

0603 Gear and Shaft

1 General Information.....	936
2 Diagnosis and Inspection.....	939
3 Input Shaft.....	941
4 Output Shaft.....	952
5 Shift Fork.....	961

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



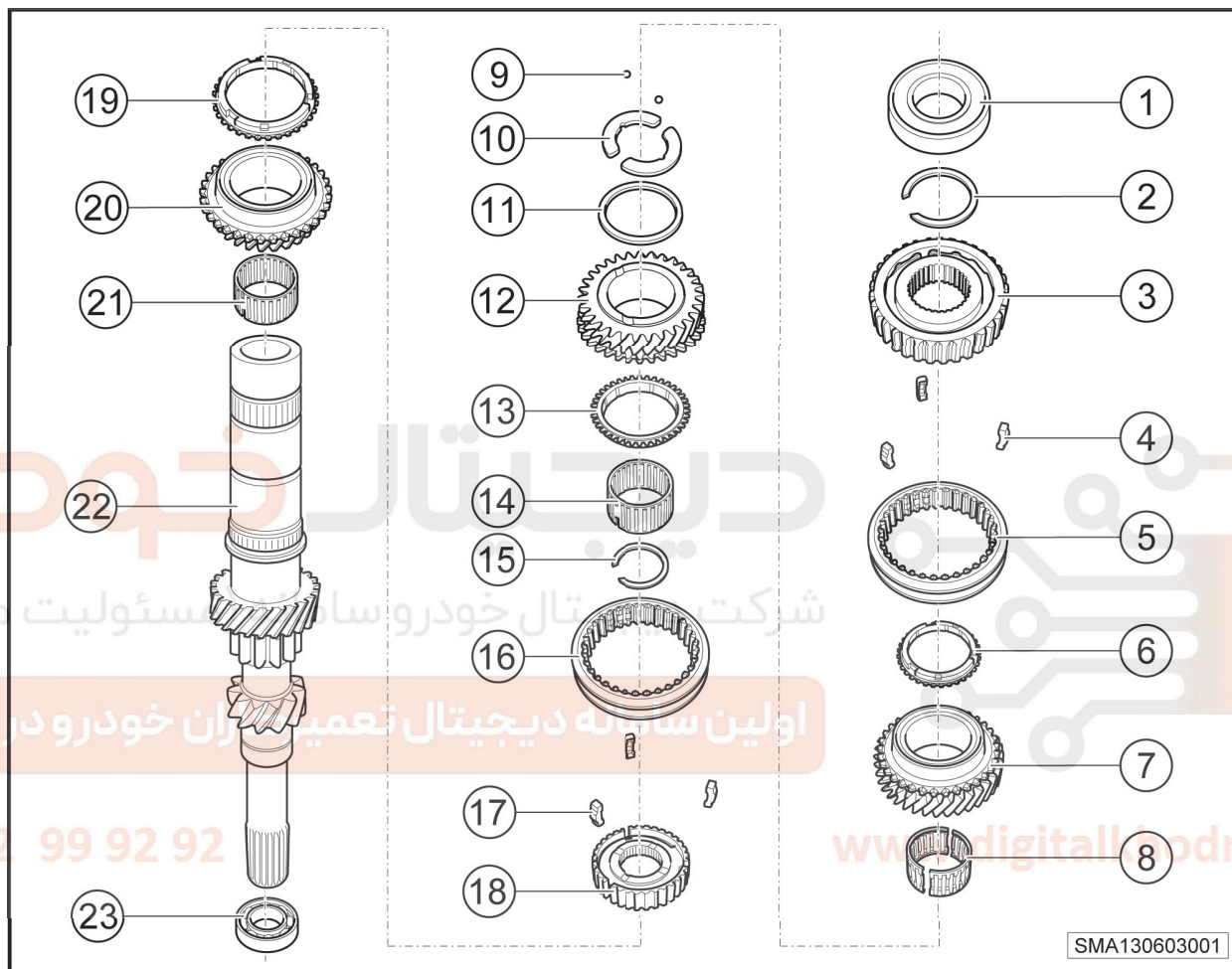
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1 General Information

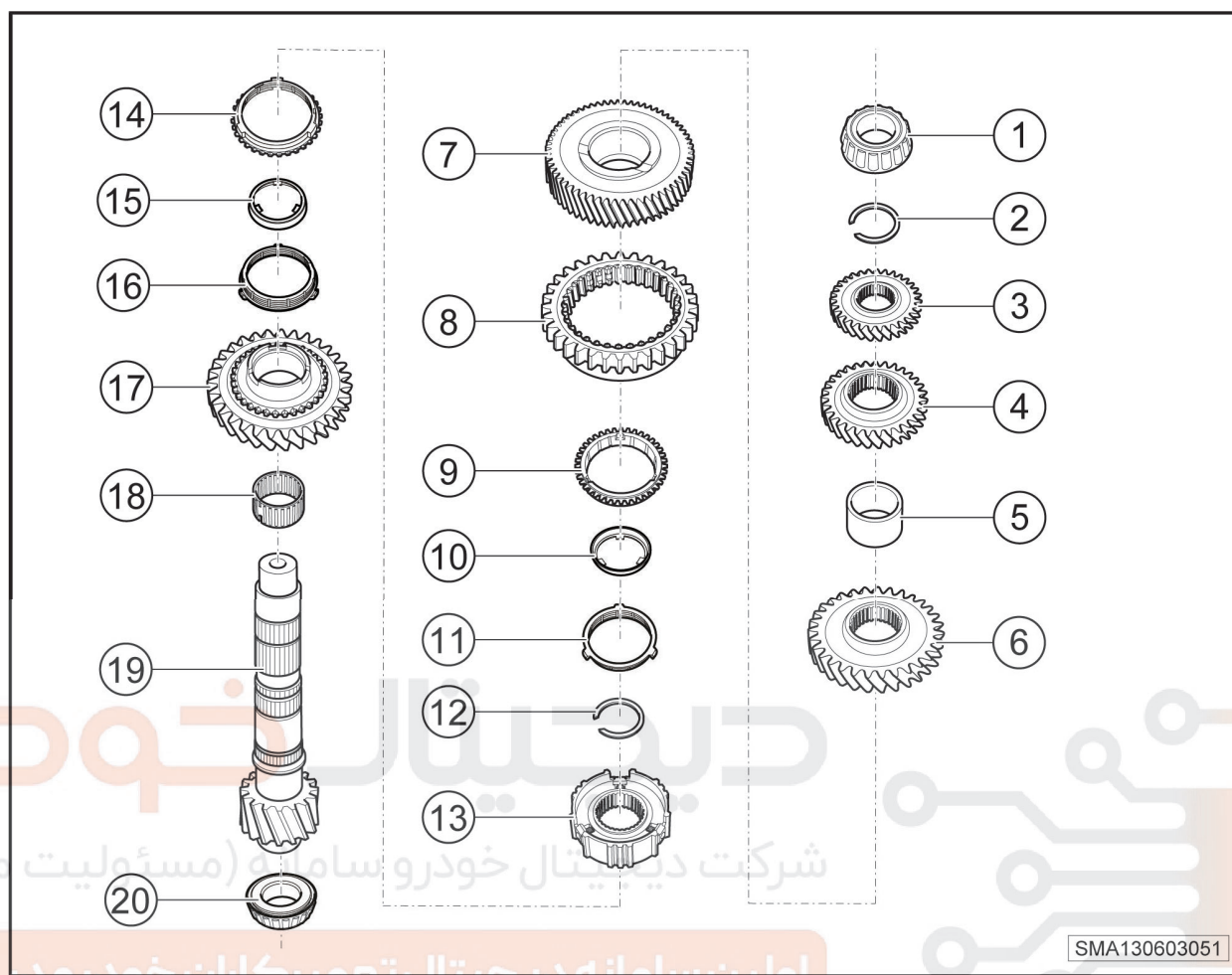
1.1 The input shaft assembly drawing.....	936
1.2 The output shaft assembly drawing.....	937
1.3 The shift fork assembly drawing.....	938

1.1 The input shaft assembly drawing



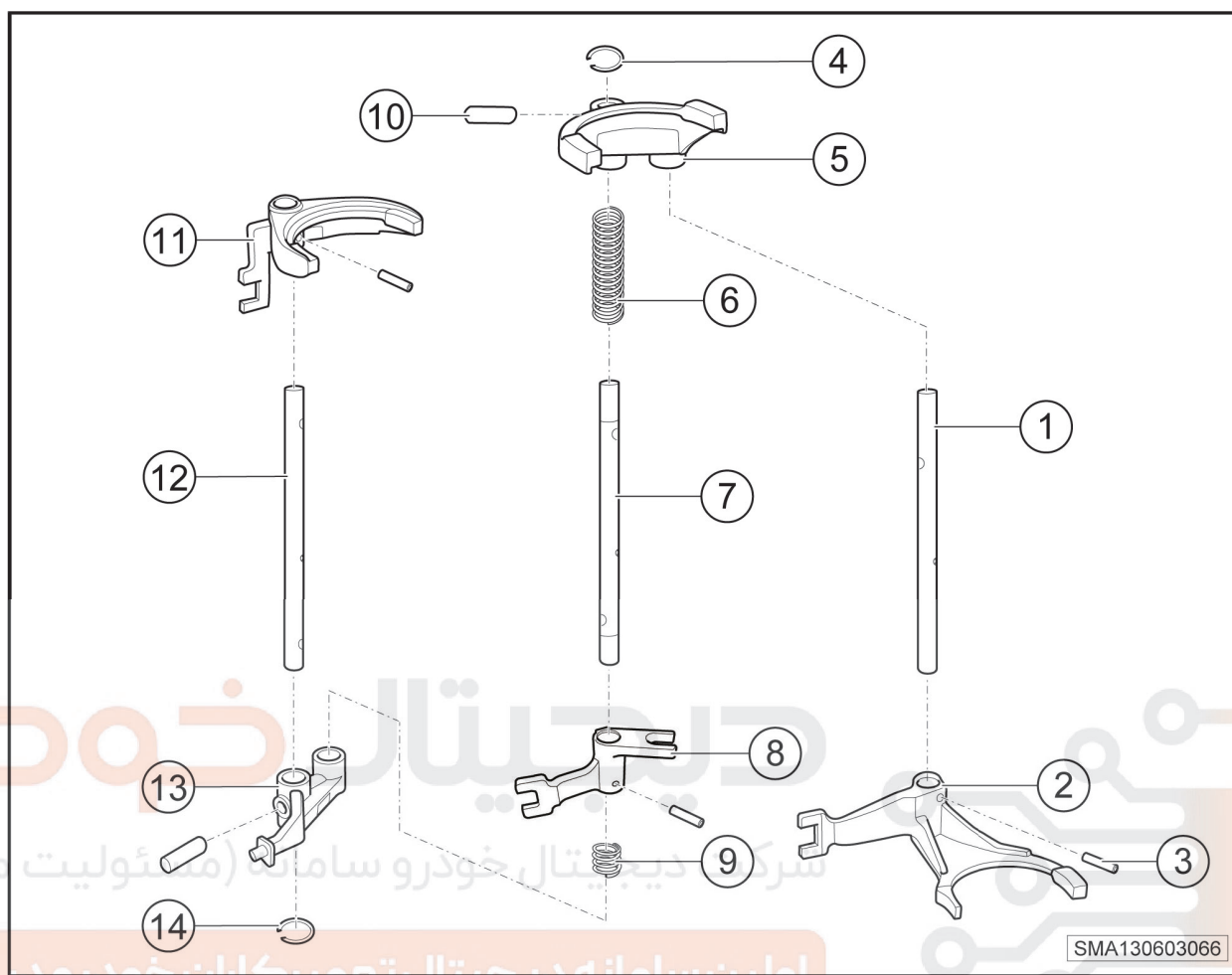
1. Input shaft rear bearing	2. Rear clamp spring
3. 5th gear synchronizing gear	4. 5th gear synchronizer cotter
5. 5th gear synchronizer outer ring	6. 5th gear synchronizing ring
7. 5th speed gear	8. 5th gear needle bearing
9. Steel ball	10. Gear baffle
11. Gear baffle clamp spring	12. 4th gear driving gear
13. 4th gear synchronizing ring	14. 4th gear needle bearing
15. Front clamp spring	16. 3rd and 4th gear synchronizer outer ring
17. 3rd and 4th gear synchronizer cotter	18. 3rd and 4th synchronizing gear
19. 3rd gear synchronizing ring	20. 3rd gear driving gear
21. 3rd needle bearing	22. Input shaft
23. Input shaft front bearing	

1.2 The output shaft assembly drawing



1. Output shaft rear bearing	2. Rear clamp spring
3. 5th gear driven gear	4. 4th gear driven gear
5. Gear bushing	6. 3rd gear driven gear
7. 2nd gear driven gear	8. 1st and 2nd gear synchronizer outer ring
9. 2nd gear synchronizer inner ring	10. 2nd gear synchronizer middle ring
11. 2nd gear synchronizer outer ring	12. Front clamp spring
13. 1st and 2nd gear synchronizer gear	14. 1st gear synchronizer outer ring
15. 1st gear synchronizer middle ring	16. 1st gear synchronizer inner ring
17. 1st gear driven gear	18. 1st gear needle bearing
19. Output shaft	20. Output shaft front bearing

1.3 The shift fork assembly drawing



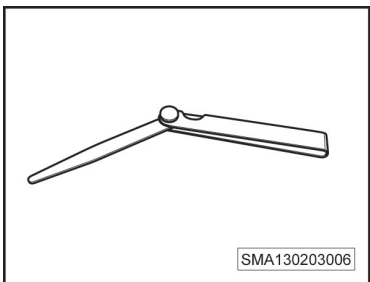
1. 1st and 2nd gear fork shaft	2. 1st and 2nd gear fork
3. Fork dowel pin	4. 5th gear fork fixing ring
5. 5th gear fork	6. 5th gear fork return spring
7. 5th and reverse gear fork shaft	8. 5th and reverse gear fork bracket
9. 5th and reverse gear fork bracket return spring	10. Interlock pin
11. 3rd and 4th gear fork	12. 3rd and 4th gear fork shaft
13. Reverse gear fork	14. Reverse gear fork fixing ring

2 Diagnosis and Inspection

2.1 Checking the synchronizing ring and gear.....939

2.1 Checking the synchronizing ring and gear

Maintenance tools and common equipment

	
Clearance gauge	

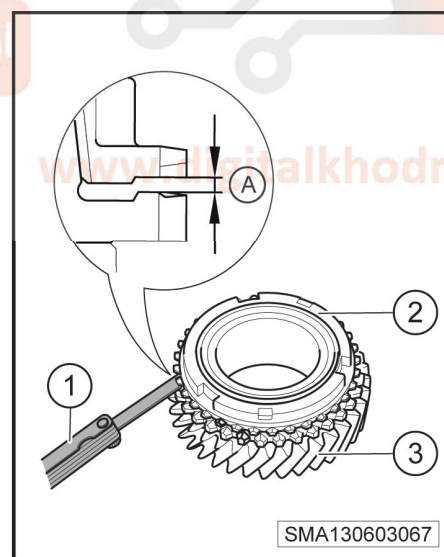
Note

- The procedures of checking the clearance of all the synchronizing rings are the same.
- If the clearance between the synchronizing ring and the synchronizing gear is less than 0.5 mm, it indicates the synchronizing ring has been excessively worn and shall be replaced.

Checking the synchronizing ring

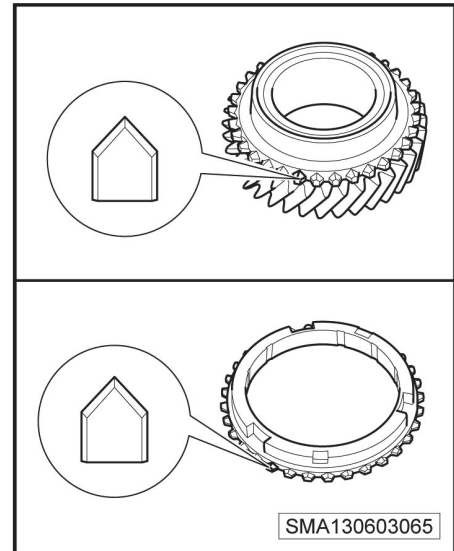
1. Check the clearance (-A-) between the synchronizing ring (-2-) and the synchronizing gear (-3-) with a clearance gauge (-1-).

Gear	Standard clearance
1st and 2nd gear synchronizing ring	1.7 ± 0.39 mm
3rd, 4th and 5th gear synchronizing ring	1.35 ± 0.39 mm



Checking the synchronizing gear

1. Check the synchronizing gear and ring of each gear for wear.
2. If the wear is serious, please replace the synchronizing gear and ring together.



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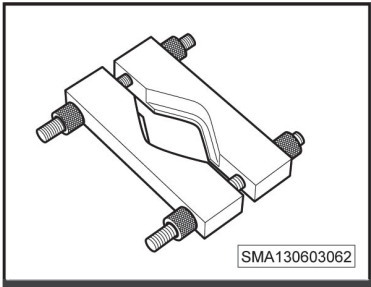
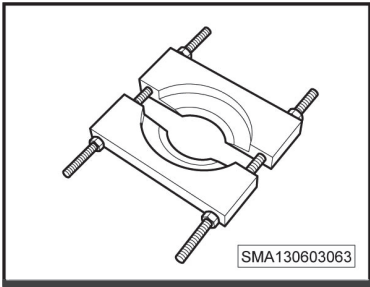
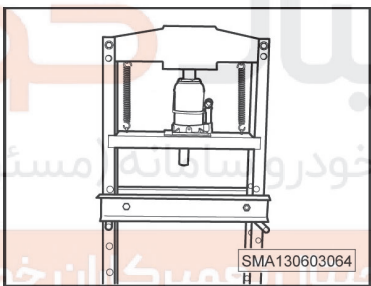
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3 Input Shaft

3.1 Disassembling the input shaft.....	941
3.2 Assembling the input shaft	947

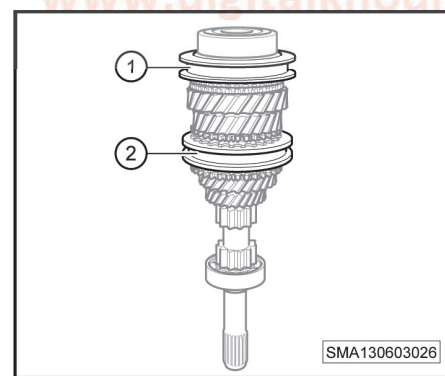
3.1 Disassembling the input shaft

Maintenance tools and common equipment

 SMA130603062	 SMA130603063
Gear retaining tool	Gear retaining tool
 SMA130603064	
Hydraulic press	

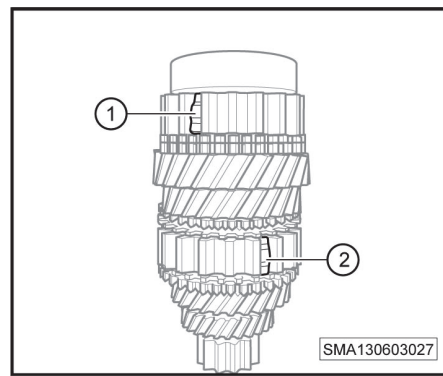
Disassembly

1. Remove the input shaft => refer to page 920.
2. Remove the 5th gear synchronizer outer ring (-1-).
3. Remove the 3rd and 4th gear synchronizer outer ring (-2-).

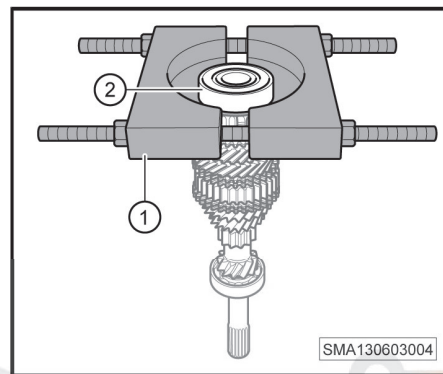


06 - Power Drive Train

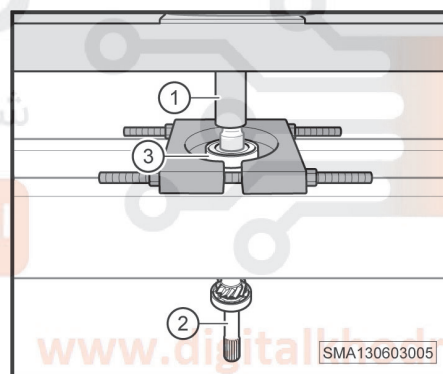
4. Remove the 5th gear synchronizer cotter (-1-).
5. Remove the 3rd and 4th gear synchronizer cotter (-2-).



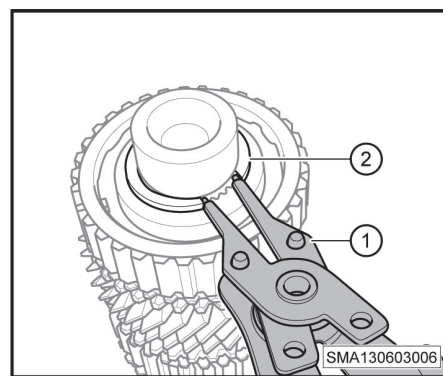
6. Fix the input shaft rear bearing (-2-) with the special tool (-1-).



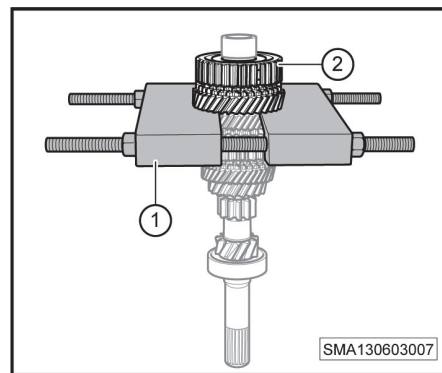
7. Press out the input shaft (-2-) with the hydraulic press (-1-).
8. Remove the input shaft rear bearing (-3-).



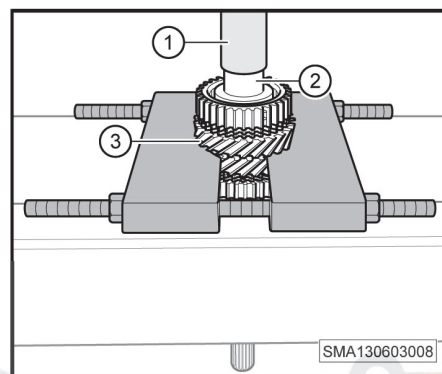
9. Remove the rear clamp spring (-2-) with the spring plier (-1-).



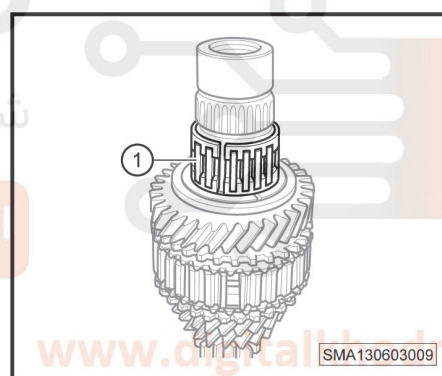
10. Fix the 5th gear driving gear (-2-) with the special tool (-1-).



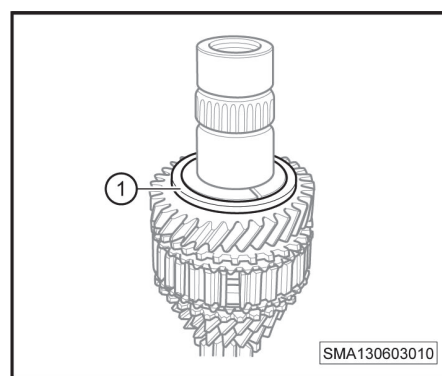
11. Press out the input shaft (-2-) with the hydraulic press (-1-).
12. Remove the 5th gear driving gear and the synchronizing gear (-3-).



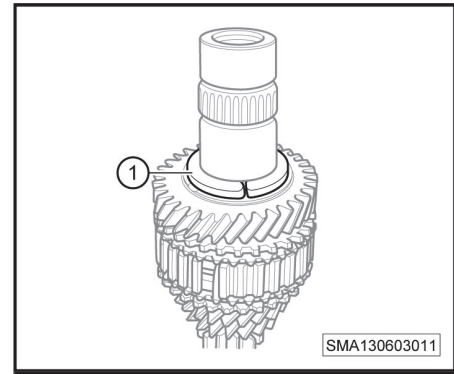
13. Remove the 5th gear needle bearing (-1-).



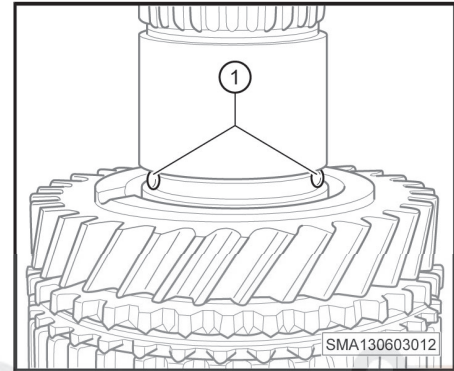
14. Remove the gear baffle clamp spring (-1-).



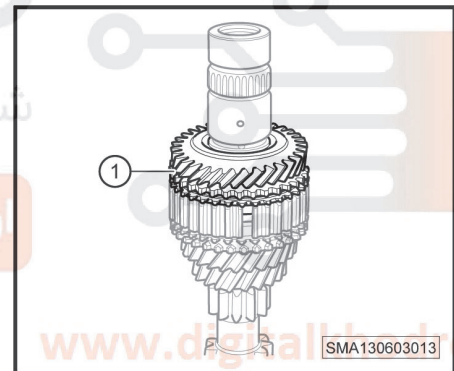
15. Remove the gear baffle (-1-).



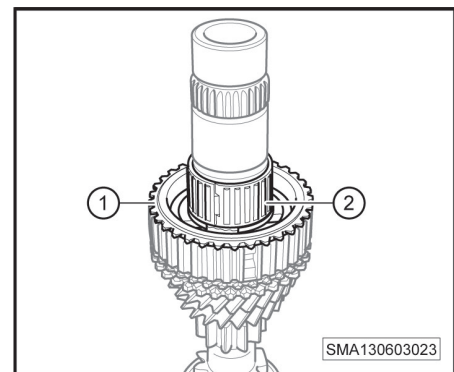
16. Remove the steel balls (-1-).



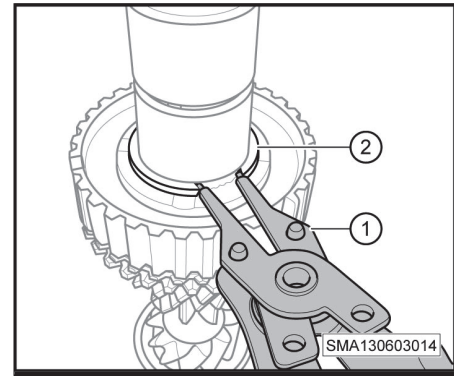
17. Remove the 4th speed gear (-1-).



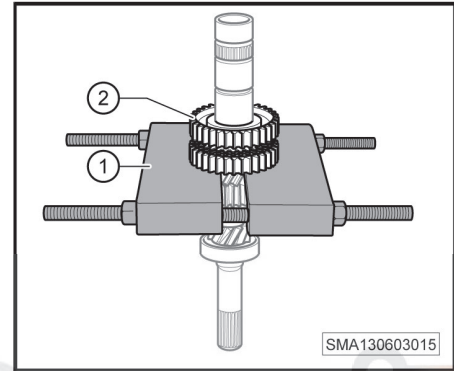
18. Remove the synchronizing ring (-1-) and the needle bearing (-2-).



19. Remove the front clamp spring (-2-) with the spring plier (-1-).

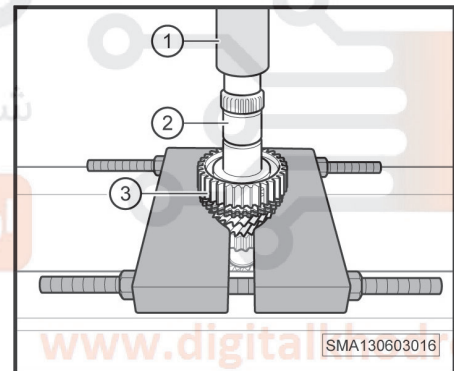


20. Fix the 3rd gear driving gear (-2-) with the special tool (-1-).

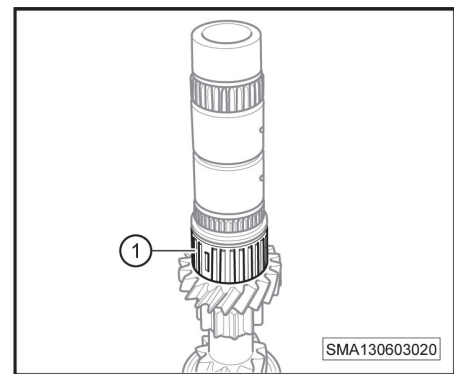


21. Press out the input shaft (-2-) with the hydraulic press (-1-).

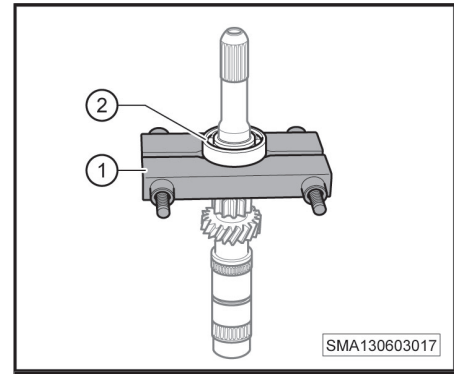
22. Remove the 3rd gear driving gear and the 3rd and 4th synchronizing gear (-3-).



23. Remove the 3rd gear needle bearing (-1-).

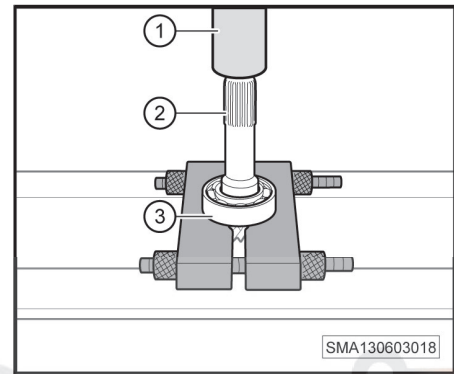


24. Fix the input shaft front bearing (-2-) with the special tool (-1-).



25. Press out the input shaft (-2-) with the hydraulic press (-1-).

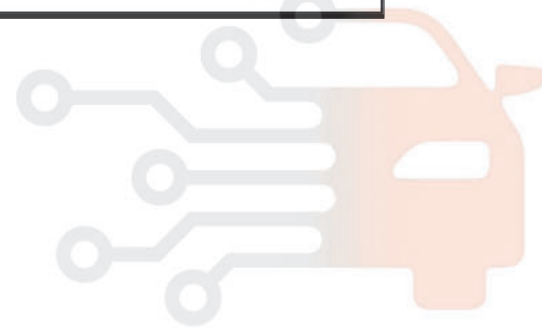
26. Remove the input shaft front bearing (-3-).



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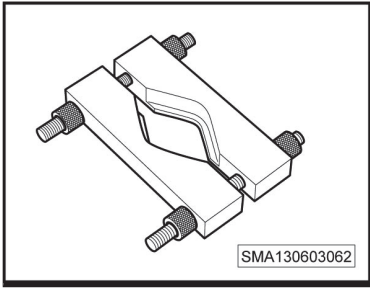
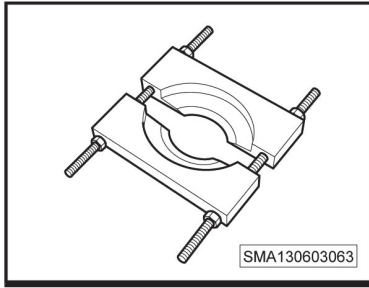
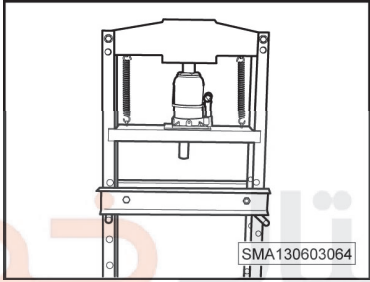


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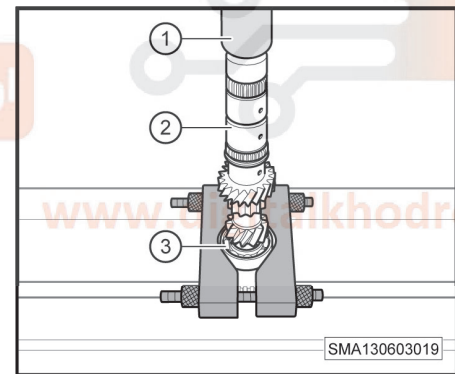
3.2 Assembling the input shaft

Maintenance tools and common equipment

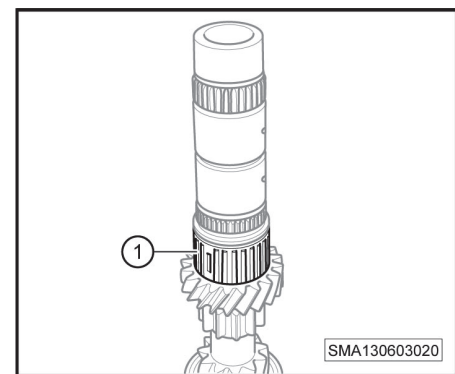
 SMA130603062	 SMA130603063
Gear retaining tool	Gear retaining tool
 SMA130603064	
Hydraulic press	

Assembly

1. Press the input shaft (-2-) into the input shaft front bearing (-3-) with the press (-1-).

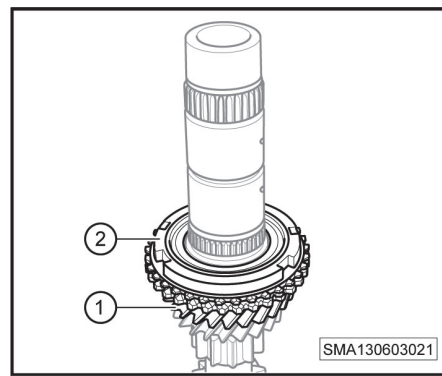


2. Install the 3rd gear needle bearing (-1-).

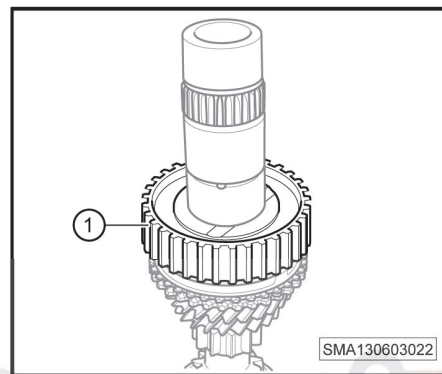


06 - Power Drive Train

3. Install the 3rd gear driving gear (-1-) and the 3rd gear synchronizing ring (-2-).

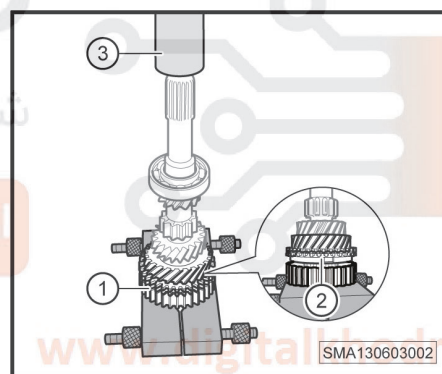


4. Install the 3rd and 4th gear synchronizing gear (-1-).

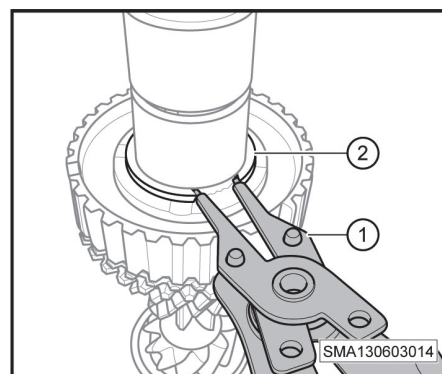


5. Press the 3rd and 4th gear synchronizing gear (-1-) into the input shaft with the hydraulic press (-3-).

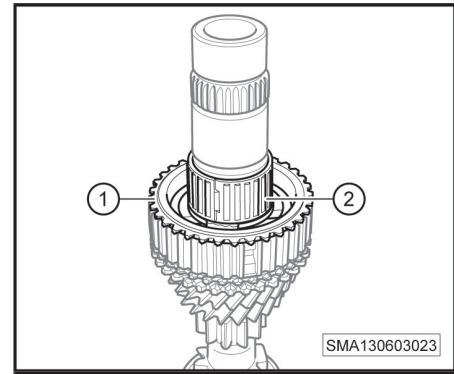
6. When pressing the synchronizing gear, avoid the 3rd gear driving gear (-2-) from disengagement.



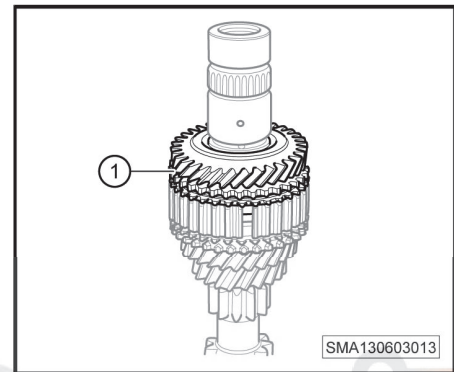
7. Install the front clamp spring (-2-) onto the input shaft with the spring plier (-1-).



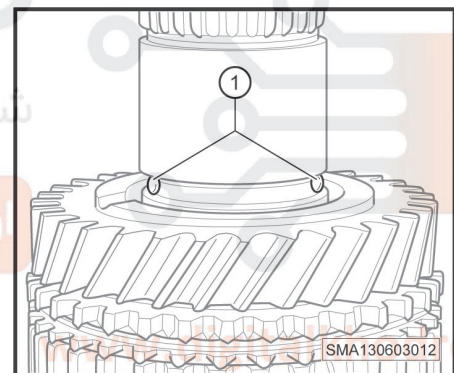
8. Install the 4th gear synchronizing ring (-1-) and the 4th gear needle bearing (-2-).



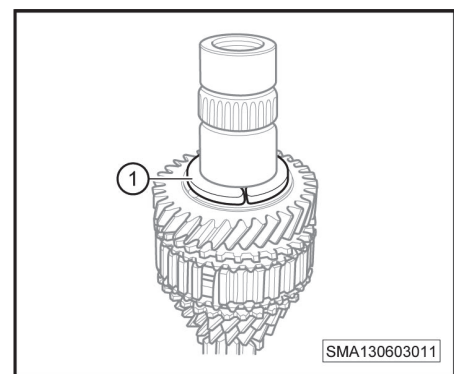
9. Install the 4th gear driving gear (-1-).



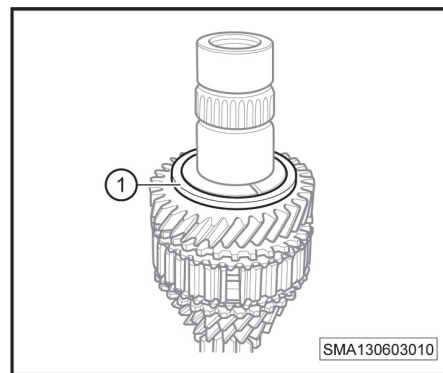
10. Install the steel balls (-1-) to the input shaft.



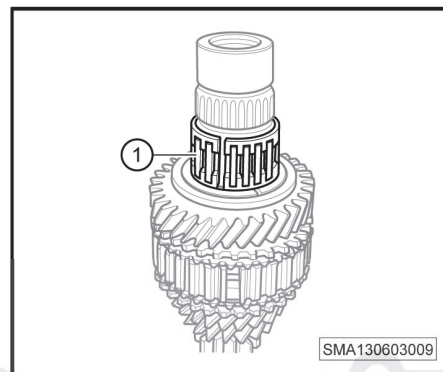
11. Install the gear baffle (-1-).



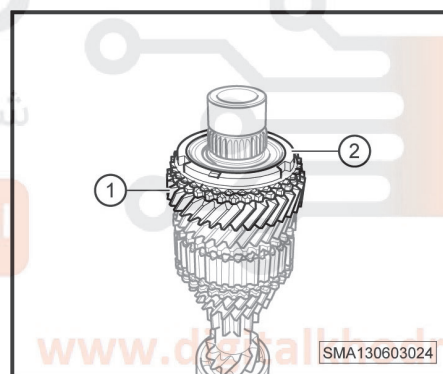
12. Install the gear baffle clamp spring (-1-).



13. Install the 5th gear needle bearing (-1-).

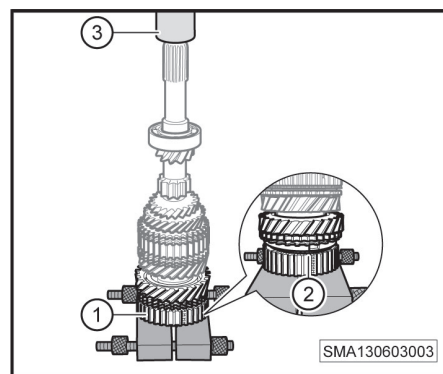


14. Install the 5th speed gear (-1-) and the 5th gear synchronizing ring (-2-).

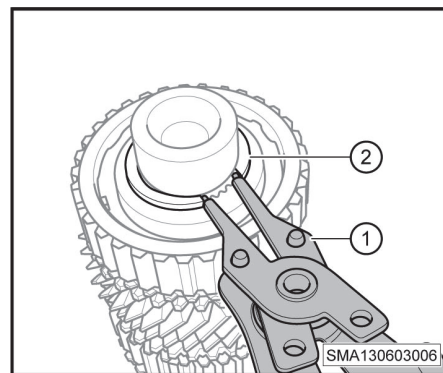


15. Press the 5th gear synchronizing gear (-1-) into the input shaft with the hydraulic press (-3-).

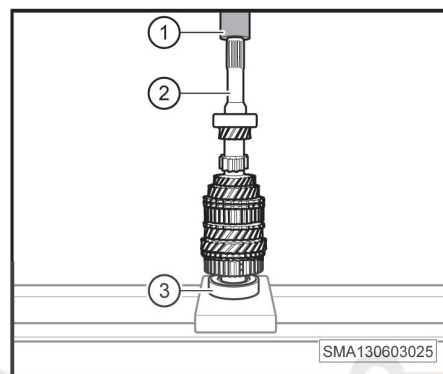
16. When pressing the synchronizing gear, avoid the 5th speed gear (-2-) from disengagement.



17. Install the rear clamp spring (-2-) with the spring plier (-1-).

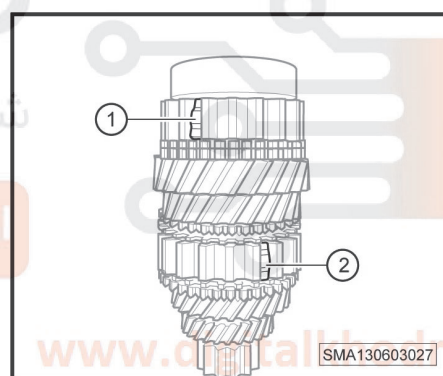


18. Press the input shaft (-2-) into the input shaft rear bearing (-3-) with the hydraulic press (-1-).



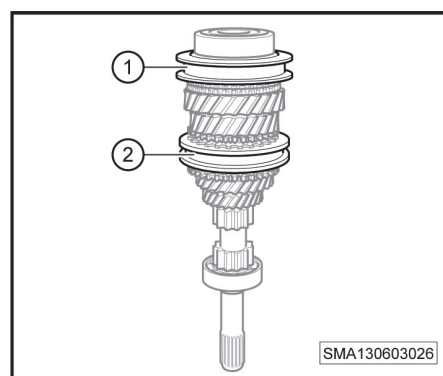
19. Install the 5th gear synchronizer cotter (-1-).

20. Install the 3rd and 4th gear synchronizer cotter (-2-).



21. Install the 5th gear synchronizer outer ring (-1-).

22. Install the 3rd and 4th gear synchronizer outer ring (-2-).



i Note

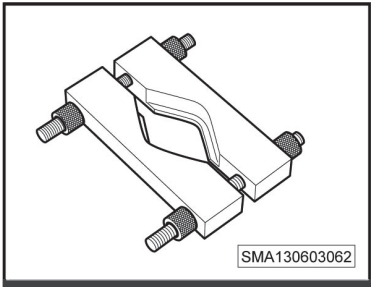
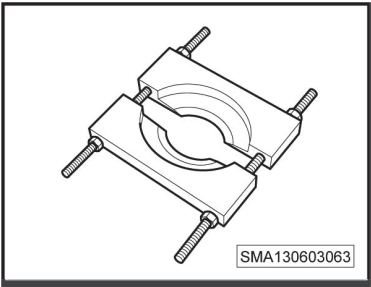
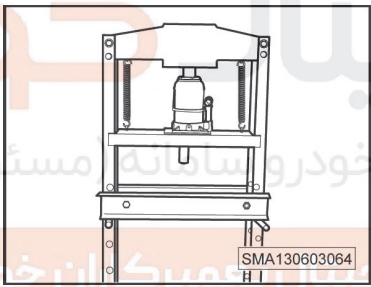
- After installation, check the gears on the input shaft for rotation smoothness.

4 Output Shaft

4.1 Disassembling the output shaft	952
4.2 Assembling the output shaft.....	957

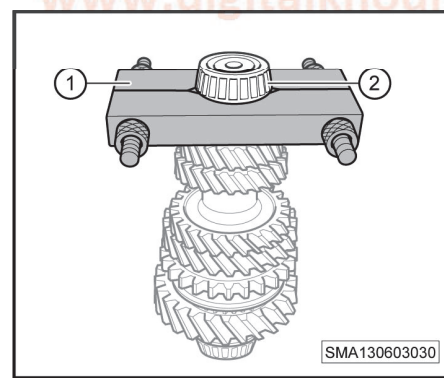
4.1 Disassembling the output shaft

Maintenance tools and common equipment

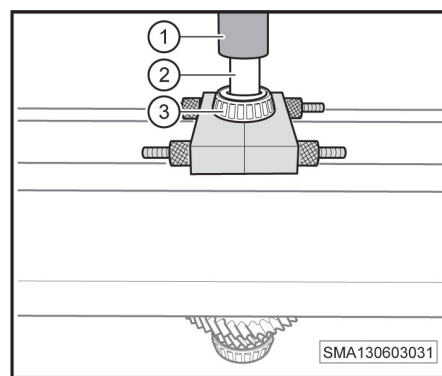
 SMA130603062	 SMA130603063
Gear retaining tool	Gear retaining tool
 SMA130603064	
Hydraulic press	

Disassembly

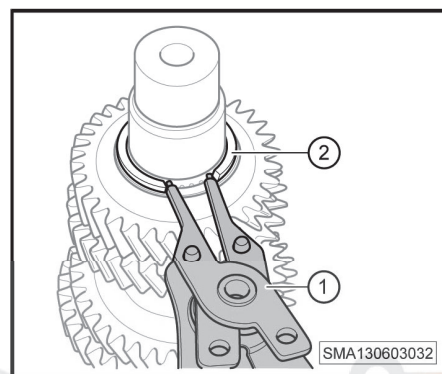
1. Remove the output shaft => refer to page 920.
2. Fix the output shaft rear bearing (-2-) with the special tool (-1-).



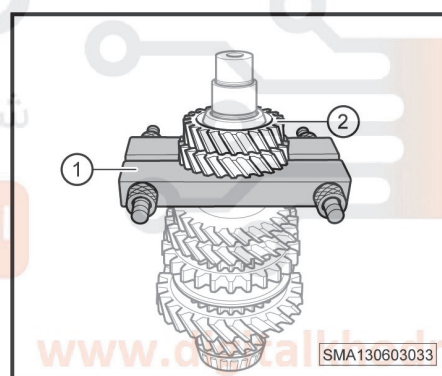
3. Press out the output shaft (-2-) with the hydraulic press (-1-) and remove the rear bearing (-3-).



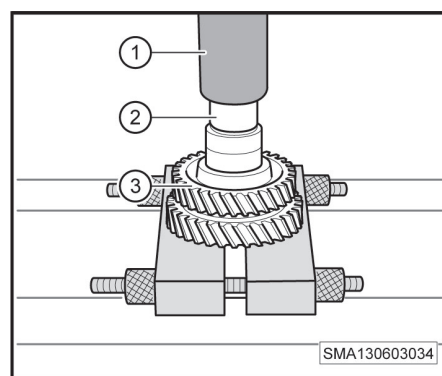
4. Remove the rear clamp spring (-2-) with the spring plier (-1-).



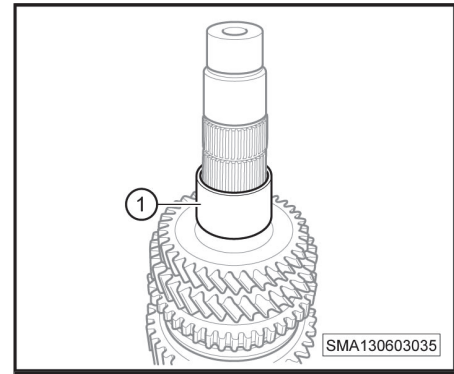
5. Fix the 4th and 5th gear driven gear set (-2-) with the special tool (-1-).



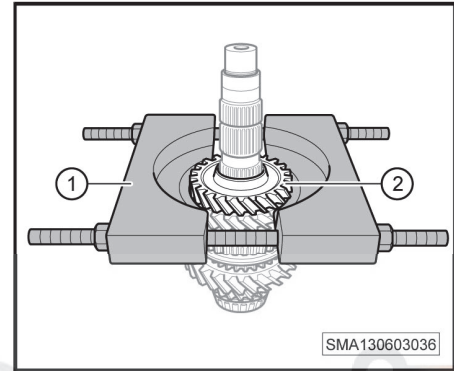
6. Press out the output shaft (-2-) with the hydraulic press (-1-).
7. Remove the 5th gear driven gear and the 4th gear driven gear (-3-).



8. Remove the gear ring spacer (-1-).

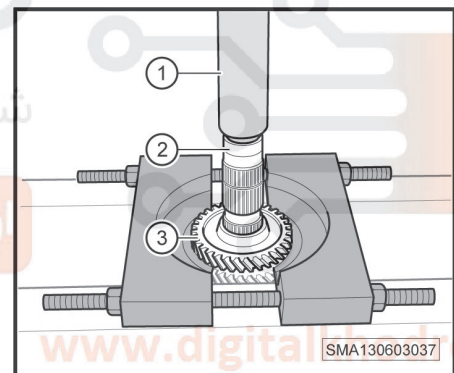


9. Fix the 3rd gear driven gear (-2-) with the special tool (-1-).

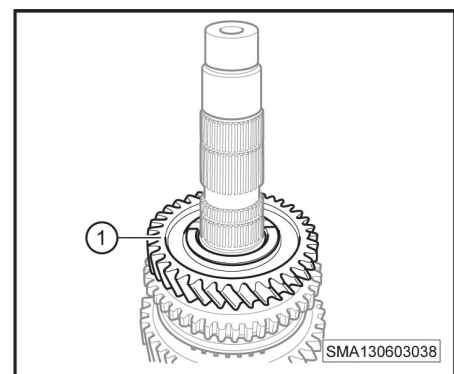


10. Press out the output shaft (-2-) with the hydraulic press (-1-).

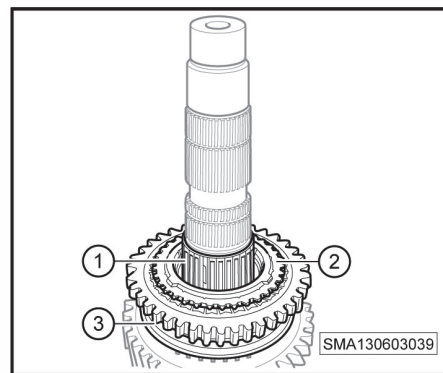
11. Remove the 3rd gear driven gear (-3-).



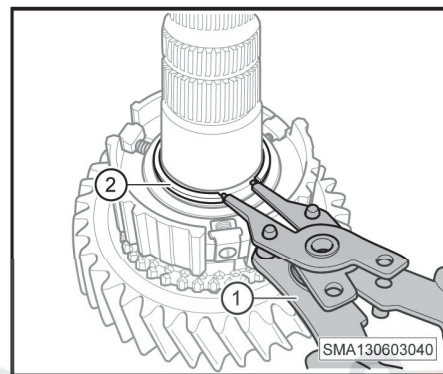
12. Remove the 2nd gear driven gear (-1-).



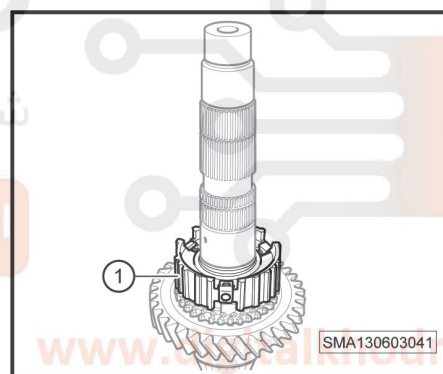
13. Remove the 2nd gear needle bearing (-1-) and the 2nd gear synchronizing ring (-2-).
14. Remove the 1st and 2nd gear synchronizer outer ring (-3-).



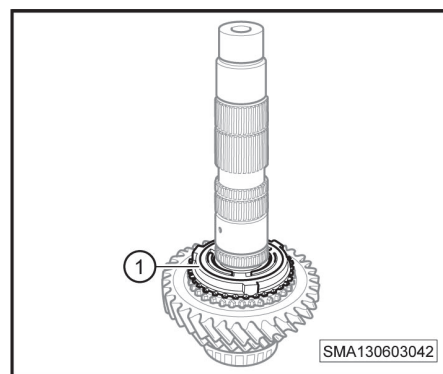
15. Remove the clamp spring (-2-) with the spring plier (-1-).



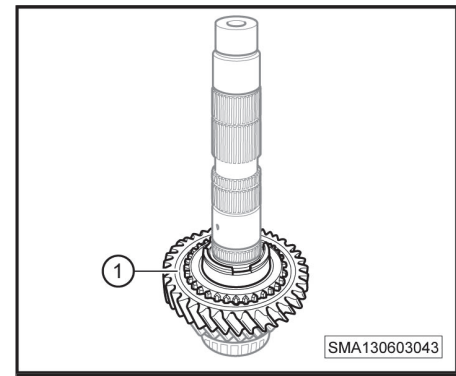
16. Remove the 1st and 2nd gear synchronizing gear (-1-).



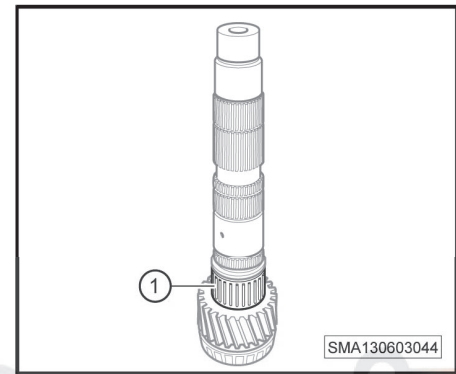
17. Remove the 1st gear synchronizing ring assembly (-1-).



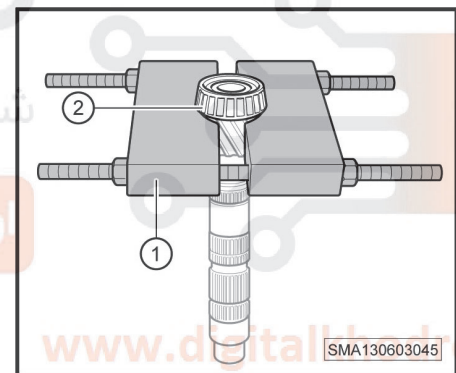
18. Remove the 1st gear driven gear (-1-).



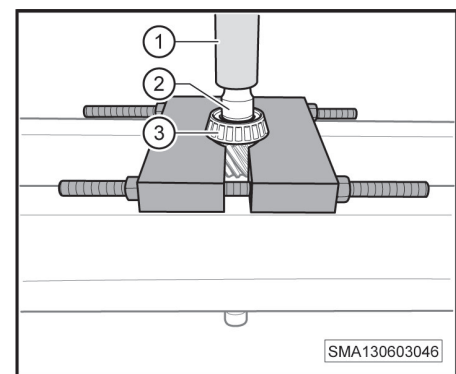
19. Remove the 1st gear needle bearing (-1-).



20. Fix the output shaft front bearing (-2-) with the tool (-1-).

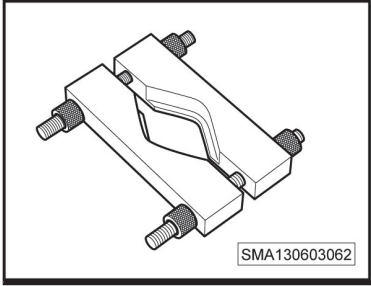
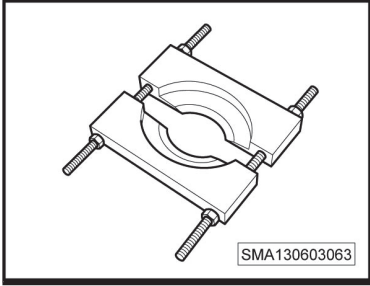
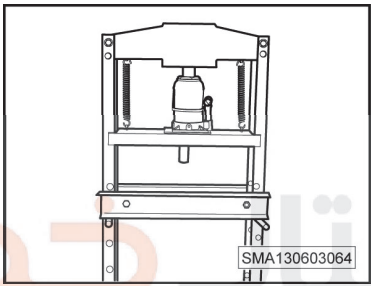


21. Press out the press tool (-2-) with the hydraulic press (-1-), and remove the front bearing (-3-).



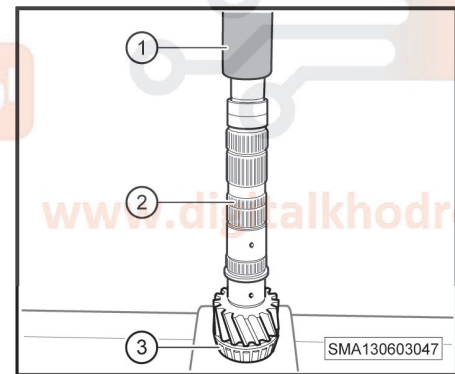
4.2 Assembling the output shaft

Maintenance tools and common equipment

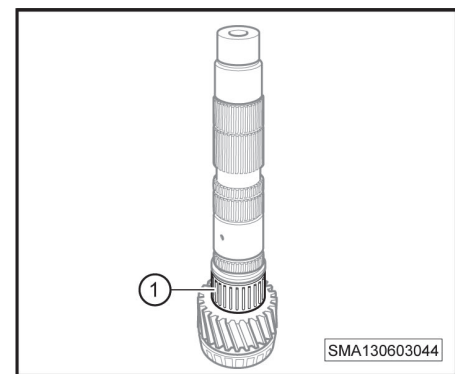
 SMA130603062	 SMA130603063
Gear retaining tool	Gear retaining tool
 SMA130603064	
Hydraulic press	

Assembly

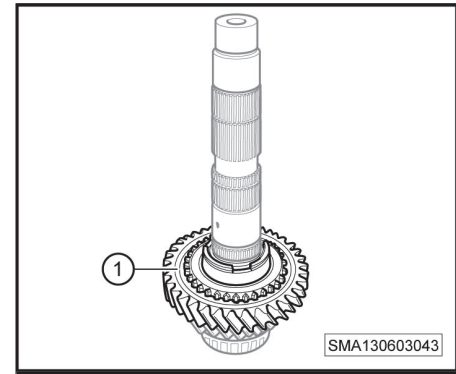
1. Install the bearing (-3-) to the output shaft (-2-) with the hydraulic press (-1-).



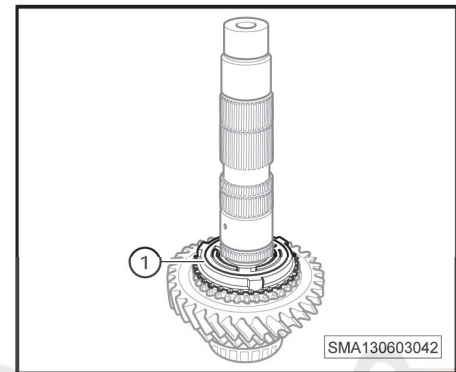
2. Install the 1st gear needle bearing (-1-).



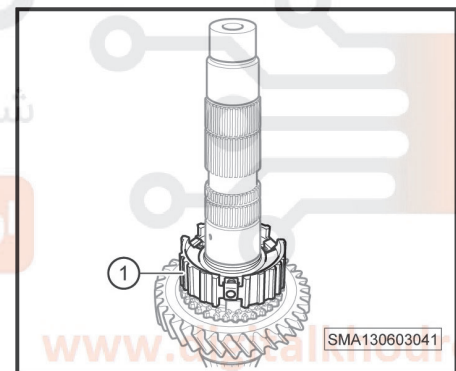
3. Install the 1st gear driven gear (-1-).



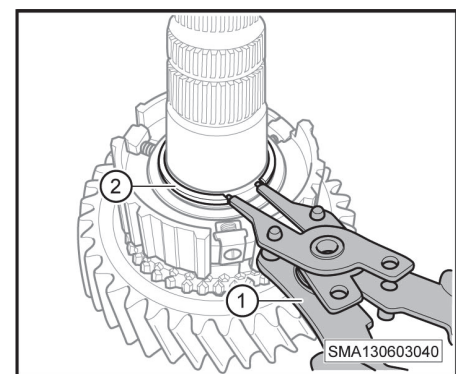
4. Install the 1st gear synchronizing ring assembly (-1-).



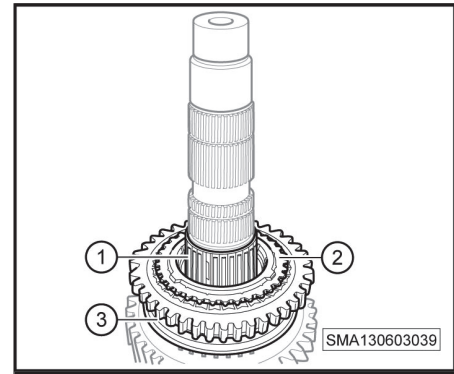
5. Install the 1st and 2nd gear synchronizing gear (-1-).



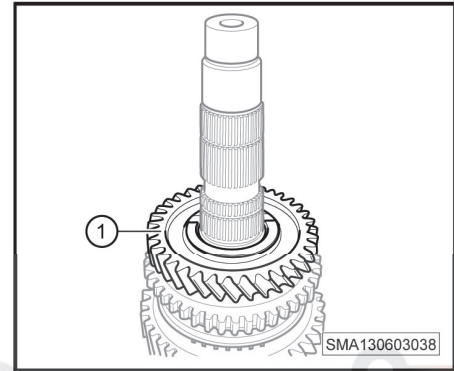
6. Install the front clamp spring (-2-) with the spring plier (-1-).



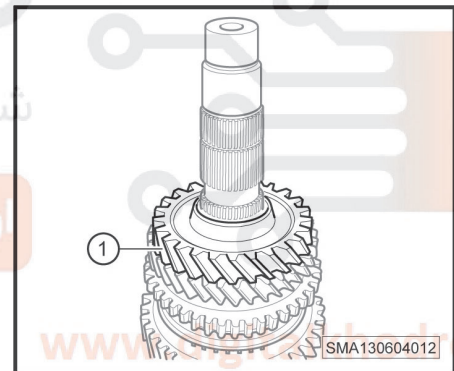
7. Install the 2nd gear needle bearing (-1-), the 2nd gear synchronizing ring assembly (-2-) and the 1st and 2nd gear synchronizer outer ring (-3-).



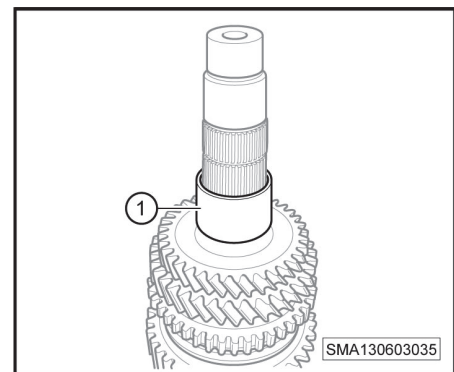
8. Install the 2nd gear driven gear (-1-).



9. Install the 3rd gear driven gear (-1-).

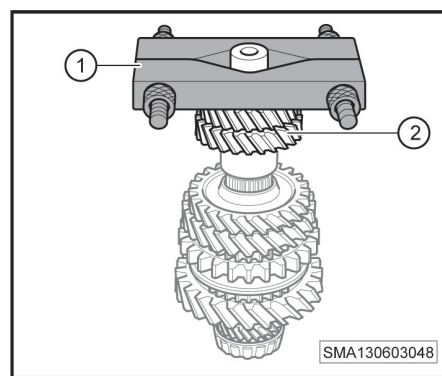


10. Install the gear bushing (-1-).

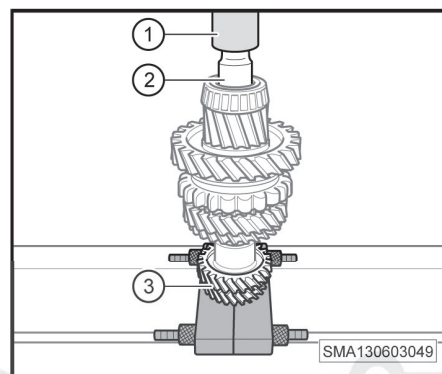


06 - Power Drive Train

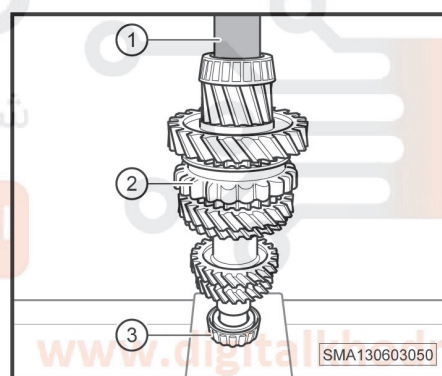
11. Install the 4th and 5th gear driven gear (-2-).
12. Fix it with the special tool (-1-).



13. Press in the output shaft (-2-) with the hydraulic press (-1-).
14. Install the 4th and 5th gear driven gear (-3-) into the output shaft.



15. Press in the output shaft (-2-) with the hydraulic press (-1-).
16. Install the output shaft rear bearing (-3-) into the output shaft.

**i Note**

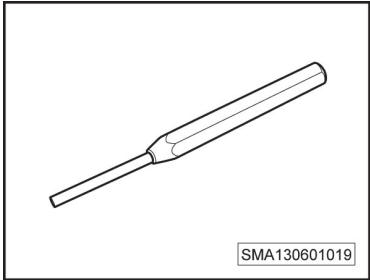
- After installation, check the gears on the output shaft for rotation smoothness.

5 Shift Fork

5.1 Removing and installing the shift fork.....961

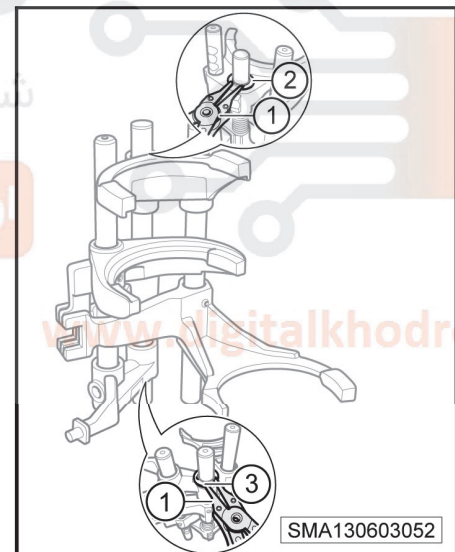
5.1 Removing and installing the shift fork

Maintenance tools and common equipment

	
Punch	

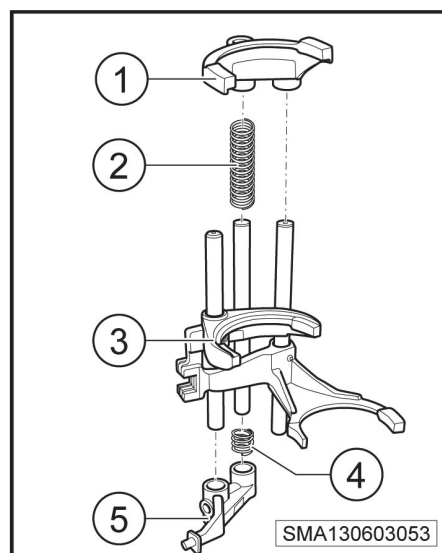
Removal

1. Remove the clamp springs (-2-) and (-3-) with the spring plier (-1-).

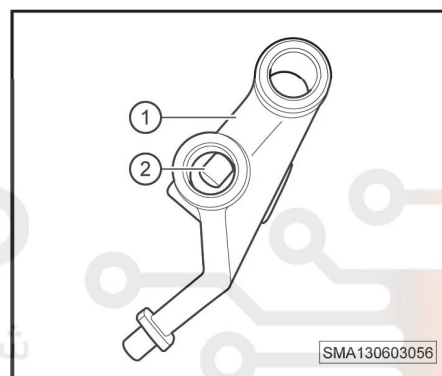


06 - Power Drive Train

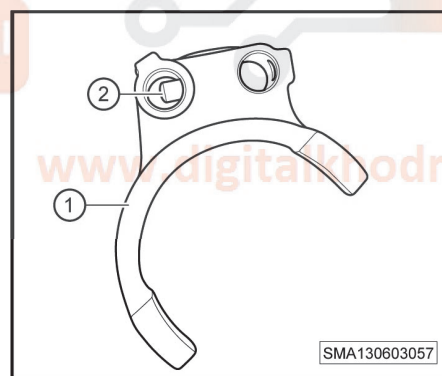
2. Remove the 5th gear fork (-1-) and the return spring (-2-).
3. Remove the reverse gear forks (-3-) and (-5-) and the return spring (-4-).



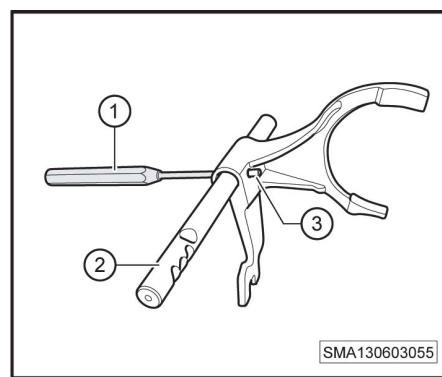
4. Remove the lock pin (-2-) from the reverse gear fork (-1-).



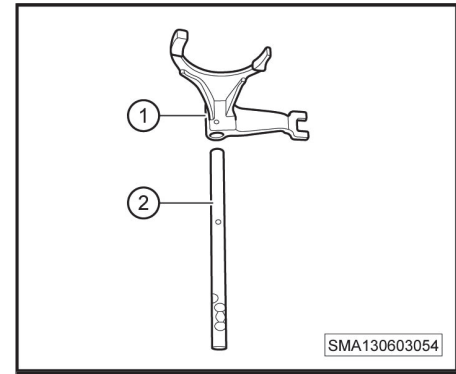
5. Remove the lock pin (-2-) from the 5th gear fork (-1-).



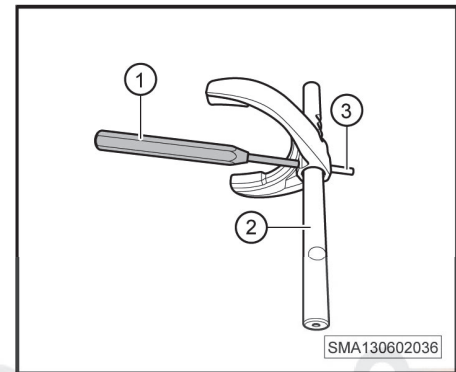
6. Knock out the dowel pin (-3-) from the shift shaft (-2-) with the punch (-1-).



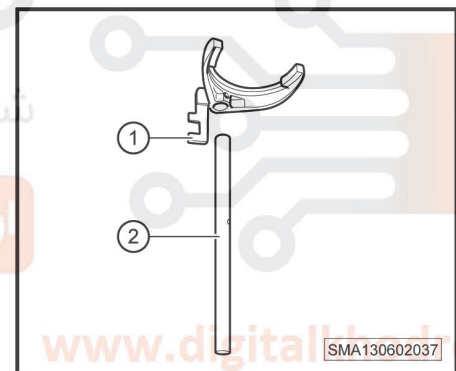
7. Separate the 3rd and 4th gear shift fork (-1-) from the shift shaft (-2-).



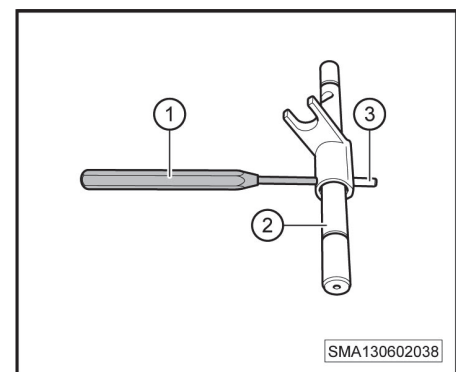
8. Knock out the dowel pin (-3-) from the shift shaft (-2-) with the punch (-1-).



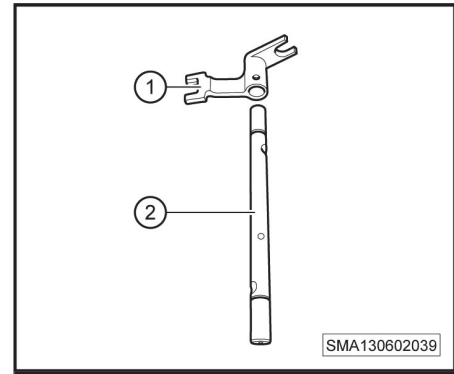
9. Separate the 1st and 2nd gear shift fork (-1-) from the shift shaft (-2-).



10. Knock out the dowel pin (-3-) from the shift shaft (-2-) with the punch (-1-).



11. Separate the fork (-1-) from the shift shaft (-2-).



Installation

Installation shall follow the reverse sequence of the removal procedure.

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



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