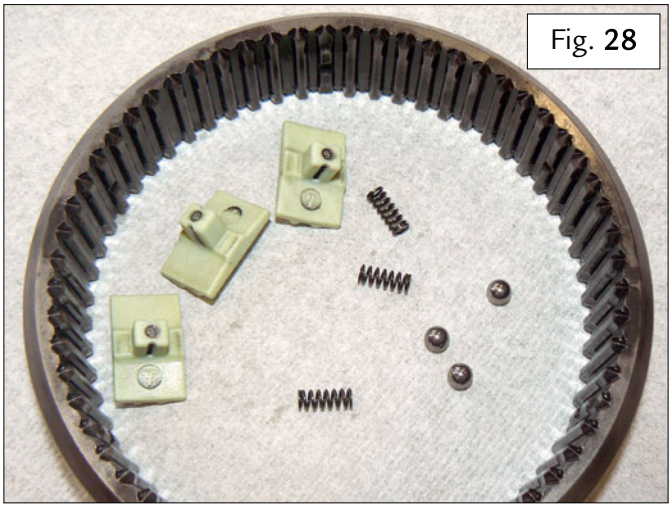


Fig. **28**

- Fit the elastic band **(16)** to keep the interlock raised – Fig. **29**.

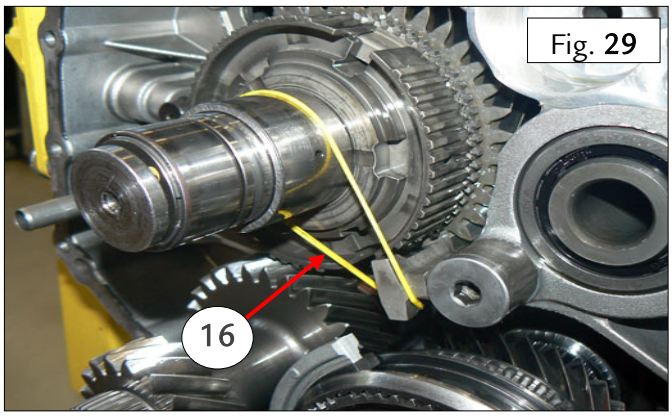


Fig. **29**

- With the gearbox still in a horizontal position, simultaneously remove the odd gear primary shaft (17), the **5th-7th** gear synchronizer (18) and the **5th** speed gear (19) – Fig. 30.
- Remove the elastic band fitted previously.

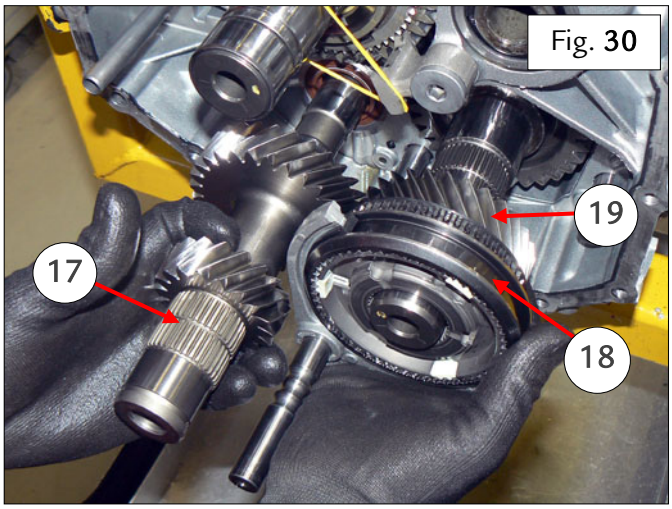


Fig. 30

- Remove the roller bearing cage (20) – Fig. 31.

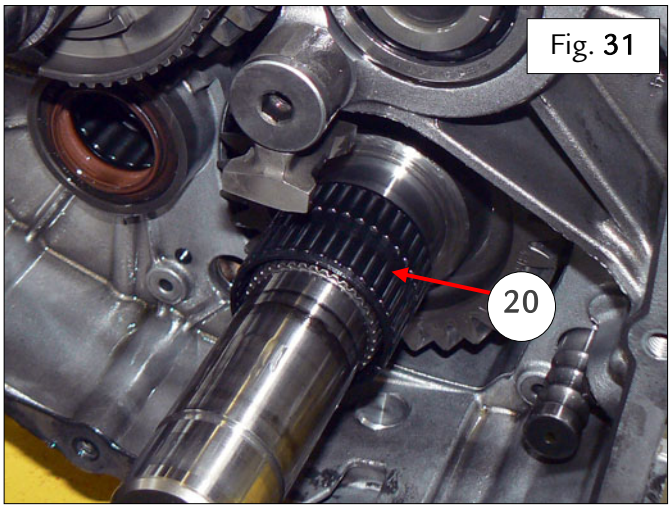


Fig. 31

- Fit the bushing **AV 8628** on the **R-4th-3rd-1st** speed secondary shaft – Fig. 32.

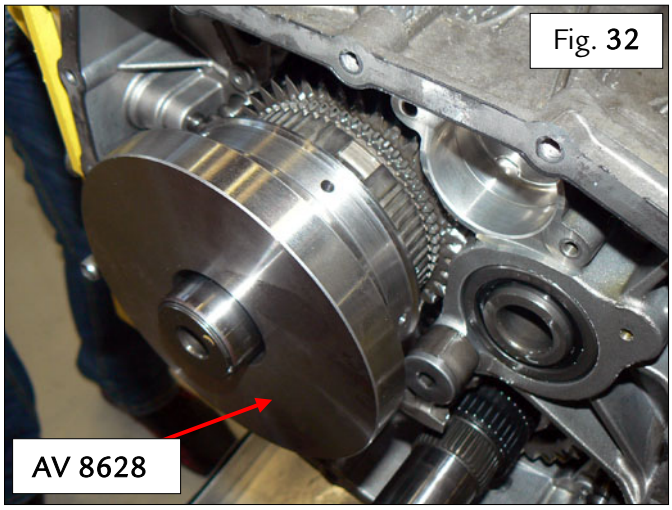


Fig. 32

- Fit the bushing **AV 8628** on the synchronizer hub **(21)**, aligning the indicated holes – Fig. **33**.

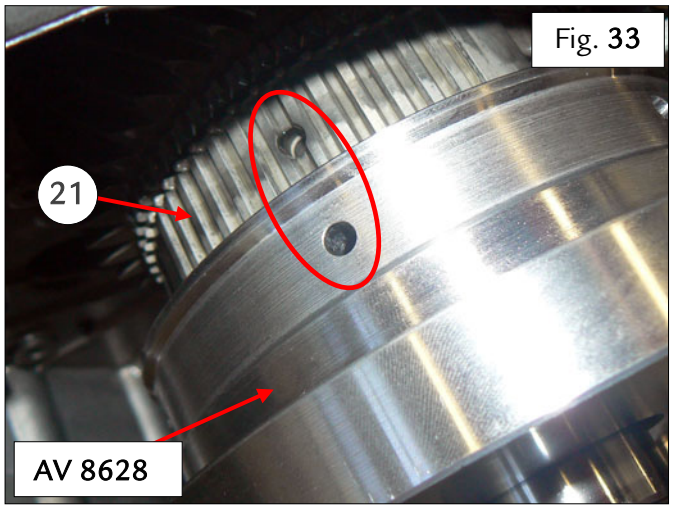


Fig. 33

- Fit the three pins in the holes spaced at 120° intervals on the bushing **AV 8628** – Fig. **34**.

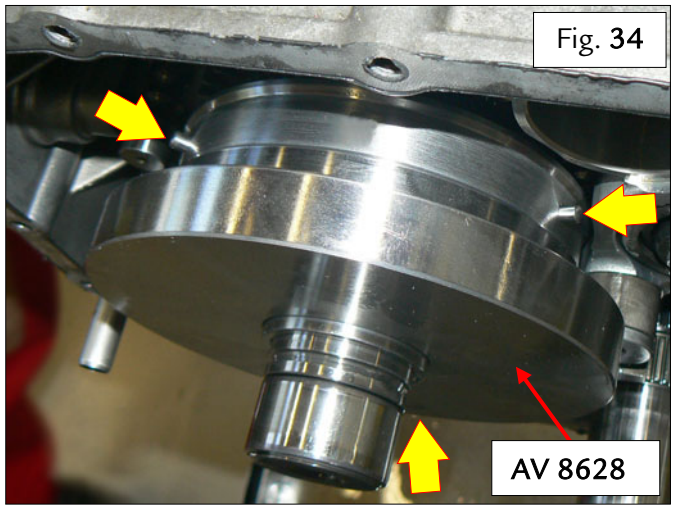


Fig. 34

- Ensure that the pins are inserted fully in the holes, as shown in the photo aside – Fig. **35**.

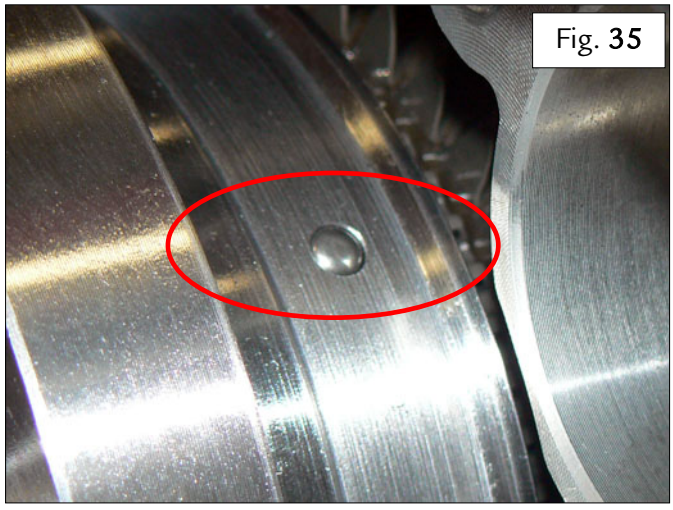


Fig. 35

- Fit the clamp (22) around the circumference of the bushing **AV 8628**, over the pins fitted previously – Fig. **36**.

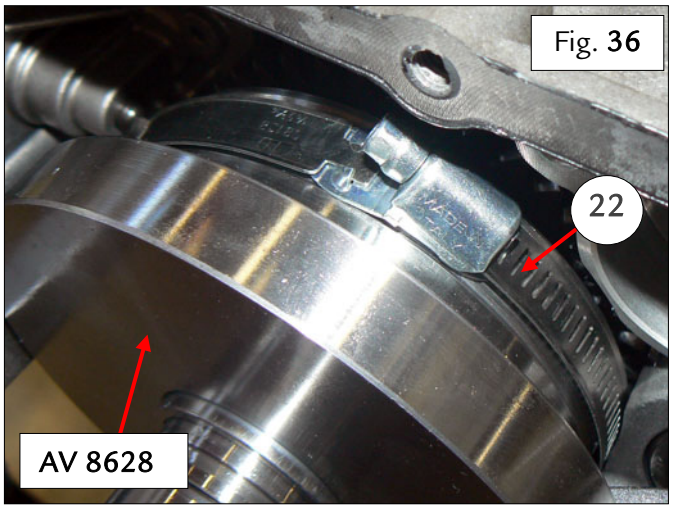


Fig. 36

- Fit the cap **AV 8613** on the **R-4th-3rd-1st** secondary shaft, then fit the extractor tool **USAG 454N/3** on the tool **AV 8628** – Fig. **37**.
- Detach and remove the bushing (12) from the **R-4th-3rd-1st** gear secondary shaft – Fig. **37**.

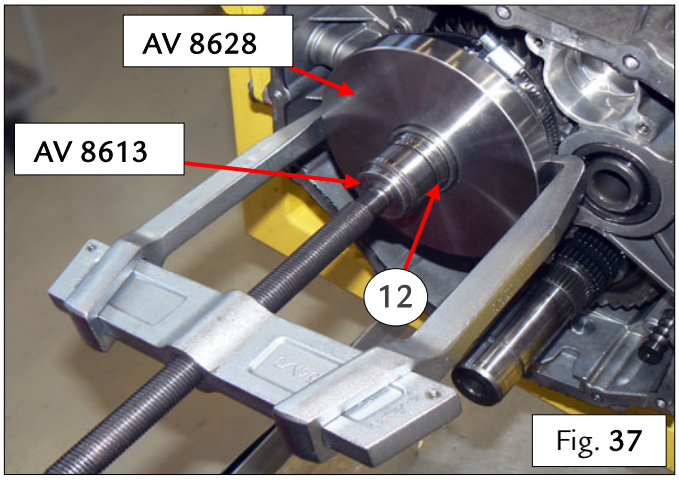


Fig. 37

- Place the assembly on the bench.
- Remove the bushing (12) from the tool **AV 8628** – Fig. **38**.

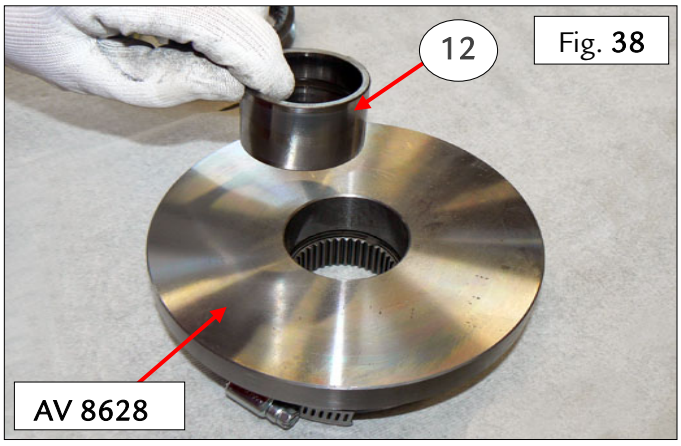


Fig. 38

Loosen then remove the clamp (23) from the bushing AV 8628 – Fig. 39.

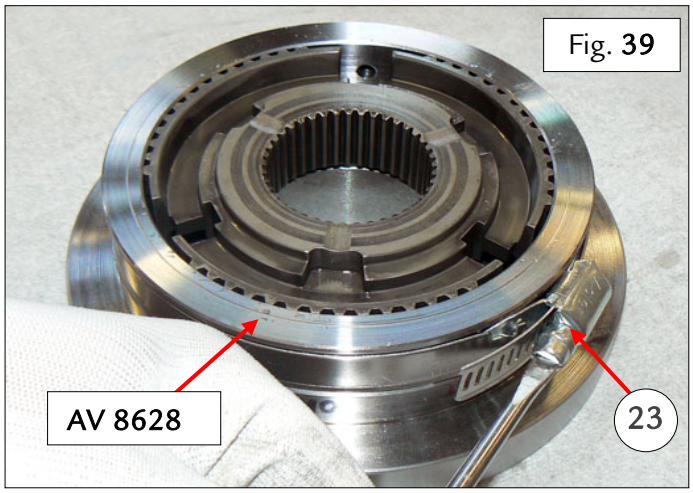


Fig. 39

- Use a magnet to remove the three pins indicated from the bushing AV 8628 – Fig. 40.
- Retrieve the synchronizer hub (21) – Fig. 40.

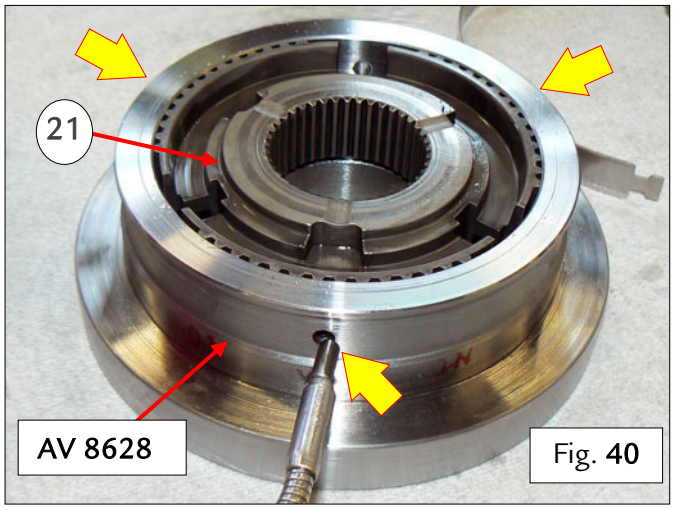


Fig. 40

- Remove the synchronizer rings (24) – Fig. 41.

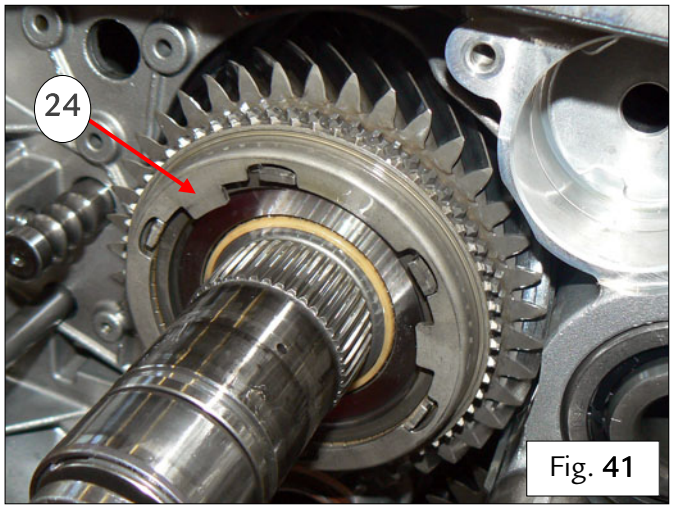


Fig. 41

- Remove the **3rd** speed gear **(25)** – Fig. **42**.

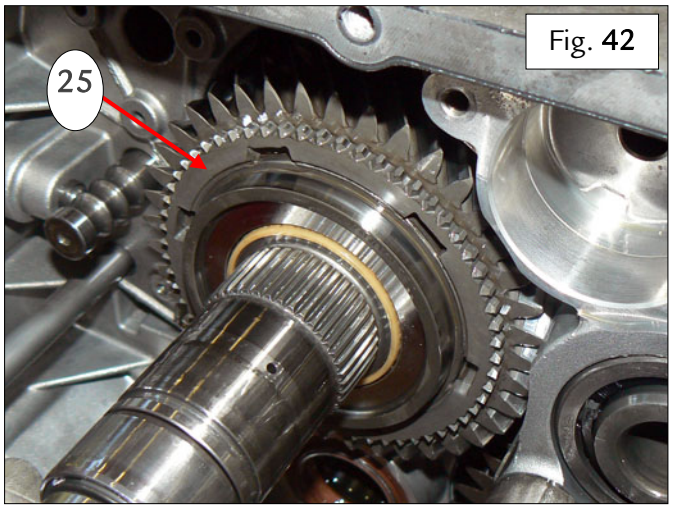


Fig. **42**

- Remove the roller bearing cage **(26)** – Fig. **43**.

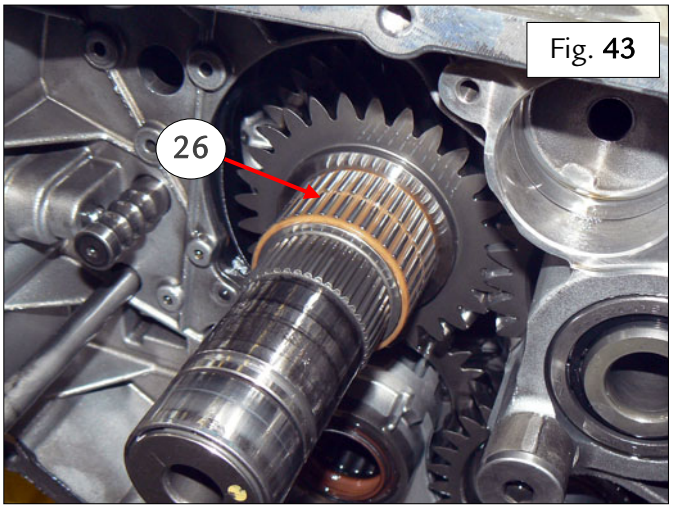


Fig. **43**

- Fit the rod **AV 8823** into the hole in the indicated pin of the Park Lock – Fig. **44**.
- Applying leverage to the rod, pull the indicated pin of the Park Lock out as far as possible in order to fit the cylinder **AV 8823** from above, as shown in the photo – Fig. **44**.
- Release the rod gradually, so that it rests against the pin fitted in the previous step – Fig. **44**.

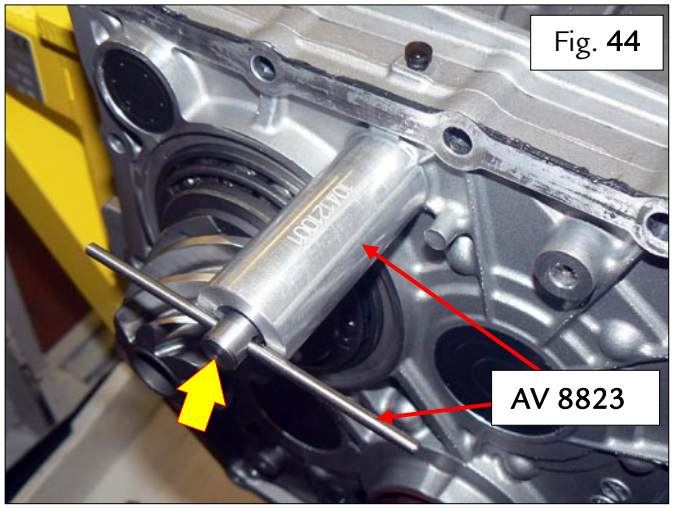
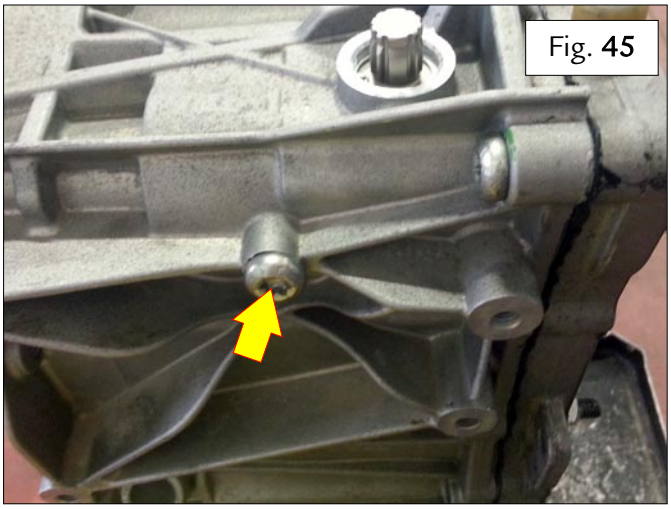
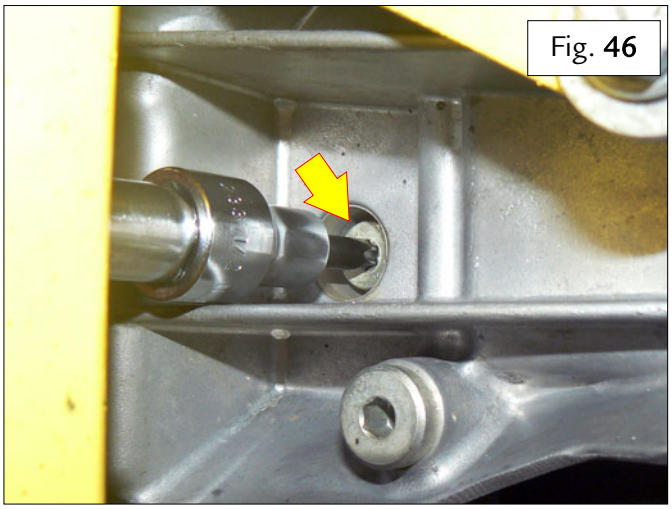


Fig. **44**

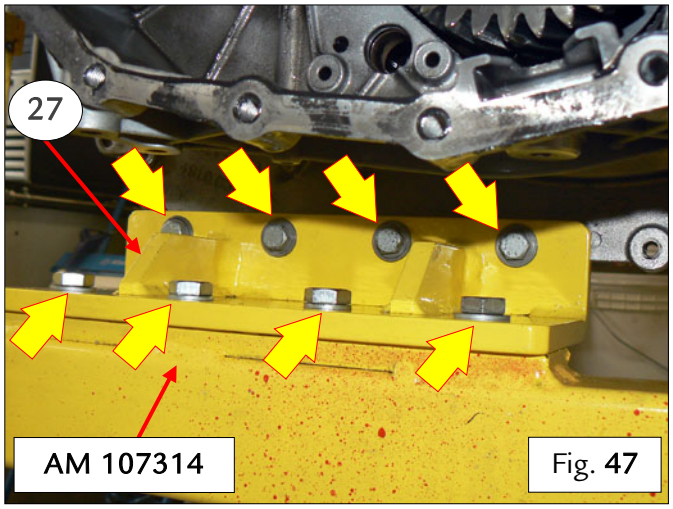
- Undo the Park Lock pin fastener screw – Fig. **45**.



- Loosen the fastener screw of the **R** shaft – Fig. **46**.



- Fit the additional lower bracket **(27)** on tool **AM 107314**, fastening with the respective fastener screws indicated – Fig. **47**.



- Fit the additional left hand lateral bracket (28) on tool AM 107314, fastening with the respective fastener screws and nuts indicated – Fig. 48.

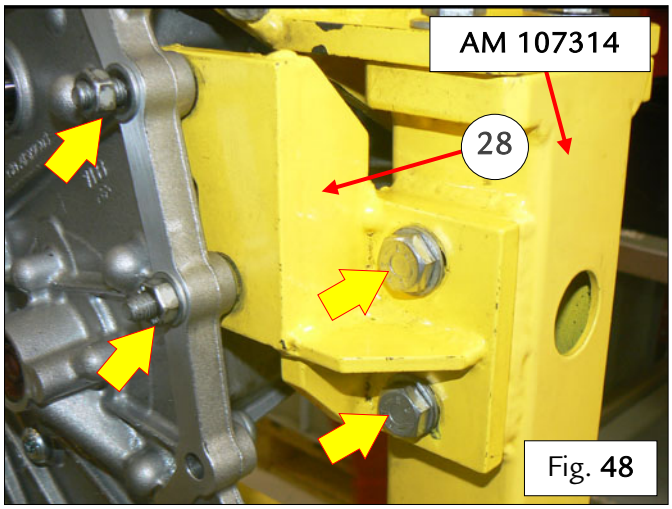


Fig. 48

- Remove the left hand mount (29) of tool AM 107314, undoing the relative fastener screws – Fig. 49.

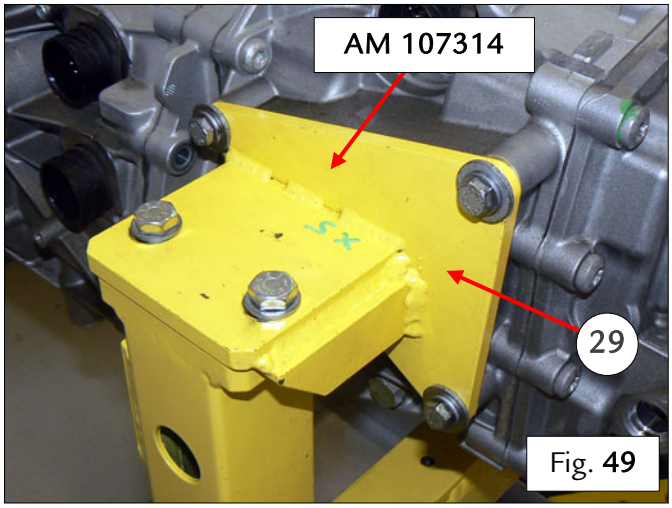


Fig. 49

- Remove the right hand mount (30) of tool AM 107314, undoing the relative fastener screws – Fig. 50.

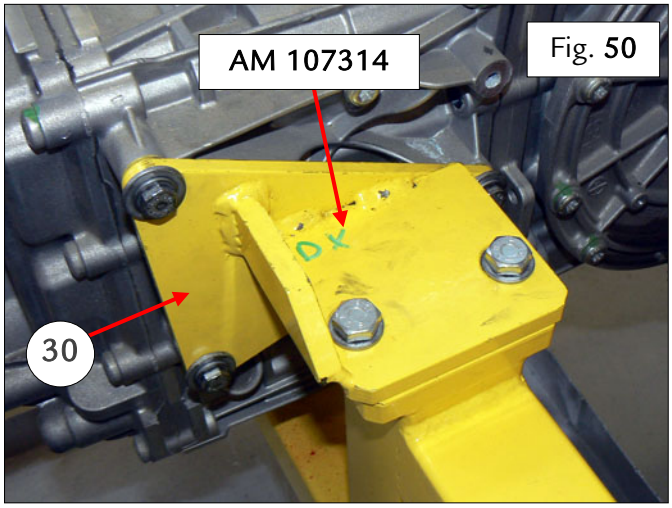


Fig. 50

On the left hand side of the gearbox, undo the indicated screws fastening the gear housing – Fig. 51.

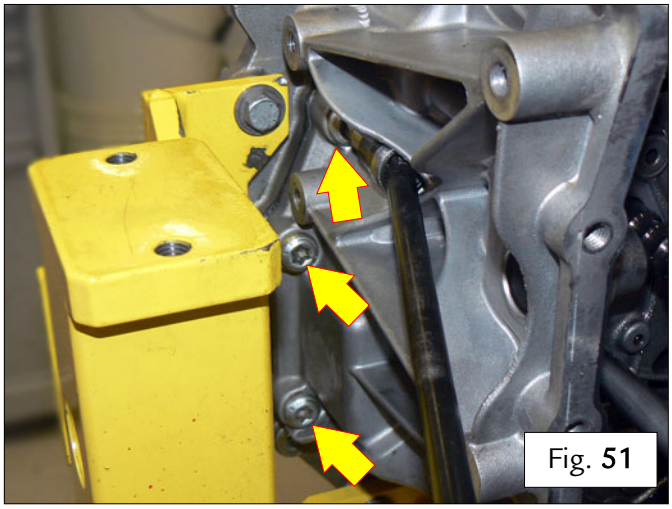


Fig. 51

- On the front side of the gearbox, undo the indicated screws fastening the gear housing – Fig. 52.

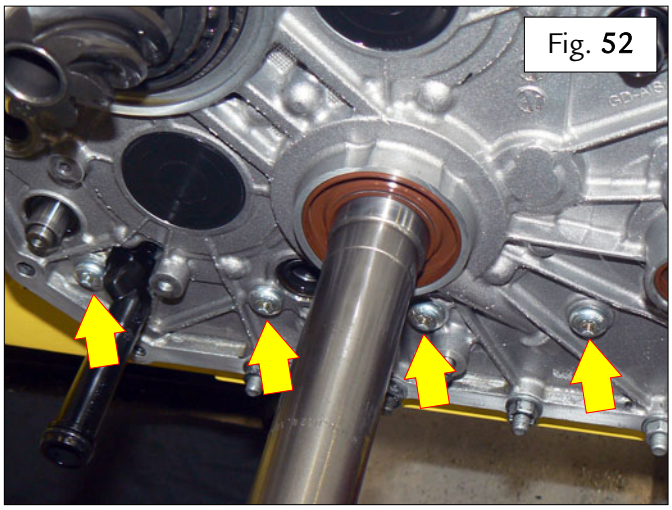


Fig. 52

- Remove the seeger ring (31), then remove the Park Lock pin (32) – Fig. 53.

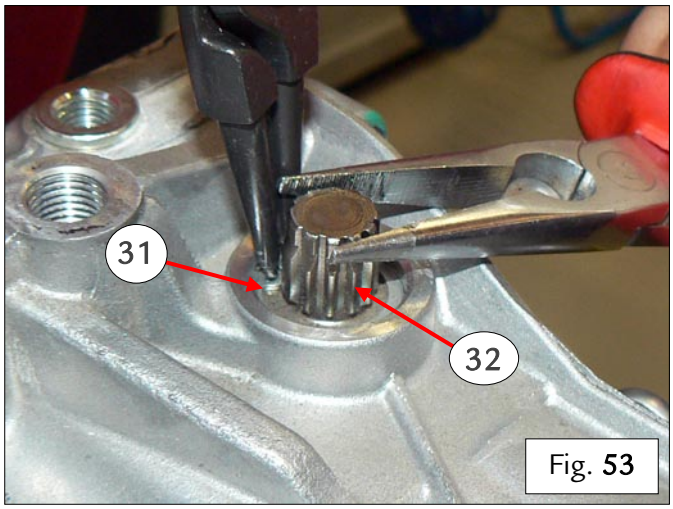


Fig. 53

- On the right hand side of the gearbox, apply a lever (33) in the position indicated to detach the gear housing (34) – Fig. 54.

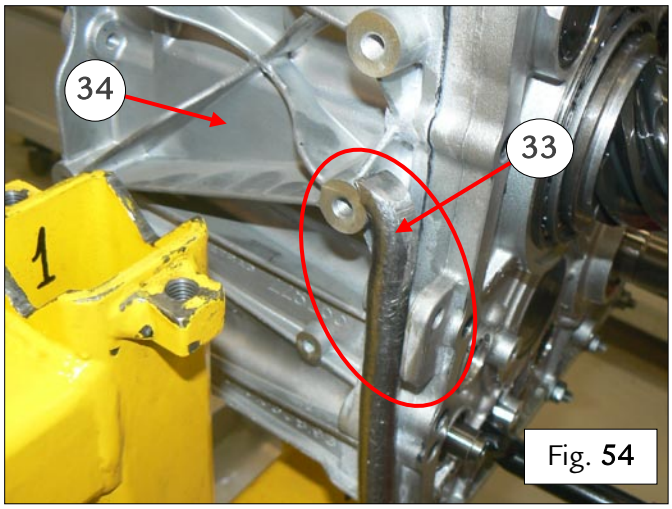


Fig. 54

- On the left hand side of the gearbox, apply a lever (33) in the position indicated to detach the gear housing (34) – Fig. 55.

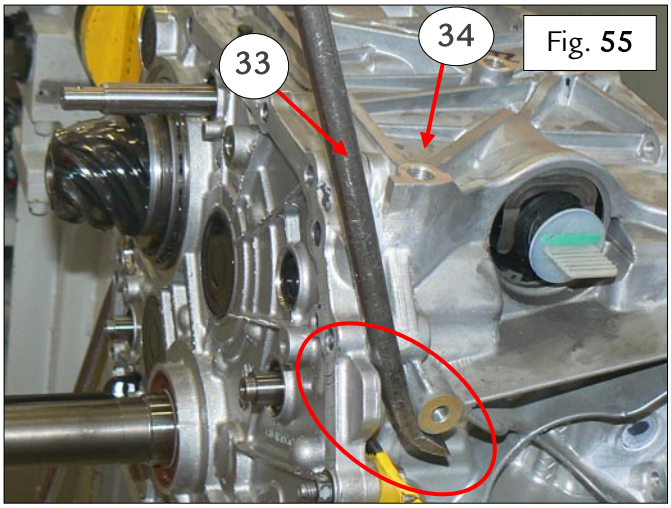


Fig. 55

- Detach the gear housing (34) from the plate, retrieving the small O-ring from the interface plate – Fig. 56.

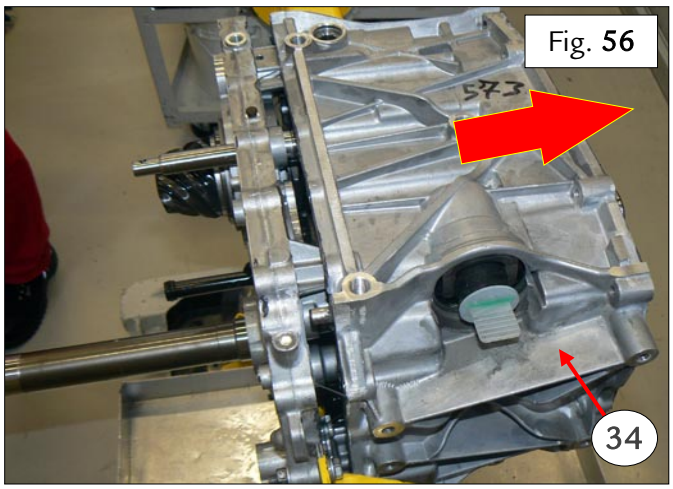


Fig. 56

- With the gear housing on the bench, replace the speed sensor as follows.
- Remove the seeger ring (35) – Fig. 57.
- Pull the speed sensor connector (36) as far as possible out of the gear housing – Fig. 57.

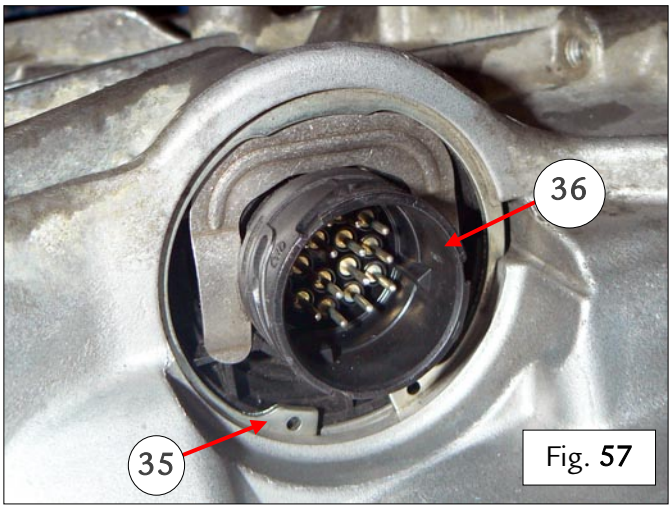


Fig. 57

- Detach the retainer clip (37) from the speed sensor connector – Fig. 58.

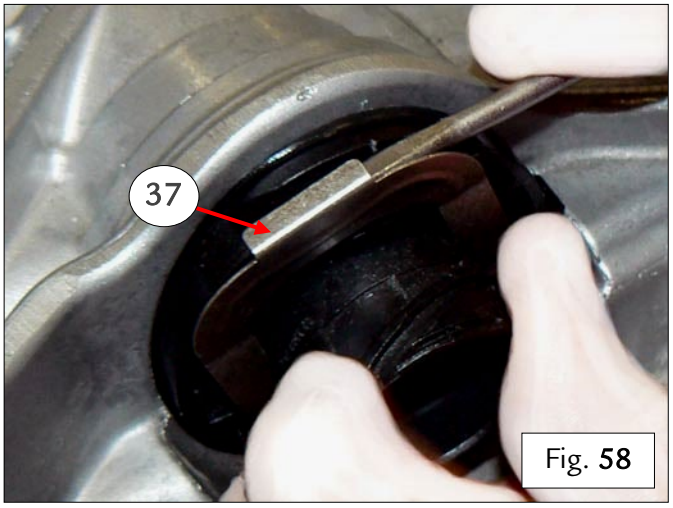


Fig. 58

- Remove the adapter (39) from the speed sensor (38) – Fig. 59.

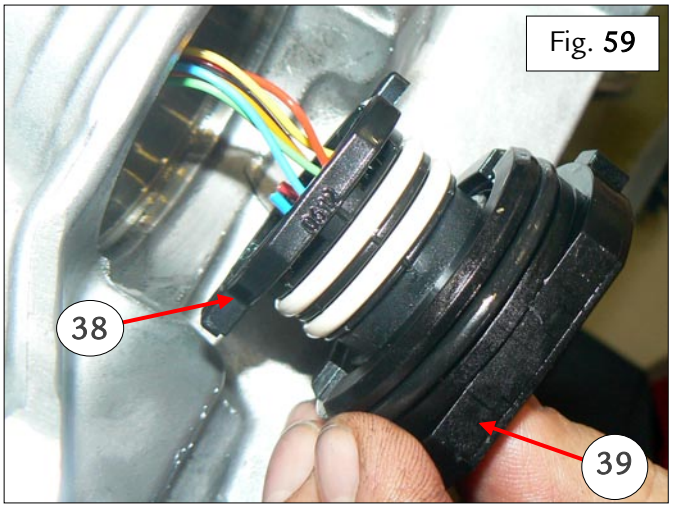


Fig. 59

- Disconnect the Park Lock connector **(41)** – Fig. **60**.
- Loosen the indicated screws, then remove the speed sensor **(40)**, pulling the relative connector out of the gear housing, and replace – Fig. **60**.

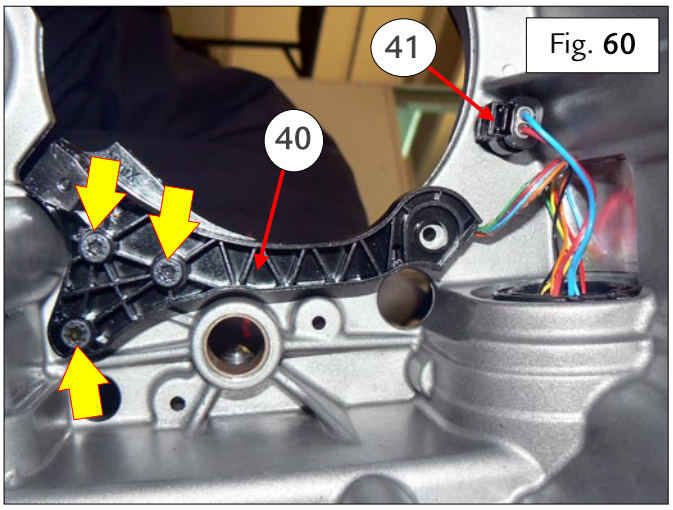


Fig. **60**

Reassembling synchronizers

- Place the gear **(1)** (the **5th** speed gear is shown in this example) on a work surface, with the side shown in the figure aside facing upwards – Fig. **1**.

  Note: The gear **(1)** is only used as a base to facilitate reassembly of the synchronizer.

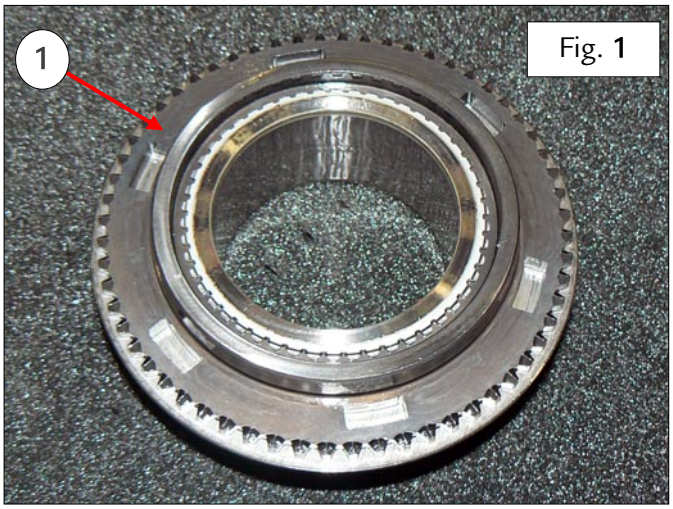


Fig. **1**

- Fit the **R-4th-3rd-1st speed** secondary shaft end shim **(2)** on the gear, as shown in the photo aside – Fig. **2**.

  Note: The shim ring **(2)** is only used as a base to facilitate reassembly of the synchronizer.

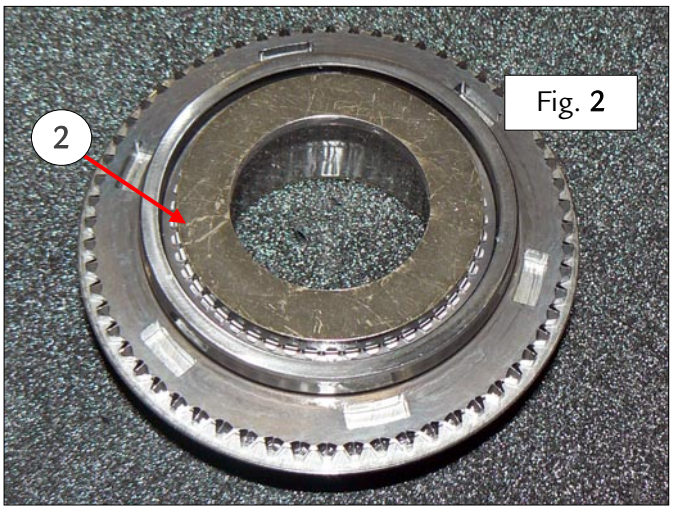


Fig. **2**

- Fit the synchronizer hub (3) – Fig. 3.

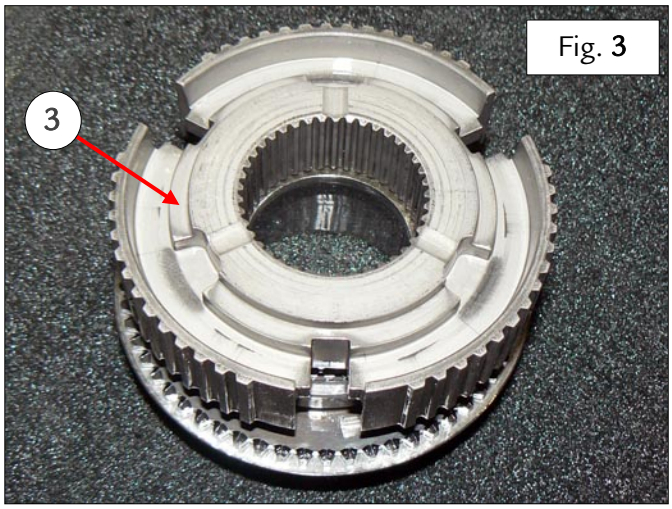


Fig. 3

- Fit the outer ring (4) of the synchronizer on the relative hub (3) – Fig. 4.
- Align the tooth with a single central notch (5) on the ring with the recess on the hub (3) (indicated by blue line), then align the tooth with two recesses (6) with the machined groove on the hub (3) (indicated by green line) – Fig. 4.

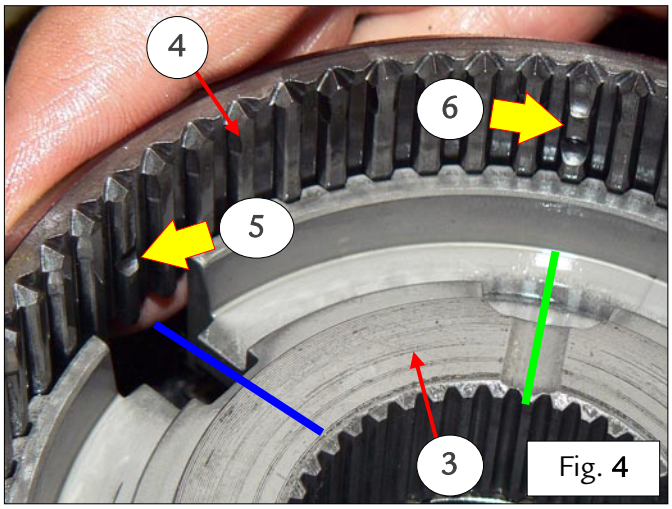


Fig. 4

- Push the outer synchronizer ring (4) down completely to allow access to the holes on the outer circumference of the hub – Fig. 5.
- Fit the three springs indicated into the holes in the outer circumference of the hub (3), which are also aligned with the machined grooves in the hub itself indicated by green lines (3) – Fig. 5.

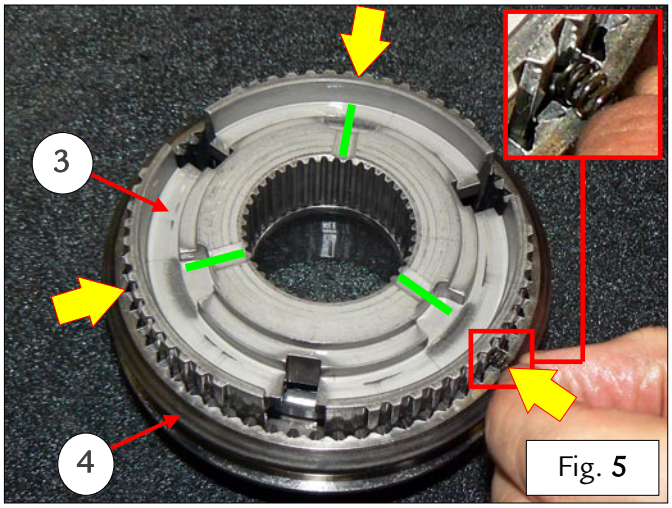


Fig. 5

- Fit the three balls on the outer synchronizer ring (4), over the three springs installed previously – Fig. 6.

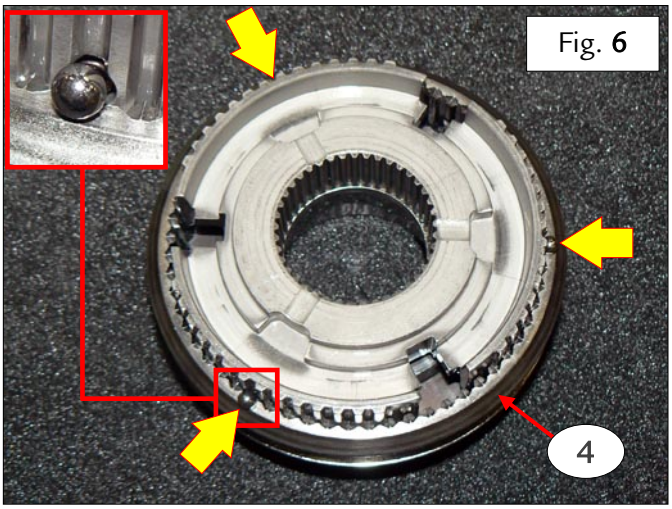


Fig. 6

- Join the opposite ends of two cable ties together to form a loop – Fig. 7.
- Fit the loop (7) around the synchronizer hub, over the three balls fitted previously – Fig. 7.

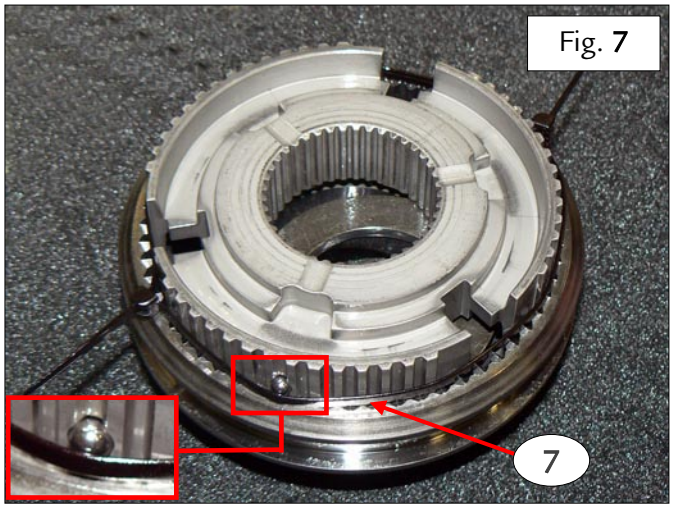


Fig. 7

- Working carefully, tighten the loop (7) around the synchronizer hub, pushing the balls into the respective holes – Fig. 8.

Note: Ensure that the balls remain secured correctly in their seats.

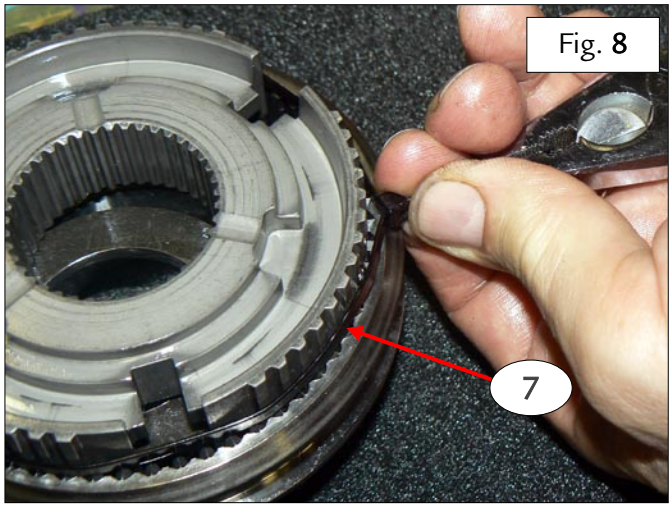


Fig. 8

- While holding the hub (3) down, lift the outer synchronizer ring (4) and engage with the hub itself, taking care not to let the balls fall out of their seats – Fig. 9.

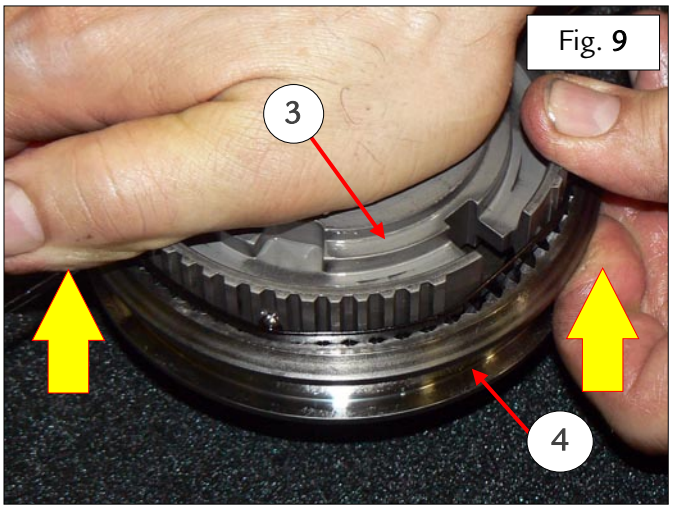


Fig. 9

- Once the outer ring is engaged correctly with the hub, retrieve the cable tie loop (7), which will have slipped off during the operation – Fig. 10.

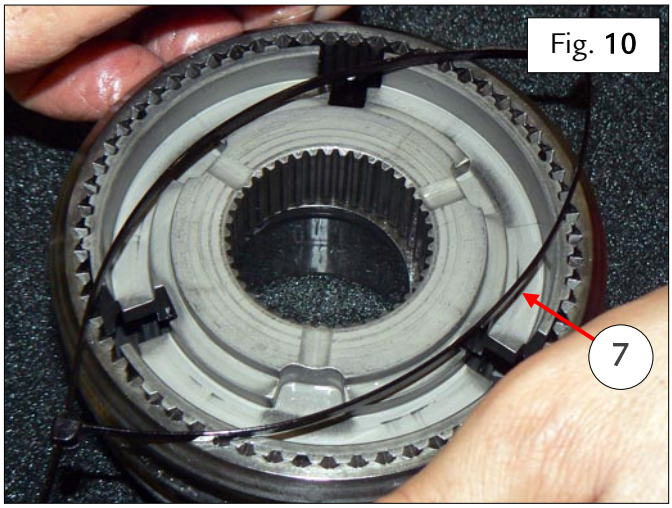


Fig. 10

- Fit the indicated blocks in the relative seats on the complete assembled synchronizer (8), pressing gently by hand to fasten into place – Fig. 11.

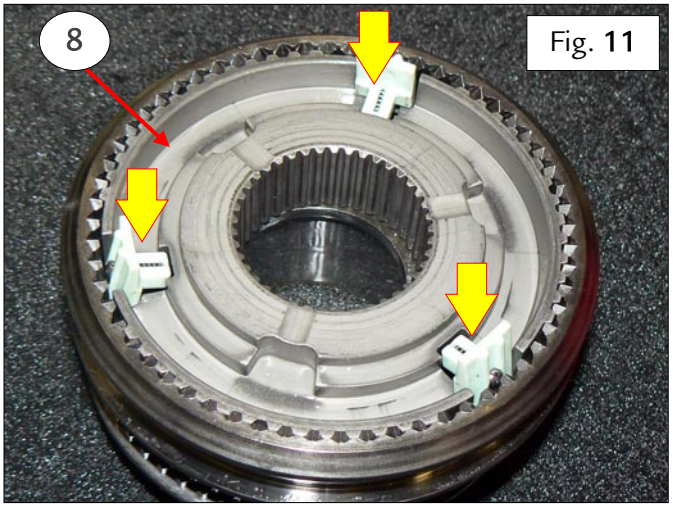


Fig. 11

- Once the assembly procedure is finished, the complete assembled synchronizer (8) should look like the example shown in the photo aside – Fig. 12.

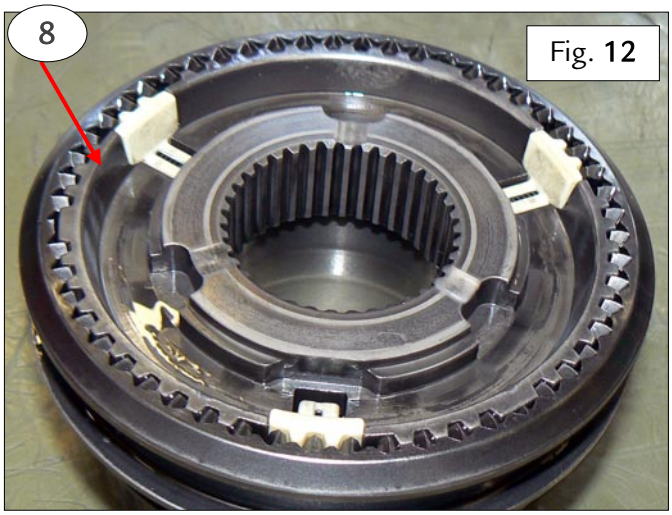


Fig. 12

Fitting the new gearbox speed sensor

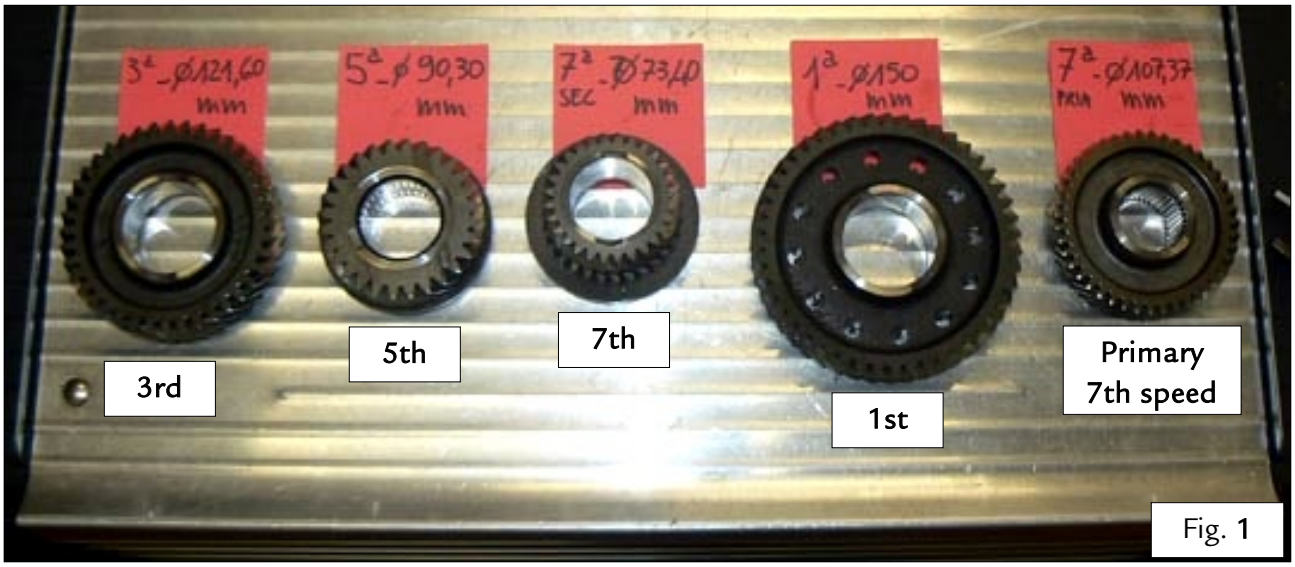


Fig. 1

The gears removed in the procedure to replace the speed sensor are illustrated in the image above. The diameters of the gears are indicated as follows to facilitate identification of the gears themselves and reassembly – Fig. 1.

- **3rd** speed _ Ø 121.60 mm
- **5th** speed _ Ø 90.30 mm
- **7th** speed _ Ø 73.40 mm
- **1st** speed _ Ø 150 mm
- Primary **7th** speed _ Ø 107.37 mm

- Using a Teflon spatula, remove all traces of sealant from the surfaces on the interface plate and the gear housing – Fig. **2**.

  Note: Be careful to not damage the surfaces of the two housings.

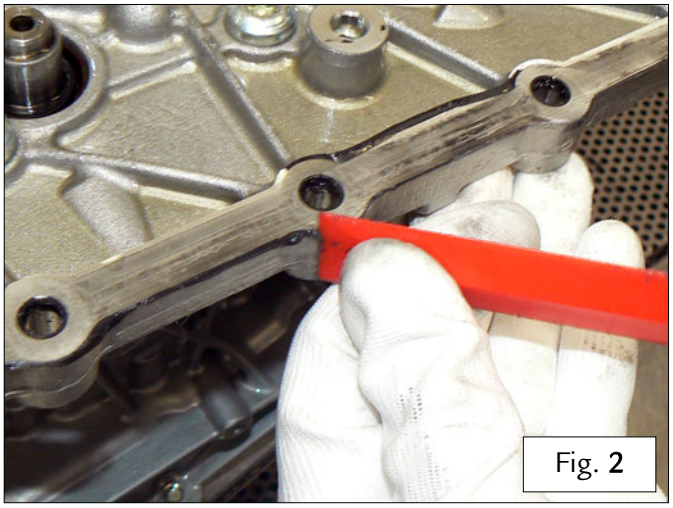


Fig. 2

- Using a Teflon spatula, remove all traces of sealant from the holes on the interface plate and the differential housing – Fig. **3**.

  Note: Be careful to not damage the surfaces of the two housings.

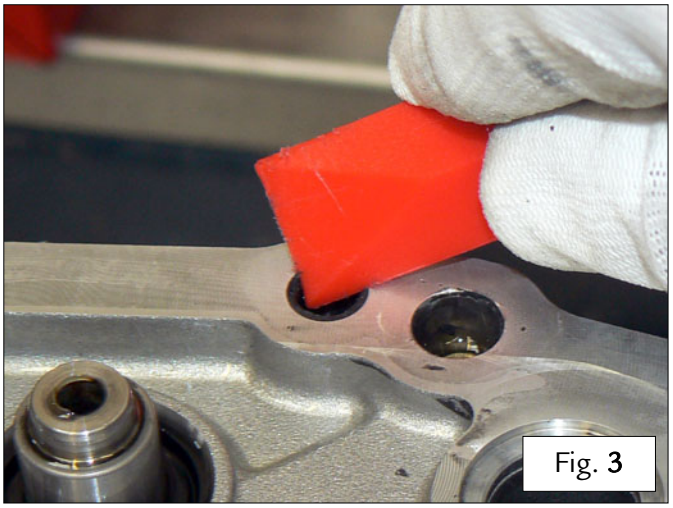


Fig. 3

- Using a lint-free cloth and heptane, remove all traces of adhesive and/or dirt from the surfaces and holes of the interface plate and from the gear housing – Fig. **4**.

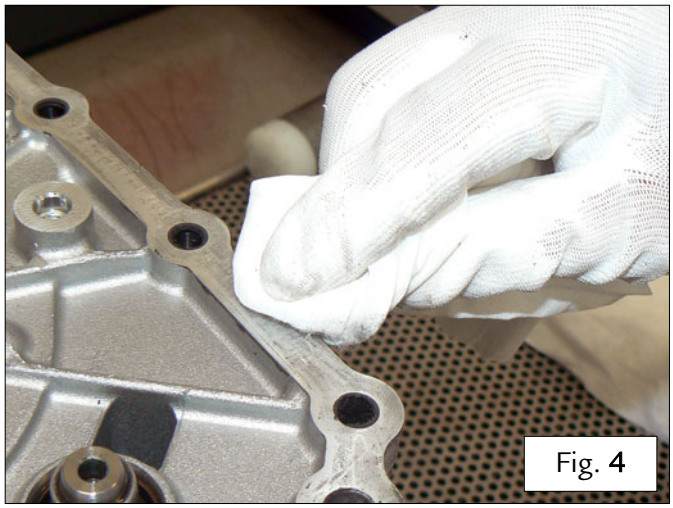


Fig. 4

- Aspirate all residue of adhesive and/or dirt from the surfaces of the interface plate and from the gear housing – Fig. **5**.

  Note: DO NOT blow or use cloth to remove dirt and/or dust.

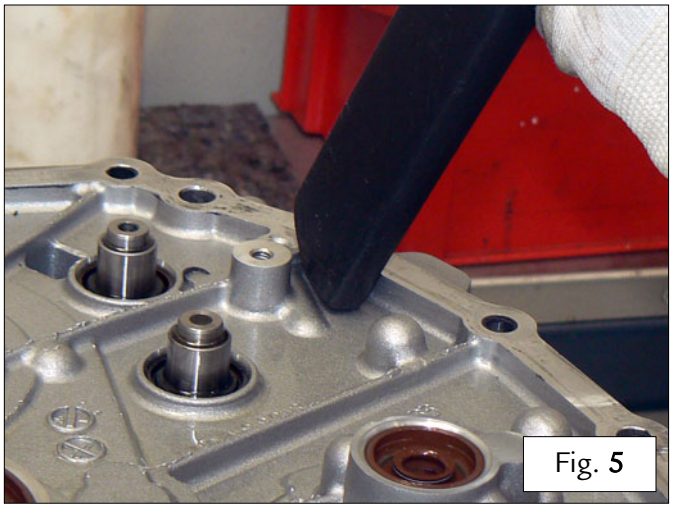


Fig. 5

- Clean the speed sensor fixing screws seats on the gear housing to remove all residue of Loctite – Fig. **6**.
- Fit the pins of the new speed sensor in the relative seats indicated on the gear housing – Fig. **6**.

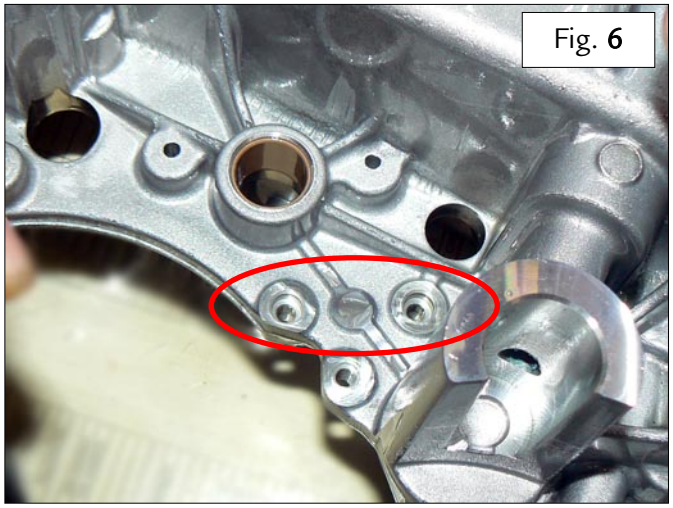


Fig. 6

- Apply **Loctite 243** to the threads of the three new screws indicated, then tighten the screws to a torque of **6 Nm** to fasten the speed sensor **(1)** – Fig. **7**.
- Connect the Park Lock connector **(52)** – Fig. **7**.

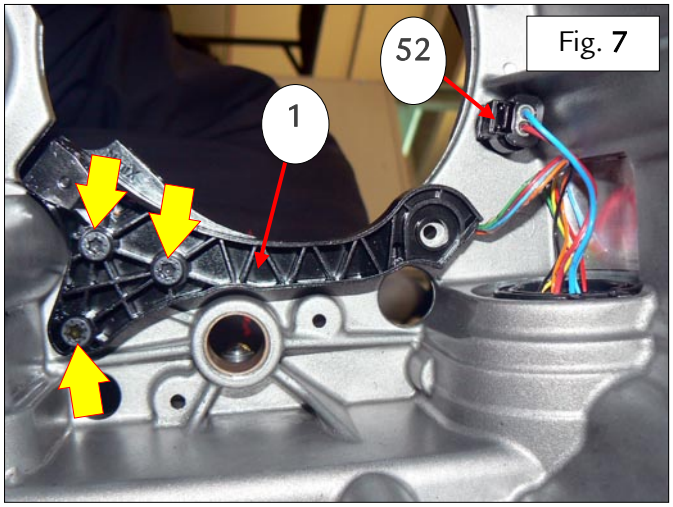


Fig. 7

Feed the connector (2) of the speed sensor through the respective hole in the housing, then fit into the adapter (3), after replacing the relative O-ring – Fig. 8.

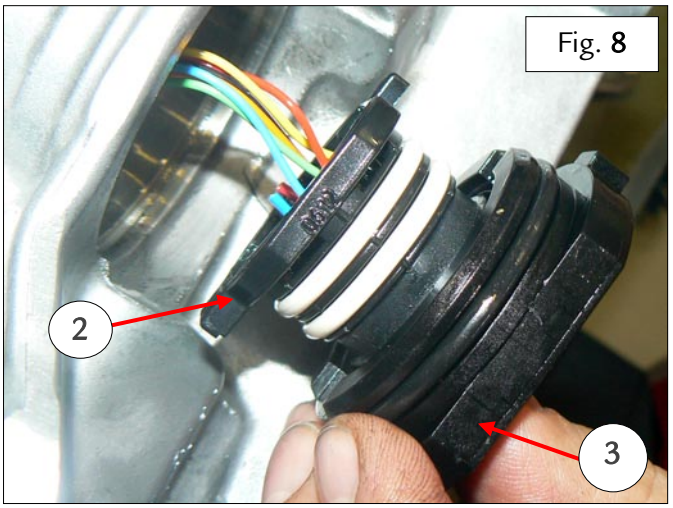


Fig. 8

- Fit the new fastener clip (3) on the connector (2) of the speed sensor – Fig. 9.
- Fit the adapter in the relative hole on the housing, then fit the new seeger ring (4) in the relative seat - Fig. 9.

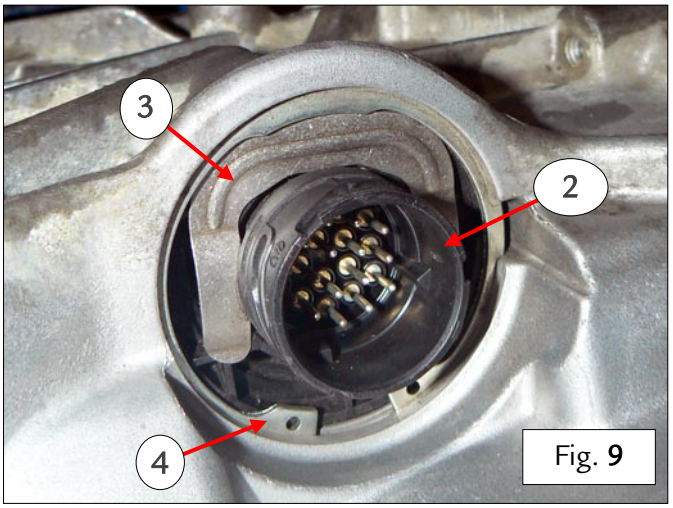


Fig. 9

- Make a loop in the gearbox speed sensor wiring and fasten in this position, together with the two Park Lock cables, by fitting a high temperature cable tie in the point indicated in the photo aside – Fig. 10.
  Note: Ensure that none of the wiring is in contact with the gearbox casting.

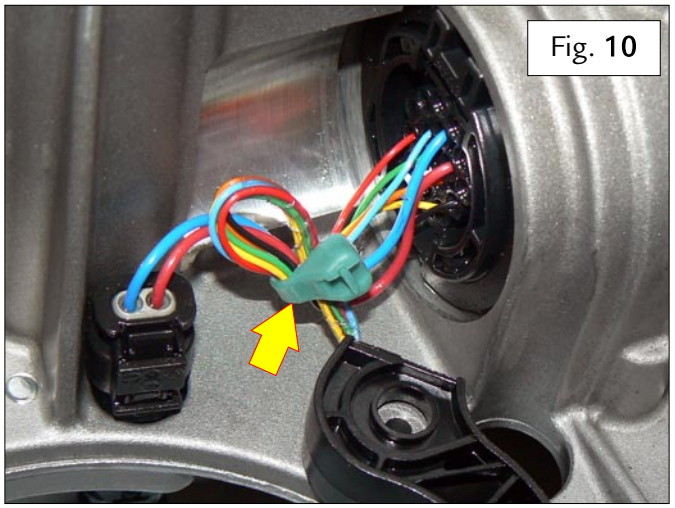


Fig. 10

- Install the new O-ring (5) on the interface plate – Fig. 11.

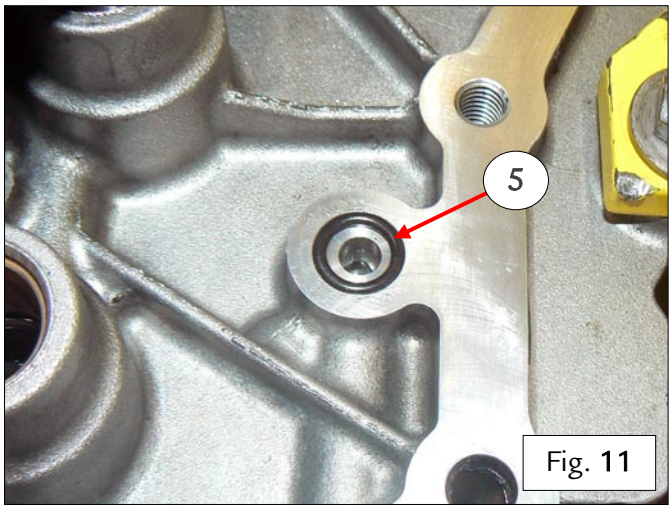


Fig. 11

- Lubricate the interior of the Corteco ring on the speed sensor side of the gear housing with SEGO grease – Fig. 12.

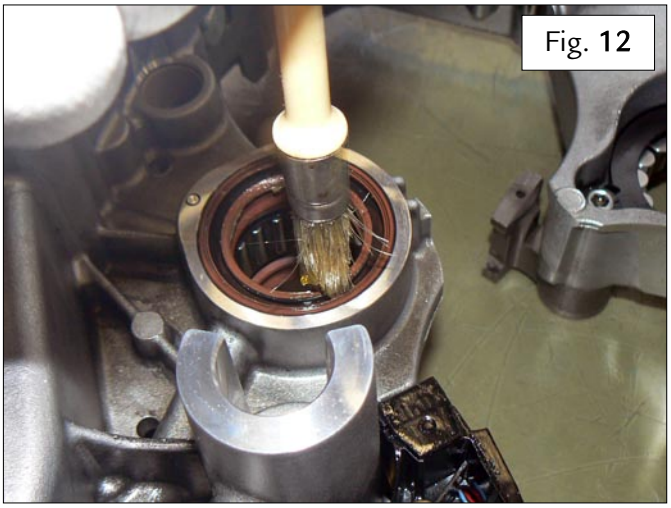


Fig. 12

- Lubricate the seat of the even gear primary shaft with SEGO grease – Fig. 13.

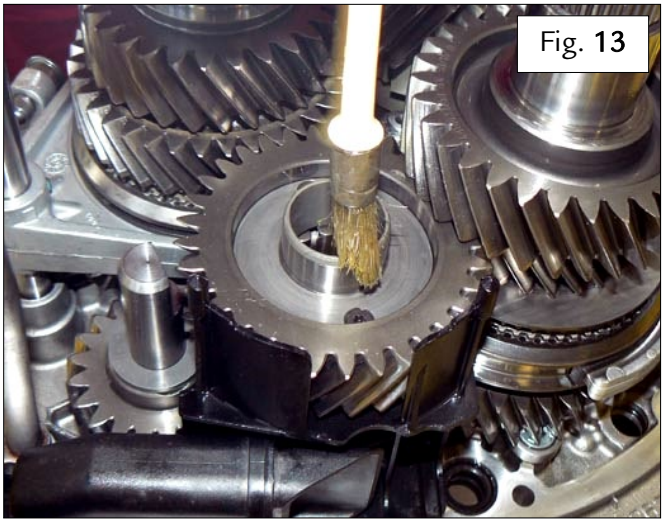


Fig. 13

Ensure that the recess in the shim (53) is aligned with the pin on the reverse shaft (54) indicated – Fig. 14.

- Ensure that the reverse shaft (54) in seated correctly – Fig. 14.

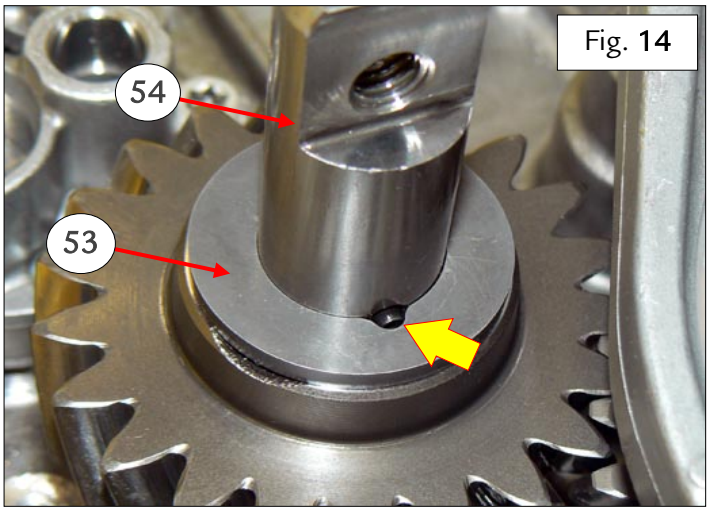


Fig. 14

Place the height checking template AV 8824 on the end of the reverse shaft (54), and ensure that it is also in contact with the shim in the position indicated – Fig. 15.If not, check if the reverse shaft (54) has dropped fully into its seat – Fig. 15.

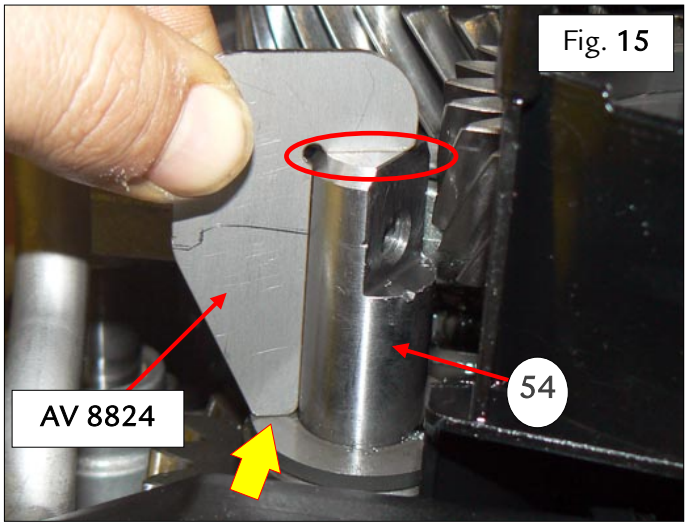


Fig. 15

Ensure that the hole indicated on the reverse shaft (54) is turned towards the indicated hole on the support tool – Fig. 16.

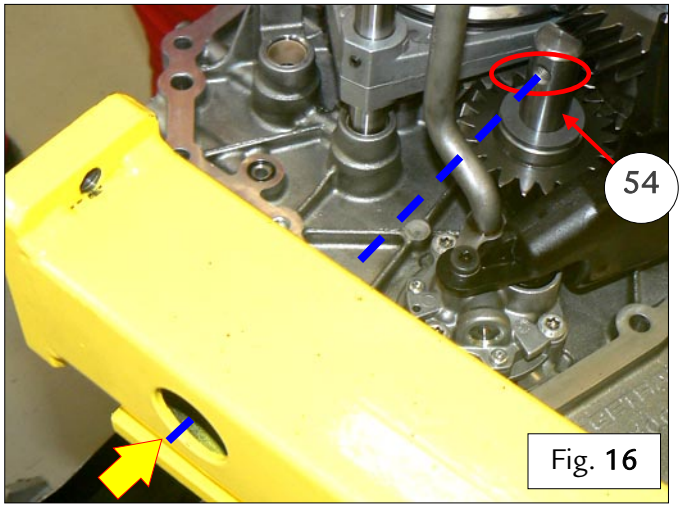


Fig. 16

Ensure that the hole indicated on the Park Lock pin is turned towards the relative hole on the gear housing – Fig. **17**.

- Clean the indicated hole to remove all residue of Loctite – Fig. **17**.

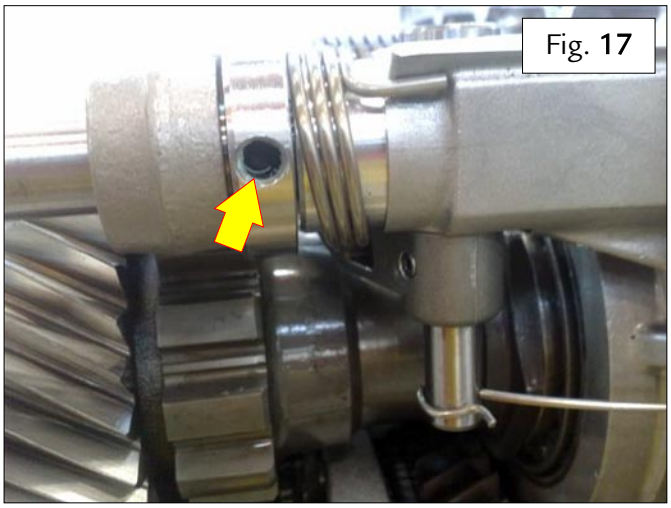


Fig. 17

- Apply a continuous bead of **Loctite 5970** to the outer mating surface of the gear housing, on the interface plate side – Fig. **18**.

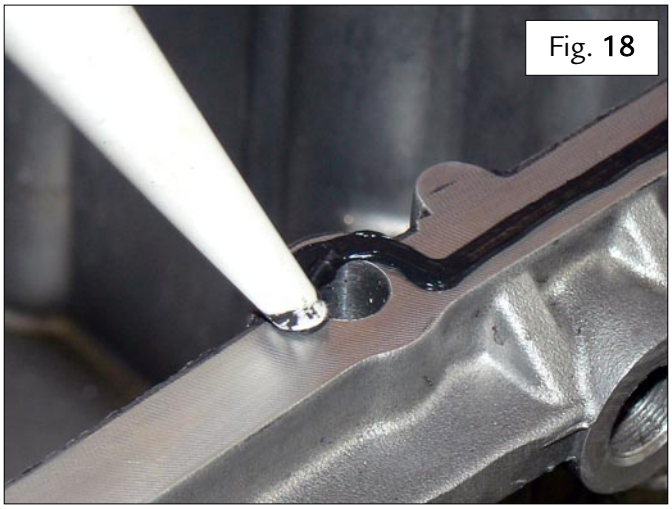


Fig. 18

- Apply a continuous bead of **Loctite 5970** around the holes in the outer mating surface of the gear housing, on the interface plate side, as shown in the photo aside – Fig. **19**.

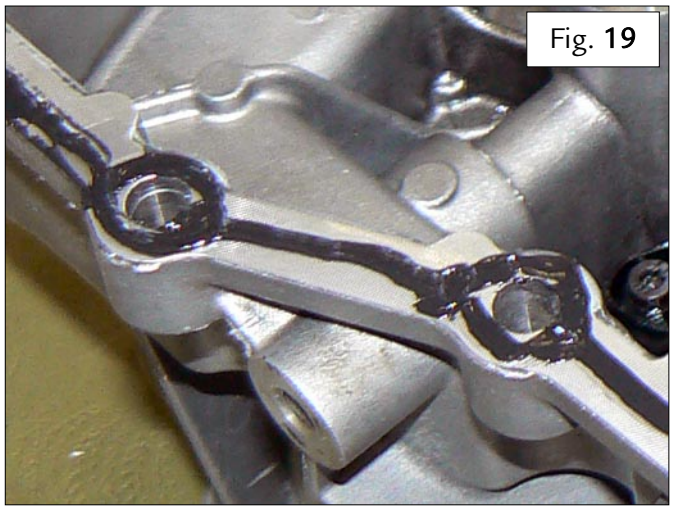
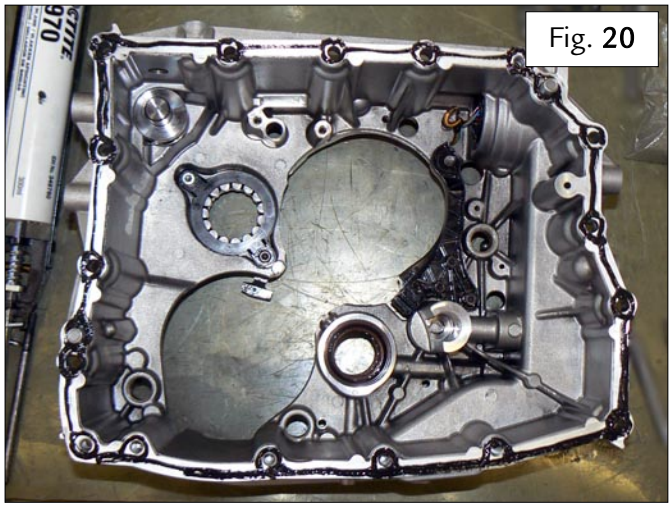
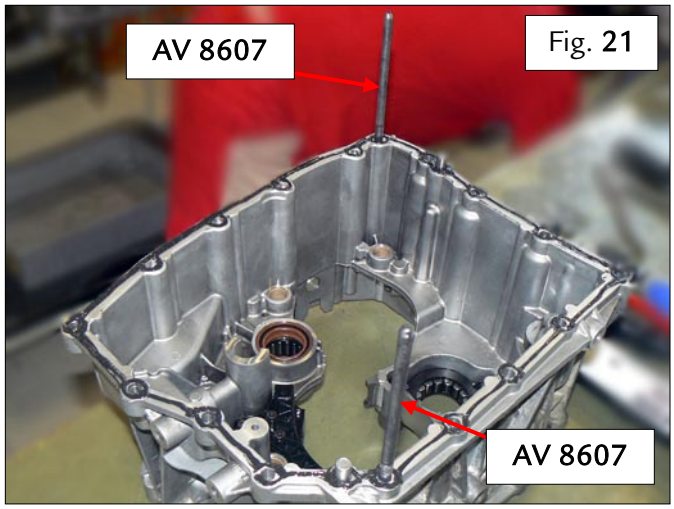


Fig. 19

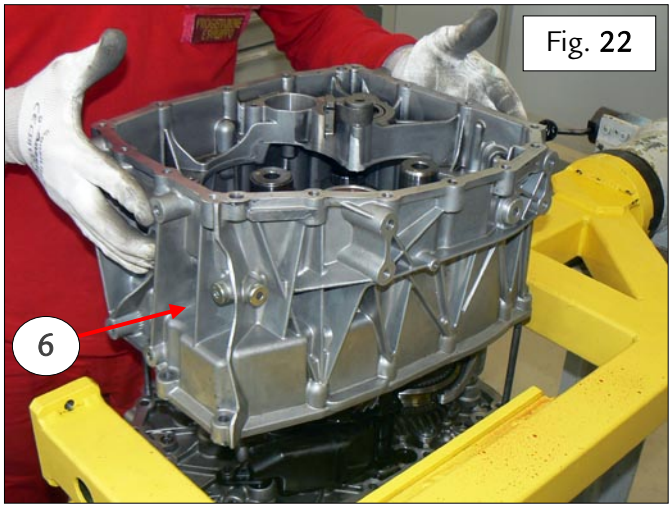
- The continuous bead of **Loctite 5970** must be applied like the example shown in the photo aside – Fig. **20**.



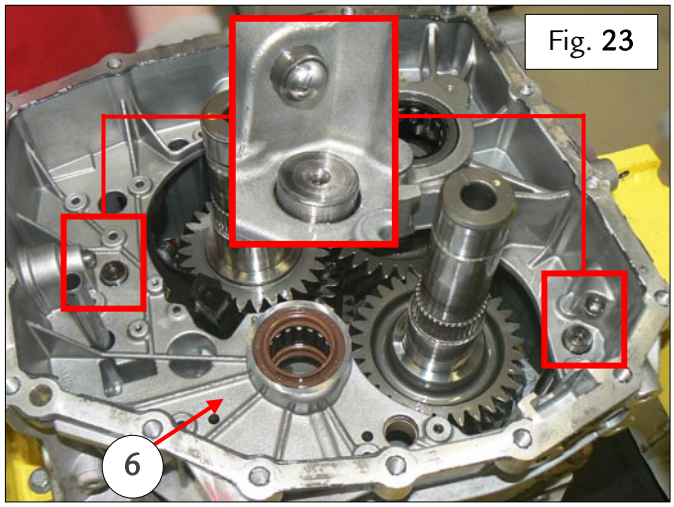
- Fit the two alignment pins **95978607 (AV 8607)** in the gear housing, in the positions indicated in the photo alongside – Fig. **21**.



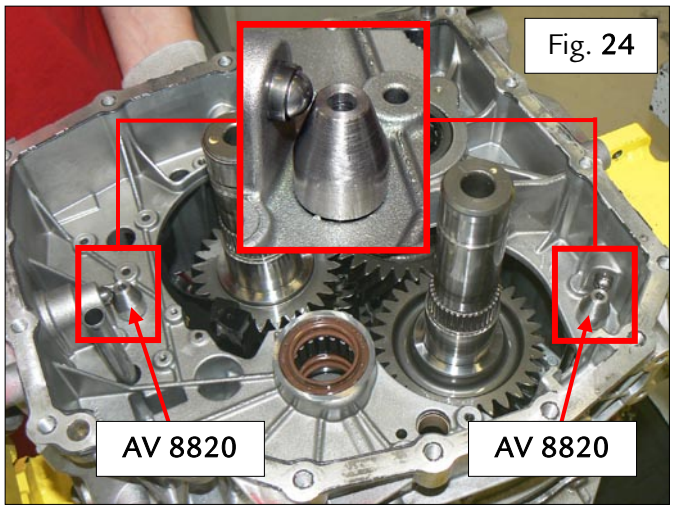
- Fit the gear housing **(6)** onto the interface plate, aligning the pins, rods and shafts correctly – Fig. **22**.



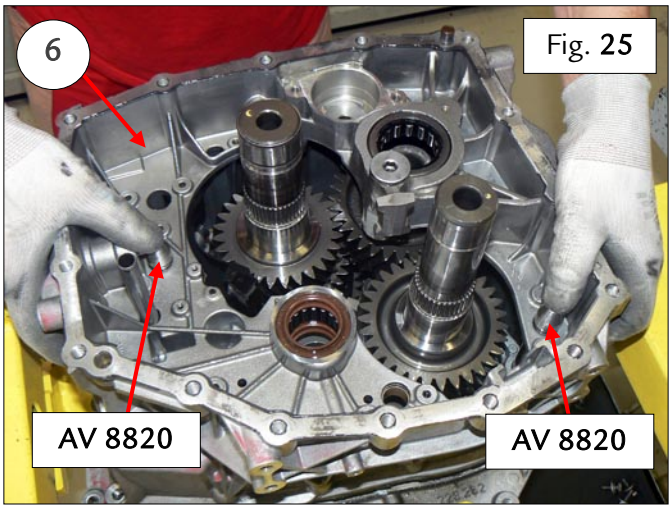
- Fit the gear housing (6), with the rods protruding from the housing itself as shown in the detail in the photo aside – Fig. 23.



- Fit the cones AV 8820 on the two rods – Fig. 24.



- While pressing down on the two cones AV 8820 by hand, lower the gear housing (6) fully into its seat, so that the pins engage in the grooves on the rods – Fig. 25.



- After checking that the indicated pins are engaged correctly in the grooves on the respective rods (7), remove the cones AV 8820 – Fig. 26.

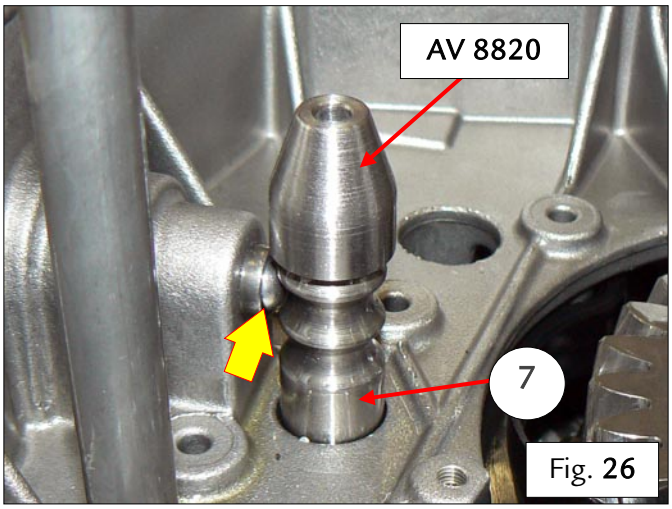


Fig. 26

- Check that the seat ring of the primary shaft (8) is installed correctly in the respective corteco ring indicated – Fig. 27.

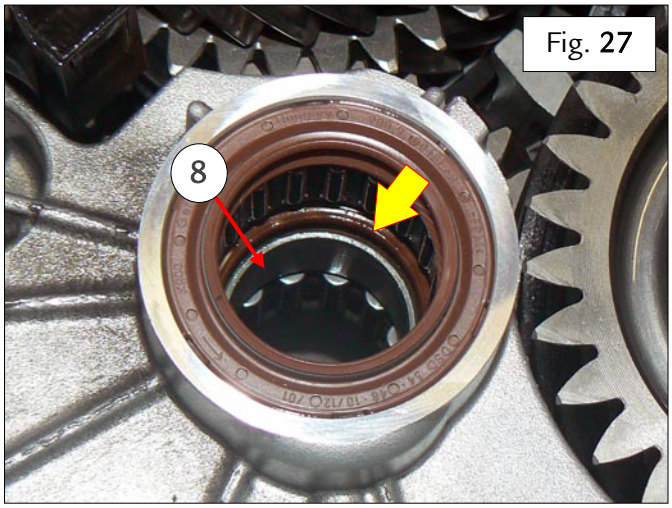


Fig. 27

- Remove the pins installed previously and hand-tighten four suitable screws in the positions indicated – Fig. 28.

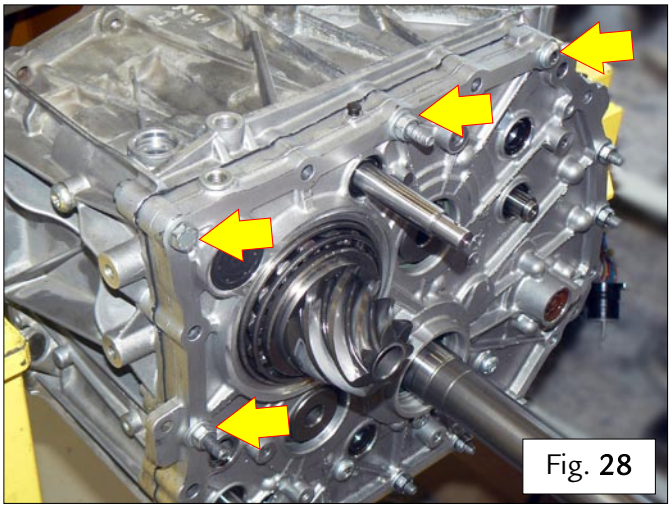


Fig. 28

- A) Hand-tighten the new screws as indicated – Fig. 29.

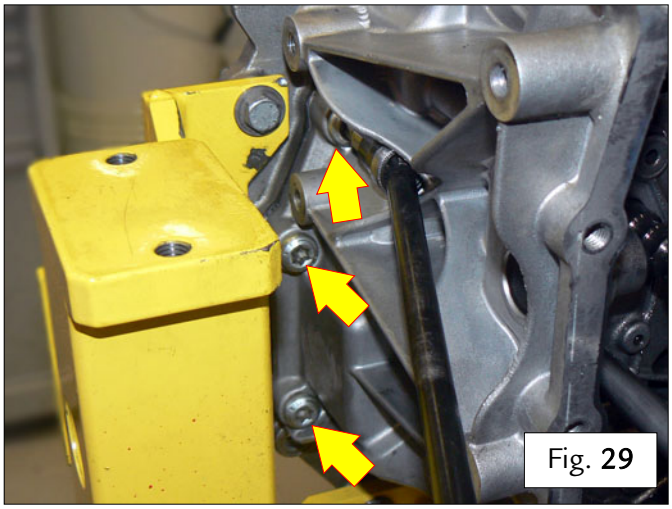


Fig. 29

- B) Hand-tighten the new screws as indicated – Fig. 30.

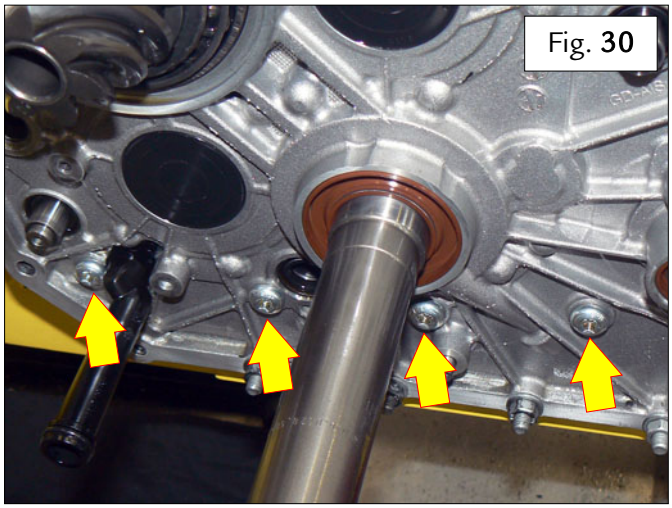


Fig. 30

- Tighten the new screws fitted in steps A and B to a torque of 34 Nm in a cross pattern.

- Apply an even layer of Loctite 5970 under the head of the new reverse gear screw – Fig. 31.

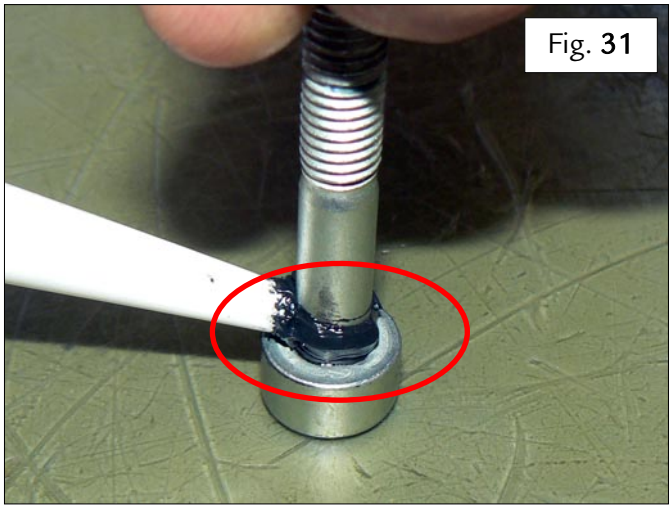


Fig. 31

- Apply **Loctite 243** to the thread of the reverse gear screw Fig. **32**.

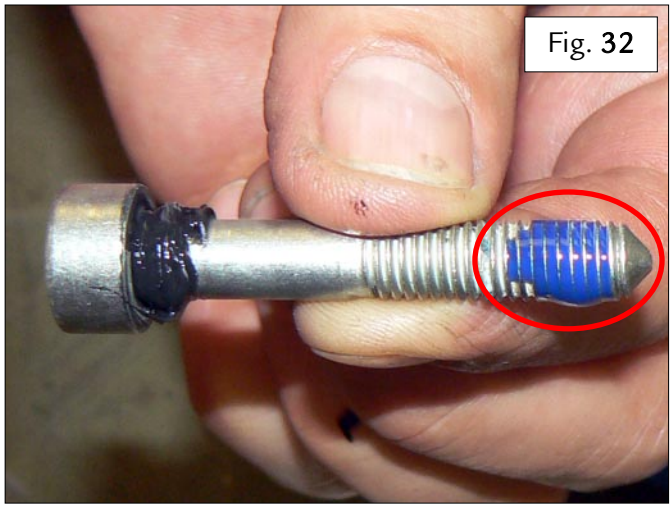


Fig. 32

- Hand-tighten the fastener screw of the **Reverse** shaft, then torque the screw to **24 Nm** class **A**– Fig. **33**.

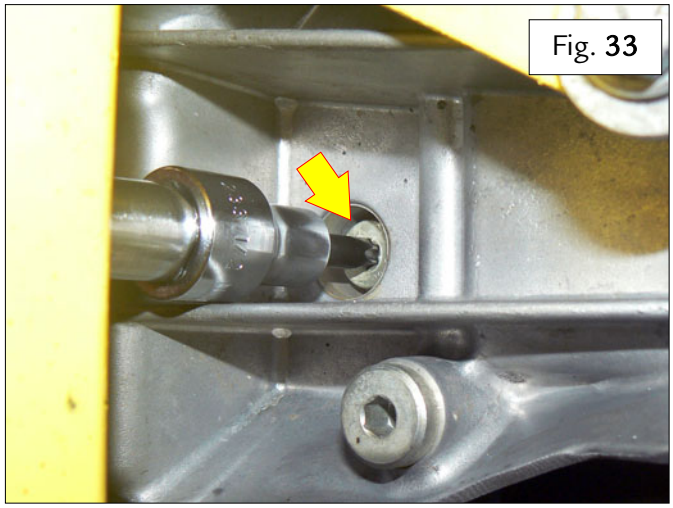


Fig. 33

- Apply an even layer of **Loctite 5970** under the head of the new Park Lock pin screw – Fig. **34**.
- Apply **Loctite 243** to the thread of the Park Lock pin screw – Fig. **34**.

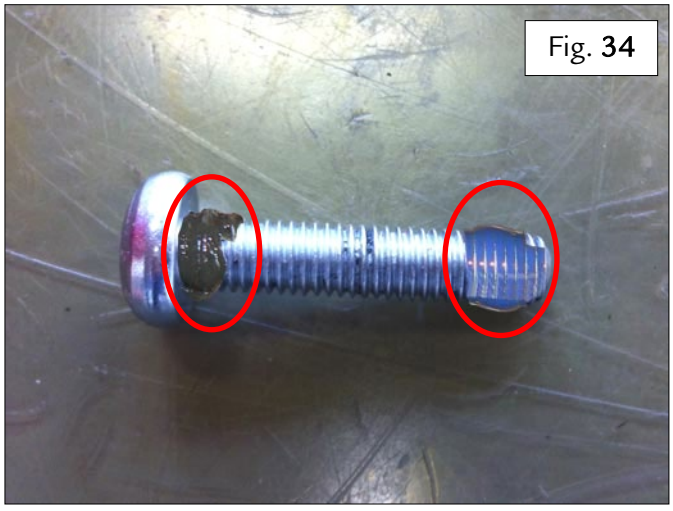
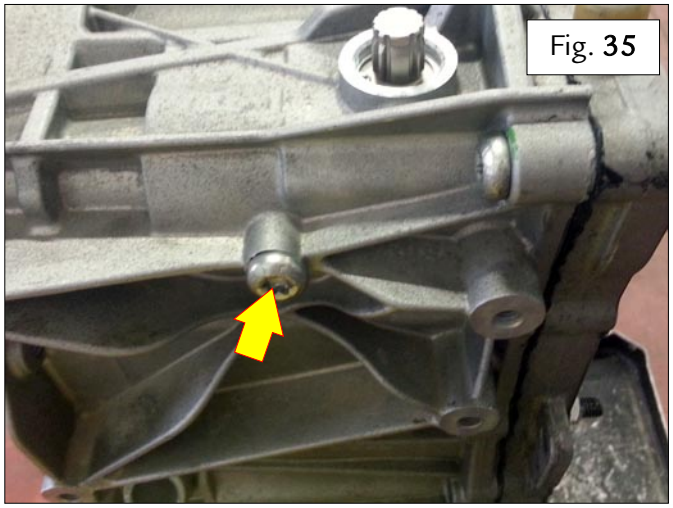
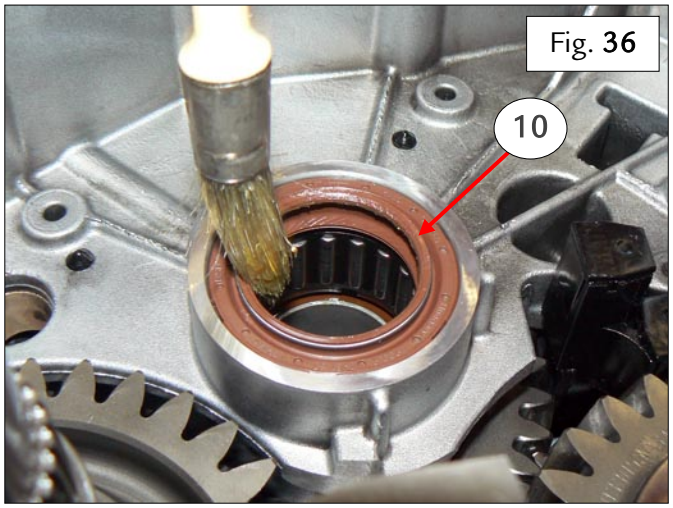


Fig. 34

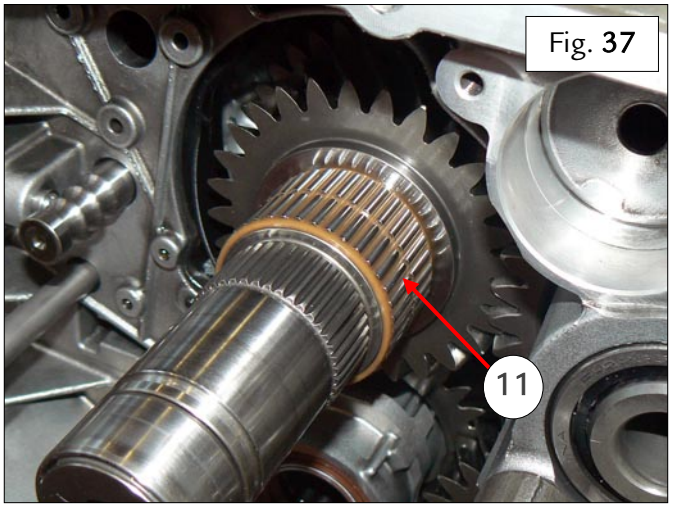
- Tighten the screw fastening the Park Lock pin to a torque of **24 Nm** class **A** – Fig. **35**.



- Lubricate the inner surface of the corteco ring **(10)** serving as the seat for the odd gear primary shaft with **SEGO** grease – Fig. **36**.



- Turn the gearbox into a horizontal position – Fig. **37**.
- Fit the roller bearing cage **(11)** onto the **R-4th-3rd-1st** gear secondary shaft – Fig. **37**.



- Fit the **3rd** speed gear **(12)** – Fig. **38**.

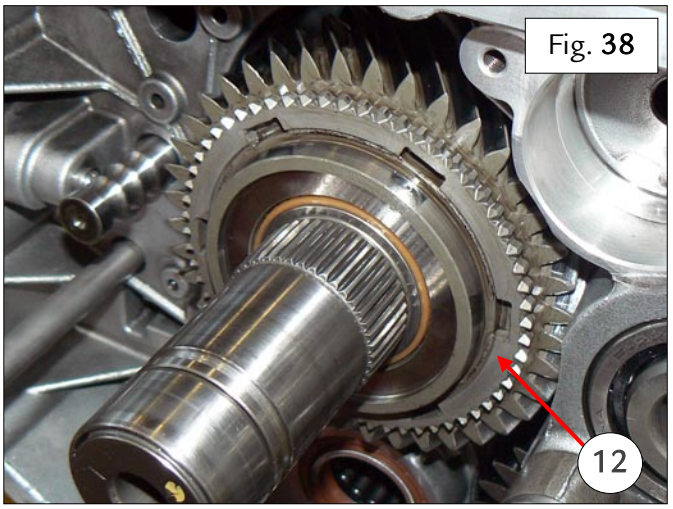


Fig. **38**

- Fit the roller bearing cage **(13)** onto the **2nd-6th-5th-7th** speed secondary shaft – Fig. **39**.

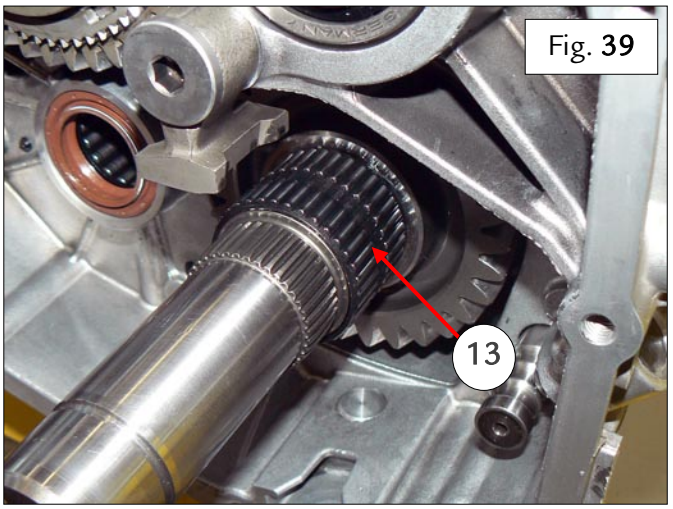


Fig. **39**

- Use an elastic band **(14)** to keep the interlock **(15)** raised as shown in the photo aside – Fig. **40**.

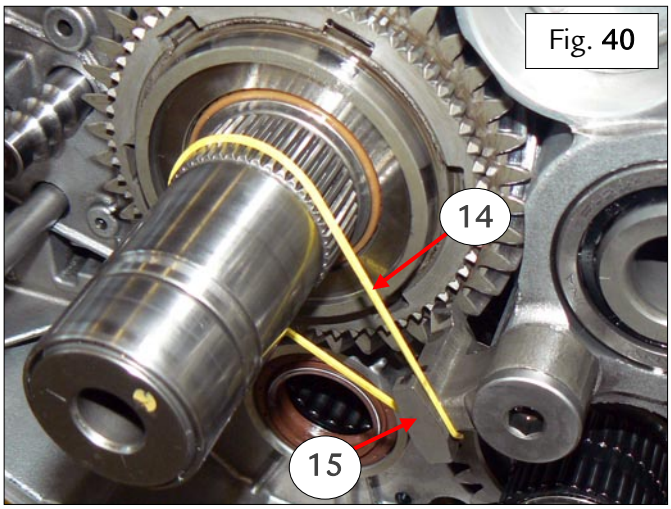


Fig. **40**

- Install the inner ring (17) in the 5th speed gear (16) – Fig. 41.

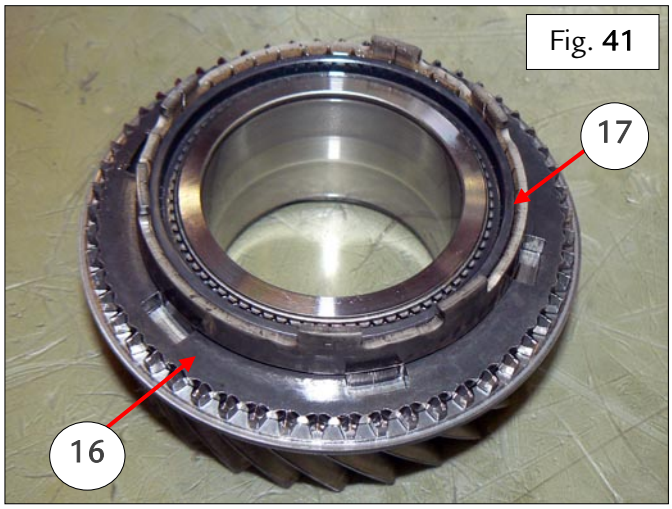


Fig. 41

- Fit the outer ring (18), aligning the respective seats – Fig. 42.

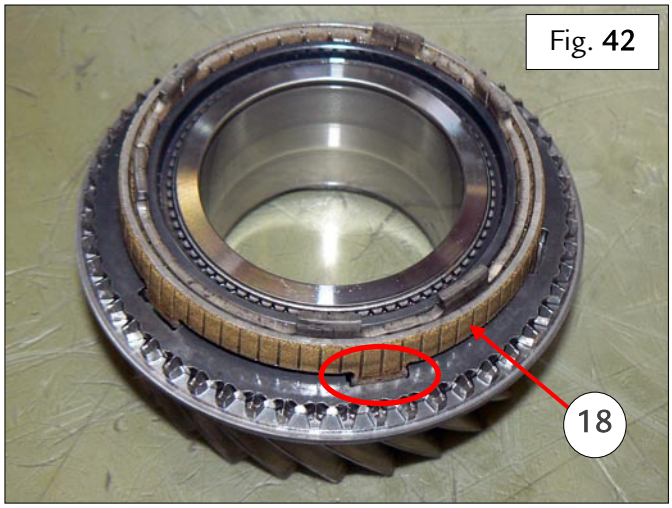


Fig. 42

- Fit the upper ring (19), aligning the respective tabs – Fig. 43.

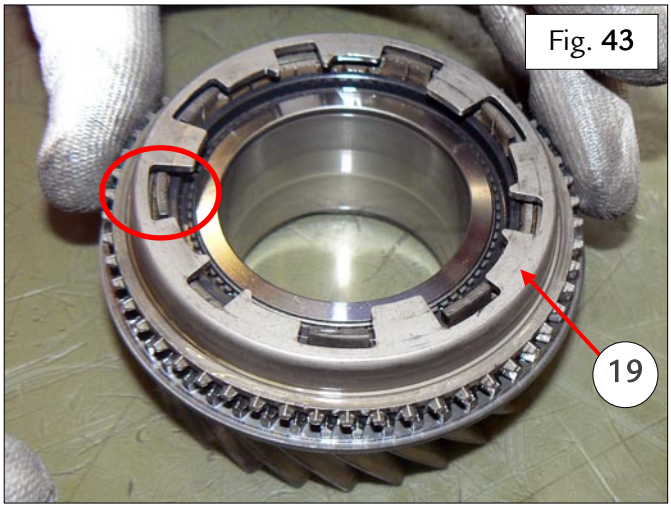


Fig. 43

- Fit the **5th-7th** speed synchronizer **(20)**, turned the right way around as originally fitted and matching the tabs on the upper ring with the recesses on the synchronizer itself as shown – Fig. **44**.

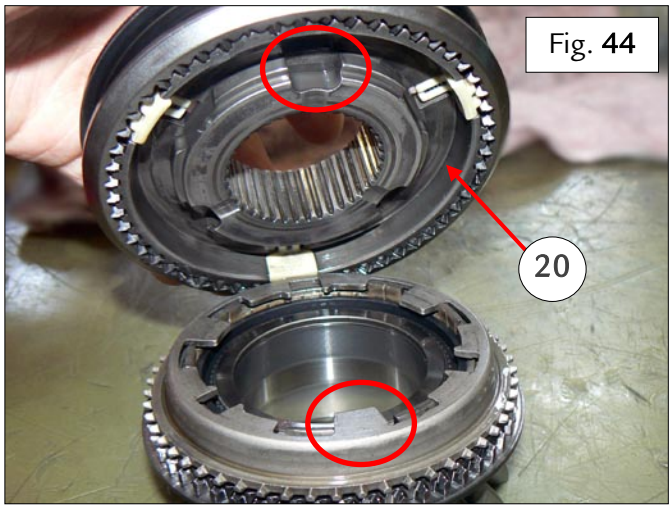


Fig. **44**

- Select the **5th-7th** speed fork **(9)** (the longer of the two) – Fig. **45**.

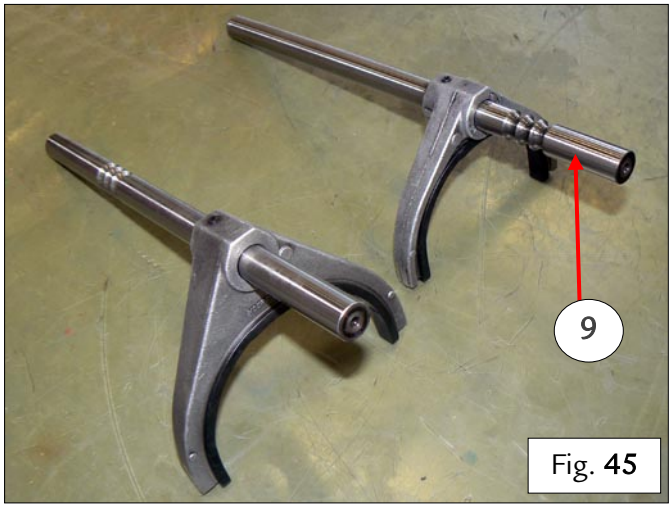


Fig. **45**

- Fit the tool **AV 8817** on the longer part of the **5th-7th** speed fork – Fig. **46**.

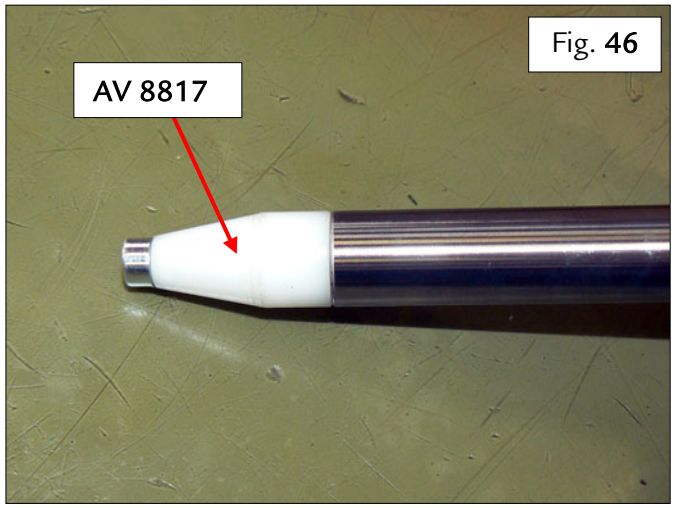


Fig. **46**

- Fit the **5th-7th** speed fork **(9)** onto the synchronizer assembly and the **5th** speed gear **(21)**, as shown in the photo aside – Fig. **47**.
- Engage the odd gear primary shaft **(22)** with the **5th** speed gear as shown in the photo aside – Fig. **47**.

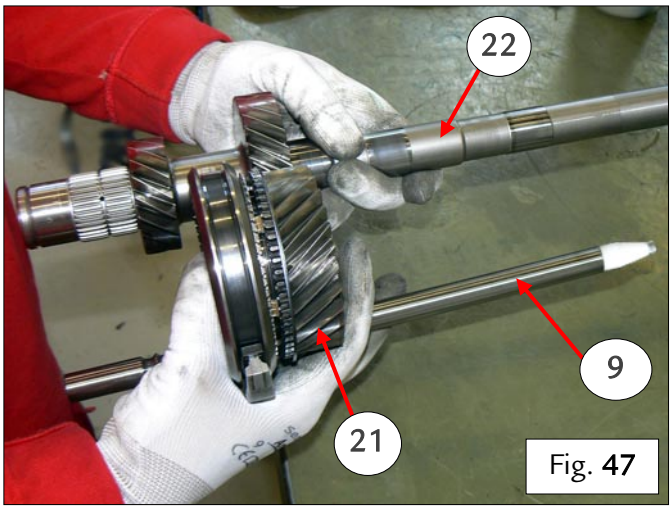


Fig. **47**

- Fit the odd gear primary shaft assembly **(22)** and the **5th** speed gear **(21)**, complete with synchronizer and relative fork, into the respective seats on the gear housing – **Fig.48**

  Note: Handle the synchronizer with extreme care during this procedure to prevent the components of the synchronizer itself from separating

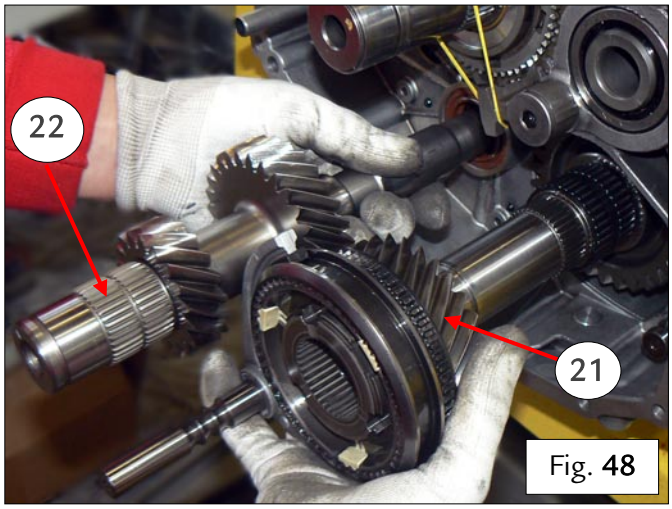


Fig. **48**

- During installation, engage the teeth on the primary shaft **(22)** with the **3rd** speed gear **(12)** – Fig. **49**.

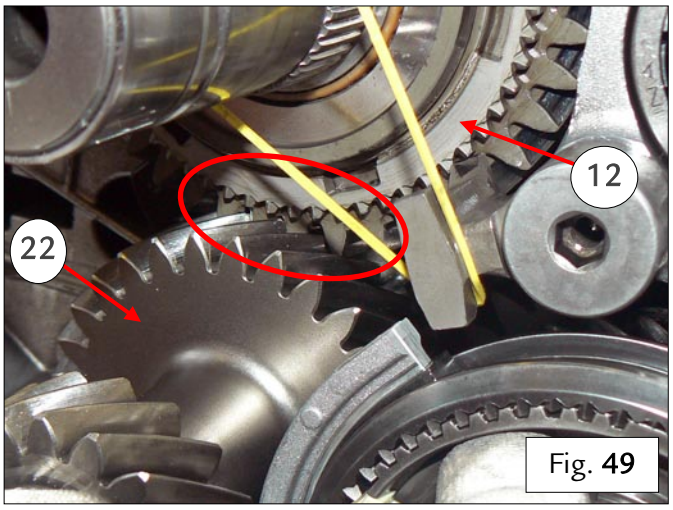


Fig. **49**

- Ensure that the parts are all assembled correctly by checking that the protruding part of the **5th-7th** speed synchronizer **(20)** is flush with the splining of the shaft – Fig. **50**.

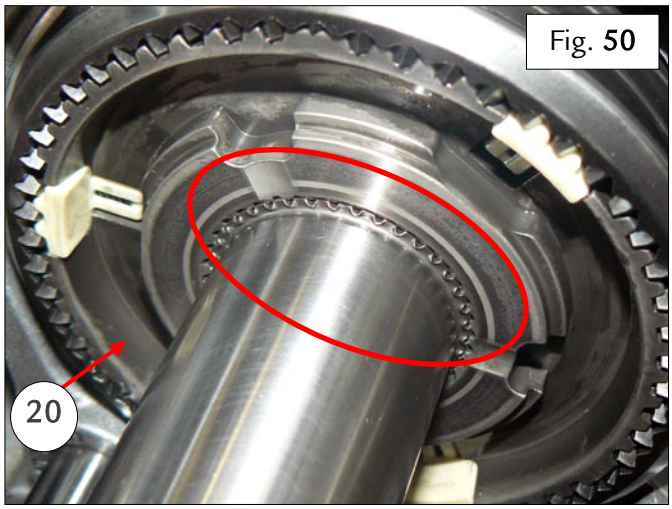


Fig. **50**

- Remove the elastic band **(14)** fitted previously – Fig. **51**.

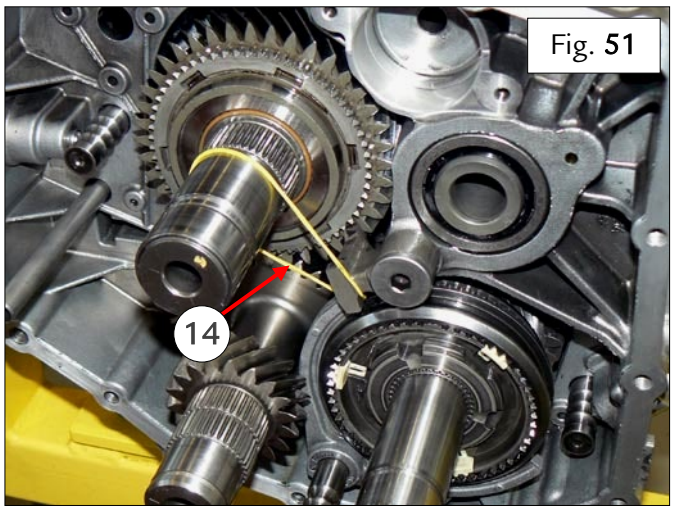


Fig. **51**

- Unscrew and remove the bushing **AV 8817** from the rod – Fig. **52**.

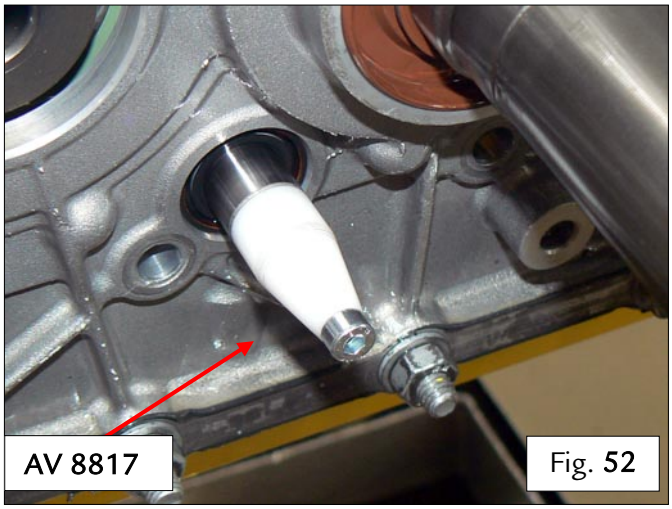
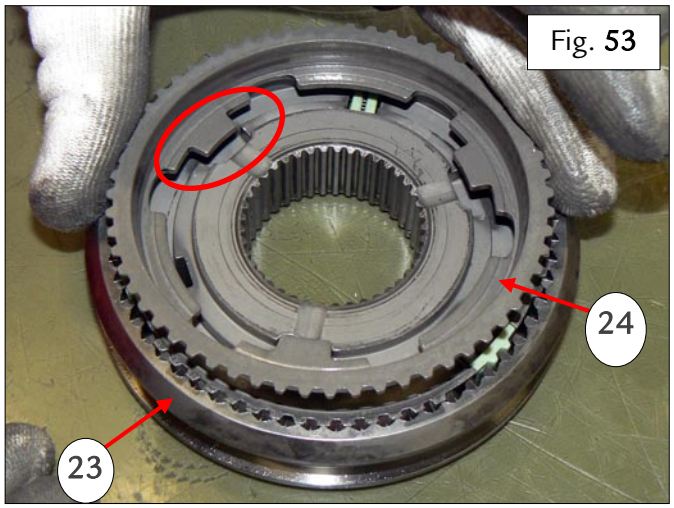
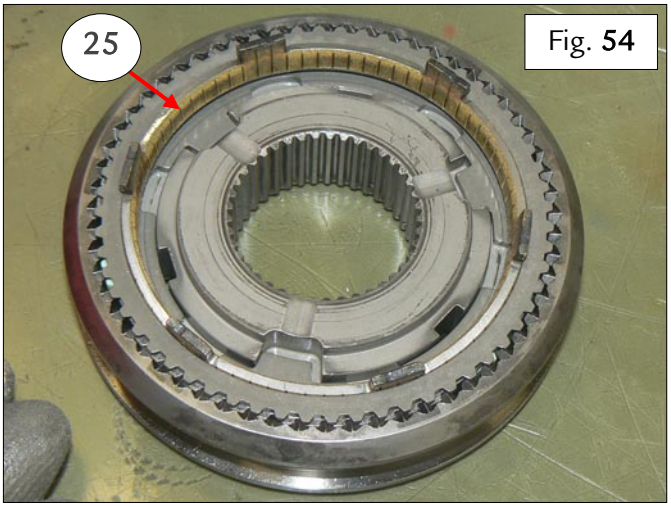


Fig. **52**

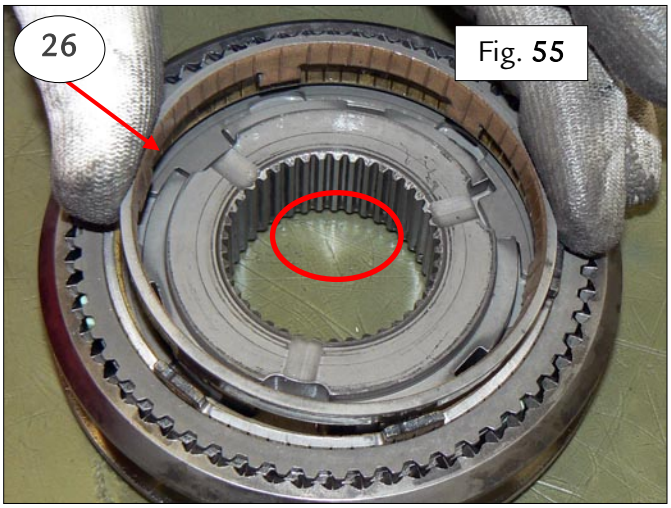
- Install the lower ring (24) onto the 1st-3rd gear synchronizer (23) reassembled previously, aligning the recesses correctly – Fig. 53.



- Install the exterior ring (25) – Fig. 54.



- Install the interior ring (26), aligning the recesses as shown – Fig. 55.



- Fit the tool **AV 8817** on the longer part of the **1st-3rd** speed fork – Fig. **56**.

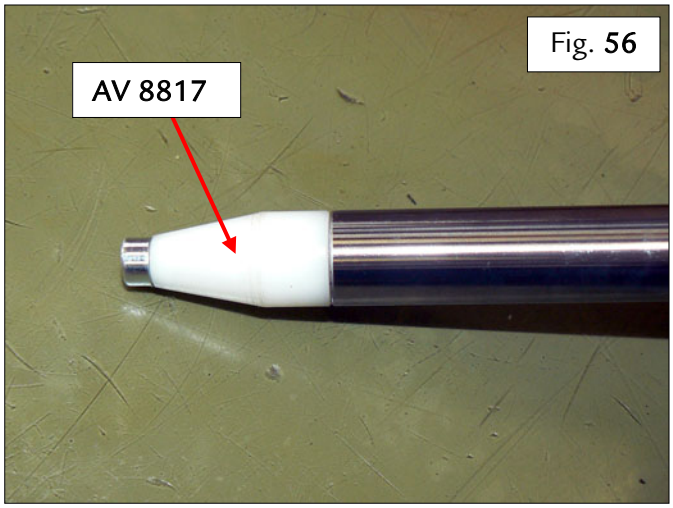


Fig. **56**

- Fit the shorter **1st-3rd** speed fork **(27)** onto the relative synchronizer **(23)**, then fit the assembly fully into the indicated seats – Fig. **57**.

  Note: **If necessary, rotate the primary shaft by hand to facilitate installation.**

  Note: **Handle the synchronizer with extreme care during this procedure to prevent the components of the synchronizer itself from separating.**

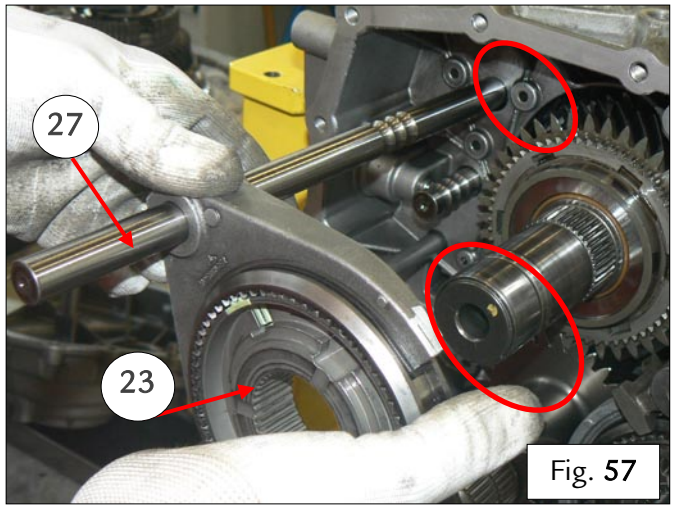


Fig. **57**

- Ensure that the parts are all assembled correctly by checking that the protruding part of the **1st-3rd** speed synchronizer is flush with the splining of the shaft – Fig. **58**.

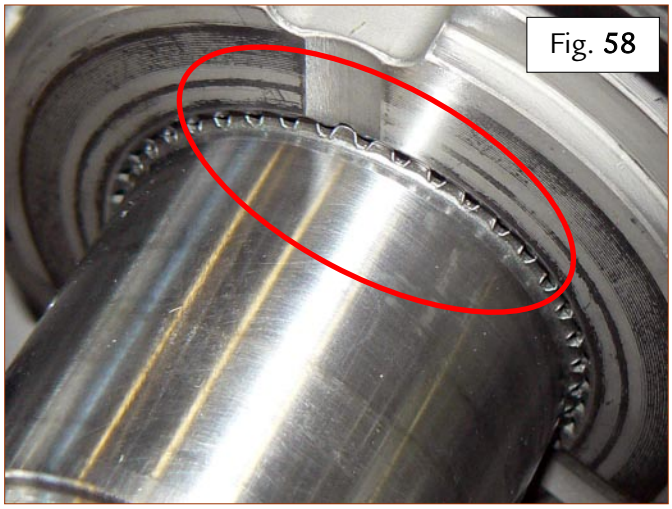
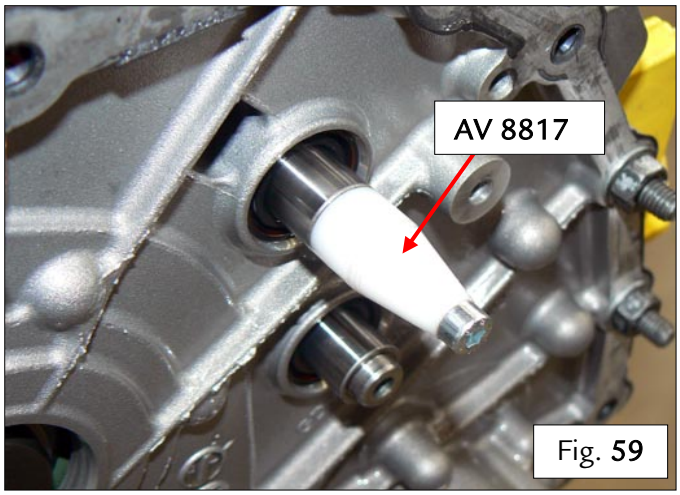
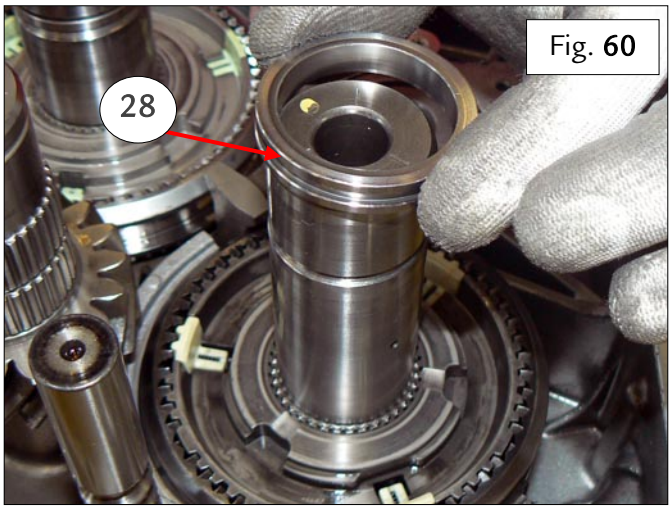


Fig. **58**

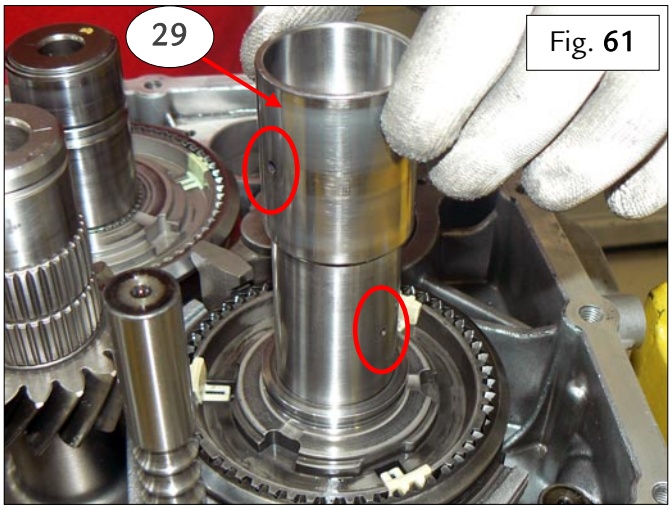
Unscrew and remove the bush **AV 8817** from the rod – Fig. **59**.



- Fit the shim ring **(28)** on the **2nd-6th-5th-7th** speed secondary shaft – Fig. **60**.
  Note: The shim **(28)** can be installed either way around.



- Fit the sleeve/bushing **(29)** on the **2nd-6th-5th-7th** speed secondary shaft, rotating the bush itself so that the lubrication holes indicated are not aligned – Fig. **61**.



- Using the punch **AV 8816** and a rubber mallet, install the bushing/sleeve **(29)** fully in its seat - Fig. **62**.

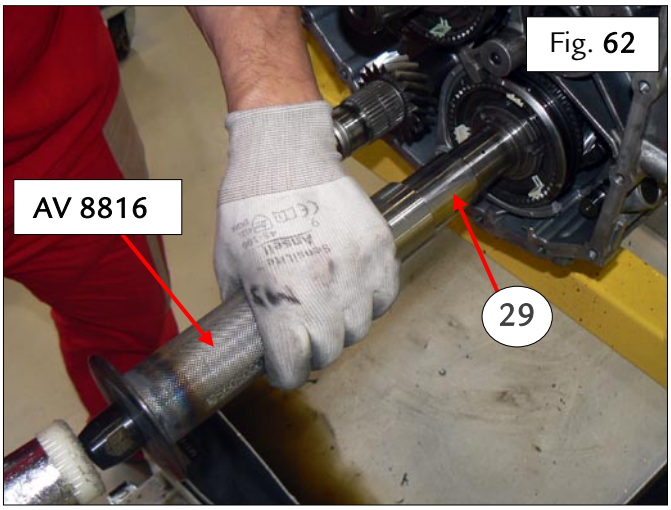


Fig. **62**

- Fit the bushing **(30)** on the **R-4th-3rd-1st** speed secondary shaft with the stamped writing at the top and ensuring that the lubrication orifices indicated are not aligned – Fig. **63**.

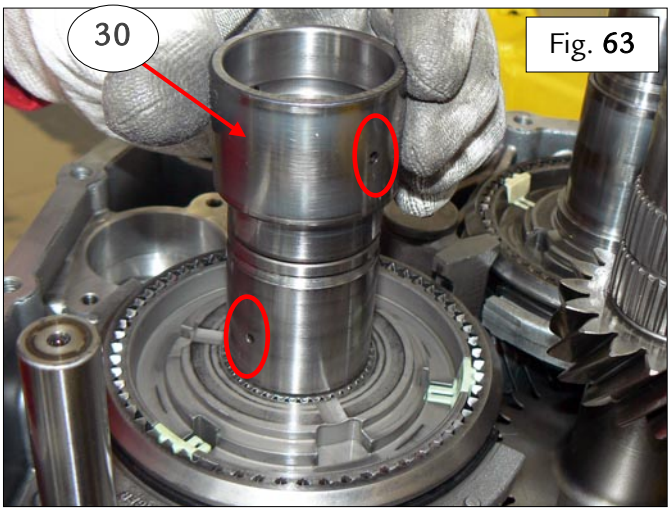


Fig. **63**

- Using the punch **AV 8630** and a rubber mallet, install the bushing **(30)** fully in its seat - Fig. **64**.

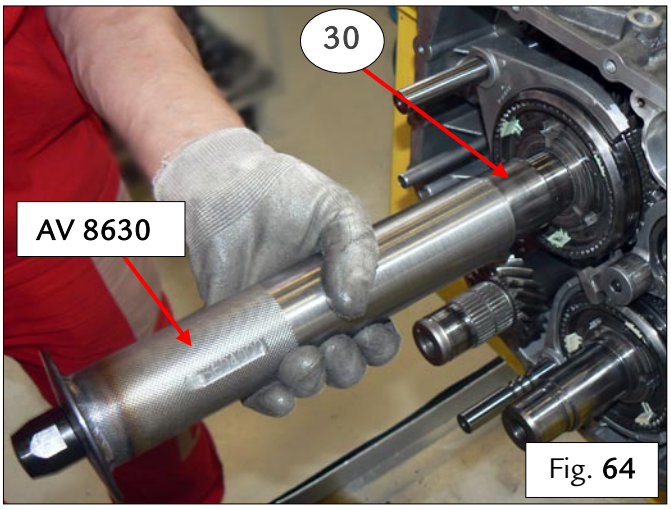


Fig. **64**

Fit the lower ring (32) on the **5th-7th** speed synchronizer, aligning the recesses correctly – Fig. **65**.

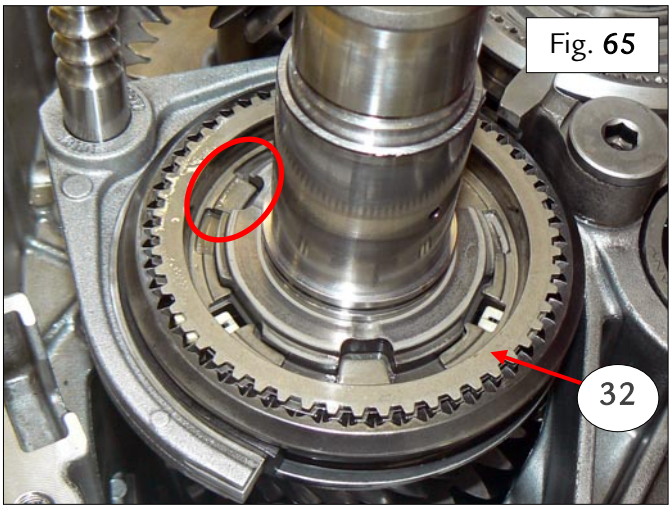


Fig. **65**

➢ Fit the outer ring (33) – Fig. **66**.

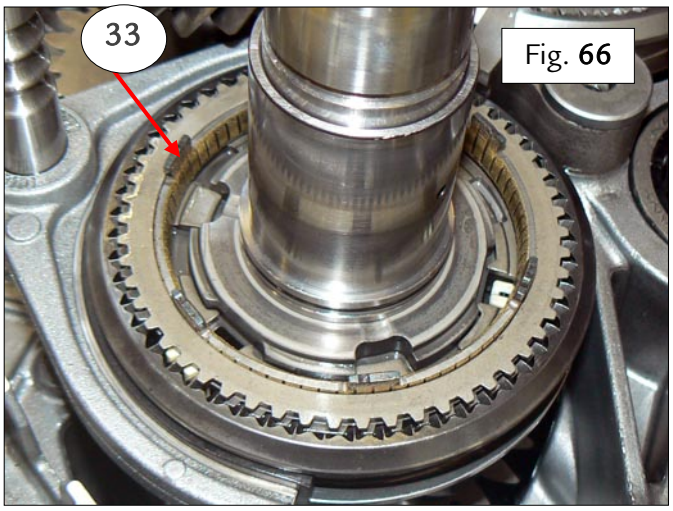


Fig. **66**

➢ Fit the inner ring (34) – Fig. **67**.

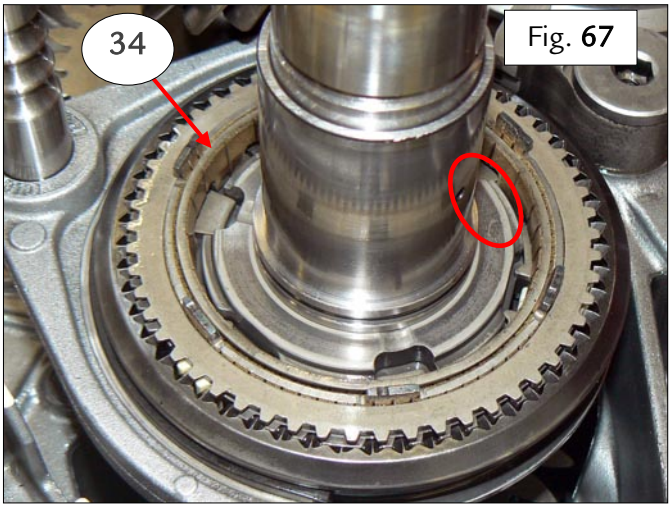


Fig. **67**

- Check that the rings are installed in the correct position, and aligned as shown in the image aside – Fig. **68**.

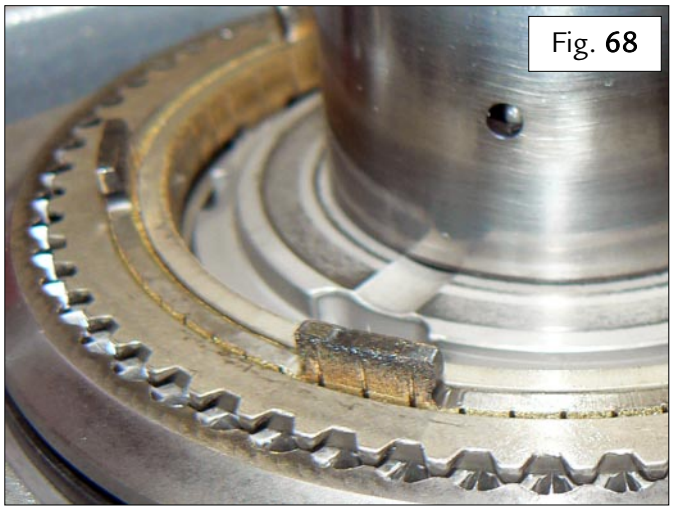


Fig. **68**

- Fit the roller bearing cage **(35)** on the **2nd-6th-5th-7th** gear secondary shaft – Fig. **69**.

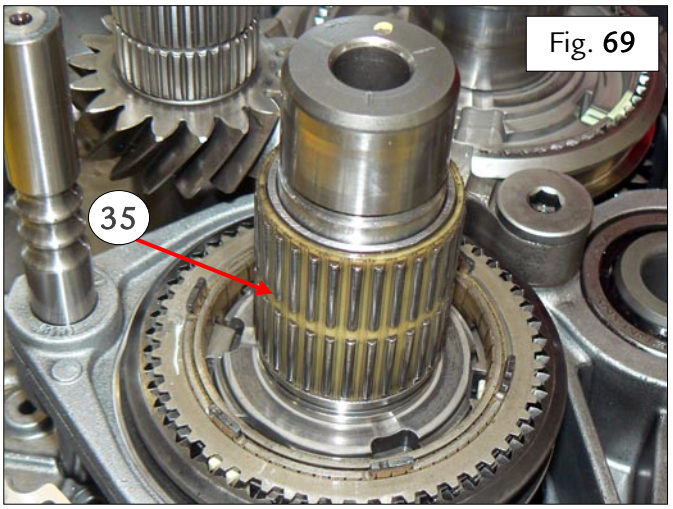


Fig. **69**

- Fit the **7th** speed gear **(36)**, aligning the respective seats correctly – Fig. **70**.

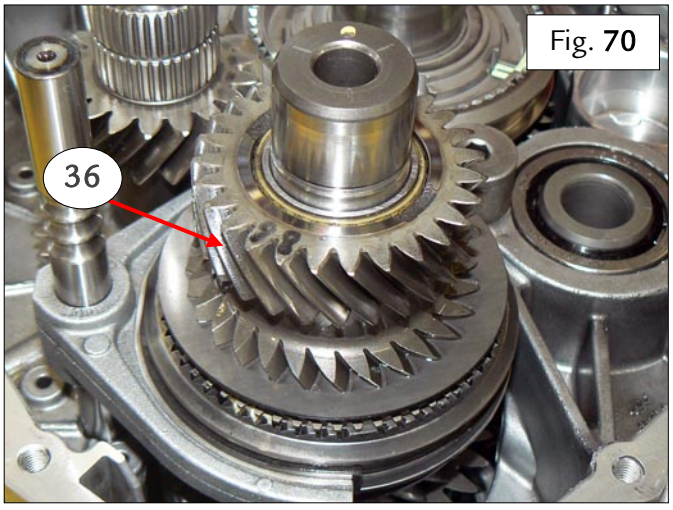
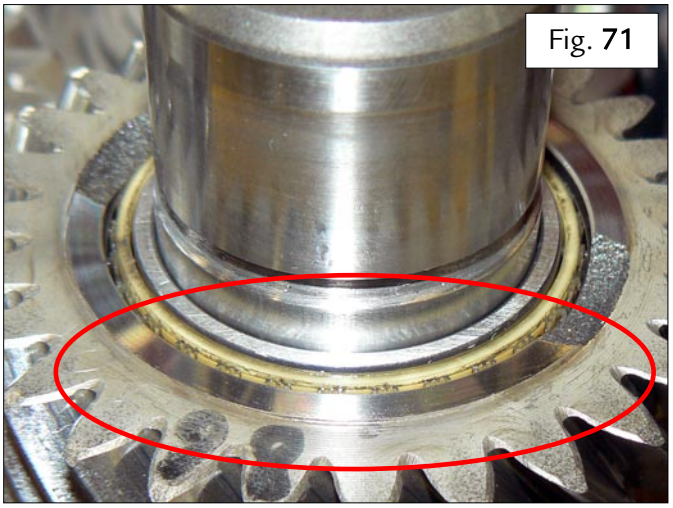
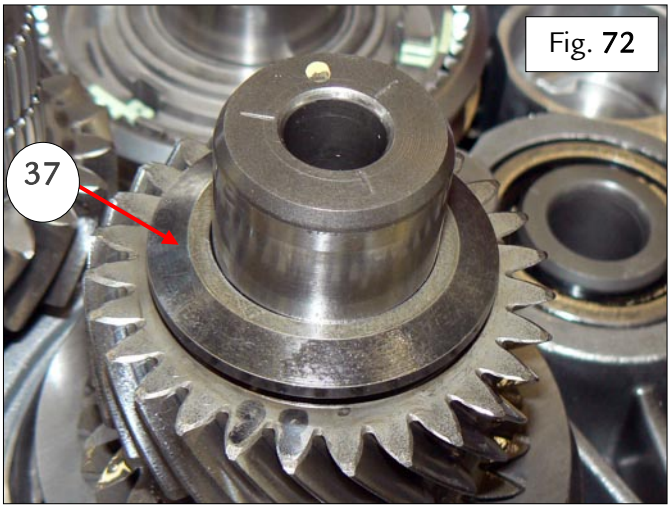


Fig. **70**

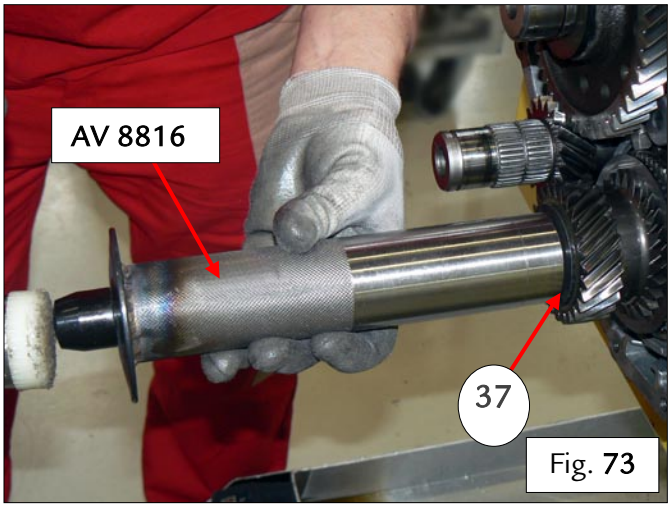
Check that the end face of the **7th** speed gear is flush with the roller bearing cage and the underlying bush – Fig. **71**.



- Fit the shim **(37)** on the **2nd-6th-5th-7th** secondary shaft with the convex side turned upward – Fig. **72**.



- Using the punch **AV 8816** and a rubber mallet, install the shim **(37)** fully in its seat - Fig. **73**.



- Fit the new seeger ring (38) in the relative groove on **2nd-6th-5th-7th** speed secondary shaft - Fig. **74**.

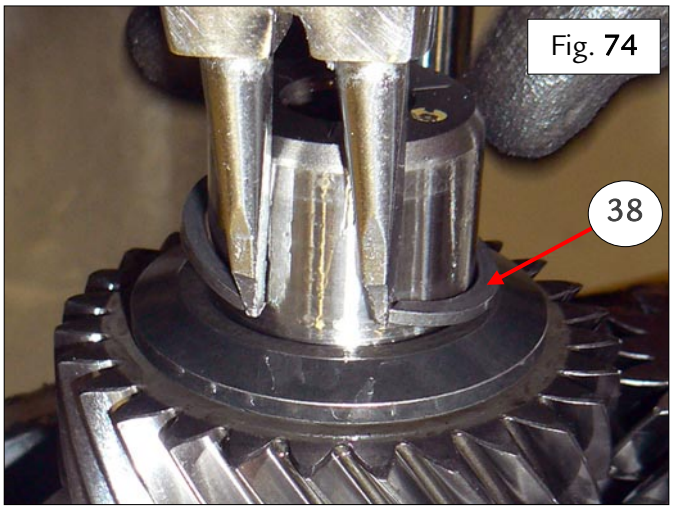


Fig. **74**

- Ensure that the seeger ring (38) is engaged correctly in the groove – Fig. **75**.
- If installed correctly, the seeger ring (38) must look as shown in the photo aside – Fig. **75**.

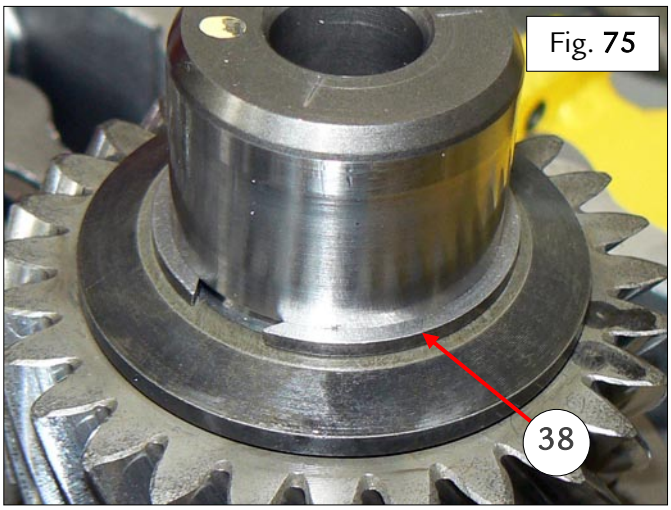


Fig. **75**

- Fit the lower ring (39) on the **1st-3rd** speed synchronizer, aligning the recesses correctly – Fig. **76**.

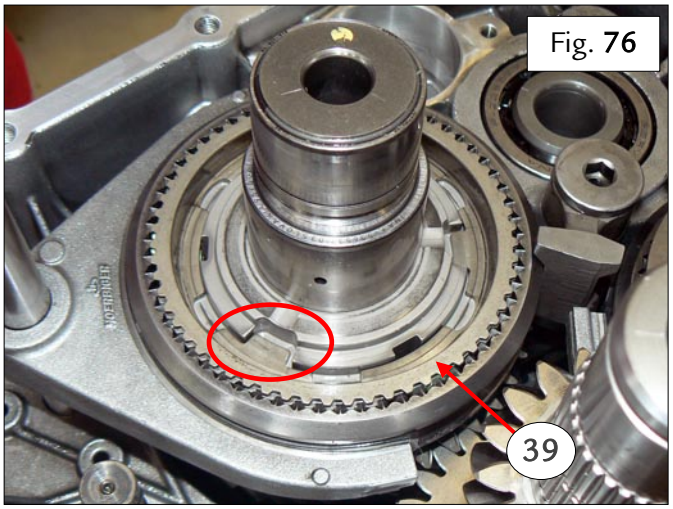


Fig. **76**

Fit the outer ring (40) – Fig. 77.

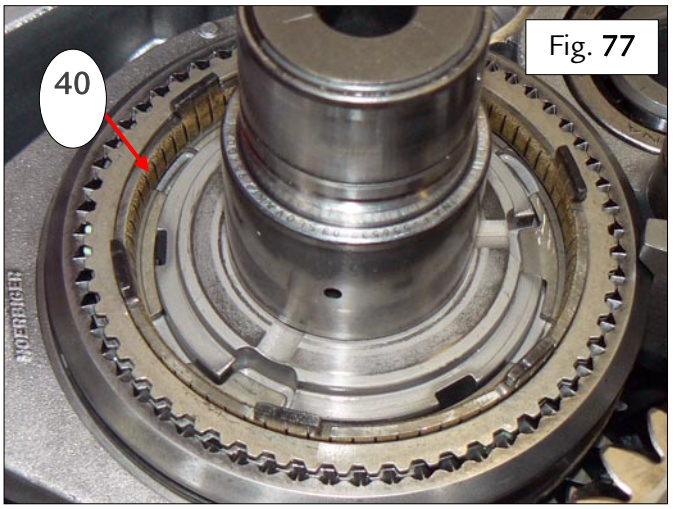


Fig. 77

➢ Fit the inner ring (41) – Fig. 78.

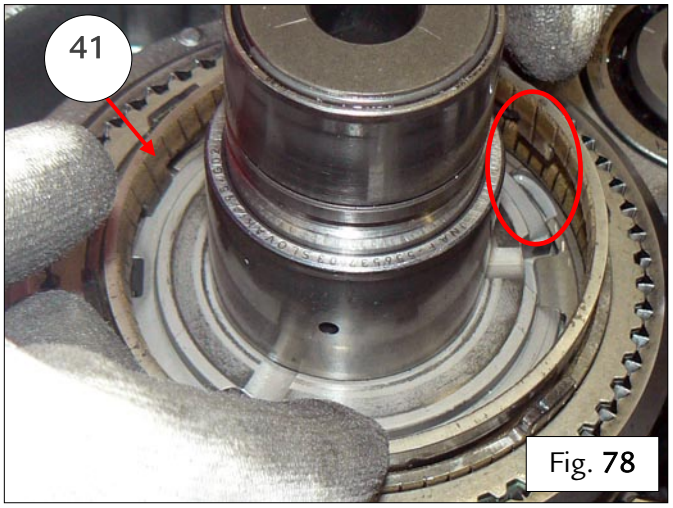


Fig. 78

➢ Check that the rings are installed in the correct position, and aligned as shown in the image aside – Fig. 79.

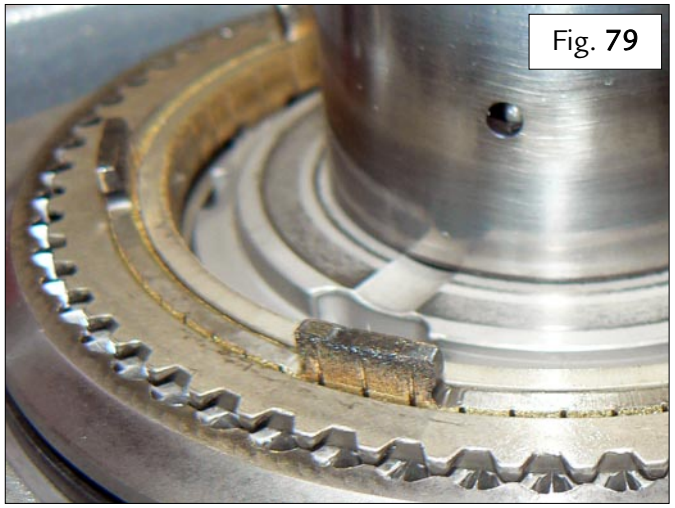


Fig. 79

Fit the roller bearing cage (42) on the **R-4th-3rd-1st** speed secondary shaft - Fig. **80**.

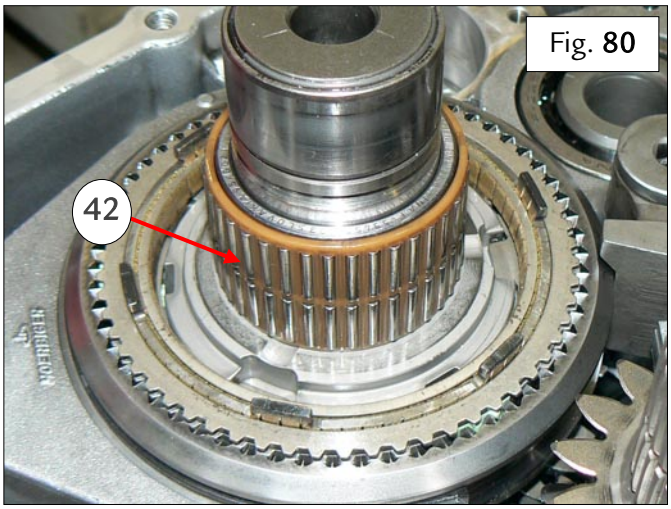


Fig. **80**

- Fit the **1st** speed gear (**43**), aligning the respective seats correctly – Fig. **81**.

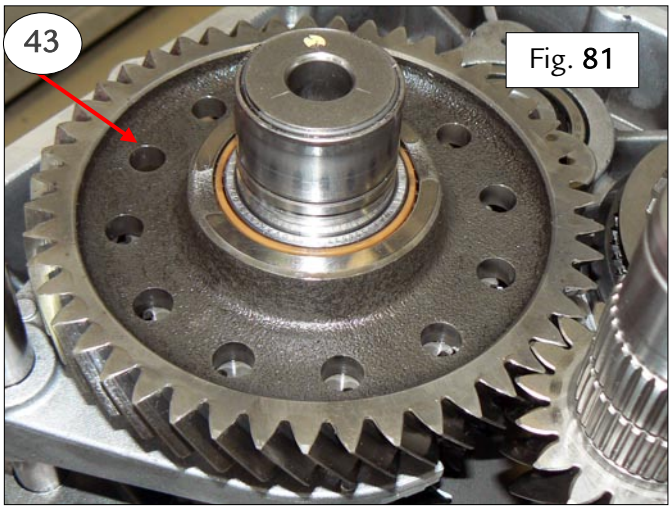


Fig. **81**

- Check that the end face of the **1st** speed gear is flush with the roller bearing cage and the underlying bushing – Fig. **82**.

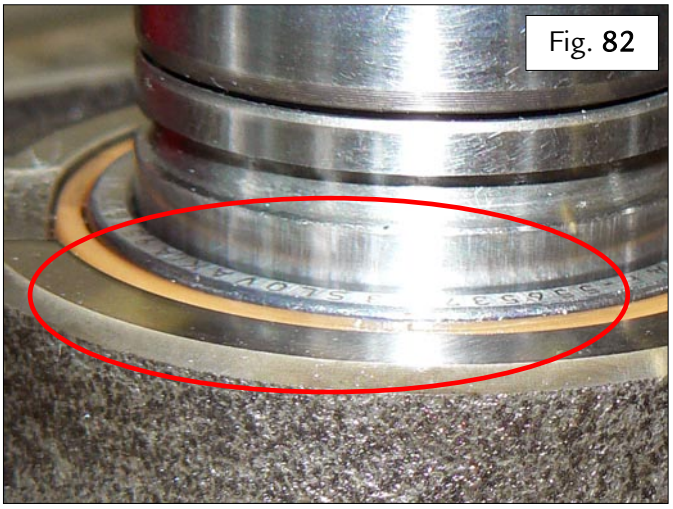


Fig. **82**

Fit the shim (44) on the **R-4th-3rd-1st** speed secondary shaft, with the bevelled side indicated facing downwards – Fig. 83.

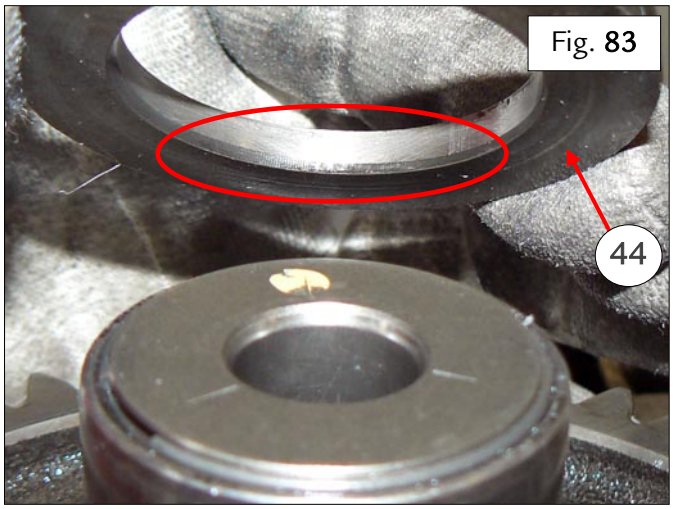


Fig. 83

- Using the punch **AV 8630** and a rubber mallet, install the shim (44) fully in its seat - Fig. 84.

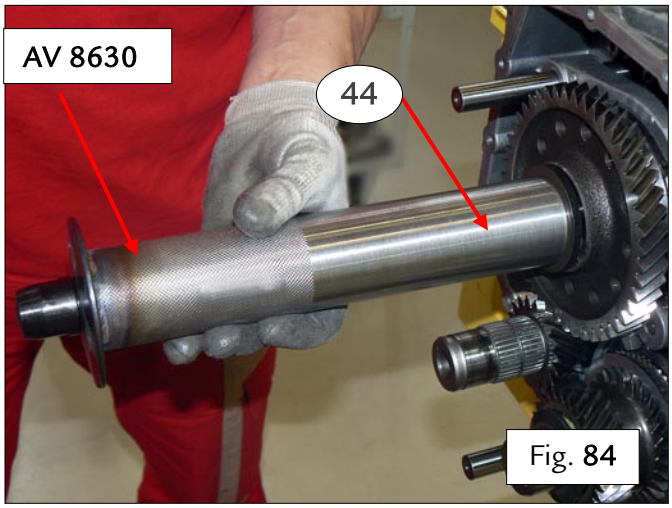


Fig. 84

- Insert the new seeger (46) into the relative groove of the secondary shaft of **RM-4th-3rd-1st** – Fig. 85.

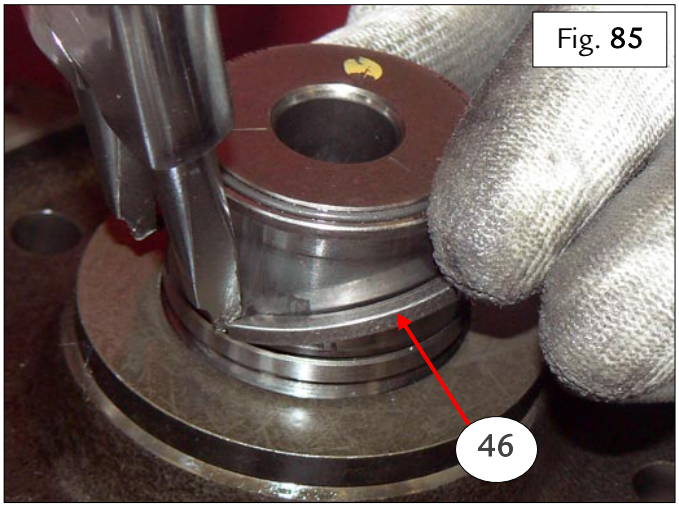


Fig. 85

Ensure that the seeger ring (46) is engaged correctly in the groove – Fig. 86.

- If installed correctly, the seeger ring (46) must look as shown in the photo aside – Fig. 86.

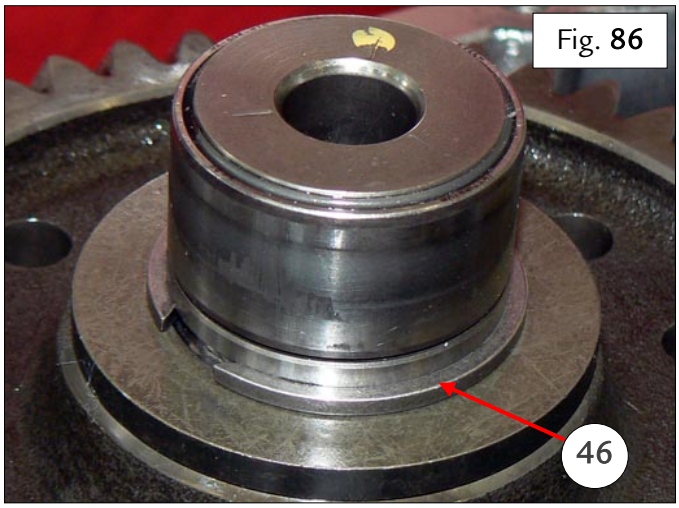


Fig. 86

- Fit the 7th speed primary gear (47) on the primary shaft, with the correct side facing upwards as shown in the photo – Fig. 87.

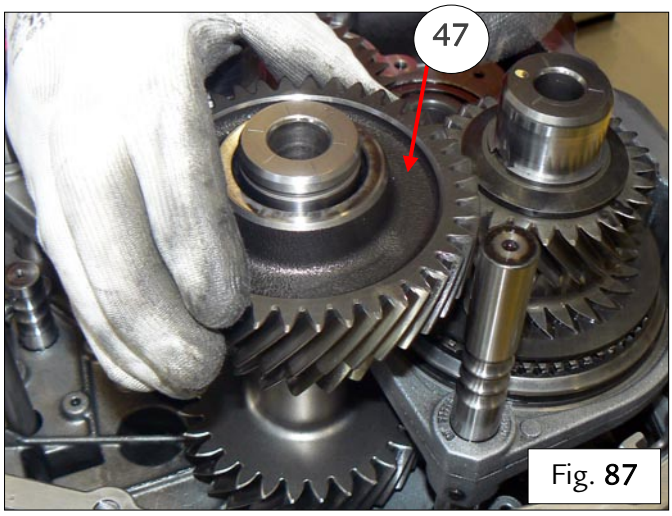


Fig. 87

- Ensure that the 7th speed gear (47) is installed correctly, and aligned as shown in the figure – Fig. 88.

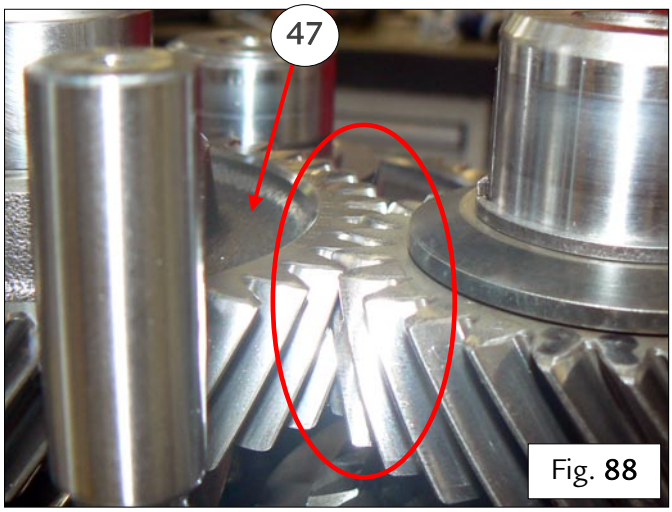


Fig. 88

- Fit the Park Lock pin (48) in the relative seat on the gear housing – Fig. 89.

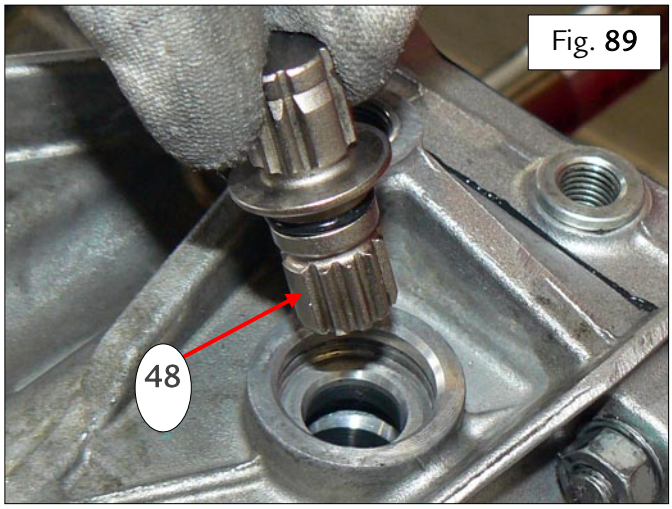


Fig. 89

- Press the Park Lock pin (48) fully into its seat by hand – Fig. 90.

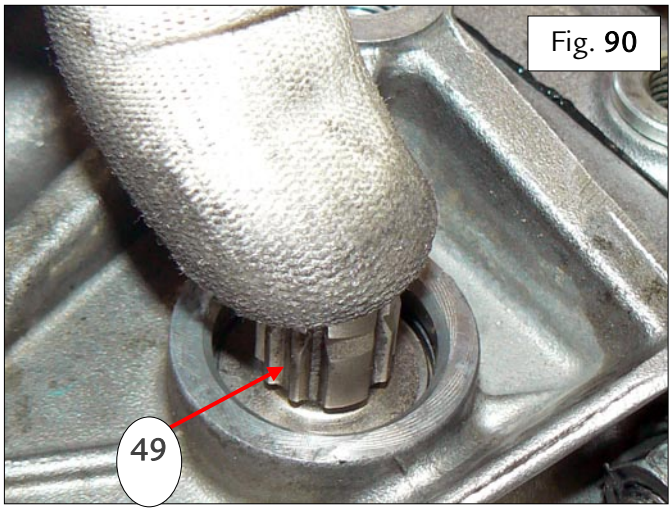


Fig. 90

- Fit the circlip (50) – Fig. 91.

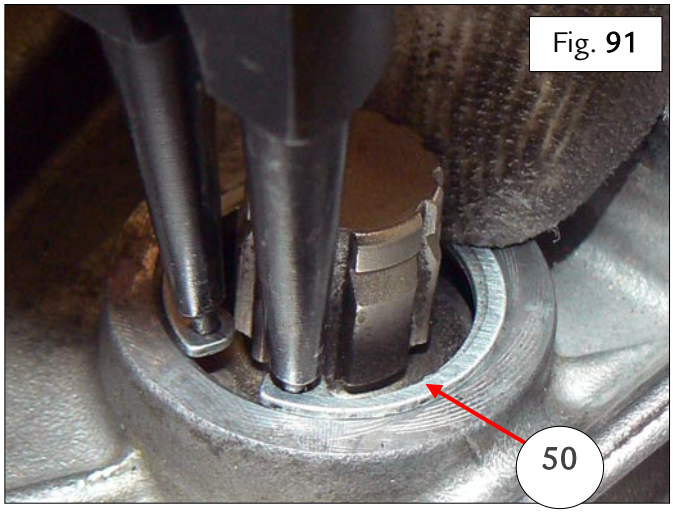


Fig. 91

Fit the tube (51) in the relative seat on the interface plate – Fig. 92.

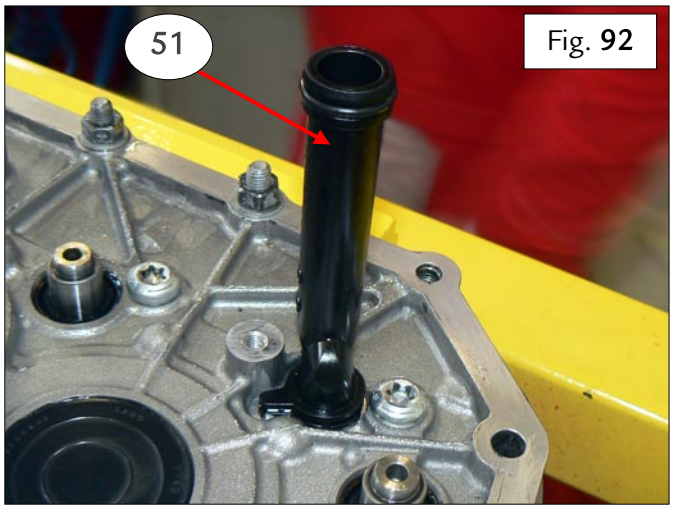


Fig. 92

- Move the control rods indicated into the neutral position, with all the rods protruding by the same distance relative to the plate – Fig. 93.
  Note: The rods have three different working positions. The center position is neutral, while the positions at the two extremities correspond to the engaged positions for the respective gears.
- In this position, check that the even gear primary shaft (56) and the odd gear primary shaft (57) rotate freely, while the output pinion shaft (58) cannot rotate – Fig. 93.
  Note: As the 7th speed primary gear is not fastened, ensure that it does not slip off the relative shaft during this operation and all subsequent operations in which shafts and gears are turned and moved.

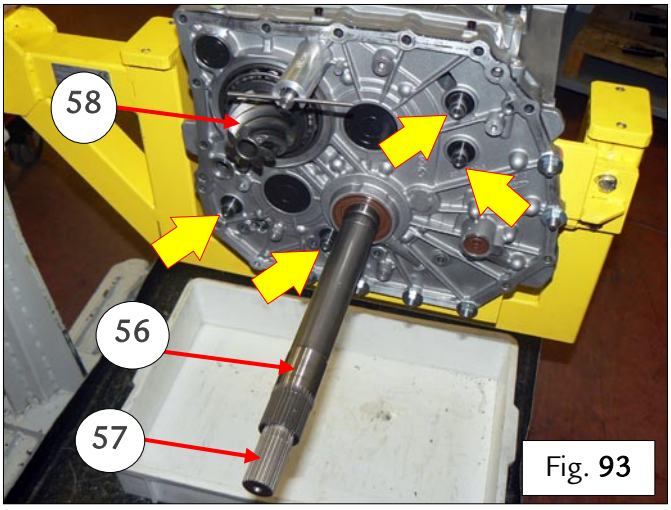


Fig. 93

- Starting with all the rods in neutral, perform the following operations (the example given in the figure shows the **2nd-6th** speed control rod) – Fig. **94**.
- From the SAP side, press the **2nd-6th** speed control rod (59) by one click to engage **6th** gear – Fig. **94**.
- In this position, manually check that the even gear primary shaft turns correctly and transmits drive to the output pinion shaft – Fig. **94**.
  Note: In this situation, the odd gear primary shaft will rotate if turned manually, as it is in neutral and does not transmit drive to the output pinion shaft.

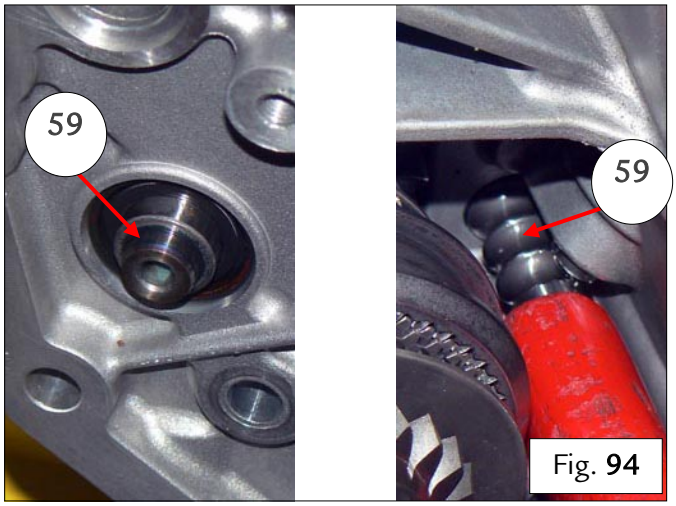


Fig. **94**

- From the cover side, press the **2nd-6th** speed control rod (59) by two clicks to engage **2nd** gear – Fig. **94**.
- In this position, manually check that the even gear primary shaft turns correctly and transmits drive to the output pinion shaft – Fig. **94**.
  Note: In this situation, the odd gear primary shaft will rotate if turned manually, as it is in neutral and does not transmit drive to the output pinion shaft.
- After completing the procedure, press the **2nd-6th** speed control rod (59) again from the SAP side by one click return the rod to the neutral position – Fig. **94**.

- Repeat the checks on the remaining three control rods, referring to the rod positions shown in the image aside and rotating the corresponding primary shaft – Fig. **95**.
  Note: The **R** gear is rotated by the even gear primary shaft.

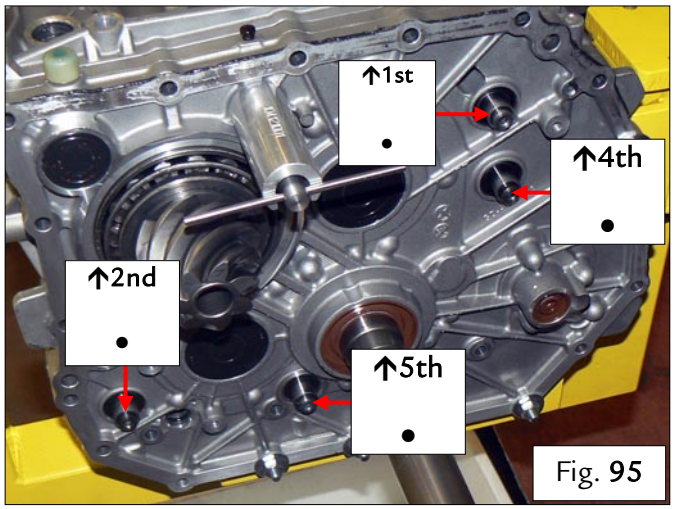


Fig. **95**

- Gripping the rod **AV 8823**, pull out the Park Lock pin indicated as far as possible to allow the cylinder **AV 8823** to be removed from above – Fig. **96**.
- Release the rod gradually, allowing the Park Lock pin to return to its rest position – Fig. **96**.
- Remove the rod **AV 8823** from the Park Lock pin – Fig. **96**.

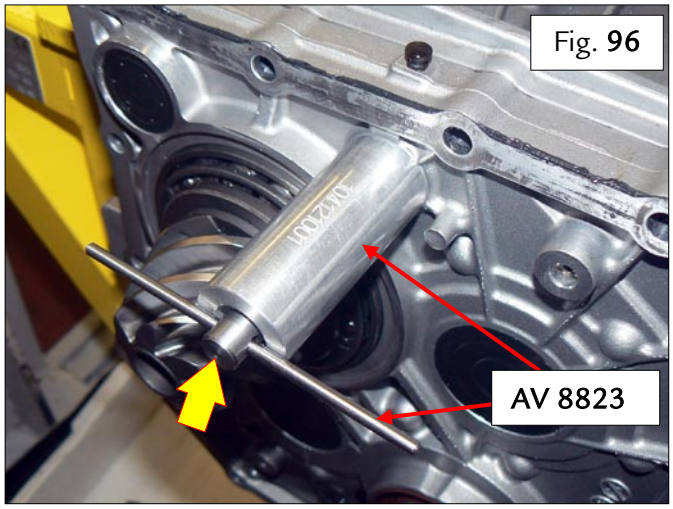


Fig. **96**

- Refit the rear cover.
- Refit the SAP (as indicated in **Technical Information 2619**).
- Refit the complete E-Diff pipe.

Thank you for your co-operation.

DCT Gearbox Pre-Diagnosis Form

Model	Updated on
458 ITALIA · 458 SPIDER · 458 SPECIALE · 458 SPECIALE A · California · F12 tdf · F12 berlinetta · FF · 488 PISTA SPIDER · California T · 488 SPIDER · 488 PISTA · Portofino · GTC4 LUSSO T · GTC4 LUSSO · F8 TRIBUTO · MONZA SP1 · MONZA SP2 · 812 superfast	October 2019

VEHICLE FILE	
Date:	Chassis number:
Model:	Dealer:
Market:	Vehicle Km/mi:
Gearbox No.:	ROL No. (if available):
Warranty start date:	Warranty end date:
Prior procedures on DCT gearbox (date and type of procedure):	

DIAGNOSTIC FILE
Provide description of oil leakage found (attach photos), specifying number of leaks, in reference to the drawings from page 2 to 4 of Technical Information 2622:
List any DTC errors in NCR (in reference to the list from page 6 to 14 of Technical Information 2622):

In the event of NOISE from gearbox/differential, specify:

Conditions in which noise occurs:

Vehicle speed:

Gear selected:

N	1st	2nd	3rd	4th	5th	6th	7th	R
☐	☐	☐	☐	☐	☐	☐	☐	☐

During gear shift? YES ☐ NO ☐

If noise occurs during gear shifting, specify:

Upshifts ☐ Downshifts ☐

Automatic mode ☐ Manual mode ☐ Performance mode ☐

DCT Gearbox Pre-Diagnosis Form

Model	Updated on
458 ITALIA, 458 SPIDER, 458 SPECIALE, 458 SPECIALE A, California, F12 tdf, F12 berlinetta, FF, 488 PISTA SPIDER, California T, 488 SPIDER, 488 PISTA, Portofino, GTC4 LUSSO T, GTC4 LUSSO, F8 TRIBUTO, MONZA SP1, MONZA SP2, 812 superfast	October 2019

If noise occurs with gear engaged, specify when:

- Under acceleration ☐
- When lifting off throttle ☐
- Constant throttle (cruise) ☐

Noise is heard when:

- Driving straight ☐
- Turning right ☐
- Turning left ☐
- Negotiating traffic circle ☐
- Negotiating tight bend ☐
- Negotiating wide bend ☐

Describe the type of noise heard:

- Whistle ☐
- Rumble ☐
- Gear noise ☐
- Differential bevel gear ☐
- Vibration ☐
- Clunking ☐

Check the levels of the clutch hydraulic oil system (ATF) and the gearbox gear oil system (GL)

Oil level (ATF)

- Too high ☐
- Too low ☐
- OK ☐

Oil level (GL)

- Too high ☐
- Too low ☐
- OK ☐

Is metal debris found on plug?

JOB FILE

Job performed:

Kit Part Nos. ordered:

DCT Gearbox Pre-Diagnosis Form

Model	Updated on
458 ITALIA, 458 SPIDER, 458 SPECIALE, 458 SPECIALE A, California, F12 tdf, F12 berlinetta, FF, 488 PISTA SPIDER, California T, 488 SPIDER, 488 PISTA, Portofino, GTC4 LUSSO, GTC4 LUSSO T, F8 TRIBUTO, MONZA SP1, MONZA SP2, 812 superfast	October 2019

Job performed on:	
CCP	SAP
Identification No. of old CCP:	Identification No. of old SAP:
Identification No. of new CCP:	Identification No. of new SAP:
Any faults noted during repair procedure:	

Task performed by (Dealer):

_____

_____

Technical Manager:

First name _____ Last name _____

(Print) (Print)

Company stamp

_____

Full signature