

STEERING SYSTEM

PRECAUTION

NOTICE:

When disconnecting the cable from the negative (-) battery terminal, some systems require initialization after the cable is reconnected (See page [IN-33](#)).

1. HANDLING PRECAUTIONS FOR STEERING SYSTEM

- (a) Care must be taken when replacing parts. Incorrect replacement may affect the performance of the steering system and result in driving hazards.

2. HANDLING PRECAUTIONS FOR SRS AIRBAG SYSTEM

- (a) The vehicle is equipped with an SRS (Supplemental Restraint System) such as airbags. Failure to carry out service operations in the correct sequence could cause the SRS to unexpectedly deploy during servicing. This may cause a serious accident. Before servicing (including inspection, replacement, removal and installation of parts), be sure to read the precautionary notices for the Supplemental Restraint System (See page [RS-1](#)).

PROBLEM SYMPTOMS TABLE

HINT:

Use the table below to help determine the cause of the problem. The numbers indicate likely causes of the problem in descending order. Check each part in order. If necessary, repair or replace faulty parts.

STEERING SYSTEM

Symptom	Suspected Area	See page
Hard steering	1. Tires (Improperly inflated)	TW-3
	2. Front wheel alignment (Incorrect)	SP-4
	3. Steering system joints (Worn)	-
	4. Suspension arm ball joints (Worn)	SP-25
	5. Steering column (Binding)	SR-78
	6. Power steering gear	PS-28
Poor return	1. Tires (Improperly inflated)	TW-3
	2. Front wheel alignment (Incorrect)	SP-4
	3. Steering column (Binding)	SR-78
	4. Power steering gear	PS-28
Excessive free play	1. Steering system joints (Worn)	-
	2. Suspension arm ball joints (Worn)	SP-25
	3. Intermediate shaft, universal joint, sliding yoke (Worn)	-
	4. Front wheel bearing (Worn)	AH-5
	5. Power steering gear	PS-28
Abnormal noise	1. Steering system joints (Worn)	-
	2. Power steering gear	PS-28

ON-VEHICLE INSPECTION

1. INSPECT STEERING WHEEL FREE PLAY

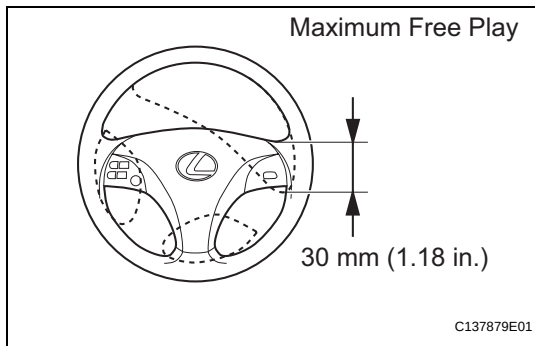
- (a) Stop the vehicle and align the tires facing straight ahead.
- (b) Gently turn the steering wheel right and left by hand, and check the steering wheel free play.

Maximum free play:

30 mm (1.18 in.)

HINT:

If the free play exceeds the maximum, check the steering column, steering intermediate shaft, or steering gear.



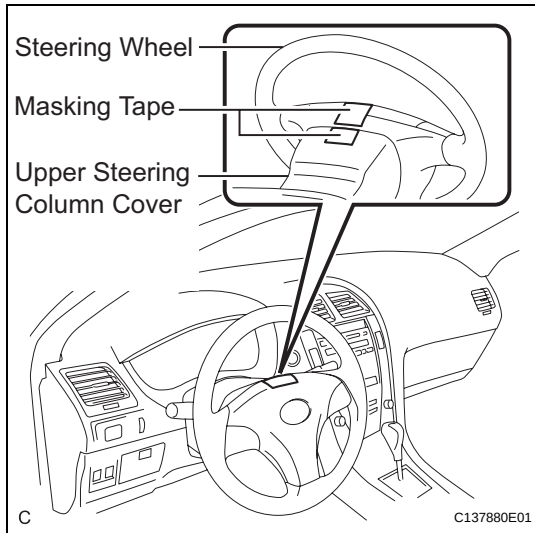
ADJUSTMENT

1. STEERING OFF CENTER ADJUSTMENT PROCEDURE

HINT:

This is the adjustment procedure for steering off center.

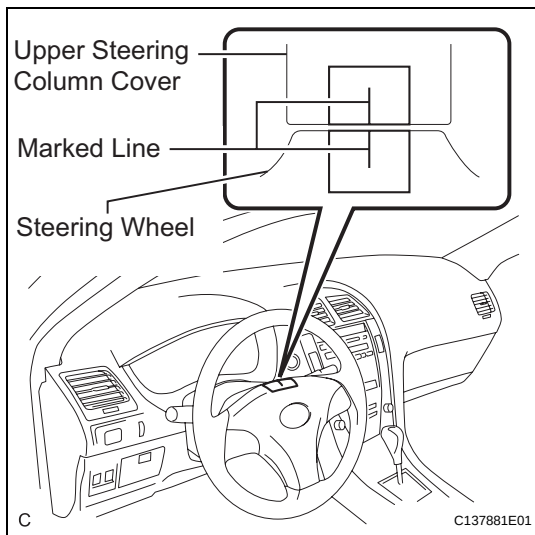
- (a) Inspect steering wheel off center.
- (1) Apply masking tape to the top center of the steering wheel and steering column upper cover.
 - (2) Drive the vehicle in a straight line for 100 meters at a constant speed of 35 mph (56 km/h), and hold the steering wheel to maintain the course.

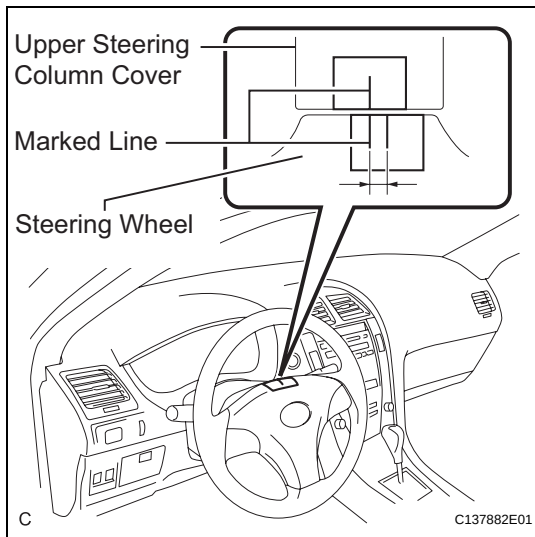


- (3) Draw a line on the masking tape as shown in the illustration.
- (4) Turn the steering wheel to the center position.

HINT:

Look at the upper surface of the steering wheel, steering spoke, and SRS airbag line to find the center position.

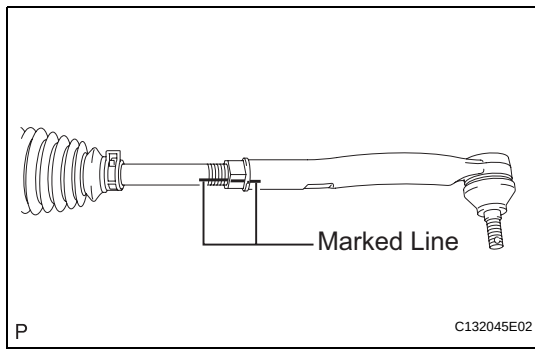




- (5) Draw a new line on the masking tape on the steering wheel as shown in the illustration.
- (6) Measure the distance between the 2 lines on the masking tape on the steering wheel.
- (7) Convert the measured distance to steering angle.

HINT:

- Measured distance 1 mm (0.04 in.) = Steering angle of approximately 1 degree.
- Make a note of the steering angle.

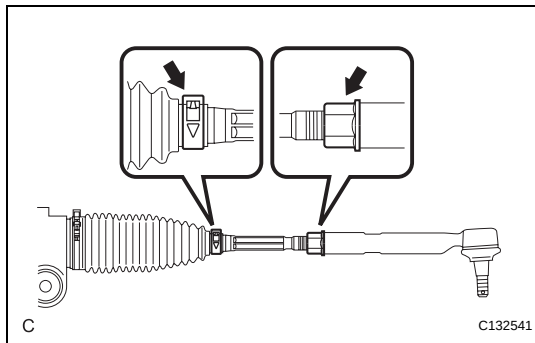


(b) Adjust steering angle.

- (1) Draw a line on the RH and LH tie rod ends and rack ends respectively where it can be easily seen.
- (2) Using a paper gauge, measure the distance from the RH and LH tie rod ends to the rack end screws.

HINT:

- Measure both the RH and LH sides.
- Make a note of the measured values.



- (3) Remove the RH and LH boot clips from the rack boots.
- (4) Loosen the RH and LH lock nuts.
- (5) Turn the RH and LH rack ends by the same amount (but in different directions) according to the steering angle.

HINT:

One 360 degree turn of the rack end (1.5 mm (0.059 in.) horizontal movement) equals to 12 degrees of steering angle.

- (6) Tighten the RH and LH lock nuts to the specified torque.

Torque: 74 N*m (755 kgf*cm, 55 ft.*lbf)

NOTICE:

Make sure that the difference in length between the RH and LH tie rod ends and rack end screws is within 1.5 mm (0.059 in.).

- (7) Install the RH and LH boot clips.

POWER TILT AND POWER TELESCOPIC STEERING COLUMN SYSTEM

PRECAUTION

NOTICE:

Some systems need to be initialized after reconnecting the negative (-) battery terminal (See page [IN-33](#)).

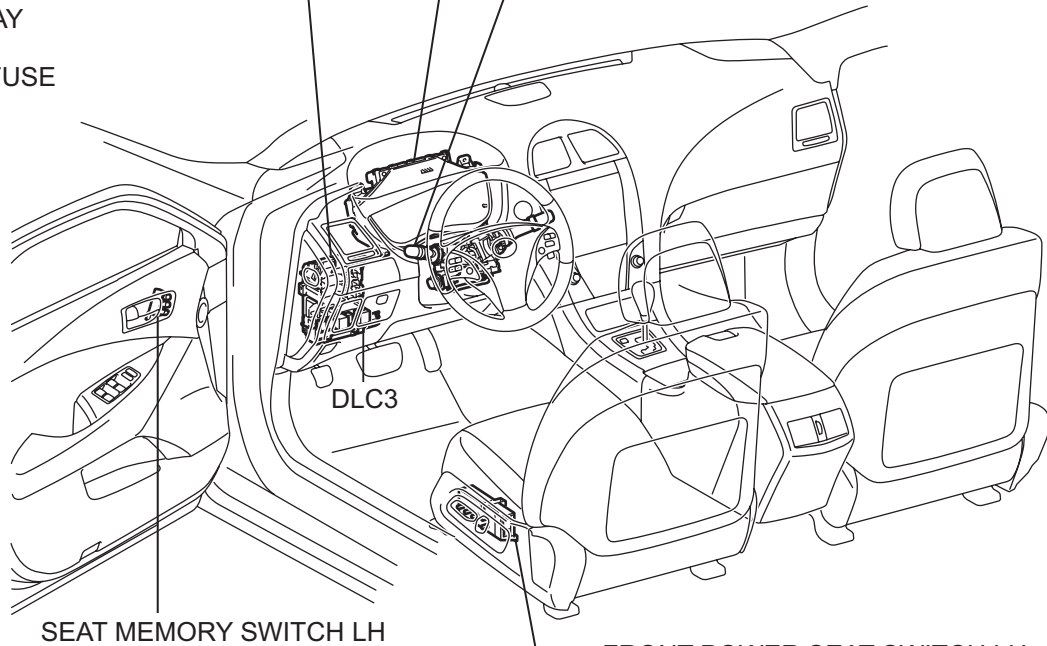
PARTS LOCATION

MAIN BODY ECU
(INSTRUMENT PANEL J/B)

- ECU IG NO. 1 FUSE
- IG1 RELAY
- TI & TE FUSE

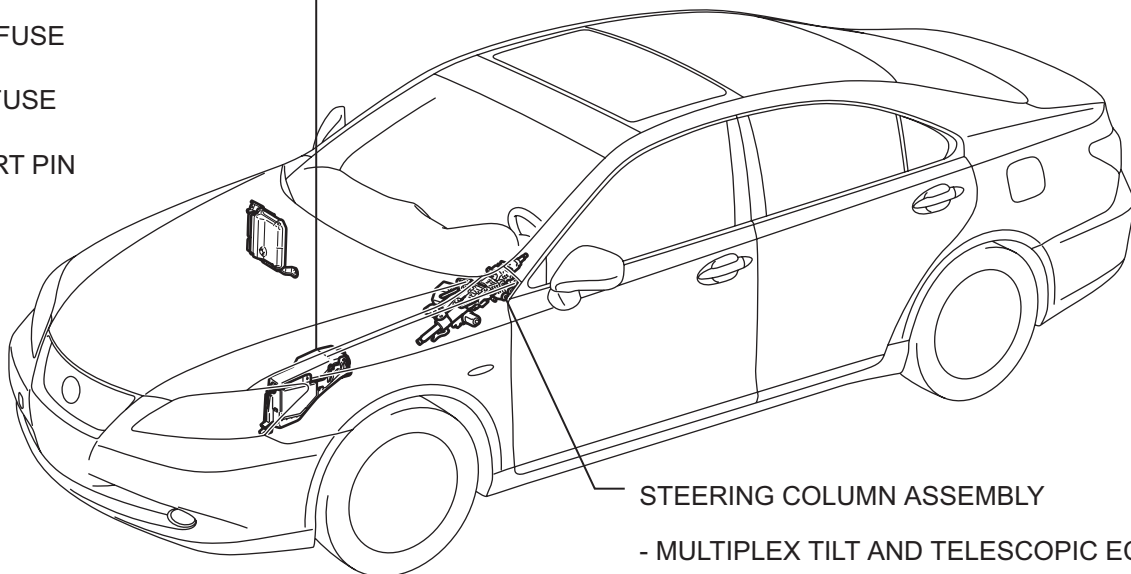
COMBINATION METER ASSEMBLY

- HEADLIGHT DIMMER SWITCH ASSEMBLY
- TILT AND TELESCOPIC MANUAL SWITCH



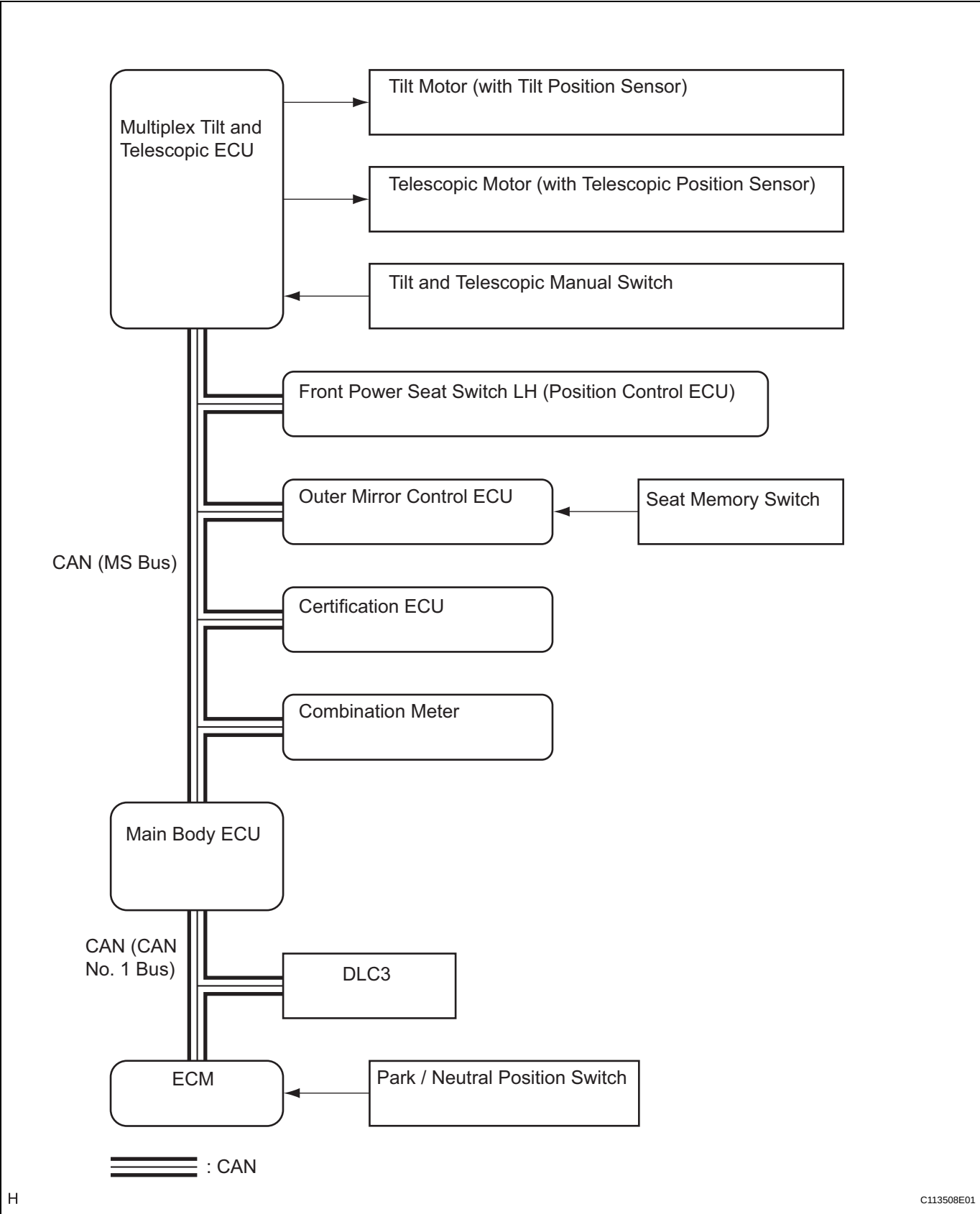
ENGINE ROOM J/B AND R/B

- ECU-B NO. 1 FUSE
- AM2 FUSE
- ALT FUSE
- SHORT PIN



SR

SYSTEM DIAGRAM



Communication Table:

Sender	Receiver	Signal	Line
Main Body ECU	Multiplex Tilt and Telescopic ECU	- Ignition switch signal - Key switch signal - Key signal for push start system use	CAN
Multiplex Tilt and Telescopic ECU	Front Power Seat Switch LH (Position Control ECU)	- Tilt and Telescopic execution signal - Tilt and Telescopic completion signal	CAN
Front Power Seat Switch LH (Position Control ECU)	Multiplex Tilt and Telescopic ECU	- Memory command of Memory 1 for driver's seat - Memory command of Memory 2 for driver's seat - Play command of Memory 1 for driver's seat - Play command of Memory 2 for driver's seat - Start signal to play Tilt and Telescopic steering - Stop signal to play Tilt and Telescopic steering	CAN
Combination meter ECU	Multiplex Tilt and Telescopic ECU	Vehicle speed signal (meter to other)	CAN

SYSTEM DESCRIPTION

1. FUNCTION OF MAIN COMPONENTS

Components	Function
Multiplex tilt and telescopic ECU	This ECU sends a control signal to the power tilt motor and the power telescopic motor, based on signals from each switch, to adjust the steering position.
Power tilt motor (with tilt position sensor)	This motor is activated by a signal from the multiplex tilt and telescopic ECU and adjusts the tilt position. The tilt position sensor in the motor detects the tilt position by counting the number of pulses as the motor rotates.
Power telescopic motor (with telescopic position sensor)	This motor is activated by a signal from the multiplex tilt and telescopic ECU and adjusts the telescopic position. The telescopic position sensor in the motor detects the telescopic position by counting the number of pulses as the motor rotates.

2. MANUAL OPERATION

- (a) The tilt and telescopic positions can be adjusted as desired by operating the tilt and telescopic switch.

3. AUTO AWAY/RETURN FUNCTION

- (a) When the engine switch is turned off, the steering column moves forward, away from the driver, and also tilts up for easy ingress and egress.
- (b) When the engine switch is turned on (IG), the steering column returns to the previously set position.
- (c) The auto away/return function can be prohibited by using the intelligent tester.

4. DRIVING POSITION MEMORY FUNCTION (with Seat Position Memory System)

- (a) The steering column moves to the previously set position by pressing the seat memory switches.

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

*: Use the intelligent tester.

1 VEHICLE BROUGHT TO WORKSHOP

NEXT

2 CHECK CAN COMMUNICATION SYSTEM*

NEXT

3 CHECK AND CLEAR DTCS*

NEXT

4 PROBLEM SYMPTOM CONFIRMATION

SYMPTOM DOES NOT OCCUR (GO TO STEP 5)



SYMPTOM OCCURS (GO TO STEP 6)

5 SYMPTOM SIMULATION

NEXT

6 DTC CHECK*

NORMAL SYSTEM CODE (GO TO STEP 7)



TROUBLE CODE (GO TO STEP 8)

7 PROBLEM SYMPTOMS TABLE

GO TO STEP 9

8 DTC CHART

NEXT

9	CIRCUIT INSPECTION*
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NEXT

10	IDENTIFICATION OF PROBLEM
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NEXT

11	REPAIR
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NEXT

12	CONFIRMATION TEST
----	-------------------

NEXT

END

CUSTOMIZE PARAMETERS

HINT:

The following can be customized.

NOTICE:

- **Be sure to record the current value before customizing.**
- **When troubleshooting, be careful, as customizing could turn off the function. (Example: If the wireless operation does not function, check that it has not been turned off by customizing.)**

TILT & TELESCO:

DISPLAY	DEFAULT	CONTENTS	SETTING
AUTO TILT AWAY	ON	ON/OFF of the auto away / return function	ON/OFF

PROBLEM SYMPTOMS TABLE

The power tilt and power telescopic steering column system uses the multiplex communication system, so check its diagnostic system before proceeding to troubleshooting. The table below will be useful in troubleshooting these electrical systems. The numbered suspected areas indicate the likelihood of the cause in descending order. Inspect each part in the order shown, and replace if a fault is found.

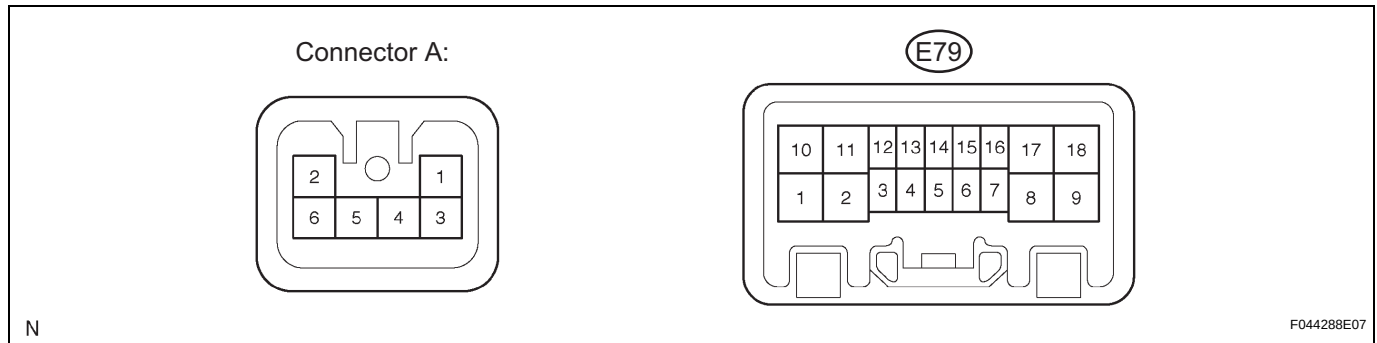
- If the instruction "PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE" is given in the flow chart on the following pages, proceed to the circuit with the next highest number in the table below to continue the check.
- If the problem still occurs when there is no abnormality in the related circuits, check the multiplex tilt and telescopic ECU and replace it if necessary.

POWER TILT AND POWER TELESCOPIC STEERING COLUMN SYSTEM:

Symptom	Suspected Area	See page
Only manual switch does not operate	1. Tilt and telescopic manual switch circuit	SR-45
	2. Headlight dimmer switch assembly (Tilt and Telescopic manual switch)	SR-45
	3. Multiplex tilt and telescopic ECU	SR-90
Only auto away/return function does not operate	1. Check customization status of auto away function using intelligent tester	SR-9
	2. IG power source circuit	SR-46
	3. Multiplex tilt and telescopic ECU	SR-90
Only auto away function does not operate	1. Smart access system with push button start function	ST-17
	2. Multiplex tilt and telescopic ECU	SR-90
Only auto return function does not operate	1. Smart access system with push button start function	ST-17
	2. Multiplex tilt and telescopic ECU	SR-90
Only memory function does not operate	1. Driving position memory switch	SE-124
	2. Multiplex tilt and telescopic ECU	SR-90

TERMINALS OF ECU

1. MULTIPLEX TILT AND TELESCOPIC ECU



Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
TEM+ (A-2) - GND (E79-11)	- (Not available) - W-B	Telescopic motor output	• Engine switch on (IG) • Telescopic steering contracts	10 to 14 V
			Telescopic motor is not operating	Below 1 V
VCE (A-3) - E1 (A-5)	- (Not available)	Telescopic sensor power source	Engine switch on (IG)	8 to 16 V
TES (A-4) - E1 (A-5)	- (Not available)	Telescopic sensor signal	Telescopic motor is operating	Pulse generation HI: 8 to 16 V LOW: 0 V
E1 (A-5) - Body ground	- (Not available) - Body ground	Telescopic sensor ground	Always	Below 1 V
TEM- (A-6) - GND (E79-11)	- (Not available) - W-B	Telescopic motor output	• Engine switch on (IG) • Telescopic steering extends	10 to 14 V
			Telescopic motor is not operating	Below 1 V
TIM- (E79-1) - GND (E79-11)	L - W-B	Tilt motor output	• Engine switch on (IG) • Steering tilts down	10 to 14 V
			Tilt motor is not operating	Below 1 V
+B (E79-2) - GND (E79-11)	W - W-B	Motor power source	Always	10 to 14 V
MSW (E79-3) - GND (E79-11)	GR - W-B	Manual switch signal	• Engine switch on (IG) • Tilt up by manual switch	1.67 to 2.13 V
			• Engine switch on (IG) • Tilt down by manual switch	0.54 to 0.74 V
			• Engine switch on (IG) • Telescopic contracted by manual switch	1.08 to 1.40 V
			• Engine switch on (IG) • Telescopic extended by manual switch	2.22 to 2.77 V
			Manual switch is not operated	Below 0.2 V
VC (E79-4) - GND (E79-11)	LG - W-B	Manual switch power source	Engine switch on (IG)	4.9 to 5.1 V
CANH (E79-5) - GND (E79-11)	BR - W-B	CAN communication	Engine switch on (IG)	Below 1 V
VCI (E79-6) - E1 (E79-17)	B - L	Tilt sensor power source	Engine switch on (IG)	8 to 16 V
TIS (E79-7) - E1 (E79-17)	Y - L	Tilt sensor signal	Tilt motor is operating	Pulse generation HI: 8 to 16 V LOW: 0 V

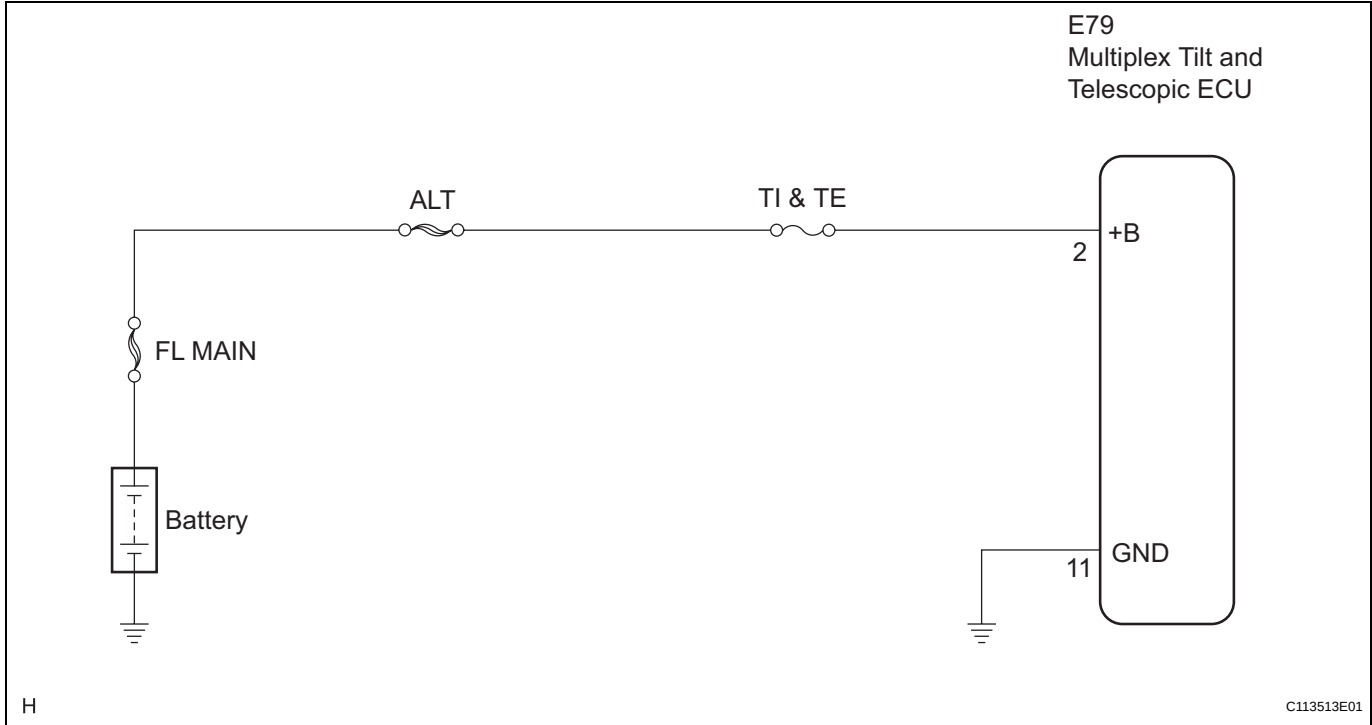
Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
IG (E79-8) - GND (E79-11)	B - W-B	IG signal / IG power source	Engine switch on (IG)	10 to 14 V
			Engine switch off	Below 1 V
ECUB (E79-9) - GND (E79-11)	V - W-B	ECU power source	Always	10 to 14 V
TIM+ (E79-10) - GND (E79-11)	B - W-B	Tilt motor output	• Engine switch on (IG) • Steering tilts up	10 to 14 V
			Tilt motor is not operating	Below 1 V
GND (E79-11) - Body ground	W-B - Body ground	ECU ground	Always	Below 1 V
CANL (E79-14) - GND (E79-11)	GR - W-B	CAN communication	Engine switch on (IG)	Below 1 V
E1 (E79-17) - Body ground	L - Body ground	Tilt sensor ground	Always	Below 1 V

Actuator Power Source Circuit

DESCRIPTION

This is the power source for the motors.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT FUSE (TI & TE)

- Remove the TI & TE fuse from the instrument panel J/B.
- Measure the resistance of the TI & TE fuse.

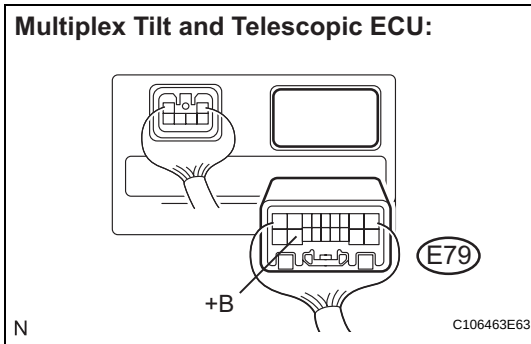
Standard resistance:

Below 1 Ω

NG

REPLACE FUSE

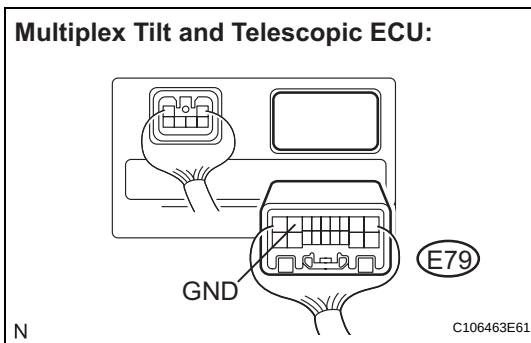
OK

2 CHECK HARNESS AND CONNECTOR (MULTIPLEX TILT AND TELESCOPIC ECU - BATTERY)**Multiplex Tilt and Telescopic ECU:**

- (a) Disconnect the E79 connector from the multiplex tilt and telescopic ECU.
(b) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
+B (E79-2) - Body ground	Always	10 to 14 V

NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****3 CHECK HARNESS AND CONNECTOR (MULTIPLEX TILT AND TELESCOPIC ECU - BODY GROUND)****Multiplex Tilt and Telescopic ECU:**

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

Standard resistance

Tester Connection	Condition	Specified Condition
GND (E79-11) - Body ground	Always	Below 1 Ω

NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE**

Tilt and Telescopic Manual Switch Circuit

DESCRIPTION

The signals generated by operating the manual switch are sent to the multiplex tilt and telescopic ECU through the communication bus.

INSPECTION PROCEDURE

1 READ VALUE OF INTELLIGENT TESTER (COMBINATION SWITCH)

- (a) Connect the intelligent tester to the DLC3.
- (b) Turn the engine switch on (IG) and turn the intelligent tester on.
- (c) Select "COMBINATION SWITCH".
- (d) Select the following items from the DATA LIST.
- (e) Check the tilt and telescopic manual switch.

COMBINATION SWITCH:

Tester Display	Measurement Item/Range	Normal Condition	Normal Condition
TELESC SHORT SW	Telescopic SHORT switch status / OFF or ON	OFF: Telescopic short is not activated by manual switch ON: Telescopic short is activated by manual switch	-
TELESC LONG SW	Telescopic LONG switch status / OFF or ON	OFF: Telescopic long is not activated by manual switch ON: Telescopic long is activated by manual switch	-
TILT DOWN SW	Tilt DOWN switch status / OFF or ON	OFF: Tilt down is not activated by manual switch ON: Tilt down is activated by manual switch	-
TILT UP SW	Tilt UP switch status / OFF or ON	OFF: Tilt up is not activated by manual switch ON: Tilt up is activated by manual switch	-

OK:

"ON" is displayed on the tester screen when each switch is turned on.

"OFF" is displayed on the tester screen when each switch is turned off.

NG

REPLACE HEADLIGHT DIMMER SWITCH ASSEMBLY

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

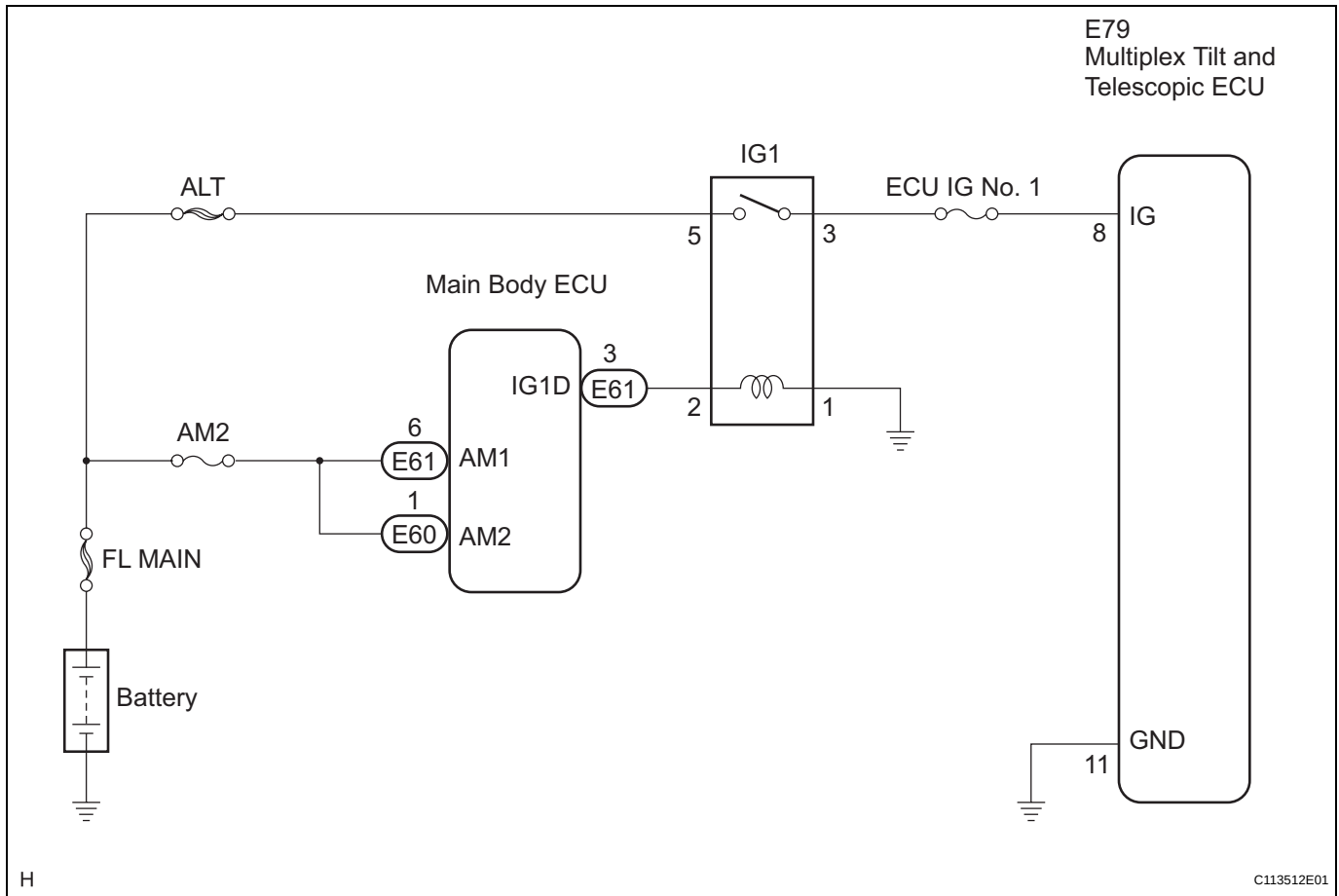
IG Power Source Circuit

DESCRIPTION

When the engine switch is turned on (IG), the IG power source circuit supplies positive voltage to the multiplex tilt and telescopic ECU.

The multiplex tilt and telescopic ECU also receives engine switch signals via this circuit.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT FUSE (ECU IG NO. 1)

- Remove the ECU-IG No. 1 fuse from the instrument panel J/B.
- Measure the resistance of the ECU-IG No. 1 fuse.

Standard resistance:

Below 1 Ω

NG

REPLACE FUSE

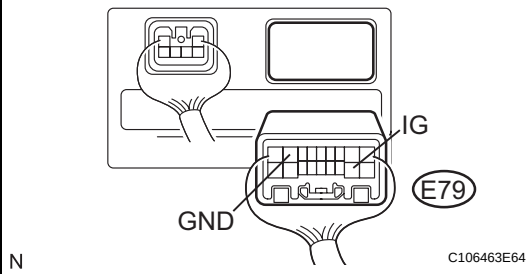
OK

SR

2

INSPECT MULTIPLEX TILT AND TELESCOPIC ECU (IG TERMINAL VOLTAGE)

Multiplex Tilt and Telescopic ECU:



- (a) Disconnect the E79 connector from the multiplex tilt and telescopic ECU.
- (b) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
IG (E79-8) - GND (E79-11)	Engine switch on (IG)	10 to 14 V

OK

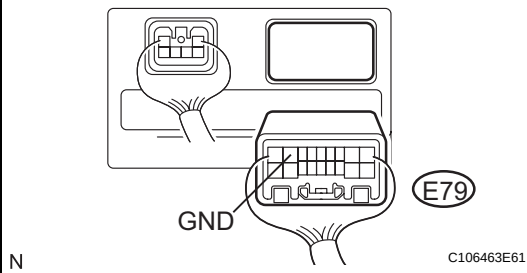
PROCEED TO NEXT CIRCUIT INSPECTION
SHOWN IN PROBLEM SYMPTOMS TABLE

NG

3

CHECK HARNESS AND CONNECTOR (MULTIPLEX TILT AND TELESCOPIC ECU - BODY GROUND)

Multiplex Tilt and Telescopic ECU:



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

Standard resistance

Tester Connection	Condition	Specified Condition
GND (E79-11) - Body ground	Always	Below 1 Ω

NG

REPAIR OR REPLACE HARNESS OR
CONNECTOR

OK

REPLACE MULTIPLEX TILT AND TELESCOPIC ECU

ELECTRIC STEERING LOCK

PRECAUTION

NOTICE:

Some systems need to be initialized after reconnecting the negative (-) battery terminal (See page [IN-33](#)).

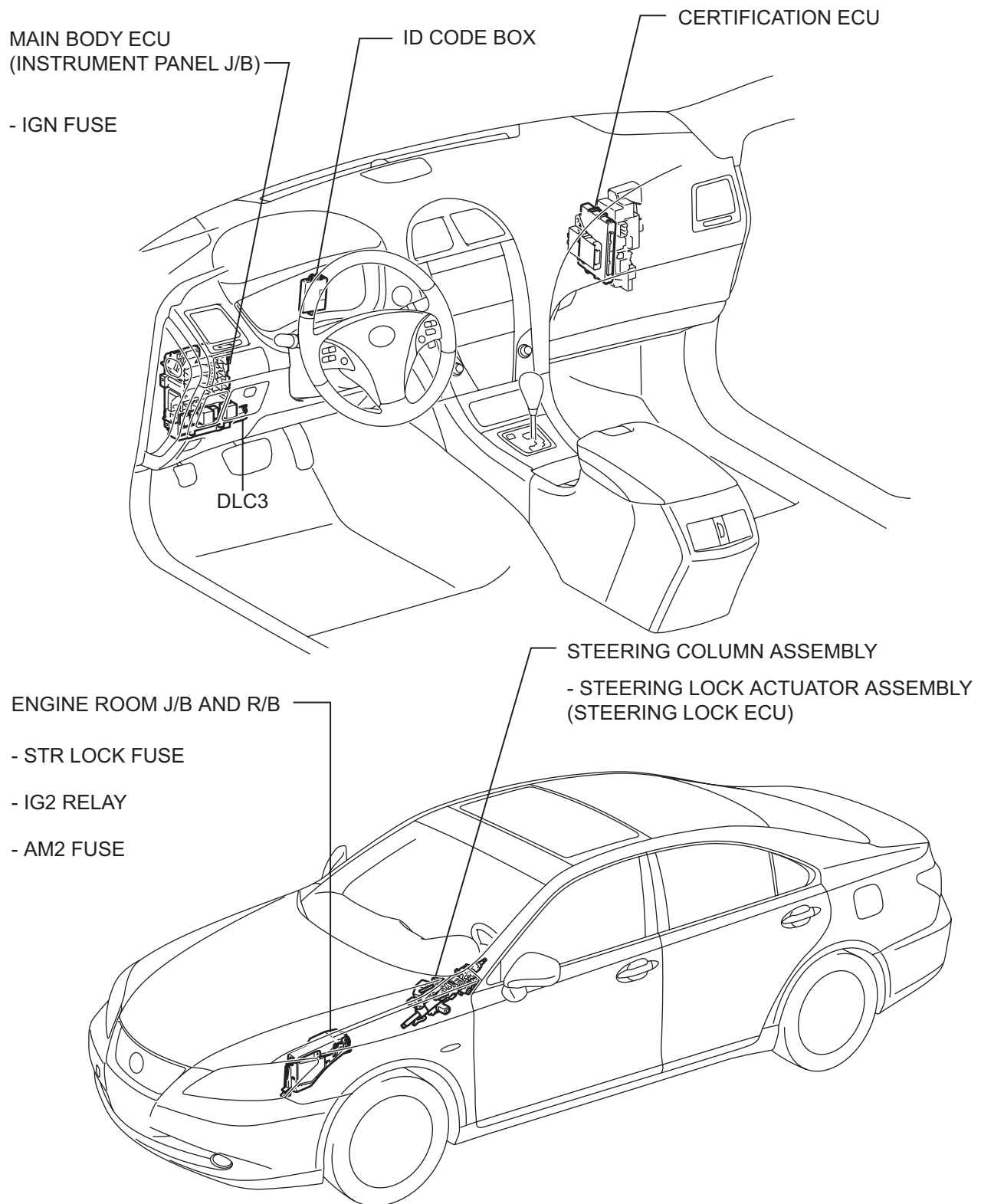
1. PRECAUTIONS WHEN WORKING ON ELECTRIC STEERING LOCK

- (a) After replacing the steering lock actuator assembly (steering lock ECU), perform the key ID code registration.
- (b) If the steering lock actuator assembly is replaced, open and close the driver's door. The engine may not start until the driver's door is opened or closed.
HINT:
Opening and closing the driver's door causes the steering lock actuator assembly (steering lock ECU) to memorize the correct steering lock bar position.
- (c) If checking for DTCs of the smart access system with push-button start function or if checking the DATA LIST with the engine switch off, make sure that the driver's door is open.

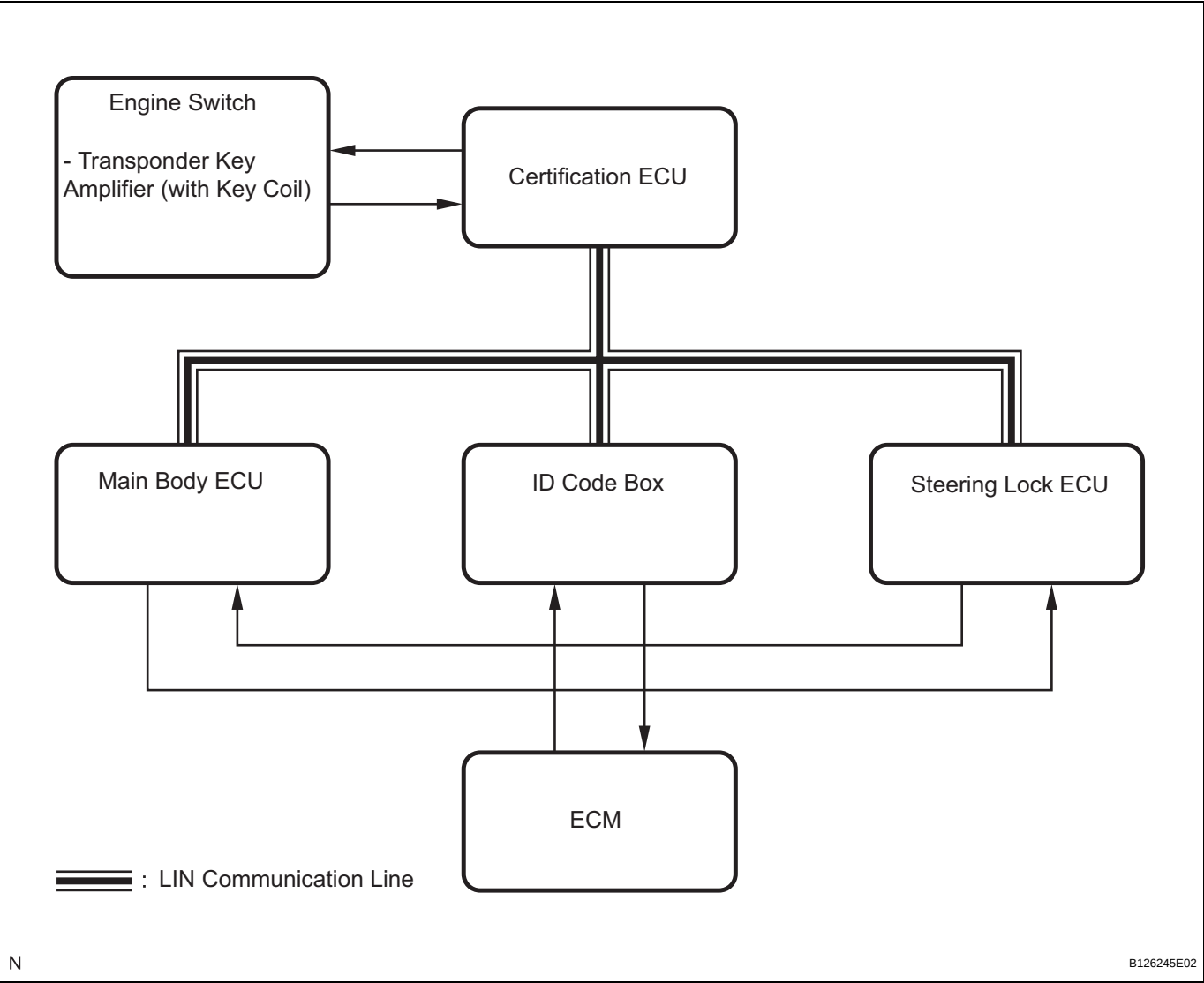
HINT:

When the engine switch is off, the main body ECU may be in a sleep mode. If the main body ECU is in this sleep mode, it will not be possible for the intelligent tester to communicate with it. Opening and closing the driver's door will cause the ECU to exit the sleep mode.

PARTS LOCATION



SYSTEM DIAGRAM



Input and output signals of each ECU:

Transmitting ECU (transmitter)	Receiving ECU	Signals	Communication Method
Main Body ECU	Steering Lock ECU	Power supply status (to steering lock motor)	LIN
Steering Lock ECU	- Certification ECU - Main Body ECU - ID Code Box	Sleep available status	LIN
Steering Lock ECU	- Certification ECU - Main Body ECU - ID Code Box	Lock / Unlock sensor status	LIN
Steering Lock ECU	- Certification ECU - Main Body ECU - ID Code Box	Steering lock status	LIN
Steering Lock ECU	- Certification ECU - Main Body ECU - ID Code Box	Motor control status	LIN
Steering Lock ECU	- Certification ECU - Main Body ECU - ID Code Box	Diagnostic response status	LIN
Steering Lock ECU	- Certification ECU - Main Body ECU - ID Code Box	Lock / Unlock sensor malfunction	LIN

Transmitting ECU (transmitter)	Receiving ECU	Signals	Communication Method
Steering Lock ECU	• Certification ECU • Main Body ECU • ID Code Box	Power supply malfunction (to steering lock motor)	LIN
Steering Lock ECU	• Certification ECU • Main Body ECU • ID Code Box	Motor driver malfunction	LIN
Steering Lock ECU	• Certification ECU • Main Body ECU • ID Code Box	Lock bar (stuck) status	LIN
Steering Lock ECU	• Certification ECU • Main Body ECU • ID Code Box	Push start status	LIN
Steering Lock ECU	• Certification ECU • Main Body ECU • ID Code Box	Lock / Unlock relay drive status	LIN
Steering Lock ECU	• Certification ECU • Main Body ECU • ID Code Box	Engine start control status	LIN

SYSTEM DESCRIPTION

1. DESCRIPTION

- (a) The steering lock system locks or unlocks the steering lock by activating the steering lock bar with a motor. The steering lock ECU activates the motor based on signals from the certification ECU and main body ECU.
- (b) A LIN (Local Interconnect Network) is used for communication between different ECUs in this system.

2. FUNCTIONS OF COMPONENTS

- (a) The steering lock ECU controls the system based on information from the following components.

Item	Function
Steering lock actuator assembly	Consists of a motor, lock bar, lock and unlock position sensors, etc. Activated by the steering lock ECU.
Steering lock ECU	Included in the steering lock actuator assembly. This ECU activates the steering lock motor based on permission signals from the main body ECU and certification ECU. Detects steering lock or unlock state and transmits this information to other ECUs.
Main body ECU	Permits the steering lock ECU to supply power to activate the motor. The main body ECU and certification ECU permit engine start after receiving an unlock signal from the steering lock ECU.
Certification ECU	Orders the steering lock ECU to lock / unlock the steering. The main body ECU and certification ECU permit engine start after receiving an unlock signal from the steering lock ECU.
IG2 relay	Controlled by the main body ECU. This ECU sends IG signals to the steering lock ECU.

HOW TO PROCEED WITH TROUBLESHOOTING

*: Use the intelligent tester.

1 VEHICLE BROUGHT TO WORKSHOP

NEXT

2 CHECK AND CLEAR DTCS*

NEXT

3 PROBLEM SYMPTOM CONFIRMATION



SYMPTOM DOES NOT OCCUR (Go to step 4)



SYMPTOM OCCURS (Go to step 5)

4 SYMPTOM SIMULATION

NEXT

5 CHECK CAN COMMUNICATION SYSTEM*

HINT:

Check that there are no problems with the CAN communication system before troubleshooting the steering lock system.

NEXT

6 DTC CHECK*



DTC IS NOT OUTPUT (Go to step 7)



DTC IS OUTPUT (Go to step 8)

7 PROBLEM SYMPTOMS TABLE



Go to step 9

8	DTC CHART
NEXT	
9	CIRCUIT INSPECTION*
NEXT	
10	PROBLEM IDENTIFICATION
NEXT	
11	REPAIR OR REPLACEMENT
NEXT	
12	CONFIRMATION TEST
NEXT	
END	

INITIALIZATION

HINT:

In vehicles equipped with the smart access system with push-button start function, the starting function may not operate after recharging or while jump-starting a discharged battery. This condition is most common if the battery voltage drops below 9 V. The following procedure has been developed to address this condition.

1. INITIALIZATION PROCEDURE

- (a) Confirm that the short pin is installed.

HINT:

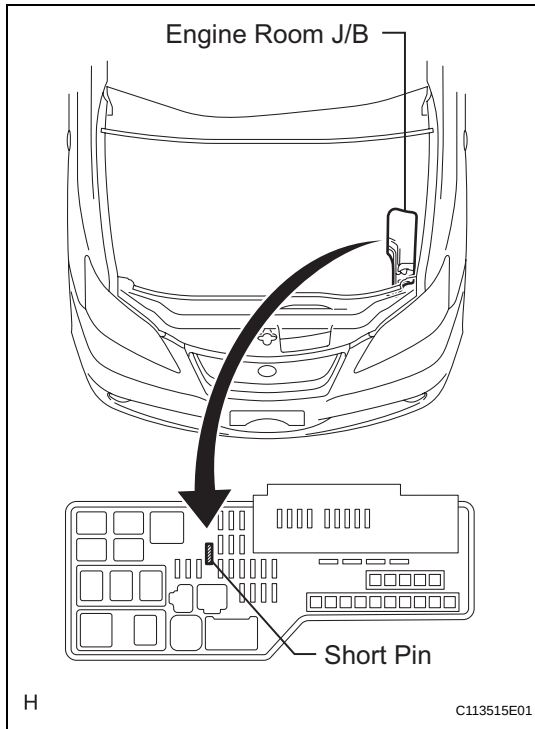
If the short pin fuse is not installed, install it at this time.

- (b) Move the shift lever to the P position.
- (c) Turn the engine switch off.
- (d) Open the driver's door.

HINT:

Opening the driver's door will start an initialization process between the steering lock ECU and the engine room J/B.

- (e) Depress the brake pedal.
- (f) Press the "START STOP" switch.



PROBLEM SYMPTOMS TABLE

Inspect the suspected areas in numerical order by referring to the corresponding pages when any of the following symptoms occurs:

ELECTRIC STEERING LOCK FUNCTION:

Symptom	Suspected Area	See page
Steering wheel cannot be unlocked (the engine cannot be started).	1. Initialization	SR-53
	2. Check for DTCs in the smart access system with push-button start.	ST-28
	3. Check for DTCs in the engine immobiliser system.	EI-25
	4. Check that the LCK/UNLCK REC item in the DATA LIST of the certification ECU displays YES within 10 seconds after starting the engine. (If it displays NO, see "No steering unlock command" in this table.)	SR-58
	5. Check the input signal from the IGE terminal of the steering lock ECU.	SR-68
	6. Steering lock ECU power source circuit.	SR-74
	7. Replace the steering lock ECU.	SR-82
Steering wheel cannot be unlocked (no steering unlock command).	1. Check that the S CODE MACH item in the DATA LIST of the certification ECU displays OK. (If it displays NG, replace the ID code box.)	-
	2. Check that the L CODE MACH item in the DATA LIST of the certification ECU displays OK. (If it displays NG, replace the ID code box.)	-
	3. Replace the certification ECU.	-
Steering wheel cannot be locked.	1. Check for DTCs in the smart access system with push-button start.	ST-28
	2. Check for DTCs in the engine immobiliser system.	EI-25
	3. With the engine switch off and the shift lever in the P position, open and close the drivers door. After that, check that the LCK/UNLCK REC item in the DATA LIST of the certification ECU displays YES within 10 seconds. (If it displays NO, see "No steering lock command" in this table.)	SR-58
	4. Check the input signal from the IGE terminal of the steering lock ECU.	SR-68
	5. Steering lock ECU power source circuit.	SR-74
	6. Replace the steering lock ECU.	SR-82
Steering wheel cannot be locked (no steering lock command).	1. Courtesy light switch circuit	LI-94
	2. Check that the S CODE MACH item in the DATA LIST of the certification ECU displays OK. (If it displays NG, replace the ID code box.)	-
	3. Check that the L CODE MACH item in the DATA LIST of the certification ECU displays OK. (If it displays NG, replace the ID code box.)	-
	4. Replace the certification ECU.	-

SMART ACCESS SYSTEM WITH PUSH-BUTTON START FUNCTION:

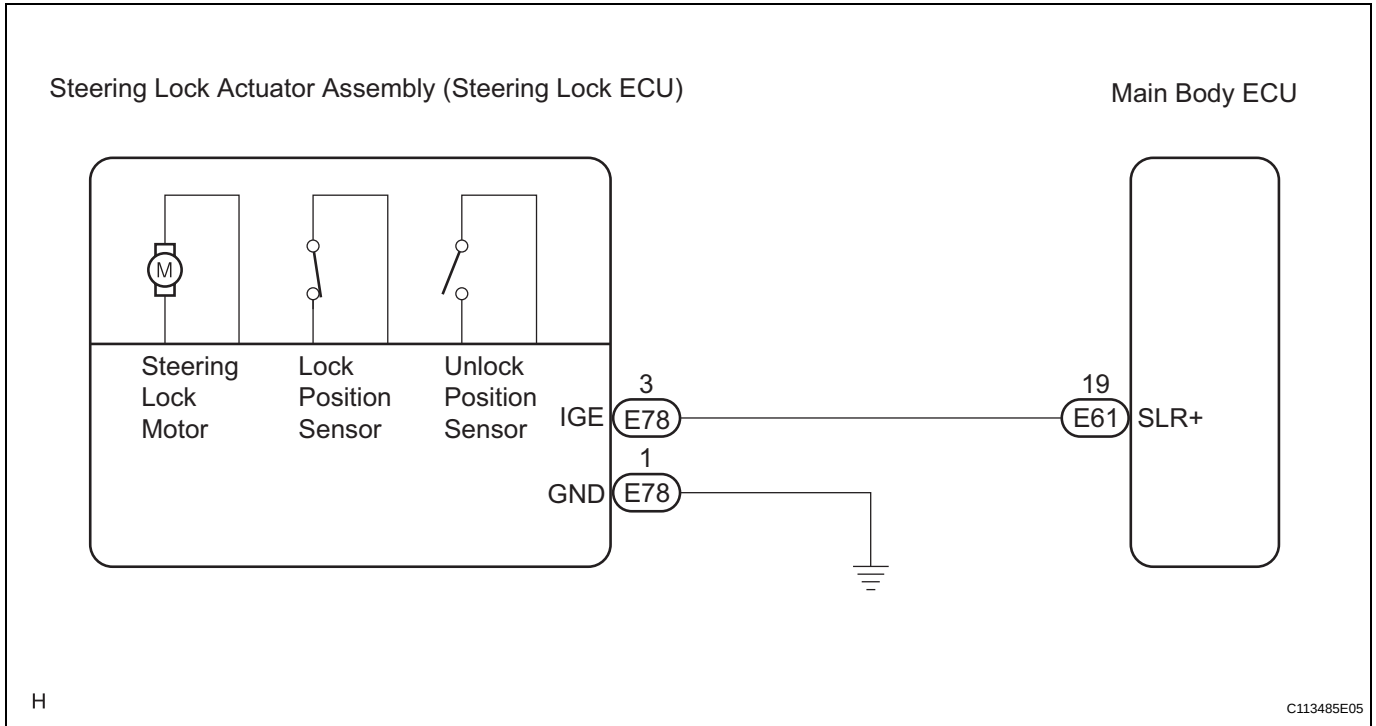
Symptom	Suspected Area	See page
Engine does not start.	1. Initialization	SR-53
	2. Check for DTCs in the smart access system with push-button start.	ST-28
	3. Check for DTCs in the engine immobiliser system.	EI-25
	4. Check that the engine switch is turned on (IG).	-
	5. Check cranking operation. (If cranking operation is possible, see "Engine does not start due to the engine immobiliser" in this table.)	-
	6. Check SHIFT P SIG in the DATA LIST of the power source control ECU and confirm that the shift signal is normal.	-
	7. Check whether the steering wheel is locked or unlocked. (If it is locked, see "Steering wheel cannot be unlocked" in the steering lock function table.)	-
	8. Check the output from the SLP terminal of the steering lock ECU.	SR-72
	9. Check the output signal from the ST SW of the certification ECU (DTC B2275).	ST-48
	10. Replace the main body ECU.	-
Engine does not start due to the engine immobiliser.	1. Check that the L CODE MACH item in the DATA LIST of the certification ECU displays OK. (If it displays NG, replace the ID code box.)	-
	2. Check that the ENG START REQ item in the DATA LIST of the certification ECU displays YES. (If it displays NO, replace the certification ECU.)	-
	3. Check that the S CODE MACH item in the DATA LIST of the certification ECU displays OK. (If it displays NG, replace the ID code box.)	-
	4. Replace the ID code box.	-

Steering Lock Motor Drive Power Circuit

DESCRIPTION

The steering lock ECU is connected to the main body ECU and certification ECU. The steering lock ECU cannot activate the motor unless it receives permission signals from both ECUs. (The main body ECU permits the steering lock ECU to supply power to activate the motor.)

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK VEHICLE CONDITION

- (a) Check the problem symptom of the steering lock system.

Result

Condition	Proceed to
Steering lock cannot be released	A
Steering cannot be locked	B

B

Go to step 6

A

2 READ VALUE OF INTELLIGENT TESTER

- (a) Connect the intelligent tester to the DLC3.
 (b) Turn the engine switch on (IG), and turn the intelligent tester on.

- (c) Select the item below in the DATA LIST, and read its value displayed on the intelligent tester.

SMART:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
LCK/UNLCK REC	Steering lock command reception record / YES or NO	YES: Steering lock / unlock signal received NO: Steering lock / unlock signal not received	-

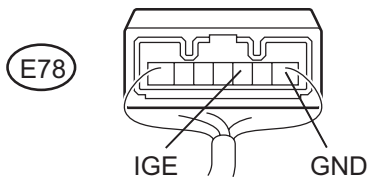
- (d) Check if a steering unlock command signal has been received.

OK:

"YES" is displayed on the tester display.

NG

**CHECK SMART ACCESS SYSTEM WITH
PUSH-BUTTON START**

OK**3****INSPECT STEERING LOCK ACTUATOR ASSEMBLY (STEERING LOCK ECU)****Steering Lock Actuator Assembly:**

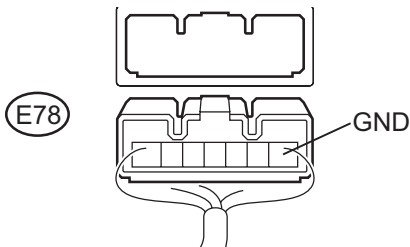
- (a) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
E78-3 (IGE) - E78-1 (GND)	1. Engine switch off 2. Engine switch on (ACC or IG)	- Motor activated: Below 1 V - Motor not activated: 10 to 12 V

OK

**PROCEED TO NEXT CIRCUIT INSPECTION
SHOWN IN PROBLEM SYMPTOMS TABLE**

NG**4****CHECK HARNESS AND CONNECTOR (STEERING LOCK ACTUATOR ASSEMBLY - BODY GROUND)****Steering Lock Actuator Assembly:**

- (a) Disconnect the E78 connector from the steering lock actuator assembly.
(b) Measure the resistance according to the value(s) in the table below.

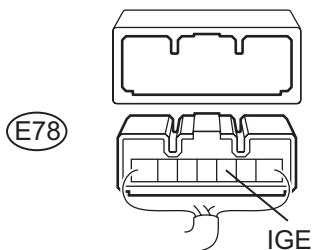
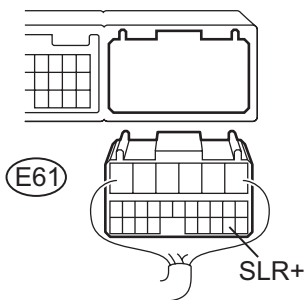
Standard resistance

Tester Connection	Condition	Specified Condition
E78-1 (GND) - Body ground	Always	Below 1 Ω

NG

**REPAIR OR REPLACE HARNESS OR
CONNECTOR**

OK

5**CHECK HARNESS AND CONNECTOR (STEERING LOCK ACTUATOR ASSEMBLY - MAIN BODY ECU)****Steering Lock Actuator Assembly:****Main Body ECU:**

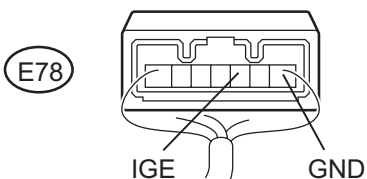
H

C113502E03

- (a) Disconnect the E61 connector from the main body ECU.
 (b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
E78-3 (IGE) - E61-19 (SLR+)	Always	Below 1 Ω
E78-3 (IGE) - Body ground	Always	10 k Ω or higher

NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****REPLACE MAIN BODY ECU****6****INSPECT STEERING LOCK ACTUATOR ASSEMBLY (STEERING LOCK ECU)****Steering Lock Actuator Assembly:**

H

C106483E28

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

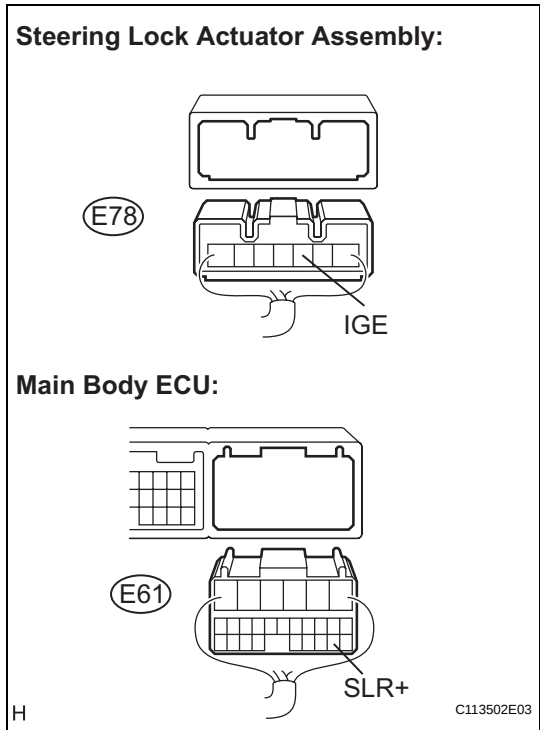
Standard voltage

Tester Connection	Condition	Specified Condition
E78-3 (IGE) - E78-1 (GND)	The specified condition should be checked after performing the following: 1. Move the shift lever to the P position 2. Turn the engine switch off 3. Open the driver's door	- Motor activated: Below 1 V - Motor not activated: 10 to 12 V

OK**PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE****NG****SR**

7

CHECK HARNESS AND CONNECTOR (STEERING LOCK ACTUATOR ASSEMBLY - MAIN BODY ECU)



- (a) Disconnect the E78 connector from the steering lock actuator assembly.
- (b) Disconnect the E61 connector from the main body ECU.
- (c) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
E78-3 (IGE) - E61-19 (SLR+)	Always	Below 1 Ω
E78-3 (IGE) - Body ground	Always	10 kΩ or higher

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

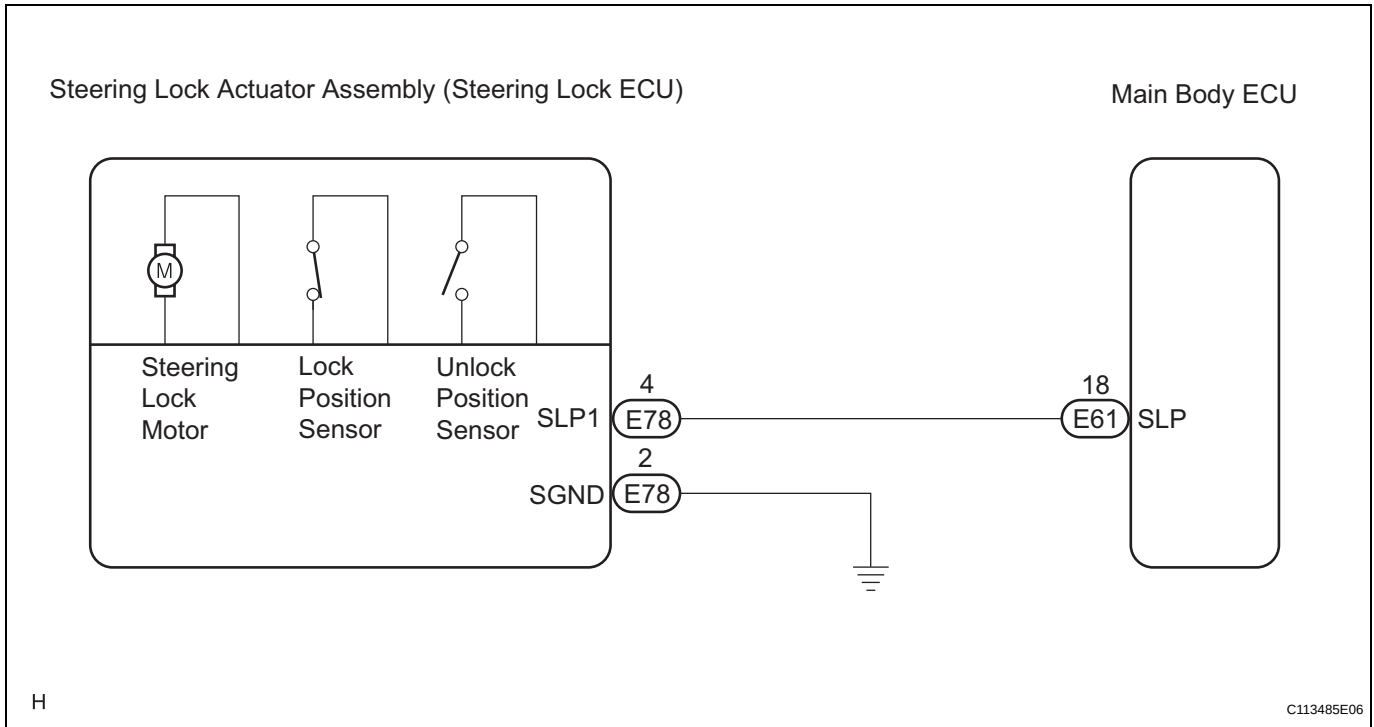
REPLACE MAIN BODY ECU

Unlock Position Sensor Signal Circuit

DESCRIPTION

The unlock position sensor is one of the components in the steering lock actuator. The sensor switch contact closes when the steering lock is released. The steering lock release signal is then sent to the main body ECU. Receiving the signal, the ECU permits engine start. (This prevents the engine from being started with the steering locked.)

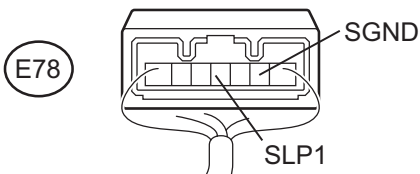
WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT STEERING LOCK ACTUATOR ASSEMBLY (STEERING LOCK ECU)

Steering Lock Actuator Assembly:



H

C106483E29

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

Standard voltage

Tester Connection	Condition	Specified Condition
E78-4 (SLP1) - E78-2 (SGND)	1. Engine switch off 2. Engine switch on (ACC or IG)	Below 1 V

OK

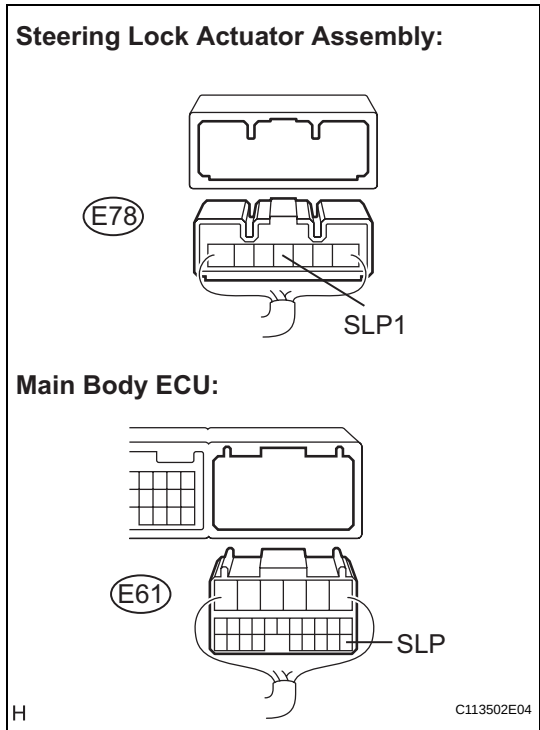
**CHECK SMART ACCESS SYSTEM WITH
PUSH-BUTTON START FUNCTION**

NG

SR

2

CHECK HARNESS AND CONNECTOR (STEERING LOCK ACTUATOR ASSEMBLY - MAIN BODY ECU)



- (a) Disconnect the E78 connector from the steering lock actuator assembly.
- (b) Disconnect the E61 connector from the main body ECU.
- (c) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
E78-4 (SLP1) - E61-18 (SLP)	Always	Below 1 Ω
E78-4 (SLP1) - Body ground	Always	10 kΩ or higher

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

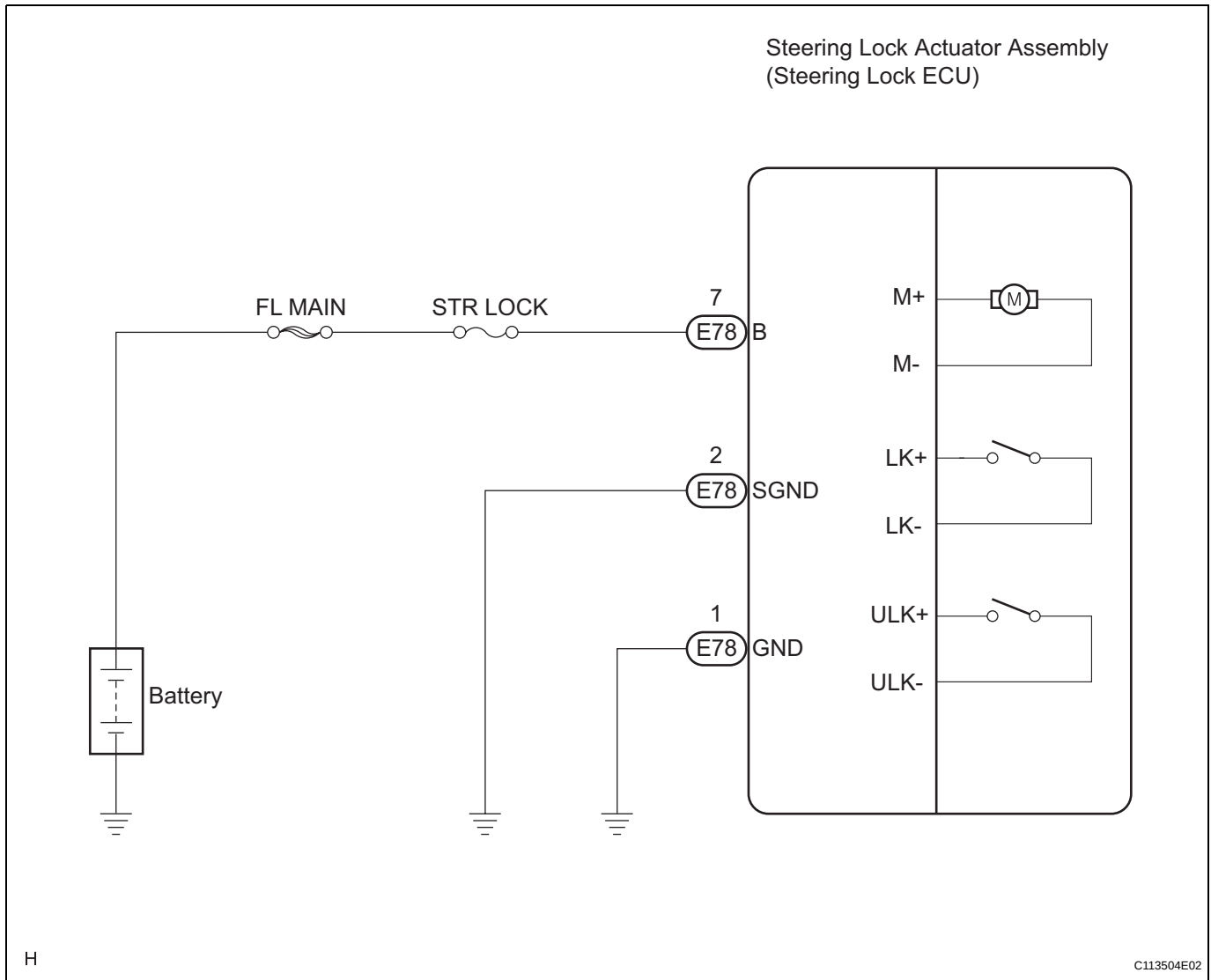
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

Power Source Circuit

DESCRIPTION

This circuit supplies voltage from the battery to terminal B of the steering lock ECU. This circuit is used as power source for the steering lock CPU, motor, communication, and peripheral circuits.

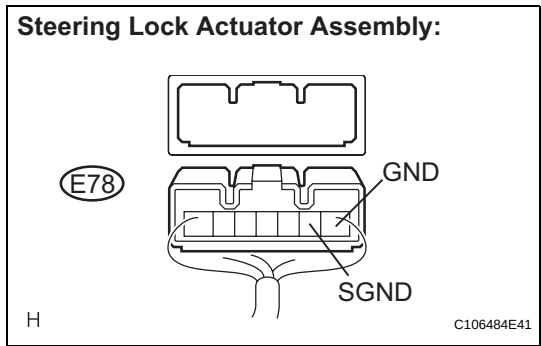
WIRING DIAGRAM



INSPECTION PROCEDURE

1

CHECK HARNESS AND CONNECTOR (STEERING LOCK ACTUATOR ASSEMBLY - BODY GROUND)



- (a) Disconnect the E78 connector from the steering lock actuator assembly.
- (b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
E78-1 (GND) - Body ground	Always	Below 1 Ω
E78-2 (SGND) - Body ground	Always	Below 1 Ω

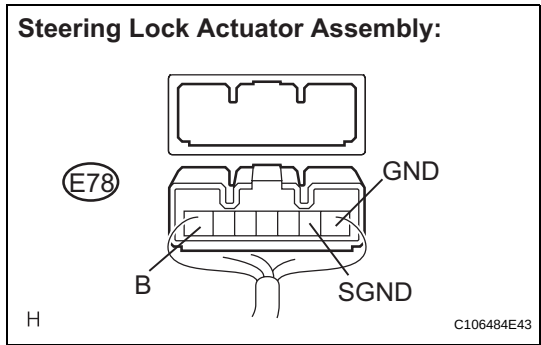
NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2

CHECK HARNESS AND CONNECTOR (STEERING LOCK ACTUATOR ASSEMBLY - BATTERY)



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

Standard voltage

Tester Connection	Condition	Specified Condition
E78-7 (B) - E78-1 (GND)	Always	10 to 14 V
E78-7 (B) - E78-2 (SGND)	Always	10 to 14 V

OK

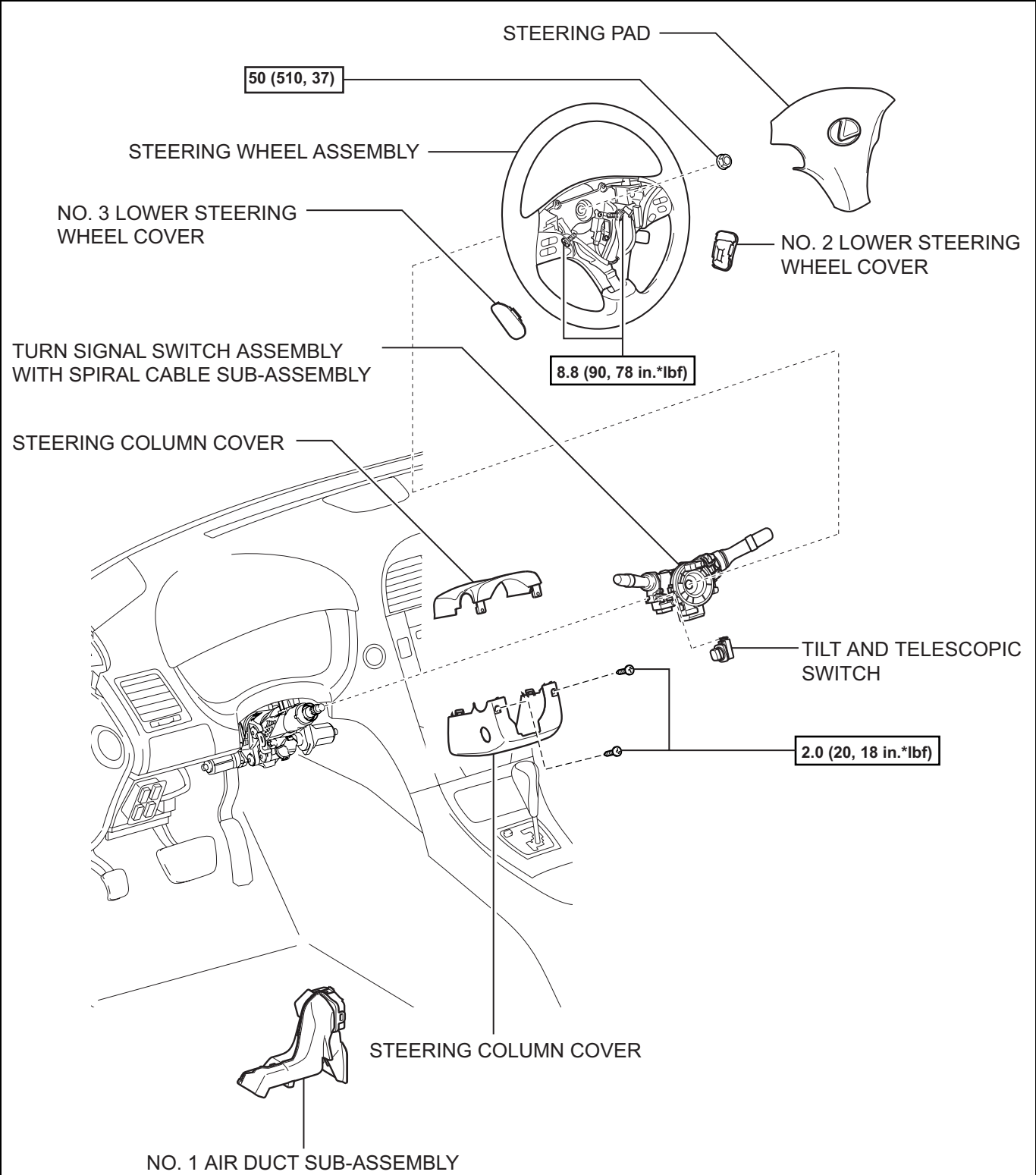
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

NG

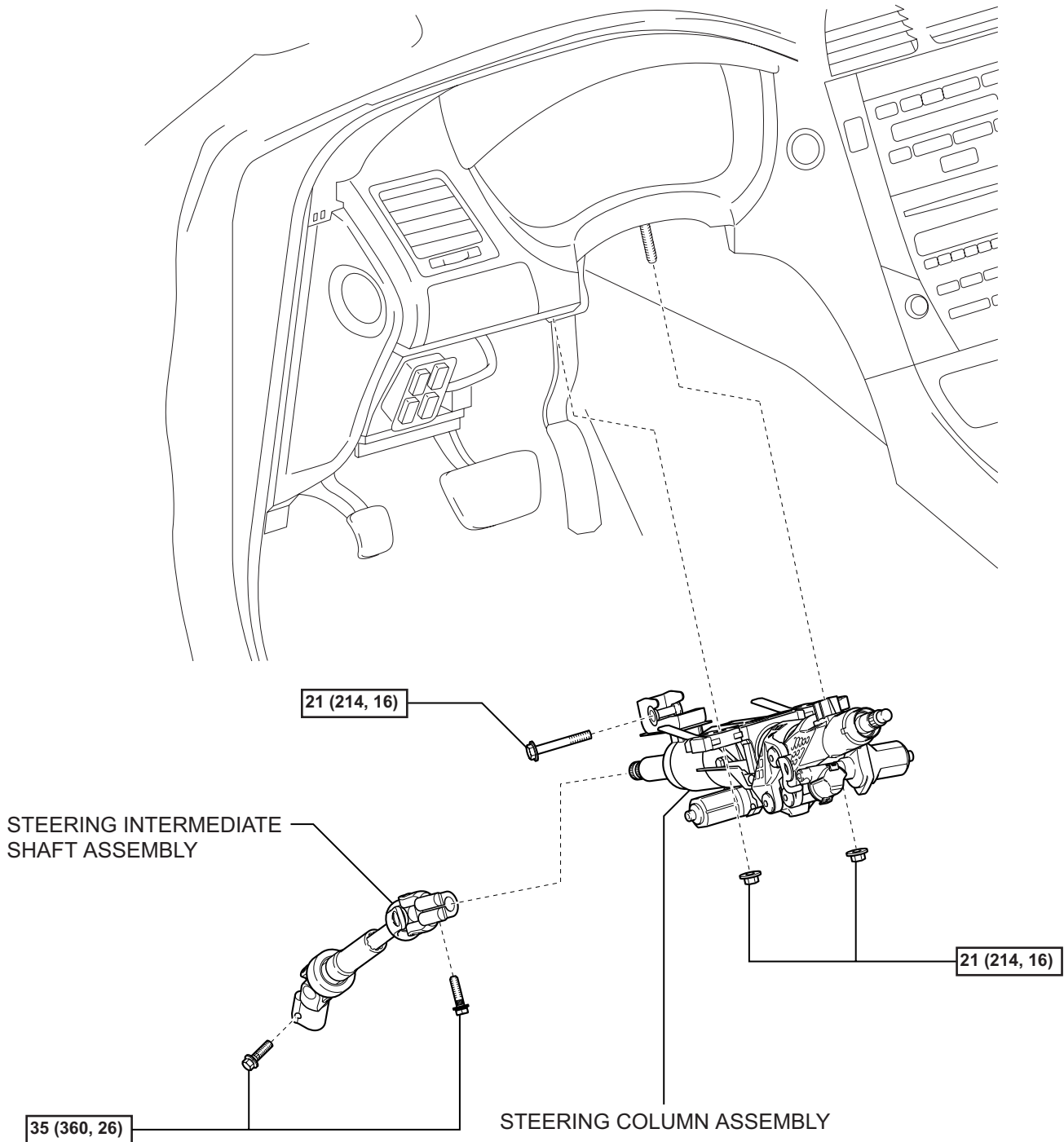
REPAIR OR REPLACE HARNESS OR CONNECTOR (STEERING LOCK ACTUATOR ASSEMBLY - BATTERY)

STEERING COLUMN ASSEMBLY

COMPONENTS

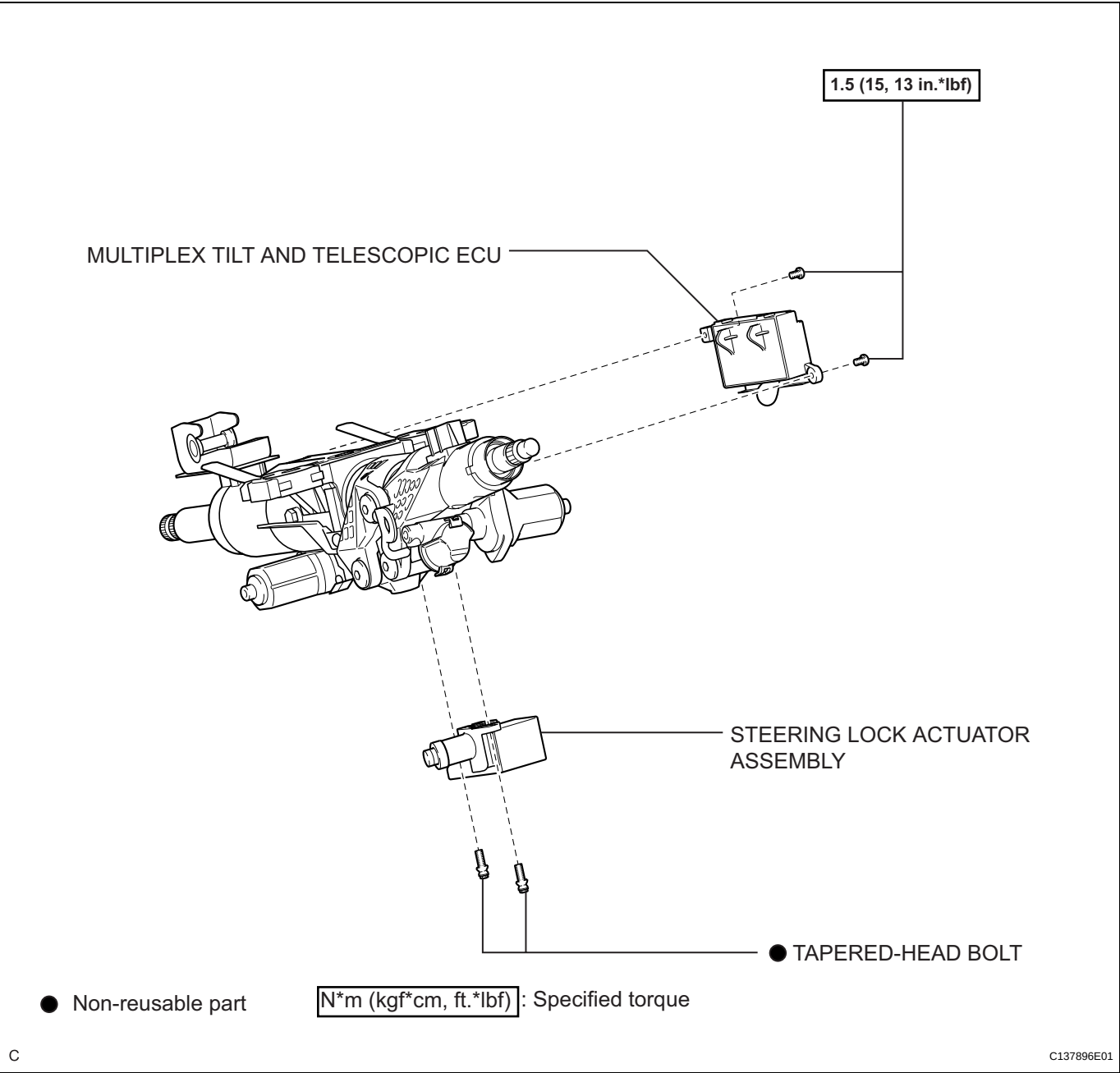


N*m (kgf*cm, ft.*lbf): Specified torque



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

SR



REMOVAL

1. PRECAUTION

HINT:

(See page [SR-1](#))

2. PLACE FRONT WHEELS FACING STRAIGHT AHEAD

3. REMOVE FRONT WHEEL LH

4. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

- (a) Disable the AUTO TILT AWAY function by changing the customize parameter (See page [SR-9](#)).

NOTICE:

Record the current customize parameter setting (whether the AUTO TILT AWAY function is enabled or disabled) in order to restore the current setting after finishing the operation.

HINT:

Performing the above operation causes the AUTO TILT AWAY function to be disabled when the engine switch is turned off.

- (b) Turn the engine switch on (IG). Operate the tilt and telescopic switch to fully extend and lower the steering column assembly.
- (c) Turn the engine switch off and disconnect the cable from the negative battery terminal.

NOTICE:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

5. REMOVE FRONT DOOR SCUFF PLATE LH (See page [IR-39](#))

6. REMOVE FRONT DOOR OPENING TRIM COVER LH (See page [IR-39](#))

7. REMOVE SIDE INSTRUMENT PANEL LH (See page [IP-12](#))

8. REMOVE INSTRUMENT PANEL FINISH PANEL END LH (See page [IP-13](#))

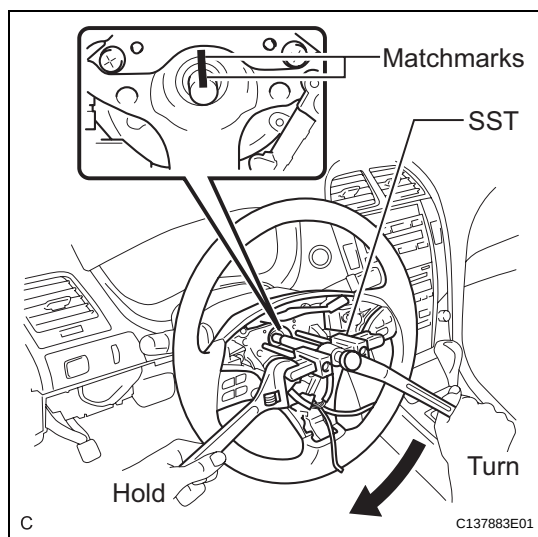
9. REMOVE LOWER INSTRUMENT PANEL SUB-ASSEMBLY (See page [IP-13](#))

10. REMOVE DRIVER SIDE KNEE AIRBAG ASSEMBLY (See page [RS-386](#))

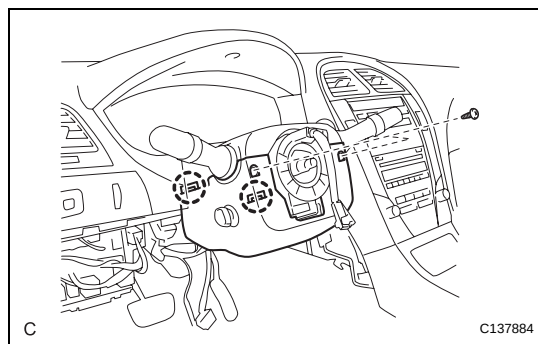
11. REMOVE NO. 2 LOWER STEERING WHEEL COVER (See page [RS-367](#))

12. REMOVE NO. 3 LOWER STEERING WHEEL COVER (See page [RS-367](#))

13. REMOVE STEERING PAD (See page [RS-367](#))

**14. REMOVE STEERING WHEEL ASSEMBLY**

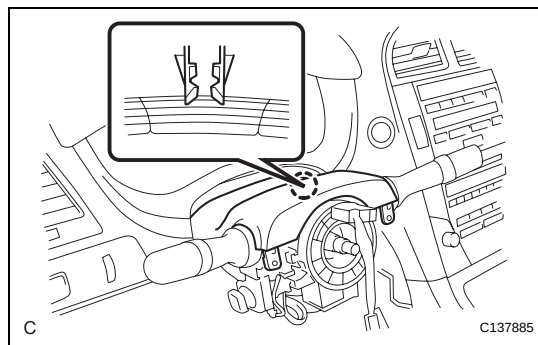
- Remove the steering wheel assembly set nut.
- Put matchmarks on the steering wheel assembly and main shaft assembly.
- Using SST, remove the steering wheel assembly.
SST 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05011)

**15. REMOVE STEERING COLUMN COVER**

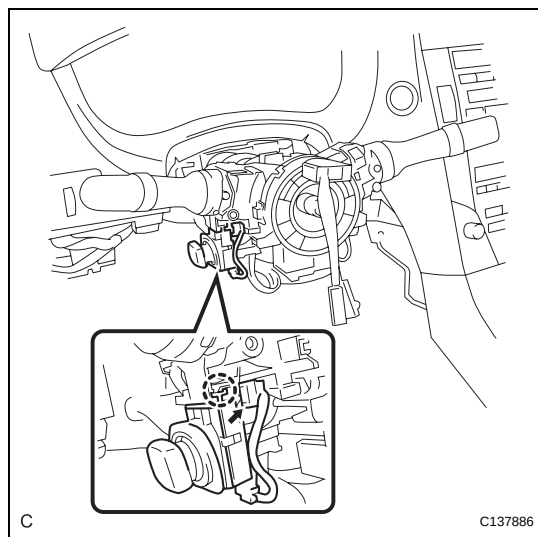
- Remove the 2 screws.
- Disengage the 2 claws to remove the lower steering column cover.

NOTICE:

Do not damage the tilt and telescopic switch.



- Disengage the claw to remove the upper steering column cover.

**16. REMOVE TILT AND TELESCOPIC SWITCH**

- Disconnect the connector.
- Using a screwdriver, disengage the claw and pull out the tilt and telescopic switch.

NOTICE:

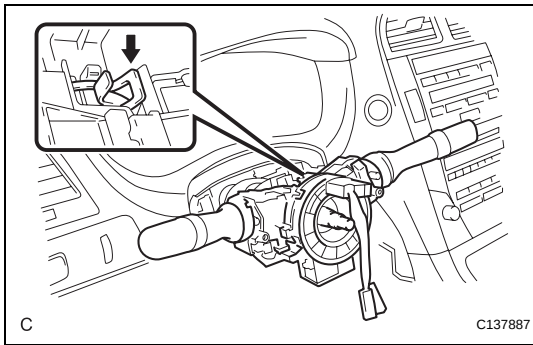
Pushing on the claw too hard will break the claw.

HINT:

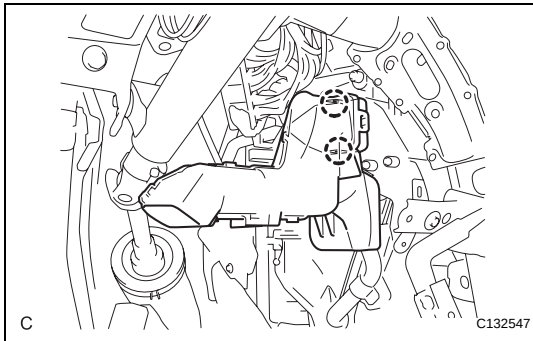
Tape the screwdriver tip before use.

17. REMOVE TURN SIGNAL SWITCH ASSEMBLY WITH SPIRAL CABLE SUB-ASSEMBLY

- Disconnect the connectors from the turn signal switch assembly with spiral cable sub-assembly.

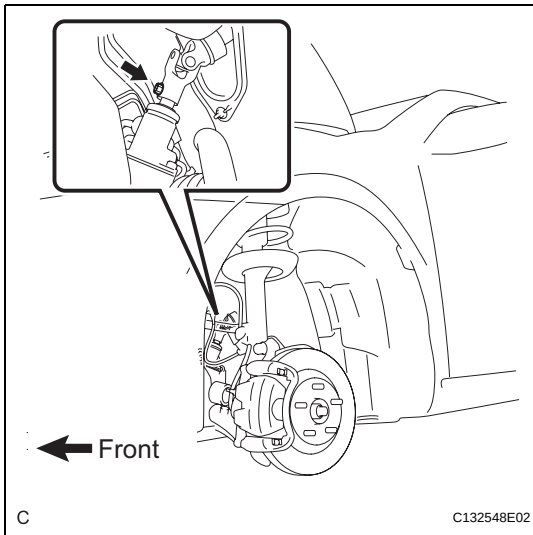


- (b) Using pliers, grip the claws of the clip and remove the turn signal switch assembly with spiral cable sub-assembly from the steering column assembly.



18. REMOVE NO. 1 AIR DUCT SUB-ASSEMBLY

- (a) Disengage the 2 claws and remove the No. 1 air duct sub-assembly.

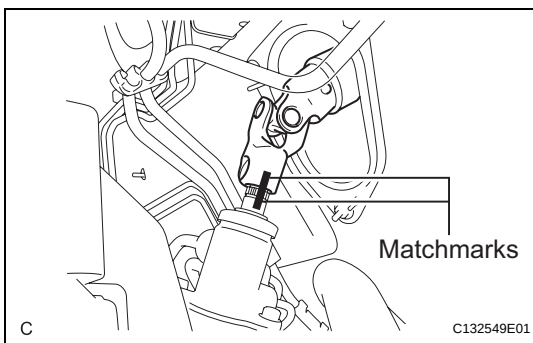


19. SEPARATE STEERING INTERMEDIATE SHAFT ASSEMBLY

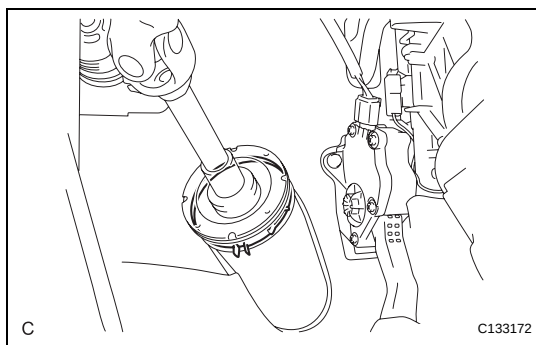
- (a) Remove the bolt and slide the steering intermediate shaft assembly.

NOTICE:

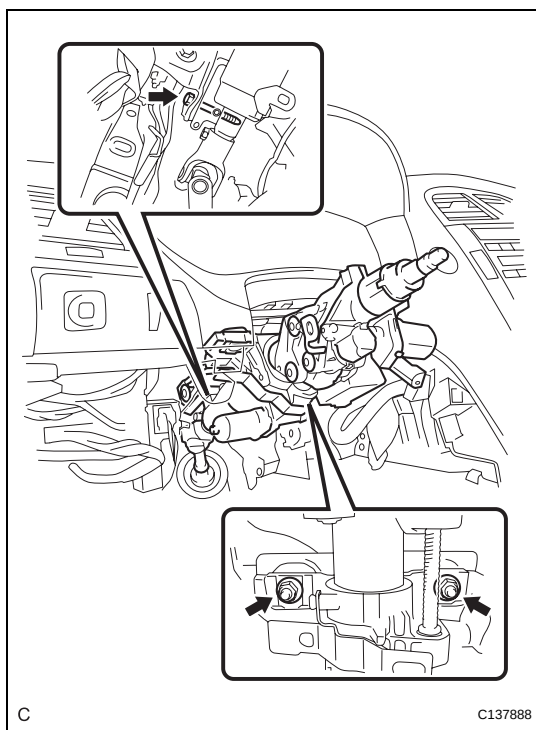
Do not separate the steering intermediate shaft assembly from the power steering link assembly.



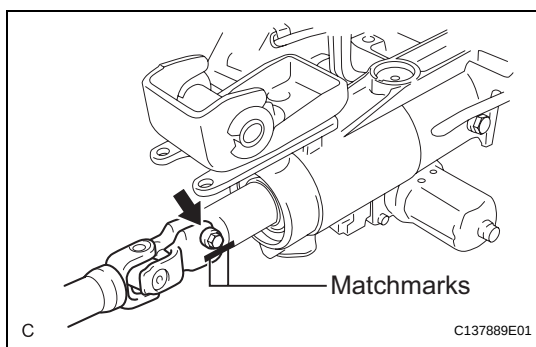
- (b) Put matchmarks on the steering intermediate shaft assembly and the power steering link assembly.
(c) Separate the steering intermediate shaft assembly from the power steering link assembly.

**20. REMOVE STEERING COLUMN ASSEMBLY**

- (a) Remove the clamp from the steering column hole shield.
- (b) Disconnect the connectors and wire harness clamps from the steering column assembly.



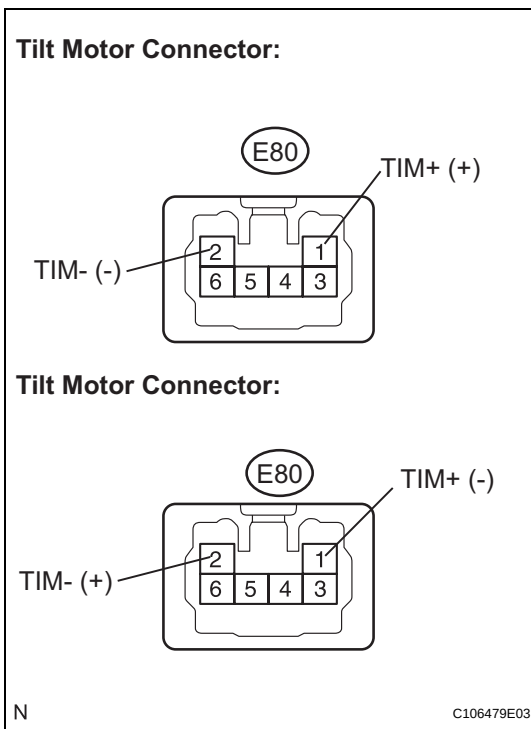
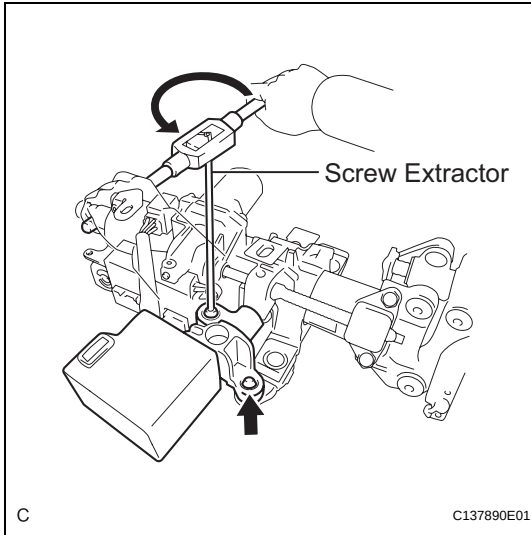
- (c) Remove the bolt, 2 nuts, and steering column assembly.

**21. REMOVE STEERING INTERMEDIATE SHAFT ASSEMBLY**

- (a) Put matchmarks on the steering intermediate shaft assembly and the steering main shaft.
- (b) Remove the bolt and the steering intermediate shaft assembly.

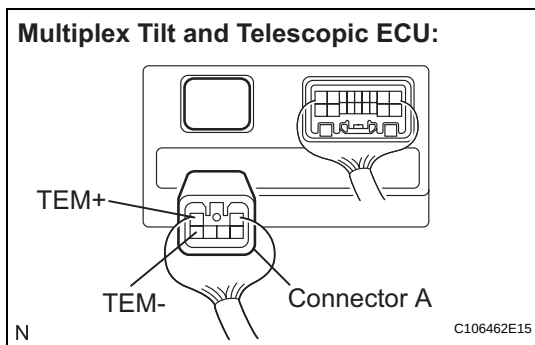
DISASSEMBLY

1. **REMOVE STEERING LOCK ACTUATOR ASSEMBLY**
 - (a) Using a center punch, mark the center of the 2 tapered-head bolts.
 - (b) Using a 3 to 4 mm (0.12 to 0.16 in.) drill, drill a hole in the 2 tapered-head bolts.
 - (c) Using a screw extractor, remove the 2 tapered-head bolts and steering lock actuator assembly from the steering column assembly.
2. **REMOVE MULTIPLEX TILT AND TELESCOPIC ECU**
(See page [SR-90](#))



INSPECTION

1. **INSPECT STEERING COLUMN ASSEMBLY (Tilt Motor)**
 - (a) Connect the positive battery terminal to terminal TIM+ (E80-1) and the negative battery terminal to terminal TIM- (E80-2) of the tilt motor connector. Then confirm that the steering wheel tilts up.
OK:
The steering wheel tilts up.
 - (b) Connect the negative battery terminal to terminal TIM+ (E80-1) and the positive battery terminal to terminal TIM- (E80-2) of the tilt motor connector. Then confirm that the steering wheel tilts down.
OK:
The steering wheel tilts down.



2. INSPECT STEERING COLUMN ASSEMBLY (Telescopic Motor)

- (a) Disconnect connector A from the multiplex tilt and telescopic ECU.
- (b) Connect the positive battery terminal to terminal TEM+ (A-2) and the negative battery terminal to terminal TEM- (A-6) of the telescopic motor connector. Then confirm that the steering column contracts.

OK:

The steering column contracts.

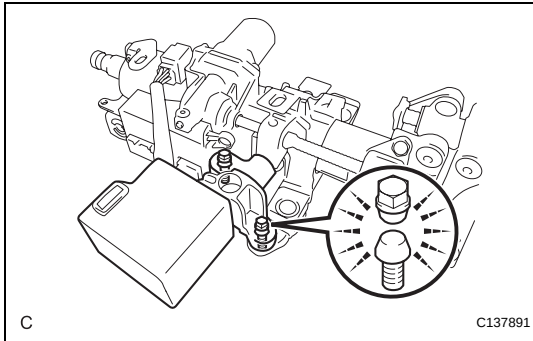
- (c) Connect the negative battery terminal to terminal TEM+ (A-2) and the positive battery terminal to terminal TEM- (A-6) of the telescopic motor connector. Then confirm that the steering column extends.

OK:

The steering column extends.

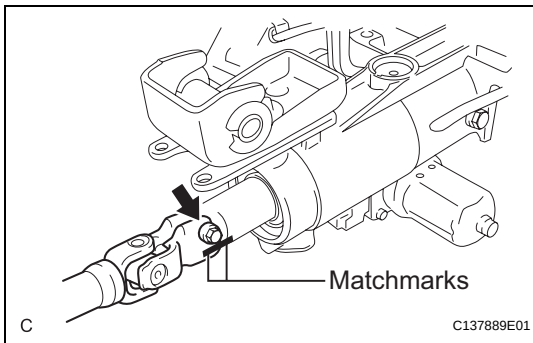
REASSEMBLY

1. **INSTALL MULTIPLEX TILT AND TELESCOPIC ECU**
(See page [SR-90](#))
2. **INSTALL STEERING LOCK ACTUATOR ASSEMBLY**
 - (a) Temporarily install the steering lock actuator assembly with 2 new tapered-head bolts.
 - (b) Tighten the 2 tapered-head bolts until the bolt heads break off.

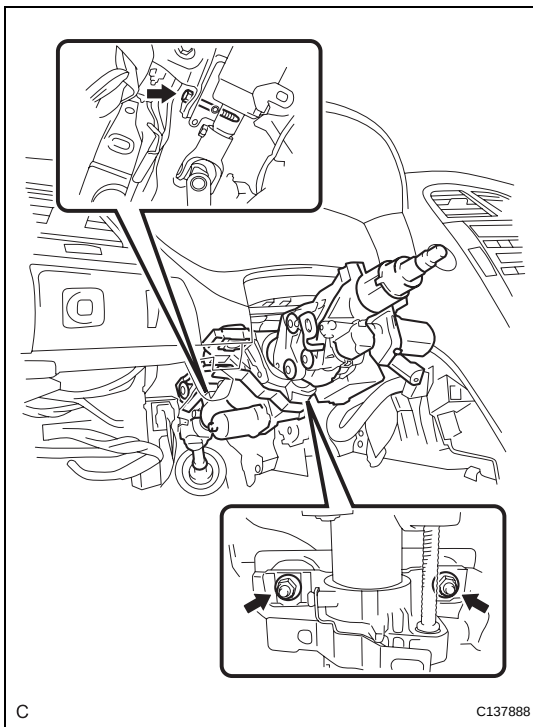


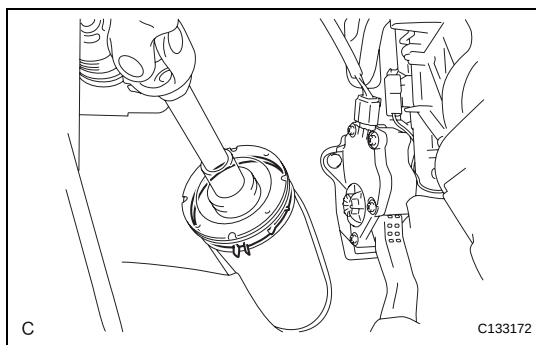
INSTALLATION

1. **INSTALL STEERING INTERMEDIATE SHAFT ASSEMBLY**
 - (a) Align the matchmarks on the steering intermediate shaft assembly and the steering main shaft.
 - (b) Install the bolt.
Torque: 35 N*m (360 kgf*cm, 26 ft.*lbf)

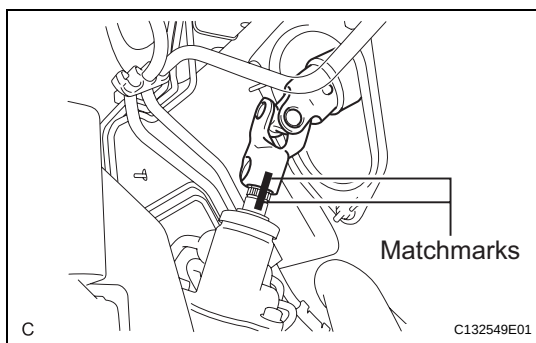


2. **INSTALL STEERING COLUMN ASSEMBLY**
 - (a) Install the steering column assembly with the bolt and 2 nuts.
Torque: 21 N*m (214 kgf*cm, 16 ft.*lbf)
 - (b) Connect the connectors and wire harness clamps to the steering column assembly.



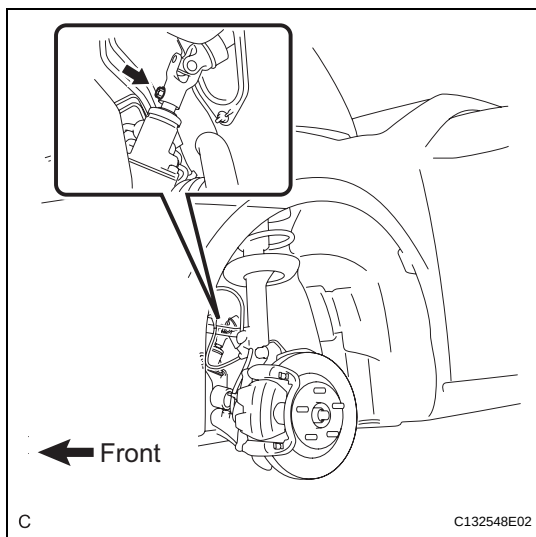


(c) Install the clamp to the steering column hole shield.



3. CONNECT STEERING INTERMEDIATE SHAFT ASSEMBLY

(a) Align the matchmarks on the steering intermediate shaft assembly and the power steering link assembly.

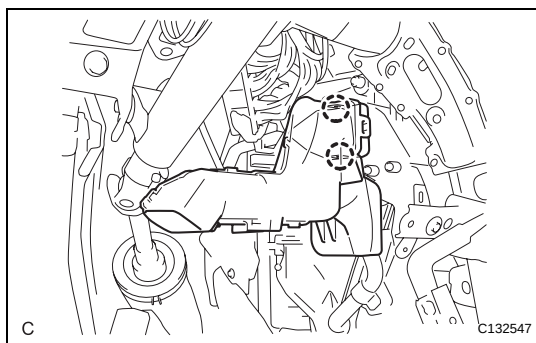


(b) Install the bolt.

Torque: 35 N*m (360 kgf*cm, 26 ft.*lbf)

4. INSTALL FRONT WHEEL LH

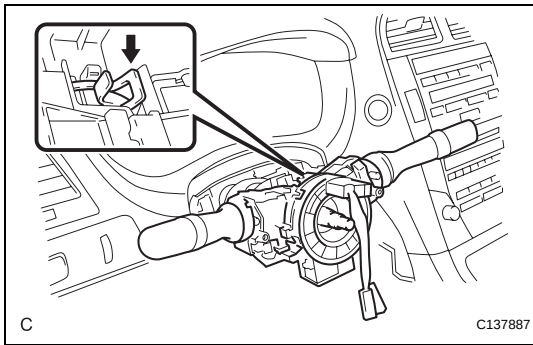
Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)



5. INSTALL NO. 1 AIR DUCT SUB-ASSEMBLY

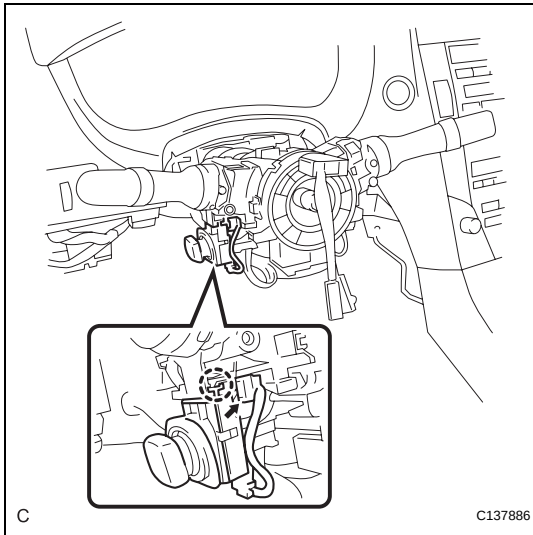
(a) Engage the 2 claws to install the No. 1 air duct sub-assembly.

6. PLACE FRONT WHEELS FACING STRAIGHT AHEAD



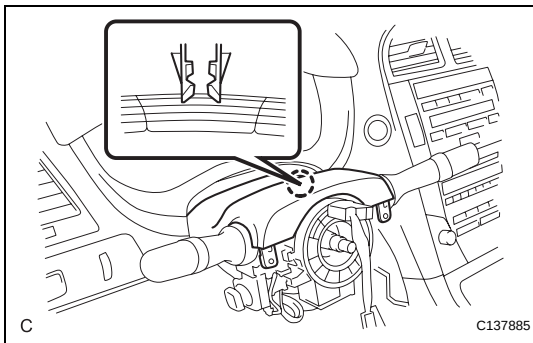
7. INSTALL TURN SIGNAL SWITCH ASSEMBLY WITH SPIRAL CABLE SUB-ASSEMBLY

- Install the turn signal switch assembly with spiral cable sub-assembly to the steering column assembly with the clamp.
- Connect the connectors to the turn signal switch assembly with spiral cable sub-assembly.



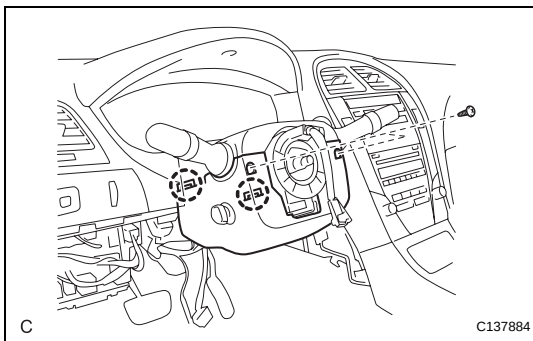
8. INSTALL TILT AND TELESCOPIC SWITCH

- Engage the claw to install the tilt and telescopic switch.
- Connect the connector.



9. INSTALL STEERING COLUMN COVER

- Engage the claw to install the upper steering column cover.



- Engage the 2 claws to install the lower steering column cover.

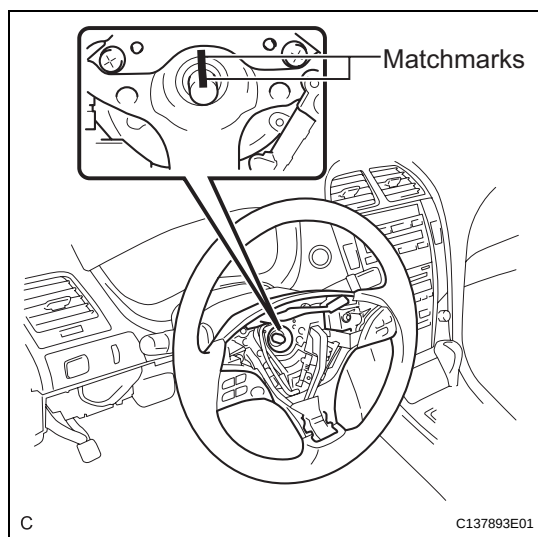
NOTICE:

Do not damage the tilt and telescopic switch.

- Install the 2 screws.

Torque: 2.0 N*m (20 kgf*cm, 18 in.*lbf)

10. ADJUST SPIRAL CABLE (See page [RS-382](#))

**11. INSTALL STEERING WHEEL ASSEMBLY**

- (a) Align the matchmarks on the steering wheel assembly and steering main shaft assembly.
- (b) Install the steering wheel assembly set nut.
Torque: 50 N*m (510 kgf*cm, 37 ft.*lbf)

12. INSPECT STEERING WHEEL CENTER POINT**13. INSTALL DRIVER SIDE KNEE AIRBAG ASSEMBLY**
(See page [RS-387](#))**14. INSTALL LOWER INSTRUMENT PANEL SUB-ASSEMBLY** (See page [IP-46](#))**15. INSTALL INSTRUMENT PANEL FINISH PANEL END LH** (See page [IP-46](#))**16. INSTALL SIDE INSTRUMENT PANEL LH** (See page [IP-47](#))**17. INSTALL FRONT DOOR OPENING TRIM COVER LH**
(See page [IR-64](#))**18. INSTALL FRONT DOOR SCUFF PLATE LH** (See page [IR-65](#))**19. INSTALL STEERING PAD** (See page [RS-368](#))**20. INSTALL NO. 3 LOWER STEERING WHEEL COVER**
(See page [RS-369](#))**21. INSTALL NO. 2 LOWER STEERING WHEEL COVER**
(See page [RS-369](#))**22. INSPECT STEERING PAD** (See page [RS-369](#))**23. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL****NOTICE:**

Reset the AUTO TILT AWAY function setting to the previous condition by changing the customize parameter (See page [SR-9](#)).

24. INSPECT SRS WARNING LIGHT**HINT:**

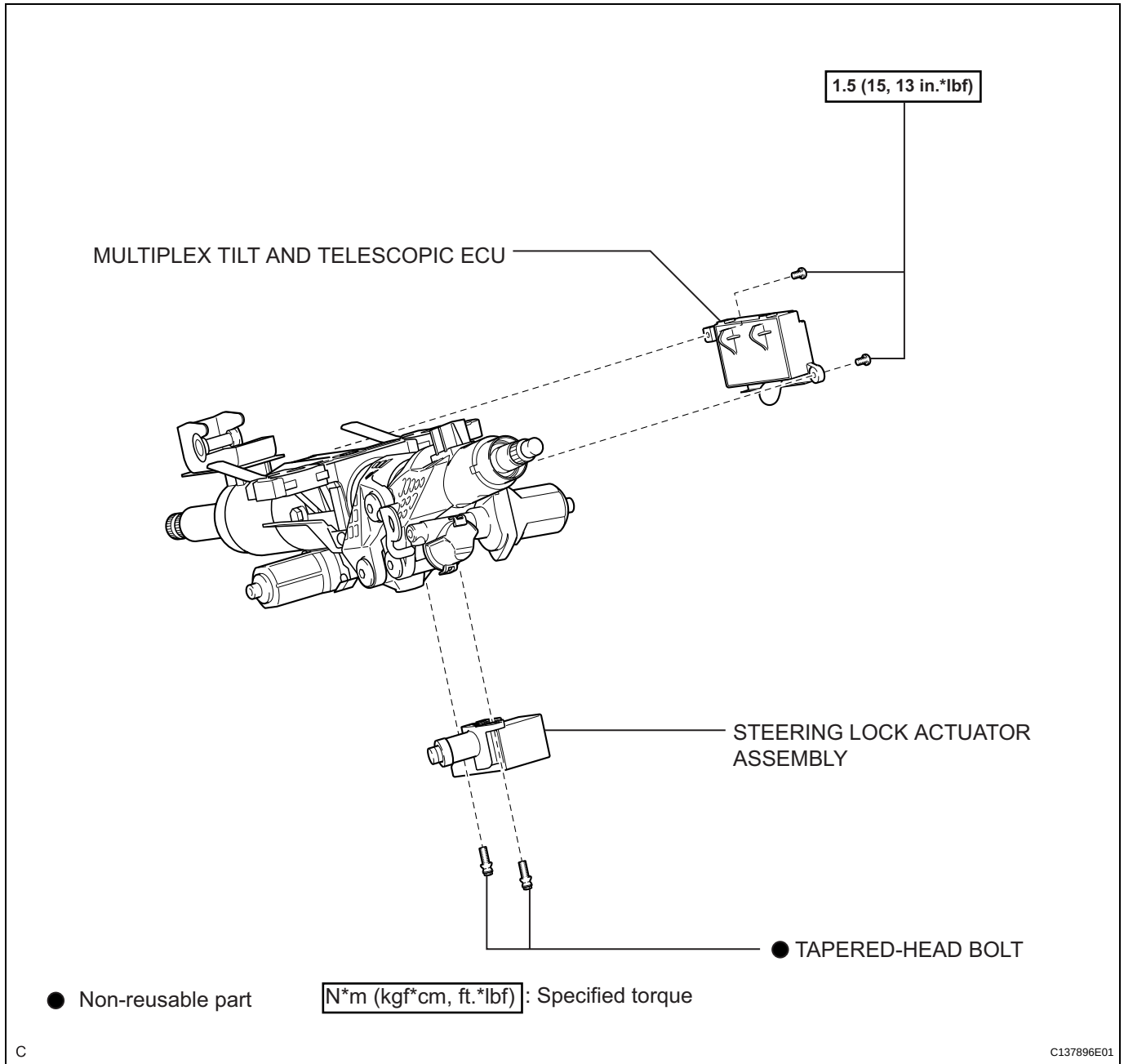
(See page [RS-37](#))

25. PERFORM INITIALIZATION**NOTICE:**

Some systems need initialization after reconnecting the cable to the negative battery terminal (See page [IN-33](#)).

MULTIPLEX TILT AND TELESCOPIC ECU

COMPONENTS



REMOVAL

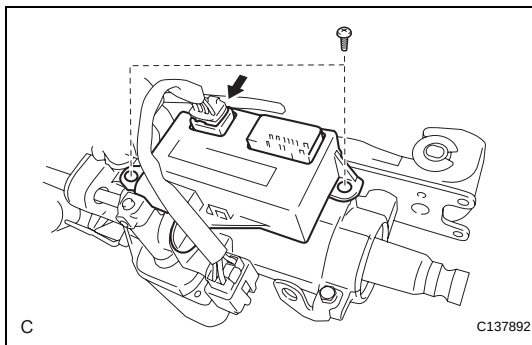
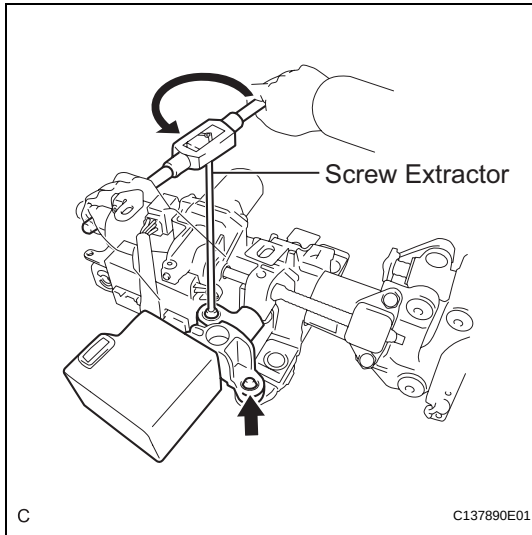
1. REMOVE STEERING COLUMN ASSEMBLY

HINT:

Refer to the instructions for REMOVAL of the STEERING COLUMN ASSEMBLY (See page [SR-78](#)).

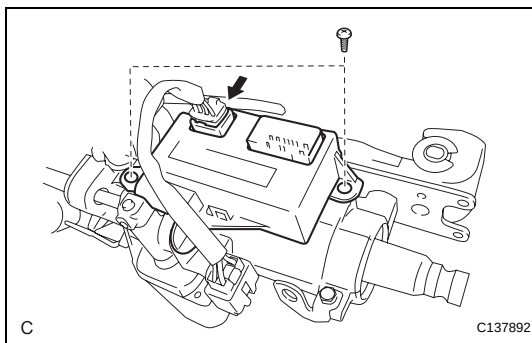
2. REMOVE STEERING LOCK ACTUATOR ASSEMBLY

- Using a center punch, mark the center of the 2 tapered-head bolts.
- Using a 3 to 4 mm (0.12 to 0.16 in.) drill, drill a hole in the 2 bolts.
- Using a screw extractor, remove the 2 bolts and steering lock actuator assembly from the steering column assembly.



3. REMOVE MULTIPLEX TILT AND TELESCOPIC ECU

- Disconnect the connector from the multiplex tilt and telescopic ECU.
- Remove the 2 screws and multiplex tilt and telescopic ECU.



INSTALLATION

1. INSTALL MULTIPLEX TILT AND TELESCOPIC ECU

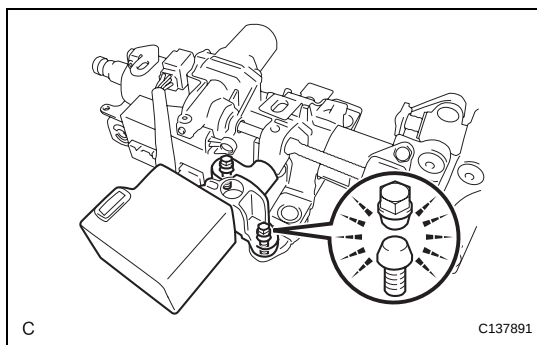
- Install the multiplex tilt and telescopic ECU with the 2 screws.

Torque: 1.5 N*m (15 kgf*cm, 13 in.*lbf)

- Connect the connector to the multiplex tilt and telescopic ECU.

NOTICE:

- The connectors on both ends of the wire harness between the telescopic motor and ECU are the same shape.
- When installing them, connect the connectors of the same color.



2. **INSTALL STEERING LOCK ACTUATOR ASSEMBLY**
 - (a) Temporarily install the steering lock actuator assembly with 2 new tapered-head bolts.
 - (b) Tighten the 2 tapered-head bolts until the bolt heads break off.

3. **INSTALL STEERING COLUMN ASSEMBLY**

HINT:

Refer to the instructions for INSTALLATION of the STEERING COLUMN ASSEMBLY (See page [SR-84](#)).