

WIPER AND WASHER

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GENERAL INFORMATION

System Overview

Description

Wiper and Washer



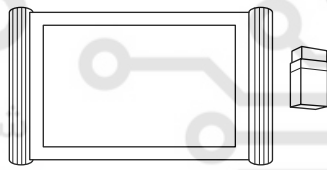
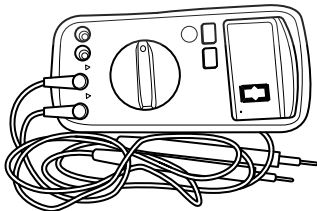
1	Rear Wiper Arm Trim Cap	10	Sub Wiper Arm Assembly
2	Rear Wiper Arm Assembly	11	Sub Wiper Blade
3	Rear Wiper Blade	12	Front Windshield Lower Support Assembly

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4	Rear Nozzle Assembly	13	Front Wiper Nozzle
5	Grommet	14	Front Wiper Motor Link Rod Assembly
6	Rear Wiper Motor Assembly	15	Washer Line Assembly
7	Front Wiper Arm Trim Cap	16	Guide Pipe Assembly
8	Main Wiper Arm Assembly	17	Washer Pump
9	Main Wiper Blade	18	Washer Fluid Reservoir Assembly

Wiper and washer are important equipment for cleaning the front windshield assembly, which can operate only with ENGINE START STOP switch ON. Driver can control all operations of wiper and washer by moving switch control lever.

Tools

Tool Name	Tool Drawing
X-431 PAD Diagnostic Tester	 RCH0001006
Digital Multimeter	 RCH0002006

Torque Specifications

Description	Torque (N•m)
Front Wiper Arm Assembly Fixing Nut	18 ± 2
Wiper Motor and Link Rod Assembly Fixing Bolt	9.5 ± 1.5
Rear Wiper Arm Assembly Upper Fixing Nut	10 ± 1.5
Rear Wiper Motor Assembly Fixing Bolt	10 ± 1.5
Washer Fluid Reservoir Assembly Fixing Bolt	7 ± 1

Description	Torque (N•m)
Front Wiper Motor Fixing Bolt	10 ± 1.5
Guide Pipe Fixing Bolt	5 ± 1

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



DIAGNOSIS & TESTING

Problem Symptoms Table

Hint:

Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Suspected Area
Both front wiper and washer systems do not operate	Fuse
	Wiper switch assembly
	Washer pump
	Wire harness or connector
	BCM
Front wiper system does not operate in LO or HI	Wiper switch assembly
	Front wiper motor assembly
	Wire harness or connector
	BCM
Front wiper system does not operate	Fuse
	Wiper switch assembly
	Front wiper motor assembly
	Wire harness or connector
	BCM
Front wiper arm and blade do not return to original position when front wiper switch is turned off	Front wiper motor assembly
	Wire harness or connector
	BCM
Both rear wiper and washer systems do not operate	Fuse
	Wiper switch assembly
	Rear wiper motor assembly
	Washer pump
	Wire harness or connector
	BCM
Washer system does not operate	Nozzle assembly
	Wiper switch assembly
	Washer pump
	Wire harness or connector
	BCM

Diagnosis Contents

Diagnostic Help

1. Connect diagnostic tester X-431 3G (the latest software) to Data Link Connector (DLC), and make it communicate with vehicle electronic module through data network.
2. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
3. If Diagnostic Trouble Code (DTC) cannot be cleared, it indicates that there is a current malfunction.
4. Only use a digital multimeter to measure voltage of electronic system.
5. Refer to any Technical Bulletin that may apply to this malfunction.
6. Visually check related wire harness and connector.
7. Check and clean all system grounds related to the latest DTCs.
8. If numerous trouble codes are set, refer to circuit diagram and look for any common ground circuit or power supply circuit applied to DTC.

Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the followings:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Monitor diagnostic tester (the latest software) data that is related to this circuit.
- Wiggle related wire harnesses and connectors and observe if signal is interrupt in related circuit.
- If possible, try to duplicate the conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggle test.
- Look for broken, bent, protruded or corroded terminals.
- Inspect airbag components and mounting areas for damage, foreign matter, etc. that will cause incorrect signals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- If multiple trouble codes were set, refer to circuit diagrams to look for any common ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to this malfunction.

Ground Inspection

Ground points are very important to the proper operation of circuits. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit operates. Circuits are very sensitive to proper grounding. A loose or corroded ground can seriously affect the control circuit. Check the ground points as follows:

1. Remove ground bolt or nut.
2. Check all contact surfaces for tarnish, dirt and rust, etc.
3. Clean as necessary to ensure that contact is in good condition.
4. Reinstall ground bolt or nut securely.
5. Check if any additional accessories interfere with ground circuit.
6. If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

ON-VEHICLE SERVICE

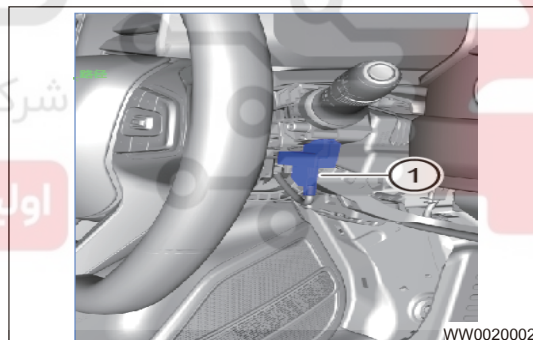
Wiper Switch Assembly

Removal

Hint:

- Be sure to wear safety equipment to prevent accidents, when removing wiper switch assembly.
- Appropriate force should be applied, when removing wiper switch assembly. Be careful not to operate roughly.
- Try to prevent interior and body paint surface from being scratched, when removing wiper switch assembly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the combination switch lower cover.
4. Remove the combination switch upper cover.
5. Remove the wiper switch assembly.
 - a. Disconnect the wiper switch connector (1).



- b. Detach fixing clip of wiper switch from combination switch and remove wiper switch.

Inspection

Caution

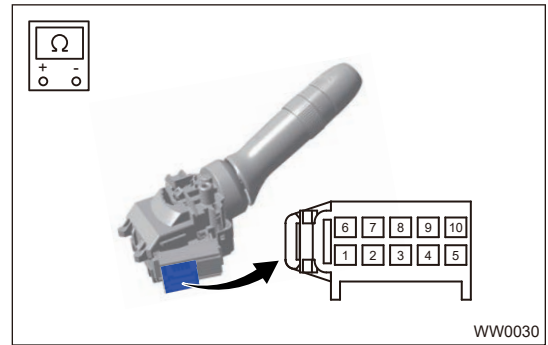
- Be sure to wear safety equipment to prevent accidents, when removing wiper switch assembly.
- Appropriate force should be applied, when removing wiper switch assembly. Be careful not to operate roughly.
- Try to prevent interior and body paint surface from being scratched, when removing wiper switch assembly.

1. Check the wiper switch assembly.

- a. Using a digital multimeter, check for continuity between terminals of wiper switch assembly according to table below.

Multimeter Connection	Switch Condition	Specified Condition
Terminal 1 - Terminal 3	MIST	$\leq 1 \Omega$
Terminal 2 - Terminal 3	AUTO	$\leq 1 \Omega$
Terminal 1 - Terminal 3	LO	$\leq 1 \Omega$
Terminal 1, 2 - Terminal 3	HI	$\leq 1 \Omega$
Terminal 3 - Terminal 4	Front washer	$\leq 1 \Omega$
Terminal 3 - Terminal 7, 9	Rear washer	$\leq 1 \Omega$

If result is not as specified, replace wiper switch assembly.



Installation

Caution

- Always operate carefully to prevent components from being damaged, when installing wiper switch assembly.
- Install connectors in place, when installing wiper switch assembly.
- Check wiper switch for proper operation, after installing wiper switch assembly.

1. Installation is in the reverse order of removal.

Front Wiper Blade Assembly

Removal

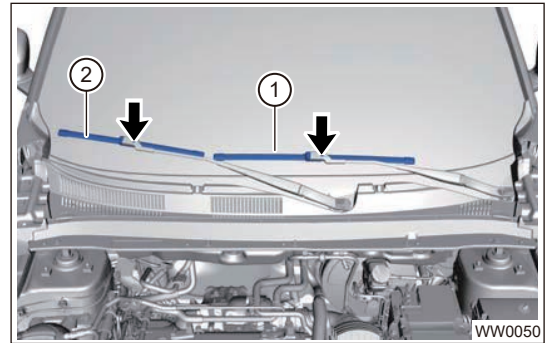
Caution

- Be sure to wear safety equipment to prevent accidents, when removing front wiper blade assembly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front wiper blade assembly.

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- a. As shown in illustration, press button in direction of arrow, slightly pull it outwards to remove front wiper main blade (1) and front wiper sub blade (2).



Installation

1. Installation is in the reverse order of removal.

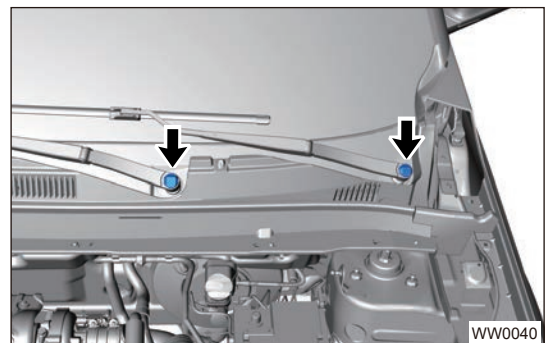
Front Wiper Arm Assembly

Removal

Hint:

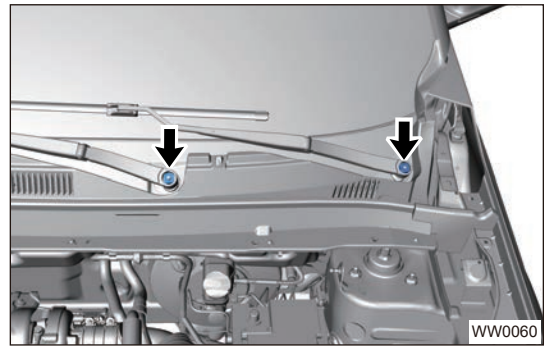
- Be sure to wear safety equipment to prevent accidents, when removing front wiper arm assembly.
- Appropriate force should be applied, when removing front wiper arm assembly. Be careful not to operate roughly.
- Try to prevent front windshield assembly from being scratched, when removing front wiper arm assembly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Open the hood.
3. Disconnect the negative battery cable.
4. Remove the front wiper arm assembly.
 - a. Using a screwdriver wrapped with protective tape, remove front wiper arm trim caps (arrow).

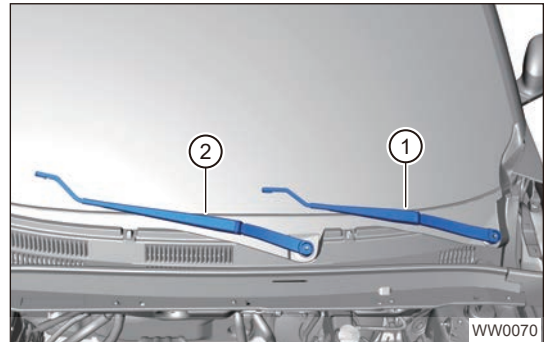


- b. Remove 2 fixing nuts (arrow) from front wiper arm assembly.

Tightening torque
 $18 \pm 2 \text{ N}\cdot\text{m}$



- c. Remove front main wiper arm (1) and front sub wiper arm (2).



Installation

Caution



- Always operate carefully to prevent other components from being damaged, when installing front wiper arm assembly.
- Be sure to tighten fixing nuts to specified torque, when installing front wiper arm assembly.
- Check front wiper arm assembly for proper operation after installation.

Hint:

- Adjust front wiper arm assembly to proper position when installing.
- Pay attention to locating points on front windshield assembly during installation. Wiper arm blade should be pressed against locating points.

1. Installation is in the reverse order of removal.

Front Wiper Motor and Link Rod Assembly

Removal

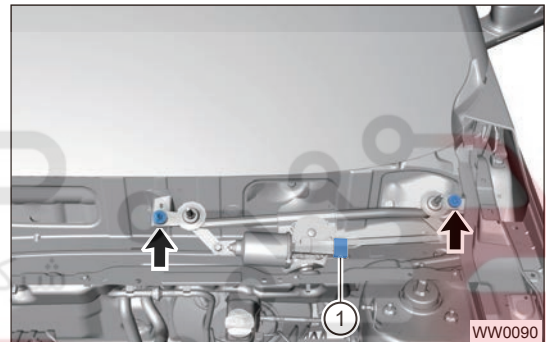
Hint:

- Be sure to wear safety equipment to prevent accidents, when removing front wiper motor assembly.
- Appropriate force should be applied, when removing front wiper motor assembly. Be careful not to operate roughly.
- Try to prevent body paint surface from being scratched, when removing front wiper motor assembly.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the front right wing assembly.
4. Remove the front windshield lower support assembly.
5. Remove the wiper motor and link rod assembly.
 - a. Disconnect connector (1) from wiper motor and link rod assembly.
 - b. Remove 2 fixing bolts (arrow) from wiper motor and link rod assembly.

Tightening torque

9.5 ± 1.5 N·m



- c. Remove the wiper motor and link rod assembly.

Inspection

1. Check the front wiper motor assembly.
 - a. Check the LO operation.

Measurement Condition	Specified Condition
Battery negative (-) → Terminal 4	Motor running at low speed (LO)
Battery positive (+) → Terminal 2	

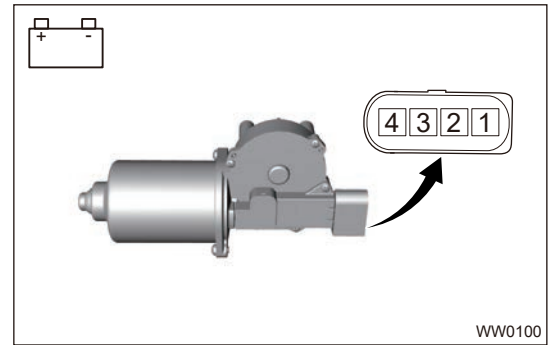
If result is not as specified, replace front wiper motor assembly.

- b. Check the HI operation.

Measurement Condition	Specified Condition
Battery negative (-) → Terminal 4	Motor running at low speed (HI)
Battery positive (+) → Terminal 1	

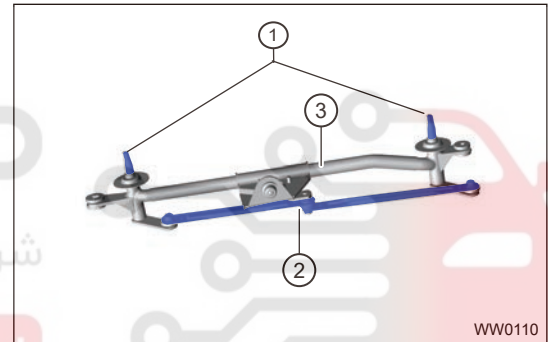
c. Check the auto reset function.

- Connect positive (+) battery lead to terminal 2 or 1, and connect negative (-) battery lead to terminal 4. When motor runs at low speed (LO) or high speed (HI), disconnect battery positive (+) to stop front wiper motor at any position other than the original position.
- Connect terminal 4 and terminal 3 with a lead and then connect another lead from middle to positive (+) battery, and connect negative (-) battery lead to terminal 2 to make motor run to original position at low speed (LO) again.
- Check if front wiper motor assembly can stop automatically after running to the original position.
OK: Motor runs to original position and stops automatically, that is, motor can reset automatically.
If result is not as specified, replace front wiper motor assembly.



2. Check the wiper link rod.

- a. Check pivots (1) for looseness or falling off, link rod (2) for deformation or breakage, and shaft sleeve (3) for catching. Replace wiper link rod if necessary.

**Installation****Hint:**

- Always operate carefully to prevent other components from being damaged, when installing front wiper motor assembly.
- Adjust and make sure wiper motor and link rod are at original position, before installing front wiper motor assembly, otherwise, wiper system cannot operate normally.
- Install connector in place and tighten fixing bolts and nuts to specified torque when installing front wiper motor assembly.
- Check wiper system for proper operation after installing front wiper motor assembly.

1. Installation is in the reverse order of removal.

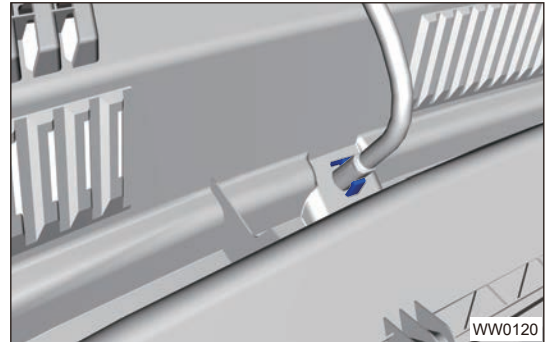
Front Nozzle Assembly**Removal****Hint:**

- Be sure to wear safety equipment to prevent accidents, when removing front nozzle assembly.
- Appropriate force should be applied, when removing multi-function interface. Be careful not to operate roughly.

1. Turn off all electrical equipment and ENGINE START STOP switch.

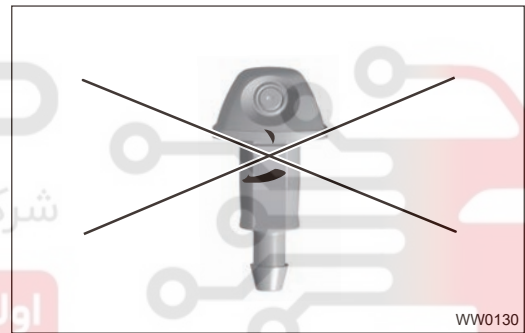
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2. Disconnect the negative battery cable.
3. Remove the front windshield lower support assembly.
4. Remove the front nozzle assembly.
 - a. Loosen front nozzle assembly and disconnect water spray hose in direction of arrow as shown in illustration.



Inspection

1. Check the front nozzle assembly.
 - a. Check front nozzle for blockage, deformation or damage. Replace front nozzle if necessary.



Installation

Caution

- Always operate carefully to prevent components from being damaged, when installing front nozzle assembly.
- Install washer line joints in place, when installing front nozzle assembly.
- Check nozzle for proper operation, after installing front nozzle assembly.

1. Installation is in the reverse order of removal.

Rear Wiper Arm Assembly

Removal

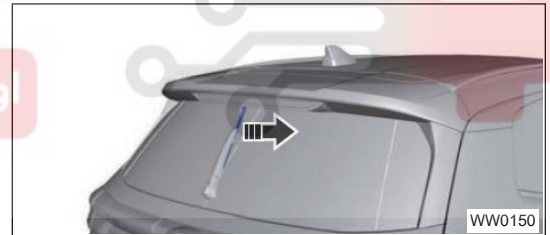
Caution

- Be sure to wear safety equipment to prevent accidents, when removing rear wiper arm assembly.
- Appropriate force should be applied, when removing rear wiper arm assembly. Be careful not to operate roughly.
- Try to prevent rear windshield assembly from being scratched, when removing rear wiper arm assembly.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the rear wiper blade.
 - a. Lift rear wiper arm assembly in direction of arrow as shown in illustration.

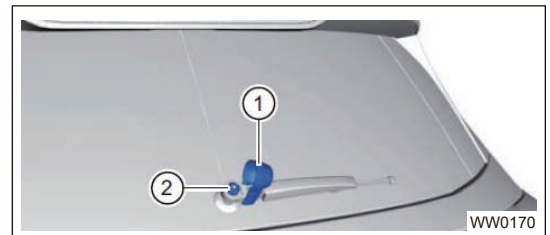


- b. Pull rear wiper arm blade from rear wiper arm assembly in direction of arrow as shown in illustration.



4. Remove the rear wiper arm assembly.
 - a. Remove the rear wiper arm trim cap (1).
 - b. Remove fixing nut (2) from rear wiper arm assembly.

Tightening torque
 $10 \pm 1.5 \text{ N}\cdot\text{m}$



- c. Remove the rear wiper arm assembly.

Installation

Caution

- Always operate carefully to prevent other components from being damaged, when installing rear wiper arm assembly.
- Be sure to tighten fixing nuts to specified torque, when installing rear wiper arm assembly.
- Check rear wiper arm assembly for proper operation, after installing rear wiper arm assembly.

1. Installation is in the reverse order of removal.

Rear Wiper Motor Assembly

Removal

Caution

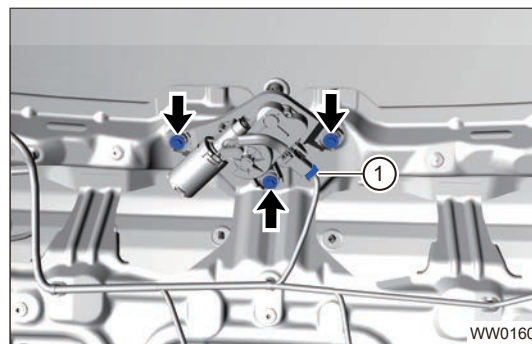
- Be sure to wear safety equipment to prevent accidents, when removing rear wiper motor assembly.
- Appropriate force should be applied, when removing rear wiper motor assembly. Be careful not to operate roughly.
- Try to prevent rear windshield assembly from being scratched, when removing rear wiper motor assembly.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the rear wiper arm assembly.
4. Remove the luggage compartment protector assembly.
5. Remove the rear wiper motor assembly.

- a. Disconnect the rear wiper motor assembly connector (1).
- b. Remove 3 fixing bolts (arrow) from rear wiper motor assembly.

Tightening torque

$10 \pm 1.5 \text{ N}\cdot\text{m}$



- c. Using a screwdriver wrapped with protective tape, pry off grommet (arrow).

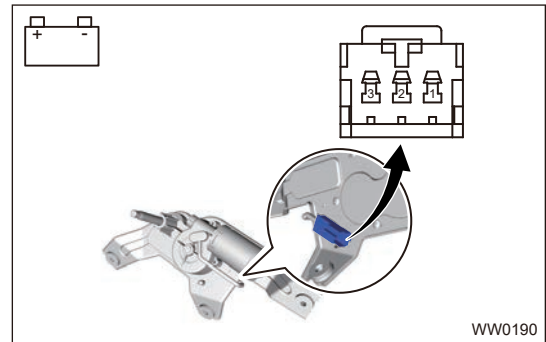


- d. Remove the rear wiper motor assembly.

Inspection

1. Check the rear wiper motor assembly.
 - a. Check the rear wiper motor assembly operation.

Pin	Function	Rated Current	Current		Signal Type	Optional Line Diameter
			Imin (A)	Imax (A)		
1	Positive (red)	1.5 A	≤ 2 A	≤ 11 A	DC	0.75
2	Reset (black)	1.5 A	≤ 2 A	≤ 11 A	DC	0.75
3	Negative (blue)	1.5 A	≤ 2 A	≤ 11 A	DC	0.75



If result is not as specified, replace rear wiper motor assembly.

Installation

Caution

- Always operate carefully to prevent other components from being damaged, when installing rear wiper motor assembly.
- Be sure to tighten fixing nuts to specified torque, when installing rear wiper motor assembly.
- Check wiper arm assembly for proper operation, after installing rear wiper motor assembly.

1. Installation is in the reverse order of removal.

Rear Nozzle Assembly

Removal

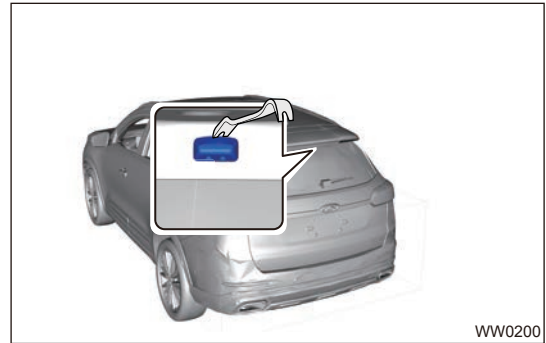
Caution

- Be sure to wear safety equipment to prevent accidents, when removing rear nozzle assembly.
- Appropriate force should be applied, when removing rear nozzle assembly. Be careful not to operate roughly.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the rear spoiler assembly.
4. Remove the rear nozzle assembly.

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- a. Remove rear nozzle assembly with an interior crow plate and disconnect connecting water pipe.

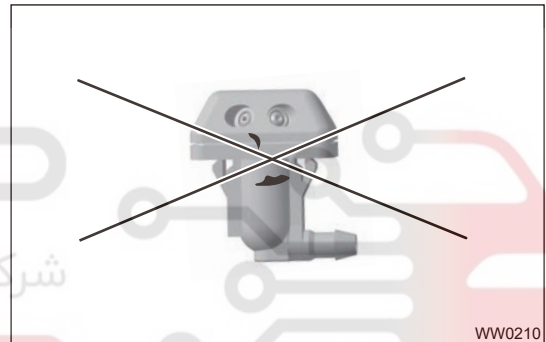


WW0200

- b. Remove the rear nozzle assembly.

Inspection

1. Check the rear nozzle assembly.
 - a. Check rear nozzle assembly for blockage, deformation or damage. Replace rear nozzle if necessary.



WW0210

Installation**Caution**

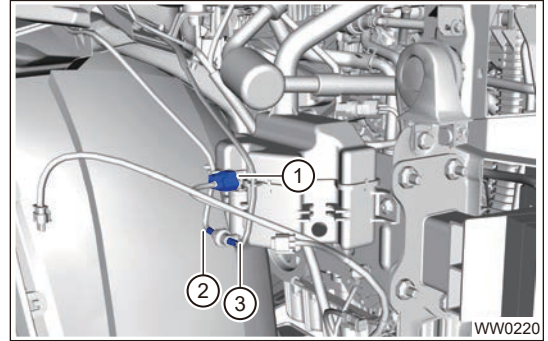
- Always operate carefully to prevent components from being damaged, when installing rear nozzle assembly.
- Install washer line joints in place, when installing rear nozzle assembly.
- Check nozzle for proper operation, after installing rear nozzle assembly.

1. Installation is in the reverse order of removal.

Washer Pump Assembly**Removal****Caution**

- Be sure to wear safety equipment to prevent accidents, when removing washer pump assembly.
- Appropriate force should be applied, when removing washer pump assembly. Be careful not to operate roughly.
- Try to prevent body paint surface from being scratched, when removing washer pump assembly.

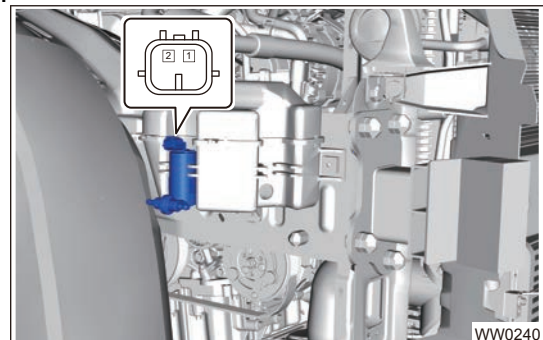
1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the front bumper assembly.
4. Remove the washer pump assembly.
 - a. Disconnect the front and rear washer pump connector (1).
 - b. Disconnect joint (3) between rear washer line and washer pump and joint (2) between front washer line and washer pump.



- c. Remove the washer pump assembly.

Inspection

1. Check the washer pump assembly.
 - a. Fill washer fluid reservoir assembly with washer fluid.
 - b. Connect positive (+) battery lead to terminal 1 of washer pump, and connect negative (-) battery lead to terminal 2.
 - c. Check that washer fluid flows out of front washer pump. OK: Washer fluid flows out of front washer pump. If result is not as specified, replace washer pump assembly.
 - d. Connect positive (+) battery lead to terminal 1 of washer pump, and connect negative (-) battery lead to terminal 2.
 - e. Check that washer fluid flows out of rear washer pump. OK: Washer fluid flows out of rear washer pump. If result is not as specified, replace washer pump assembly.



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Installation**Caution**

- Always operate carefully to prevent components from being damaged, when installing washer pump assembly.
- Install washer line joint in place, when installing washer pump assembly.
- Check washer system for proper operation, after installing washer pump assembly.

1. Installation is in the reverse order of removal.

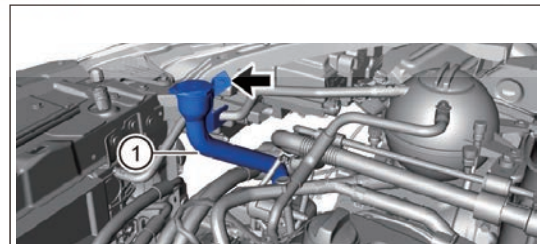
Washer Fluid Reservoir Assembly**Removal****Caution**

- Be sure to wear safety equipment to prevent accidents, when removing washer fluid reservoir assembly.
- Appropriate force should be applied, when removing washer fluid reservoir assembly. Be careful not to operate roughly.
- Try to prevent body paint surface from being scratched, when removing washer fluid reservoir assembly.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the front bumper assembly.
4. Remove the guide pipe assembly.
 - a. Remove fixing bolt (arrow) from guide pipe assembly.

Tightening torque $5 \pm 1 \text{ N}\cdot\text{m}$

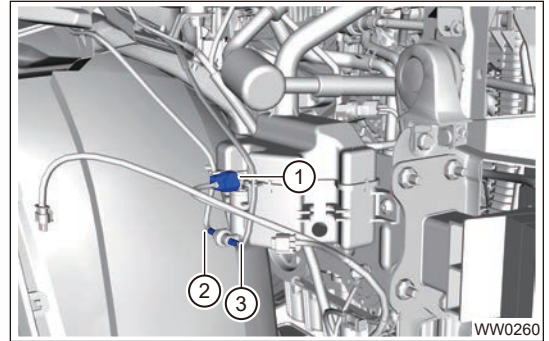
- b. Remove guide pipe assembly (1) from washer fluid reservoir assembly.



WW0250

5. Remove the washer fluid reservoir assembly.

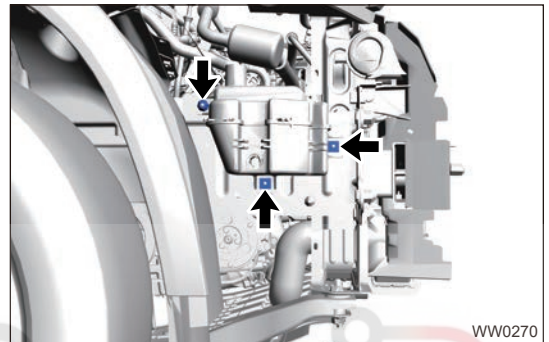
- a. Disconnect the front and rear washer pump connector (1).
- b. Disconnect joint (3) between rear washer line and washer pump and joint (2) between front washer line and washer pump.



- c. Remove 3 fixing nuts (arrow) from washer fluid reservoir assembly, and remove washer fluid reservoir assembly.

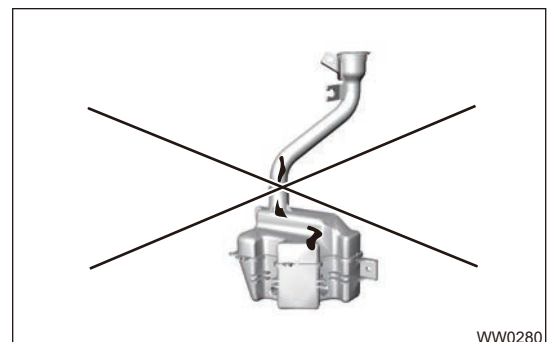
Tightening torque

$7 \pm 1 \text{ N}\cdot\text{m}$



Inspection

1. Check the washer fluid reservoir assembly.
 - a. Check washer fluid reservoir assembly for leakage, deformation or damage. Replace washer fluid reservoir assembly if necessary.
 - b. Check internal and external sides of washer fluid reservoir for dirt. Remove dirt or replace washer fluid reservoir assembly if necessary.
 - c. Check grommet for damage. Replace grommet if necessary.



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Installation**Caution**

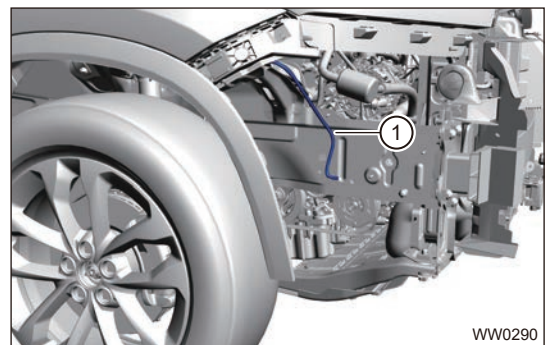
- Always operate carefully to prevent components from being damaged, when installing washer fluid reservoir assembly.
- Tighten fixing bolts to specified torque, when installing washer fluid reservoir assembly.
- Install washer line joint in place, when installing washer fluid reservoir assembly.

1. Installation is in the reverse order of removal.

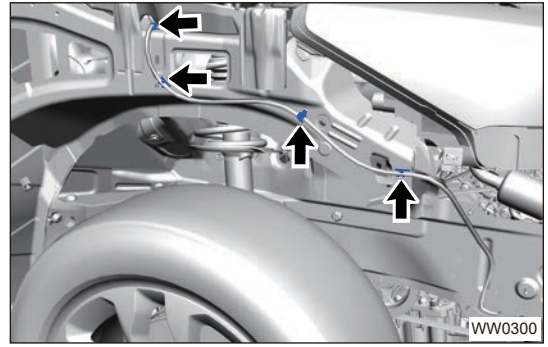
Front Washer Line Assembly**Removal****Caution**

- Be sure to wear safety equipment to prevent accidents, when removing washer line assembly.
- Appropriate force should be applied, when removing washer line assembly. Be careful not to operate roughly.
- Try to prevent body paint surface from being scratched, when removing washer line assembly.

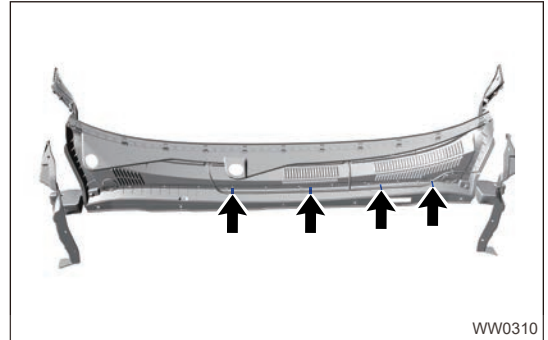
1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the front bumper assembly.
4. Remove the front right wheel house protector assembly.
5. Remove the front windshield trim board assembly.
6. Remove the front nozzle assembly.
7. Remove the front washer line assembly.
 - a. Disconnect joint (1) between front washer line and front washer pump.



- b. Remove clips (arrow) from washer line on the inner side of wing.



- c. Remove 4 clips (arrow) from washer line on front windshield trim board.



Installation

Caution

- Always operate carefully to prevent components from being damaged, when installing washer line assembly.
- Install washer line joint in place, when installing washer line assembly.
- Check washer system for proper operation, after installing washer line assembly.

1. Installation is in the reverse order of removal.

Rear Washer Line Assembly

Removal

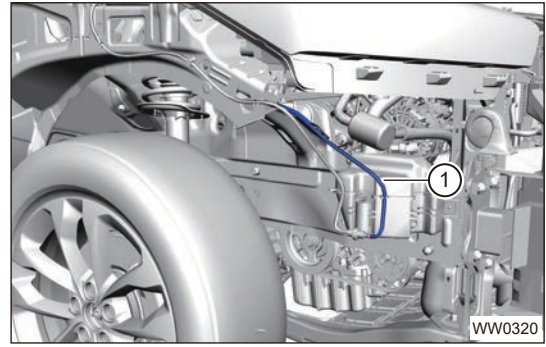
Caution

- Be sure to wear necessary safety equipment to prevent accidents, when removing rear washer line assembly.
- Appropriate force should be applied, when removing rear washer line assembly. Be careful not to operate roughly.
- Try to prevent body paint surface from being scratched, when removing rear washer line assembly.

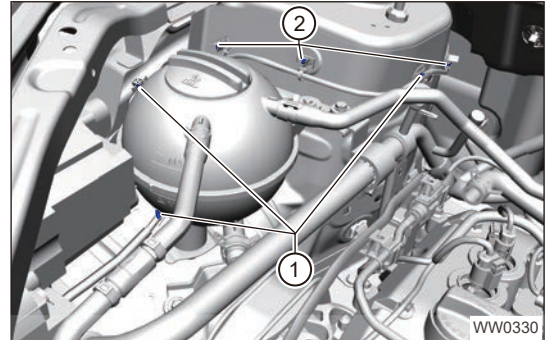
1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the front bumper assembly.
4. Remove the rear washer line assembly.

23 - WIPER AND WASHER

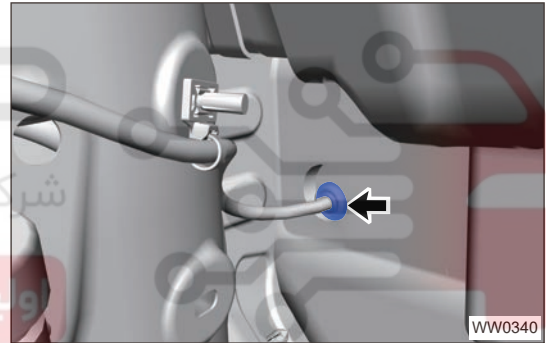
- a. Disconnect joint (1) between rear washer line and rear washer pump.



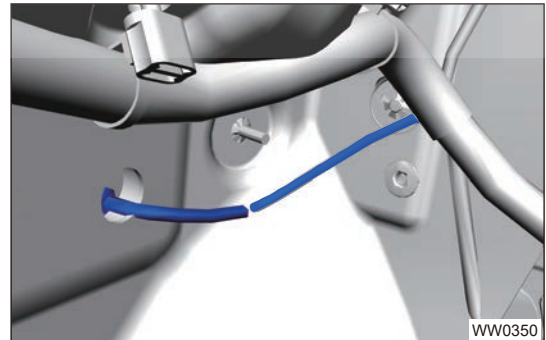
- b. Remove 3 fixing clips (1) and 3 band clips (2) of line from projection welding stud along line.



- c. Separate 2-way joint (arrow) between washer line and wire harness end line.



- d. Remove grommet with line from front baffle plate.



Installation

Caution

- Always operate carefully to prevent components from being damaged, when installing washer line assembly.
- Install washer line joint in place, when installing washer line assembly.
- Check washer system for proper operation, after installing washer line assembly.

1. Installation is in the reverse order of removal.