

0402 Steering System

1 General Information.....	644
2 Diagnosis and Inspection.....	648
3 Steering Column.....	650
4 Power Steering Gear.....	658
5 Power Steering Pump.....	662

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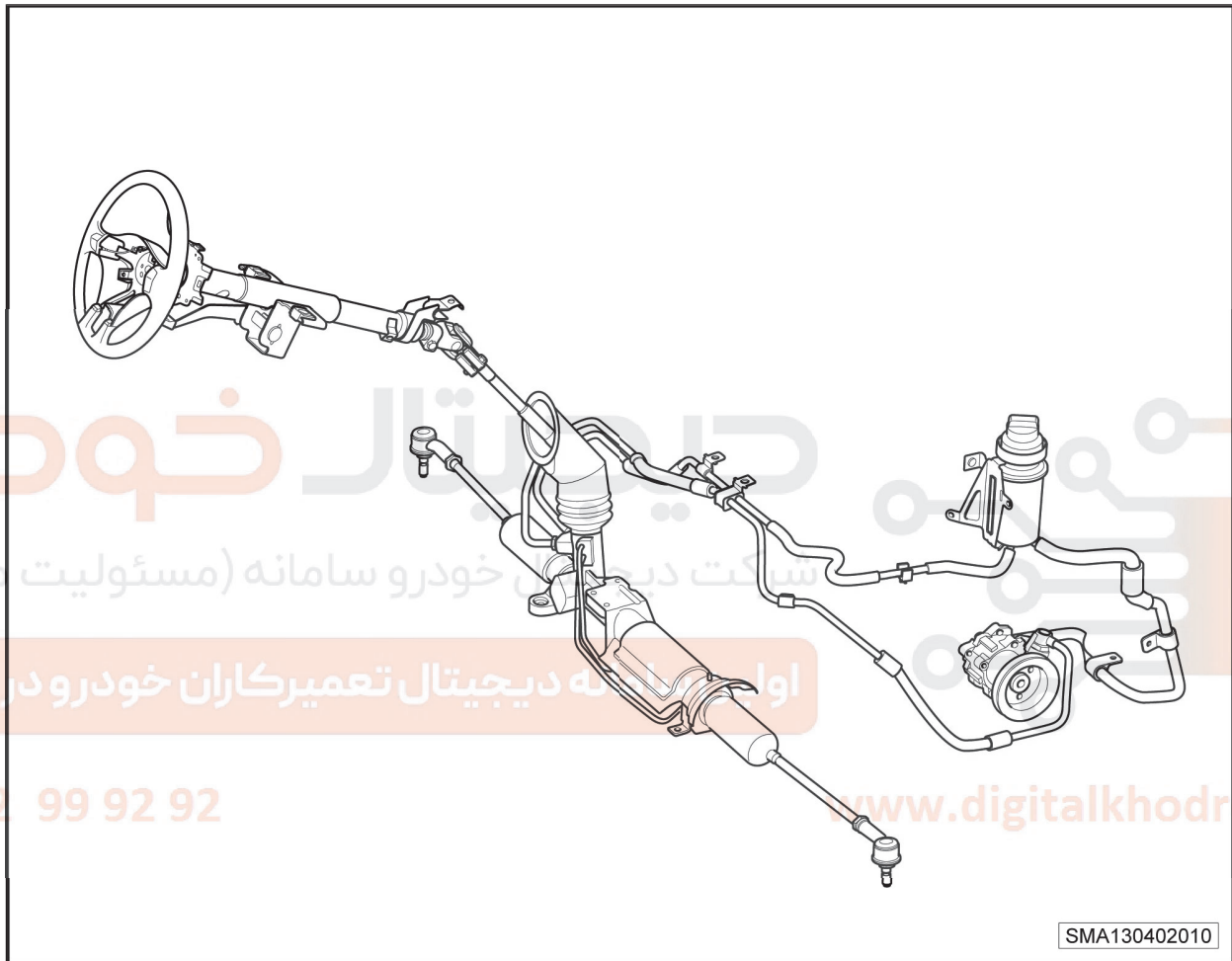
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1 General Information

1.1 Overview.....	644
1.2 Important notes.....	645
1.3 Product specifications.....	646
1.4 The steering system assembly drawing.....	647

1.1 Overview



- This model features the hydraulic power steering system, which can reduce the work load when the driver operates the steering wheel and enhance the operating convenience and driving safety.
- The power steering gear comes with the hydraulic rack-and-pinion steering, a helical cylindrical gear structure with both ends linking to the tie rods. The structure features simple and compact construction and sensitive steering.
- The steering system consists of the following components:
 - a. Steering wheel
 - b. Steering column
 - c. Steering universal joint
 - d. Power steering gear assembly
 - e. Power steering fluid reservoir
 - f. Power steering pump
 - g. Steering system high pressure pipe
 - h. Steering system low pressure pipe

1.2 Important notes

- Please wear necessary protective articles during repair to avoid accidents.
- This vehicle is equipped with the driver airbag. Please follow the standard procedure to remove the steering wheel.
- When removing and installing parts around the thermal parts, you shall not operate until the thermal parts drop to normal temperature to avoid scald.
- Only use the power steering fluid approved by Chery Automobile Co., Ltd..
- The automatic transmission oil ATF-III is used as the power steering fluid.
- The power steering fluid pipe shall be sealed immediately after disconnection to prevent foreign matters from getting in.
- Human body shall avoid contacting with the power steering fluid when removing the steering system.
- The status shall last no longer than ten seconds when the steering wheel turns to its limit position.
- Never operate the power steering pump when lack of power steering fluid.

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1.3 Product specifications

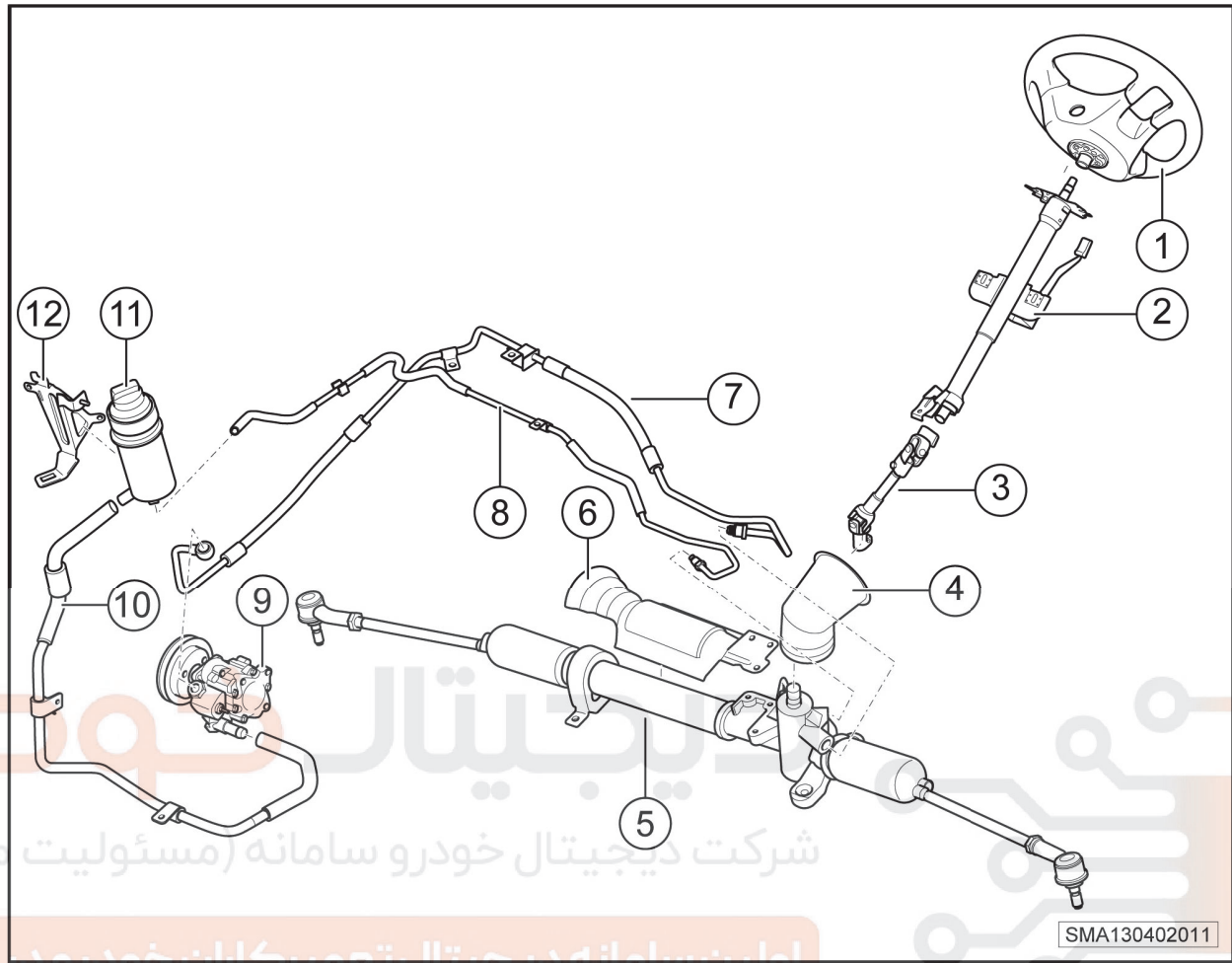
Torque specifications

Component	Torque (N·m)
Assembling bolt of the power steering gear assembly	30±3
Fixing bolt of the steering wheel	35±5
Fixing bolt of the power steering pump mounting bracket	50±5
Coupling nut between the steering column and the cross car beam	25±3
Hollow bolt of the power steering pump	45±5
Lock nut of the steering gear tie rod ball joint	35±4
Tension adjustment bolt of the power steering pump belt	25±2
Fixing bolt of the power steering pump bracket	25±2
Fixing bolt of the power steering gear heat shield	25±3
Fixing nut of the power steering gear heat shield	8±1

Power steering fluid specifications

Component	Model
Power steering fluid	ATF-III

1.4 The steering system assembly drawing



SMA130402011

1. Steering wheel	2. Steering column
3. Universal joint assembly	4. Universal joint assembly shield
5. Power steering gear	6. Power steering gear heat shield
7. Power steering pump high pressure pipe	8. Power steering gear return pipe
9. Power steering pump	10. Power steering pump suction pipe
11. Power steering fluid reservoir	12. Mounting bracket of the power steering fluid reservoir

2 Diagnosis and Inspection

2.1 Steering system fault diagnosis list.....648
 2.2 Checking the steering system.....649

2.1 Steering system fault diagnosis list

Item	Possible causes	Troubleshooting
Heavy steering	Low steering gear tire pressure	Adjust the tire pressure to the standard value
	Misaligned front wheels	Check and adjust the front wheel alignment
	Lack of power steering fluid	Add power steering fluid
	Looseness of the power steering pump poly V-belt	Adjust the poly V-belt
	Severe wear of the power steering pump poly V-belt	Replace the poly V-belt
	Leakage or blockage of the power steering fluid pipe	Replace the power steering fluid pipe
	Failure of the power steering pump	Replace the power steering pump
	Failure of the power steering gear	Replace the power steering gear
Abnormal noise of the steering system	Looseness of the steering linkage	Tighten the steering system
	Damage to the power steering pump poly V-belt	Replace the poly V-belt
	Failure of the power steering gear	Replace the power steering gear
	Failure of the power steering pump	Replace the power steering pump
Poor wheel returnability	Failure of the power steering gear universal joint assembly	Replace the power steering gear universal joint assembly
	Low steering gear tire pressure	Adjust the tire pressure to the standard value
	Misaligned front wheels	Check and adjust the front wheel alignment
Excessive steering wheel clearance	Failure of the power steering gear	Replace the power steering gear
	Wear or looseness of the ball joint	Replace the ball joint
	Wear of the front wheel bearing	Replace the bearing
	Failure of the power steering gear universal joint assembly	Replace the power steering gear universal joint assembly
	Failure of the power steering gear	Replace the power steering gear

2.2 Checking the steering system

Basic items

1. Check all fixing bolts of the steering system for looseness. Tighten them if necessary.
2. Check the steering wheel for clearance. If there is, please check and adjust the steering wheel.

Checking the steering tie rods

1. Check the tie rod ball joint for looseness. If there is, please replace the ball joint.
2. Check the dust cover of the tie rod ball joint for damage. If there is, please replace the dust cover.

Checking the power steering gear

1. Check the power steering gear dust cover for breakage. If there is, please replace the dust cover; otherwise, water and dust is prone to get in and damage the parts earlier.
2. Check the power steering gear for damage. If there is, please replace the power steering gear.

Checking the power steering pump

1. Check the power steering pump for blockage. If there is, please replace the power steering pump.
2. Check the power steering pump bearing for abnormal noise. If there is, please replace the power steering pump bearing.
3. Check the steering system pipeline for leakage. If there is, please replace the steering system pipeline.



3 Steering Column

3.1 Removing and installing the steering wheel.....650
 3.2 Removing and installing the steering column cover.....653
 3.3 Removing and installing the steering column.....654

3.1 Removing and installing the steering wheel

i Note

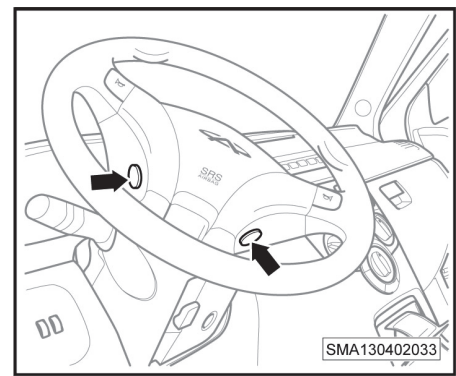
- This vehicle is equipped with the driver airbag. Please follow the standard procedure to remove the steering wheel.
- Before removing the steering wheel, use a marking pen to mark on the engaged teeth between the steering column and the steering wheel for match.
- When removing the steering wheel, never knock the steering wheel or the steering column shaft.

Maintenance tools and common equipment

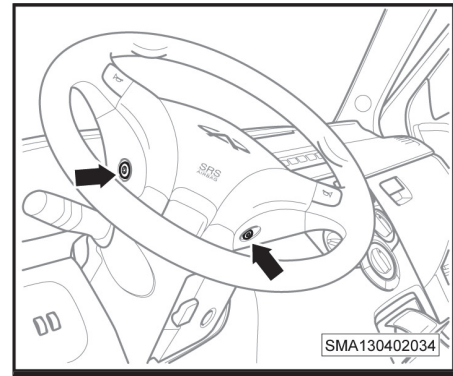


Removal

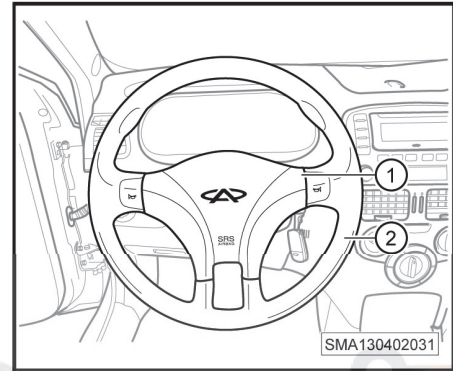
1. Switch off all electrical equipment and the ignition switch.
2. Disconnect the battery negative cable.
3. Remove the fixing bolt decorative caps of the driver airbag (-arrow-).



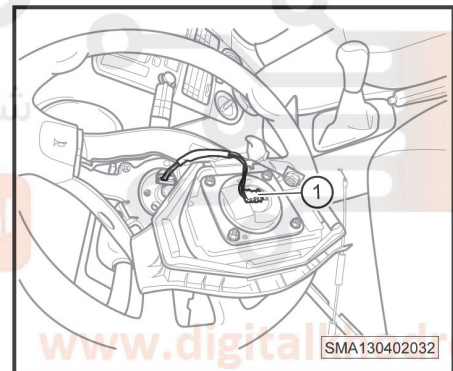
4. Unscrew the fixing bolts of the driver airbag (-arrow-).
 - Tightening torque of the bolt: 25 ± 3 N*m



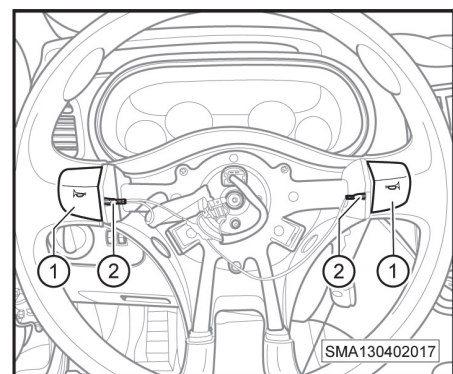
5. Remove the driver airbag (-1-) from the steering wheel (-2-).



6. Disconnect the driver airbag connector (-1-).



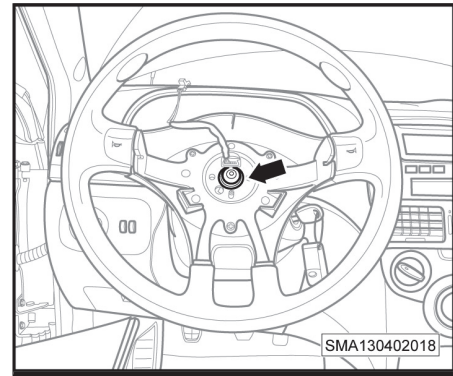
7. Disconnect the connectors (-2-) of the horn buttons (-1-).



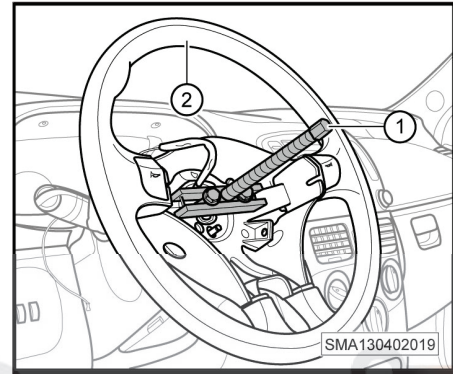
8. Turn the steering wheel to the mean position (the wheels are in the straight running position).

04 - Chassis

9. Unscrew the fixing nut of the steering wheel (-arrow-).
 - Tightening torque of the nut: $35\pm 5 \text{ N}\cdot\text{m}$



10. Rotate the puller screw (-1-) and pull out the steering wheel (-2-).



Installation

Installation shall follow the reverse sequence of the removal procedure. Please pay attention to the following notes:

- Tighten the fixing bolts with the specified torque.
- Install the steering wheel according to the match marks on the engaged teeth between the steering column and the steering wheel.

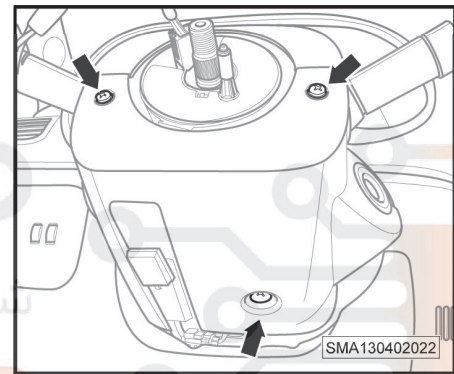
3.2 Removing and installing the steering column cover

i Note

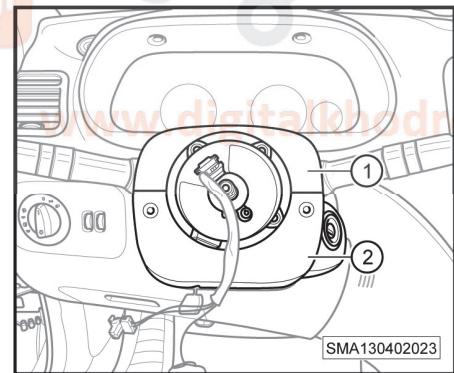
- This vehicle is equipped with the driver airbag. Please follow the standard procedure to remove the steering wheel.
- Before removing the steering wheel, use a marking pen to mark on the engaged teeth between the steering column and the steering wheel for match.
- When removing the steering wheel, never knock the steering wheel or the steering column shaft.

Removal

1. Switch off all electrical equipment and the ignition switch.
2. Disconnect the battery negative cable.
3. Remove the steering wheel. => refer to page 650
4. Unscrew the assembling bolts of the steering wheel cover (-arrow-).



5. Separate the steering column cover (-1-) from (-2-) and remove them.



Installation

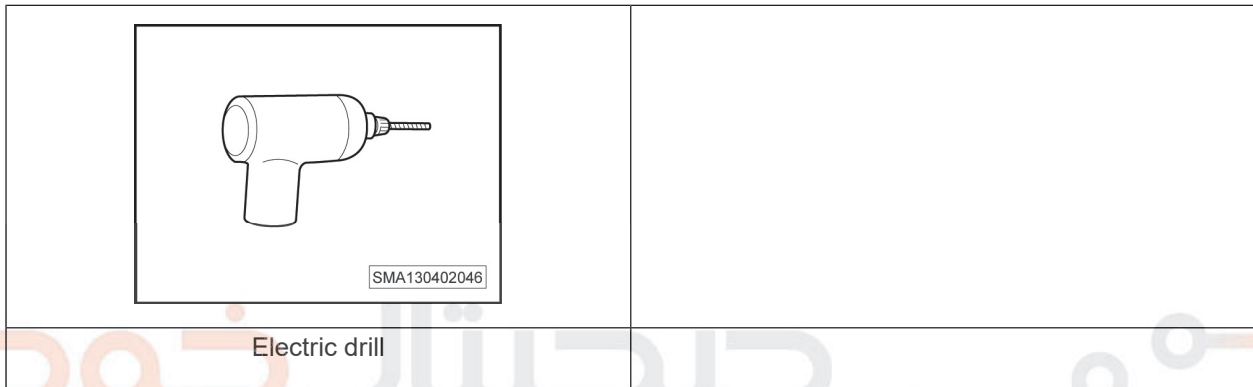
Installation shall follow the reverse sequence of the removal procedure.

3.3 Removing and installing the steering column

i Note

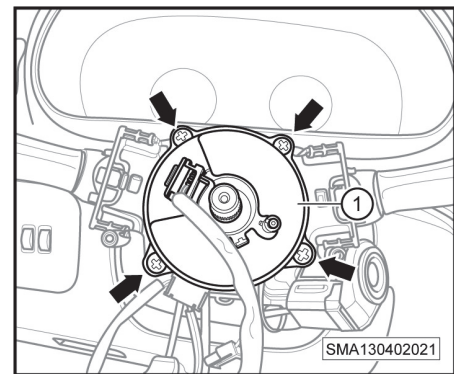
- This vehicle is equipped with the driver airbag. Please follow the standard procedure to remove the steering wheel.
- Before removing the steering wheel, use a marking pen to mark on the engaged teeth between the steering column and the steering wheel for match.
- When removing the steering wheel, never knock the steering wheel or the steering column shaft.

Maintenance tools and common equipment



Removal

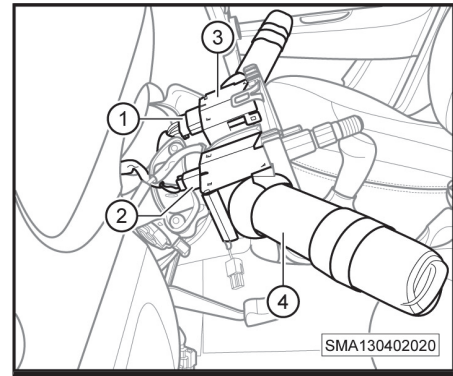
1. Switch off all electrical equipment and the ignition switch.
2. Disconnect the battery negative cable.
3. Remove the steering wheel. => refer to page 650
4. Remove the steering column cover. => refer to page 653
5. Remove the lower dashboard on the driver's side. => refer to page 832
6. Unscrew the inner ring fixing bolts (-arrow-) and remove the inner ring (-1-).



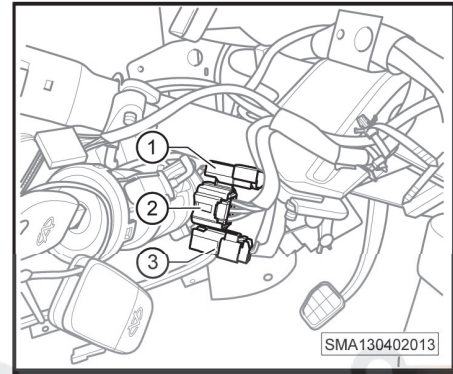
i Note

- Never disassemble or repair the inner ring.

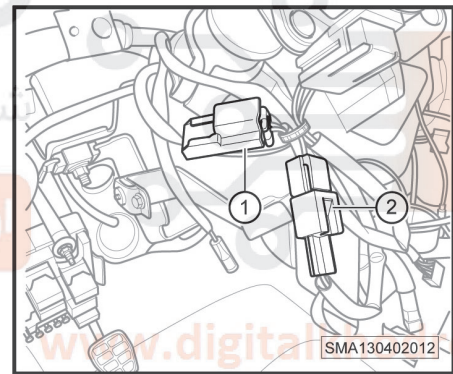
7. Disconnect the wiper combination switch connector (-1-) and the light combination switch (-2-), and remove the wiper combination switch (-3-) and the light combination switch (-4-).



8. Disconnect the ignition lock connectors (-1-), (-2-) and (-3-).

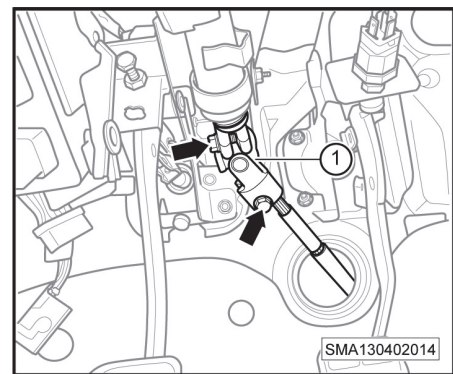


9. Disconnect the driver airbag wiring harness connector (-1-) and the horn wiring harness (-2-).



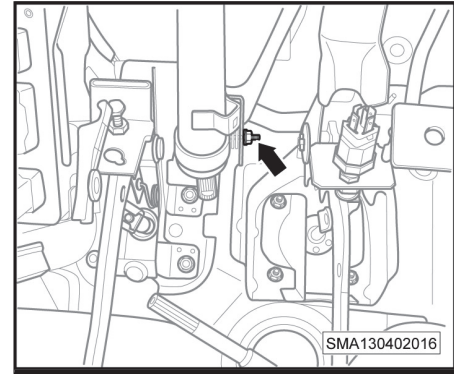
10. Unscrew the assembling bolts of the steering universal joint (-arrow-) and remove the steering universal joint (-1-).

- Tightening torque of the bolt: $25 \pm 3 \text{ N}\cdot\text{m}$

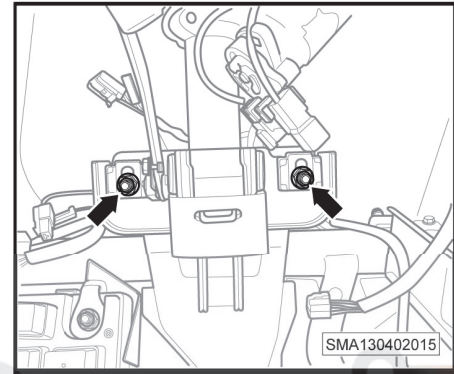


04 - Chassis

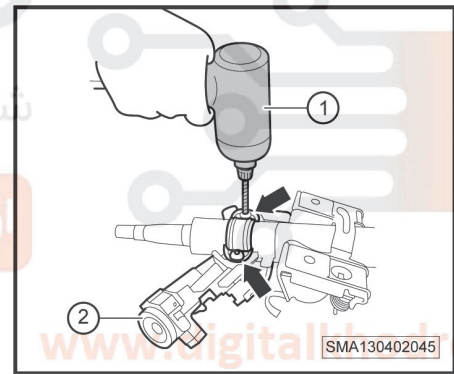
11. Unscrew the coupling nut between the steering column and the cross car beam (-arrow-).
- Tightening torque of the nut: $25 \pm 3 \text{ N}\cdot\text{m}$



12. Unscrew the coupling nuts between the steering column and the cross car beam (-arrow-) and remove the steering column.
- Tightening torque of the nut: $25 \pm 3 \text{ N}\cdot\text{m}$



13. Carefully drill out the fixing bolts (-arrow-) of the ignition lock (-2-) with an electric drill (-1-) and remove the ignition lock (-2-).



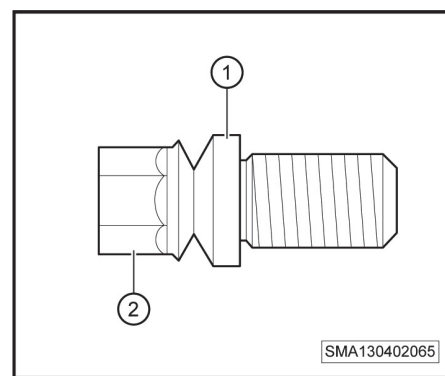
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Installation

Installation shall follow the reverse sequence of the removal procedure. Please pay attention to the following notes:

- Tighten the fixing bolts with the specified torque.
- Please follow the standard procedure to avoid damaging the ignition lock.
- Before installing the steering wheel, adjust the front wheel to the straight running position.
- When installing the inner ring, turn it to the limit position clockwise and then turn it 3.2 circles anticlockwise to make the arrow mark on the spiral cable aligning with the arrow mark on the inner ring housing .

- Install the fixing bolt of the ignition lock (-1-) and unscrew it until the hexagon head (-2-) falls off.



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4 Power Steering Gear

4.1 Removing and installing the power steering gear.....658
 4.2 Removing and installing the power steering gear tie rod ball joint.....660

4.1 Removing and installing the power steering gear

i Note

- Block the disconnected power steering fluid pipe with a stopper to prevent foreign matters from getting in.
- When disconnecting the pipe, recover the fluid in the pipe with a collection vessel to avoid polluting the vehicle and environment.
- Only use the power steering fluid approved by Chery Automobile Co., Ltd..

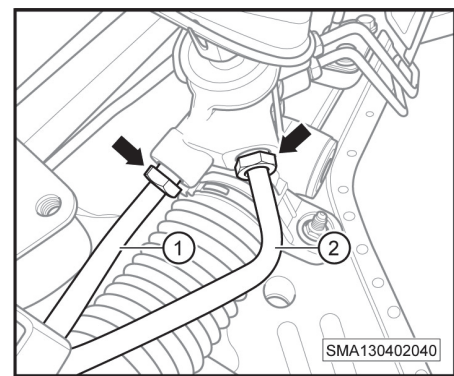
Maintenance tools and common equipment

 <p>SMA130401043</p>	
Ball joint separator	

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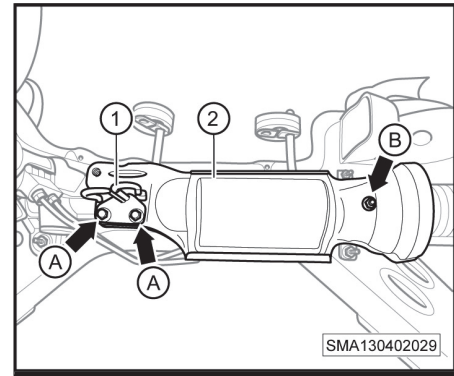
Removal

1. Switch off all electrical equipment and the ignition switch.
2. Disconnect the battery negative cable.
3. Discharge the power steering fluid .=> refer to page 40
4. Remove the front subframe .=> refer to page 624
5. Unscrew the fixing nuts (-arrow-) of the power steering fluid pipes (-1-) and (-2-).
 - Tightening torque of the nut: $35\pm 3 \text{ N}\cdot\text{m}$



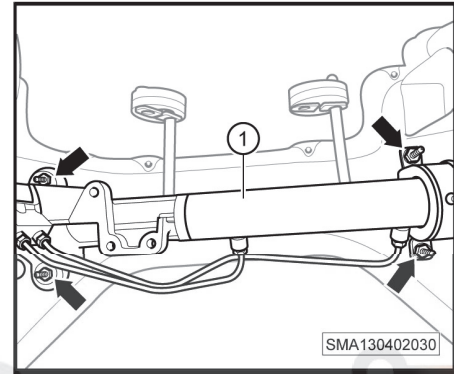
6. Unscrew the bolts (-arrow A-) and remove the hook (-1-). Unscrew the fixing nut (-arrow B-) of the power steering gear heat shield (-2-) and remove the heat shield (-2-).

- Tightening torque of the bolt (-arrow A-): 25 ± 3 N•m
- Tightening torque of the bolt (-arrow B-): 8 ± 1 N•m



7. Unscrew the nuts of the power steering gear fixing bolts (-arrow-) and remove the power steering gear (-1-).

- Tightening torque of the nut: 30 ± 3 N•m



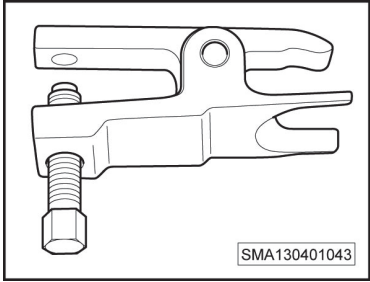
Installation

Installation shall follow the reverse sequence of the removal procedure. Please pay attention to the following notes:

- Tighten the fixing bolts with the specified torque.
- Refill the steering oil=> refer to page 40.
- After installation, check the wheel alignment. Adjust it if necessary .

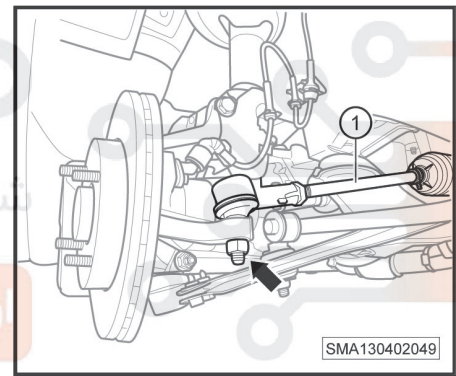
4.2 Removing and installing the power steering gear tie rod ball joint

Maintenance tools and common equipment

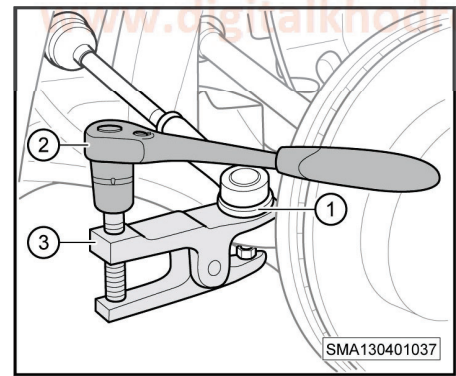
	
<p>Ball joint separator</p>	

Removal

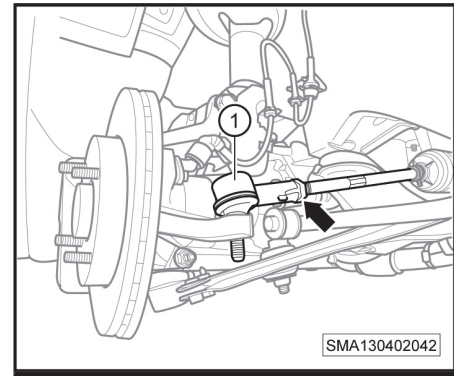
1. Remove the front wheels .=> refer to page 760
2. Loosen the lock nut (-arrow-) of the power steering gear tie rod (-1-).
 - Tightening torque of the nut: $35 \pm 4 \text{ N}\cdot\text{m}$



3. Install the ball joint separator (-3-) and tighten the screw of the ball joint separator with a wrench (-2-), and press out the tie rod ball (-1-) from the knuckle.



4. Unscrew the lock nut of the power steering gear tie rod (-arrow-) and remove the tie rod ball joint (-1-).
 - Tightening torque of the nut: $55 \pm 5 \text{ N}\cdot\text{m}$



Installation

Installation shall follow the reverse sequence of the removal procedure. Please pay attention to the following notes:

- Tighten the fixing bolts with the specified torque.
- After installation, check the wheel alignment. Adjust it if necessary .

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5 Power Steering Pump

5.1 Removing and installing the power steering pump.....	662
5.2 Removing and installing the power steering fluid reservoir.....	665
5.3 Removing and installing the steering system high pressure pipe.....	667
5.4 Removing and installing the steering system low pressure pipe.....	668
5.5 Checking and replacing the power steering fluid.....	671

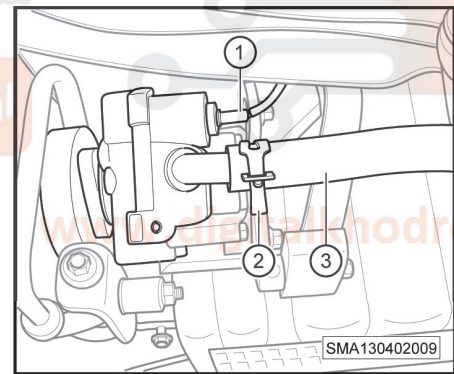
5.1 Removing and installing the power steering pump

i Note

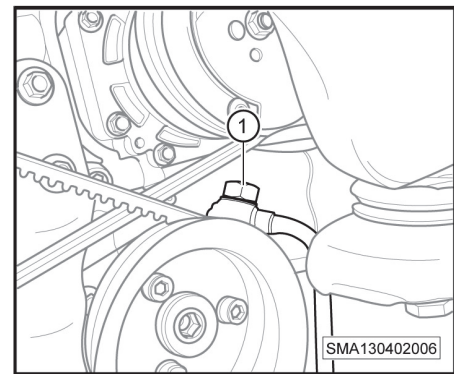
- Block the disconnected steering system pipeline with a stopper to prevent foreign matters from getting in.
- When disconnecting the pipe, recover the fluid in the pipe with a collection vessel to avoid polluting the vehicle and environment.
- Only use the power steering fluid approved by Chery Automobile Co., Ltd..

Removal

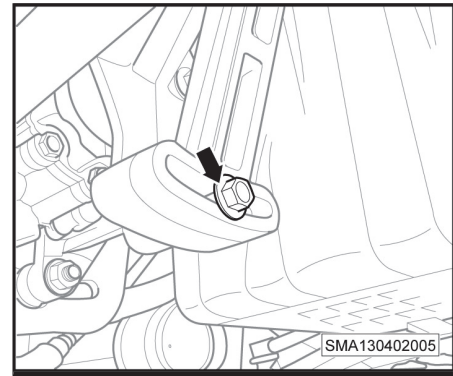
1. Switch off all electrical equipment and the ignition switch.
2. Discharge the power steering fluid .=> refer to page 40
3. Disconnect the power steering pump pressure switch connector (-1-) and loosen the clamp of the power steering pump suction pipe (-2-), and then disconnect the suction pipe (-3-).



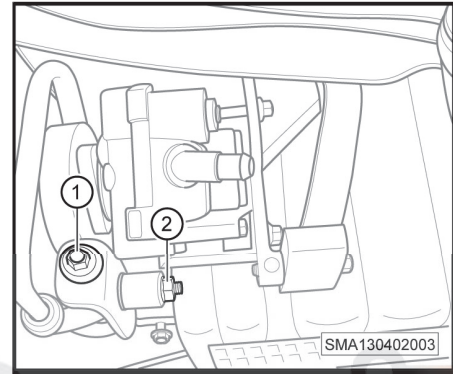
4. Unscrew the coupling bolt between the power steering pump high pressure pipe and the power steering pump (-1-).
 - Tightening torque of the bolt: 45±3 N•m



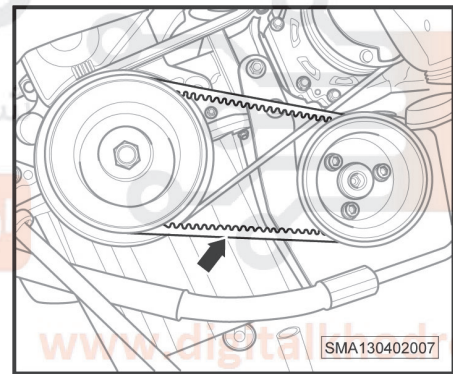
5. Unscrew the assembling bolt of the power steering pump (-arrow-).
- Tightening torque of the bolt: $20 \pm 2 \text{ N}\cdot\text{m}$



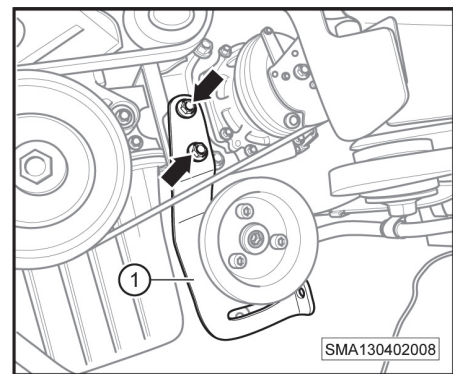
6. Loosen the fixing nut (-2-) and unscrew the tension adjustment bolt of the power steering pump poly V-belt (-1-); unscrew the fixing nut (-2-) and remove the coupling bolts between the tension adjustment bracket of the power steering pump poly V-belt and the power steering pump.
- Tightening torque of bolt (-1-): $25 \pm 2 \text{ N}\cdot\text{m}$
 - Tightening torque of nut (-2-): $20 \pm 2 \text{ N}\cdot\text{m}$



7. Remove the power steering pump poly V-belt (-arrow-).

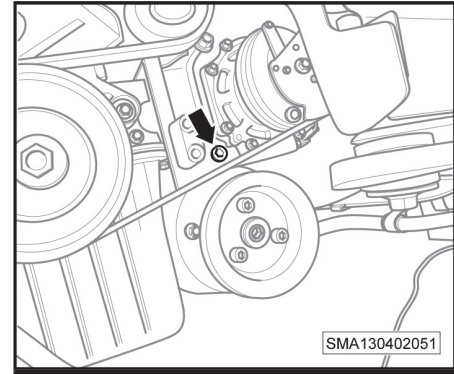


8. Unscrew the fixing bolts (-arrow-) of the power steering pump poly V-belt adjustment bracket and remove the adjustment bracket (-1-).
- Tightening torque of the bolt: $50 \pm 5 \text{ N}\cdot\text{m}$



04 - Chassis

9. Unscrew the coupling bolt between the power steering pump and the compressor mounting bracket (-arrow-) and remove the power steering pump.
- Tightening torque of the bolt: $25 \pm 2 \text{ N}\cdot\text{m}$



Installation

Installation shall follow the reverse sequence of the removal procedure. Please pay attention to the following notes:

- Tighten the fixing bolts with the specified torque.
- Refill the power steering fluid => refer to page 40.

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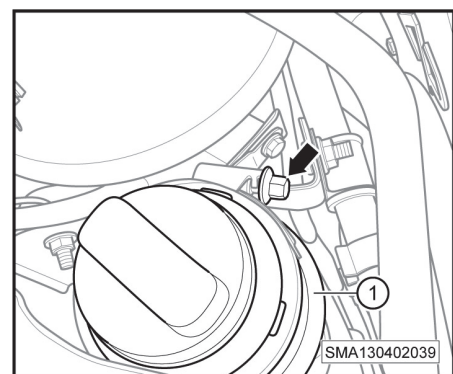
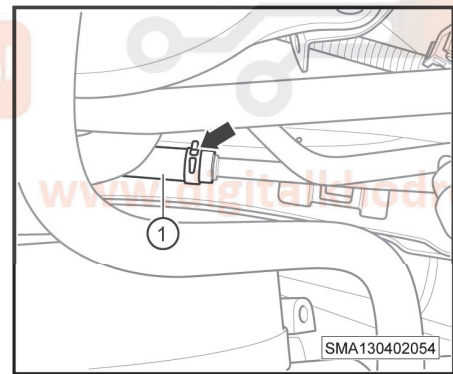
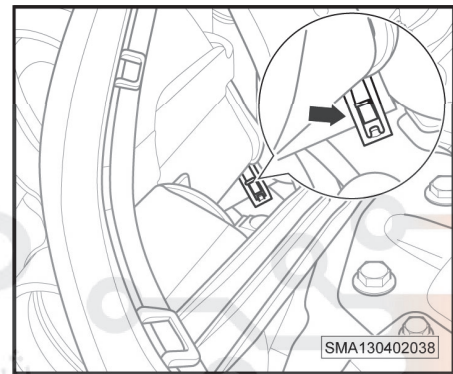
5.2 Removing and installing the power steering fluid reservoir

i Note

- Block the disconnected steering system pipeline with a stopper to prevent foreign matters from getting in.
- When disconnecting the pipe, recover the fluid in the pipe with a collection vessel to avoid polluting the vehicle and environment.
- Only use the power steering fluid approved by Chery Automobile Co., Ltd..

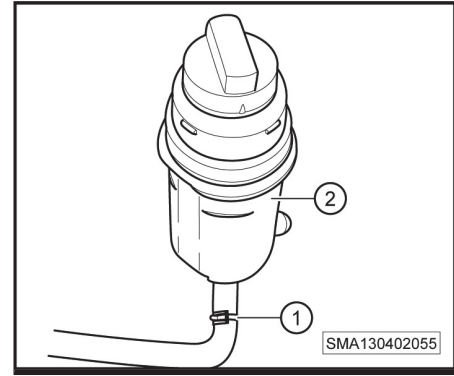
Removal

1. Discharge the power steering fluid => refer to page 40.
2. Loosen the clamp of the power steering pump suction pipe (-arrow-) and disconnect the power steering pump suction pipe from the power steering fluid reservoir.
3. Loosen the clamp of the power steering pump return pipe (-arrow-) and disconnect the power steering gear return pipe (-1-).
4. Unscrew the fixing clamp bolt of the power steering reservoir (-arrow-) and remove the power steering fluid reservoir (-1-).



04 - Chassis

5. Loosen the oil pipe clamp (-1-) and remove the power steering fluid reservoir (-2-).



Installation

Installation shall follow the reverse sequence of the removal procedure. Please pay attention to the following notes:

- Tighten the fixing bolts with the specified torque.
- Refill the power steering fluid => refer to page 40.

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

04

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



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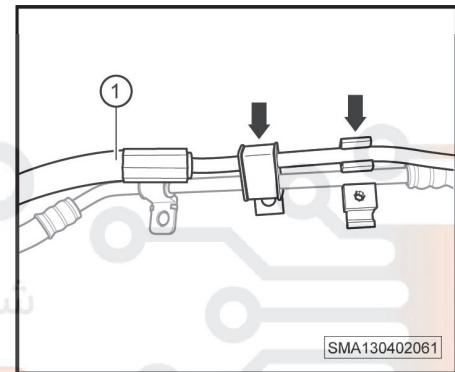
5.3 Removing and installing the steering system high pressure pipe

i Note

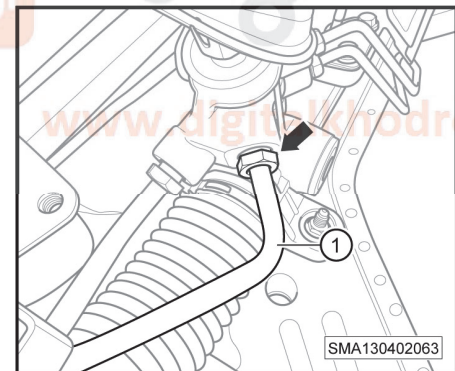
- Block the disconnected steering system pipeline with a stopper to prevent foreign matters from getting in.
- When disconnecting the pipe, recover the fluid in the pipe with a collection vessel to avoid polluting the vehicle and environment.
- Only use the power steering fluid approved by Chery Automobile Co., Ltd..

Removal

1. Discharge the power steering fluid. => refer to page 40
2. Remove the front wheels .=> refer to page 760
3. Remove the front subframe .=> refer to page 624
4. Loosen the clips of the power steering gear high pressure pipe (-arrow-) and remove the high pressure pipe (-1-).



5. Unscrew the coupling nut (-arrow-) between the power steering gear high pressure pipe (-1-) and the power steering gear, and remove the high pressure pipe (-1-).
 - Tightening torque of the nut: $35 \pm 3 \text{ N} \cdot \text{m}$



Installation

Installation shall follow the reverse sequence of the removal procedure. Please pay attention to the following notes:

- Tighten the fixing bolts with the specified torque.
- Refill the power steering fluid .
- After installation, check the wheel alignment. Adjust it if necessary.

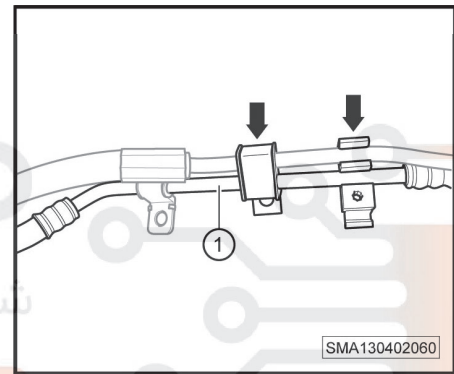
5.4 Removing and installing the steering system low pressure pipe

i Note

- Block the disconnected steering system pipeline with a stopper to prevent foreign matters from getting in.
- When disconnecting the pipe, recover the fluid in the pipe with a collection vessel to avoid polluting the vehicle and environment.
- Only use the power steering fluid approved by Chery Automobile Co., Ltd..

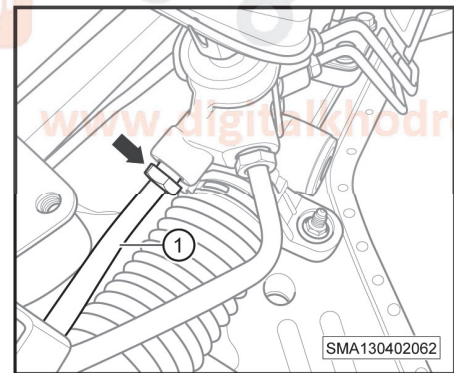
Removal

1. Discharge the power steering fluid. => refer to page 40
2. Remove the front wheels .=> refer to page 760
3. Remove the front subframe .=> refer to page 624
4. Loosen the clips of the power steering gear return pipe (-arrow-) and remove the return pipe (-1-).

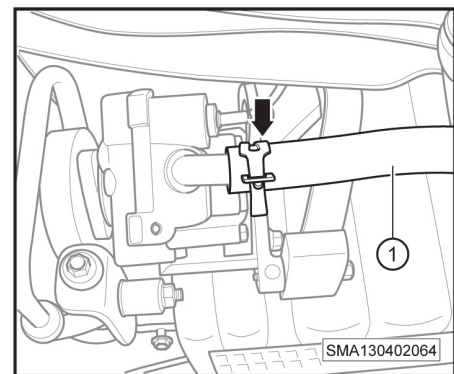


5. Unscrew the coupling nut (-arrow-) between the power steering gear return pipe (-1-) and the power steering gear, and remove the return pipe (-1-).

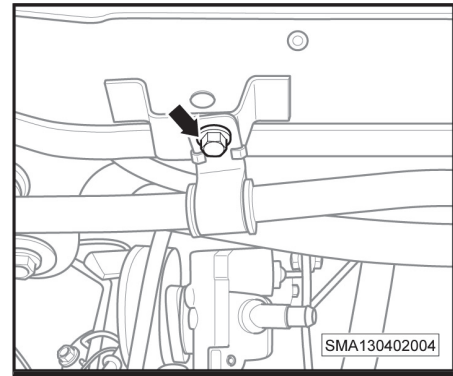
- Tightening torque of the nut: $35 \pm 3 \text{ N} \cdot \text{m}$



6. Loosen the clamp (-arrow-) and remove the power steering pump suction pipe (-1-).

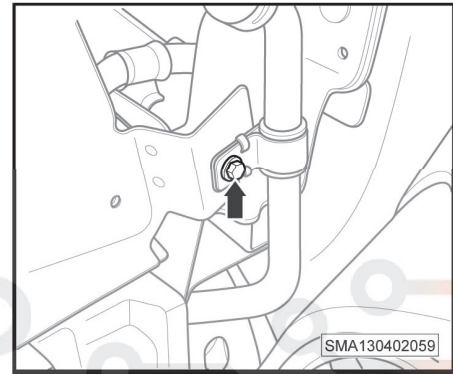


7. Unscrew the fixing bolt of the power steering pump suction pipe clip (-arrow-).

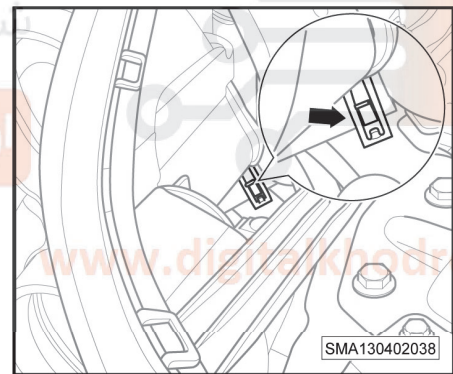


8. Remove the front bumper .=> refer to page 838

9. Unscrew the fixing bolt of the power steering pump suction pipe clip (-arrow-).

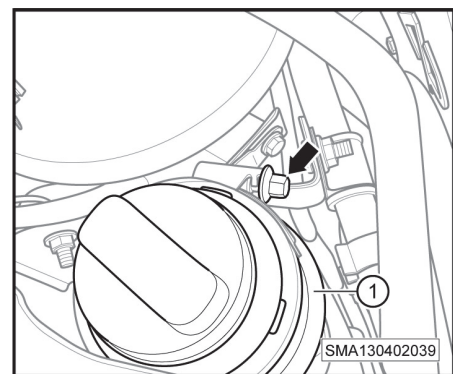


10. Loosen the coupling clamp between the power steering fluid reservoir and the power steering pump suction pipe (-arrow-), and remove the suction pipe.



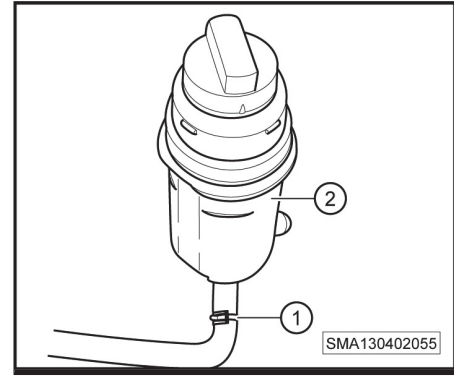
11. Unscrew the fixing clamp bolt of the power steering reservoir (-arrow-) and remove the reservoir (-1-).

- Tightening torque of the bolt: $5\pm 1 \text{ N}\cdot\text{m}$



04 - Chassis

12. Loosen the pipe clamp (-2-) and remove the return pipe (-1-).

**Installation**

Installation shall follow the reverse sequence of the removal procedure. Please pay attention to the following notes:

- Tighten the fixing bolts with the specified torque.
- Refill the power steering fluid .
- After installation, check the wheel alignment. Adjust it if necessary .

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

04

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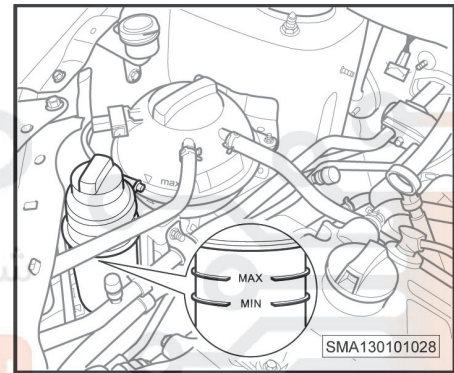
5.5 Checking and replacing the power steering fluid

i Note

- Block the disconnected steering system pipeline with a stopper to prevent foreign matters from getting in.
- When disconnecting the pipe, recover the fluid in the pipe with a collection vessel to avoid polluting the vehicle and environment.
- Only use the power steering fluid approved by Chery Automobile Co., Ltd..

Inspection

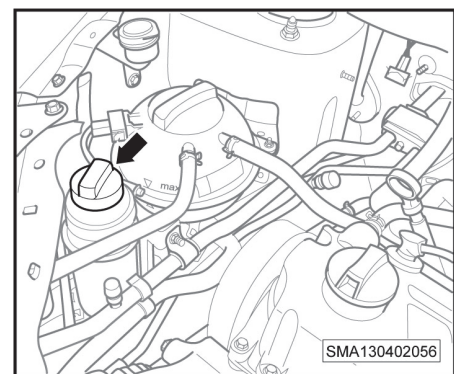
1. Park the vehicle on level ground.
2. Start the engine and turn the steering wheel to the left and right for several turns and then reset the steering wheel.
3. Switch off the ignition switch.
4. Check the power steering fluid level to assure it between the MAX (maximum) and MIN (minimum) marks.



5. When the power steering fluid level is higher than the MAX (maximum) mark, please discharge the power steering fluid. When the power steering fluid level is lower than the MIN (minimum) mark, please check the steering system pipe for leakage. If there is, repair it.

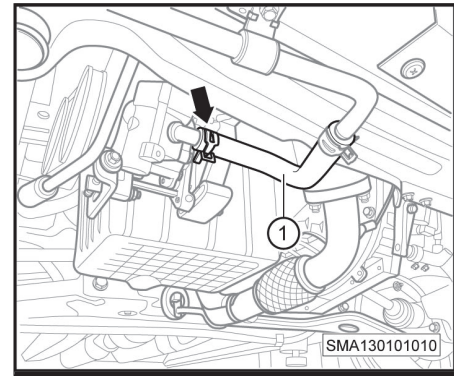
Discharge

1. Open the sealing cap of the power steering fluid reservoir (-arrow-).
2. Lift the vehicle and place the collection vessel under the vehicle.



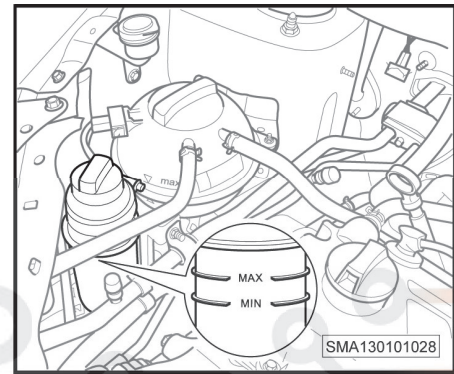
04 - Chassis

3. Loosen the clamp (-arrow-) and disconnect the pipe connection (-1-).
4. Turn the steering wheel to the left and right and discharge the power steering fluid completely.
5. Install the connection pipe (-1-) and the fixing clamp (-arrow-).



Filling

1. Add power steering fluid until the fluid level is between the MIN (minimum) and the MAX (maximum) marks.
2. When the engine runs at idle speed, turn the steering wheel from the left limit position to the right limit position repeatedly until no bubbles are seen in the oil reservoir. If the fluid level drops, please add the power steering fluid continuously until the fluid level reaches the specified MAX (maximum) mark.



3. Switch off the engine and check the power steering fluid level. Add some if necessary.