

WIPER AND WASHER SYSTEM

PRECAUTION

1. EXPRESSIONS OF IGNITION SWITCH

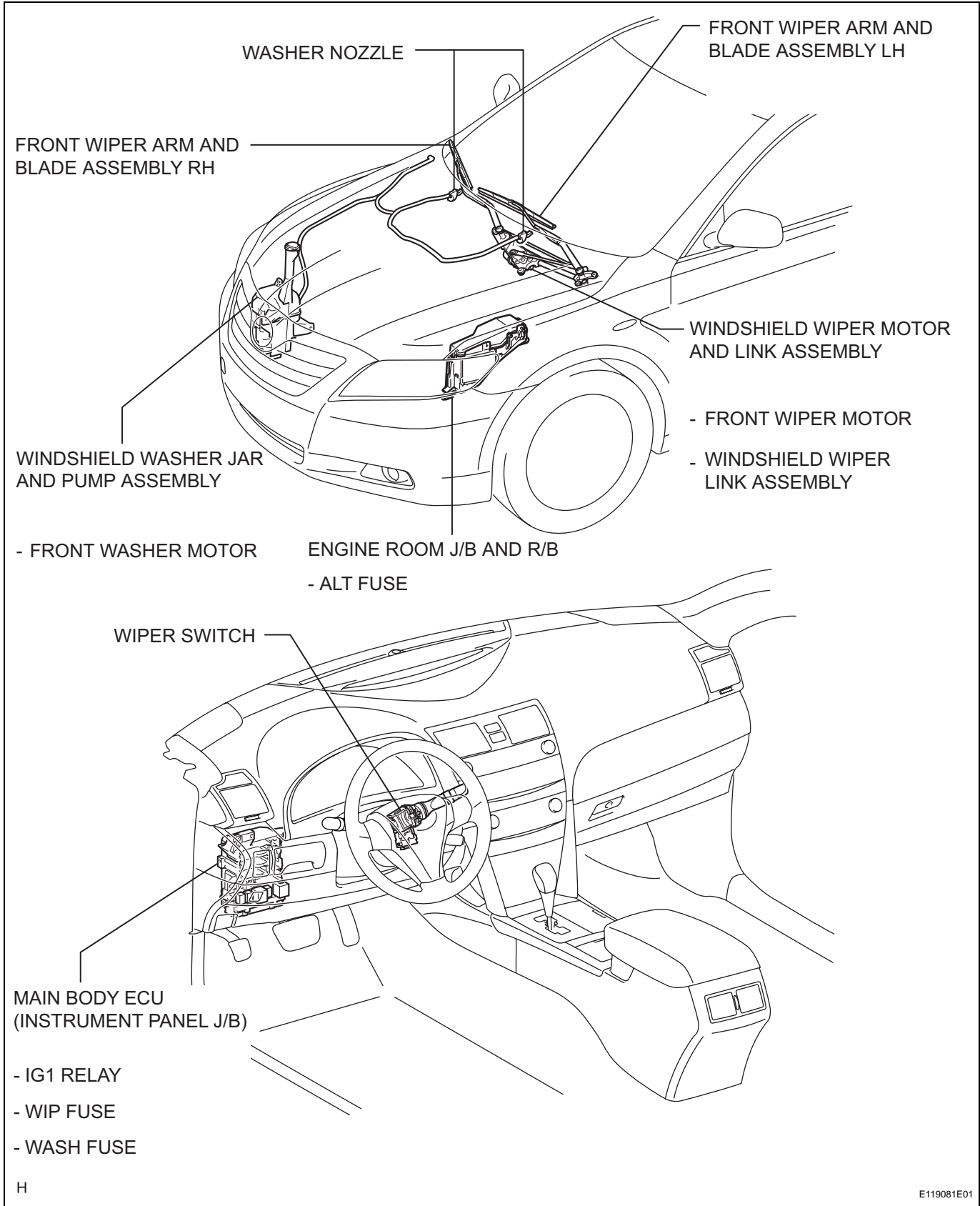
- (a) The type of ignition switch used on this model differs according to the specifications of the vehicle. The expressions listed in the table below are used in this section.

	Switch Type	Ignition Switch (position)	Engine Switch (condition)
Expression	Ignition switch off	LOCK	Off
	Ignition switch on (IG)	ON	On (IG)
	Ignition switch on (ACC)	ACC	On (ACC)
	Engine start	START	Start

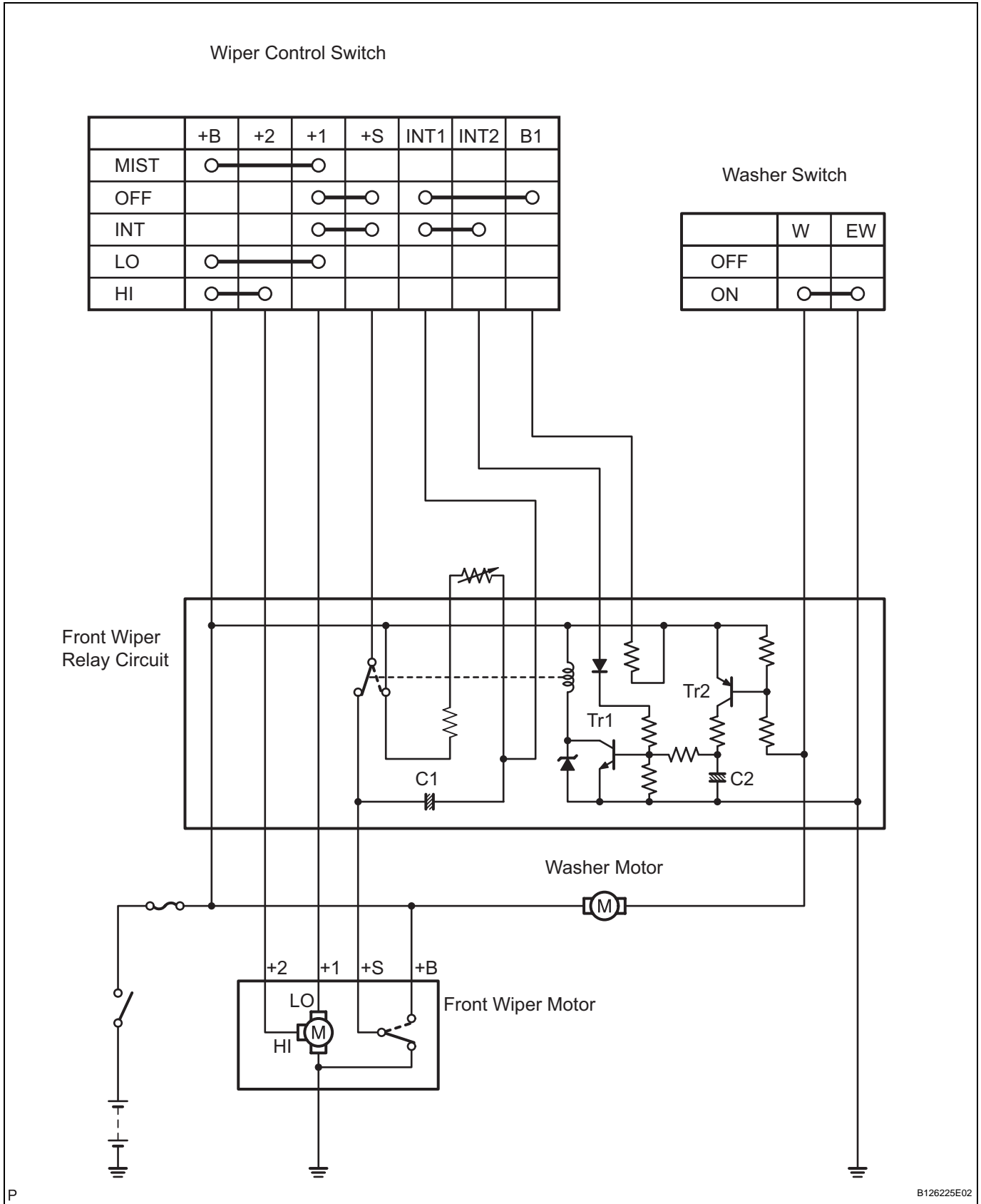
2. PRECAUTION OF WASHER NOZZLE ADJUSTMENT

- (a) Do not clean or adjust the washer nozzle with a safety pin, etc. because;
- (1) the washer nozzle tip is made of resin and could be damaged.
 - (2) adjustment is not necessary because the washer nozzle is a spray type. If it is necessary to change the nozzle angle, replace the washer nozzle with one that has a different nozzle angle. (See page [WW-28](#))
- (b) In case the washer nozzle is clogged with wax, etc., remove it and clean the nozzle hole with a soft resin brush, etc.

PARTS LOCATION



SYSTEM DIAGRAM



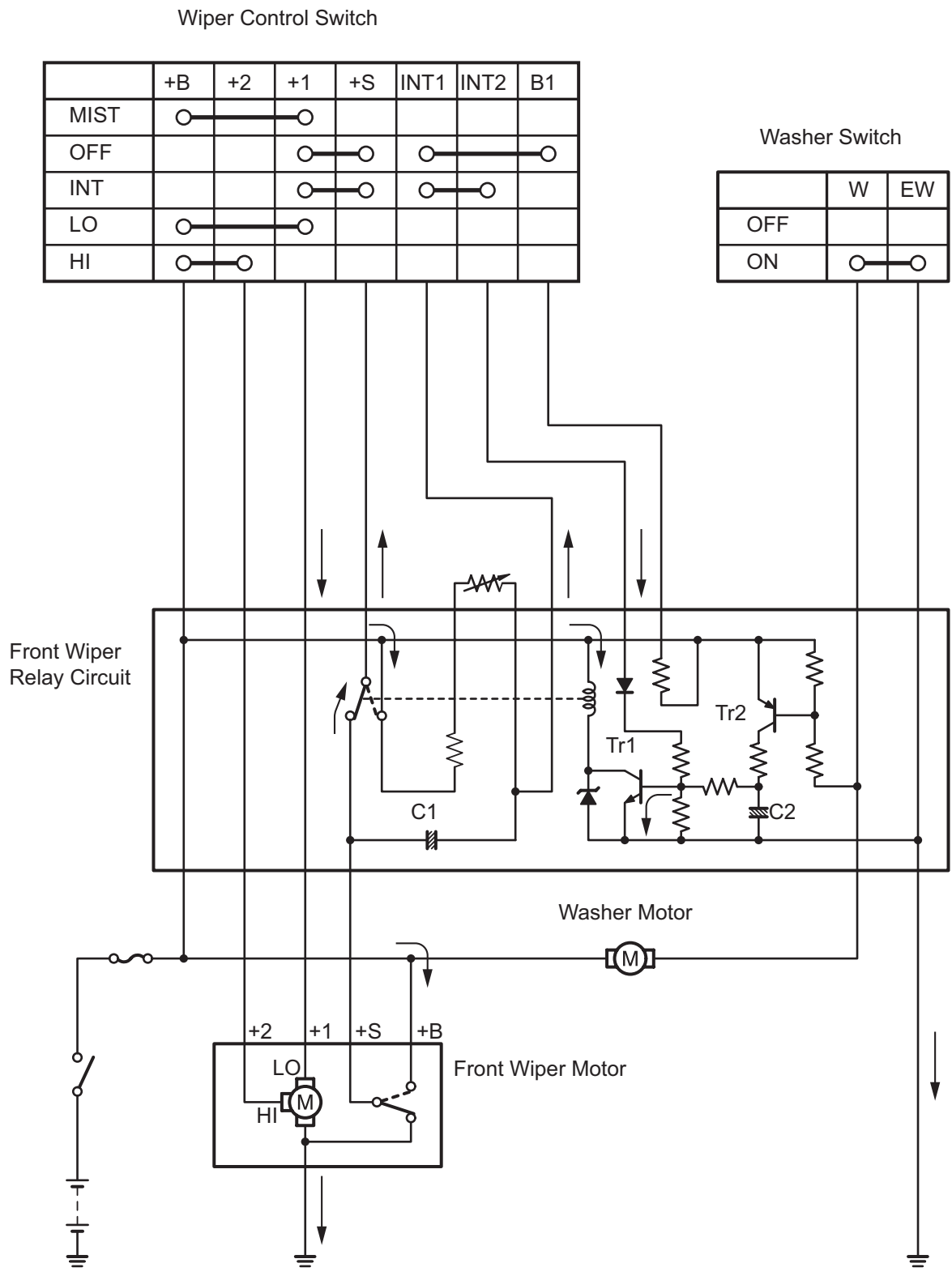
SYSTEM DESCRIPTION

1. WASHER LINKED OPERATION

- (a) This system operates the front wipers at a low speed immediately after a jet of washer fluid when the front washer switch is turned on for approximately 0.3 seconds or more. If the switch is turned off within approximately 1.5 seconds, the system stops the wipers when the switch is turned off. If the switch is turned on for approximately 1.5 seconds or more, the system stops the wipers approximately 2.2 seconds after the switch is turned off.

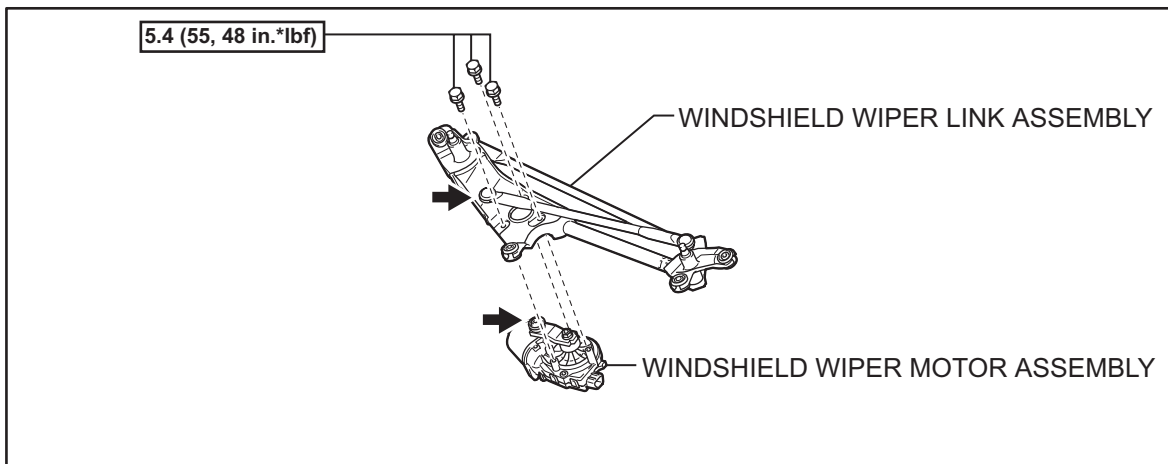
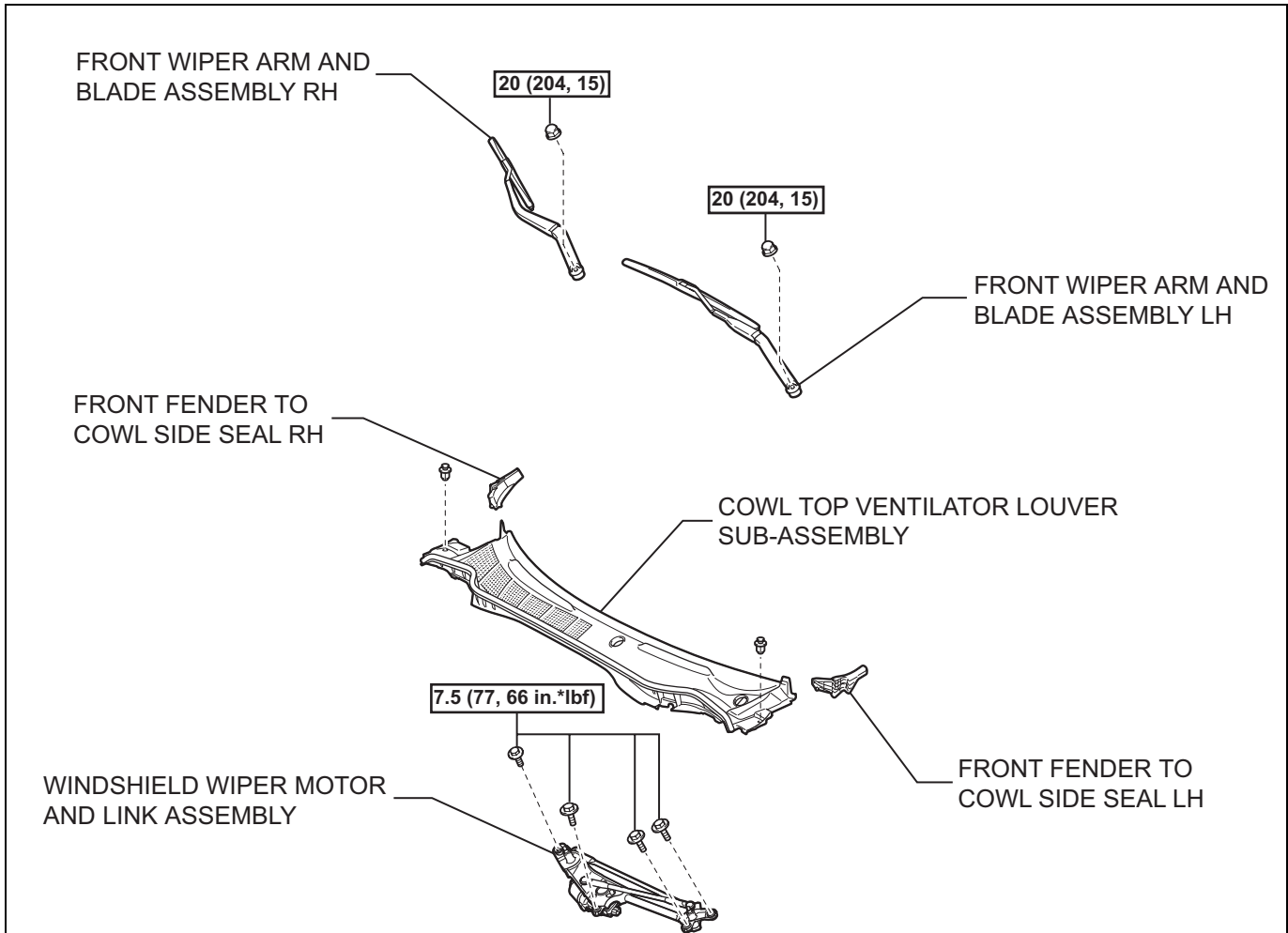
2. INTERMITTENT OPERATION

- (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 between 1.6 and 10.7 seconds.
- (b) If the wiper control switch is turned to the INT position, current flows from the already charged capacitor C1 to Tr1 (transistor) through terminals INT1 and INT2 of the wiper control switch. When Tr1 turns on, current flows from terminal +S of the wiper control switch to terminal +1 of the wiper motor, to the wiper motor and finally to the 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 activates, causing the motor to operate. 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.



FRONT WIPER MOTOR

COMPONENTS

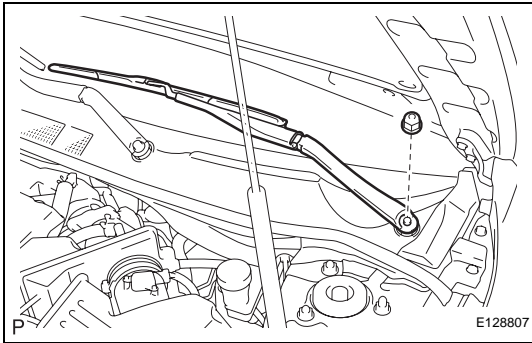


N*m (kgf*cm, ft.*lbf) : Specified torque

← Apply MP grease

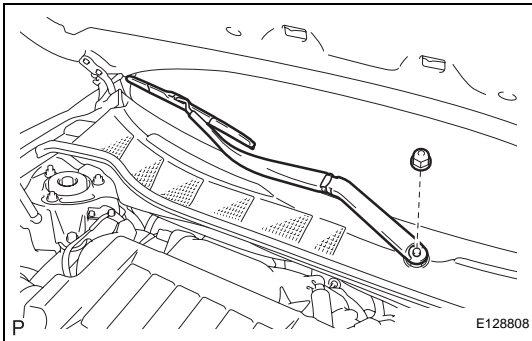


REMOVAL



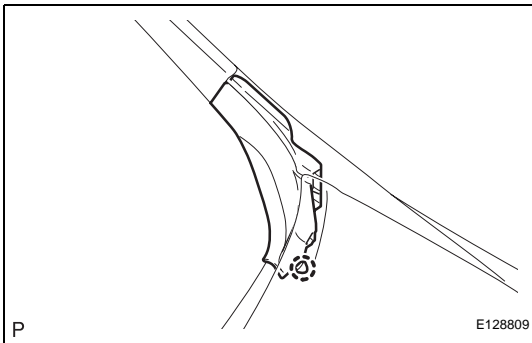
1. REMOVE FRONT WIPER ARM AND BLADE ASSEMBLY LH

- (a) Remove the nut and the front wiper arm and blade assembly LH.



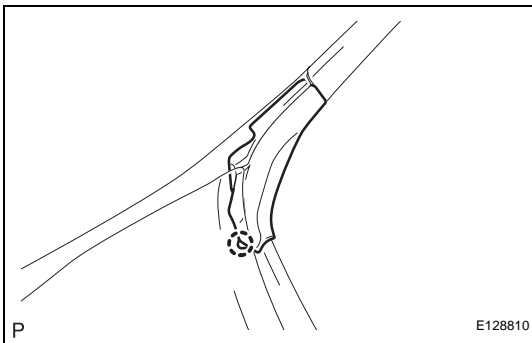
2. REMOVE FRONT WIPER ARM AND BLADE ASSEMBLY RH

- (a) Remove the nut and the front wiper arm and blade assembly RH.



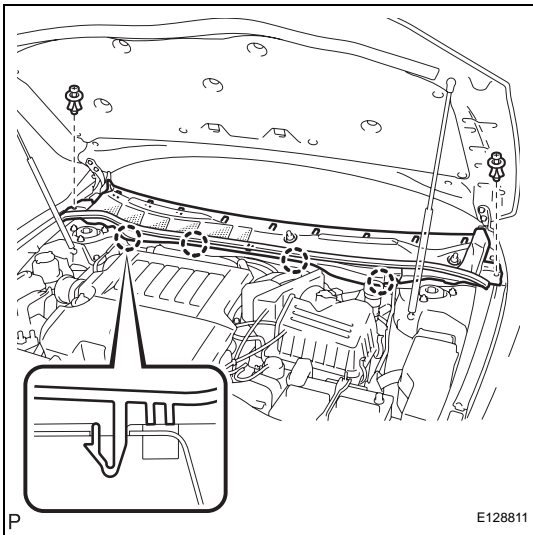
3. REMOVE FRONT FENDER TO COWL SIDE SEAL LH

- (a) Disengage the claw and remove the front fender to cowl side seal LH.



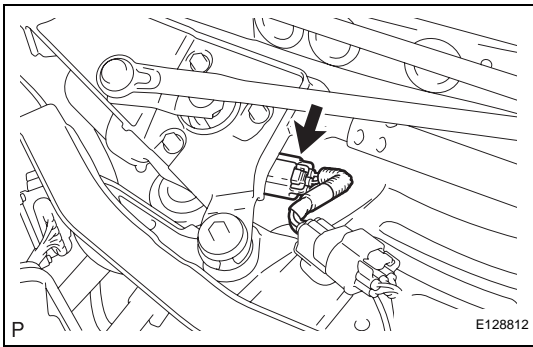
4. REMOVE FRONT FENDER TO COWL SIDE SEAL RH

- (a) Disengage the claw and remove the front fender to cowl side seal RH.



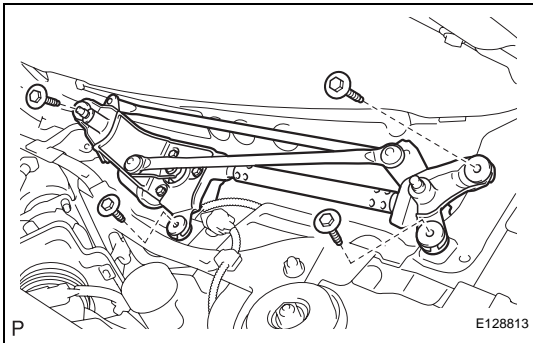
5. REMOVE COWL TOP VENTILATOR LOUVER SUB-ASSEMBLY

- (a) Remove the 2 clips.
- (b) Disengage the 4 claws and remove the cowl top ventilator louver sub-assembly.

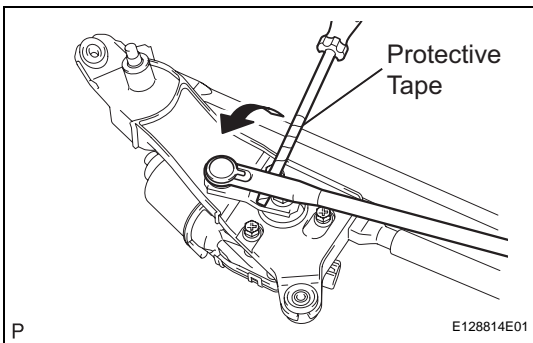


6. REMOVE WINDSHIELD WIPER MOTOR AND LINK ASSEMBLY

- (a) Disconnect the connector.

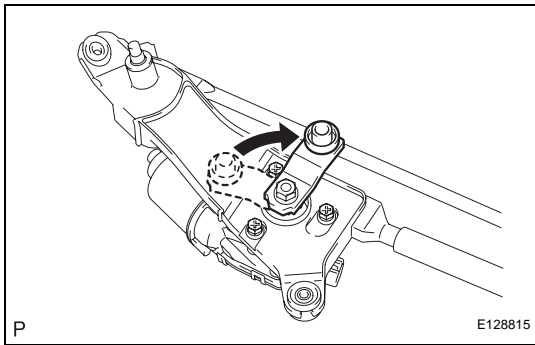


- (b) Remove the 4 bolts and the windshield wiper motor and link assembly.

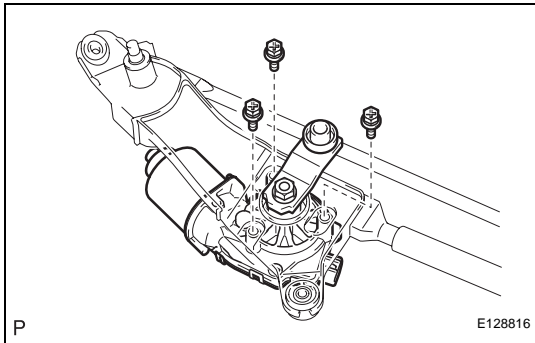


7. REMOVE WINDSHIELD WIPER MOTOR ASSEMBLY

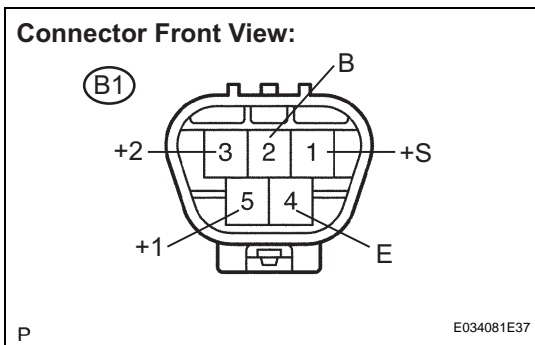
- (a) Using a screwdriver, separate the No. 2 windshield wiper link rod from the crank arm pivot of the front wiper motor assembly as shown in the illustration.
HINT:
Tape the screwdriver tip before use.



- (b) Move the crank arm in the direction indicated by the arrow.



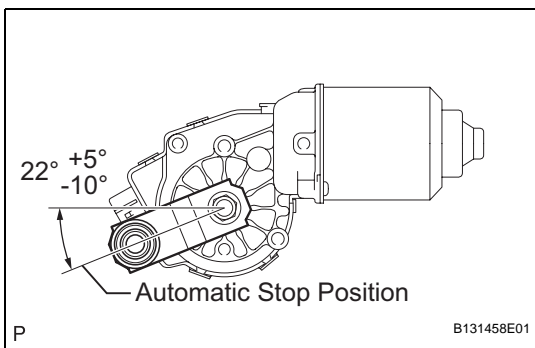
- (c) Remove the 3 bolts and the windshield wiper motor assembly from the windshield wiper link assembly.



INSPECTION

1. INSPECT WINDSHIELD WIPER MOTOR ASSEMBLY (for TMC Made)

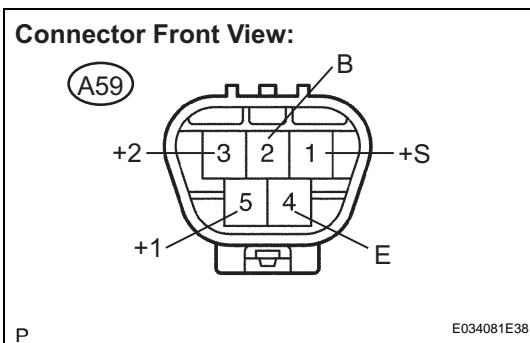
- (a) LO Operation Check
 - (1) Connect a positive (+) battery lead to terminal B1-5 (+1) of the connector, and a negative (-) battery lead to terminal B1-4 (E), and check that the motor operates at low speed (LO).
- (b) HI Operation Check
 - (1) Connect a positive (+) lead to terminal B1-3 (+2) of the connector, and a negative (-) battery lead to terminal B1-4 (E), and check that the motor operates at high speed (HI).
- (c) Automatic Stop Operation Check
 - (1) Put matchmarks on the windshield wiper motor assembly. The matchmarks will be used to confirm the return of the motor shaft to the park position.



- (2) Connect a positive (+) battery lead to terminal B1-5 (+1) of the connector on the wiper motor and connect a negative battery lead to terminal B1-4 (E) of the wiper motor. With the motor operating at low speed (LO), disconnect terminal B1-5 (+1) to stop the wiper motor at a position where the matchmarks do not line up. HINT:

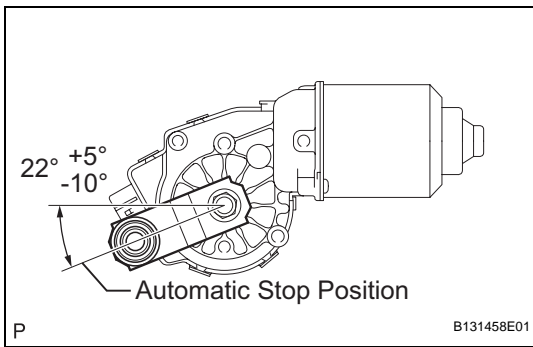
In the following step, connections will be made at the wiper motor to allow verification of the operation of the park contacts that are operated by the cam in the wiper motor. After the connections have been made, when the motor is not in the park position, current will flow from terminal B1-2 (B) through the park contacts in the wiper motor, to terminal B1-1 (+S). The current will then flow through the jumper wire to terminal B1-5 (+1) through the motor to ground (causing it to operate). When the motor reaches the park position, the park contacts should open, stopping the operation of the wiper motor in the correct location. Terminals B1-2 (B) and B1-1 (+S) are connected by the internal cam in the wiper motor when the wiper motor is not in the park position. Terminals B1-1 (+S) and B1-4 (E) are connected by the internal cam in the wiper motor when the wiper motor is in the park position.

- (3) With the ground wire still attached from the previous step, connect a jumper lead between terminal B1-1 (+S) and terminal B1-5 (+1). Next, connect a positive (+) battery lead to terminal B1-2 (B) to cause the wiper motor to operate at low speed. If the wiper motor is operating correctly, the wiper will operate until it reaches the park position. When it reaches the park position, it will automatically stop.
- (4) Verify that the matchmarks on the windshield wiper motor assembly are lined up.

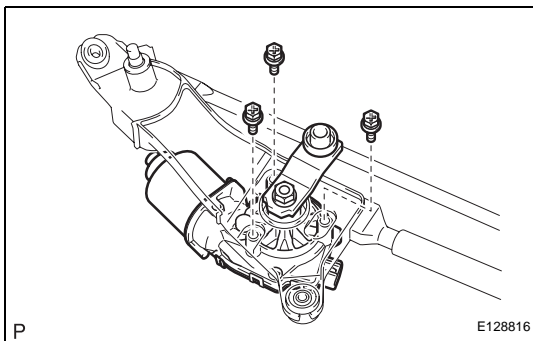


2. INSPECT WINDSHIELD WIPER MOTOR ASSEMBLY (for TMMK Made)

- (a) LO Operation Check
 - (1) Connect a positive (+) battery lead to terminal A59-5 (+1) of the connector, and a negative (-) battery lead to terminal A59-4 (E), and check that the motor operates at low speed (LO).
- (b) HI Operation Check
 - (1) Connect a positive (+) lead to terminal A59-3 (+2) of the connector, and a negative (-) battery lead to terminal A59-4 (E), and check that the motor operates at high speed (HI).

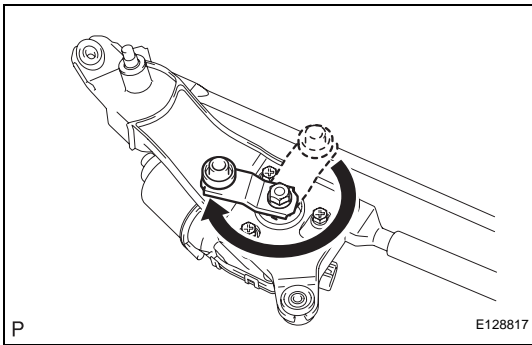


- (c) Automatic Stop Operation Check
- (1) Put matchmarks on the windshield wiper motor assembly. The matchmarks will be used to confirm the return of the motor shaft to the park position.
 - (2) Connect a positive (+) battery lead to terminal A59-5 (+1) of the connector on the wiper motor and connect a negative battery lead to terminal A59-4 (E) of the wiper motor. With the motor operating at low speed (LO), disconnect terminal A59-5 (+1) to stop the wiper motor at a position where the matchmarks do not line up. HINT:
In the following step, connections will be made at the wiper motor to allow verification of the operation of the park contacts that are operated by the cam in the wiper motor. After the connections have been made, when the motor is not in the park position, current will flow from terminal A59-2 (B) through the park contacts in the wiper motor, to terminal A59-1 (+S). The current will then flow through the jumper wire to terminal A59-5 (+1) through the motor to ground (causing it to operate). When the motor reaches the park position, the park contacts should open, stopping the operation of the wiper motor in the correct location. Terminals A59-2 (B) and A59-1 (+S) are connected by the internal cam in the wiper motor when the wiper motor is not in the park position. Terminals A59-1 (+S) and A59-4 (E) are connected by the internal cam in the wiper motor when the wiper motor is in the park position.
 - (3) With the ground wire still attached from the previous step, connect a jumper lead between terminal A59-1 (+S) and terminal A59-5 (+1). Next, connect a positive (+) battery lead to terminal A59-2 (B) to cause the wiper motor to operate at low speed. If the wiper motor is operating correctly, the wiper will operate until it reaches the park position. When it reaches the park position, it will automatically stop.
 - (4) Verify that the matchmarks on the windshield wiper motor assembly are lined up.

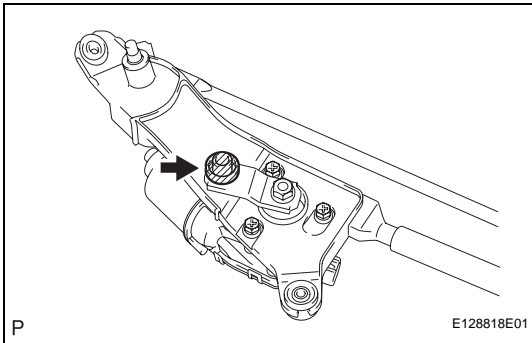


INSTALLATION

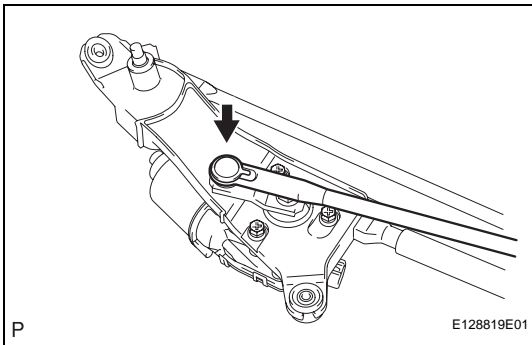
1. **INSTALL WINDSHIELD WIPER MOTOR ASSEMBLY**
 - (a) Install the windshield wiper motor assembly with the 3 bolts.
Torque: 5.4 N*m (55 kgf*cm, 48 in.*lbf)



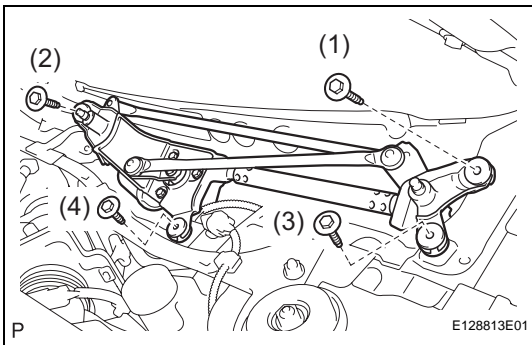
(b) Move the crank arm in the direction indicated by the arrow.



(c) Apply MP grease to the crank arm pivot of the windshield wiper motor assembly.



(d) Install the No. 2 windshield wiper link rod to the pivot of the windshield wiper motor assembly.



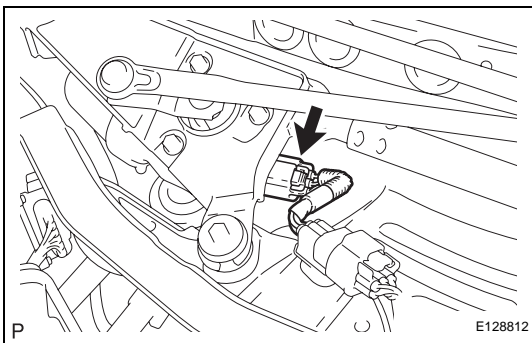
2. INSTALL WINDSHIELD WIPER MOTOR AND LINK ASSEMBLY

(a) Install the windshield wiper motor and link assembly with the 4 bolts.

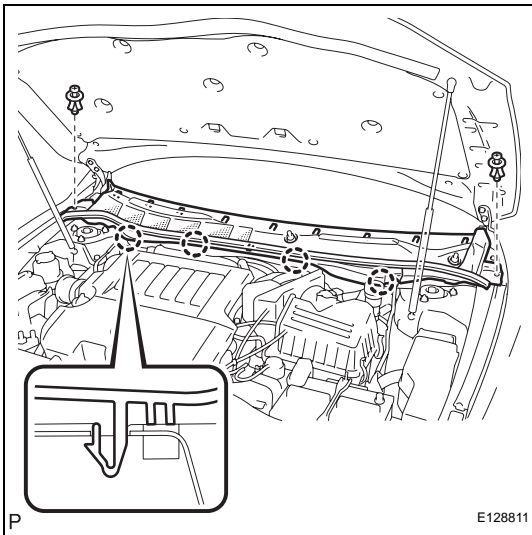
Torque: 7.5 N*m (77 kgf*cm, 66 in.*lbf)

NOTICE:

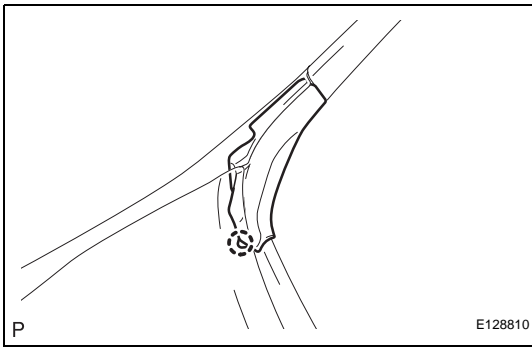
Tighten the bolts in the order shown in the illustration.



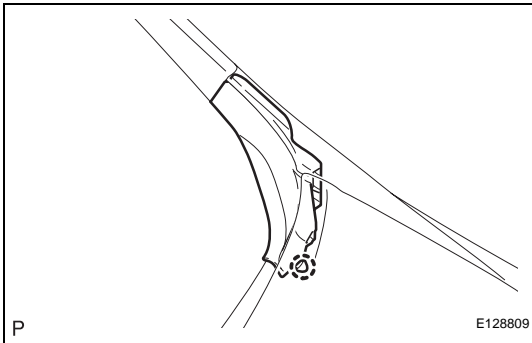
(b) Connect the connector.

**3. INSTALL COWL TOP VENTILATOR LOUVER SUB-ASSEMBLY**

- (a) Engage the 4 claws and install the cowl top ventilator louver sub-assembly.
- (b) Install the 2 clips.

**4. INSTALL FRONT FENDER TO COWL SIDE SEAL RH**

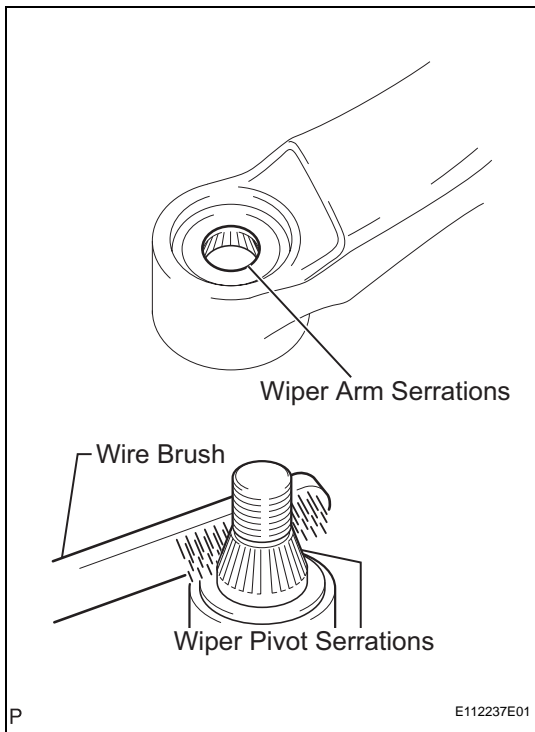
- (a) Engage the claw and install the front fender to cowl side seal RH.

**5. INSTALL FRONT FENDER TO COWL SIDE SEAL LH**

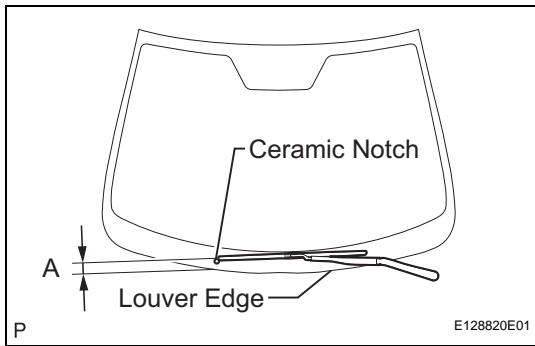
- (a) Engage the claw and install the front fender to cowl side seal LH.

6. INSTALL FRONT WIPER ARM AND BLADE ASSEMBLY LH

- (a) Operate the wiper and stop the windshield wiper motor at the automatic stop position.



- (b) Clean the wiper arm serrations.
- (c) When reinstalling:
 - (1) Clean the wiper pivot serrations with a wire brush.

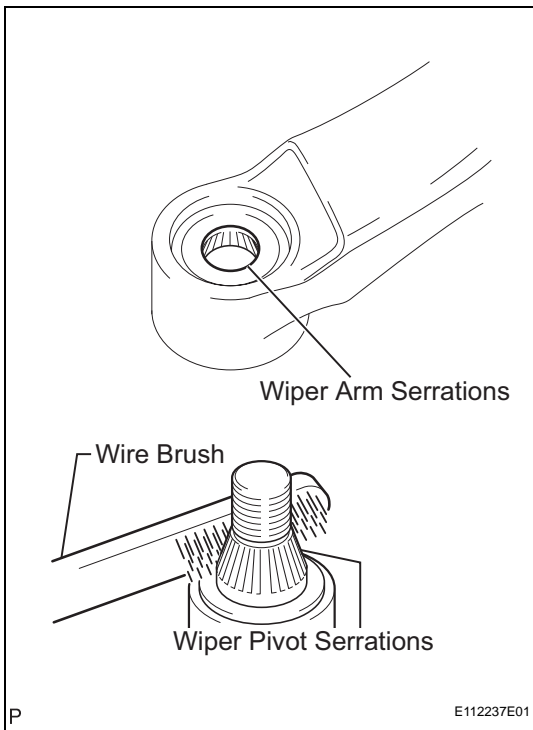


- (d) Install the front wiper arm and blade assembly LH with the nut to the position shown in the illustration.
 - Torque: 20 N*m (204 kgf*cm, 15 ft.*lbf)**
 - HINT: Hold the arm hinge by hand to fasten the nut.

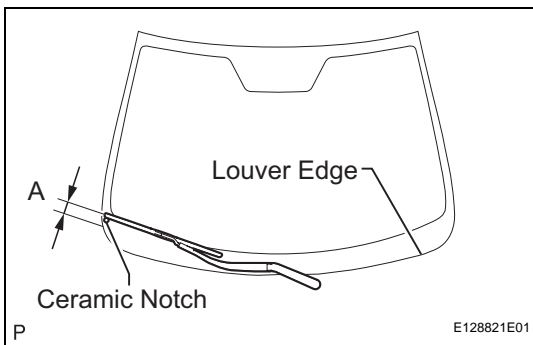
Area	Measurement
A	37 to 52 mm (1.46 to 2.05 in.)

7. INSTALL FRONT WIPER ARM AND BLADE ASSEMBLY RH

- (a) Operate the wiper and stop the windshield wiper motor at the automatic stop position.



- (b) Clean the wiper arm serrations.
- (c) When reinstalling:
 - (1) Clean the wiper pivot serrations with a wire brush.



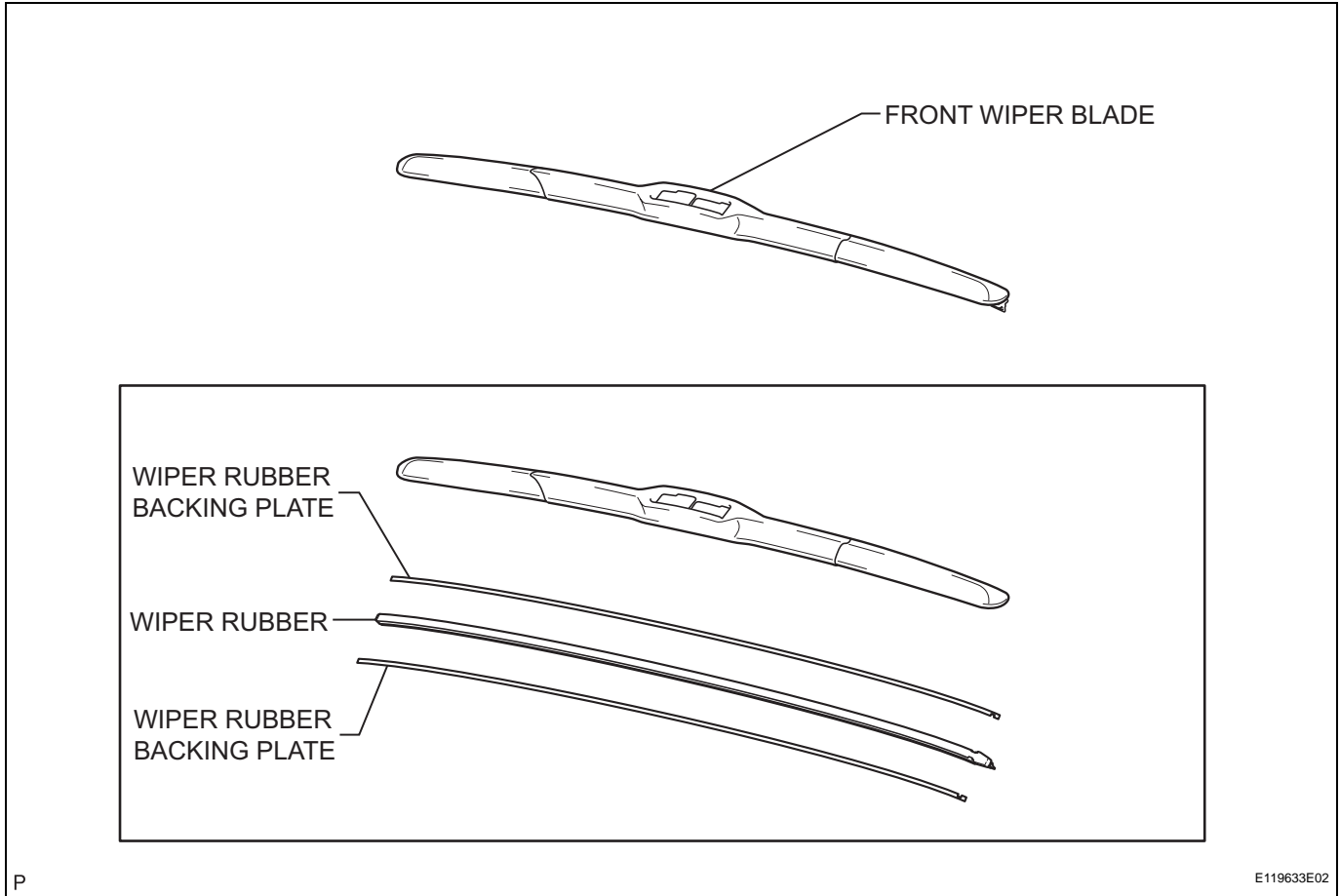
- (d) Install the front wiper arm and blade assembly RH with the nut to the position shown in the illustration.
Torque: 20 N*m (204 kgf*cm, 15 ft.*lbf)
 HINT:
 Hold the arm hinge by hand to fasten the nut.

Area	Measurement
A	23 to 38 mm (0.90 to 1.49 in.)

- (e) Operate the front wipers while spraying washer fluid on the windshield glass. Make sure that the front wipers function properly and the wipers do not come into contact with the vehicle body.

FRONT WIPER RUBBER

COMPONENTS



P

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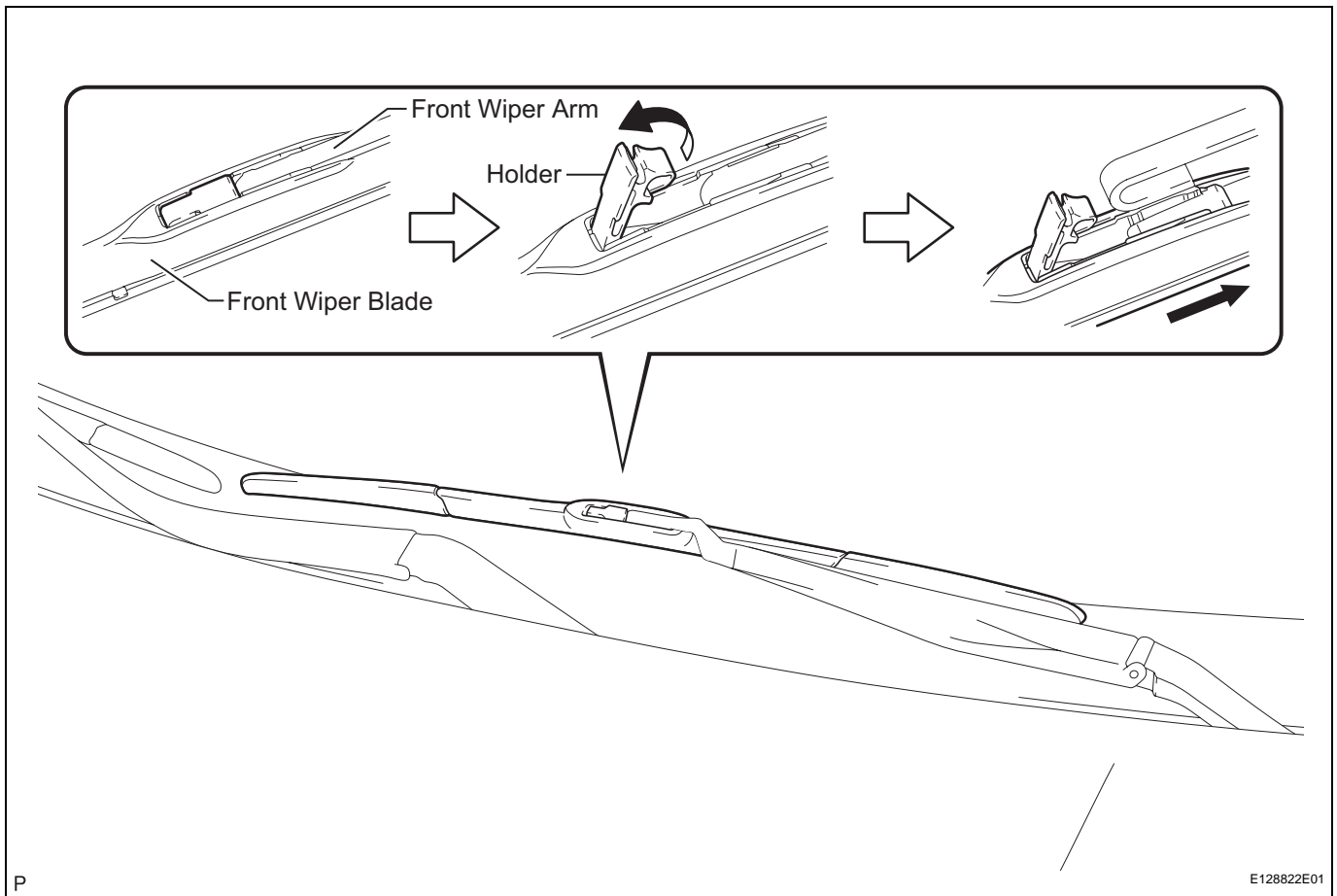
REMOVAL

1. REMOVE FRONT WIPER BLADE

- (a) Disengage the holder of the front wiper blade.
- (b) Remove the front wiper blade from the front wiper arm as shown in the illustration.

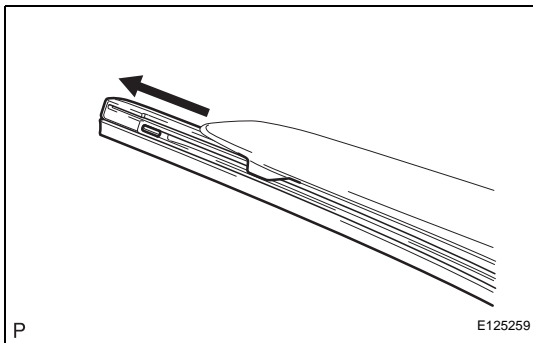
NOTICE:

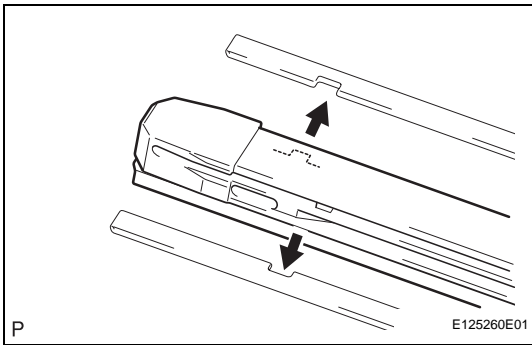
Do not bend the front wiper arm with the front wiper blade removed because the arm tip could damage the windshield surface.



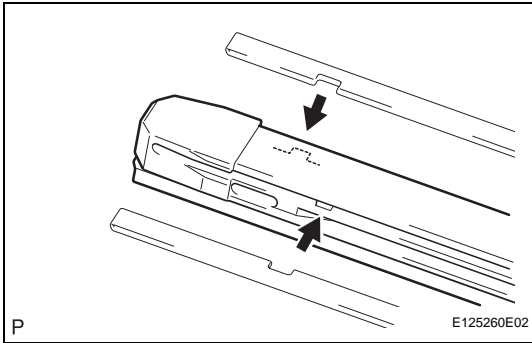
2. REMOVE WIPER RUBBER

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





(b) Remove the 2 wiper rubber backing plates from the wiper rubber.



INSTALLATION

1. INSTALL WIPER RUBBER

(a) Install the 2 wiper rubber backing plates to the wiper rubber.

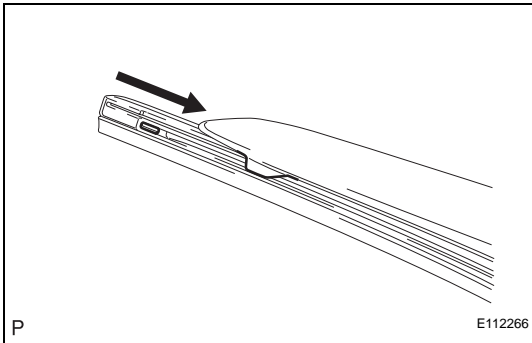
NOTICE:

- Align the protrusions on the wiper rubber with the notches in the backing plates.
- Align the curves of the backing plates with the curve of the glass.

(b) Install the wiper rubber to the front wiper blade with the tip of the rubber (curved end) facing the axis of the wiper arm.

NOTICE:

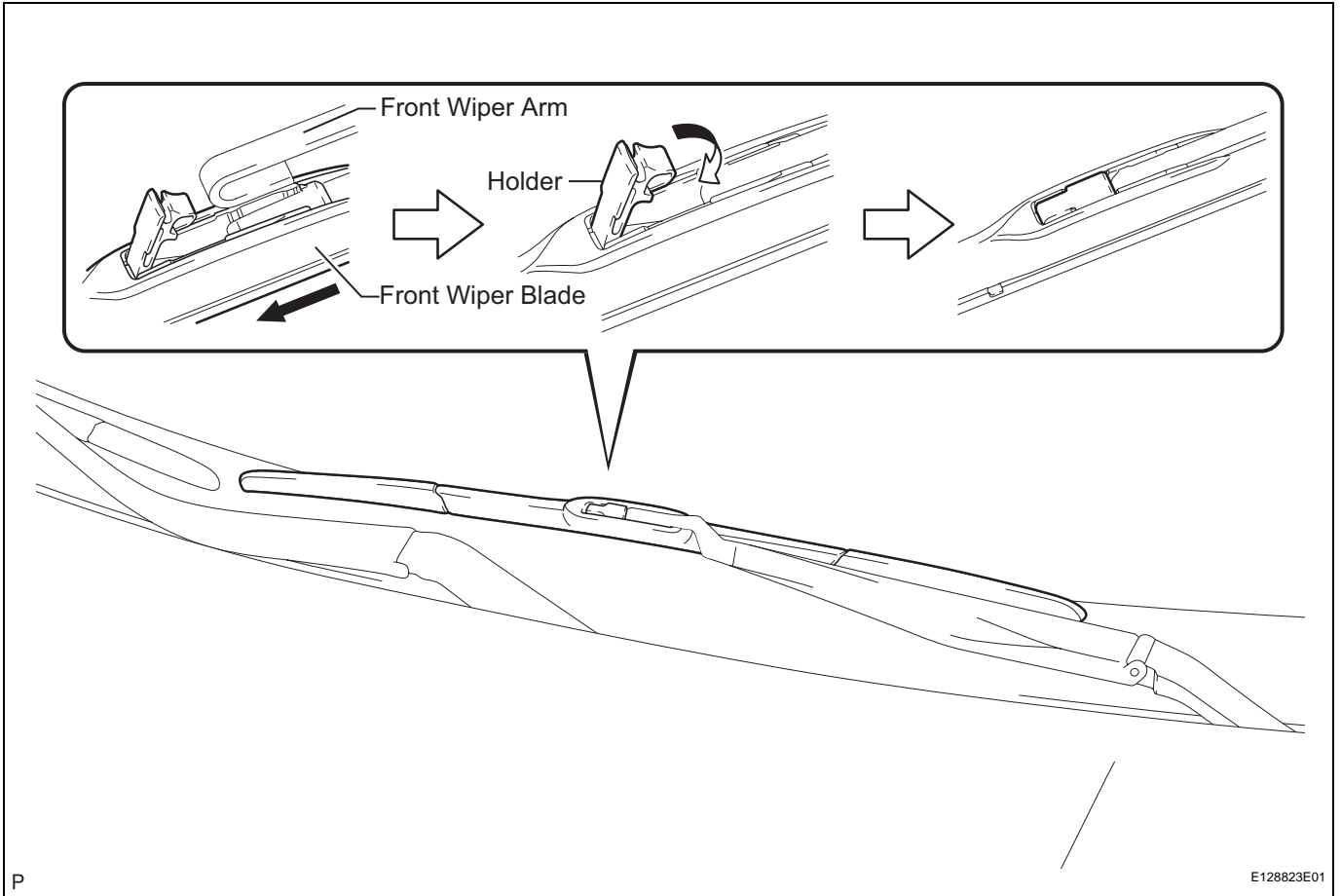
Firmly push the wiper rubber into the wiper blade to securely engage them.



2. INSTALL FRONT WIPER BLADE

(a) Install the front wiper blade as shown in the illustration.

(b) Install the holder of the front wiper blade.

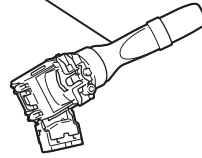


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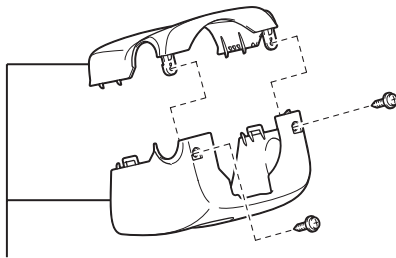
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WIPER SWITCH COMPONENTS

WINDSHIELD WIPER SWITCH ASSEMBLY

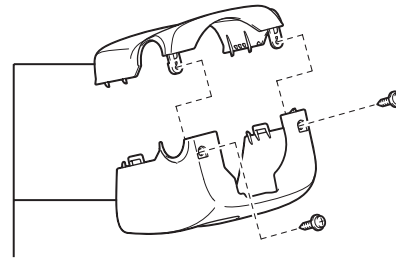


without Smart Key System:



STEERING COLUMN
COVER

with Smart Key System:



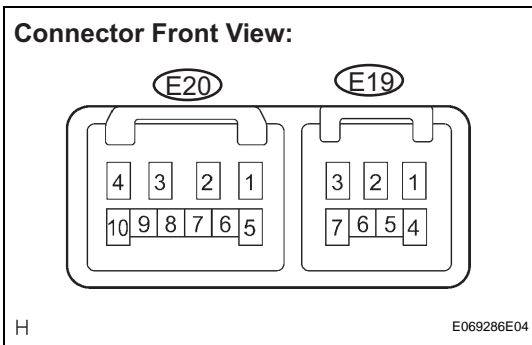
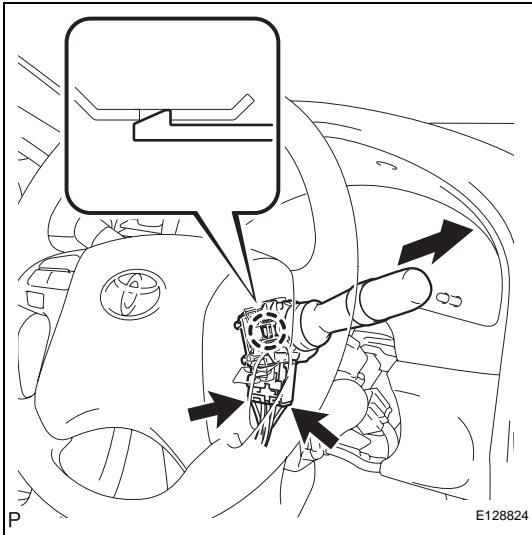
STEERING COLUMN
COVER

REMOVAL

1. REMOVE STEERING COLUMN COVER (See page [SR-39](#))
2. REMOVE WINDSHIELD WIPER SWITCH ASSEMBLY
 - (a) Disconnect the 2 connectors.
 - (b) Disengage the claw and remove the windshield wiper switch assembly as shown in the illustration.

NOTICE:

If the claw is pushed with excessive force, it may break.



INSPECTION

1. INSPECT WINDSHIELD WIPER SWITCH ASSEMBLY
 - (a) Check the continuity of the windshield wiper switch assembly.
 - (1) Measure the resistance according to the value(s) in the table below.

Standard resistance:
Front Wiper Switch

Switch Position	Tester Connection	Specified Resistance
MIST	E20-2 (+B) - E20-3 (+1)	Below 1 Ω
OFF	E20-1 (+S) - E20-3 (+1)	Below 1 Ω
INT	E20-1 (+S) - E20-3 (+1)	Below 1 Ω
LO	E20-2 (+B) - E20-3 (+1)	Below 1 Ω
HI	E20-2 (+B) - E20-4 (+2)	Below 1 Ω

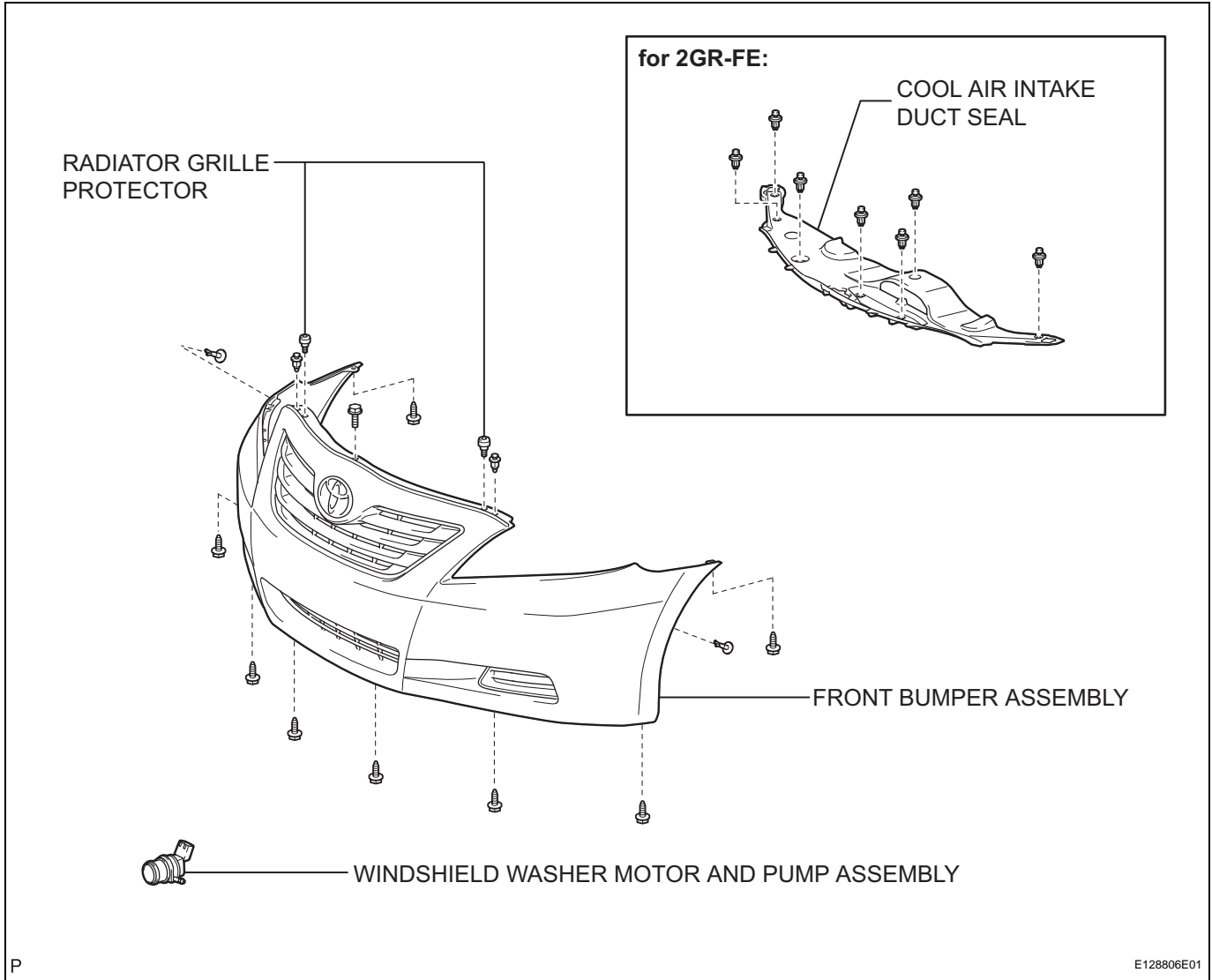
Front Washer Switch

Switch Position	Tester Connection	Specified Resistance
OFF	E19-3 (WF) - E19-2 (EW)	10 kΩ or higher
ON	E19-3 (WF) - E19-2 (EW)	Below 1 Ω

- (b) Intermittent Operation Check
 - (1) Connect the voltmeter (+) terminal to terminal E20-3 (+1) of the connector and the voltmeter (-) terminal to terminal E19-2 (EW).
 - (2) Connect a positive (+) battery lead to terminal E20-2 (+B) of the connector and a negative (-) battery lead to terminals E19-2 (EW) and E20-1 (+S).
 - (3) Turn the wiper switch to the INT position.
 - (4) Connect a positive (+) battery lead to terminal E20-1 (+S) of the connector for 5 seconds.

FRONT WASHER MOTOR

COMPONENTS

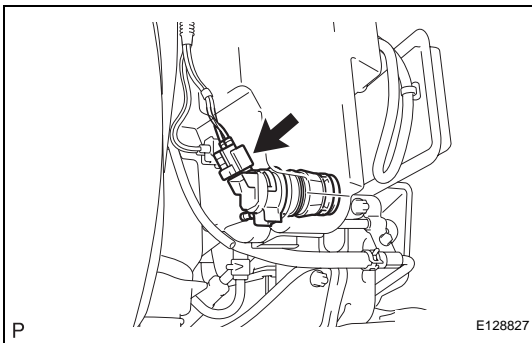
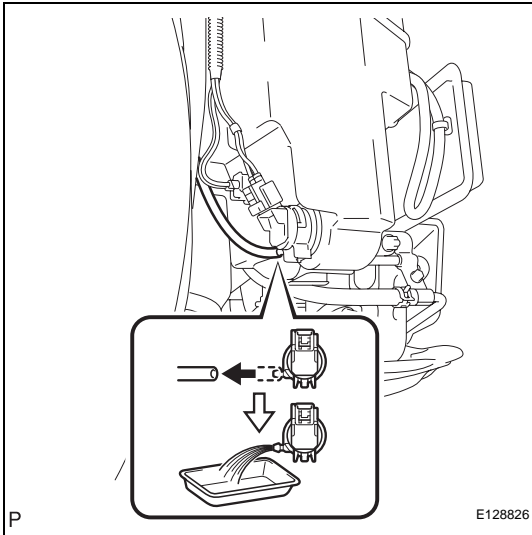


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REMOVAL

1. REMOVE COOL AIR INTAKE DUCT SEAL (for 2GR-FE) (See page [ET-4](#))
2. REMOVE FRONT BUMPER ASSEMBLY (w/o Fog Light) (See page [ET-5](#))
3. REMOVE FRONT BUMPER ASSEMBLY (w/ Fog Light) (See page [ET-6](#))
4. DRAIN WASHER FLUID
 - (a) Disconnect the washer hose from the windshield washer motor and pump assembly, and drain the washer fluid.



5. REMOVE WINDSHIELD WASHER MOTOR AND PUMP ASSEMBLY
 - (a) Disconnect the connector.
 - (b) Remove the windshield washer motor and pump assembly.

INSPECTION

1. INSPECT WINDSHIELD WASHER MOTOR AND PUMP ASSEMBLY

HINT:

This check should be performed with the front washer motor and pump installed to the washer jar.

- (a) Fill the washer jar with washer fluid.
- (b) Connect the positive (+) battery lead to terminal A37-1 of the washer motor and pump, and the negative (-) lead to terminal A37-2.
- (c) Check if washer fluid is pumped from the washer jar.

OK:

Washer fluid is pumped from the washer jar.

2. INSPECT WASHER FLUID LEVEL SENSOR

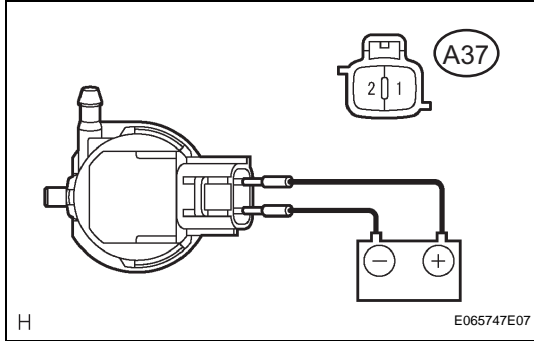
HINT:

The following check should be performed with the windshield washer motor and pump installed to the washer jar.

- (a) Fill the washer jar with washer fluid.
- (b) Disconnect the connector from the washer fluid level sensor.
- (c) Measure the resistance according to the value(s) in the table below.

Standard resistance

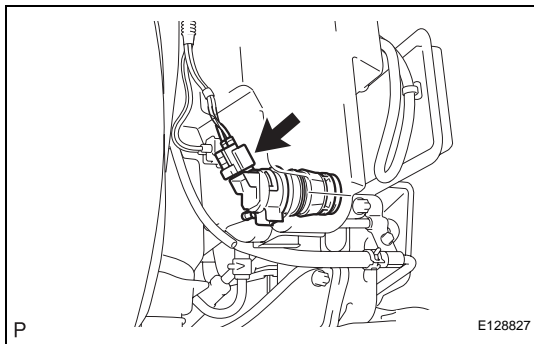
Fluid Volume	Specified Condition
More than 700 to 900 ml	10 k Ω or higher
Less than 700 to 900 ml	Below 1 Ω

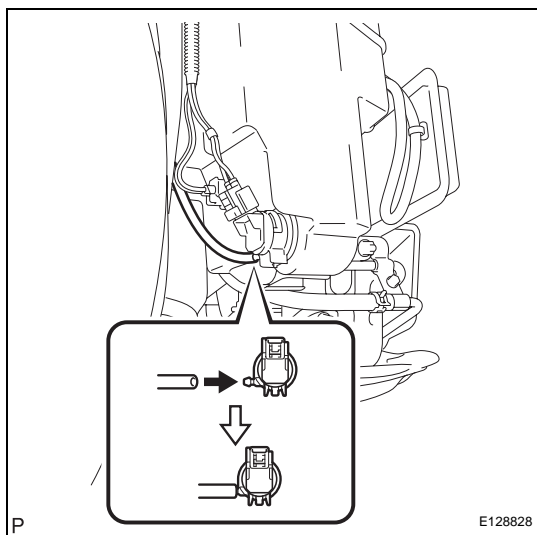


INSTALLATION

1. INSTALL WINDSHIELD WASHER MOTOR AND PUMP ASSEMBLY

- (a) Install the windshield washer motor and pump assembly.
- (b) Connect the connector.





2. **FILL UP WASHER JAR WITH WASHER FLUID**
 - (a) Connect the washer hose to the windshield washer motor and pump assembly and fill the washer jar with washer fluid.
3. **INSTALL FRONT BUMPER ASSEMBLY (w/ Fog Light)**
(See page [ET-14](#))
4. **INSTALL FRONT BUMPER ASSEMBLY (w/o Fog Light)**
(See page [ET-13](#))
5. **INSTALL COOL AIR INTAKE DUCT SEAL (for 2GR-FE)**
(See page [ET-14](#))

WASHER NOZZLE

ON-VEHICLE INSPECTION

1. INSPECT WASHER NOZZLE SUB-ASSEMBLY

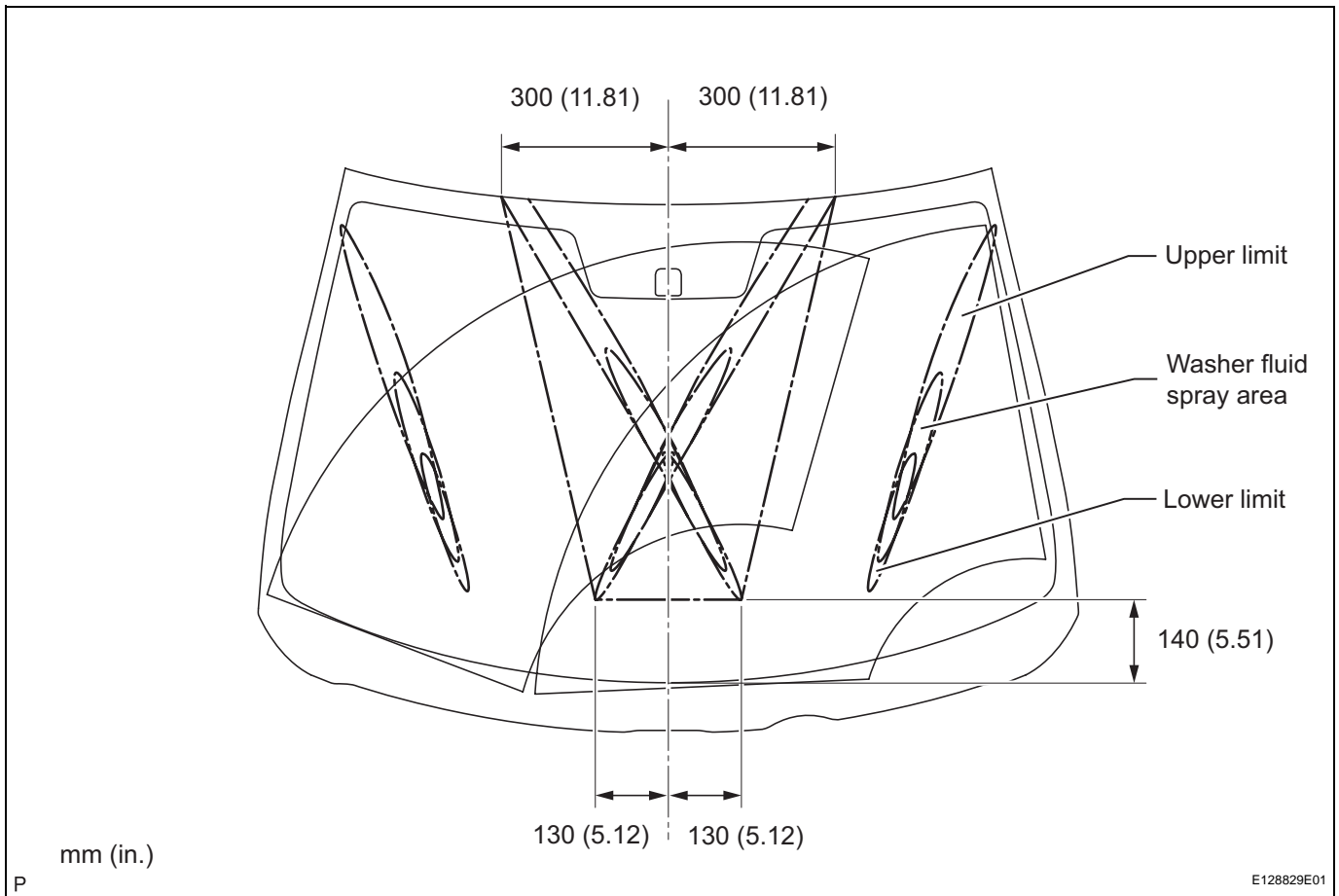
- (a) With the engine running, check the position that the washer fluid hits the windshield.

Standard:

Washer fluid hits the windshield in the areas shown in the illustration.

HINT:

If the result is not as specified, replace the washer nozzle.



ADJUSTMENT

1. ADJUST WASHER NOZZLE SUB-ASSEMBLY

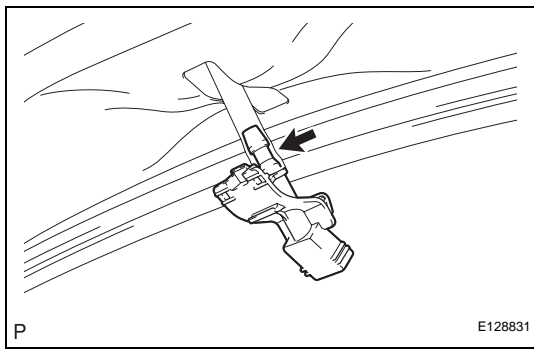
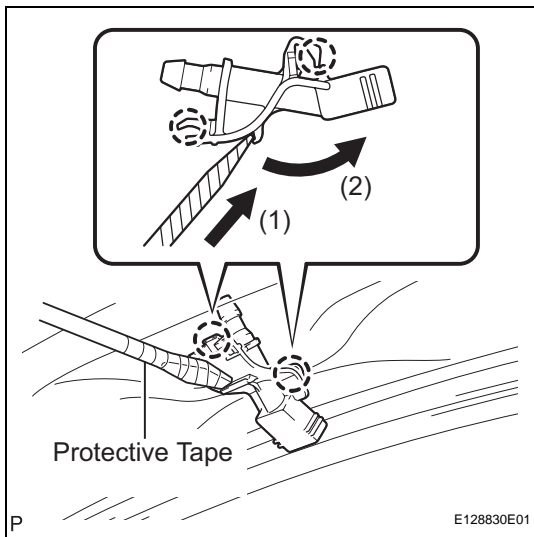
- (a) Using a screwdriver, disengage the 2 claws and separate the washer nozzle sub-assembly as shown in the illustration.

NOTICE:

Be careful not to damage the windshield.

HINT:

Tape the screwdriver tip before use.



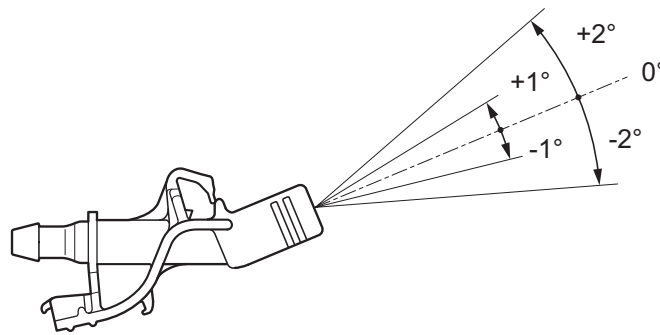
- (b) Disconnect the washer nozzle sub-assembly from the washer hose.

NOTICE:

Washer nozzles cannot be reused.

- (c) Select a washer nozzle sub-assembly so that the washer fluid spray area is within the standard.

Available Washer Nozzles:



Washer Fluid
Spray Angle

-2°

-1°

0°

+1°

+2°

Part Number

85381-30210

85381-30190

85381-30170

85381-30180

85381-30200

- (d) Connect the selected washer nozzle sub-assembly to the washer hose.
- (e) Engage the 2 claws and install the washer nozzle sub-assembly.