

WIPER AND WASHER

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GENERAL INFORMATION

Overview

Description



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WW0001501

1- Rear Wiper Arm Trim Cap	2- Rear Wiper Arm Assembly
3- Rear Wiper Blade	4- Rear Nozzle Assembly
5- Gasket	6- Rear Wiper Motor Assembly

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7- Front Wiper Arm Trim Cap	8- Main Wiper Arm Assembly
9- Main Wiper	10- Sub Wiper Arm Assembly
11- Sub Wiper Blade	12- Front Windshield Lower Support Assembly
13- Front Wiper Nozzle	14- Front Wiper Motor Link Rod Assembly
15- Washer Line Assembly	16- Guide Pipe Assembly
17- Washer Pump	18- Washer Fluid Reservoir Assembly

Wiper and washer are important equipment for cleaning the front windshield assembly. which can operate only with ignition switch ON. Driver can control all the operations of wipers and washers by moving switch control lever.

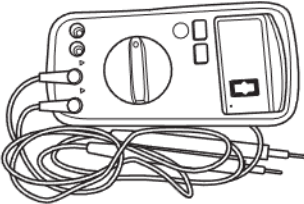
Specifications

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
Front Wiper Motor Assembly Fixing Bolt	10 ± 1.5
Guide Pipe Fixing Bolt	5 ± 1

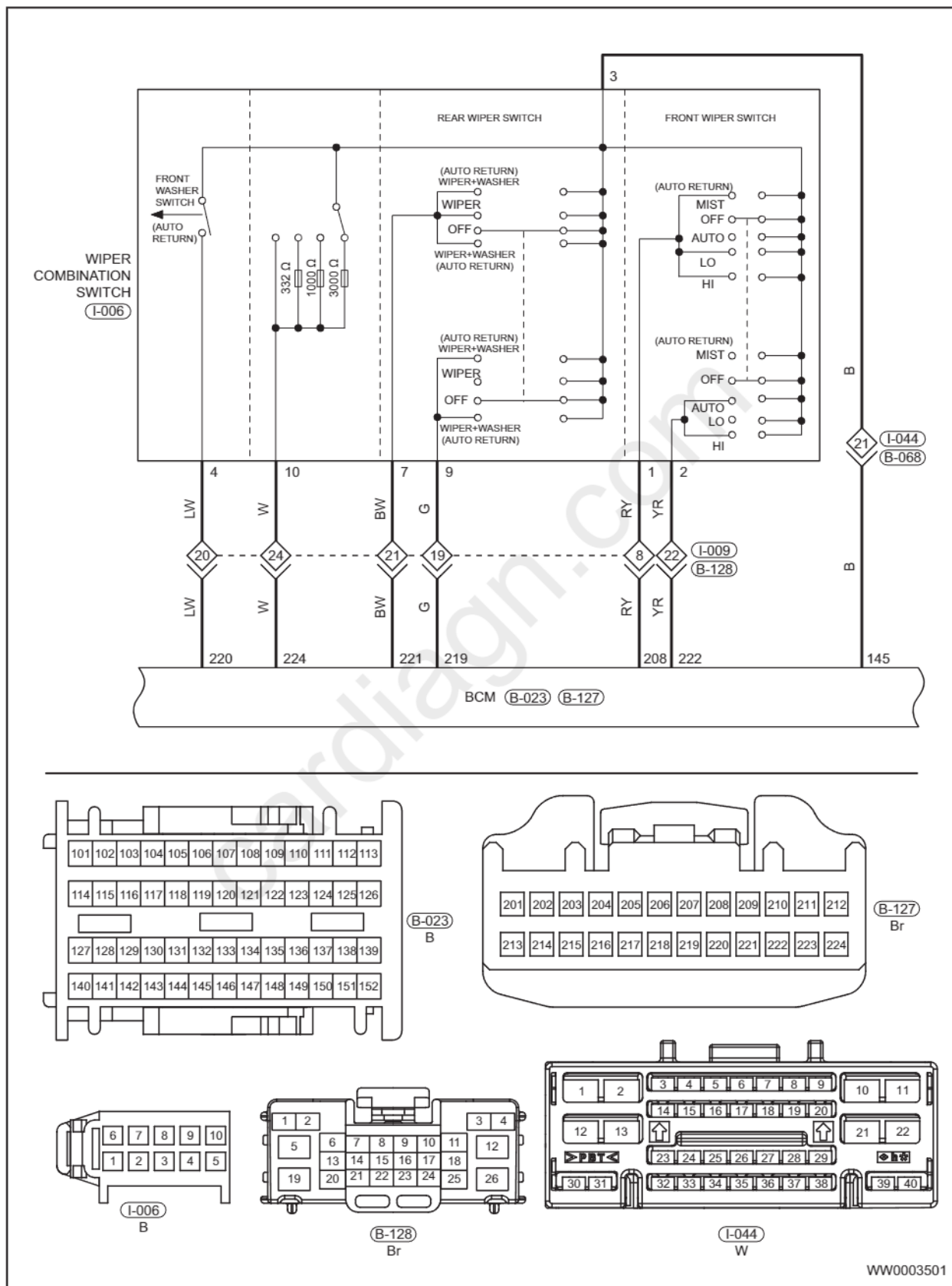
Tool

General Tools

X-431 PAD Diagnostic Tester	 001
Digital Multimeter	 002

Circuit Diagram

Wiper and Washer (Page 1 of 2)





DIAGNOSIS & TESTING

Diagnostic Content

Problem Symptoms Table

Hint:

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

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

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Diagnosis Tools

Diagnostic Tester

When connecting the diagnostic tester:

- Connect diagnostic tester (the latest software) to Data Link Connector (DLC) for communication with vehicle.
- DLC is located on instrument panel lower left protector.
- DLC uses a trapezoidal design which can hold 16 terminals.

Digital Multimeter

When using digital multimeter:

- Troubleshoot electrical malfunctions and wire harness system.
- Look for basic malfunction.
- Measure voltage, current and resistance.



Diagnostic Help

When using digital multimeter:

1. Connect diagnostic tester (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 DTC cannot be deleted, malfunction is current.
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 wiper system grounds related to the latest DTC.
8. If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

Intermittent DTC Troubleshooting

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.
- Wiggle related wire harness and connector and observe if signal in related circuit is interrupted.
- 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 the mounting areas of audio system, wire harness or wire harness connector and so on for damage, foreign matter, etc. that will cause incorrect signals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- Remove the Body Control Module (BCM) from malfunctioning vehicle, then install it to a new vehicle and perform a test. If DTC cannot be cleared, the Body Control Module (BCM) is malfunctioning. If DTC can be cleared, reinstall the Body Control Module (BCM) to original vehicle.
- 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

Groundings are very important to entire circuit system, which are normal or not can seriously affect the entire circuit system. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) and oxidation may increase load resistance. This case will seriously affect normal operation of 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 contacting is in good condition.
4. Reinstall ground bolt or nut securely.
5. Check if add-on accessories interfere with ground circuit.
6. If several wire harnesses are crimped into one ground terminal, check for proper crimps. Make sure that all wire harnesses are clean and securely fastened while providing a good ground path.

Diagnosis Procedure

Hint:

Use following procedures to troubleshoot the audio system.

1	Vehicle brought to workshop
----------	------------------------------------

Result

Proceed to
Next

Next

2 Check battery voltage

Check if battery voltage is normal.

Normal

Standard voltage: Not less than 12 V

Result

Proceed to
OK
NG

NG

Recharge or replace battery.

OK

3 Customer problem analysis**Result**

Proceed to
Next

Next

4 Check for DTCs (current DTC and history DTC)**Result**

Result
No DTC
Current DTC
History DTC

History
DTC**5** Problem repair (no DTC), then go to step 8**Result**

Proceed to
Next

Next

Go to step 6



6	Troubleshoot according to Diagnostic Trouble Code (DTC) chart, then go to step 8
----------	--

Result

Proceed to
Next

Next

Go to step 7

7	Troubleshoot according to Problem Symptoms Table, then go to step 8
----------	---

Result

Proceed to
Next

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Next

8	Adjust, repair or replace
----------	---------------------------

Result

Proceed to
Next

Next

9	Conduct test and confirm malfunction has been repaired
----------	--

Result

Proceed to
Next

Next

End

Trouble Symptom Diagnosis

Trouble Diagnosis

If wiper wash function of BCM is failed, perform diagnosis according to trouble symptom. Check input/output of BCM wiper washer for normal operation. If input/output is normal, there is a malfunction in BCM. Otherwise, check the input or output part.

Read data stream

Connect the tester and select model Tiggo 8/T18, select "Body Control System".

1. Read DTCs
 - Read current DTC
 - Read history DTC
2. Clear DTCs
 - Clear current DTC and history DTC.

3. Read data stream

Warning:**Caution**

- Turn ignition switch to ON before reading certain data stream.

(a) Wiper washer input state

- (1) Front wiper (high speed range): Not activated/activated. When wiper switch is operated in this position, screen displays activated, otherwise it displays not activated.
- (2) Front wiper (low speed range): Not activated/activated. When wiper switch is operated in this position, screen displays activated, otherwise it displays not activated.
- (3) Front wiper (automatic/intermittent): Not activated/activated. When wiper switch is operated in this position, screen displays activated, otherwise it displays not activated.
- (4) Front washer: Not activated/activated. When wiper switch is operated in this position, screen displays activated, otherwise it displays not activated.
- (5) Rear washer: Not activated/activated. When wiper switch is operated in this position, screen displays activated, otherwise it displays not activated.
- (6) Wiper intermittent range 1 (13S), 2 (8S), 3 (4S), 4 (2S): Not activated/activated. When wiper switch is operated in this position, screen displays activated, otherwise it displays not activated.

4. Operation test

- (a) Click "ON" on the front wiper (high speed range) to operate wiper at high range. Click "OFF" to stop operation.
- (b) Click "ON" on the washer to operate washer motor. Click "OFF" to stop operation.
- (c) Click "ON" on the front wiper (low speed range) to operate wiper at low range. Click "OFF" to stop operation.
- (d) Click "ON" on the front washer to operate front wiper. Click "OFF" to stop operation.



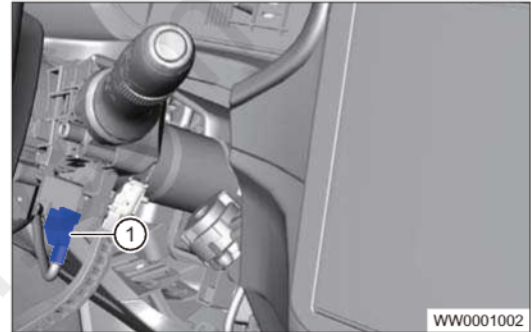
ON-VEHICLE SERVICE

Wiper Switch Assembly

Removal

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. Turn off all electrical equipment and the ignition switch.
 2. Disconnect the negative battery cable.
 3. Remove the combination switch cover (See page 47-11).
 4. Remove the wiper switch assembly.
 - (a) Disconnect the wiper switch connector (arrow).



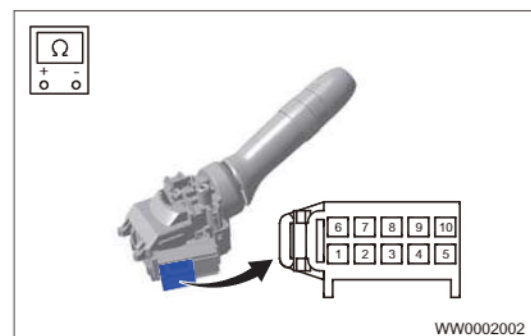
- (b) Detach fixing clamp of wiper switch from combination switch and remove the wiper switch.

Inspection

- 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 wiper switch assembly.
 - (a) Using a digital multimeter, check for continuity between terminals of wiper switch assembly according to the 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 the wiper switch assembly.



Installation

1. Installation is in the reverse order of removal.

Caution:

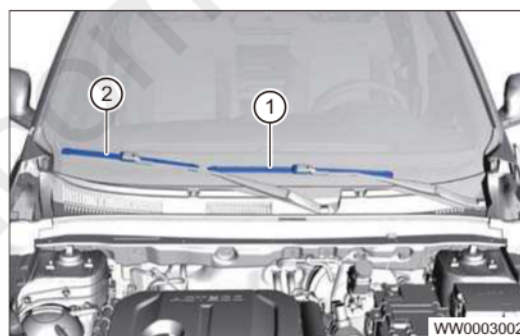
- Always operate carefully to prevent components from being damaged, when installing wiper switch assembly.
- Install connectors in place when installing wiper switch assembly.
- Check wiper switch for proper operation after installing wiper switch assembly.

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 the ignition switch.
 2. Disconnect the negative battery cable.
 3. Remove the front wiper blade assembly.
 - (a) As shown in illustration, press the button in the direction of arrow, slightly pull it outwards to remove front wiper main blade (1) and front wiper sub blade (2).



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Installation

1. Installation is in the reverse order of removal.



Front Wiper Arm Assembly

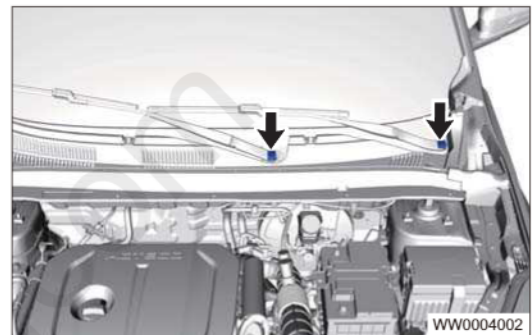
Removal

Caution:

- 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 the ignition switch.
2. Open the hood.
3. Disconnect the negative battery cable.
4. Remove the front wiper arm assembly.

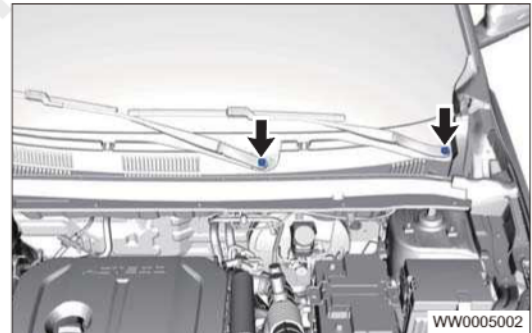
- (a) Using a screwdriver wrapped with protective tape, remove the front wiper arm trim caps (arrow).



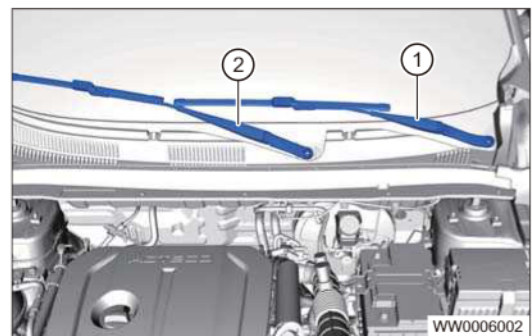
- (b) Remove 2 fixing nuts (arrow) from front wiper arm assembly.

Tightening torque

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



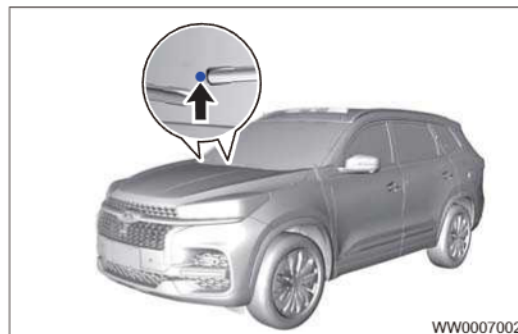
- (c) Remove the front main wiper arm (1) and front sub wiper arm (2).



Installation

Caution:

- Operate carefully to prevent other components from being damaged, when installing front wiper arm assembly.
- Be sure to tighten fixing nuts to the 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 the locating points on front windshield assembly when installing. Wiper arm blade should be pressed against the points as shown in the illustration:
1. Installation is in the reverse order of removal.

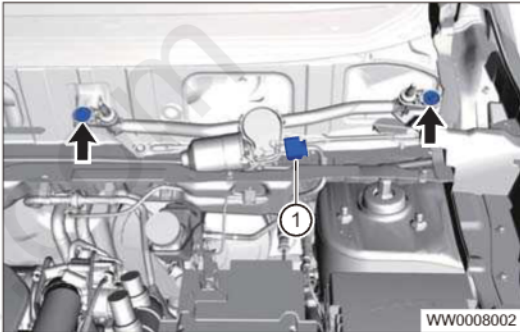
Front Wiper Motor and Link Rod Assembly

Removal

Caution:

- 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 wiper arm assembly (See page 35-14).
 4. Remove the front windshield lower support assembly (See page 50-16).
 5. Remove the wiper motor and link rod assembly.
 - (a) Disconnect the 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 LO operation.

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

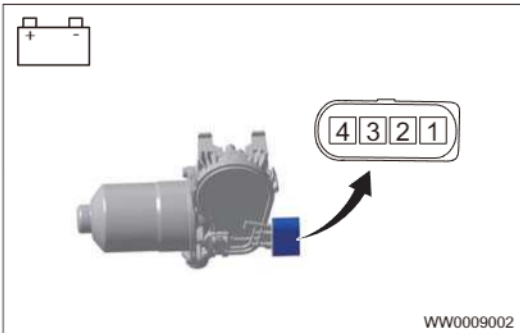
If result is not as specified, replace front wiper motor assembly.

- (b) Check HI operation.

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

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

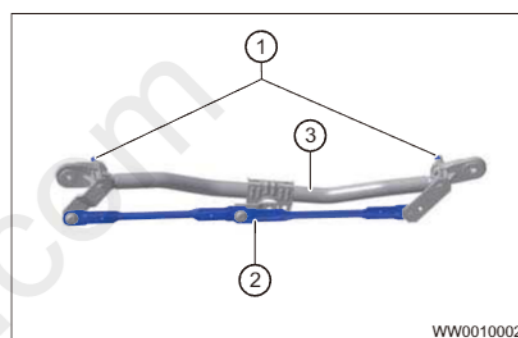
- (c) Check the auto return function.
 - Connect positive (+) battery lead to terminal 2 or 1, and connect negative (-) battery lead to terminal 4. When motor operates at low speed (LO) or high speed (HI), disconnect positive (+) battery lead to stop front wiper motor in a position except for original 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 operate to original position at low speed (LO) again.
- Check whether the front wiper motor assembly can stop automatically after it operates to original position.
OK: Motor operates 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 the pivot (1) for looseness or falling off, link rod (2) for deformation or break, and shaft sleeve (3) for catching. Replace the wiper link rod if necessary.



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Installation

1. Installation is in the reverse order of removal.

Caution:

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

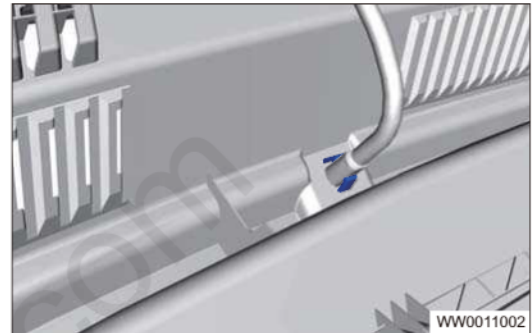


Front Washer Nozzle Assembly

Removal

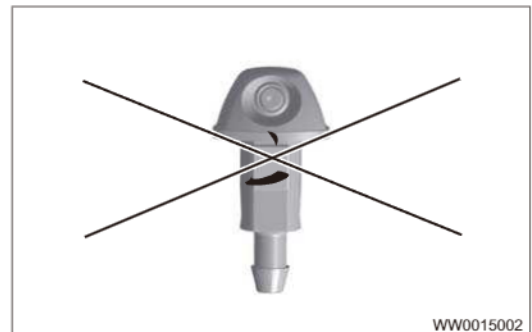
Caution:

- Be sure to wear safety equipment to prevent accidents when removing front washer 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 the ignition switch.
 2. Disconnect the negative battery cable.
 3. Remove the front windshield lower support assembly (See page 50-16).
 4. Remove the front nozzle assembly.
 - (a) Loosen the front washer nozzle assembly and disconnect water spray hose in the direction of arrow as shown in the illustration.



Inspection

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



Installation

1. Installation is in the reverse order of removal.

Caution:

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

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 the rear wiper arm assembly in the direction of arrow as shown in illustration.



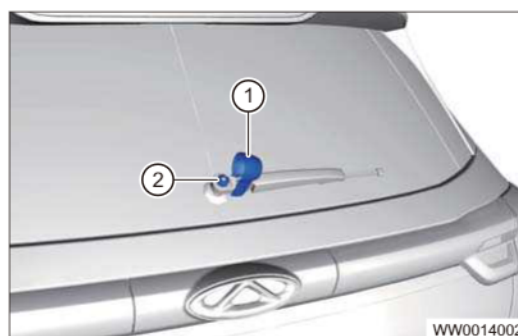
- (b) Pull the rear wiper arm blade from rear wiper arm assembly in the direction of arrow as shown in illustration.



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 ± 1.5 N·m



- (c) Remove the rear wiper arm assembly.



Installation

1. Installation is in the reverse order of removal.

Caution:

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

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 arm assembly. Be careful not to operate roughly.
- Try to prevent rear windshield assembly from being scratched when removing rear wiper motor assembly.

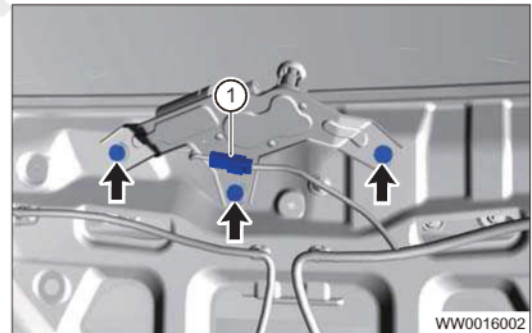
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1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the rear wiper arm assembly (See page 35-19).
4. Remove the luggage compartment protector assembly.
5. Remove the rear wiper motor assembly.
 - (a) Disconnect the rear wiper motor assembly connector (1).
 - (b) Remove 3 fixing bolts (arrow) from rear wiper motor assembly.

Tightening torque

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

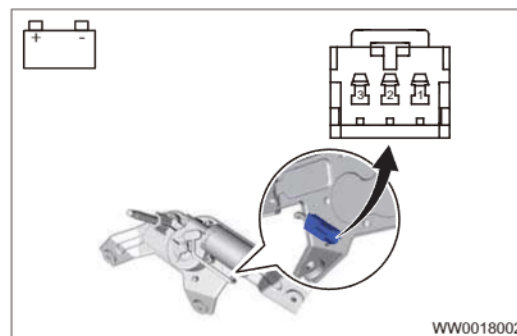
- (c) Remove the rear wiper motor assembly.
- (d) Using a screwdriver wrapped with protective tape, pry off the gasket (arrow).



Inspection

1. Check the rear wiper motor assembly.

(a) Check the rear wiper motor assembly operation.



Pin	Function	Rating Current	Current		Signal Type	Used Wire Diameter
			Imin (A)	Imax (A)		(mm ²)
1	Positive (red)	1.5 A	≤ 2 A	≤ 11 A	Direct current	0.75
2	Reset (black)	1.5 A	≤ 2 A	≤ 11 A	Direct current	0.75
3	Negative (blue)	1.5 A	≤ 2 A	≤ 11 A	Direct current	0.75

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

Installation

1. Installation is in the reverse order of removal.

Caution:

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



Rear Nozzle Assembly

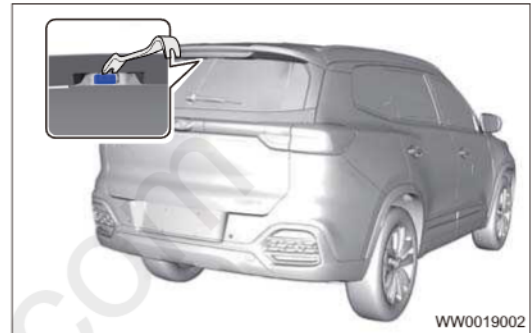
Removal

Caution:

- Be sure to wear safety equipment to prevent accidents when removing rear washer nozzle assembly.
- Appropriate force should be applied when removing rear washer 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 (See page 50-21).
4. Remove the rear nozzle assembly.

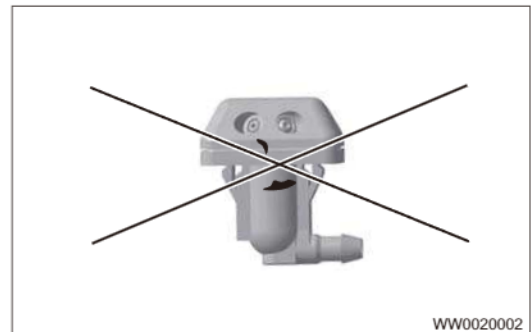
- (a) Remove the rear nozzle assembly (arrow) with a interior crow plate and disconnect connecting water pipe.



- (b) Remove the rear nozzle assembly

Inspection

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



Installation

1. Installation is in the reverse order of removal.

Caution:

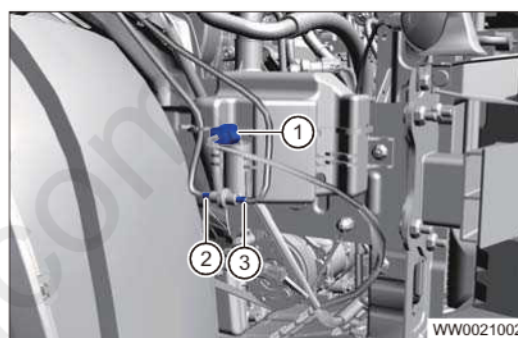
- Always operate carefully to prevent components from being damaged when installing rear washer nozzle assembly.
- Install washer line joints in place when installing rear washer nozzle assembly.
- Check rear washer nozzle for proper operation after installing rear washer nozzle assembly.

Washer Pump Assembly

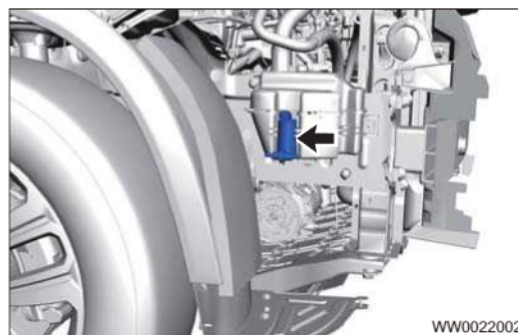
Removal

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 (See page 50-6).
 4. Remove the washer pump assembly.
 - (a) Disconnect the front and rear washer pump connectors (1).
 - (b) Disconnect the joint (3) between rear washer line and washer pump, and disconnect 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 the 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 the washer pump assembly.



Installation

1. Installation is in the reverse order of removal.

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.

Washer Fluid Reservoir Assembly

Removal

Caution:

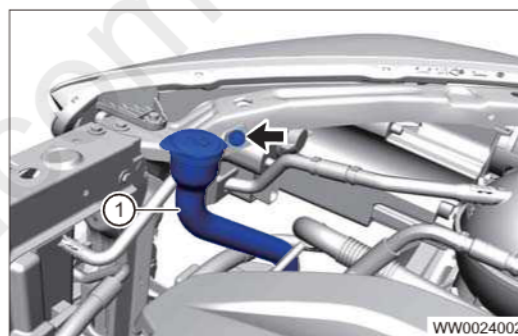
- Be sure to wear necessary safety equipment to prevent accidents when removing washer fluid reservoir assembly.
- Appropriate force should be applied when removing washer fluid reservoir assembly. Be careful not to operate roughly.
- Try to prevent body paint surface from being scratched removing washer 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 (See page 50-6).
4. Remove the guide pipe assembly.
 - (a) Remove the fixing bolt (arrow) from guide pipe assembly.

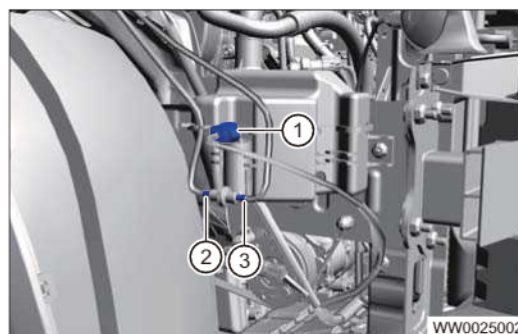
Tightening torque

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

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



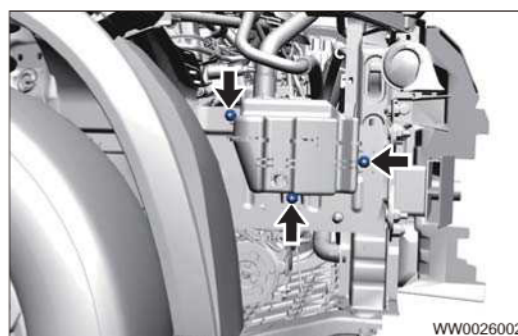
5. Remove the washer fluid reservoir assembly.
 - (a) Disconnect the front and rear washer pump connectors (1).
 - (b) Disconnect the joint (3) between rear washer line and washer pump, and disconnect joint (2) between front washer line and washer pump.



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

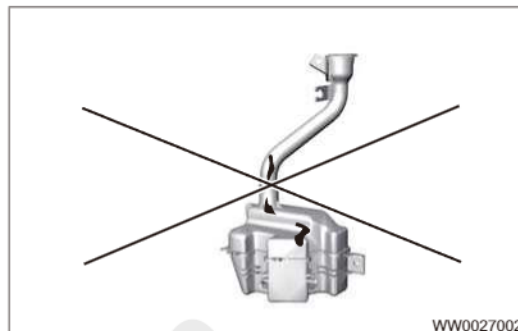
Tightening torque

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



Inspection

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



35 Installation

1. Installation is in the reverse order of removal.

Caution:

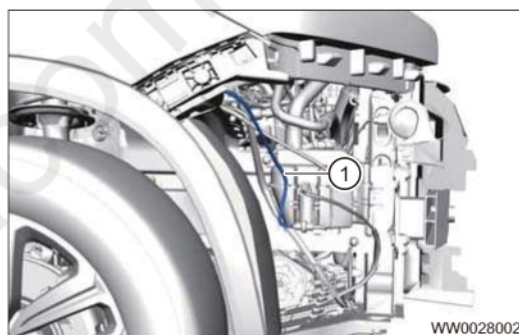
- Always operate carefully to prevent components from being damaged when installing washer fluid reservoir assembly.
- Tighten fixing bolts to the specified torque, when installing washer fluid reservoir assembly.
- Install washer line joint in place when installing washer fluid reservoir assembly.

Front Washer Line Assembly

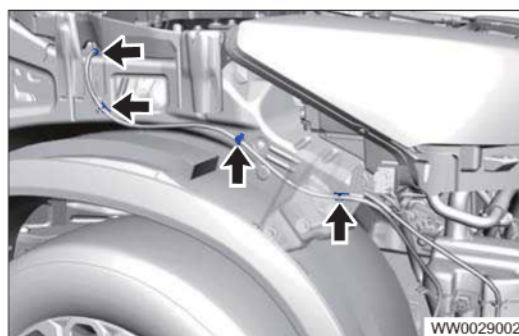
Removal

Caution:

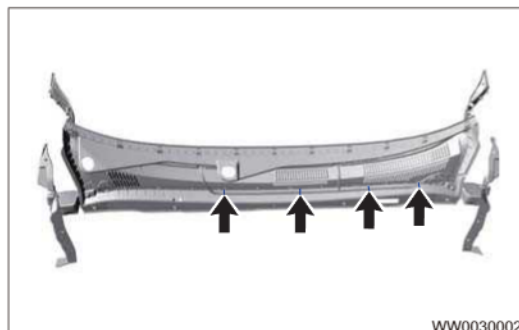
- Be sure to wear necessary safety equipment to prevent accidents when removing washer line assembly.
 - Appropriate force should be applied when removing washer line assembly. Be careful not to operate roughly.
 - Try to prevent body paint surface from being scratched when removing washer line assembly.
1. Turn off all electrical equipment and the ignition switch.
 2. Disconnect the negative battery cable.
 3. Remove the front bumper assembly (See page 50-6).
 4. Remove the front right wheel house protector assembly (See page 50-15).
 5. Remove the front windshield trim board assembly (See page 50-16).
 6. Remove the front nozzle assembly (See page 35-18).
 7. Remove the front washer line assembly.
 - (a) Disconnect the joint (1) between front washer line and front washer pump.



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



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



Installation

1. Installation is in the reverse order of removal.

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.

Rear Washer Line Assembly

Removal

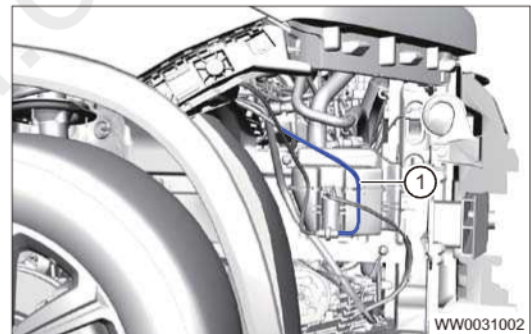
Caution:

- 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.

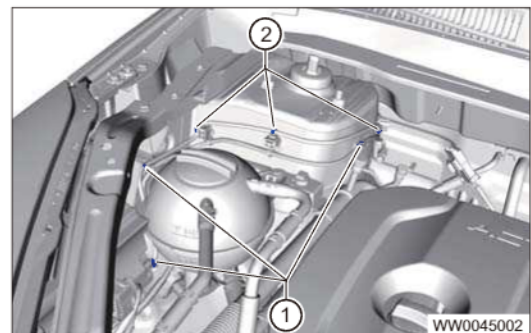
35

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the front bumper assembly (See page 50-6).
4. Remove the rear washer line assembly.

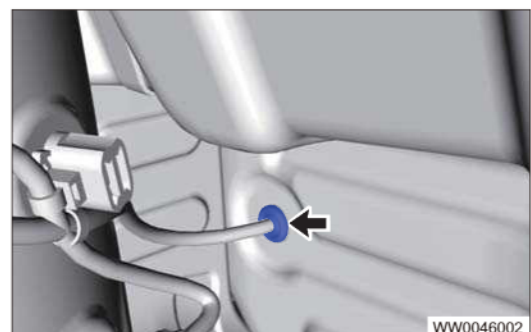
- (a) Disconnect the joint (1) between rear washer line and rear washer pump.



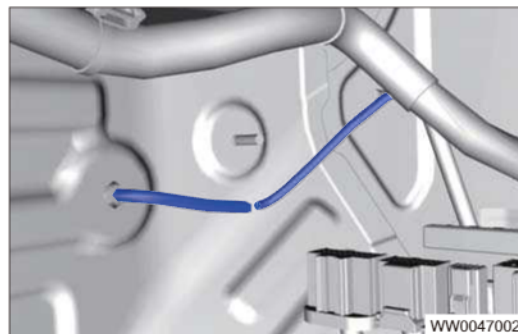
- (b) Follow line direction and remove line from 3 fixing clips (1) and 3 band clips (2) from projection welding stud.



- (c) Separate washer line from two- way of wire harness end line (arrow).



- (d) Remove sealing ring with line from front baffle plate.



Installation

1. Installation is in the reverse order of removal.

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.



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