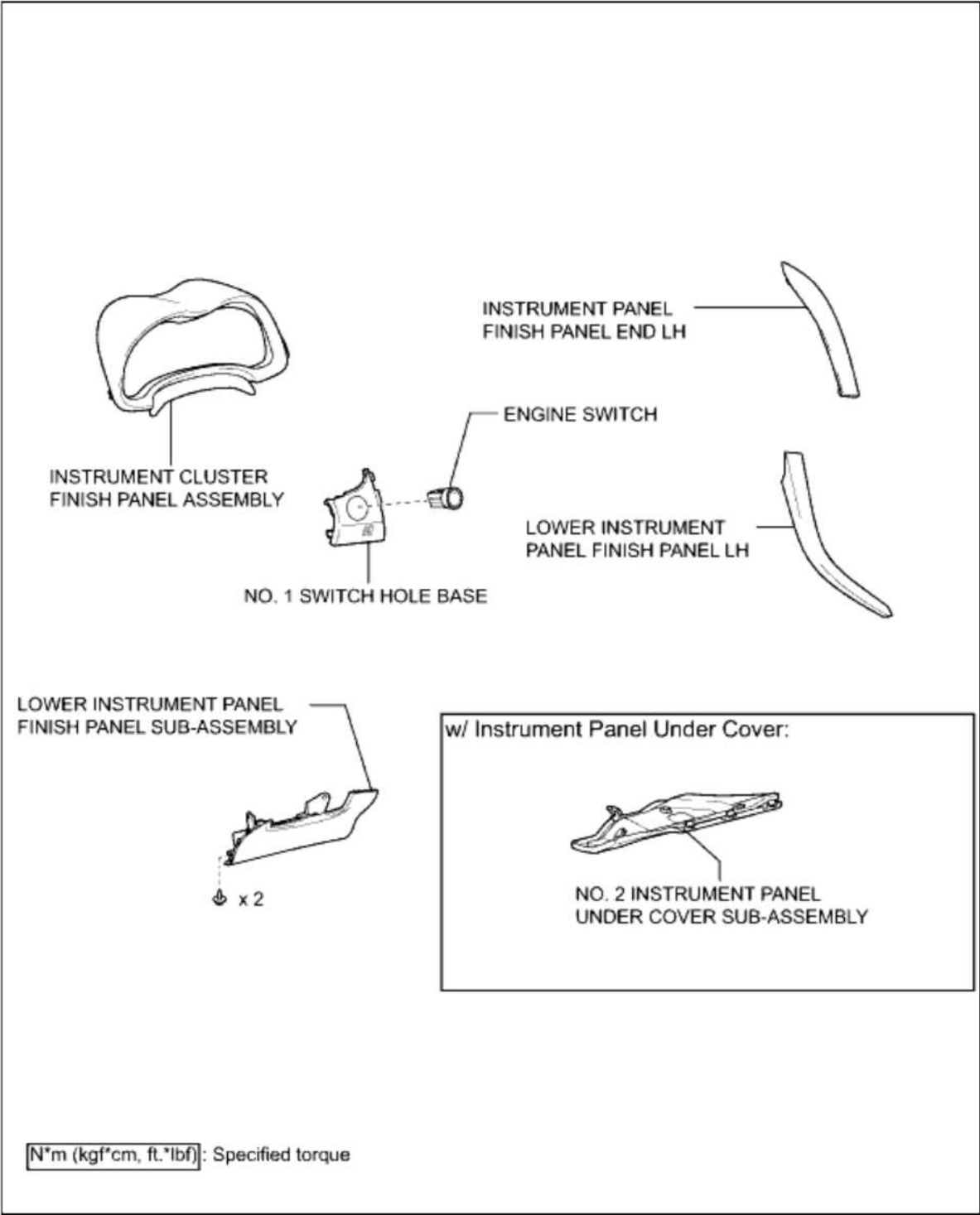


Last Modified: 3-10-2010	6.4 K	From: 200901
Model Year: 2010	Model: Corolla	Doc ID: RM000002YWB00HX
Title: 2ZR-FE STARTING: ENGINE SWITCH: COMPONENTS (2010 Corolla)		

COMPONENTS

ILLUSTRATION





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Last Modified: 3-10-2010	6.4 A	From: 200901
Model Year: 2010	Model: Corolla	Doc ID: RM000002YWC00TX
Title: 2ZR-FE STARTING: ENGINE SWITCH: REMOVAL (2010 Corolla)		

REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

2. REMOVE LOWER INSTRUMENT PANEL FINISH PANEL LH [INFO](#)

3. REMOVE INSTRUMENT PANEL FINISH PANEL END LH [INFO](#)

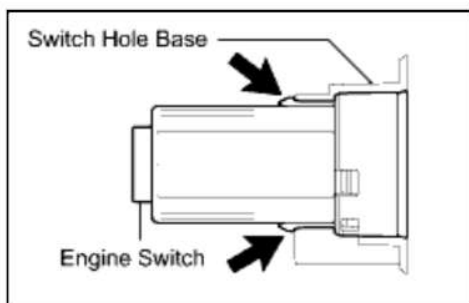
4. REMOVE INSTRUMENT CLUSTER FINISH PANEL ASSEMBLY [INFO](#)

5. REMOVE NO. 2 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY (w/ Instrument Panel Under Cover) [INFO](#)

6. REMOVE LOWER INSTRUMENT PANEL FINISH PANEL SUB-ASSEMBLY [INFO](#)

7. REMOVE NO. 1 SWITCH HOLE BASE [INFO](#)

8. REMOVE ENGINE SWITCH



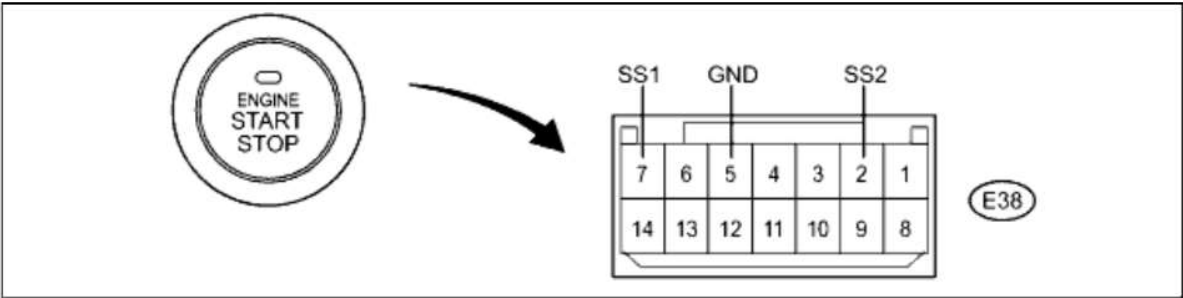
(a) Disengage the 2 claws and remove the engine switch from the No. 1 switch hole base.

Last Modified: 3-10-2010	6.4 G	From: 200901
Model Year: 2010	Model: Corolla	Doc ID: RM000002YWA011X
Title: 2ZR-FE STARTING: ENGINE SWITCH: INSPECTION (2010 Corolla)		

INSPECTION

1. INSPECT ENGINE SWITCH

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

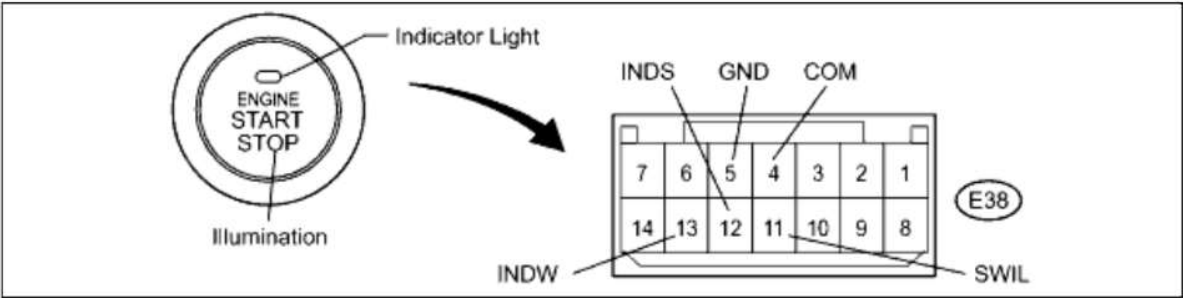


Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
SS1 (E38-7) - GND (E38-5)	Pushed	Below 1 Ω
SS2 (E38-2) - GND (E38-5)	Pushed	Below 1 Ω
SS1 (E38-7) - GND (E38-5)	Not pushed	10 kΩ or higher
SS2 (E38-2) - GND (E38-5)	Not pushed	10 kΩ or higher

If the result is not as specified, replace the engine switch.

(b) Apply battery voltage between the terminals of the switch and check the illumination condition of the switch.



OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
Battery positive (+) → SWIL (E38-11) Battery negative (-) → COM (E38-4) or GND (E38-5)	Illuminates

MEASUREMENT CONDITION	SPECIFIED CONDITION
Battery positive (+) → INDS (E38-12) Battery negative (-) → COM (E38-4) or GND (E38-5)	Illuminates
Battery positive (+) → INDW (E38-13) Battery negative (-) → COM (E38-4) or GND (E38-5)	Illuminates

NOTICE:

- If the positive (+) lead and the negative (-) lead are incorrectly connected, the engine switch indicator light will not illuminate.
- If the voltage is too low, the indicator light will not illuminate.

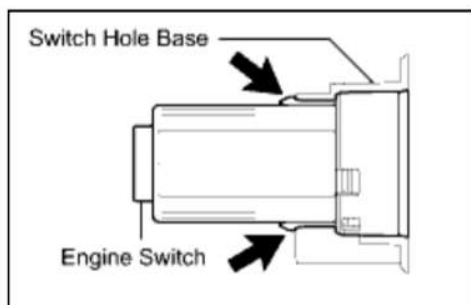
If the result is not as specified, replace the engine switch.



Last Modified: 3-10-2010	6.4 A	From: 200901
Model Year: 2010	Model: Corolla	Doc ID: RM000002YW900TX
Title: 2ZR-FE STARTING: ENGINE SWITCH: INSTALLATION (2010 Corolla)		

INSTALLATION

1. INSTALL ENGINE SWITCH



(a) Engage the 2 claws to install the engine switch.

2. INSTALL NO. 1 SWITCH HOLE BASE INFO

3. INSTALL LOWER INSTRUMENT PANEL FINISH PANEL SUB-ASSEMBLY INFO

4. INSTALL NO. 2 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY (w/ Instrument Panel Under Cover) INFO

5. INSTALL INSTRUMENT CLUSTER FINISH PANEL ASSEMBLY INFO

6. INSTALL INSTRUMENT PANEL FINISH PANEL END LH INFO

7. INSTALL LOWER INSTRUMENT PANEL FINISH PANEL LH INFO

8. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

HINT: INFO .

9. INSPECT SRS WARNING LIGHT

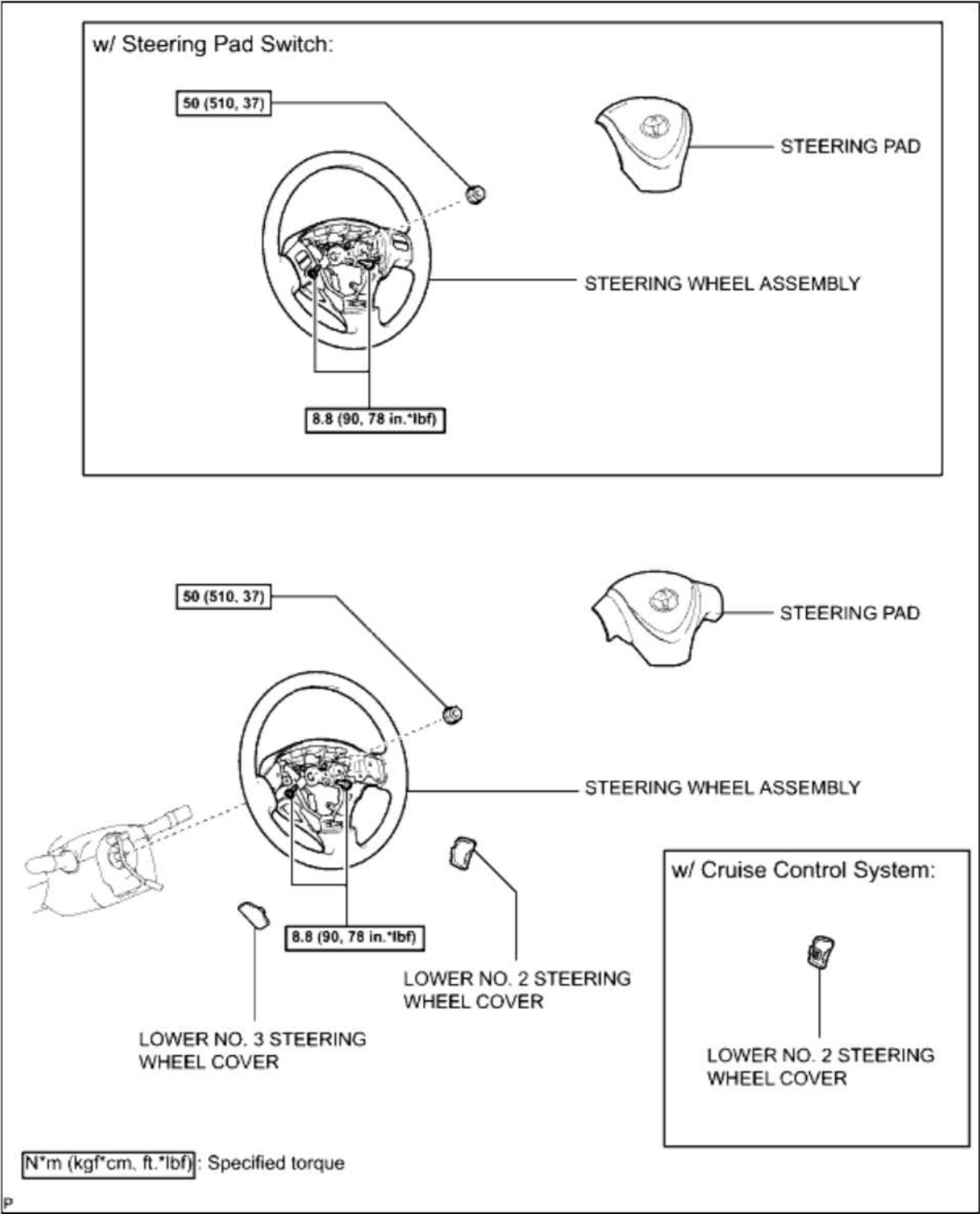
INFO



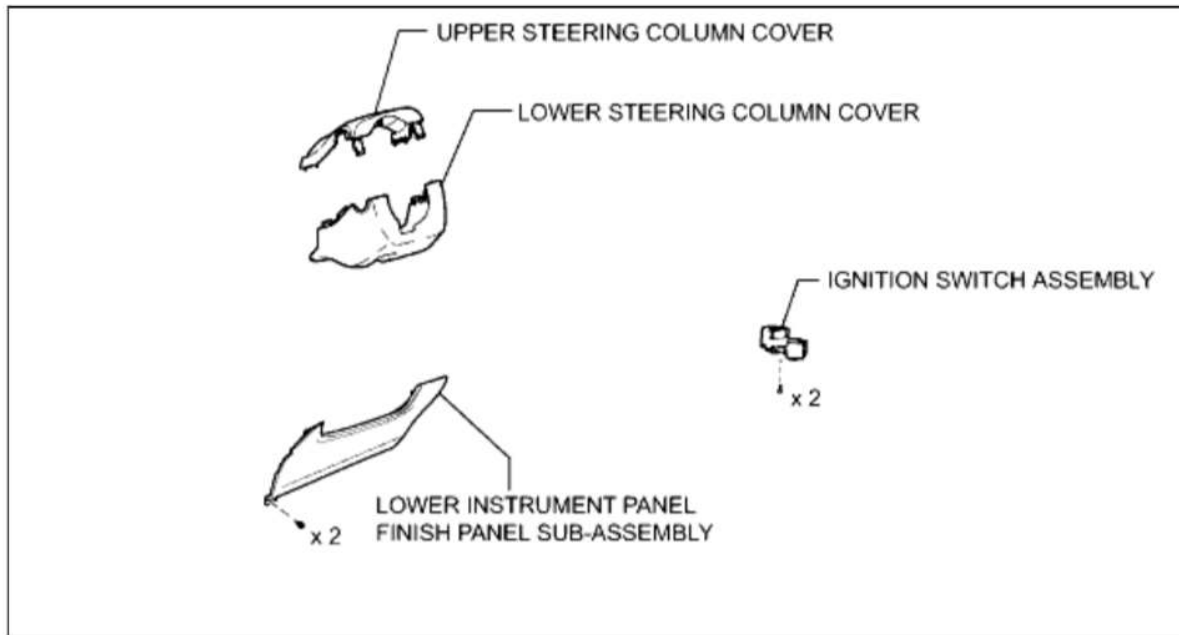
Last Modified: 3-10-2010	6.4 K	From: 200901
Model Year: 2010	Model: Corolla	Doc ID: RM0000034SW00DX
Title: 2AZ-FE STARTING: IGNITION SWITCH: COMPONENTS (2010 Corolla)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION



TOYOTA

Last Modified: 3-10-2010	6.4 A	From: 200901
Model Year: 2010	Model: Corolla	Doc ID: RM0000034SX00DX
Title: 2AZ-FE STARTING: IGNITION SWITCH: REMOVAL (2010 Corolla)		

REMOVAL

CAUTION:

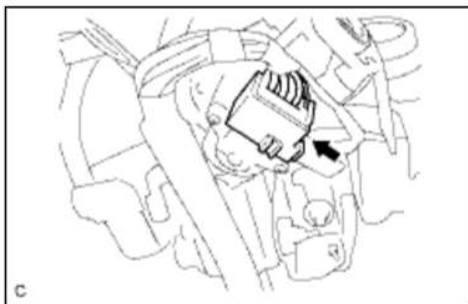
Some of these service operations affect the SRS airbag system. Read the precautionary notices concerning the SRS airbag system before servicing .

1. ALIGN FRONT WHEELS STRAIGHT AHEAD
2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

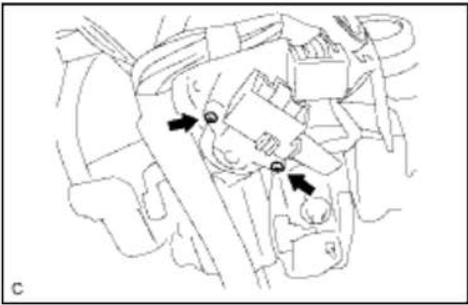
Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

3. REMOVE LOWER NO. 3 STEERING WHEEL COVER 
4. REMOVE LOWER NO. 2 STEERING WHEEL COVER 
5. REMOVE STEERING PAD 
6. REMOVE STEERING WHEEL ASSEMBLY 
7. REMOVE LOWER INSTRUMENT PANEL FINISH PANEL SUB-ASSEMBLY 
8. REMOVE LOWER STEERING COLUMN COVER 
9. REMOVE UPPER STEERING COLUMN COVER 
10. REMOVE IGNITION SWITCH ASSEMBLY



(a) Disconnect the connector from the ignition switch.

(b) Remove the 2 screws and ignition switch.



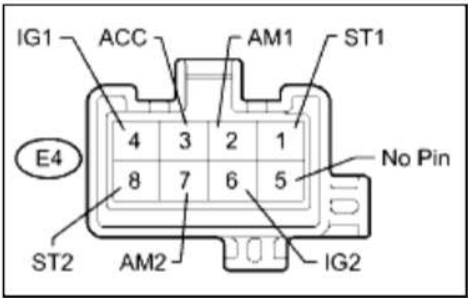
Last Modified: 3-10-2010	6.4 G	From: 200901
Model Year: 2010	Model: Corolla	Doc ID: RM0000026VF00XX
Title: 2AZ-FE STARTING: IGNITION SWITCH: INSPECTION (2010 Corolla)		

INSPECTION

1. INSPECT IGNITION SWITCH

(a) Measure the resistance of the switch.

Standard Resistance:



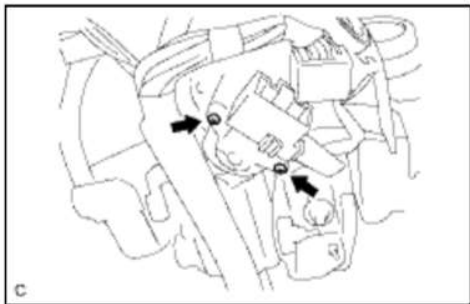
TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
Between all terminals	LOCK	10 kΩ or higher
AM1 (E4-2) - ACC (E4-3)	ACC	Below 1 Ω
AM1 (E4-2) - ACC (E4-3) AM1 (E4-2) - IG1 (E4-4) IG2 (E4-6) - AM2 (E4-7)	ON	Below 1 Ω
ST1 (E4-1) - AM1 (E4-2) ST1 (E4-1) - IG1 (E4-4) IG2 (E4-6) - AM2 (E4-7) IG2 (E4-6) - ST2 (E4-8)	START	Below 1 Ω

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

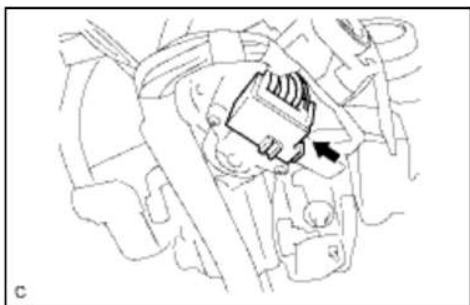
Last Modified: 3-10-2010	6.4 A	From: 200901
Model Year: 2010	Model: Corolla	Doc ID: RM0000034SV00DX
Title: 2AZ-FE STARTING: IGNITION SWITCH: INSTALLATION (2010 Corolla)		

INSTALLATION

1. INSTALL IGNITION SWITCH ASSEMBLY



(a) Install the ignition switch with the 2 screws.



(b) Connect the connector.

2. INSTALL UPPER STEERING COLUMN COVER

3. INSTALL LOWER STEERING COLUMN COVER

4. INSTALL LOWER INSTRUMENT PANEL FINISH PANEL SUB-ASSEMBLY

5. ADJUST SPIRAL CABLE

6. INSTALL STEERING WHEEL ASSEMBLY

7. INSTALL STEERING PAD

8. INSTALL LOWER NO. 3 STEERING WHEEL COVER

9. INSTALL LOWER NO. 2 STEERING WHEEL COVER

10. INSPECT STEERING WHEEL CENTER POINT

11. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

HINT:  .

12. INSPECT STEERING PAD 

13. INSPECT SRS WARNING LIGHT

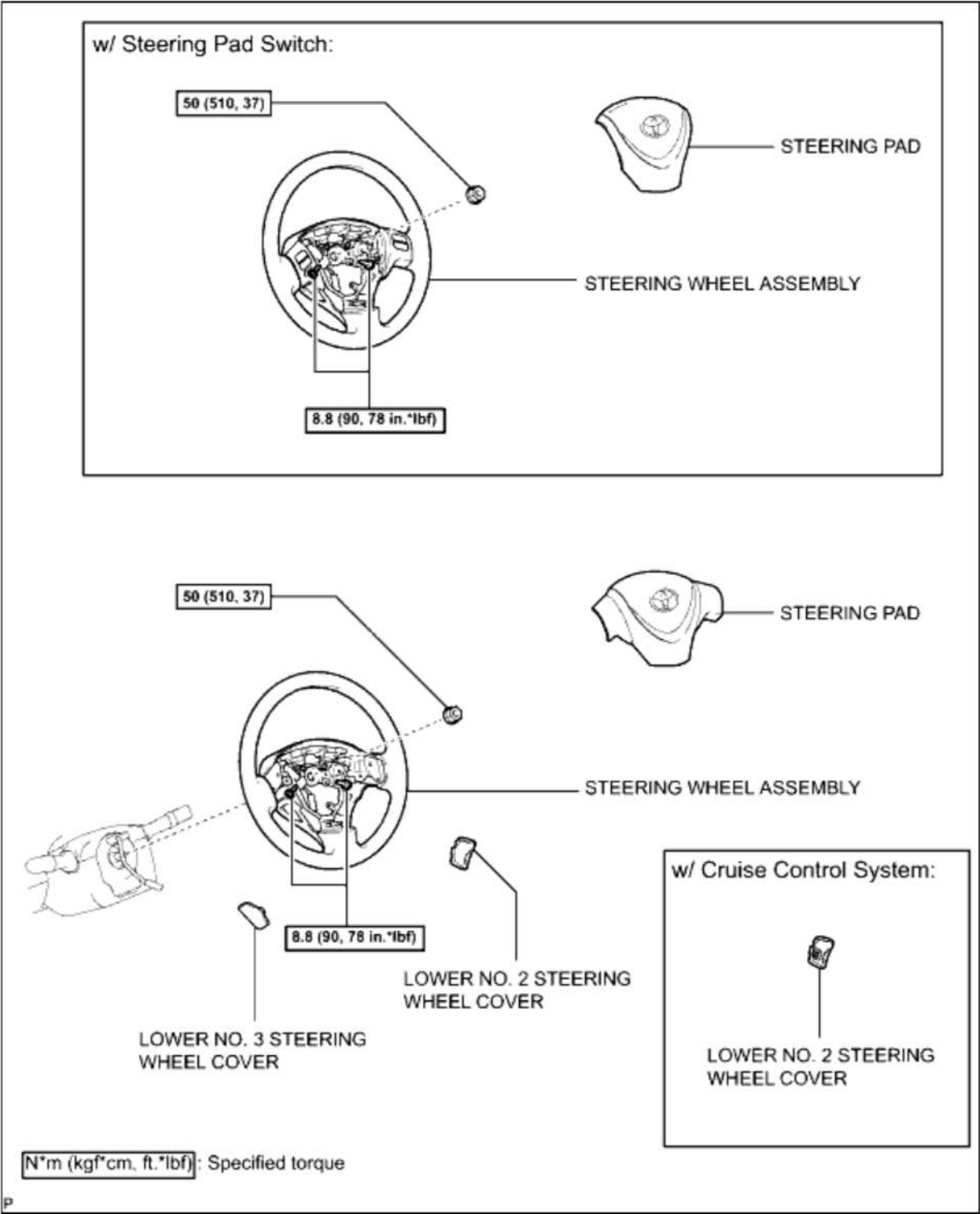
HINT:  .



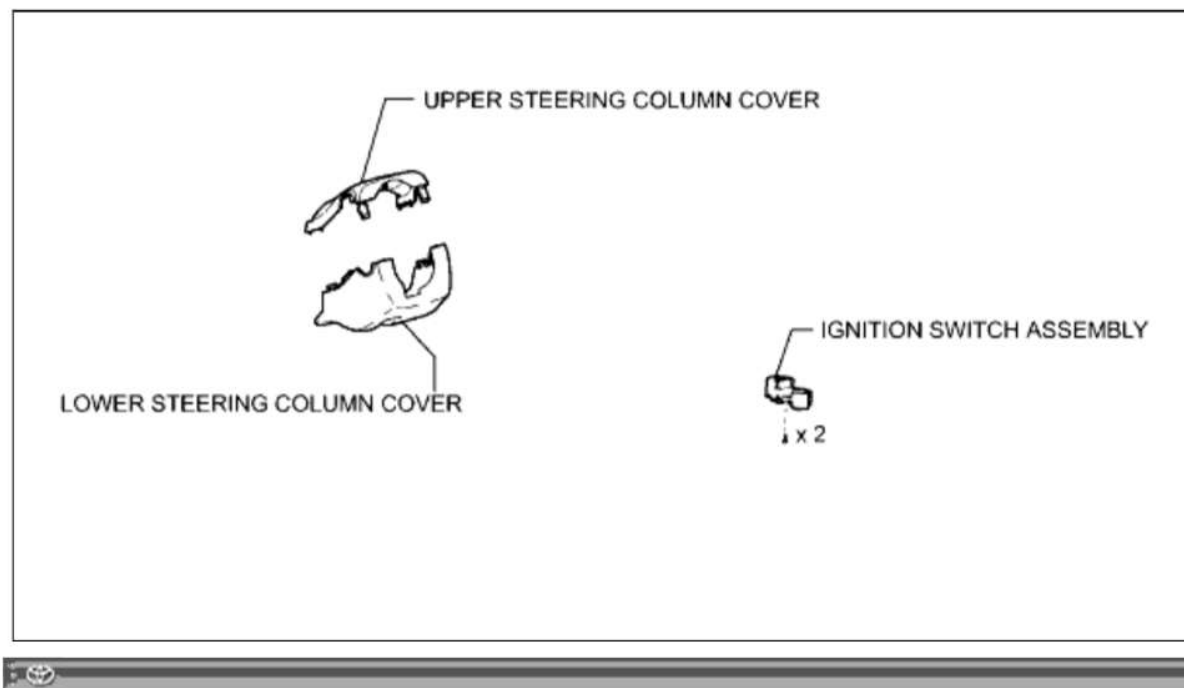
Last Modified: 3-10-2010	6.4 K	From: 200901
Model Year: 2010	Model: Corolla	Doc ID: RM0000034SW00CX
Title: 2ZR-FE STARTING: IGNITION SWITCH: COMPONENTS (2010 Corolla)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION



Last Modified: 3-10-2010	6.4 A	From: 200901
Model Year: 2010	Model: Corolla	Doc ID: RM0000034SX00CX
Title: 2ZR-FE STARTING: IGNITION SWITCH: REMOVAL (2010 Corolla)		

REMOVAL

CAUTION:

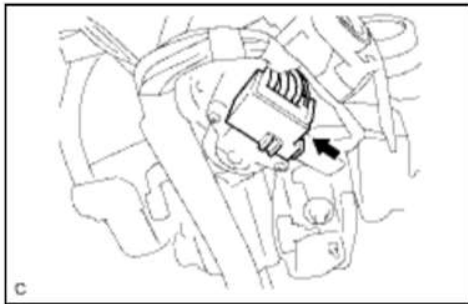
Some of these service operations affect the SRS airbag system. Read the precautionary notices concerning the SRS airbag system before servicing .

1. ALIGN FRONT WHEELS STRAIGHT AHEAD
2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

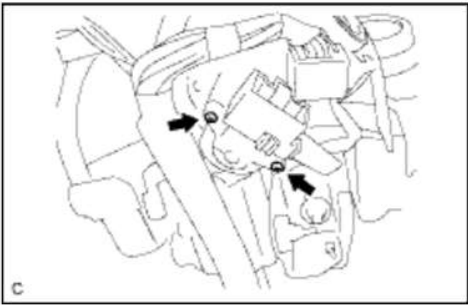
Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

3. REMOVE LOWER NO. 3 STEERING WHEEL COVER 
4. REMOVE LOWER NO. 2 STEERING WHEEL COVER 
5. REMOVE STEERING PAD 
6. REMOVE STEERING WHEEL ASSEMBLY 
7. REMOVE LOWER STEERING COLUMN COVER 
8. REMOVE UPPER STEERING COLUMN COVER 
9. REMOVE IGNITION SWITCH ASSEMBLY



(a) Disconnect the connector from the ignition switch.

(b) Remove the 2 screws and ignition switch.



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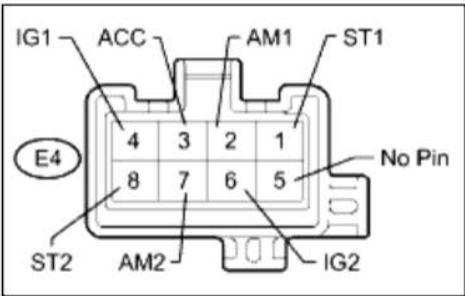
Last Modified: 3-10-2010	6.4 G	From: 200901
Model Year: 2010	Model: Corolla	Doc ID: RM0000026VF00WX
Title: 2ZR-FE STARTING: IGNITION SWITCH: INSPECTION (2010 Corolla)		

INSPECTION

1. INSPECT IGNITION SWITCH

(a) Measure the resistance of the switch.

Standard Resistance:



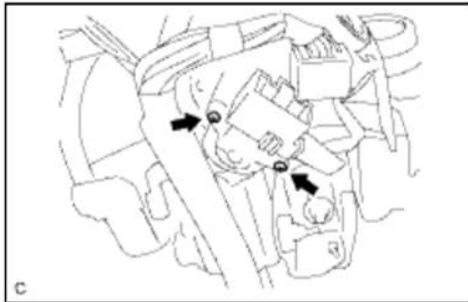
TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
Between all terminals	LOCK	10 kΩ or higher
AM1 (E4-2) - ACC (E4-3)	ACC	Below 1 Ω
AM1 (E4-2) - ACC (E4-3) AM1 (E4-2) - IG1 (E4-4) IG2 (E4-6) - AM2 (E4-7)	ON	Below 1 Ω
ST1 (E4-1) - AM1 (E4-2) ST1 (E4-1) - IG1 (E4-4) IG2 (E4-6) - AM2 (E4-7) IG2 (E4-6) - ST2 (E4-8)	START	Below 1 Ω

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

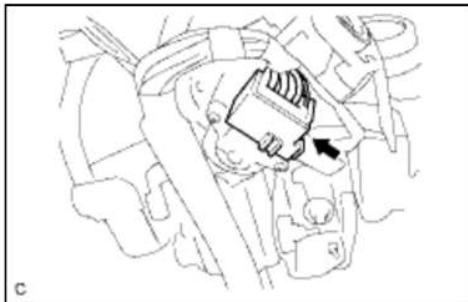
Last Modified: 3-10-2010	6.4 A	From: 200901
Model Year: 2010	Model: Corolla	Doc ID: RM0000034SV00CX
Title: 2ZR-FE STARTING: IGNITION SWITCH: INSTALLATION (2010 Corolla)		

INSTALLATION

1. INSTALL IGNITION SWITCH ASSEMBLY



(a) Install the ignition switch with the 2 screws.



(b) Connect the connector.

2. INSTALL UPPER STEERING COLUMN COVER

3. INSTALL LOWER STEERING COLUMN COVER

4. ADJUST SPIRAL CABLE

5. INSTALL STEERING WHEEL ASSEMBLY

6. INSTALL STEERING PAD

7. INSTALL LOWER NO. 3 STEERING WHEEL COVER

8. INSTALL LOWER NO. 2 STEERING WHEEL COVER

9. INSPECT STEERING WHEEL CENTER POINT

10. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

HINT: .

11. INSPECT STEERING PAD **12. INSPECT SRS WARNING LIGHT****HINT:**  .

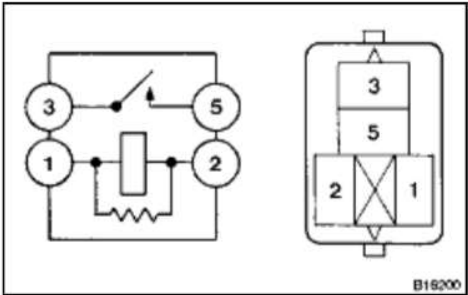
Last Modified: 3-10-2010	6.4 G	From: 200901
Model Year: 2010	Model: Corolla	Doc ID: RM000003D39003X
Title: 2AZ-FE STARTING: RELAY: ON-VEHICLE INSPECTION (2010 Corolla)		

ON-VEHICLE INSPECTION

1. INSPECT STARTER RELAY

- (a) Check the resistance.
- (1) Using an ohmmeter, measure the resistance between the terminals.

Standard Resistance:



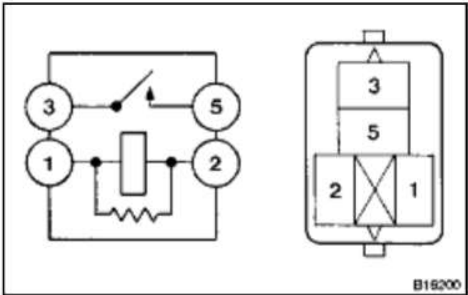
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 - 5	Battery voltage is not applied to terminals 1 and 2	10 kΩ or higher
3 - 5	Battery voltage is applied to terminals 1 and 2	Below 1 Ω

If the result is not as specified, replace the relay.

2. INSPECT ACC RELAY

- (a) Check the resistance.
- (1) Using an ohmmeter, measure the resistance between the terminals.

Standard Resistance:



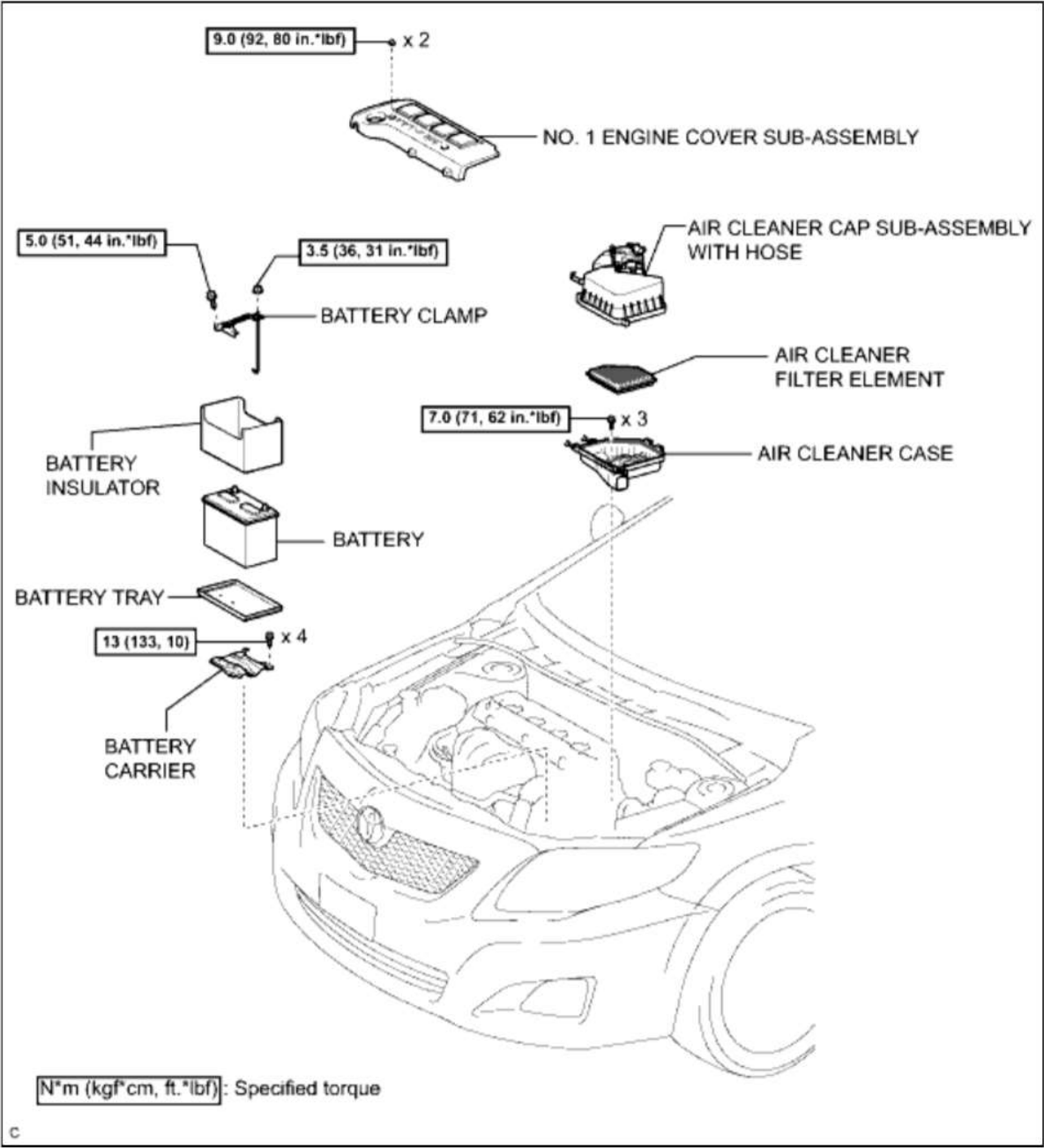
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 - 5	Battery voltage is not applied to terminals 1 and 2	10 kΩ or higher
3 - 5	Battery voltage is applied to terminals 1 and 2	Below 1 Ω

If the result is not as specified, replace the relay.

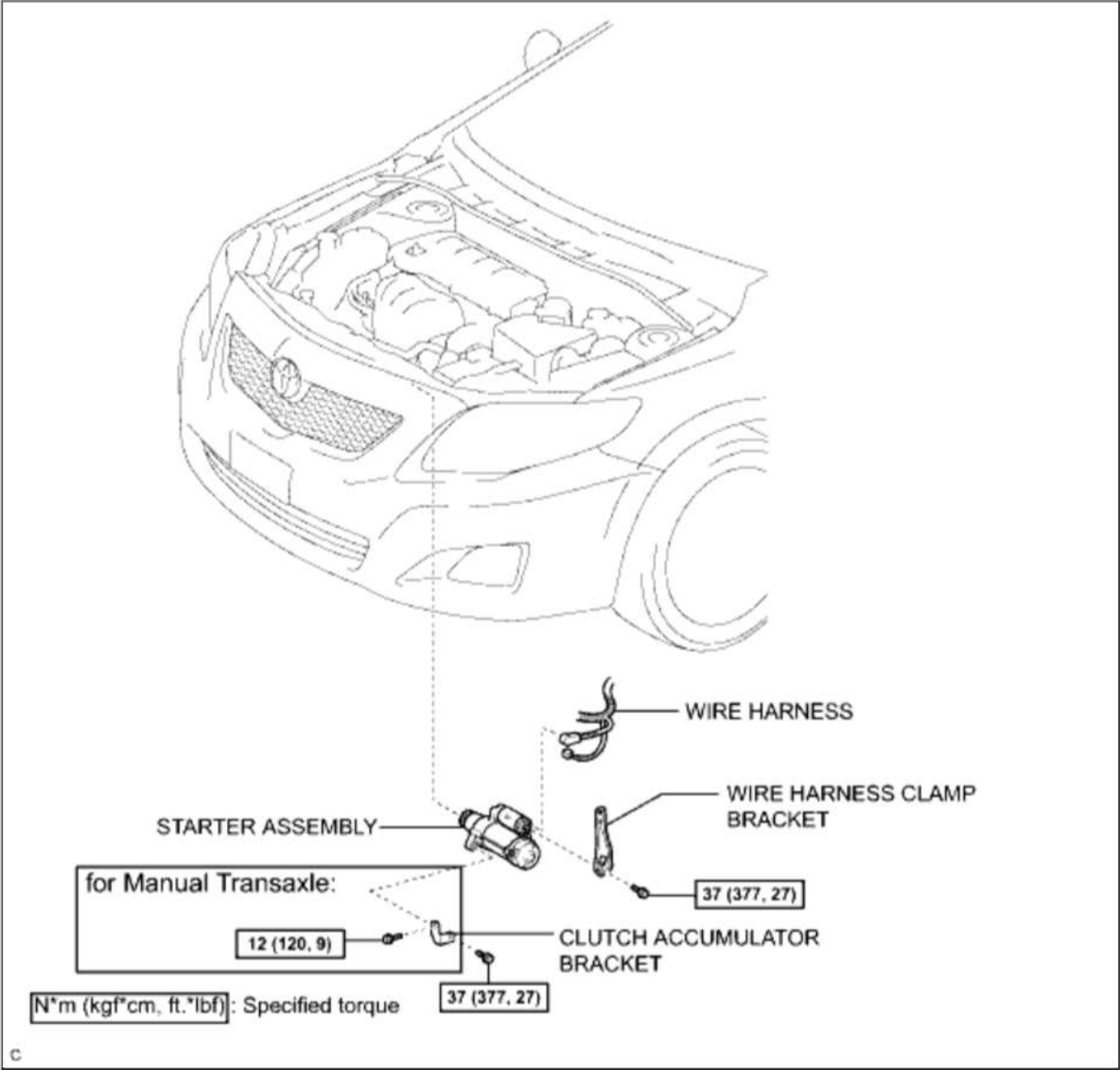
Last Modified: 3-10-2010	6.4 K	From: 200901
Model Year: 2010	Model: Corolla	Doc ID: RM0000025TZ00EX
Title: 2AZ-FE STARTING: STARTER: COMPONENTS (2010 Corolla)		

COMPONENTS

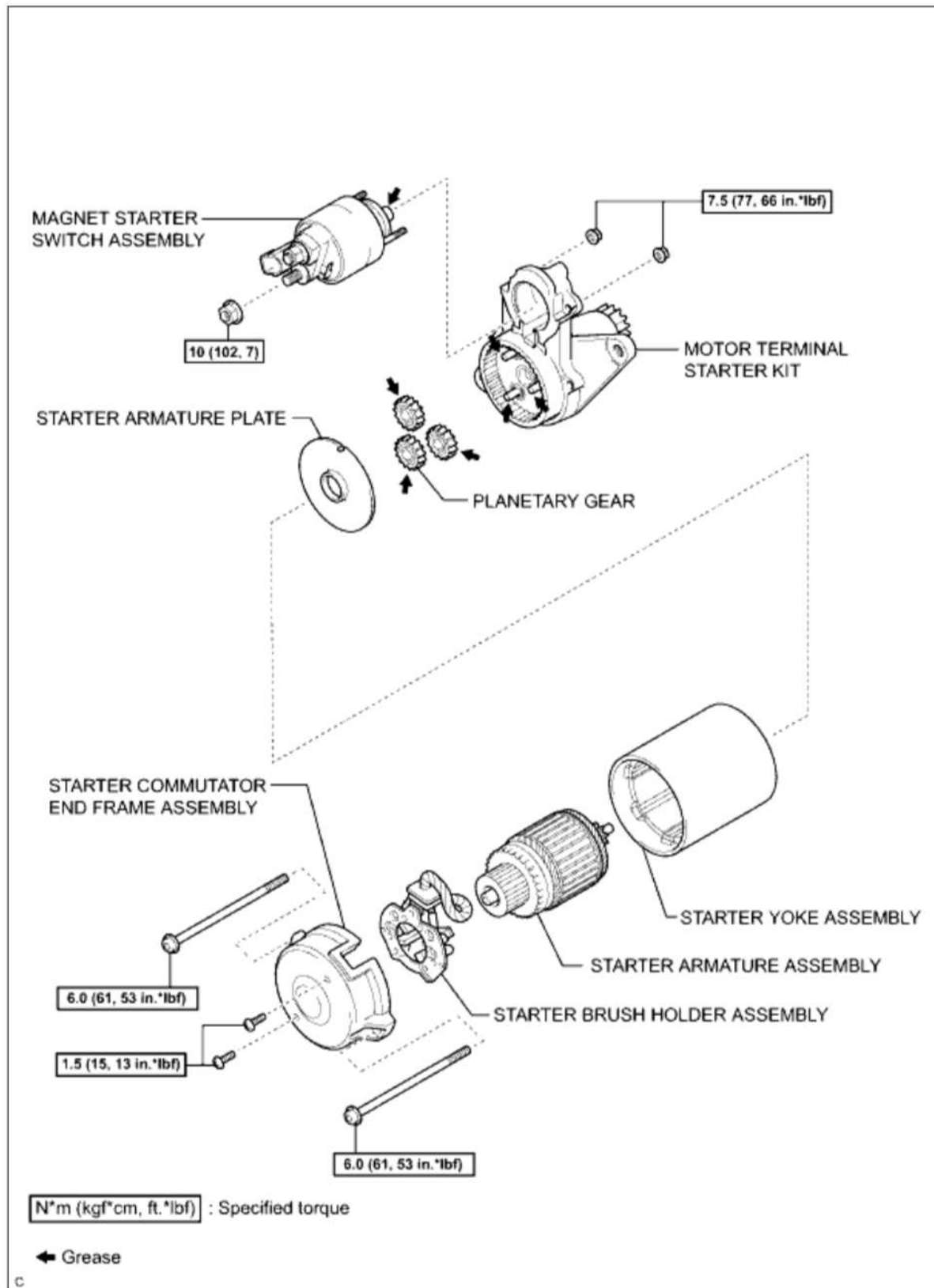
ILLUSTRATION



ILLUSTRATION



ILLUSTRATION



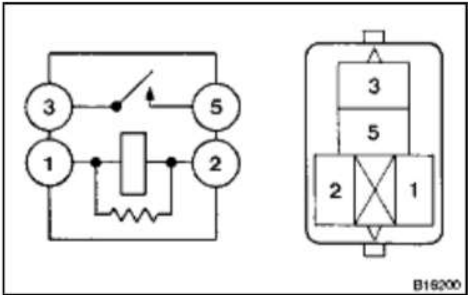
Last Modified: 3-10-2010	6.4 G	From: 200901
Model Year: 2010	Model: Corolla	Doc ID: RM000003D3A003X
Title: 2ZR-FE STARTING: RELAY: ON-VEHICLE INSPECTION (2010 Corolla)		

ON-VEHICLE INSPECTION

1. INSPECT STARTER RELAY

- (a) Check the resistance.
- (1) Using an ohmmeter, measure the resistance between the terminals.

Standard Resistance:



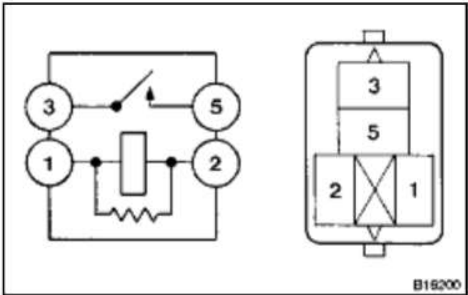
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 - 5	Battery voltage is not applied to terminals 1 and 2	10 kΩ or higher
3 - 5	Battery voltage is applied to terminals 1 and 2	Below 1 Ω

If the result is not as specified, replace the relay.

2. INSPECT ACC RELAY

- (a) Check the resistance.
- (1) Using an ohmmeter, measure the resistance between the terminals.

Standard Resistance:

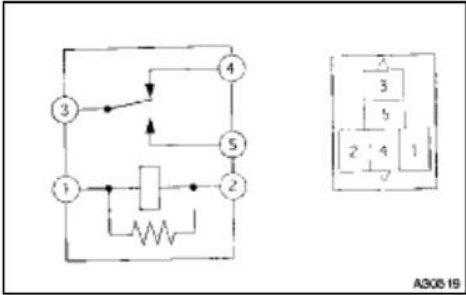


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 - 5	Battery voltage is not applied to terminals 1 and 2	10 kΩ or higher
3 - 5	Battery voltage is applied to terminals 1 and 2	Below 1 Ω

If the result is not as specified, replace the relay.

3. INSPECT ACC CUT RELAY

- (a) Check the resistance.
- (1) Using an ohmmeter, measure the resistance between the terminals.
- Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 - 4	Battery voltage is not applied to terminals 1 and 2	Below 1 Ω
3 - 4	Battery voltage is applied to terminals 1 and 2	10 k Ω or higher
3 - 5	Battery voltage is not applied to terminals 1 and 2	10 k Ω or higher
3 - 5	Battery voltage is applied to terminals 1 and 2	Below 1 Ω

If the result is not as specified, replace the relay.

Last Modified: 3-10-2010	6.4 A	From: 200901
Model Year: 2010	Model: Corolla	Doc ID: RM0000025U000TX
Title: 2AZ-FE STARTING: STARTER: REMOVAL (2010 Corolla)		

REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

2. REMOVE NO. 1 ENGINE COVER SUB-ASSEMBLY 

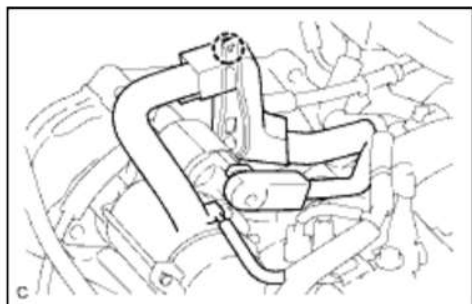
3. REMOVE AIR CLEANER CAP SUB-ASSEMBLY WITH HOSE 

4. REMOVE AIR CLEANER CASE 

5. REMOVE BATTERY 

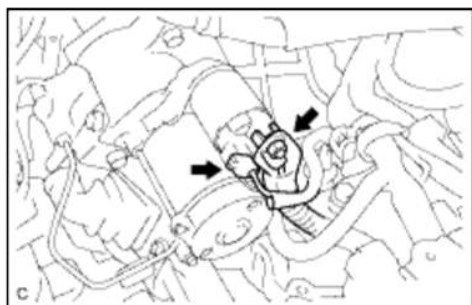
6. REMOVE BATTERY CARRIER 

7. DISCONNECT WIRE HARNESS



(a) Release the claw, and disconnect the wire harness.

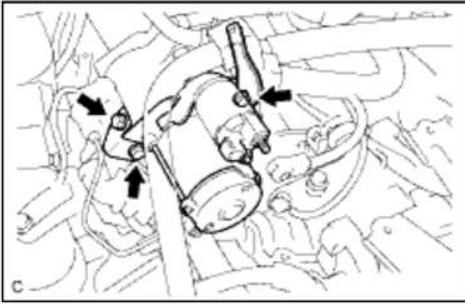
8. REMOVE STARTER ASSEMBLY (for Manual Transaxle)



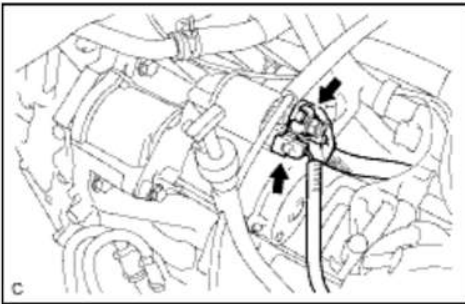
(a) Disconnect the terminal 50 connector from the starter assembly.

(b) Remove the nut and disconnect the wire harness from terminal 30.

(c) Remove the 3 bolts, clutch accumulator bracket, wire harness clamp bracket and starter assembly.

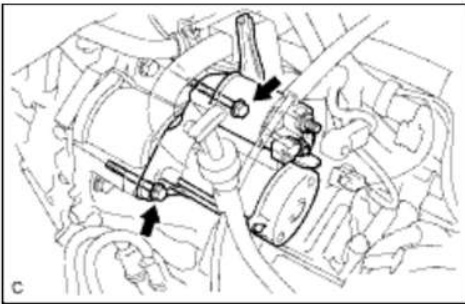


9. REMOVE STARTER ASSEMBLY (for Automatic Transaxle)



(a) Disconnect the terminal 50 connector from the starter assembly.

(b) Remove the nut and disconnect the wire harness from terminal 30.



(c) Remove the 2 bolts, wire harness clamp bracket and starter assembly.

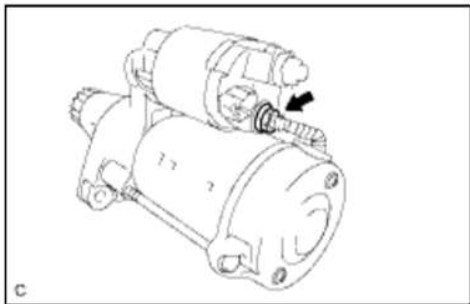


TOYOTA

Last Modified: 3-10-2010	6.4 A	From: 200901
Model Year: 2010	Model: Corolla	Doc ID: RM000001ETK019X
Title: 2AZ-FE STARTING: STARTER: DISASSEMBLY (2010 Corolla)		

DISASSEMBLY

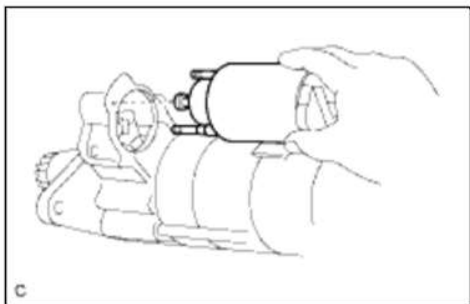
1. REMOVE MAGNET STARTER SWITCH ASSEMBLY



- (a) Remove the nut, then disconnect the lead wire from the magnet starter switch assembly.



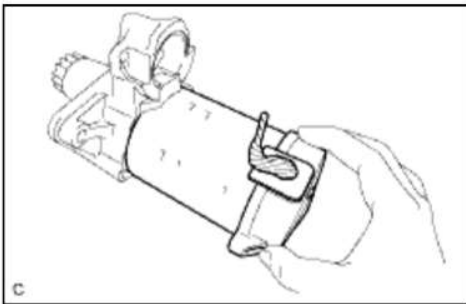
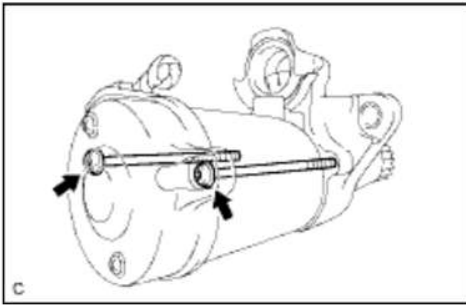
- (b) Remove the 2 nuts from the starter drive housing assembly while holding the magnet starter switch assembly.



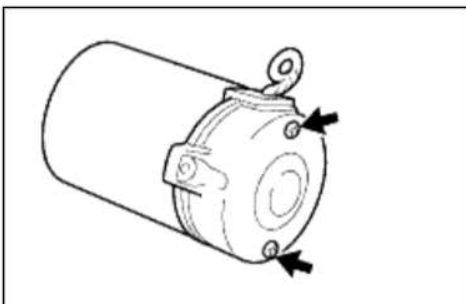
- (c) Pull the magnet starter switch assembly, and while lifting the front part of the magnet starter switch assembly, release the plunger hook from the drive lever and magnet starter switch assembly.

2. REMOVE STARTER COMMUTATOR END FRAME ASSEMBLY

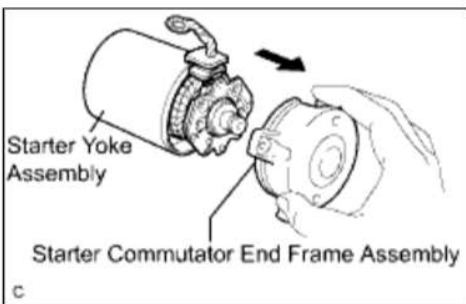
- (a) Using a T25 "TORX" socket wrench, remove the 2 bolts.



(b) Pull out the starter yoke together with the starter commutator end frame assembly.



(c) Remove the 2 screws from the starter commutator end frame assembly.



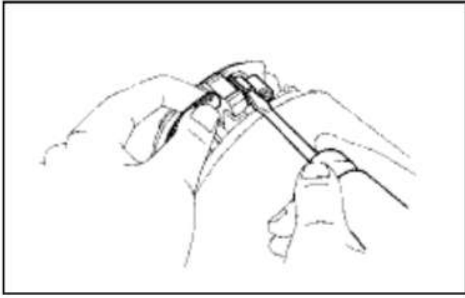
(d) Pull the starter yoke assembly out of the starter commutator end frame assembly.

NOTICE:

While holding down the lead wire, remove the starter commutator end frame.

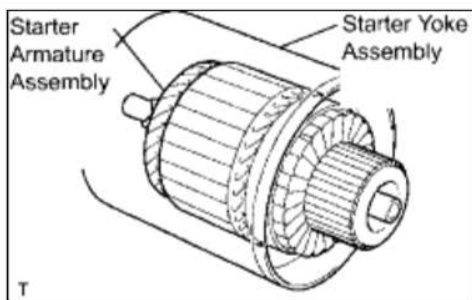
3. REMOVE STARTER ARMATURE ASSEMBLY

(a) Using a screwdriver, hold the spring back and disconnect



the brush from the brush holder.

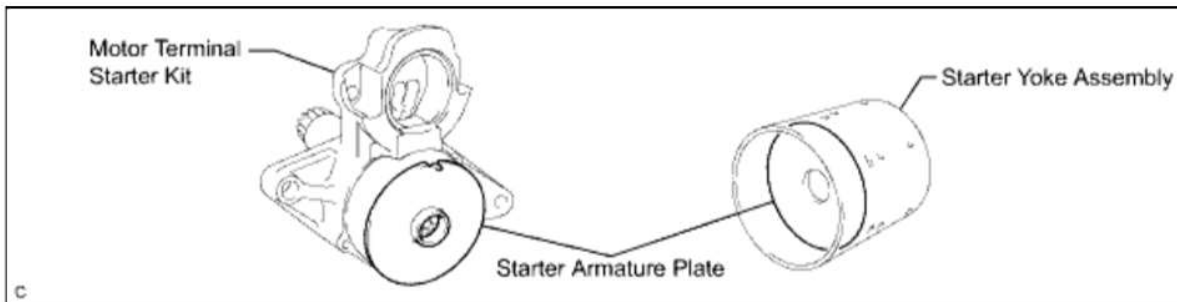
(b) Disconnect the 4 brushes, and remove the brush holder.



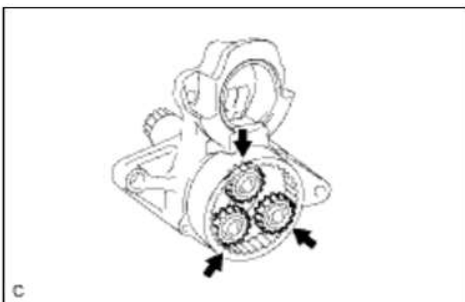
(c) Remove the starter armature assembly from the starter yoke assembly.

4. REMOVE STARTER ARMATURE PLATE

(a) Remove the armature plate from the motor terminal starter kit or the starter yoke assembly.



5. REMOVE PLANETARY GEAR



(a) Remove the 3 planetary gears from the starter center bearing clutch sub-assembly.





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Last Modified: 3-10-2010	6.4 G	From: 200901
Model Year: 2010	Model: Corolla	Doc ID: RM000001ETI01GX
Title: 2AZ-FE STARTING: STARTER: INSPECTION (2010 Corolla)		

INSPECTION

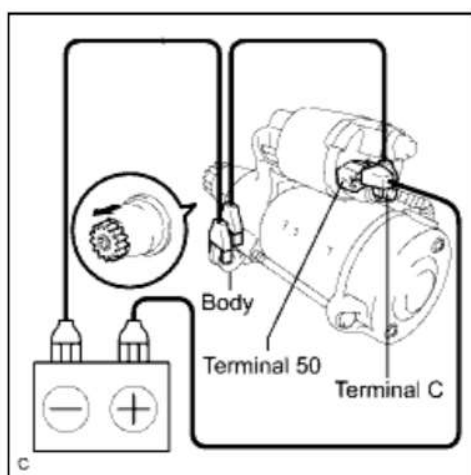
1. INSPECT STARTER ASSEMBLY

NOTICE:

Perform each of the following tests within 3 to 5 seconds.

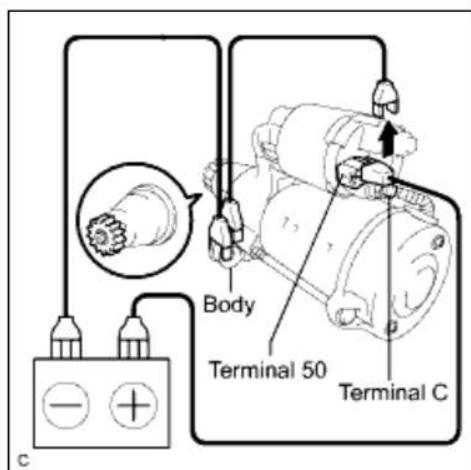
(a) Perform a pull-in test.

(1) Disconnect the field coil lead wire from terminal C.



(2) Connect the battery to the magnet starter switch as shown in the illustration and check that the pinion gear moves outward.

If the clutch pinion gear does not move, replace the magnet starter switch assembly.



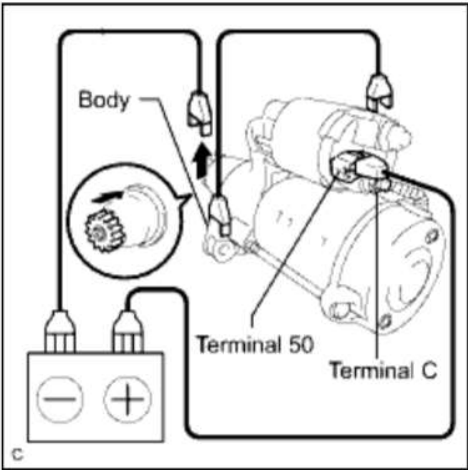
(b) Perform a hold-in test.

(1) Check that the pinion gear does not return inward after the cable is disconnected from terminal C.

If the clutch pinion gear returns inward, replace the magnet starter switch assembly.

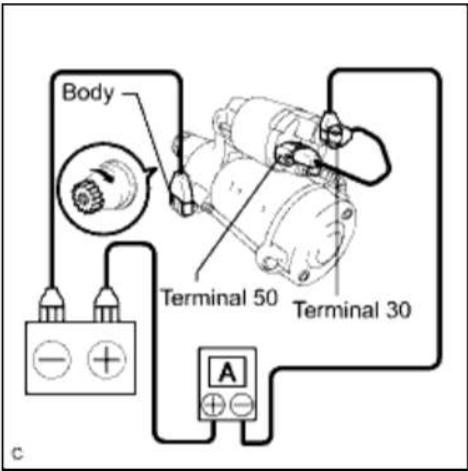
(c) Inspect the clutch pinion gear return.

(1) Disconnect the negative (-) lead from the switch body.



Check that the pinion gear moves inward.
If the clutch pinion gear does not return inward, replace the magnet starter switch assembly.

- (d) Perform an operation test without load.
- (1) Connect the field coil lead wire to terminal C.
 - Torque: 10 N·m (102 kgf·cm, 7.4ft·lbf)**
 - (2) Clamp the starter in a vise.
 - (3) Connect the battery and ammeter to the starter as shown in the illustration.



- (4) Check that the starter rotates smoothly and steadily with the clutch pinion gear extended.
- Check that the ammeter indicates the specified current.

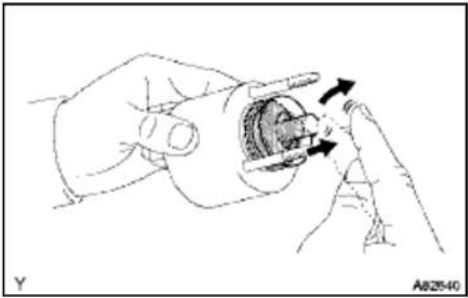
Standard Current:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Battery positive terminal - Terminal 30 - Terminal 50	11.5 V	Below 90 A

If the result is not as specified, replace the starter assembly.

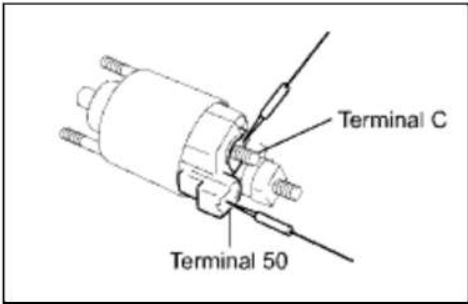
2. INSPECT MAGNET STARTER SWITCH ASSEMBLY

- (a) Check the plunger.
 - (1) Push in the plunger, then check that it returns quickly to its original position.
- If necessary, replace the magnet starter switch assembly.



- (b) Inspect the resistance of the pull-in coil.
- (1) Using an ohmmeter, measure the resistance between terminals 50 and C.

Standard Resistance:

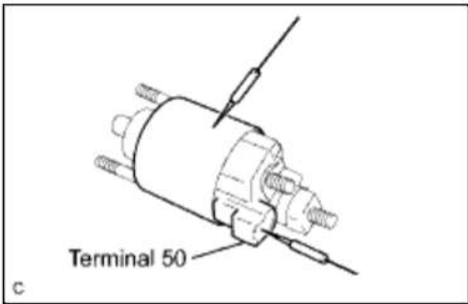


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Terminal 50 - Terminal C	-	Below 1 Ω

If the result is not as specified, replace the magnet starter switch assembly.

- (c) Inspect the resistance of the hold-in coil.
- (1) Using an ohmmeter, measure the resistance between terminal 50 and switch body.

Standard Resistance:

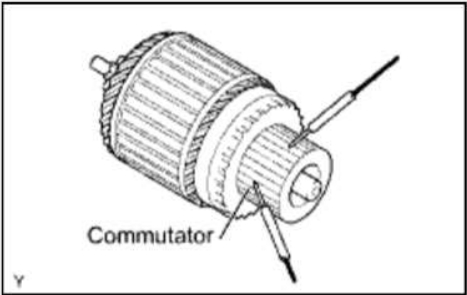


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Terminal 50 - Body ground	-	Below 2 Ω

If the result is not as specified, replace the magnet starter switch assembly.

3. INSPECT STARTER ARMATURE ASSEMBLY

- (a) Inspect the resistance of the commutator.
- (1) Using an ohmmeter, measure the resistance between any 2 segments of the commutator.



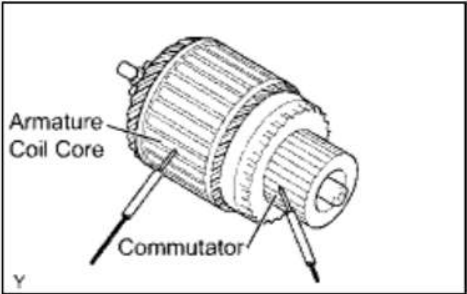
Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Segment - Segment	-	Below 1 Ω

If the result is not as specified, replace the starter armature assembly.

- (b) Check the commutator for a short to ground.
- (1) Using an ohmmeter, measure the resistance between the commutator and the armature coil core.

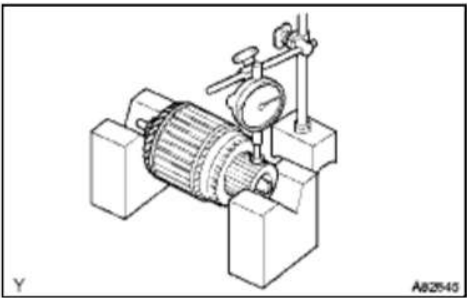
Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Commutator - Armature	-	10 k Ω or higher

If the result is not as specified, replace the starter armature assembly.

- (c) Check the appearance.
- If the surface is dirty or burnt, restore the surface with sandpaper (No. 400) or on a lathe.

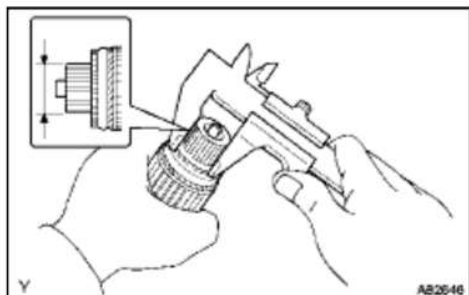


- (d) Check the commutator circle for runout.
- (1) Place the commutator on V-blocks.
- (2) Using a dial indicator, measure the circle runout.

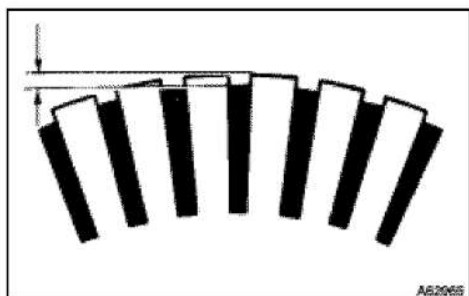
Standard runout:
0.02 mm (0.000787 in.)
Maximum runout:
0.05 mm (0.00197 in.)

If the runout is greater than the maximum, replace the armature assembly.

- (e) Using vernier calipers, measure the commutator diameter.
- Standard diameter:
29.0 mm (1.14 in.)
Minimum diameter:
28.0 mm (1.10 in.)



If the diameter is less than the minimum, replace the armature assembly.



(f) Check that the undercut portion is clean and free of foreign matter. Smooth out the edge.

Standard undercut depth:

0.7 mm (0.0276 in.)

Minimum undercut depth:

0.2 mm (0.00787 in.)

If the undercut depth is less than the minimum, increase the depth using a hacksaw blade.

4. INSPECT STARTER BRUSH HOLDER ASSEMBLY

(a) Remove the claws of the springs, then remove the 4 brushes.

(b) Using a vernier caliper, measure the brush length.

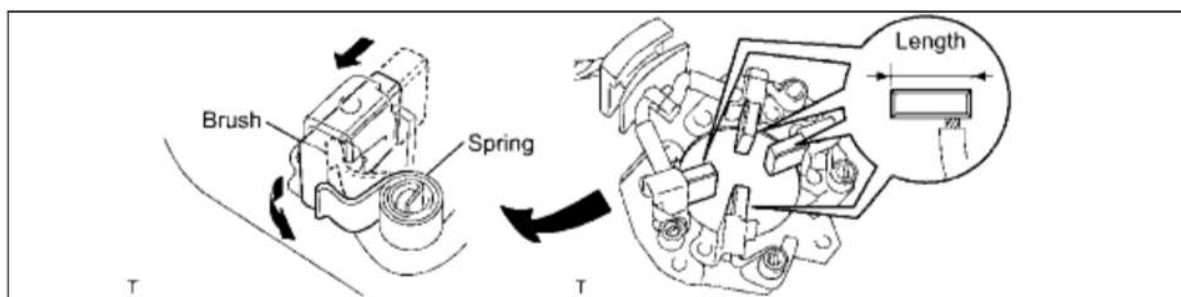
Standard length:

14.4 mm (0.567 in.)

Minimum length:

9.0 mm (0.354 in.)

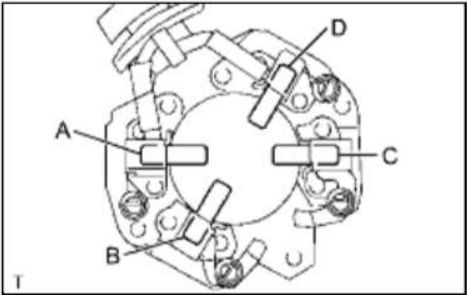
If the length is less than the minimum, replace the starter brush holder assembly.



(c) Check the brush holder.

(1) Using an ohmmeter, measure the resistance between the brushes.

Standard Resistance:

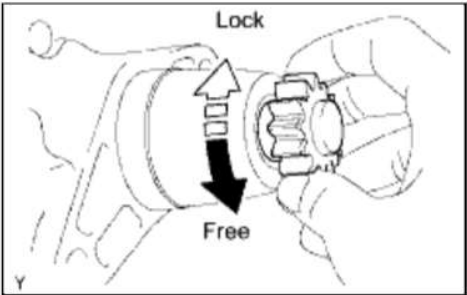


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A - B	-	10 kΩ or higher
A - C	-	10 kΩ or higher
A - D	-	Below 1 Ω
B - C	-	Below 1 Ω
B - D	-	10 kΩ or higher
C - D	-	10 kΩ or higher

If the result is not as specified, replace the starter brush holder assembly.

5. INSPECT STARTER CENTER BEARING CLUTCH SUB-ASSEMBLY

- (a) Inspect the gear teeth on the planetary gear, internal gear and starter clutch for wear or damage.
If damaged, replace the gear or clutch assembly. Also check the planetary gears for wear or damage.

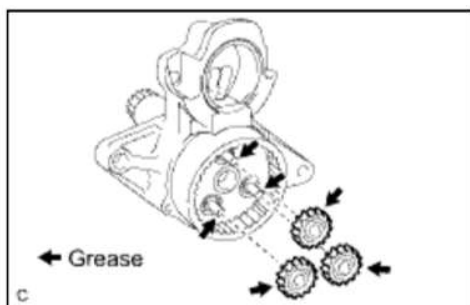


- (b) Inspect the starter clutch.
- (1) Rotate the clutch pinion gear clockwise and check that it turns freely. Try to rotate the clutch pinion gear counterclockwise and check that it locks.
- If necessary, replace the starter center bearing clutch sub-assembly.

Last Modified: 3-10-2010	6.4 A	From: 200901
Model Year: 2010	Model: Corolla	Doc ID: RM000001ETL019X
Title: 2AZ-FE STARTING: STARTER: REASSEMBLY (2010 Corolla)		

REASSEMBLY

1. INSTALL PLANETARY GEAR

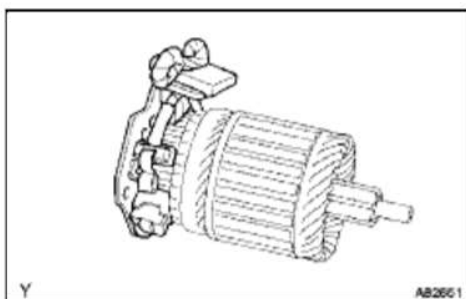


(a) Apply high-temperature grease to the planetary gears and pin parts of the planetary shaft.

(b) Install the 3 planetary gears.

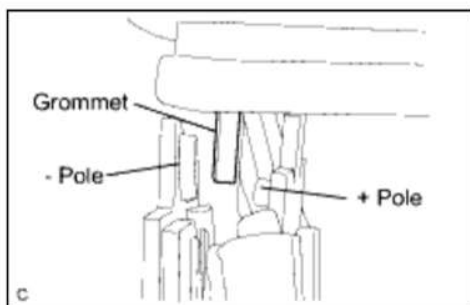
2. INSTALL STARTER BRUSH HOLDER ASSEMBLY

(a) Install the brush holder.



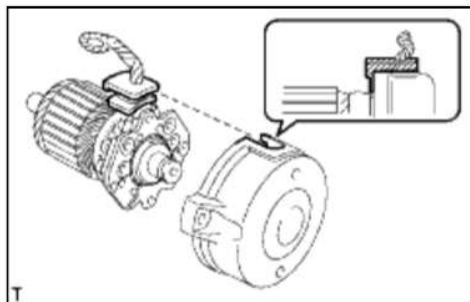
(1) Using a screwdriver, hold the brush springs back, and install the 4 brushes into the brush holder.

(2) Install the brush holder to the starter armature.

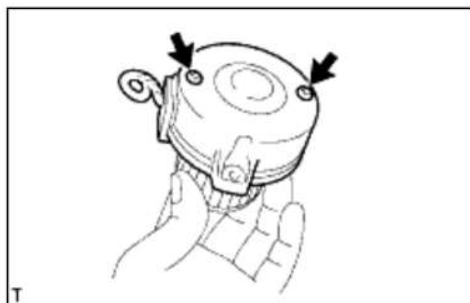


(3) Insert the grommet between the positive (+) pole and negative (-) pole.

3. INSTALL STARTER COMMUTATOR END FRAME ASSEMBLY



- (a) Fit the clamp of the brush holder into the starter commutator end frame assembly.



- (b) Install the commutator end frame with the 2 screws.
Torque: 1.5 N·m (15 kgf·cm, 13in·lbf)

4. INSTALL STARTER ARMATURE ASSEMBLY

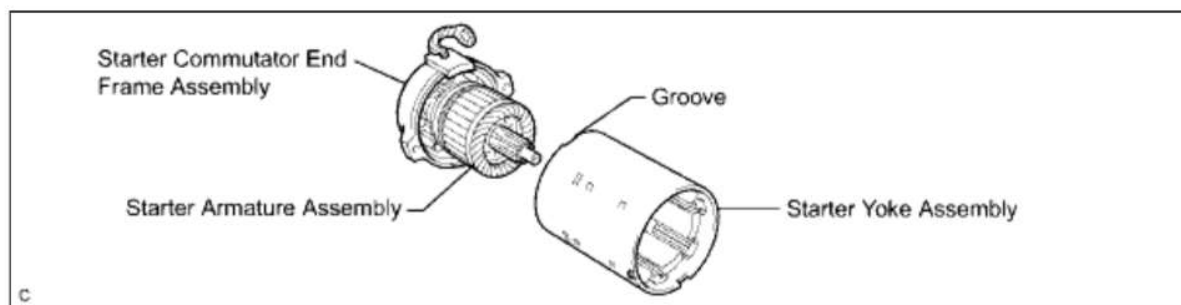
- (a) Align the rubber with the groove of the starter yoke assembly.
(b) Install the starter armature with the brush holder onto the starter yoke assembly.

NOTICE:

The magnet of the starter yoke assembly may attract the starter armature assembly when the starter commutator end frame assembly is installed, causing the magnet to break.

HINT:

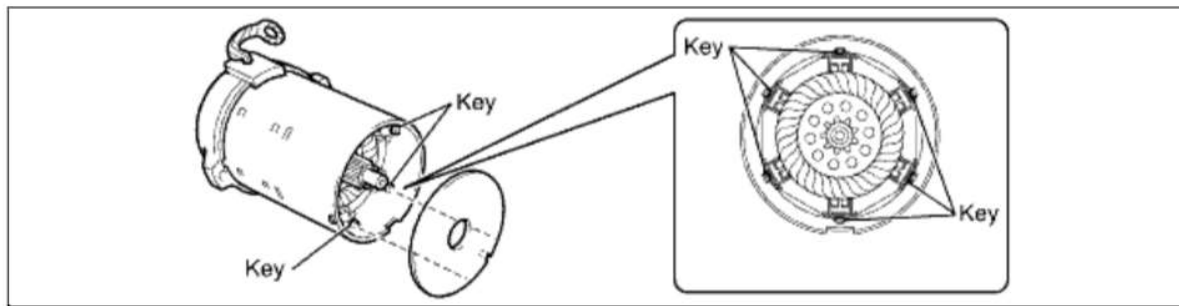
Support the starter armature so that it may not be pulled out from the starter brush holder by magnetic force of the starter yoke assembly.



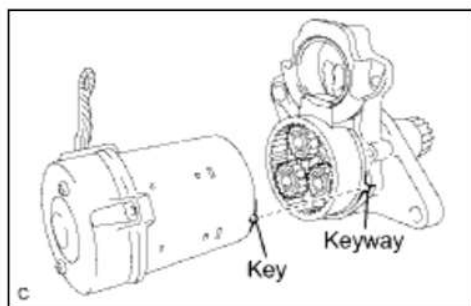
5. INSTALL STARTER ARMATURE PLATE

- (a) Install the starter armature plate onto the starter yoke assembly.

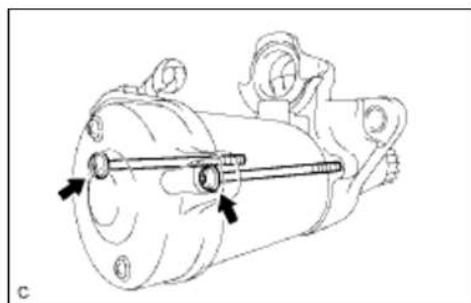
(b) Install the starter plate so that the keyway is positioned between the keys.



6. INSTALL STARTER COMMUTATOR END FRAME ASSEMBLY



(a) Align the key of the starter yoke with the keyway located on the starter drive housing assembly.



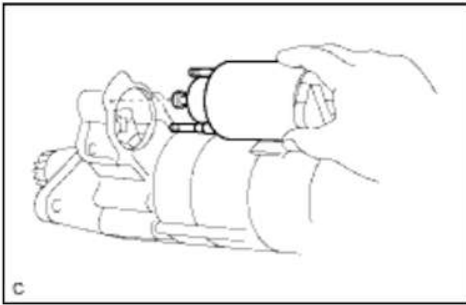
(b) Using a T25 "TORX" socket wrench, install the drive housing with the 2 bolts.

Torque: 6.0 N·m (61 kgf·cm, 53in·lbf)

7. INSTALL MAGNET STARTER SWITCH ASSEMBLY

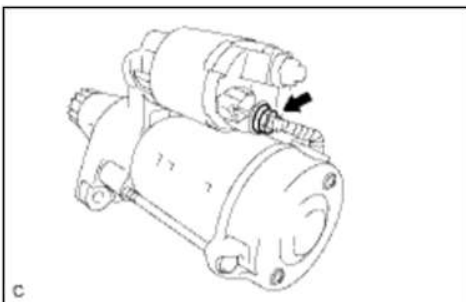
(a) Apply high-temperature grease to the plunger hook.

(b) Hang the plunger of the magnet starter switch assembly into the drive lever from the upper side.



(c) Install the magnet starter switch assembly with the 2 nuts.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)



(d) Connect the lead wire to the magnet starter switch, then fasten it with the nut.

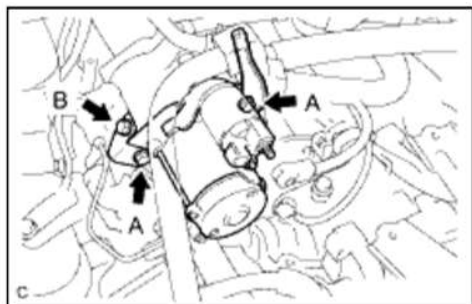
Torque: 10 N·m (102 kgf·cm, 7.4ft·lbf)



Last Modified: 3-10-2010	6.4 A	From: 200901
Model Year: 2010	Model: Corolla	Doc ID: RM0000025TY00TX
Title: 2AZ-FE STARTING: STARTER: INSTALLATION (2010 Corolla)		

INSTALLATION

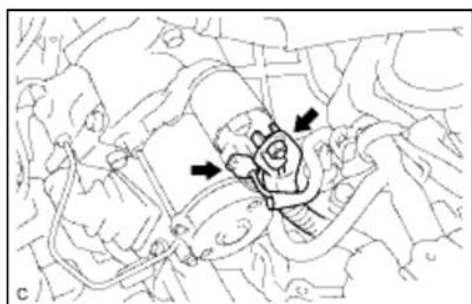
1. INSTALL STARTER ASSEMBLY (for Manual Transaxle)



- (a) Install the starter assembly, clutch accumulator bracket and wire harness clamp bracket with the 3 bolts.

Bolt A - Torque: 37 N·m (377 kgf·cm, 27ft·lbf)

Bolt B - Torque: 12 N·m (120 kgf·cm, 9ft·lbf)

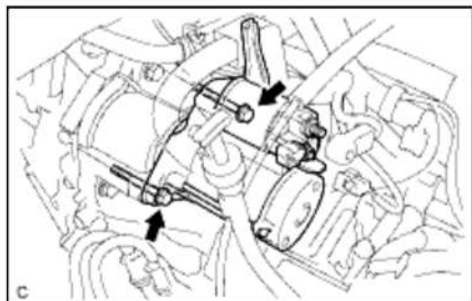


- (b) Connect the wire harness to terminal 30 and install the nut. Then, attach the terminal cap.

Torque: 9.8 N·m (100 kgf·cm, 87in·lbf)

- (c) Connect the terminal 50 connector to the starter assembly.

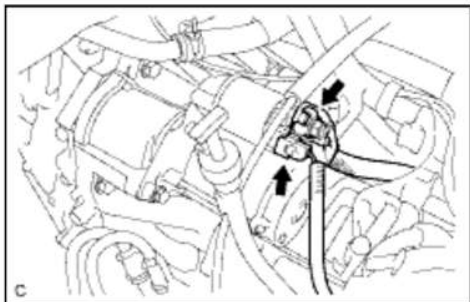
2. INSTALL STARTER ASSEMBLY (for Automatic Transaxle)



- (a) Install the starter assembly and wire harness clamp bracket with the 2 bolts.

Torque: 37 N·m (377 kgf·cm, 27ft·lbf)

- (b) Connect the wire harness to terminal 30 and install the nut. Then, attach the terminal cap.



Torque: 9.8 N·m (100 kgf·cm, 87in·lbf)

(c) Connect the terminal 50 connector to the starter assembly.

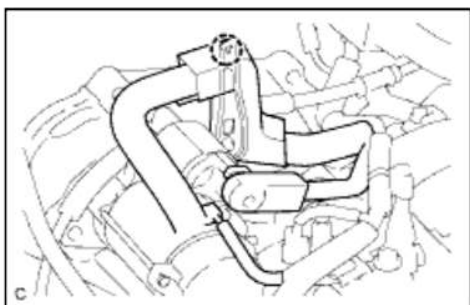
3. INSTALL BATTERY CARRIER

INFO

4. INSTALL BATTERY

INFO

5. INSTALL WIRE HARNESS



(a) Install the claw and wire harness.

6. INSTALL AIR CLEANER CASE

INFO

7. INSTALL AIR CLEANER CAP SUB-ASSEMBLY WITH HOSE

INFO

8. INSTALL NO. 1 ENGINE COVER SUB-ASSEMBLY

INFO

9. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

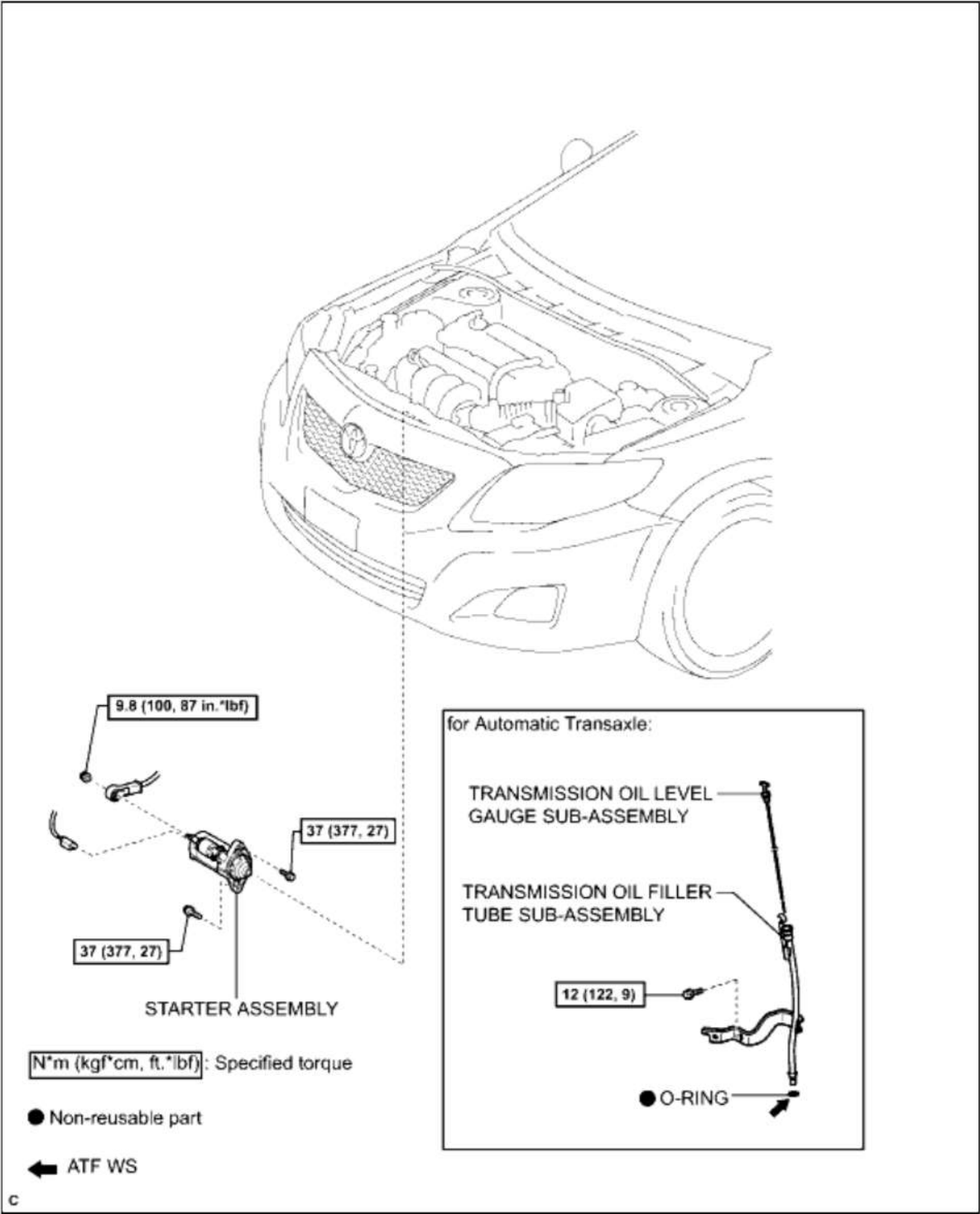
HINT: INFO .



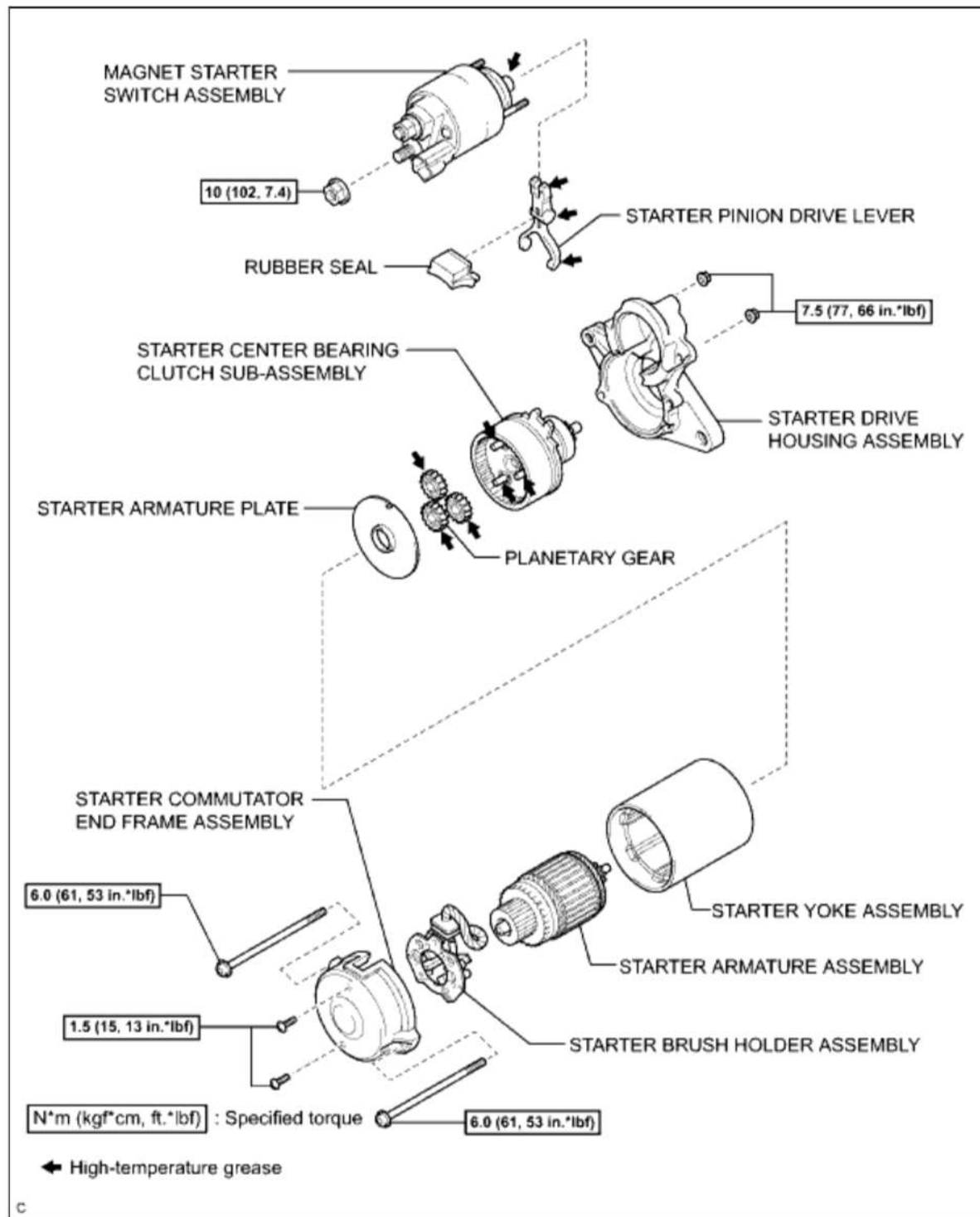
Last Modified: 3-10-2010	6.4 K	From: 200901
Model Year: 2010	Model: Corolla	Doc ID: RM0000034TB007X
Title: 2ZR-FE STARTING: STARTER: COMPONENTS (2010 Corolla)		

COMPONENTS

ILLUSTRATION



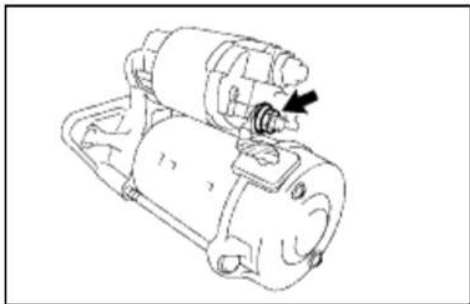
ILLUSTRATION



Last Modified: 3-10-2010	6.4 A	From: 200901
Model Year: 2010	Model: Corolla	Doc ID: RM0000034TD00BX
Title: 2ZR-FE STARTING: STARTER: DISASSEMBLY (2010 Corolla)		

DISASSEMBLY

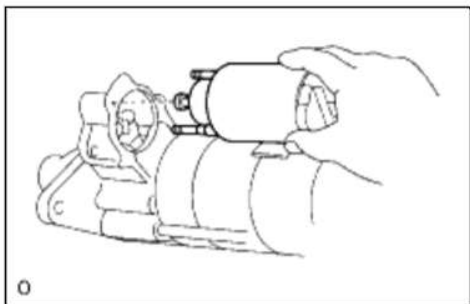
1. REMOVE MAGNET STARTER SWITCH ASSEMBLY



- (a) Remove the nut, then disconnect the lead wire from the magnet starter switch assembly.



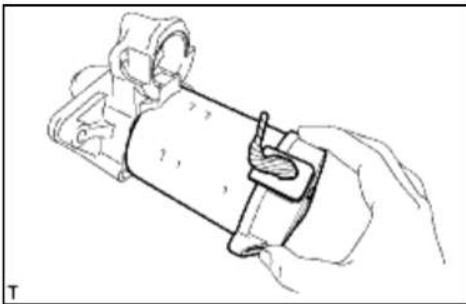
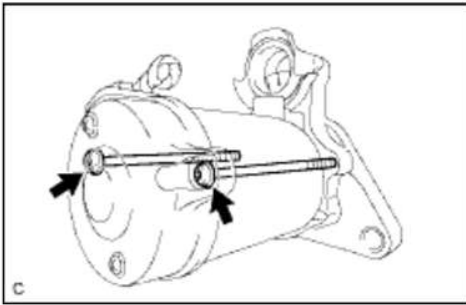
- (b) Remove the 2 nuts from the starter drive housing assembly while holding the magnet starter switch assembly.



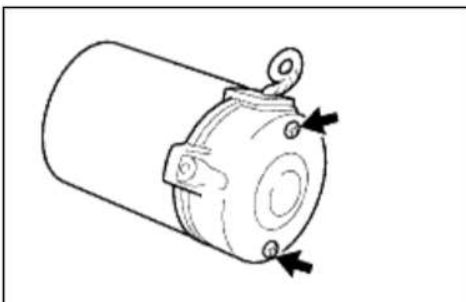
- (c) Pull the magnet starter switch assembly, and while lifting the front part of the magnet starter switch assembly, release the plunger hook from the drive lever and magnet starter switch assembly.

2. REMOVE STARTER COMMUTATOR END FRAME ASSEMBLY

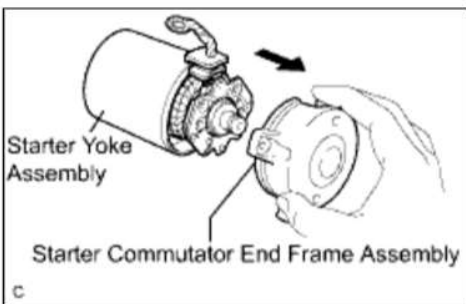
- (a) Using a T25 "TORX" socket wrench, remove the 2 bolts.



(b) Pull out the starter yoke together with the starter commutator end frame assembly.



(c) Remove the 2 screws from the starter commutator end frame assembly.



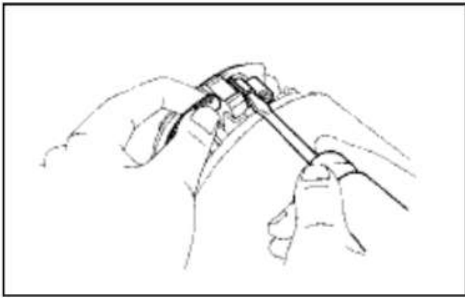
(d) Pull the starter yoke assembly out of the starter commutator end frame assembly.

NOTICE:

While holding down the lead wire, remove the starter commutator end frame.

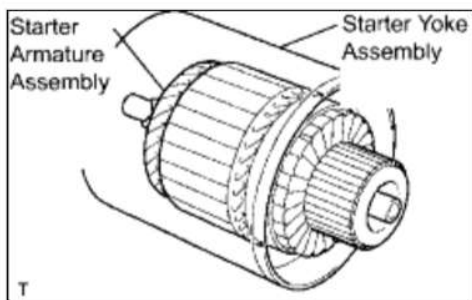
3. REMOVE STARTER ARMATURE ASSEMBLY

(a) Using a screwdriver, hold the spring back and disconnect



the brush from the brush holder.

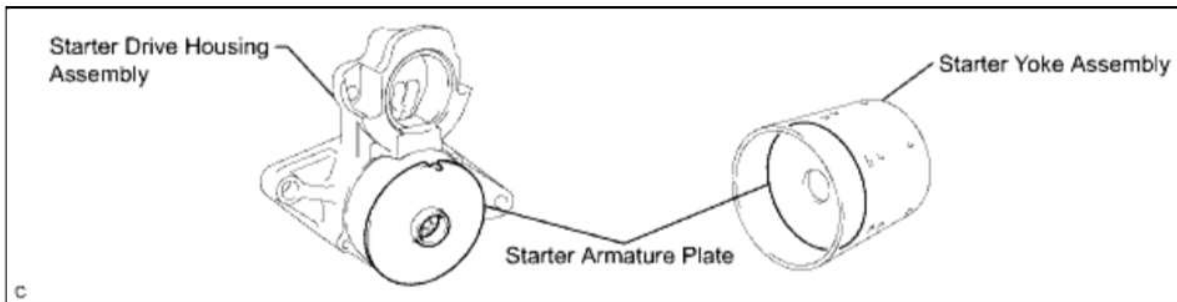
(b) Disconnect the 4 brushes, and remove the brush holder.



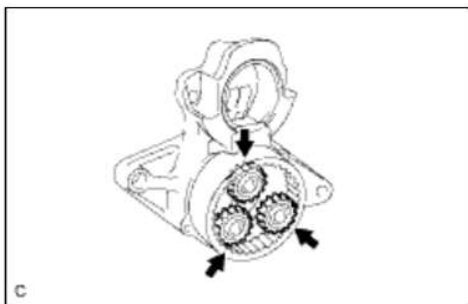
(c) Remove the starter armature assembly from the starter yoke assembly.

4. REMOVE STARTER ARMATURE PLATE

(a) Remove the armature plate from the starter drive housing assembly or the starter yoke assembly.

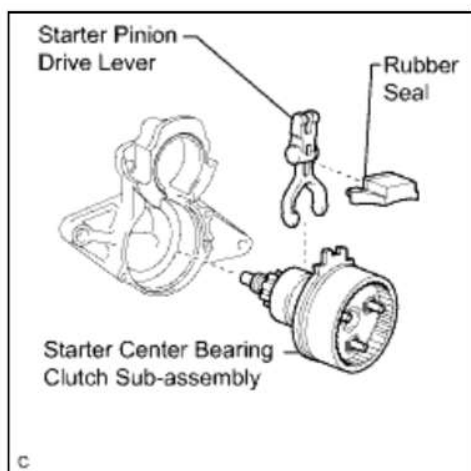


5. REMOVE PLANETARY GEAR



(a) Remove the 3 planetary gears from the starter center bearing clutch sub-assembly.

6. REMOVE STARTER CENTER BEARING CLUTCH SUB-ASSEMBLY



- (a) Remove the starter center bearing clutch sub-assembly with starter pinion drive lever from the starter drive housing assembly.

- (b) Remove the starter center bearing clutch sub-assembly, rubber seal, and the starter pinion drive lever.



Last Modified: 3-10-2010	6.4 A	From: 200901
Model Year: 2010	Model: Corolla	Doc ID: RM0000034TC007X
Title: 2ZR-FE STARTING: STARTER: REMOVAL (2010 Corolla)		

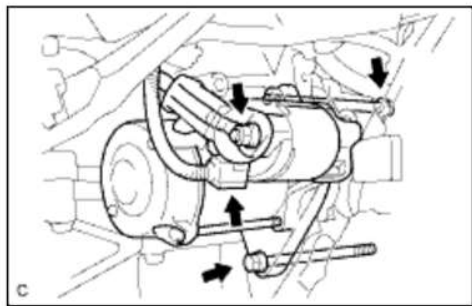
REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

2. REMOVE TRANSMISSION OIL FILLER TUBE SUB-ASSEMBLY (for Automatic Transaxle)

HINT:  .

3. REMOVE STARTER ASSEMBLY



(a) Remove the terminal cap.

(b) Remove the nut and disconnect terminal 30.

(c) Disconnect the connector.

(d) Remove the 2 bolts and starter assembly.



Last Modified: 3-10-2010	6.4 G	From: 200901
Model Year: 2010	Model: Corolla	Doc ID: RM0000034TA007X
Title: 2ZR-FE STARTING: STARTER: INSPECTION (2010 Corolla)		

INSPECTION

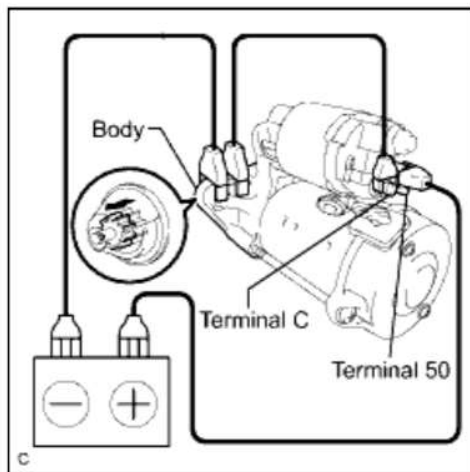
1. INSPECT STARTER ASSEMBLY

NOTICE:

Perform each of the following tests within 3 to 5 seconds.

(a) Perform a pull-in test.

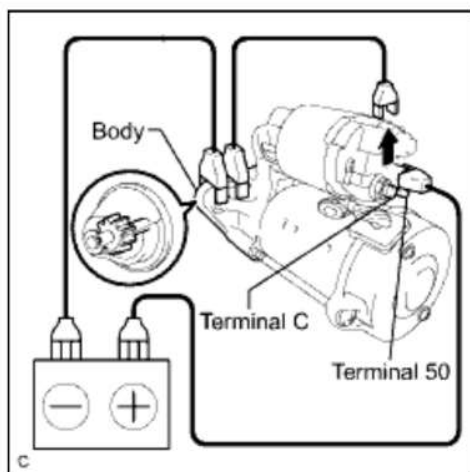
(1) Disconnect the field coil lead wire from terminal C.



(2) Connect the battery to the magnet starter switch as shown in the illustration and check that the pinion gear moves outward.

If the clutch pinion gear does not move, replace the magnet switch assembly.

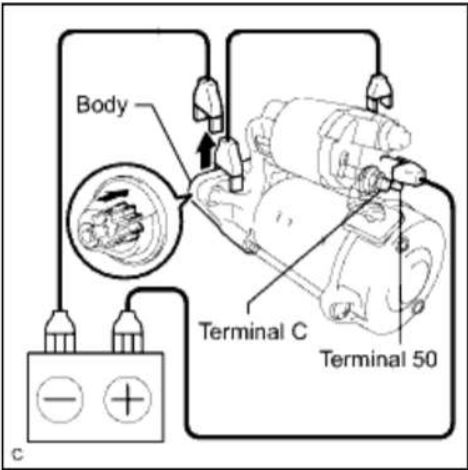
(b) Perform a hold-in test.



(1) Check that the pinion gear does not return inward after the cable is disconnected from terminal C.

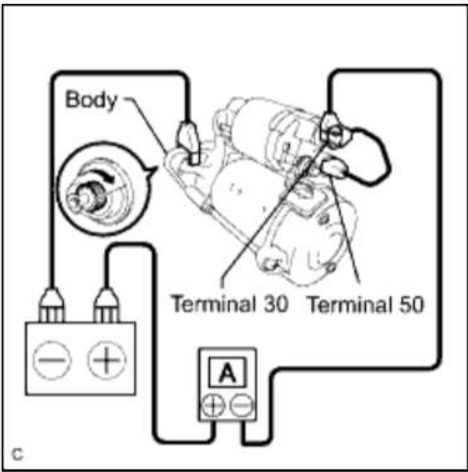
If the clutch pinion gear returns inward, replace the magnet starter switch assembly.

(c) Inspect the clutch pinion gear return.



- (1) Disconnect the negative (-) lead from the switch body.
Check that the pinion gear moves inward.
If the clutch pinion gear does not return inward, replace the magnet starter switch assembly.

- (d) Perform an operation test without load.
(1) Connect the lead wire to terminal C.
Torque: 10 N·m (102 kgf·cm, 7.4ft·lbf)
(2) Clamp the starter in a vise.



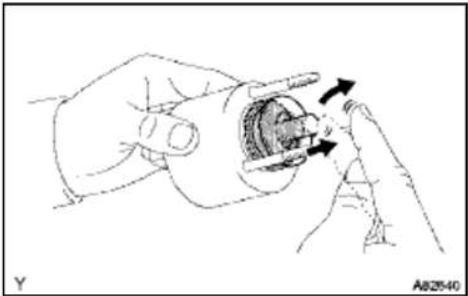
- (3) Connect the battery and ammeter to the starter as shown in the illustration.

- (4) Check that the starter rotates smoothly and steadily with the clutch pinion gear extended.
Check that the ammeter indicates the specified current.
Standard Current:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Battery positive terminal - Terminal 30 - Terminal 50	11.5 V	Below 90 A

2. INSPECT MAGNET STARTER SWITCH ASSEMBLY

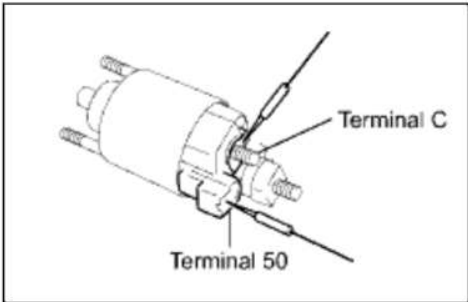
- (a) Check the plunger.



- (1) Push in the plunger, then check that it returns quickly to its original position.
If necessary, replace the magnet starter switch assembly.

- (b) Inspect the resistance of the pull-in coil.
(1) Using an ohmmeter, measure the resistance between terminals 50 and C.

Standard Resistance:

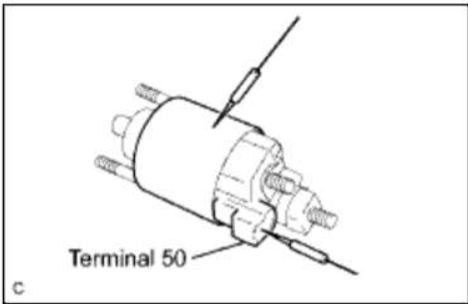


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Terminal 50 - Terminal C	-	Below 1 Ω

If the result is not as specified, replace the magnet starter switch assembly.

- (c) Inspect the resistance of the hold-in coil.
(1) Using an ohmmeter, measure the resistance between terminal 50 and switch body.

Standard Resistance:

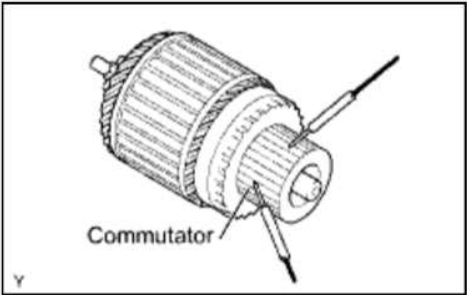


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Terminal 50 - Body ground	-	Below 2 Ω

If the result is not as specified, replace the magnet starter switch assembly.

3. INSPECT STARTER ARMATURE ASSEMBLY

- (a) Inspect the resistance of the commutator.
(1) Using an ohmmeter, measure the resistance between any 2 segments of the commutator.



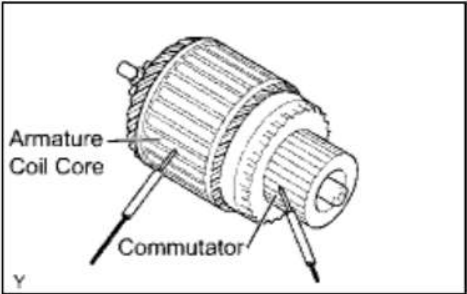
Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Segment - Segment	-	Below 1 Ω

If the result is not as specified, replace the starter armature assembly.

- (b) Check the commutator for a short to ground.
- (1) Using an ohmmeter, measure the resistance between the commutator and the armature coil core.

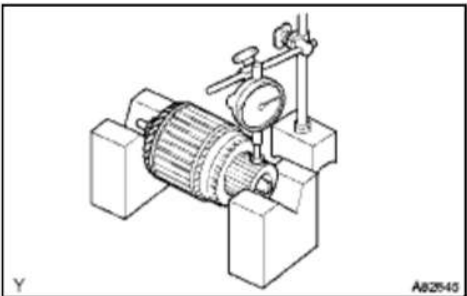
Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Commutator - Armature	-	10 k Ω or higher

If the result is not as specified, replace the starter armature assembly.

- (c) Check the appearance.
- (1) If the surface is dirty or burnt, restore the surface with sandpaper (No. 400) or on a lathe.

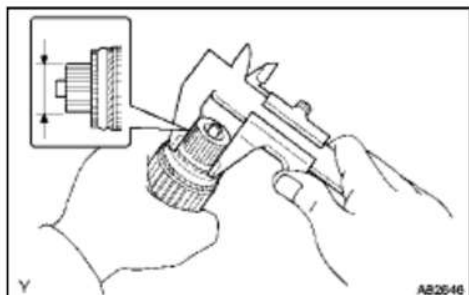


- (d) Check the commutator circuit for runout.
- (1) Place the commutator on V-blocks.
- (2) Using a dial indicator, measure the circle runout.

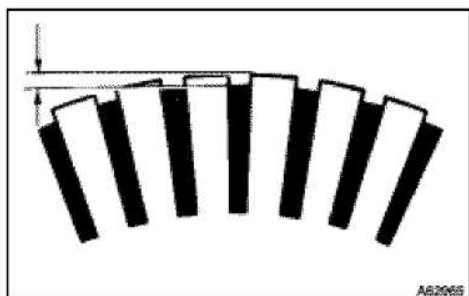
Standard runout:
0.02 mm (0.000787 in.)
Maximum runout:
0.05 mm (0.00197 in.)

If the runout is greater than the maximum, replace the armature assembly.

- (e) Using a vernier caliper, measure the commutator diameter.
- Standard diameter:
29 mm (1.14 in.)
Minimum diameter:
28 mm (1.10 in.)



If the diameter is less than the minimum, replace the armature.



(f) Check that the undercut portion is clean and free of foreign matter. Smooth out the edges.

Standard undercut depth:

0.7 mm (0.0276 in.)

Minimum undercut depth:

0.2 mm (0.00787 in.)

If the undercut depth is less than the minimum, increase the depth using a hacksaw blade.

4. INSPECT STARTER BRUSH HOLDER ASSEMBLY

(a) Remove the claw of the spring, then remove the 4 brushes.

(b) Using a vernier caliper, measure the brush length.

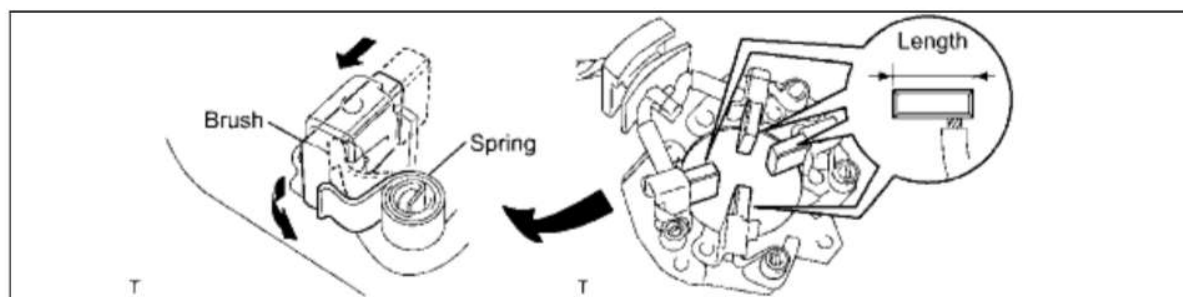
Standard length:

14.4 mm (0.567 in.)

Minimum length:

9.0 mm (0.354 in.)

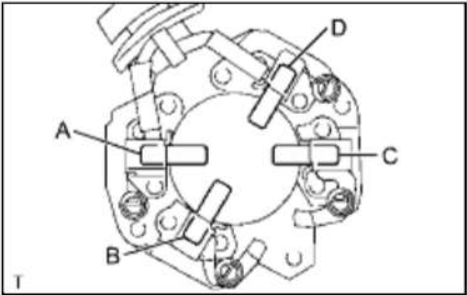
If the length is less than the minimum, replace the starter brush holder assembly.



(c) Check the brush holder.

(1) Using an ohmmeter, measure the resistance between the brushes.

Standard Resistance:

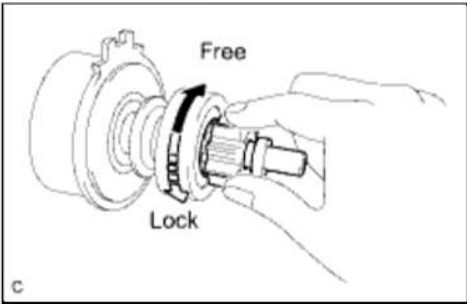


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A - B	-	10 kΩ or higher
A - C	-	10 kΩ or higher
A - D	-	Below 1 Ω
B - C	-	Below 1 Ω
B - D	-	10 kΩ or higher
C - D	-	10 kΩ or higher

If the result is not as specified, replace the starter brush holder assembly.

5. INSPECT STARTER CENTER BEARING CLUTCH SUB-ASSEMBLY

- (a) Inspect the gear teeth on the planetary gear, internal gear and starter clutch for wear or damage.
If damaged, replace the gear or clutch assembly. Also check the planetary gears for wear or damage.

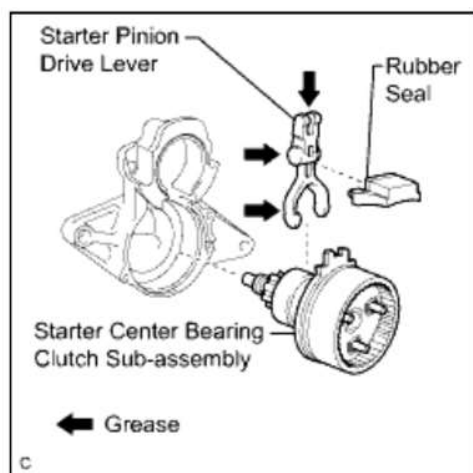


- (b) Inspect the starter clutch.
- (1) Rotate the clutch pinion gear clockwise and check that it turns freely. Try to rotate the clutch pinion gear counterclockwise and check that it locks.
- If necessary, replace the starter center bearing clutch sub-assembly.

Last Modified: 3-10-2010	6.4 A	From: 200901
Model Year: 2010	Model: Corolla	Doc ID: RM0000034TE00BX
Title: 2ZR-FE STARTING: STARTER: REASSEMBLY (2010 Corolla)		

REASSEMBLY

1. INSTALL STARTER CENTER BEARING CLUTCH SUB-ASSEMBLY

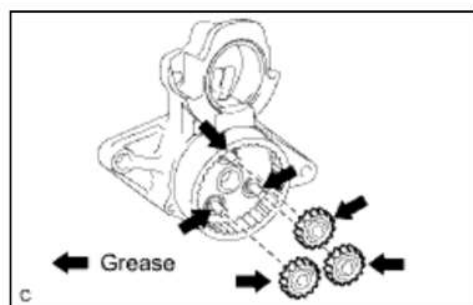


- (a) Apply high-temperature grease to the parts of the starter pinion drive lever that contact the starter pivot part of the starter pinion drive lever.

- (b) Install the starter pinion drive lever and rubber seal into the starter center bearing clutch sub-assembly.

- (c) Install the starter center bearing clutch together with the starter pinion drive lever into the starter drive housing assembly.

2. INSTALL PLANETARY GEAR

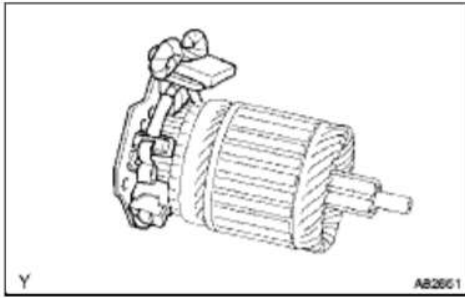


- (a) Apply high-temperature grease to the planetary gears and pin parts of the planetary shaft.

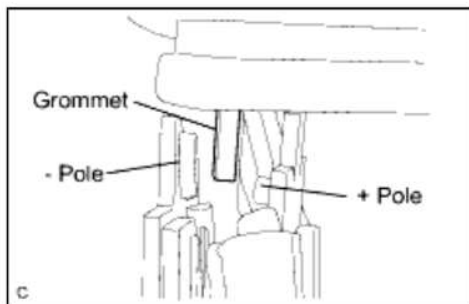
- (b) Install the 3 planetary gears.

3. INSTALL STARTER BRUSH HOLDER ASSEMBLY

- (a) Install the brush holder.

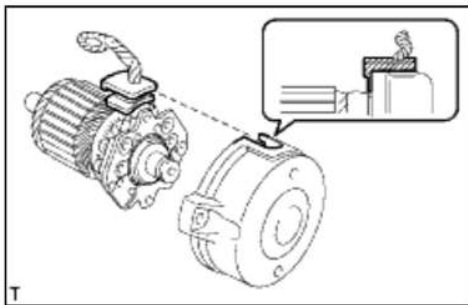


- (1) Using a screwdriver, hold the brush springs back, and install the 4 brushes into the brush holder.
- (2) Install the brush holder to the starter armature.

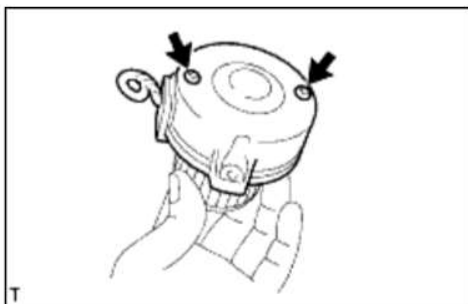


- (3) Insert the grommet between the positive (+) pole and negative (-) pole.

4. INSTALL STARTER COMMUTATOR END FRAME ASSEMBLY



- (a) Fit the clamp of the brush holder into the starter commutator end frame assembly.



- (b) Install the commutator end frame with the 2 screws.
Torque: 1.5 N·m (15 kgf·cm, 13in·lbf)

5. INSTALL STARTER ARMATURE ASSEMBLY

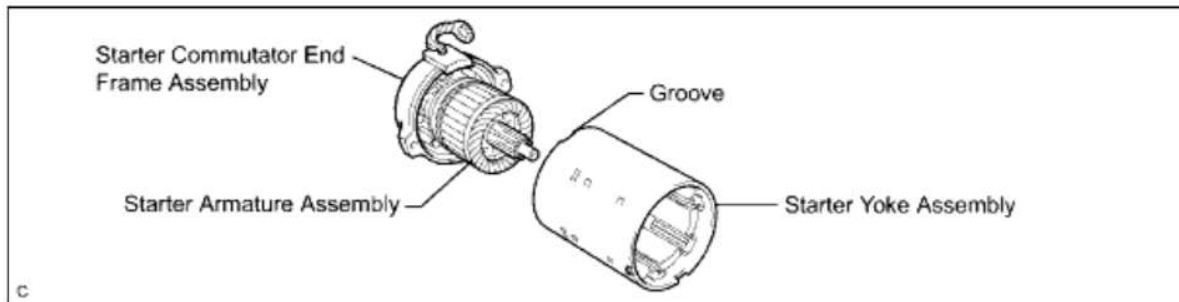
- Align the rubber with the groove of the starter yoke assembly.
- Install the starter armature with the brush holder onto the starter yoke assembly.

NOTICE:

The magnet of the starter yoke assembly may attract the starter armature assembly when the starter commutator end frame assembly is installed, causing the magnet to break.

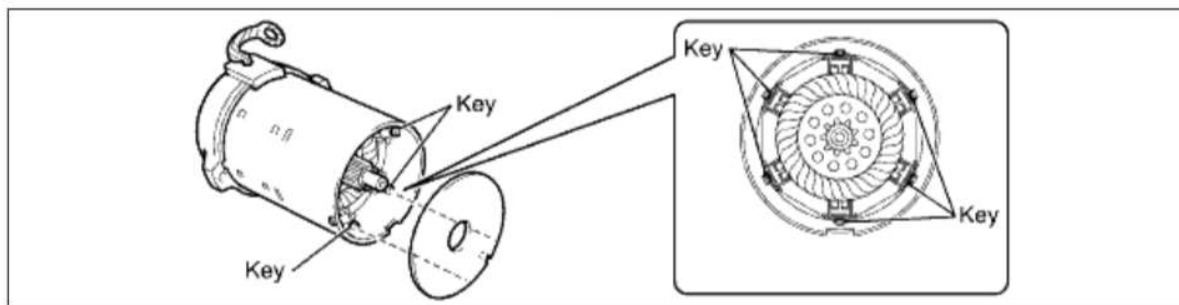
HINT:

Support the starter armature so that it may not be pulled out from the starter brush holder by magnetic force of the starter yoke assembly.

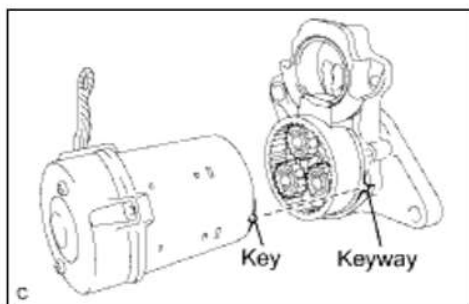


6. INSTALL STARTER ARMATURE PLATE

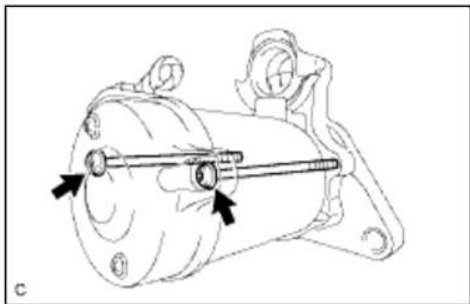
- Install the starter armature plate onto the starter yoke assembly.
- Install the starter plate so that the keyway is positioned between the keys.



7. INSTALL STARTER COMMUTATOR END FRAME ASSEMBLY



- Align the key of the starter yoke with the keyway located on the starter drive housing assembly.

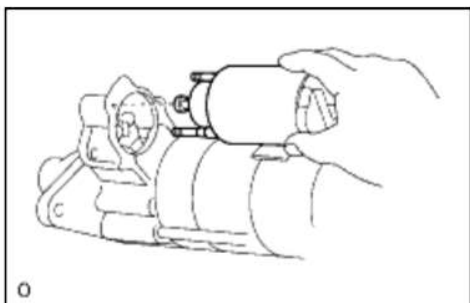


(b) Using a T25 "TORX" socket wrench, install the drive housing with the 2 bolts.

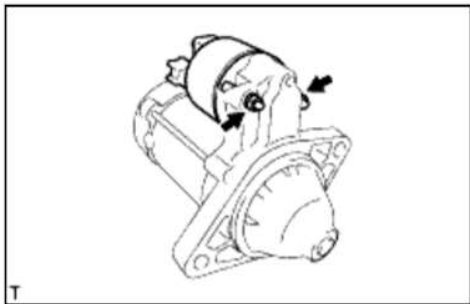
Torque: 6.0 N·m (61 kgf·cm, 53in·lbf)

8. INSTALL MAGNET STARTER SWITCH ASSEMBLY

(a) Apply high-temperature grease to the plunger hook.

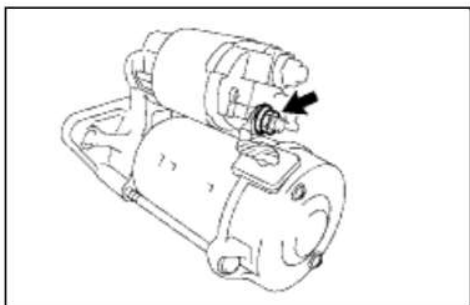


(b) Hang the plunger of the magnet starter switch assembly into the drive lever from the upper side.



(c) Install the magnet starter switch assembly with the 2 nuts.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)



(d) Connect the lead wire to the magnet starter switch, then fasten it with the nut.

Torque: 10 N·m (102 kgf·cm, 7.4ft·lbf)

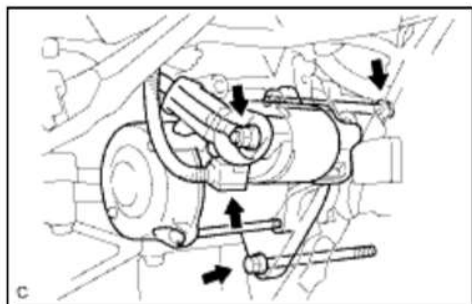


TOYOTA

Last Modified: 3-10-2010	6.4 A	From: 200901
Model Year: 2010	Model: Corolla	Doc ID: RM0000034T9007X
Title: 2ZR-FE STARTING: STARTER: INSTALLATION (2010 Corolla)		

INSTALLATION

1. INSTALL STARTER ASSEMBLY



(a) Install the starter assembly with the 2 bolts.

Torque: 37 N·m (377 kgf·cm, 27ft·lbf)

(b) Connect the connector.

(c) Connect terminal 30 with the nut.

Torque: 9.8 N·m (100 kgf·cm, 87in·lbf)

(d) Close the terminal cap.

2. INSTALL TRANSMISSION OIL FILLER TUBE SUB-ASSEMBLY (for Automatic Transaxle)

HINT:  .

3. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

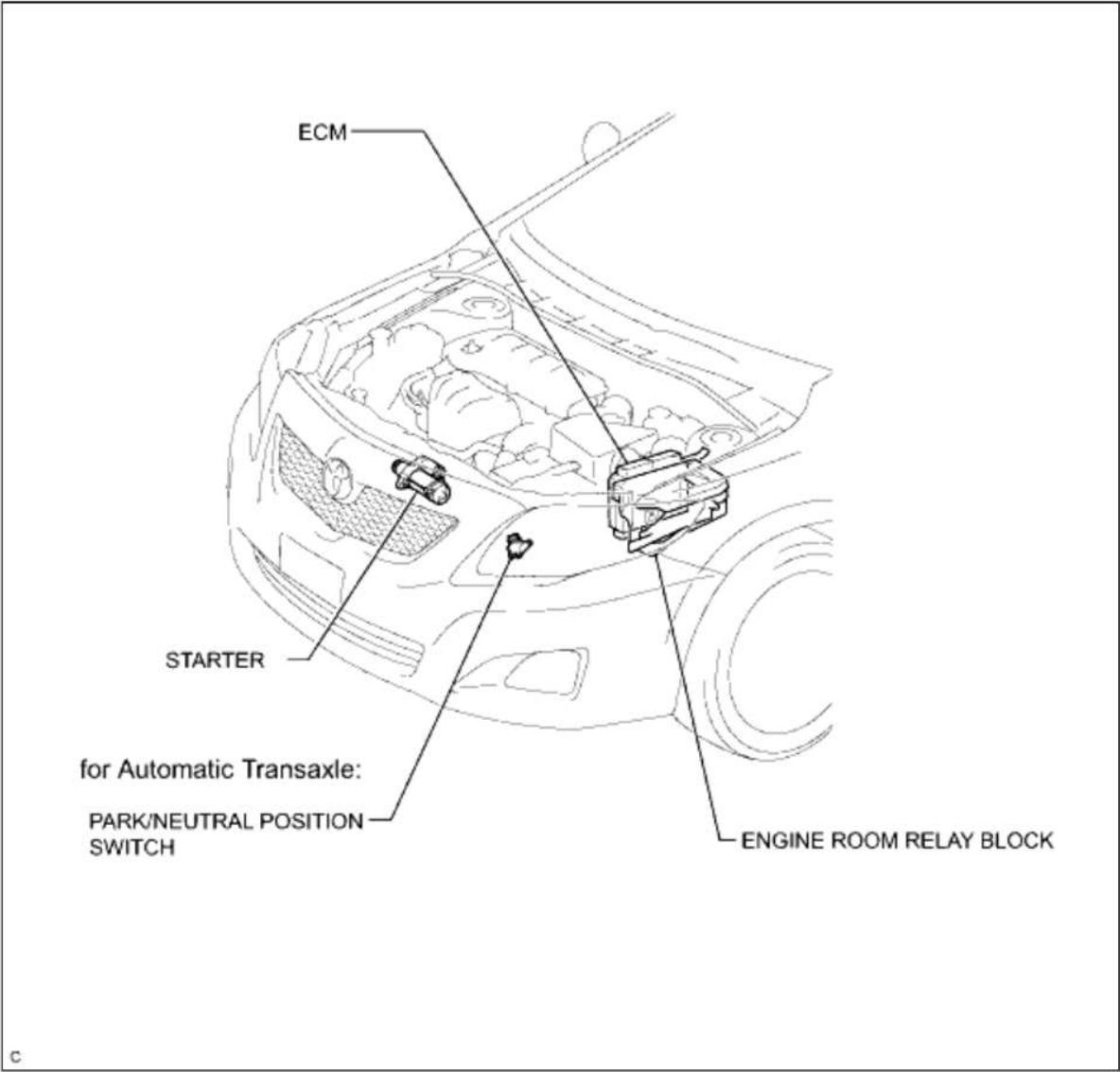
HINT:  .



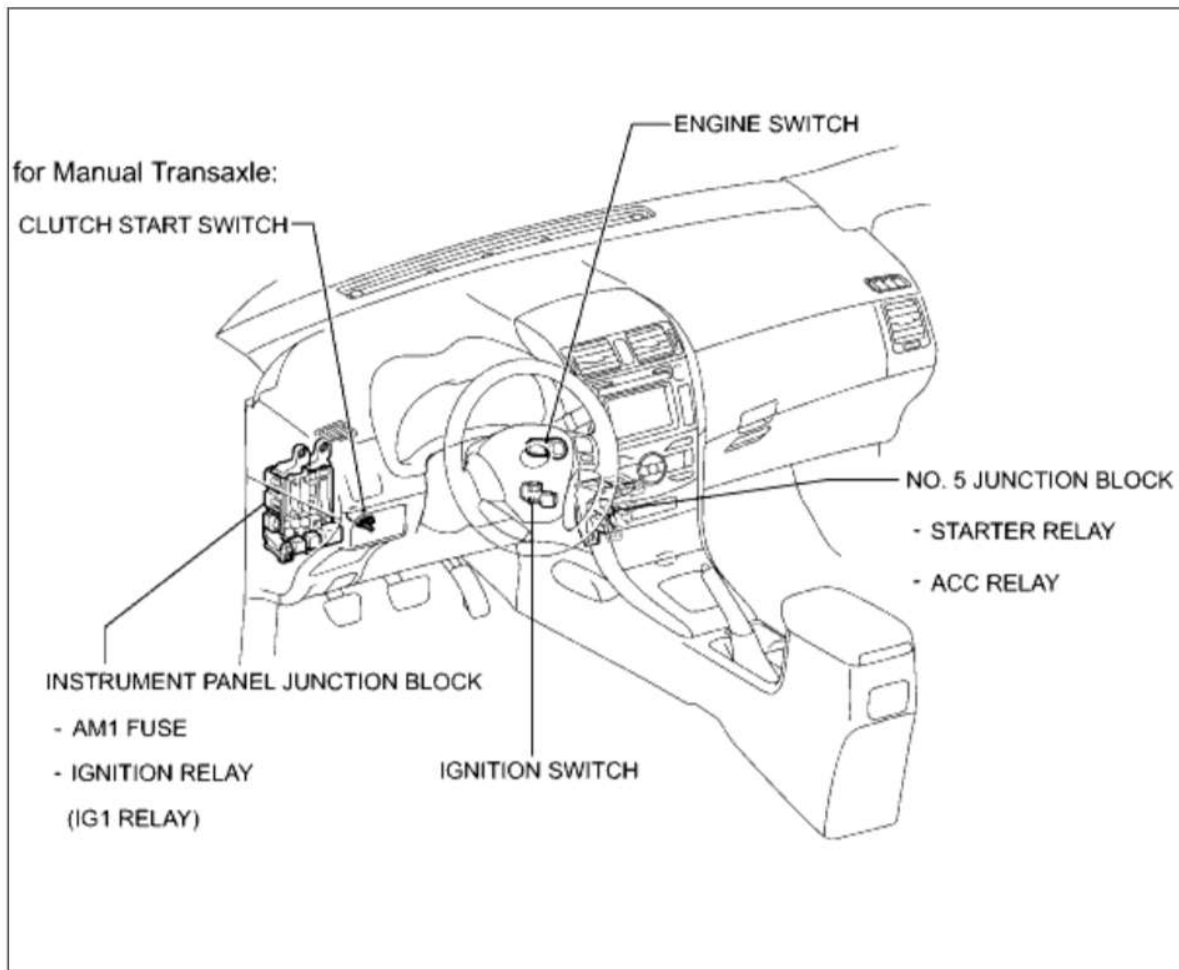
Last Modified: 3-10-2010	6.4 R	From: 200901
Model Year: 2010	Model: Corolla	Doc ID: RM000002DR2008X
Title: 2AZ-FE STARTING: STARTING SYSTEM: PARTS LOCATION (2010 Corolla)		

PARTS LOCATION

ILLUSTRATION



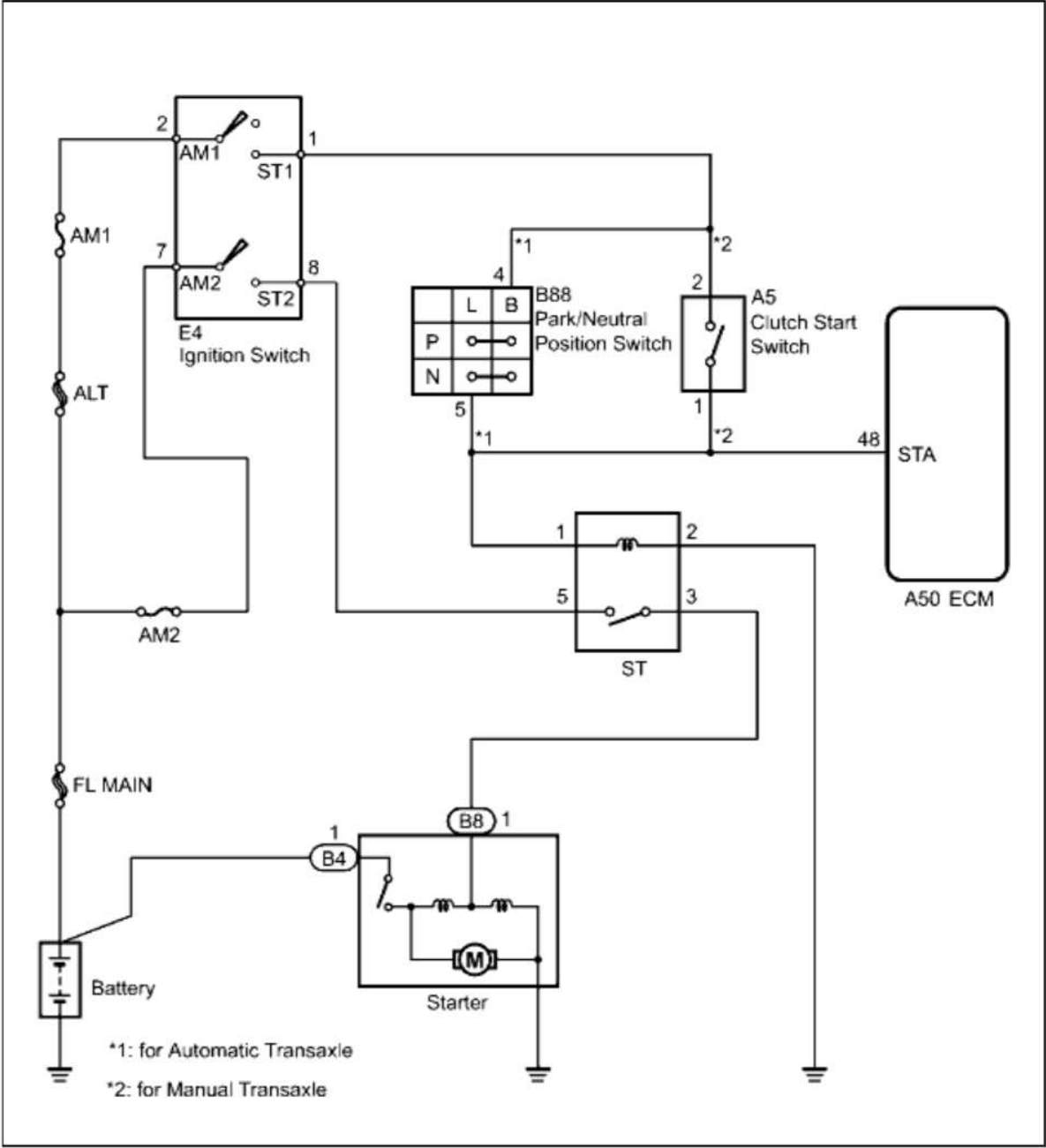
ILLUSTRATION



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Last Modified: 3-10-2010	6.4 U	From: 200901
Model Year: 2010	Model: Corolla	Doc ID: RM000003GH6006X
Title: 2AZ-FE STARTING: STARTING SYSTEM: SYSTEM DIAGRAM (2010 Corolla)		

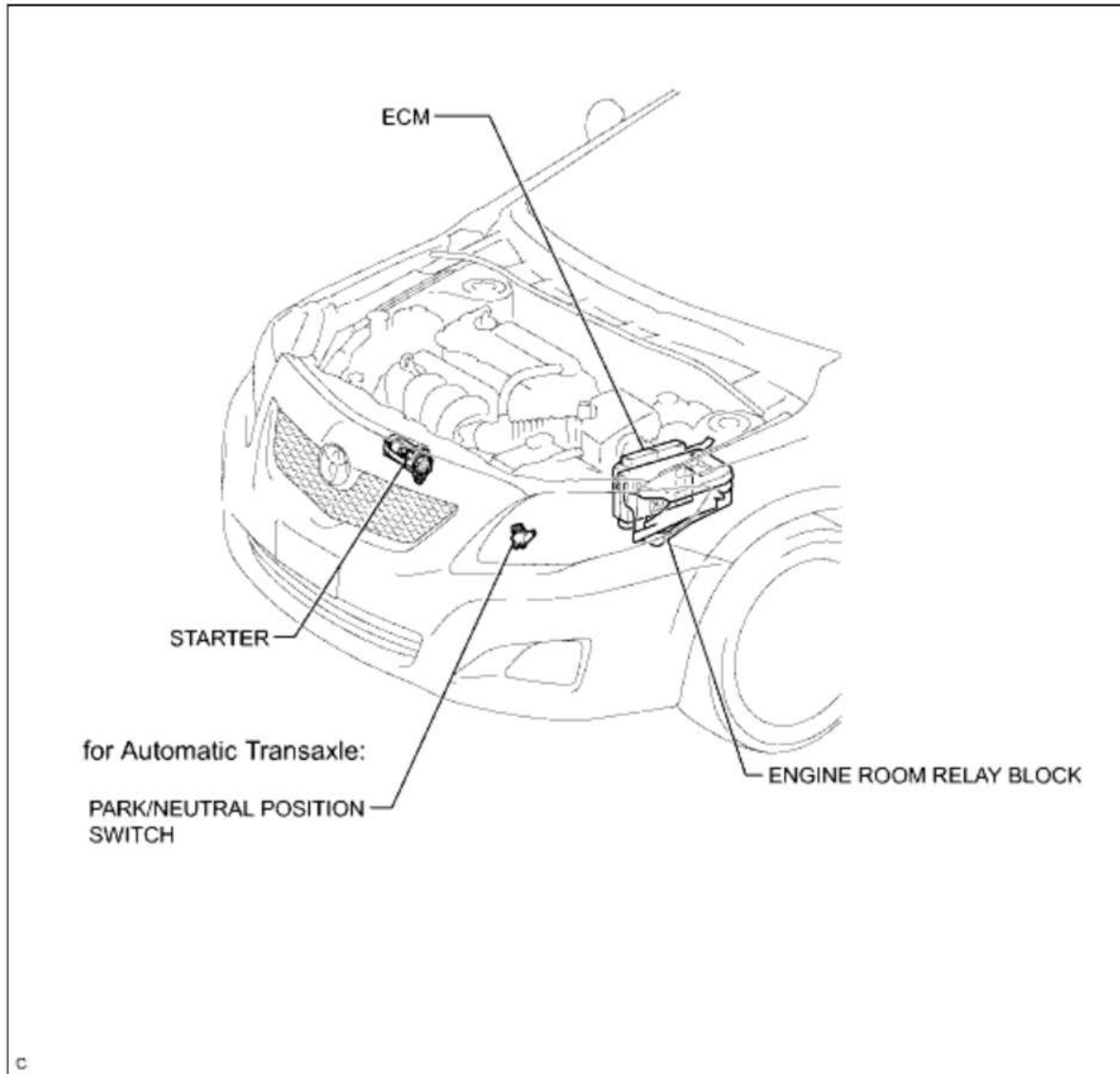
SYSTEM DIAGRAM



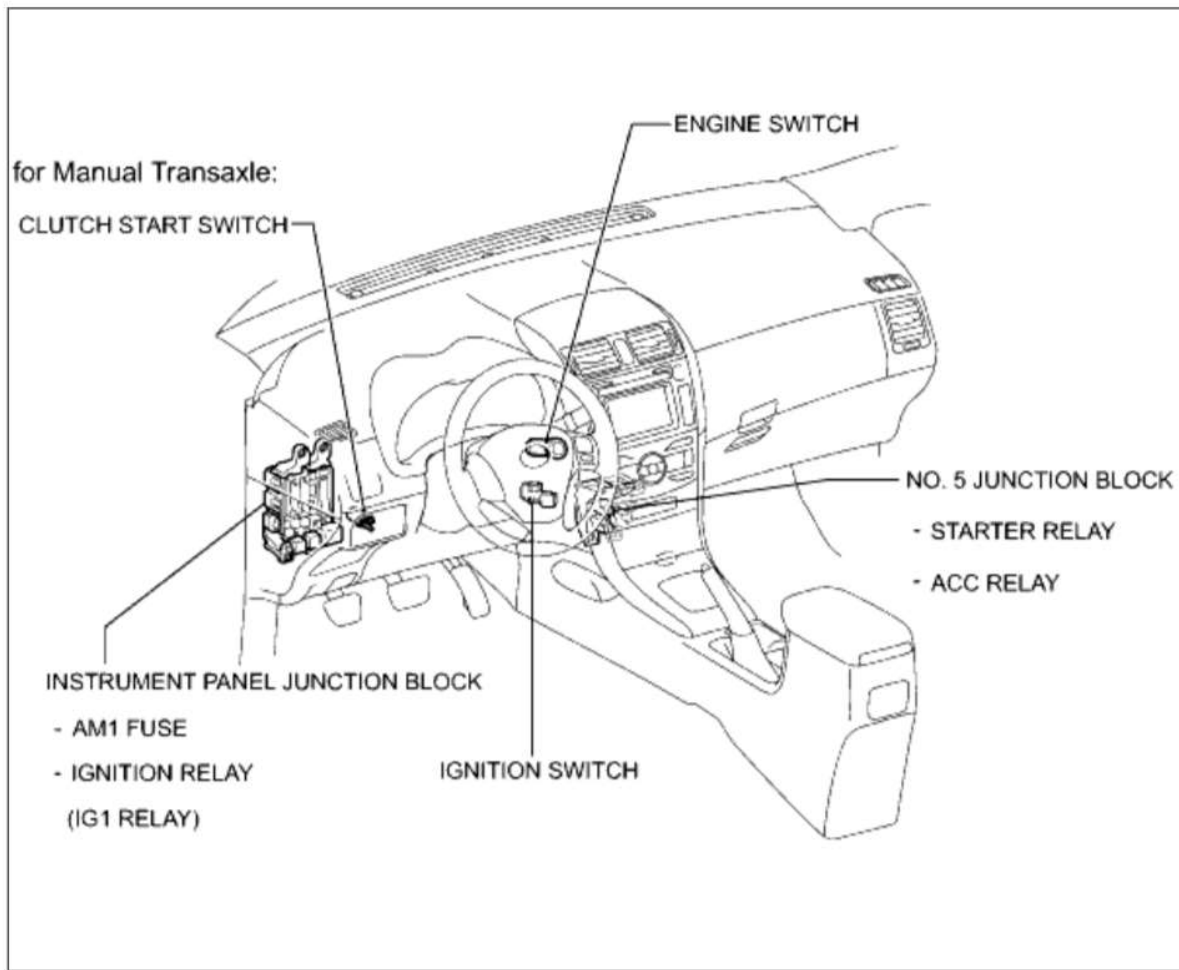
Last Modified: 3-10-2010	6.4 R	From: 200901
Model Year: 2010	Model: Corolla	Doc ID: RM0000034T7007X
Title: 2ZR-FE STARTING: STARTING SYSTEM: PARTS LOCATION (2010 Corolla)		

PARTS LOCATION

ILLUSTRATION



ILLUSTRATION



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Model Year: 2010	Model: Corolla	Doc ID: RM000003GH6005X
Title: 2ZR-FE STARTING: STARTING SYSTEM: SYSTEM DIAGRAM (2010 Corolla)		

SYSTEM DIAGRAM

