

WIPER AND WASHER SYSTEM

6605A-08

PRECAUTION

1. PRECAUTION FOR WASHER NOZZLE (4WAY TYPE) HANDLING

- (a) Do not adjust the washer nozzle with a safety pin, etc. as the washer nozzle tip is made of resin and could be damaged. Be sure to use SST for adjustment.
SST 95060-10010
- (b) When the washer nozzle is clogged with wax, etc., do not use metal objects such as a safety pin to clean the washer nozzle hole. Be sure to use a soft resin brush, etc.

NOTICE FOR INITIALIZATION:

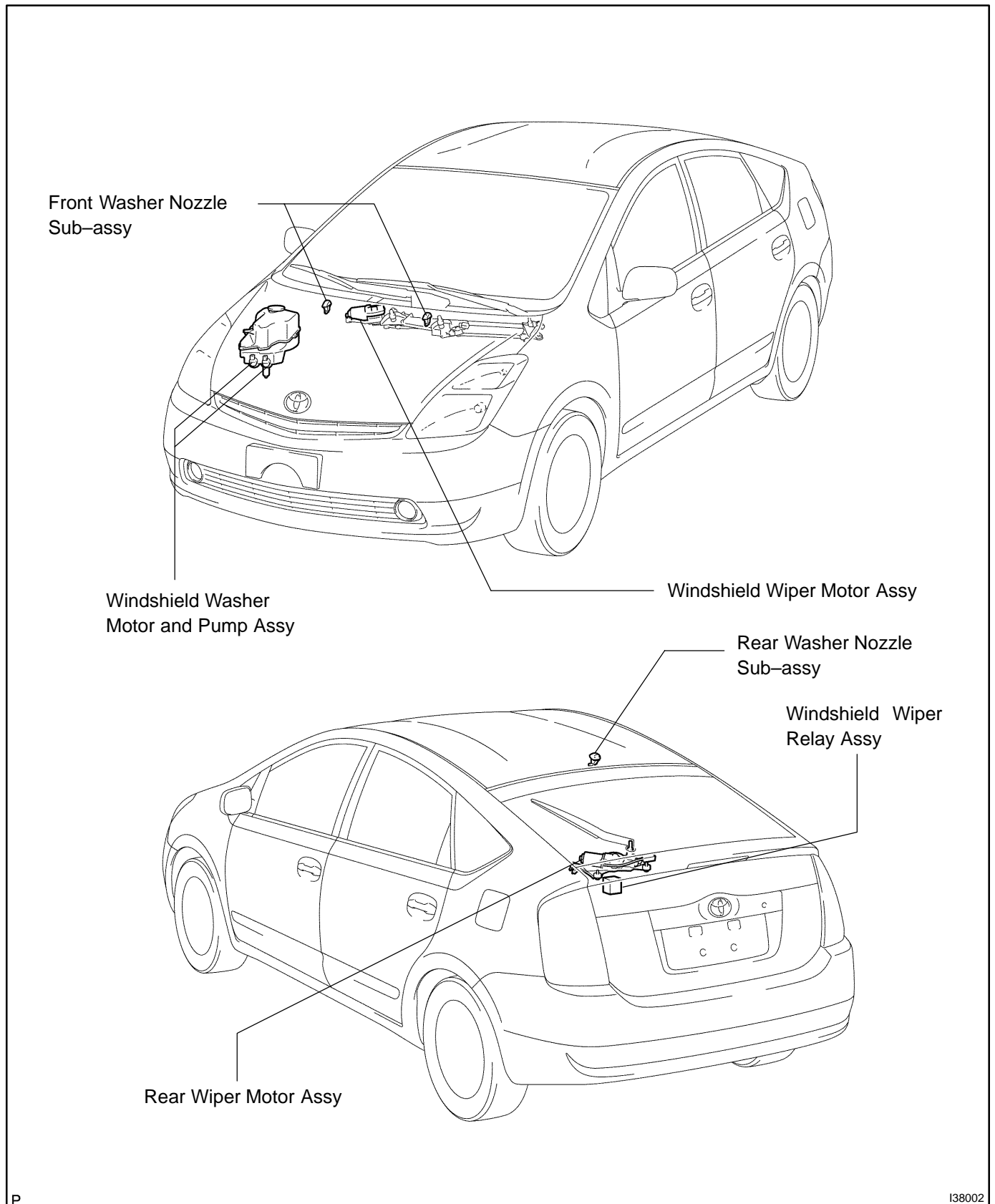
When disconnecting the negative (-) battery terminal, initialize the following systems after the terminal is reconnected.

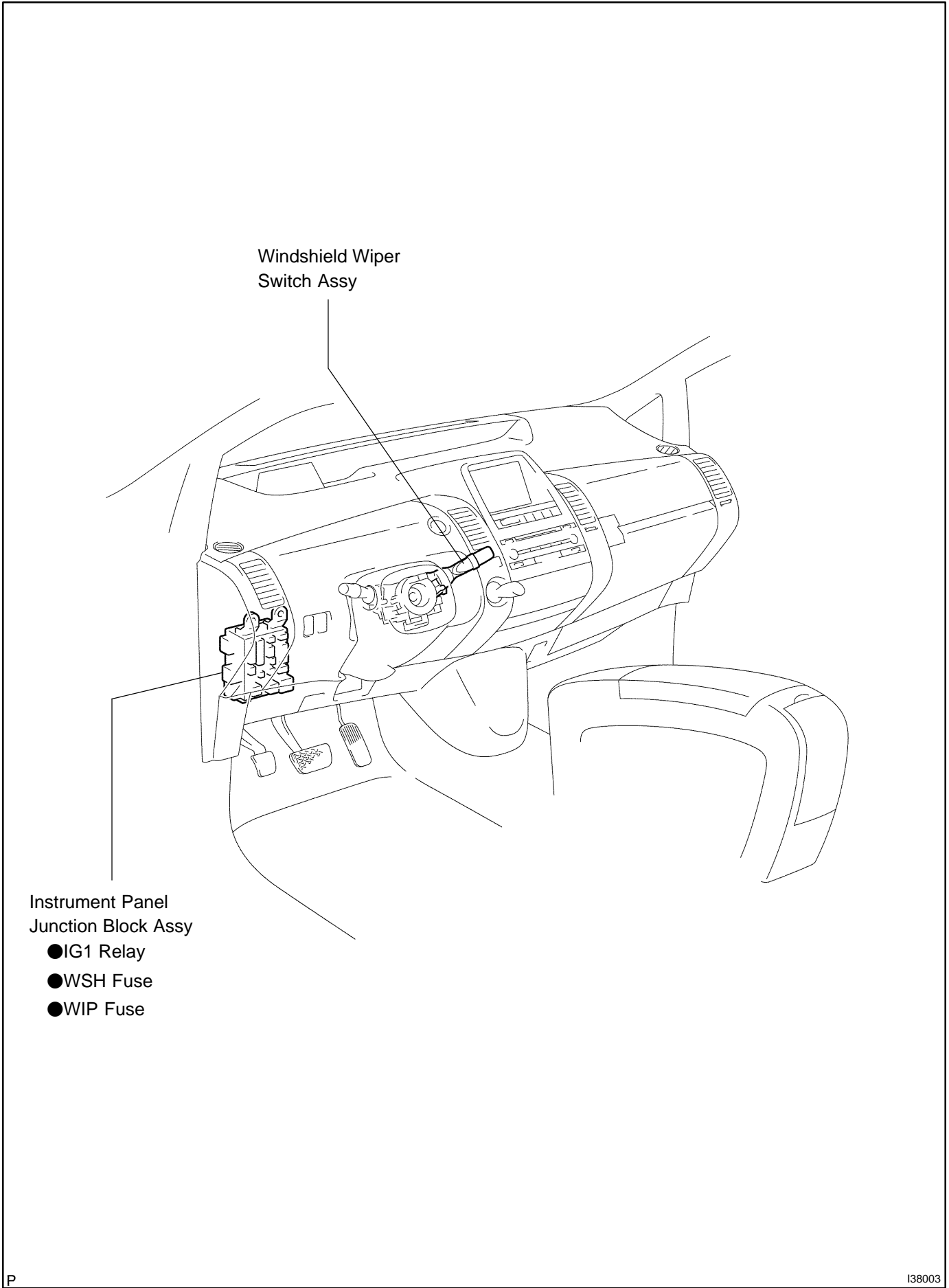
System Name	See page
Power Window Control System	01-28

NOTICES FOR HYBRID SYSTEM ACTIVATION:

- When the warning lamp is illuminated or the battery has been disconnected and reconnected, pressing the power switch may not start the system on the first try. If so, press the power switch again.
- With the power switch's power mode changed to ON (IG), disconnect the battery. If the key is not in the key slot during recollection, DTC B2799 may be output.

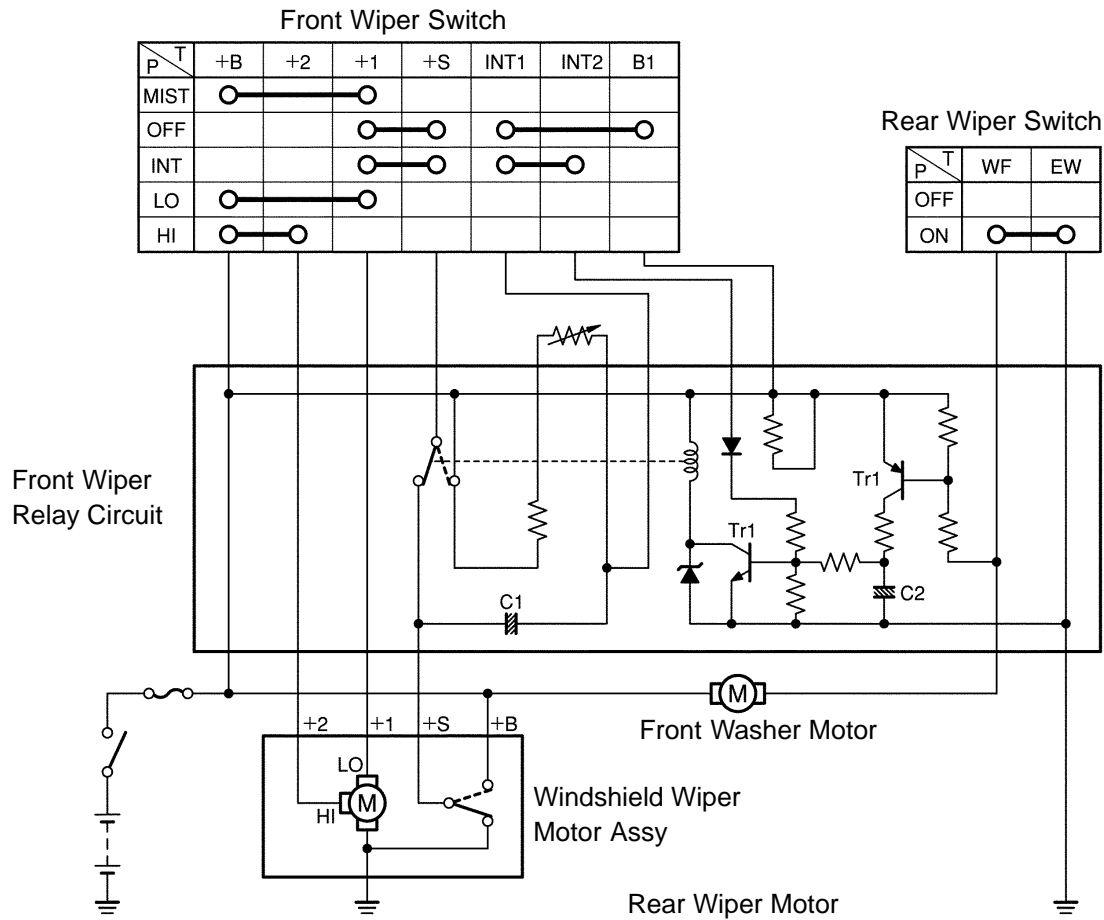
LOCATION



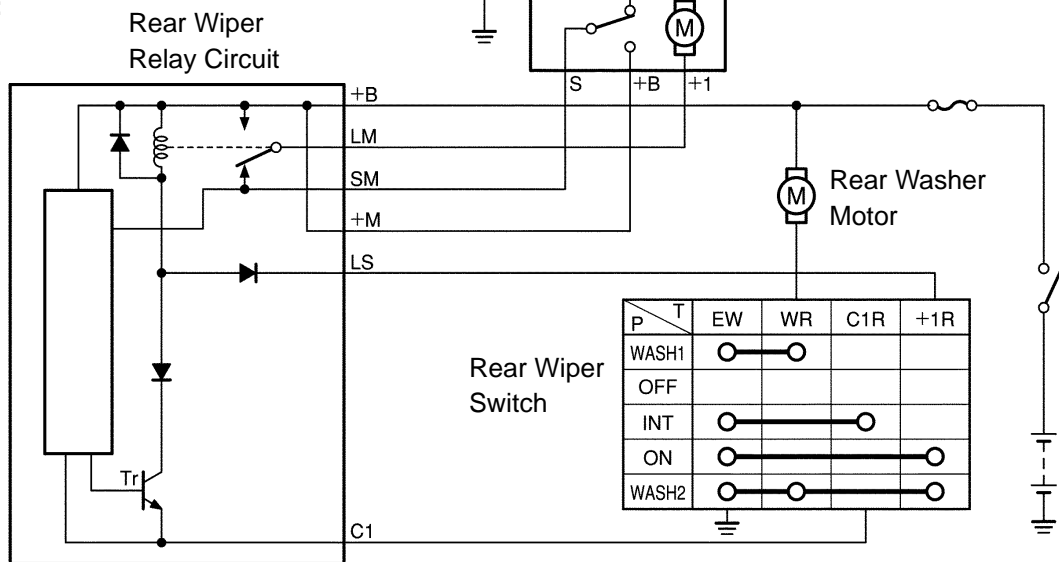


SYSTEM DIAGRAM

Front Wiper:



Rear Wiper:



P

138001

SYSTEM DESCRIPTION

1. WASHER LINKED OPERATION

(a) This system operates the front wipers at low speed immediately after a jet of washer fluid when the front washer switch is on for 0.3 second or more. The system operates the front wipers at low speed for approximately 2.2 seconds and then stops operation when the washer switch is on for 1.5 seconds or more.

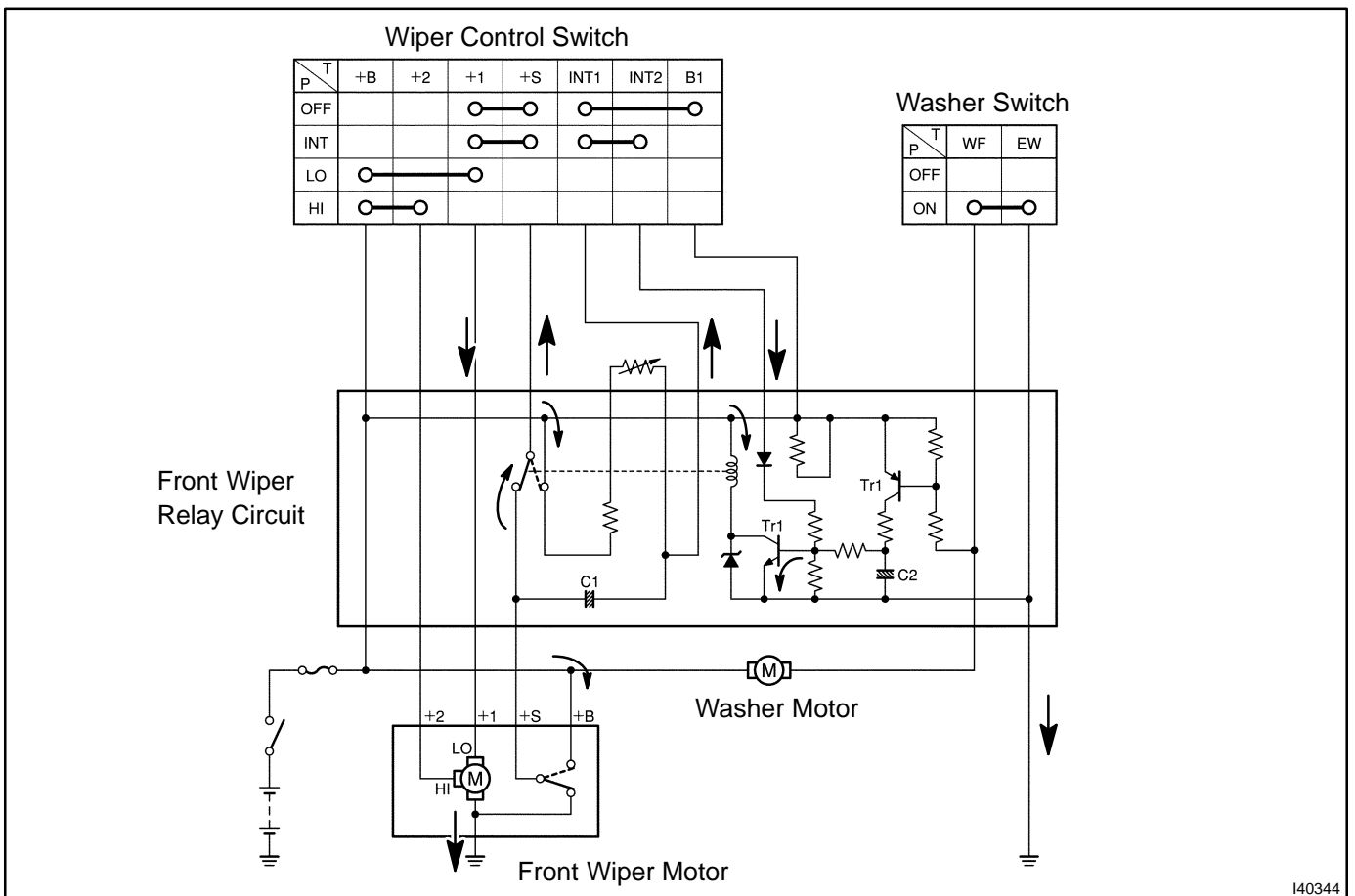
2. INTERMITTENT OPERATION

(a) The system operates the front wipers once in approximately 1.6 to 10.7 seconds when the front wiper switch is turned to the INT position. The intermittent time can be adjusted from 1.6 to 10.7 seconds by using the intermittent time adjust dial.

(b) If the wiper control switch is turned to the INT position, current flows from the already charged capacitor C1 through terminals INT1 and INT2 of the wiper control switch, to Tr1 (transistor). When Tr1 turns on, current flows from terminal +S of the wiper control switch to terminal +1 of the wiper control switch, to terminal +1 of the wiper motor, to the wiper motor and finally to ground, causing the wiper motor to operate. At the same time, current flows from capacitor C1 to terminal INT1 of the wiper control switch and then INT2. When the current flow from capacitor C1 ends, Tr1 turns off to stop the relay contact point and halt the wiper motor.

When the relay contact point turns off, capacitor C1 begins to charge again and Tr1 remains off until charging has been completed. This period corresponds to the intermittent time. When capacitor C1 is fully charged, Tr1 turns on and then the relay contact point turns on, causing the motor to operate again. This cycle is the intermittent operation.

The intermittent time can be adjusted by using the intermittent time adjust dial (variable resistor) to change the charge time of capacitor C1.



I40344

3. REAR WIPER INTERMITTENT OPERATION

(a) When the rear wiper control switch is turned to the INT position, current flows from the capacitor of the intermittent operation control circuit to turn on Tr. Current flows from terminal +B of the rear wiper relay, to relay coil, to Tr, to terminal C1 of the rear wiper relay, to terminal C1R of the rear wiper control switch and finally to ground, causing the relay contact point to turn on.

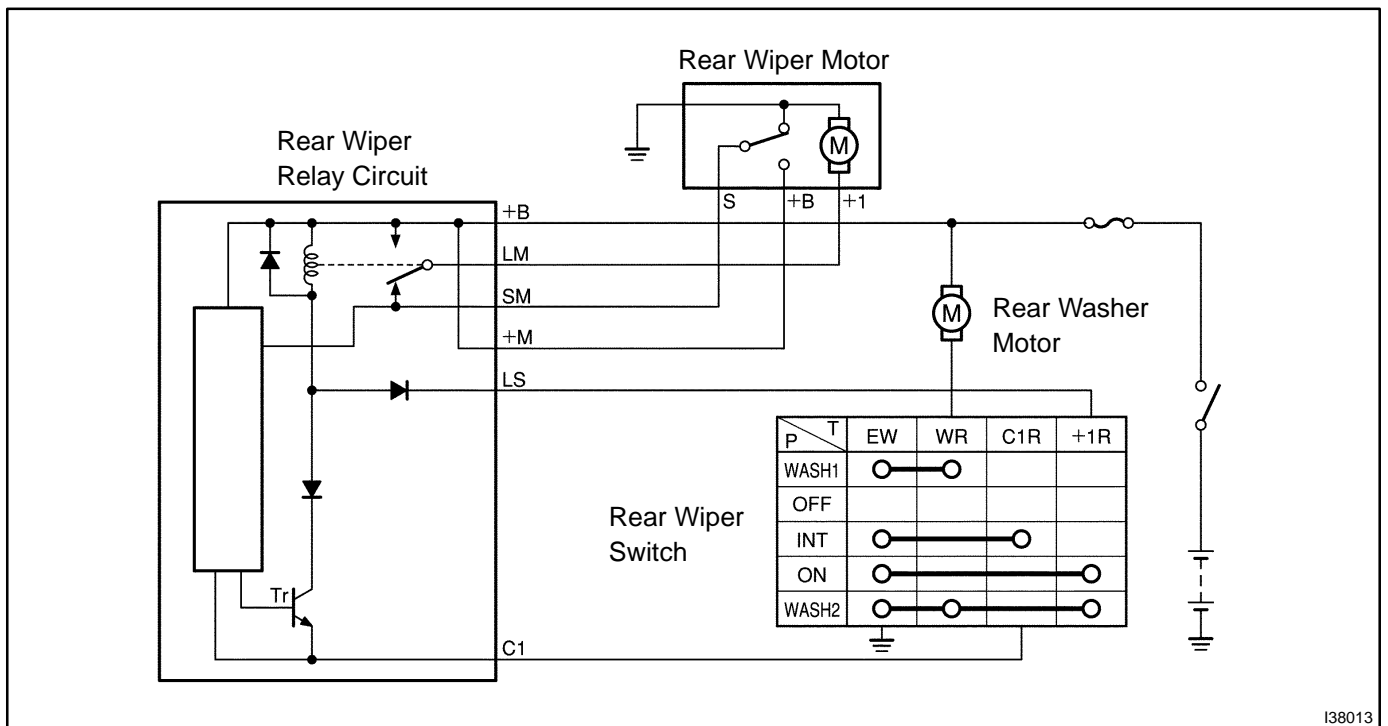
When the relay contact point turns on, current flows from terminal +B of the rear wiper relay to the relay contact point, to terminal LM of the rear wiper relay, to terminal +1 of the rear wiper motor, to the rear wiper motor and finally to ground, causing the rear wiper motor to operate.

Tr turns off immediately after the rear wiper motor operation as the current flow from capacitor ends, causing the relay contact point to turn off.

Even when the relay contact point turns off, current flows from terminal +B of the rear wiper motor, to the relay contact point in the rear wiper motor, to terminal S of the rear wiper motor, to terminal SM of the rear wiper relay, to the contact point of the rear wiper relay, to terminal LM of the rear wiper motor, to terminal +1 of the rear wiper motor and finally to ground until the rear wiper motor stops at the automatic stop position, causing the rear wiper motor to operate. Then the rear wiper motor stops at the automatic stop position as the relay contact point in the rear wiper motor turns off.

The capacitor in the intermittent operation control circuit is charged in approximately 12 seconds after the current flow ends. After the charge is completed, current starts flowing again to turn on Tr, causing the relay contact point to turn on.

This cycle (of current flow and charging) as described above is the intermittent operation.



I38013

PROBLEM SYMPTOMS TABLE

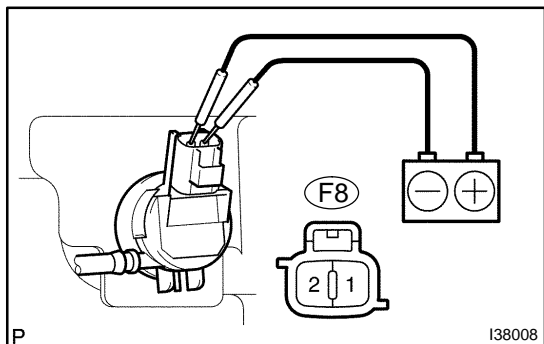
1. FRONT WIPER AND WASHER SYSTEM

Symptom	Suspected Area	See page
Both front wipers and washer systems do not operate.	4. Windshield Wiper Switch Assy 5. Wire Harness or connector	66-10 –
Front wipers do not operate when the windshield washer is normal.	1. WIP fuse 2. Windshield wiper switch assy 3. Windshield wiper motor assy 4. Wire harness or connector	– 66-10 66-10 –
Front wipers do not operate in LO or HI.	1. Windshield Wiper Switch Assy 2. Windshield Wiper Motor Assy 3. Wire Harness or connector	66-10 66-10 –
Front wipers do not operate in INT.	1. Windshield wiper switch assy 2. Windshield wiper motor assy 3. Wire harness or connector	66-10 66-10 –
Windshield washer motor does not operate.	1. WSH fuse 2. Windshield wiper switch assy 3. Windshield washer motor and pump assy 4. Wire harness or connector	– 66-10 66-8 –
Front wipers do not operate when a jet of washer fluid is emitted with the washer switch on.	1. Windshield wiper switch assy 2. Windshield wiper motor assy 3. Wire harness or connector	66-10 66-10 –
A jet of washer fluid is not emitted when windshield washer motor is normal.	1. Washer hose and nozzle	–
Wiper blade does not return or the return position is wrong when the windshield wiper switch is off.	1. Windshield wiper arm installation position 2. Windshield wiper motor assy 3. Wire harness or connector	66-14 66-10 –

2. REAR WIPER AND WASHER SYSTEM

Symptom	Suspected Area	See page
Both rear wiper and washer systems do not operate.	1. Windshield wiper switch assy 2. Wire harness or connector	66-10 –
Rear wiper does not operate in INT or ON.	1. Windshield wiper switch assy 2. Rear wiper motor assy 3. Wire harness or connector	66-10 66-10 –
Rear washer motor does not operate.	1. WSH fuse 2. Windshield wiper switch assy 3. Windshield washer motor and pump assy 4. Wire harness or connector	– 66-10 66-10 –
A jet of washer fluid is not emitted when rear washer motor is normal.	1. Washer hose and nozzle	–
Wiper blade does not return or the return position is wrong when the rear wiper switch is off.	1. Rear wiper arm installation position 2. Rear wiper motor assy 3. Wire harness or connector	66-19 66-10 –

ON-VEHICLE INSPECTION



1. WINDSHIELD WASHER MOTOR AND PUMP ASSY

(a) Operation Check

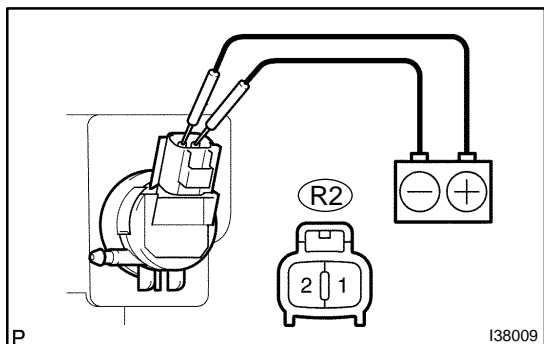
- (1) Fill the washer jar with washer fluid.

HINT:

Operation should be performed with the windshield washer motor and pump assy installed to the washer jar assy.

- (2) Connect the positive battery (+) lead to terminal 1 of the windshield washer motor and pump assy, and the negative battery (-) lead to terminal 2. Check that washer fluid flows from the washer jar.

Standard: Washer fluid flows from the washer jar.



2. REAR WASHER MOTOR ASSY (w/ Rear Wiper)

(a) Operation Check

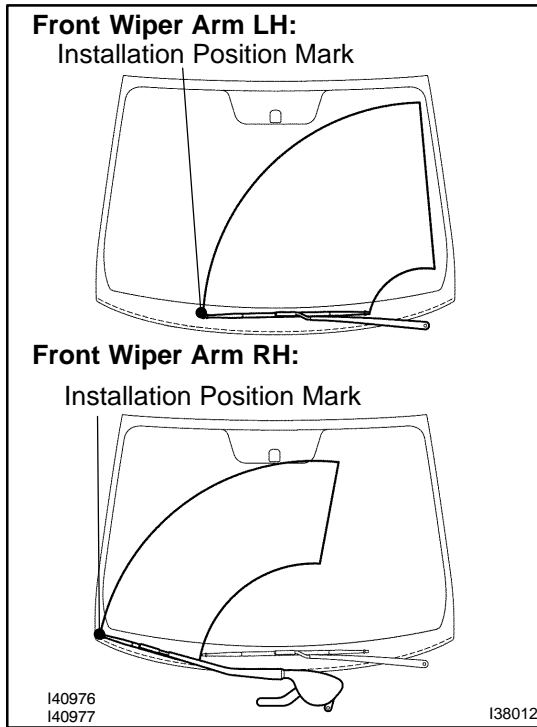
- (1) Fill the washer jar with washer fluid.

HINT:

Operation should be performed with the windshield washer motor and pump assy installed to the washer jar assy.

- (2) Connect the positive battery (+) lead to terminal 1 of the windshield washer motor and pump assy, and the negative battery (-) lead to terminal 2. Check that washer fluid flows from the washer jar.

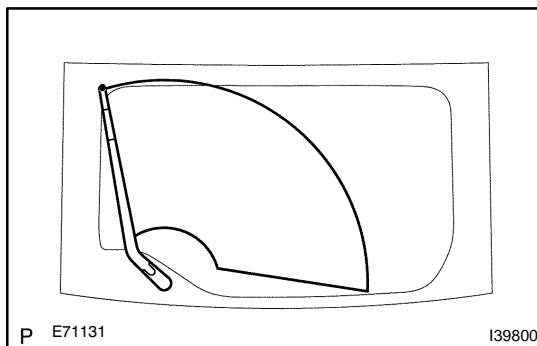
Standard: Washer fluid flows from the washer jar.



3. WINDSHIELD WIPER MOTOR ASSY

- (a) Automatic Stop Position Inspection
- (1) Operate the windshield wiper motor assy, and then stop the operation.
 - (2) Check the automatic stop position when stopping the windshield wiper motor assy operation.

Standard: Front wiper arm stops at the position shown in the illustration.

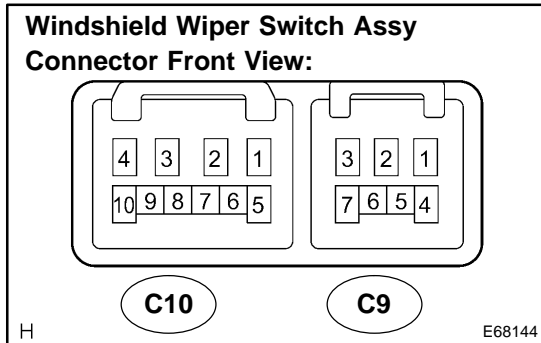


4. REAR WIPER MOTOR ASSY

- (a) Automatic Stop Position Inspection
- (1) Operate the rear wiper motor assy, and then stop the operation.
 - (2) Check the automatic stop position when stopping the rear wiper motor assy operation.

Standard: Rear wiper arm stops at the position shown in the illustration.

INSPECTION



1. WINDSHIELD WIPER SWITCH ASSY

- (a) Measure the resistance according to the value(s) in the table below.

Standard:

Front Wiper Switch

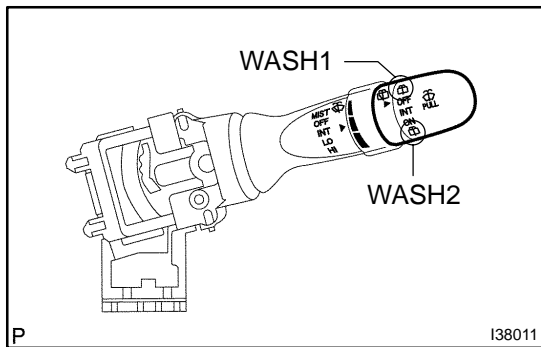
Switch position	Tester connection	Specified resistance
MIST	C10-2 (+B) – C10-3 (+1)	Below 1 Ω
OFF	C10-1 (+S) – C10-3 (+1)	Below 1 Ω
INT	C10-1 (+S) – C10-3 (+1)	Below 1 Ω
LO	C10-2 (+B) – C10-3 (+1)	Below 1 Ω
HI	C10-2 (+B) – C10-4 (+2)	Below 1 Ω

Rear Wiper Switch (w/ Rear Wiper)

Switch position	Tester connection	Specified resistance
OFF	C9-2 (EW) – C9-6 (C1R), C9-2 (EW) – C9-7 (+1R)	10 kΩ or higher
INT	C9-2 (EW) – C9-6 (C1R)	Below 1 Ω
ON	C9-2 (EW) – C9-7 (+1R)	Below 1 Ω

Front Washer Switch

Switch position	Tester connection	Specified resistance
OFF	C9-2 (EW) – C9-3 (WF)	10 kΩ or higher
ON	C9-2 (EW) – C9-3 (WF)	Below 1 Ω



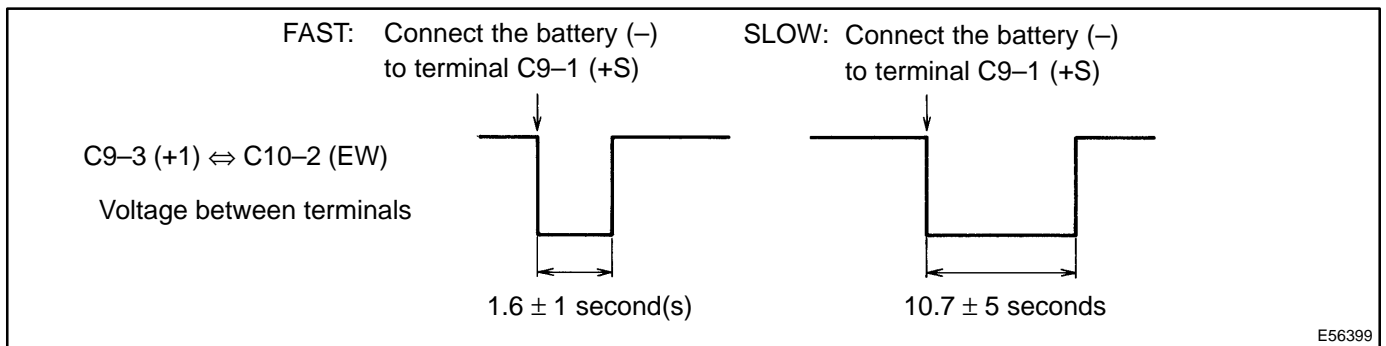
Rear Washer Switch (w/ Rear Wiper)

Switch position	Tester connection	Specified resistance
OFF	C10-5 (WR) – C9-2 (EW), C9-2 (EW) – C9-7 (+1R)	10 kΩ or higher
ON (WASH1)	C10-5 (WR) – C9-2 (EW)	Below 1 Ω
ON (WASH2)	C10-5 (WR) – C9-2 (EW), C9-2 (EW) – C9-7 (+1R)	Below 1 Ω

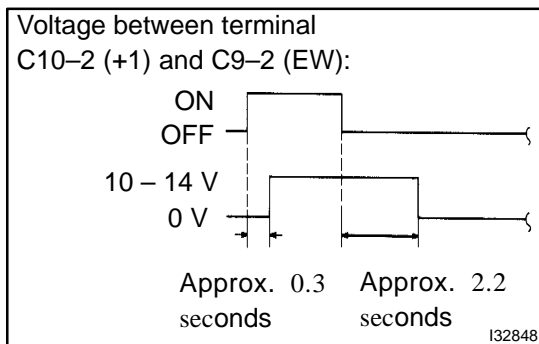
(b) Intermittent Operation Check

- (1) Connect the voltmeter (+) terminal to terminal C9-3 (+1) of the connector and the voltmeter (-) terminal to terminal C10-2 (EW).
- (2) Connect the positive battery (+) lead to terminal C9-2 (+B) of the connector and the negative battery (-) lead to terminals C10-2 (EW) and C9-1 (+S).
- (3) Turn the wiper switch to the INT position.
- (4) Connect the positive battery (+) lead to terminal C9-1 (+S) of the connector for 5 seconds.
- (5) Connect the negative battery (-) lead to terminal C9-1 (+S) of the connector. Operate the intermittent wiper relay and measure the voltage between terminals C9-3 (+1) and C10-2 (EW)

Standard: Refer to the illustration below.



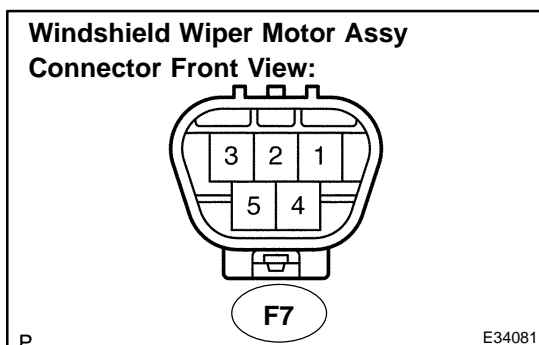
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(c) Front Washer Operation Check

- (1) Turn the wiper switch to the OFF position.
- (2) Connect the positive battery (+) lead to terminal C9-2 (+B) of the connector, the negative battery (-) lead to terminals C9-1 (+S) and the terminal C10-2(EW).
- (3) Connect the voltmeter (+) terminal to terminal C9-3 (+1) of the connector and the voltmeter (-) terminal to terminal C10-2 (EW).
- (4) Turn the washer switch to the ON and OFF positions, and measure the voltage between terminals C9-3 (+1) and C10-2 (EW).

Standard: Refer to the illustration on the left.



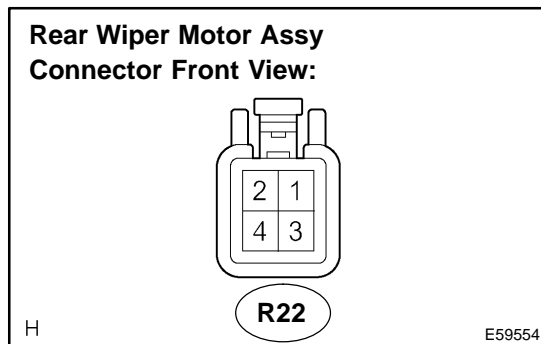
2. WINDSHIELD WIPER MOTOR ASSY

(a) LO Operation Check

- (1) Connect the positive battery (+) lead to terminal 1 (+1) of the connector, and the negative battery (-) lead to terminal 5 (E), and check that the windshield wiper motor assy operates at low speed (LO).

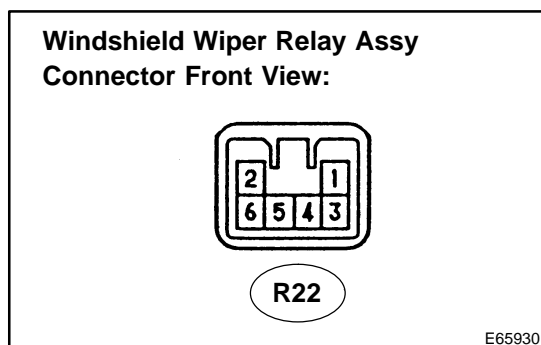
Standard: The motor operates at low speed (LO).

- (b) HI Operation Check
- (1) Connect the positive battery (+) lead to terminal 4 (+2) of the connector, and the negative battery (–) lead to terminal 5 (E), and check that the windshield wiper motor assy operates at high speed (HI).
- Standard: The motor operates at high speed (HI).**



3. REAR WIPER MOTOR ASSY

- (a) Operation Check
- (1) Connect the positive battery (+) lead to terminal 3 (+1), and the negative battery (–) lead to terminal 2 (–), and check that the rear wiper motor operates.
- Standard: The rear wiper motor operates.**



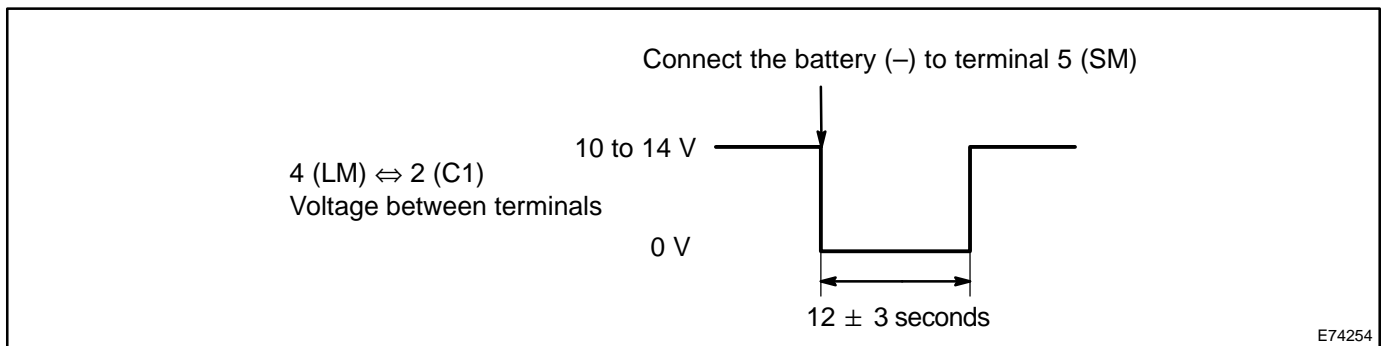
4. WINDSHIELD WIPER RELAY ASSY

- (a) Operation Check
- (1) Using a voltmeter, connect the voltmeter (+) terminal to terminal 4 (LM) of the connector, and the voltmeter (–) terminal to terminal 6 (LS).
 - (2) Connect the positive battery (+) lead to terminal 3 (+B) of the connector, and the negative battery (–) lead to terminal 6 (LS). Measure the voltage between terminals 4 (LM) and 6 (LS).
- Standard: 10 to 14 V**

(b) Intermittent Operation Check

- (1) Using a voltmeter, connect the voltmeter (+) terminal to terminal 4 (LM) of the connector, and the voltmeter (-) terminal to terminal 2 (C1).
- (2) Connect the positive battery (+) lead to terminal 3 (+B) of the connector, and the negative battery (-) lead to terminal 2 (C1). (Wiper switch is in the INT position.)
- (3) Connect the positive battery (+) lead to terminal 5 (SM) of the connector for approximately 5 seconds.
- (4) Connect the negative battery (-) lead to terminal 5 (SM) of the connector. Measure the voltage between terminals 4 (LM) and 2 (C1) when operating the intermittent wiper relay.

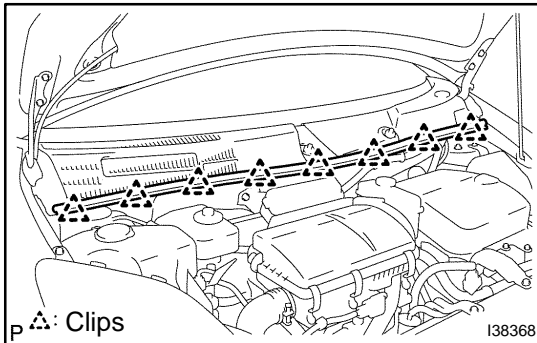
Standard: Refer to the illustration below.



WINDSHIELD WIPER MOTOR ASSY REPLACEMENT

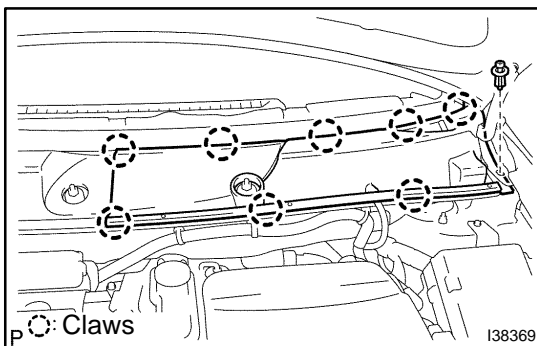
660HI-02

1. REMOVE FRONT WIPER ARM HEAD CAP
2. REMOVE FR WIPER ARM LH
 - (a) Remove the 2 nuts and the FR wiper arm LH.
3. REMOVE FR WIPER ARM RH
 - (a) Remove the nut and the FR wiper arm RH.



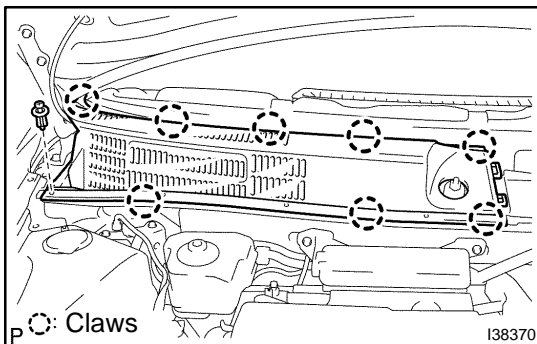
4. REMOVE HOOD TO COWL TOP SEAL

- (a) Disengage the 8 clips and remove the hood to cowl top seal.



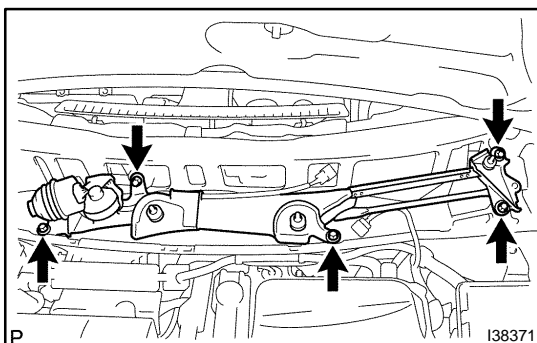
5. REMOVE COWL TOP VENTILATOR LOUVER LH

- (a) Disengage the 8 claws and clip, and remove the cowl top ventilator louver LH.



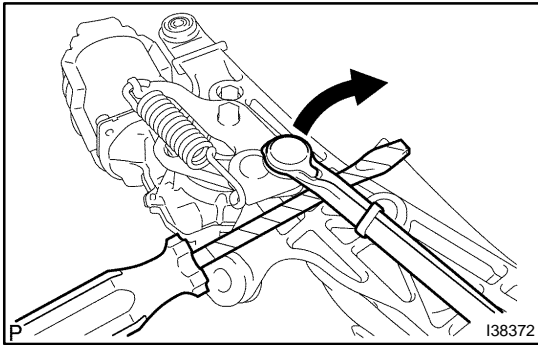
6. REMOVE COWL TOP VENTILATOR LOUVER RH

- (a) Disengage the 8 claws and clip, and remove the cowl top ventilator louver RH.



7. REMOVE WINDSHIELD WIPER MOTOR & LINK ASSY

- (a) Disconnect the connector.
- (b) Remove the 5 bolts and the windshield wiper motor & link assy.

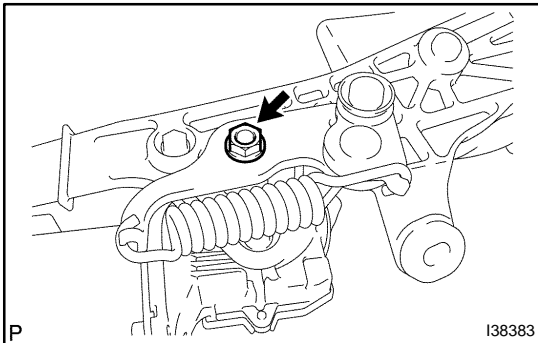


8. REMOVE WINDSHIELD WIPER MOTOR ASSY

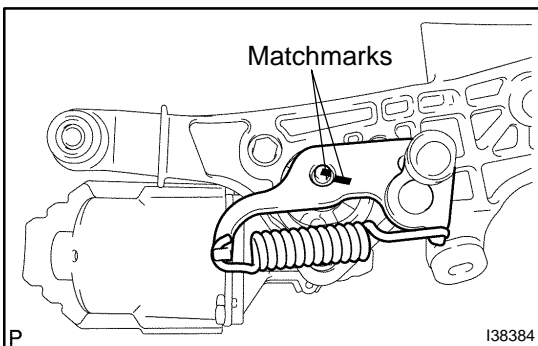
- (a) Using a flat-head screwdriver, disengage the windshield wiper link arm from the crank arm pivot of the windshield wiper motor assy.

HINT:

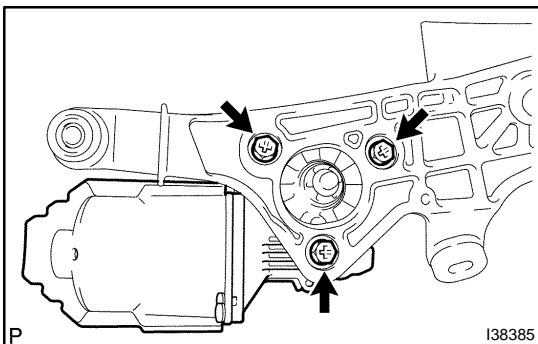
Tape up the screwdriver tip before use.



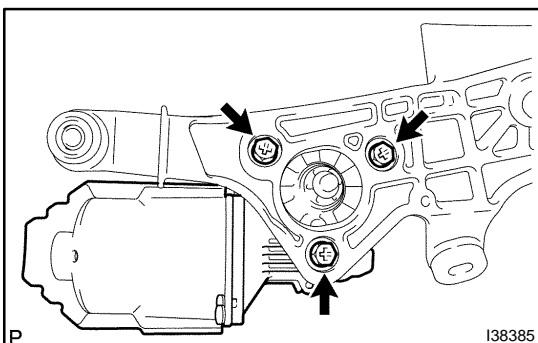
- (b) Remove the nut and washer.



- (c) Remove the crank arm assy.
 (d) Put matchmarks on the crank arm and windshield wiper motor assy, and remove the crank arm assy (when re-installing).



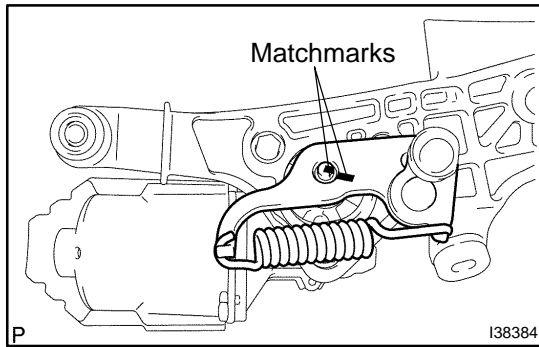
- (e) Remove the 3 bolts and the windshield wiper motor assy.



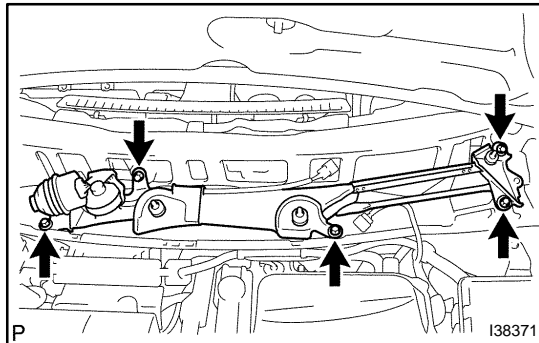
9. INSTALL WINDSHIELD WIPER MOTOR ASSY

- (a) Install the windshield wiper motor assy to the windshield wiper link assy with the 3 bolts.

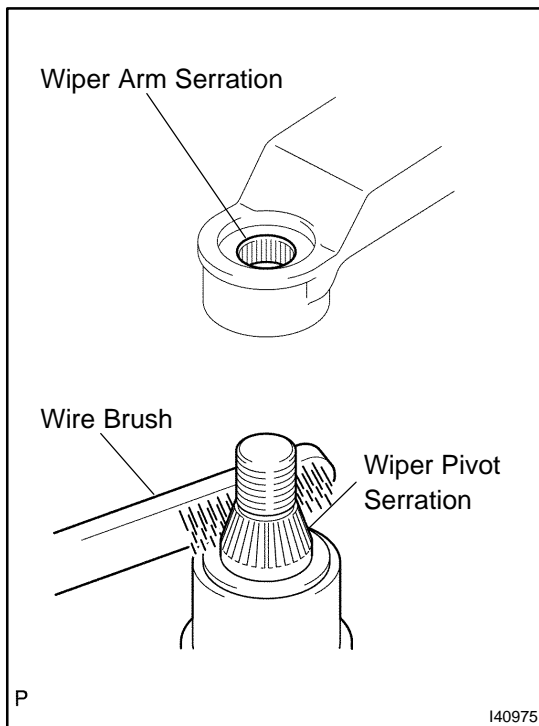
Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)



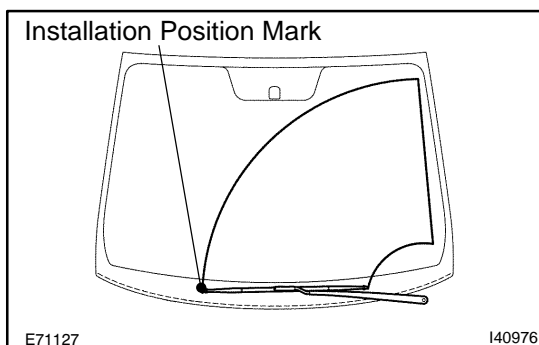
- (b) Install the crank arm assy with the washer and nut.
- (c) Align the matchmarks on the crank arm assy and windshield wiper motor assy, then install the crank arm assy with the washer and nut (when reinstalling).
Torque: 17 N·m (175 kgf·cm, 13 ft·lbf)
- (d) Apply MP grease to the crank arm pivot of the windshield wiper motor assy and install the windshield wiper link arm.



- 10. INSTALL WINDSHIELD WIPER MOTOR & LINK ASSY**
- (a) Install the windshield wiper motor & link assy with the 5 bolts.
Torque: 5.5 N·m (56 kgf·cm, 49 in·lbf)
 - (b) Connect the connector.



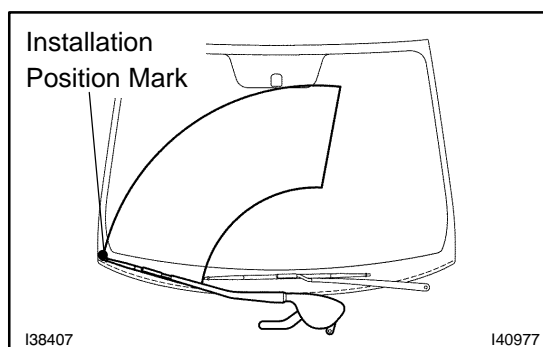
- 11. INSTALL FR WIPER ARM LH**
- (a) Clean the wiper arm serration with a round file or equivalent (when reinstalling).
 - (b) Clean the wiper pivot serration with a wire brush.



- (c) Install the front wiper arm LH with the nut so that the front wiper blade comes to the position shown in the illustration.
Torque: 21 N·m (214 kgf·cm, 15 ft·lbf)

HINT:

Hold down the arm hinge by hand in order to fasten the nut.



12. INSTALL FR WIPER ARM RH

- (a) Clean the wiper arm serration with a round file or equivalent (when reinstalling).
- (b) Clean the wiper pivot serration with a wire brush.
- (c) Install the front wiper arm RH with the 2 nuts so that the front wiper blade comes to the position shown in the illustration.

Torque: 21 N·m (214 kgf·cm, 15 ft·lbf)

HINT:

Hold down the arm hinge by hand in order to fasten the nut.

- (d) Operate the front wipers while spraying water or washer fluid on the windshield glass. Ensure that the wipers function properly and there is no interference with the body.

WIPER RUBBER REPLACEMENT

660HJ-01

1. REMOVE FRONT WIPER BLADE

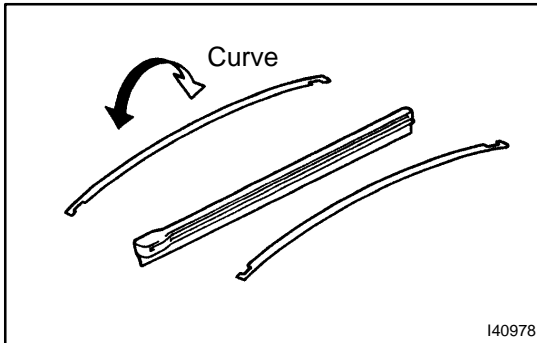
- (a) Remove the front wiper blade from the front wiper arm.

NOTICE:

Do not fold down the front wiper arm with the front wiper blade removed from it.

2. REMOVE WIPER RUBBER

- (a) Remove the wiper rubber from the front wiper blade.



3. INSTALL WIPER RUBBER

- (a) Install the wiper rubber so that the head part (larger side) of the wiper rubber faces the arm axle side.

NOTICE:

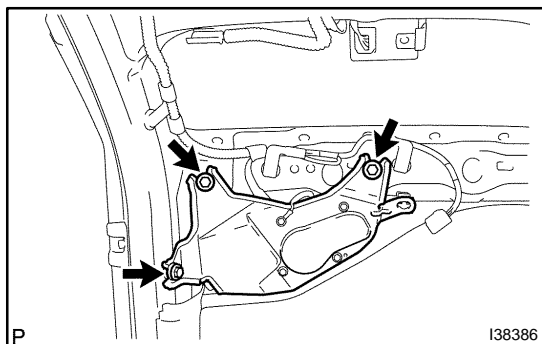
Push the front wiper blade into the grooves of the wiper rubber to engage them completely.

REAR WIPER MOTOR ASSY

660HK-02

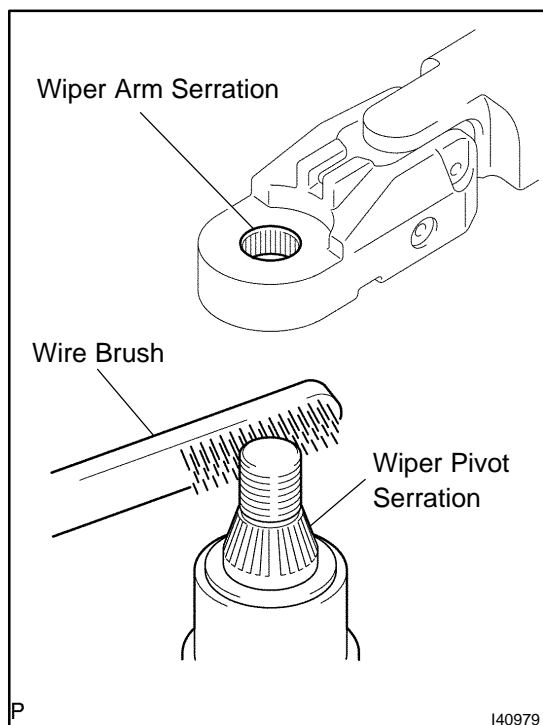
REPLACEMENT

1. REMOVE REAR WIPER ARM COVER
2. REMOVE REAR WIPER ARM ASSY
 - (a) Remove the nut and the rear wiper arm assy.
3. REMOVE BACK DOOR TRIM BOARD ASSY (SEE PAGE 75-33)
4. REMOVE BACK DOOR TRIM BOARD (SEE PAGE 75-33)

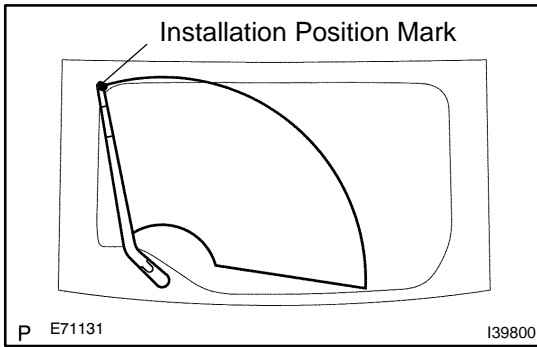


5. REMOVE REAR WIPER MOTOR ASSY
 - (a) Disconnect the connector.
 - (b) Remove the 3 bolts and the rear wiper motor assy.

6. INSTALL REAR WIPER MOTOR ASSY
 - (a) Install the rear wiper motor assy with the 3 bolts.
Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)
 - (b) Connect the connector.



7. INSTALL REAR WIPER ARM ASSY
 - (a) Clean the rear wiper arm serration with a round file or equivalent (when reinstalling).
 - (b) Clean the rear wiper pivot serration with a wire brush.



- (c) Stop the rear wiper motor assy at the automatic stop position. Install the rear wiper arm assy with the nut in the position shown in the illustration.

Torque: 5.5 N·m (56 kgf·cm, 49 in.-lbf)

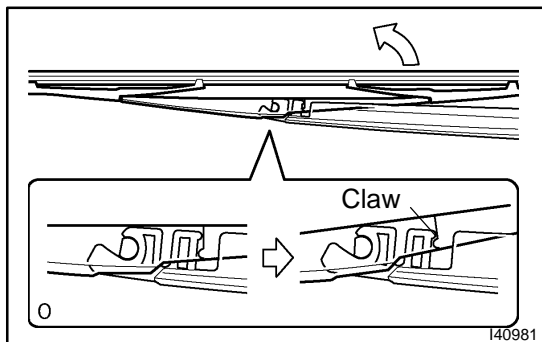
HINT:

Hold down the arm hinge by hand in order to fasten the nut.

- (d) Operate the rear wiper while spraying water or washer fluid on the glass. Ensure that the wiper functions properly and that there is no interference with the body.

REAR WIPER RUBBER REPLACEMENT

660HL-01

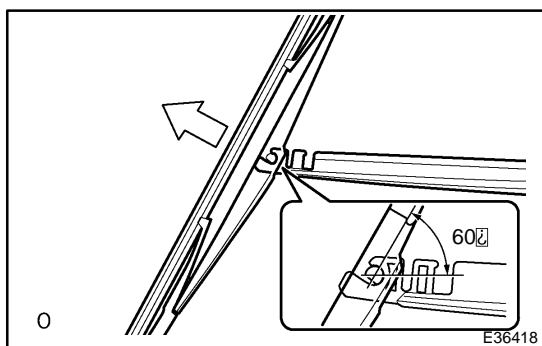


1. REMOVE RR WIPER BLADE

- (a) Raise the rear wiper blade to the position as shown in the illustration where the meshing of the claw disengages with a clicking sound. [*1]

NOTICE:

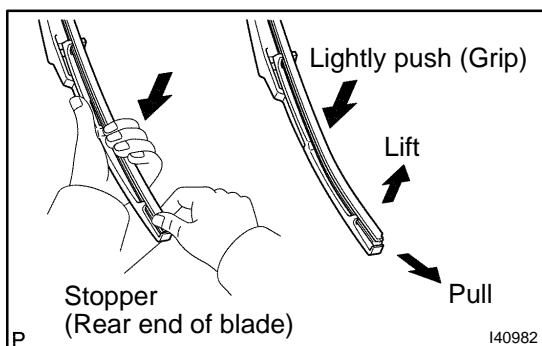
Be careful not to break the claw.



- (b) Pull the rear wiper blade straight away from the rear wiper arm towards the left side of the vehicle at condition [*1].

NOTICE:

Do not fold the rear wiper arm with the rear wiper blade removed from it.



2. REMOVE REAR WIPER RUBBER

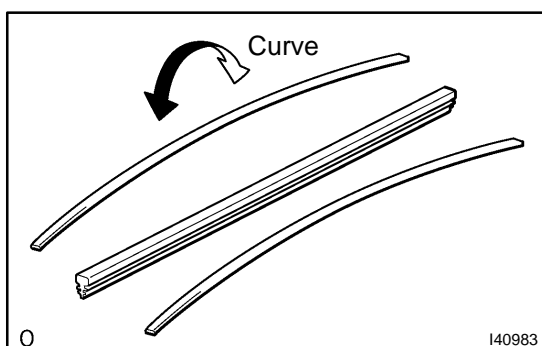
- (a) Pull the end of the wiper rubber protruding from the blade stopper as shown in the illustration.

NOTICE:

Do not pull out the wiper rubber forcibly. If you do, the backing plates will be deformed or the blade claws will be damaged.

HINT:

Lightly pushing the rubber from the ends towards the middle will allow it to be removed more easily.

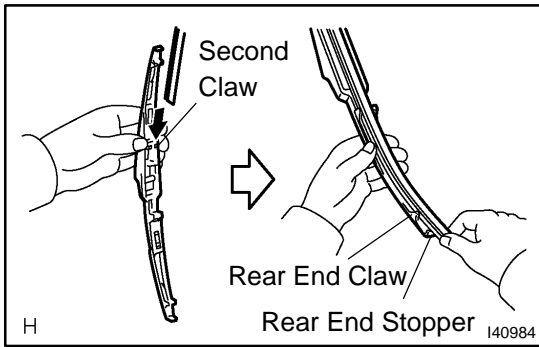


3. INSTALL REAR WIPER RUBBER

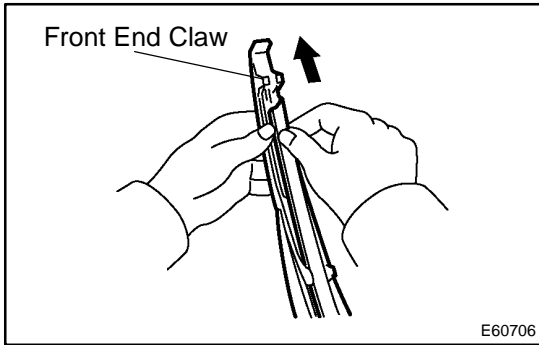
- (a) Install rear wiper rubber backing plate No.1 and No.2 as shown in the illustration.

NOTICE:

Install the backing plates in the correct direction.



- (b) Insert the rear wiper rubber from the front end of the rear wiper blade to the rear end through the second claw.
- (c) After pushing the rear wiper rubber through the rear end side claw, allow it to stick out from the rear end stopper.

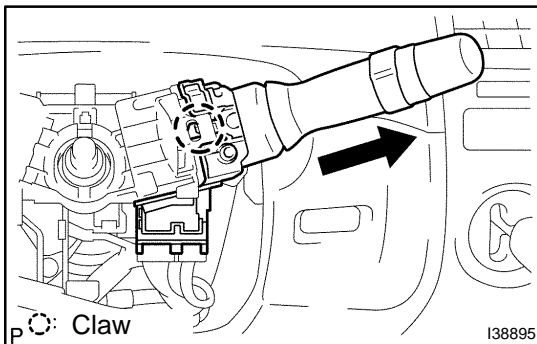


- (d) Slide the rear wiper rubber through the front end claw.

WINDSHIELD WIPER SWITCH ASSY REPLACEMENT

660HM-01

1. DISCONNECT BATTERY NEGATIVE TERMINAL (SEE PAGE 60-1)
2. REMOVE STEERING WHEEL COVER LOWER NO.2 (SEE PAGE 60-20)
3. REMOVE STEERING WHEEL COVER LOWER NO.3 (SEE PAGE 60-20)
4. REMOVE HORN BUTTON ASSY (SEE PAGE 60-20)
5. REMOVE STEERING WHEEL ASSY (SEE PAGE 50-8)
SST 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05021)
6. REMOVE TILT LEVER BRACKET (SEE PAGE 50-8)
7. REMOVE STEERING COLUMN COVER (SEE PAGE 50-8)



8. REMOVE WINDSHIELD WIPER SWITCH ASSY
 - (a) Disconnect the connector.
 - (b) Push and disengage the claw shown in the illustration and remove the windshield wiper switch assy.

NOTICE:

The claw will be broken if pressed too hard.

9. CENTER SPIRAL CABLE (SEE PAGE 60-29)
10. INSTALL STEERING WHEEL ASSY (SEE PAGE 50-8)
11. INSTALL HORN BUTTON ASSY (SEE PAGE 60-20)
12. CONNECT BATTERY NEGATIVE TERMINAL (SEE PAGE 21-54)
13. INSPECT HORN BUTTON ASSY (SEE PAGE 60-14)
14. INSPECT SRS WARNING LIGHT (SEE PAGE 05-1384)
15. PERFORM INITIALIZATION (SEE PAGE 01-28)

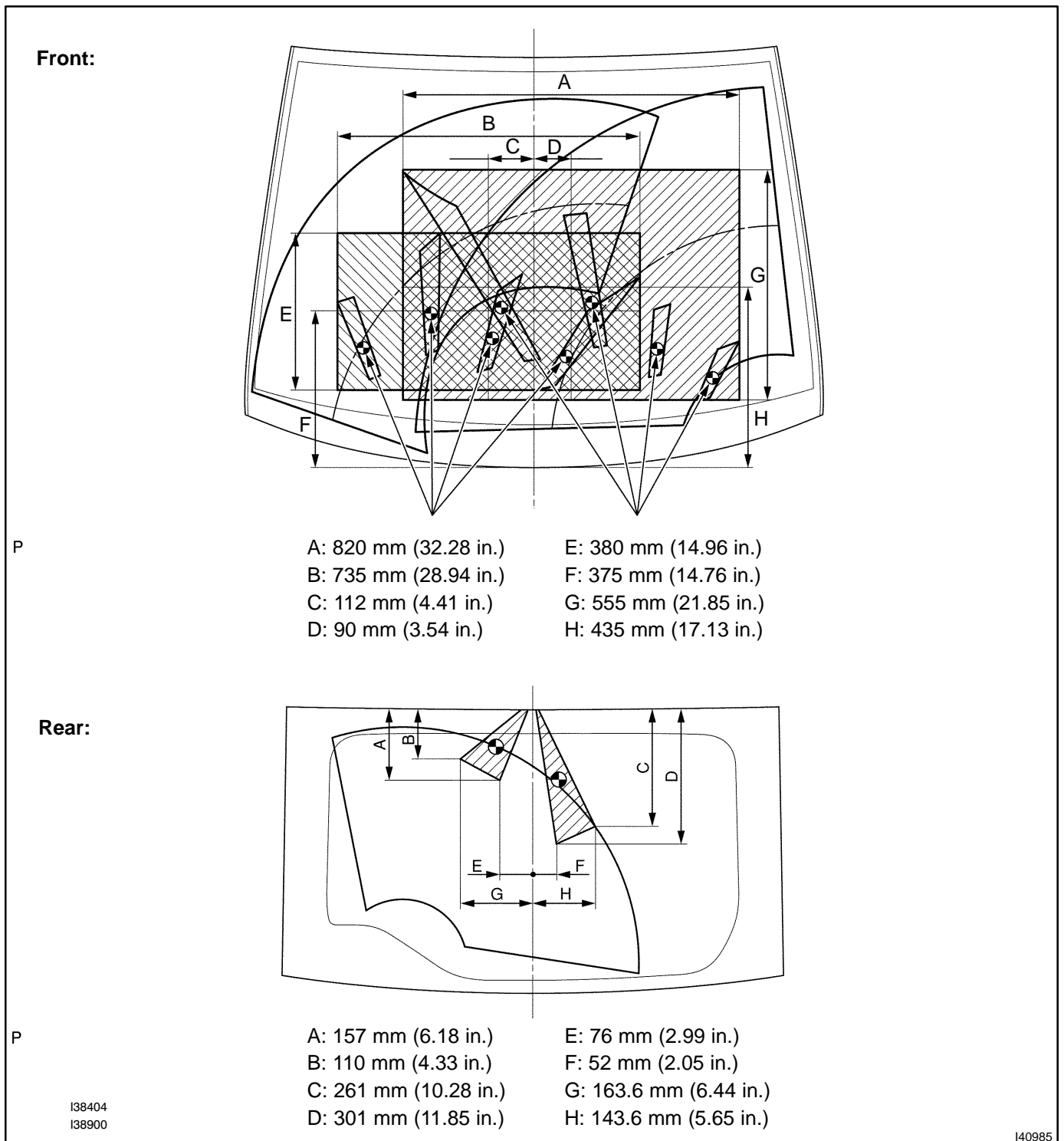
WASHER NOZZLE ADJUSTMENT

660HN-01

1. INSPECT WASHER NOZZLE

- (a) With the power switch on (IG), check the position that the washer fluid hits the windshield.

Standard: Washer fluid hits the windshield in the areas indicated in the illustration.

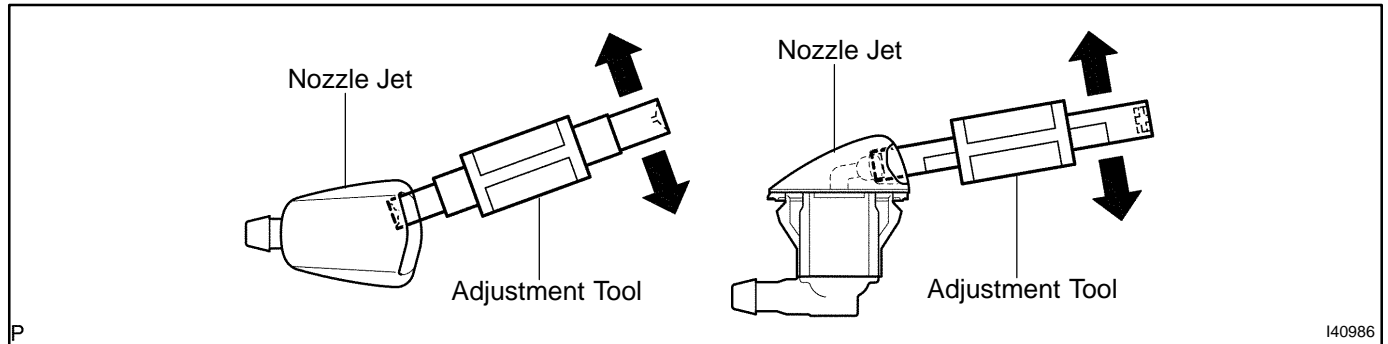


2. ADJUST WASHER NOZZLE

- (a) Using a TOYOTA 4 Way Nozzle Adjustment Tool (part number: 95060-10010), insert the bumpy portions of the adjustment tool into the bumpy portions of the nozzle jet and make the adjustment.

NOTICE:

- Clarify which type of washer nozzle is being adjusted, as two types (4 mm and 5 mm diameter types) exist.
- Do not use a metal pin or other such tool as it may damage the nozzle jet.



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