

Section 6

Steering

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Precautions

Precautions

Precautions on Steering

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Air Bag Warning

Refer to "Air Bag Warning in Section 00".

Precautions for Steering Diagnosis

Refer to "Precautions for Steering Diagnosis in Section 6A".

Service Precautions of Steering Wheel and Column

Refer to "Service Precautions of Steering Wheel and Column in Section 6B".

P/S System Note

Refer to "P/S System Note in Section 6C".

Steering General Diagnosis

Precautions

Precautions for Steering Diagnosis

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Since the problems in steering involve several systems, they must all be considered when diagnosing a complaint. To avoid using the wrong symptom, always road test the vehicle first. Proceed with the following preliminary inspection and correct any defects which are found.

- 1) Inspect tires for proper pressure and uneven wear.
- 2) Raise vehicle on a hoist and inspect steering system for loose or damaged parts.
- 3) Spin front wheels. Inspect for out-of-round tires, out-of-balance tires, bent rims, loosen and/or rough wheel bearings.

Diagnostic Information and Procedures

Steering Symptom Diagnosis

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Condition	Possible cause	Correction / Reference Item
Hard steering	Tire not adequately inflated	<i>Inflate tires to proper pressure.</i>
	Malfunction of power steering system	<i>Check and correct. Refer to "P/S System Symptom Diagnosis in Section 6C".</i>
	Bind in tie-rod end ball studs or lower ball joints	<i>Replace tie-rod end or front suspension control arm.</i>
	Disturbed front wheel alignment	<i>Check and adjust front wheel alignment.</i>
	Bind in steering column	<i>Repair or replace steering column assembly.</i>
	Rack and pinion adjustment	<i>Check and adjustment rack and pinion torque.</i>
Too much play in steering	Wheel bearings worn	<i>Replace wheel bearing.</i>
	Loose steering gear case bolts	<i>Tighten gear case bolts.</i>
	Faulty steering gear case assembly	<i>Replace steering gear case assembly.</i>
	Worn steering shaft joints	<i>Replace steering lower shaft assembly.</i>
	Worn tie-rod ends or tie-rod inside ball joints	<i>Replace tie-rod end or tie-rod.</i>
	Worn lower ball joints	<i>Replace front suspension control arm.</i>
Poor return ability	Rack and pinion adjustment	<i>Check and adjustment rack and pinion torque.</i>
	Bind in tie-rod end ball studs	<i>Replace tie-rod end.</i>
	Bind in ball joints	<i>Replace front suspension control arm.</i>
	Bind in steering column	<i>Replace steering column assembly.</i>
	Disturbed front end alignment	<i>Check and adjust front end alignment.</i>
	Faulty steering gear case assembly	<i>Replace steering gear case assembly.</i>
	Tires not adequately inflated	<i>Adjust tire pressure.</i>
Rack and pinion noise (Rattle or chuckle)	Rack and pinion adjustment	<i>Check and adjustment rack and pinion torque.</i>
	Faulty steering gear case assembly	<i>Replace steering gear case assembly.</i>
	Broken or otherwise damaged wheel bearing(s)	<i>Replace wheel bearing(s).</i>
	Loose steering gear case bolts	<i>Tighten steering gear case bolts.</i>
Wander or poor steering stability	Rack and pinion adjustment	<i>Check and adjustment rack and pinion torque.</i>
	Mismatched or uneven tires	<i>Replace or inflate tires to proper pressure.</i>
	Loosen ball joints and tie-rod ends	<i>Replace suspension control arm or tie-rod end.</i>
	Faulty struts or mountings	<i>Replace strut or repair mounting.</i>
	Loose stabilizer bar	<i>Tighten or replace stabilizer bar or bush.</i>
	Broken or sagging coil springs	<i>Replace coil spring.</i>
	Disturbed front wheel alignment	<i>Check and adjust front wheel alignment.</i>
Faulty steering gear case assembly	<i>Replace steering gear case assembly.</i>	

Condition	Possible cause	Correction / Reference Item
Erratic steering when braking	Worn wheel bearings	<i>Replace wheel bearing.</i>
	Broken or sagging coil springs	<i>Replace coil spring.</i>
	Wheel tires are inflated unequally	<i>Inflate tires to proper pressure.</i>
	Disturbed front wheel alignment	<i>Check and adjust front wheel alignment.</i>
	Brakes not working in unison	<i>Check and repair brake system.</i>
	Leaking wheel cylinder or caliper	<i>Repair or replace wheel cylinder or caliper.</i>
	Warped discs	<i>Replace brake disc.</i>
	Badly worn brake linings	<i>Replace brake shoe lining.</i>
	Drum is out of round in some brakes	<i>Replace brake drum.</i>
Defective wheel cylinders	<i>Replace or repair wheel cylinder.</i>	

Steering System Inspection

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Check steering system referring to the following items.
 If found a defective part, repair or replace it.

Inspection Item		Inspection description	Referring section
Steering wheel		Play, rattle	"Steering Wheel Play Check in Section 6C"
		Operation, travel	"Steering System Operation Check"
Steering linkage	Tie-rod end	Looseness, damage	"Tie-Rod End Inspection in Section 6C"
	Steering shaft joint	Rattle, damage	"Steering Shaft Joint On-Vehicle Inspection in Section 6C"
	Any other joint	Looseness, damage, rattle	—
Mounting and attaching bolts and nuts		Tightness, damage	—
Wheel alignment		Dimension	"Front Wheel Alignment Inspection and Adjustment in Section 2B"
Boots	Tie-rod end boot	Damage, detachment, tear	"Tie-Rod End Boot On-Vehicle Inspection in Section 6C"
	Steering rack boot	Damage, detachment, tear	"Steering Rack Boot Inspection in Section 6C"
	Any other boot	Damage, detachment, tear	—
Steering gear case		Leak, damage, etc	—

Steering System Operation Check

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- Check that steering wheel can be turned fully to the right and left.
- Check that steering wheel can be turned fully to the right and left more lightly when engine is running at idle speed than when it is stopped.

If found faulty, repair or replace it.

Steering Wheel and Column

Precautions

Service Precautions of Steering Wheel and Column

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For service precautions, refer to "Precautions on Service and Diagnosis of Air Bag System in Section 8B".

Service and Diagnosis

For diagnosis and servicing, refer to "Precautions on Service and Diagnosis of Air Bag System in Section 8B".

Disabling Air Bag System

For disabling air bag system, refer to "Disabling Air Bag System in Section 8B".

Enabling Air Bag System

For enabling air bag system, refer to "Enabling Air Bag System in Section 8B".

Handling and Storage

For handling and storage, refer to "Precautions on Handling and Storage of Air Bag System Components in Section 8B".

Disposal

For disposal, refer to "Precautions on Disposal of Air Bag and Seat Belt Pretensioner in Section 8B".

General Description

Steering Wheel and Column Construction

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This double tube type steering column has the following three important features in addition to the steering function:

- The column is energy absorbing, designed to compress in a front-end collision.
- The ignition switch and lock are mounted conveniently on this column.
- With the column mounted lock, the ignition and steering operations can be locked to inhibit theft of the vehicle.

To insure the energy absorbing action, it is important that only the specified screws, bolts and nuts be used as designated, and that they are tightened to the specified torque. When the column assembly is removed from the vehicle, special care must be taken in handling it. Use of a steering wheel puller other than the recommended puller in this manual or a sharp blow on the end of the steering shaft, leaning on the assembly, or dropping the assembly could shear the plastic shear pins which maintain column length and position.

The driver air bag (inflator) module is one of the supplemental restraint (air bag) system components and is mounted to the center of the steering wheel. During certain frontal crashes, the air bag system supplements the restraint of the driver's and passenger's seat belts by deploying the air bags. The air bag (inflator) module should be handled with care to prevent accidental deployment. When servicing, be sure to observe "Precautions on Service and Diagnosis of Air Bag System in Section 8B".

Diagnostic Information and Procedures

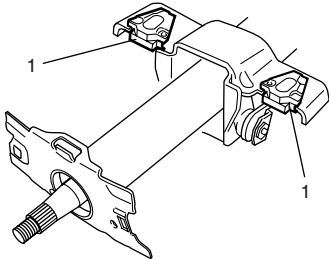
Checking Steering Column for Accident Damage

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NOTE

Vehicles involved in accidents resulting in body damage, where steering column has been impacted or air bag deployed may have a damaged or misaligned steering column.

- Check that two capsules (1) are attached to steering column bracket securely. If found loose, replace steering column assembly.



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- Take measurement "a", "b" and "c" as follows. If it is shorter than specified length, replace steering column assembly or steering lower shaft with new one.

Steering column length

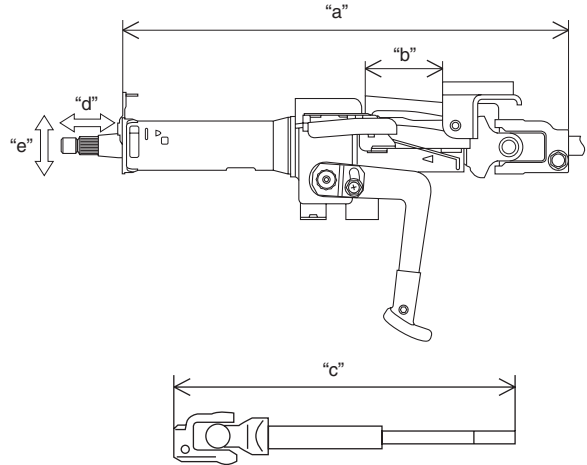
"a": 339 ± 2 mm (13.3 \pm 0.08 in.)

"b": 59.5 ± 2.1 mm (2.4 \pm 0.08 in.)

Steering lower shaft length

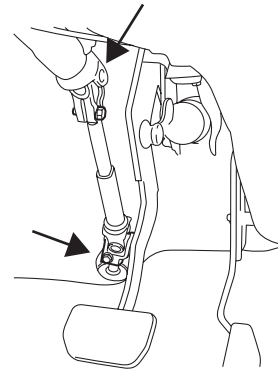
"c": 348 ± 1 mm (13.7 \pm 0.04 in.)

- Check that there is no axial looseness "d" and no axially-vertical looseness "e" for steering column shaft. If found defective, replace steering column assembly with new one.



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- Check steering shaft joints and shaft for any damages such as crack, breakage, malfunction or excessive play. If anything is found faulty, replace as lower shaft assembly or steering column assembly.



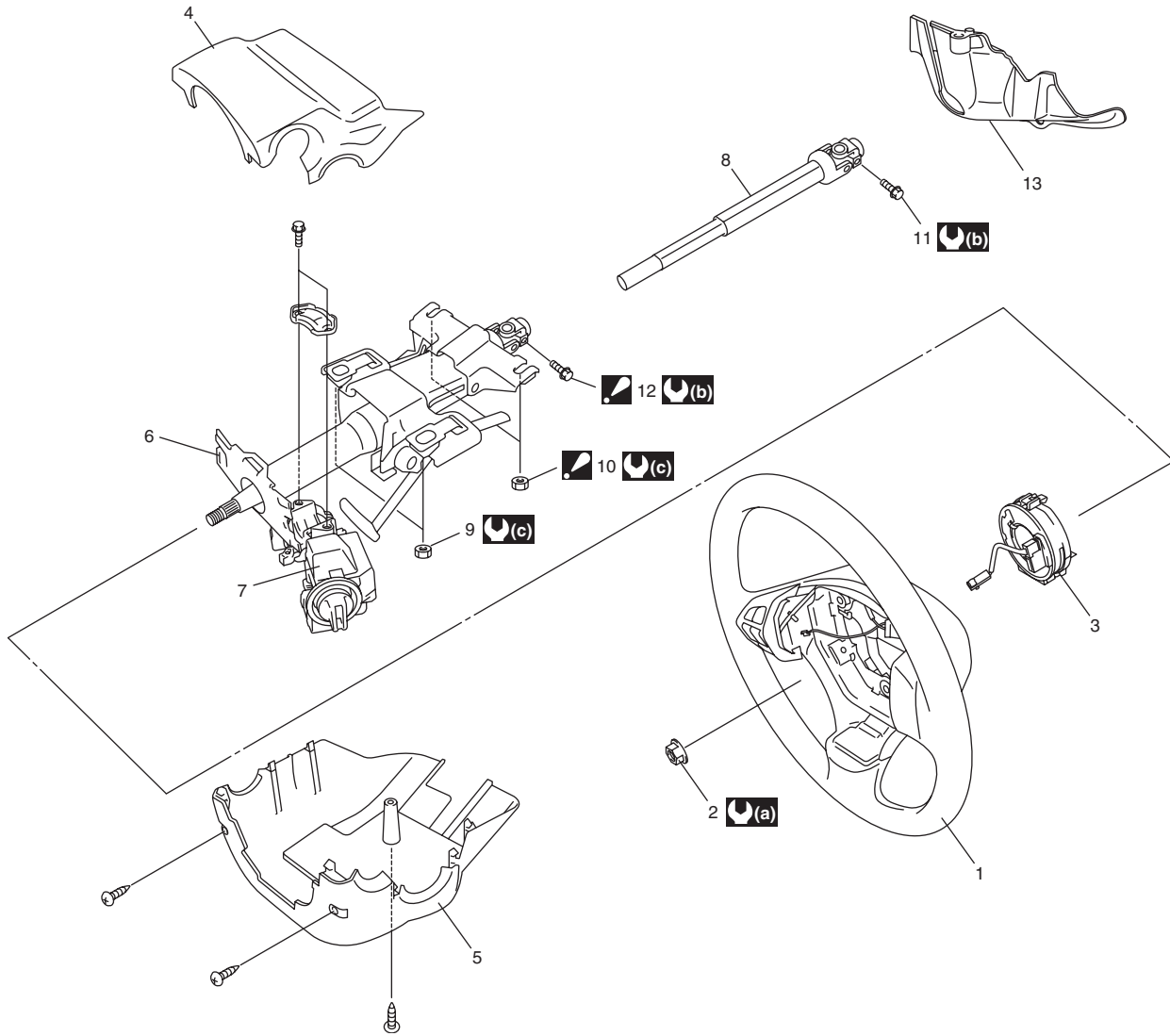
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- Check steering shaft for smooth rotation. If found defective, replace as steering column assembly.
- Check steering shaft and steering column for bend, cracks or deformation. If found defective, replace.

Repair Instructions

Steering Wheel and Column Construction

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1. Steering wheel	9. Steering column assembly mounting nut No.1
2. Steering shaft nut	10. Steering column assembly mounting nut No.2 : After tightening column mounting nut No.2, tighten column mounting nut No.1.
3. Contact coil cable assembly	11. Steering lower shaft assembly lower joint bolt
4. Steering column upper cover	12. Steering lower shaft assembly upper joint bolt : After tightening all column mounting nuts and lower shaft lower joint bolt, tighten lower shaft upper joint bolt.
5. Steering column lower cover	13. Steering joint cover
6. Steering column assembly	: 33 N·m (3.3 kgf·m, 24.0 lb·ft)
7. Steering lock assembly	: 25 N·m (2.5 kgf·m, 18.0 lb·ft)
8. Steering lower shaft assembly	: 14 N·m (1.4 kgf·m, 10.5 lb·ft)

Steering Wheel Removal and Installation

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⚠ CAUTION

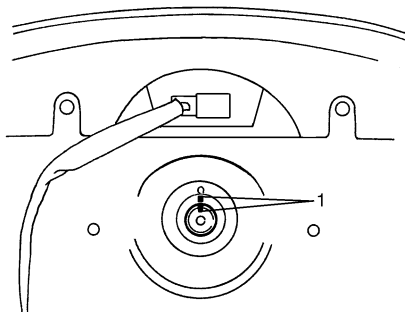
Do not turn the contact coil more than allowable number of turns (about two and a half turns from the center position clockwise or counterclockwise respectively) with steering wheel removed, or coil will break.

Removal

⚠ CAUTION

Do not hammer the end of the shaft. Hammering it will loosen the plastic shear pins which maintain the column length and impair the collapsible design of the column.

- 1) Disconnect negative (-) cable at battery.
- 2) Disable air bag system referring to "Disabling Air Bag System in Section 8B".
- 3) Remove driver air bag (inflator) module from steering wheel. Refer to "Driver Air Bag (Inflator) Module Removal and Installation in Section 8B".
- 4) Disconnect horn connector and audio control switch connector, if equipped.
- 5) Remove steering shaft nut and then make alignment marks (1) on steering wheel and shaft for a guide during reinstallation.

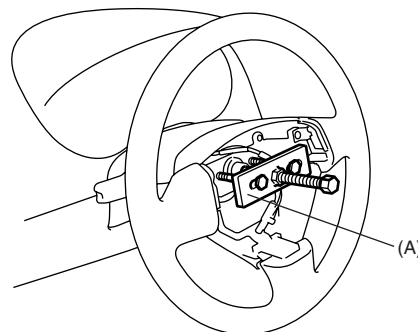


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- 6) Remove steering wheel using special tool.

Special tool

(A): 09944-36011



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Installation

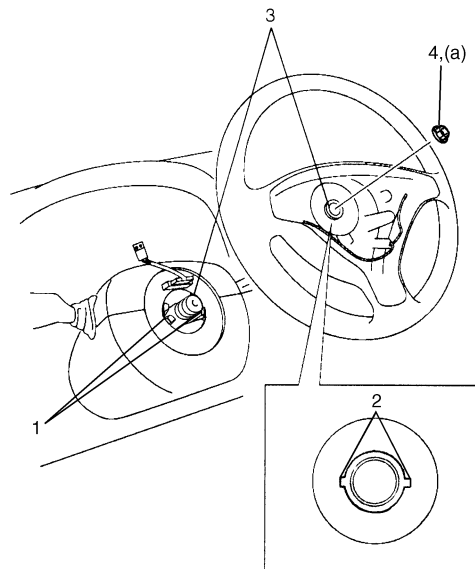
⚠ CAUTION

Following 2 Steps (Step 1) and 2)) are prerequisite for installation of steering wheel. If steering wheel has been installed without these 2 Steps, contact coil will break when steering wheel is turned.

- 1) Check that vehicle's front tires are at straight-ahead position and contact coil is centered. If contact coil is turned after removing steering wheel, center contact coil referring to "Centering Contact Coil Cable Assembly".
- 2) Install steering wheel to steering shaft with 2 grooves (1) on contact coil fitted in 2 lugs (2) in the back of steering wheel and also aligning marks (3) on steering wheel and steering shaft.
- 3) Tighten steering shaft nut (4) to specified torque.

Tightening torque

Steering shaft nut (a): 33 N·m (3.3 kgf-m, 24.0 lb-ft)



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6B-5 Steering Wheel and Column:

- 4) Connect horn connector and audio control switch connector, if necessary.
- 5) Install driver air bag (inflator) module to steering wheel. Refer to "Driver Air Bag (Inflator) Module Removal and Installation in Section 8B".
- 6) Connect negative (-) cable to battery.
- 7) Enable air bag system referring to "Enabling Air Bag System in Section 8B".

Contact Coil Cable Assembly Removal and Installation

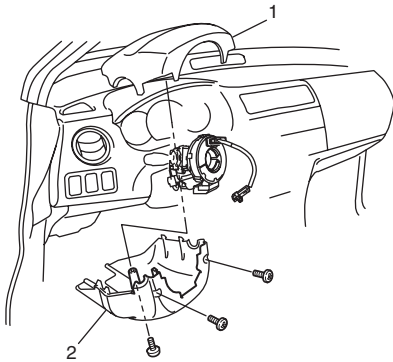
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⚠ CAUTION

Do not turn contact coil more than allowable number of turns (about two and a half turns from the center position clockwise or counterclockwise respectively), or coil will break.

Removal

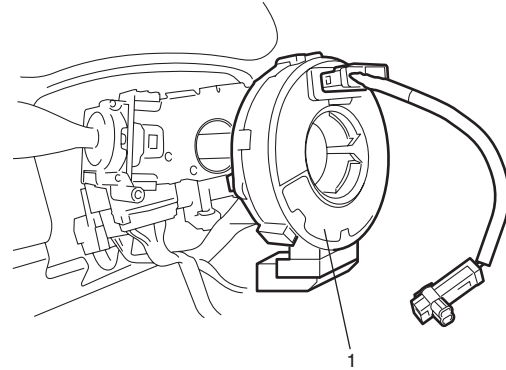
- 1) Disconnect negative (-) cable at battery.
- 2) Disable air bag system referring to "Disabling Air Bag System in Section 8B".
- 3) Remove steering wheel from steering column referring to "Steering Wheel Removal and Installation".
- 4) Remove steering column hole cover.
- 5) Remove steering column lower cover (2) and upper cover (1).



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- 6) Remove contact coil cable assembly (1) from steering column.



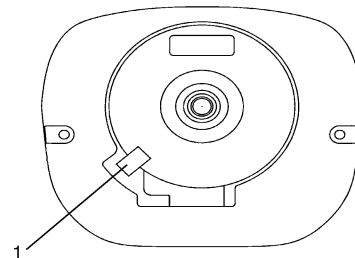
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Installation

- 1) Check to make sure that vehicle's front tires are set at straight-ahead position and then ignition switch is at LOCK position.
- 2) Install contact coil cable assembly to steering column securely.

NOTE

New contact coil cable assembly is supplied with contact coil set and held at its center position with a lock pin (1). Remove this lock pin after installing contact coil cable assembly to steering column.

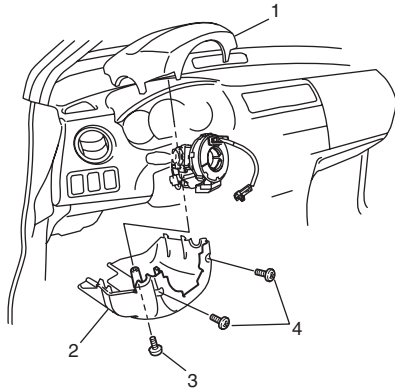


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- 3) Install steering column upper cover (1) and lower cover (2).

CAUTION

When installing covers, be careful so that each lead wire is not caught between covers. Otherwise, each lead wire is damaged.



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3. Standard screw	4. Tapping screw
-------------------	------------------

- 4) Install steering wheel to steering column. Refer to "Steering Wheel Removal and Installation".
- 5) Connect negative (-) cable to battery.
- 6) Enable air bag system referring to "Enabling Air Bag System in Section 8B".

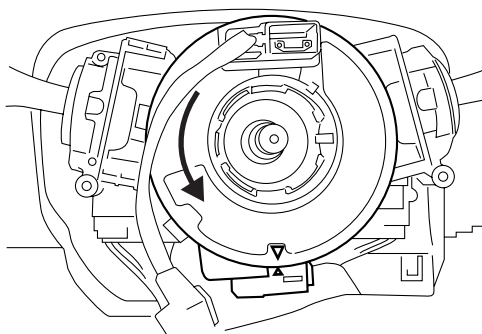
Centering Contact Coil Cable Assembly

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- 1) Check that vehicle's wheels (front tires) are set at straight-ahead position.
- 2) Check that ignition switch is at LOCK position.
- 3) Turn contact coil counterclockwise slowly with a light force till contact coil will not turn any further.

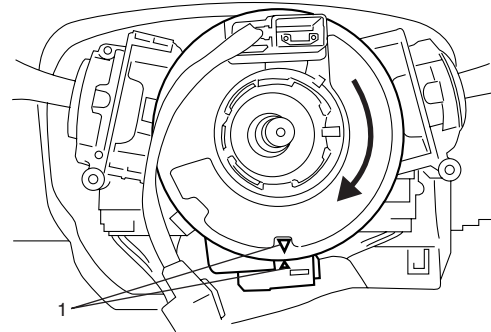
NOTE

Contact coil can turn about 5 turns at the maximum, that is, if it is at the center position, can turn about two and a half turns both clockwise and counterclockwise.



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- 4) From the position where contact coil became unable to turn any further (it stopped), turn it back clockwise about two and a half rotations and align center mark with alignment mark (1).



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Contact Coil Cable Assembly Inspection

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Refer to "Contact Coil Cable and Its Circuit Check in Section 8B".

Steering Column Removal and Installation

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CAUTION

Once the steering column is removed from the vehicle, the column is extremely susceptible to damage.

- Dropping the column assembly on its end could collapse the steering shaft or loosen the plastic shear pins which maintain column length.
- Leaning on the column assembly could cause it to bend or deform.

Any of the damage could impair the column's collapsible design.

Steering column mounting nuts should not be loosened with steering shaft joint upper side bolt tightened as this could cause damage to shaft joint bearing.

NOTE

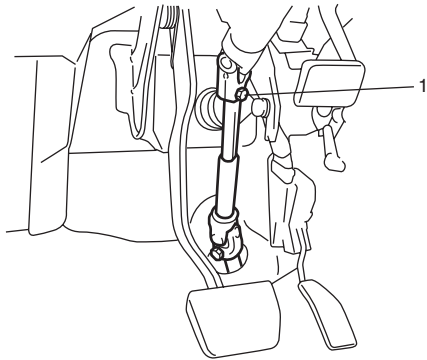
When servicing steering column or any column-mounted component, remove steering wheel. But when removing steering column simply to gain access to instrument panel components, leave steering wheel installed on steering column.

Removal

⚠ WARNING

Never rest a steering column assembly on the steering wheel with the air bag (inflator) module face down and column vertical. Otherwise, personal injury may result.

- 1) Disconnect negative (-) cable at battery.
- 2) Disable air bag system. Refer to "Disabling Air Bag System in Section 8B".
- 3) Remove steering wheel and contact coil cable assembly referring to "Steering Wheel Removal and Installation" and "Contact Coil Cable Assembly Removal and Installation".
- 4) (Immobilizer model)
 Remove immobilizer control module from steering column, referring to "ICM Removal and Installation in Section 10C".
- 5) Detach lighting switch and wiper switch from steering column.
- 6) Remove lower shaft upper joint bolt (1).

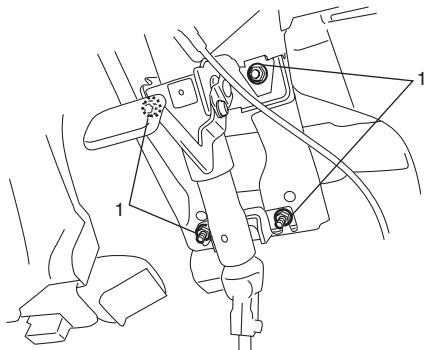


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- 7) Remove steering column mounting nuts (1), and then remove steering column from vehicle.

NOTE

Do not move tilt lever until mounting bolts and nuts are tightened to specified torque.



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Installation

⚠ CAUTION

After tightening steering column mounting nuts, shaft joint bolts should be tightened. Wrong tightening order could cause a damage to shaft joint.

- 1) Be sure that front wheels are in straight.
- 2) Install steering column assembly to lower and upper brackets. Tighten steering column mounting nuts No.2 (1) first and then steering column mounting nuts No.1 (2) to specifications as given below.

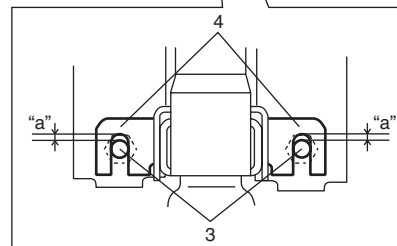
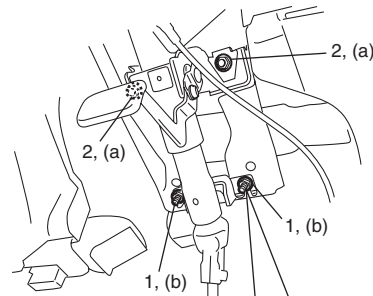
Tightening torque

Steering column mounting nut No.1 (a): 14 N·m (1.4 kgf-m, 10.5 lb-ft)

Steering column mounting nut No.2 (b): 14 N·m (1.4 kgf-m, 10.5 lb-ft)

NOTE

- When installing, make sure that clearance "a" between bolt (3) and bracket (4) should be 0 (zero).
- After installing tilt steering column, make sure that steering column moves upwards and downwards smoothly and stops when tilt lever is fixed.



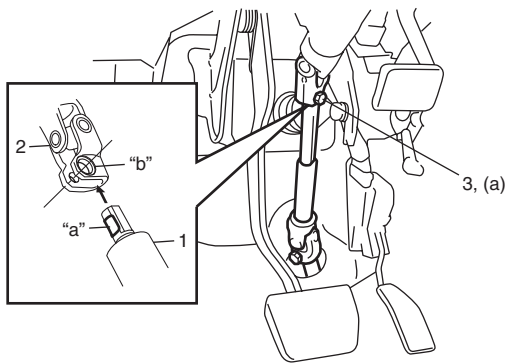
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- 3) Align flat part "a" of steering lower shaft (1) with bolt hole "b" of shaft joint (2) of column as shown. Then insert lower shaft into shaft joint of steering column.
- 4) Tighten lower shaft upper joint bolt (3) to specified torque.

⚠ CAUTION

After tightening column nuts, tighten steering shaft upper joint bolt. Otherwise, shaft joint bearing is damaged.

Tightening torque
Steering lower shaft assembly upper joint bolt
(a): 25 N·m (2.5 kgf-m, 18.5 lb-ft)



I5RW0A620007-01

- 5) Install lighting switch and wiper switch to steering column.
- 6) (Immobilizer model)
Install immobilizer control module from steering column, referring to "ICM Removal and Installation in Section 10C".
- 7) Install contact coil cable assembly and steering wheel referring to "Contact Coil Cable Assembly Removal and Installation" and "Steering Wheel Removal and Installation".
- 8) Connect negative (-) cable to battery.
- 9) Enable air bag system referring to "Enabling Air Bag System in Section 8B".

Steering Column Inspection

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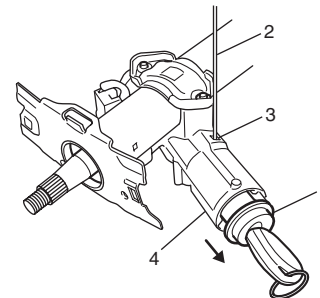
Check steering column for damage and operation referring to "Checking Steering Column for Accident Damage".

Ignition Switch Cylinder Assembly Removal and Installation (Non- Keyless Start Model)

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Removal

- 1) Disconnect negative (-) cable at battery.
- 2) Disable air bag system referring to "Disabling Air Bag System in Section 8B".
- 3) Remove steering column upper and lower covers.
- 4) (Immobilizer model)
Remove immobilizer control module referring to "ICM Removal and Installation in Section 10C".
- 5) Remove ignition switch cylinder assembly as follows.
 - a) Turn ignition key to "ACC" position.
 - b) Insert 2 mm (0.078 in.) rod (2) through hole (3) and push ignition switch cylinder lock.
 - c) Detach ignition switch cylinder assembly (1) from steering lock assembly (4).



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Installation

- 1) Install ignition switch cylinder assembly as follows.
 - a) Turn ignition key to "ACC" position.
 - b) In this state, push ignition switch cylinder assembly into steering lock assembly till it clicks.
- 2) (Immobilizer model)
Install immobilizer control module referring to "ICM Removal and Installation in Section 10C".
- 3) Install upper and lower cover and screws.
- 4) Connect negative (-) cable to battery.
- 5) Enabling air bag system referring to "Enabling Air Bag System in Section 8B".
- 6) (Immobilizer model)
If ignition switch cylinder assembly (that is ignition key) has replaced, register ignition key transponder code to ECM referring to "Registration of the Ignition Key in Section 10C".

Steering Lock Assembly (Ignition Switch) Removal and Installation

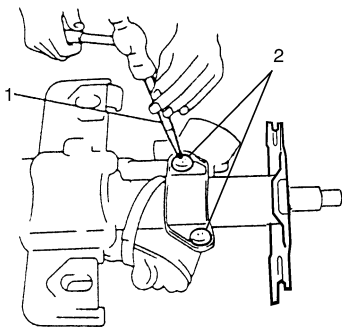
S6RW0C6206011

Removal

- 1) Remove steering column. Refer to "Steering Column Removal and Installation".
- 2) Using center punch (1), loosen and remove steering lock mounting bolts (2).

NOTE

Use care not to damage aluminum part of steering lock body with center punch.

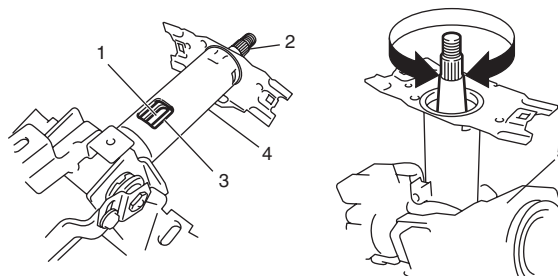


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- 3) Turn ignition key to "ACC" or "ON" position and remove steering lock assembly from steering column.

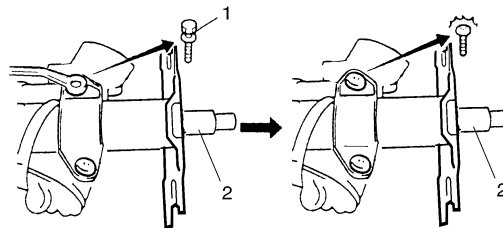
Installation

- 1) Position oblong hole (1) of steering shaft (2) in the center of hole (3) in column (4).
- 2) Turn ignition key to "ACC" or "ON" position and install steering lock assembly (5) onto column (4).
- 3) Now turn ignition key to "LOCK" position and pull it out.
- 4) Align hub on lock with oblong hole (1) of steering shaft (2) and rotate shaft to assure that steering shaft is locked.



I4RS0B620006-02

- 5) Tighten new bolts (1) until head of each bolt is broken off.
- 6) Turn ignition key to "ACC" or "ON" position and check to be sure that steering shaft (2) rotates smoothly. Also check for lock operation.



I4RS0B620007-02

- 7) Install steering column. Refer to "Steering Column Removal and Installation".
- 8) (Keyless start model)
 If steering lock assembly has replaced, after completing installation, register steering lock unit ID code to keyless start control module as following.
 - Immobilizer model:
 Register ignition key transponder code in ECM referring to "Registration of the Ignition Key in Section 10C".
 - Non-immobilizer model:
 Register steering lock unit ID code in keyless start control module referring to "Keyless Start Registration in Section 10E".

Steering Lower Shaft Removal and Installation

S6RW0C6206012

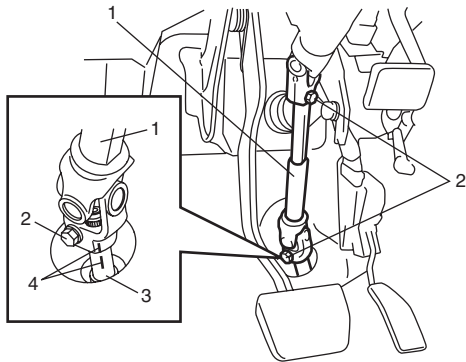
⚠ CAUTION

Never turn steering wheel while steering lower shaft is removed.

Should it have been turned and contact coil have got out of its centered position, it needs to be centered again. Also, turning steering wheel more than about two and a half turns will break contact coil.

Removal

- 1) Turn steering wheel so that vehicle's front tires are at straight-ahead position.
- 2) Turn ignition switch to LOCK position and remove key.
- 3) Remove steering joint cover.
- 4) Make alignment marks (4) on lower shaft (1) and pinion shaft (3) for a guide during reinstallation.
- 5) Remove lower shaft upper and lower joint bolts (2).
- 6) Remove steering lower shaft (1).



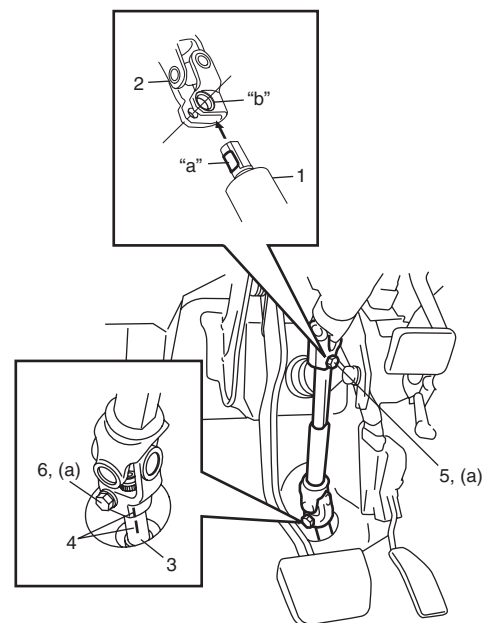
Installation

- 1) Be sure that front wheels are in straight forward state.
- 2) Align flat part "a" of steering lower shaft (1) with bolt hole "b" of shaft joint (2) of column as shown. Then insert lower shaft into shaft joint of steering column.
- 3) Insert lower shaft (1) into pinion shaft (3) with matching marks (4).
- 4) Tighten lower joint bolt (6) to specified torque first and then upper joint bolt (5) to specified torque.

Tightening torque

Steering lower shaft assembly upper joint bolt (a): 25 N·m (2.5 kgf-m, 18.5 lb-ft)

Steering lower shaft assembly lower joint bolt (b): 25 N·m (2.5 kgf-m, 18.5 lb-ft)



Specifications

Tightening Torque Specifications

S6RW0C6207001

Fastening part	Tightening torque			Note
	N-m	kgf-m	lb-ft	
Steering shaft nut	33	3.3	24.0	☞
Steering column mounting nut No.1	14	1.4	10.5	☞
Steering column mounting nut No.2	14	1.4	10.5	☞
Steering lower shaft assembly upper joint bolt	25	2.5	18.5	☞ / ☞
Steering lower shaft assembly lower joint bolt	25	2.5	18.5	☞

NOTE

The specified tightening torque is also described in the following.
 “Steering Wheel and Column Construction”

Reference:

For the tightening torque of fastener not specified in this section, refer to “Fasteners Information in Section 0A”.

Special Tools and Equipment

Special Tool

S6RW0C6208001

09944-36011 Steering wheel remover ☞		
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Power Assisted Steering System

Precautions

P/S System Note

S6RW0C6300001

NOTE

All steering gear fasteners are important attaching parts in that they could affect the performance of vital parts and systems, and/or could result in major repair expense. They must be replaced with one of the same part number or with an equivalent part if replacement becomes necessary. Do not use a replacement part of lesser quality or substitute design. Torque values must be used as specified during reassembly to assure proper retention of these parts.

Precautions in Diagnosing Troubles

S6RW0C6300002

- Take a note of DTC indicated on the SUZUKI scan tool.
- Before inspection, be sure to read "Precautions for Electrical Circuit Service in Section 00" and understand what is written there.
- DTC C1122 (engine speed signal failure) is indicated when ignition switch is at ON position and engine is not running, but it means there is nothing abnormal if indication changes to a normal one when engine is started.
- As DTC is stored in memory of the P/S control module, be sure to clear memory after repair by performing the procedure described in "DTC Clearance".

General Description

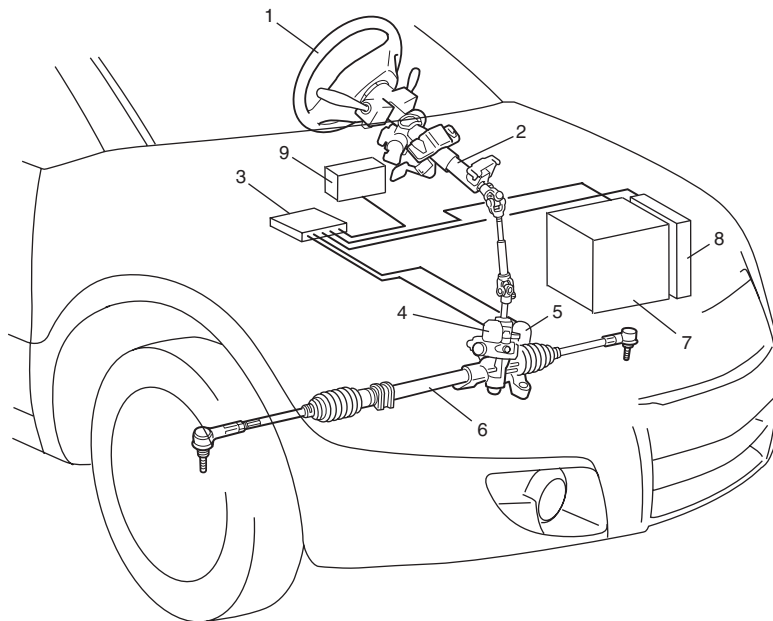
P/S System Description

S6RW0C6301001

This electronic power steering (EPS) system consists of a power steering (P/S) control module (3), a torque sensor (4), a P/S motor (5). In this system, the P/S control module determines the level and direction of the assist force for the steering wheel (1) according to the signal from the torque sensor and the vehicle speed signal from BCM (9). The P/S control module runs the motor so as to assist the operation of the steering wheel.

The P/S control module diagnoses troubles which may occur in the area including the following components when the ignition switch is ON and the engine is running. When the P/S control module detects any malfunction, it stops the motor operation.

- Torque sensor
- Vehicle speed signal circuit
- Engine speed signal circuit
- P/S Motor
- P/S control module.



2. Steering column	7. Battery
6. Steering gear case assembly	8. ECM

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EPS Diagnosis General Description

S6RW0C6301002

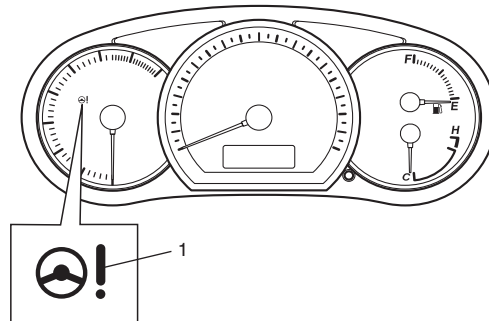
The P/S system in this vehicle is controlled by the P/S control module. The P/S control module has an on-board diagnostic system which detects a malfunction in this system. When diagnosing troubles, be sure to have full understanding of the outline of “On-Board Diagnostic System Description” and each item in “Precautions in Diagnosing Troubles”, and then execute diagnosis according to “EPS System Check”.

On-Board Diagnostic System Description

S6RW0C6301003

The P/S control module performs the on-board diagnosis (self-diagnosis) on the system and operates the “EPS” warning light (1) as follows.

- The “EPS” warning light lights when the ignition switch is turned to ON position (but the engine at stop) regardless of the condition of the P/S control system. This is only to check if the “EPS” warning light is operated properly.
- If the areas monitored by the P/S control module is free from any trouble after the engine start (while engine is running), the “EPS” warning light turns OFF.
- When the P/S control module detects a trouble which has occurred in the monitored areas the “EPS” warning light comes ON while the engine is running to warn the driver of such occurrence of the trouble and at the same time it stores the exact trouble area in memory inside of the P/S control module.



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Driving Cycle

A “Driving Cycle” consists of engine startup and engine shutoff.

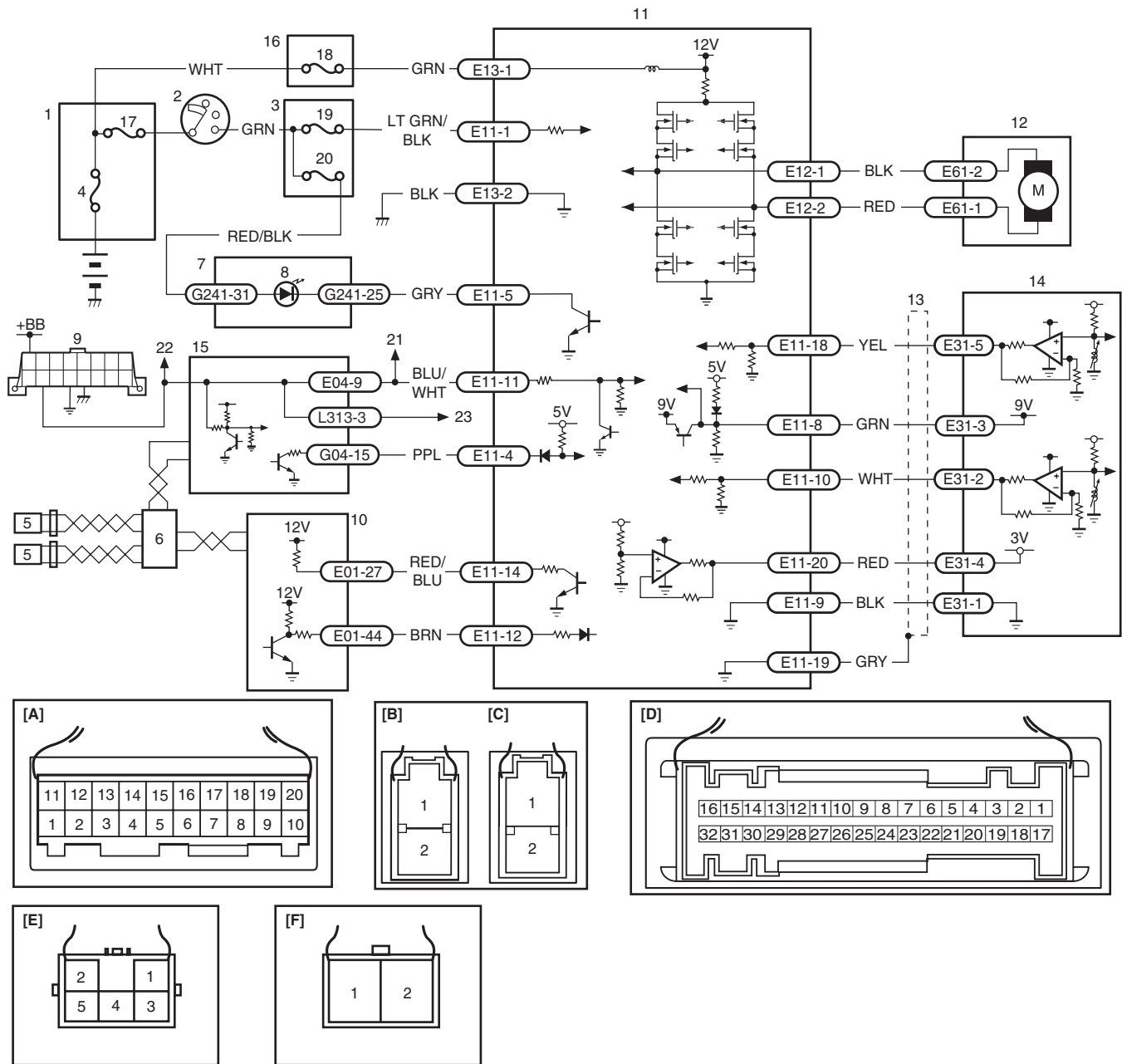
3 Driving Cycles Detection Logic

The malfunction detected in the first and second driving cycle is stored in P/S control module memory (in the form of pending DTC) but the “EPS” warning light does not light at these time. It lights up at the third detection of same malfunction also in the next driving cycle.

Schematic and Routing Diagram

EPS System Wiring Circuit Diagram

S6RW0C6302001



I6RW0C630001-02

[A]: P/S control module connector No.1 "E11" (viewed from harness side)	5. Front (left/right) wheel speed sensor	15. BCM
[B]: P/S control module connector No.2 "E13" (viewed from harness side)	6. ABS control module	16. Individual circuit fuse box No.1
[C]: P/S control module connector No.3 "E12" (viewed from harness side)	7. Combination meter	17. "IGN" fuse
[D]: Combination meter connector "G241" (viewed from harness side)	8. "EPS" warning light	18. "P/S" fuse
[E]: Torque sensor connector "E31" (viewed from harness side)	9. Data link connector (DLC)	19. "IG1 SIG" fuse
[F]: Motor connector "E61" (viewed from harness side)	10. ECM	20. "MTR" fuse
1. Main fuse box	11. P/S control module	21. To ABS control module
2. Ignition switch	12. P/S motor	22. To HVAC control module
3. Junction block assembly	13. Shield	23. To SDM
4. Main fuse	14. Torque sensor (built into steering gear case)	

Terminal Arrangement of P/S Control Module Coupler (Viewed from Harness Side)

Terminal	Circuit	Terminal	Circuit
E11-1	Ignition switch signal for P/S control module	E11-13	—
E11-2	—	E11-14	P/S active signal (idle up signal)
E11-3	—	E11-15	—
E11-4	Vehicle speed signal	E11-16	—
E11-5	“EPS” warning Light	E11-17	—
E11-6	—	E11-18	Torque sensor signal (Main)
E11-7	—	E11-19	Ground for shield wire
E11-8	9 V power supply for torque sensor	E11-20	Reference sensor power supply for torque sensor
E11-9	Ground for torque sensors	E12-1	Motor output 1
E11-10	Torque sensor signal (Sub)	E12-2	Motor output 2
E11-11	Serial communication circuit for data link connector	E13-1	Main power supply for internal memory and EPS motor
E11-12	Engine speed signal	E13-2	Ground for P/S control module

Diagnostic Information and Procedures

EPS System Check

S6RW0C6304001

▲ WARNING

Carry out test drive in light traffic area to prevent an accident.

Refer to the following items for the details of each step.

Step	Action	Yes	No
1	☞ Customer complaint analysis 1) Perform customer complaint analysis referring to “Customer Complaint Analysis”. <i>Was customer complaint analysis performed?</i>	Go to Step 2.	Perform customer complaint analysis.
2	☞ DTC check, record and clearance 1) Check for DTC (including pending DTC) referring to “DTC Check, Record and Clearance”. <i>Is there any DTC(s)?</i>	Print DTC or write them down and clear them by referring to “DTC Clearance”, and go to Step 3.	Go to Step 4.
3	☞ Visual inspection 1) Perform visual inspection referring to “Visual Inspection”. <i>Is there any faulty condition?</i>	Repair or replace malfunction part, and go to Step 11.	Go to Step 5.
4	☞ Visual inspection 1) Perform visual inspection referring to “Visual Inspection”. <i>Is there any faulty condition?</i>	Repair or replace malfunction part, and go to Step 11.	Go to Step 8.
5	☞ Trouble symptom confirmation 1) Confirm trouble symptom referring to “Trouble Symptom Confirmation”. <i>Is trouble symptom identified?</i>	Go to Step 6.	Go to Step 7.
6	☞ Rechecking and record of DTC 1) Recheck for DTC referring to “DTC Check”. <i>Is there any DTC(s)?</i>	Go to Step 9.	Go to Step 8.

Step	Action	Yes	No
7	☞ Rechecking and record of DTC 1) Recheck for DTC referring to "DTC Check". <i>Is there any DTC(s)?</i>	Go to Step 9.	Go to Step 10.
8	☞ Steering symptom diagnosis and P/S system symptom diagnosis 1) Check and repair according to "Steering Symptom Diagnosis in Section 6A" and "P/S System Symptom Diagnosis". <i>Are check and repair complete?</i>	Go to Step 11.	Check and repair malfunction part(s), and go to Step 11.
9	☞ Troubleshooting for DTC 1) Check and repair according to applicable DTC diag. flow. <i>Are check and repair complete?</i>	Go to Step 11.	Check and repair malfunction part(s), and go to Step 11.
10	☞ Intermittent problems check 1) Check for intermittent problems referring to "Intermittent Problems Check". <i>Is there any faulty condition?</i>	Repair or replace malfunction part(s), and go to Step 11.	Go to Step 11.
11	☞ Final confirmation test 1) Clear DTC if any. 2) Perform final confirmation test referring to "Final Confirmation Test". <i>Is there any problem symptom, DTC or abnormal condition?</i>	Go to Step 6.	End.

NOTE

- As execution of "DTC Clearance" will clear all DTCs, be sure to record all DTCs before service.
- DTC C1122 is indicated when ignition switch is at ON position and engine is not running, it means that nothing is abnormal.
- Current DTC and history DTC can be identified by condition of the "EPS" warning light. "EPS" warning light operates as follows.

	Current DTC is set. (Abnormality exists at present.)	Only history DTC is set. (Faulty condition occurred once in the past, but normal condition is detected at present.)	Current and history DTC exist.
"EPS" warning light after engine started	Remains ON.	Turns OFF.	Remains ON.

Step 1: Customer Complaint Analysis

Record details of the problem (failure, complaint) and how it occurred as described by the customer. For this purpose, use of such an inspection form will facilitate collecting information to the point required for proper analysis and diagnosis. Check if the problem described in “Customer questionnaire” actually occurs in the vehicle if necessary. (This step should be performed with the customer if possible)

Customer questionnaire (Example)

User name:	Model:	VIN:	
Date of issue:	Date Reg.	Date of problem:	Mileage:
Problem Symptoms	<ul style="list-style-type: none"> Steering wheel feels heavy Vehicle pulls to one side during straight driving Poor recovery from turns Too much play in steering Abnormal noise while vehicle is running: from motor, from rack and pinion, other _____ Other _____ 		
Frequency of Occurrence	<ul style="list-style-type: none"> Continuous/Intermittent (_____ times a day, a month)/other _____ 		
Conditions for Occurrence of Problem	<ul style="list-style-type: none"> Vehicle at stop & ignition switch ON: When starting: at initial start only/at every start/Other _____ Vehicle speed while: while accelerating/while decelerating/at stop/while turning/while running at constant speed/other _____ Road surface condition: Paved road/rough road/snow-covered road/other _____ Chain equipment: 		
Environmental Condition	<ul style="list-style-type: none"> Weather: fair/cloudy/rain/snow/other _____ Temperature: _____ °F (_____ °C) 		
DTC	<ul style="list-style-type: none"> First check: Normal code/malfunction code (_____) Second check after driving test: Normal code/malfunction code (_____) 		

I7RW01632004-02

NOTE

This form is a standard sample. It should be modified according to conditions characteristic of each market.

Step 2: DTC check, record and clearance

First, referring to “DTC Check”, check DTC (including pending DTC). If DTC exists, print or write down DTC and then clear them by referring to “DTC Clearance”. DTC indicates malfunction in the system but it is not possible to know from it whether the malfunction is occurring now or it occurred in the past and normal condition has been restored. In order to know that, check symptom in question according to Step 5 and then recheck DTC according to Step 6 and 7. Diagnosing a trouble based on the DTC in this step only or failure to clear the DTC in this step may result in a faulty diagnosis, trouble diagnosis of a normal circuit or difficulty in troubleshooting which is otherwise unnecessary.

Step 3 and Step 4: Visual inspection

As a preliminary step, be sure to perform visual check of the items that support proper function of the P/S system referring to “Visual Inspection”.

Step 5: Trouble Symptom Confirmation

Based on information obtained in “Step 1: Customer Complaint Analysis:” and “Step 2: DTC Check, Record and Clearance:”, confirm trouble symptoms. Also, reconfirm trouble symptom by performing test drive and turning steering wheel fully to right and left at stopped vehicle.

Step 6 and 7: Rechecking and Record of DTC

Refer to “DTC Check” for checking procedure.

Step 8: Steering Symptom Diagnosis and P/S System Symptom Diagnosis

Perform basic steering system check according to "Steering Symptom Diagnosis in Section 6A" first. When the end of the flow has been reached, check the parts of the system suspected as a possible cause referring to "P/S System Symptom Diagnosis" and based on symptoms appearing on the vehicle (symptoms obtained through steps of customer complaint analysis, trouble symptom confirmation and/or basic P/S system check) and repair or replace faulty parts, if any.

Step 9: Troubleshooting for DTC (See each DTC Diag. Flow)

Based on the DTC indicated in Step 6 or 7 and referring to the applicable DTC diag. flow, locate the cause of the trouble, namely in a sensor, switch, wire harness, connector, actuator, P/S control module or other part and repair or replace faulty parts.

Step 10: Intermittent Problems Check

Check parts where an intermittent trouble is easy to occur (e.g., wire harness, connector, etc.), referring to "Intermittent and Poor Connection Inspection in Section 00" and related circuit of DTC recorded in Step 2.

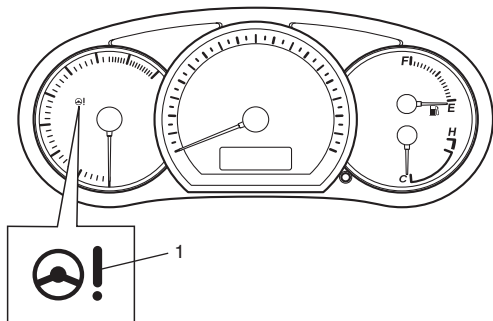
Step 11: Final Confirmation Test

Confirm that the problem symptom has gone and the P/S system is free from any abnormal conditions. If what has been repaired is related to the DTC, clear the DTC once, perform DTC confirmation procedure and confirm that no DTC is indicated.

"EPS" Warning Light Check

S6RW0C6304002

- 1) Turn ignition switch to ON position (but without running engine) and check if the "EPS" warning light (1) lights up. If the light does not light up, go to "EPS Warning Light Does Not Come ON with Ignition Switch Turned ON before Engine Starts" of the diagnostic flows.
- 2) Start engine and check that "EPS" warning light turns OFF. If light remains ON and no DTC is stored in P/S control module, go to "EPS Warning Light Remains ON Steady after Engine Starts" for troubleshooting.



I7RW01632002-01

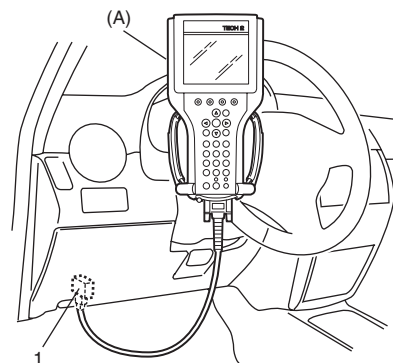
DTC Check

S6RW0C6304003

- 1) Turn ignition switch to OFF position.
- 2) Connect SUZUKI scan tool to data link connector (DLC) (1) located on underside of instrument panel at driver's seat side.

Special tool

(A): SUZUKI scan tool



I5RW0A630004-01

- 3) Start engine.
- 4) Read DTC according to the instructions displayed on SUZUKI scan tool. For further details, refer to operator's manual for SUZUKI scan tool.

NOTE

- If communication between SUZUKI scan tool and the vehicle can not be established, perform "DLC and Its Communication Check (No communication to P/S Control Module)".
- DTC C1122 (engine speed signal failure) is indicated when ignition switch is at ON position and engine is not running, but it means there is nothing abnormal if indication changes to a normal one when engine is started.

- 5) After completing the check, turn ignition switch to OFF position and disconnect SUZUKI scan tool from DLC.

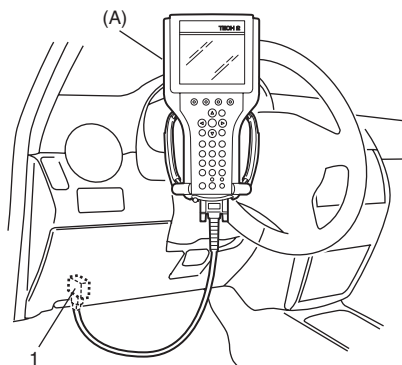
DTC Clearance

S6RW0C6304004

- 1) Turn ignition switch to OFF position.
- 2) Connect SUZUKI scan tool to data link connector (DLC) (1) located on underside of instrument panel at driver's seat side.

Special tool

(A): SUZUKI scan tool



I5RW0A630004-01

- 3) Turn ignition switch to ON position.
- 4) Erase DTC according to the instructions displayed on SUZUKI scan tool. For further details, refer to operator's manual for SUZUKI scan tool.
- 5) After completing the clearance, turn ignition switch to OFF position and disconnect SUZUKI scan tool from DLC.

DTC Table

S6RW0C6304005

⚠ CAUTION

Be sure to perform the "EPS System Check" before starting troubleshooting corresponding to each DTC.

DTC No.	Detecting item	Detecting condition (DTC will set when detecting)	Trouble area	DTC	"EPS" warning light
No CODES	Normal	—	—	—	—
C1111	Steering torque sensor (Main) circuit voltage	Circuit voltage of sensor main is more than 4.5 V or less than 0.5 V	<ul style="list-style-type: none"> • Torque sensor signal circuit • Torque sensor • P/S control module 	1 driving cycle	1 driving cycle
C1113	Steering torque sensor (Main and Sub) circuit correlation	Difference between steering torque calculated based on sensor main signal and steering torque calculated based on sensor sub signal is more than 4.9 N·m or Difference between instantaneous value and average value of steering torque calculated based on sensor main signal and steering torque calculated based on sensor sub signal is more than 2.94 N·m		1 driving cycle	1 driving cycle
C1115	Steering torque sensor (Sub) circuit voltage	Circuit voltage of sensor sub signal is more than 4.5 V or less than 0.5 V		1 driving cycle	1 driving cycle
C1116	Steering torque sensor power supply circuit	Circuit voltage of torque sensor 9 V power supply is less than 7 V	<ul style="list-style-type: none"> • Torque sensor 9 V power supply circuit • Torque sensor • P/S control module 	1 driving cycle	1 driving cycle

DTC No.	Detecting item	Detecting condition (DTC will set when detecting)	Trouble area	DTC	"EPS" warning light
C1121	No vehicle speed signal (60 Seconds or More)	Vehicle speed signal is 0 km/h even though engine speed is more than 4000 rpm for more than 60 seconds continuously (before elapse of 5 min from engine start) or vehicle speed signal is 0 km/h even though engine speed is more than 2500 rpm for more than 60 seconds continuously (after elapse of 5 min for engine start).	<ul style="list-style-type: none"> • Vehicle speed signal circuit • BCM • ECM • ABS control module • P/S control module • CAN communication line circuit 	1 driving cycle	Does not light up
C1122	Engine speed signal	Engine speed signal is less than 220 rpm for more than 0.8 seconds. or Engine speed signal is less than 220 rpm for more than 20 seconds continuously even though vehicle speed signal is more than 50 km/h.	<ul style="list-style-type: none"> • Engine speed signal circuit • ECM • P/S control module 	1 driving cycle	1 driving cycle
C1123	No vehicle speed signal (30 seconds or more)	Vehicle speed signal is 0 km/h with continuously more than 3 driving cycles even though engine speed is more than 4000 rpm for more than 30 seconds continuously (before elapse of 5 min from engine start) or vehicle speed signal is 0 km/h with continuously more than 3 driving cycles even though engine speed is more than 2500 rpm for more than 30 seconds continuously (after elapse of 5 min for engine start).	<ul style="list-style-type: none"> • Vehicle speed signal circuit • BCM • ECM • ABS control module • P/S control module • CAN communication line circuit 	3 driving cycle	3 driving cycle
C1124	Vehicle speed performance (impossible deceleration)	Vehicle speed signal is less than 5 km/h for more than 5 seconds continuously with more than specified deceleration speed (-20 m/s^2) from over 20 km/h.		1 driving cycle	Does not light up

DTC No.	Detecting item	Detecting condition (DTC will set when detecting)	Trouble area	DTC	"EPS" warning light
C1141	P/S motor circuit voltage	Voltage between both motor drive circuit is more than 8.5 V or less than 0.2 V for 0.5 second continuously while motor is not driven.		1 driving cycle	1 driving cycle
C1142	P/S motor circuit range/performance	Measured motor drive current is more than 10 A as compared with target motor drive current.		1 driving cycle	1 driving cycle
C1143	P/S motor circuit current too high	Measured motor drive current is more than 65 A.	<ul style="list-style-type: none"> • P/S motor circuit • P/S motor • Torque sensor • P/S control module 	1 driving cycle	1 driving cycle
C1145	P/S Motor Circuit Current Too Low	Measured motor drive current is less than 2 A continuously for more than 3 seconds even though target motor drive current is more than 4 A. or Measured motor drive current is less than 0.8 A for total 1 second even though motor control duty is more than 90% when target motor drive current is less than 8 A.		1 driving cycle	1 driving cycle
C1153	P/S control module power supply circuit	Power supply voltage of P/S control module is less than 9 V for 5 seconds continuously while engine speed is more than 600 rpm	<ul style="list-style-type: none"> • P/S control module power supply circuit • Undercharged Battery • Generator • P/S control module 	1 driving cycle	1 driving cycle
C1155	P/S control module internal failure	Internal memory (EEPROM) is data error.	<ul style="list-style-type: none"> • P/S control module 	1 driving cycle	Does not light up
		Internal circuit is faulty. or Power supply voltage of P/S control module exceeded 17.5 V	<ul style="list-style-type: none"> • Generator • P/S control module 	1 driving cycle	1 driving cycle

Visual Inspection

S6RW0C6304006

Visually check the following parts and systems.

Inspection Item		Referring section
Battery	Level, leakage, color	"Battery Description in Section 1J"
Connectors of electric wire harness	Disconnection friction	"Intermittent and Poor Connection Inspection in Section 00"
Fuses	Burning	"Cautions in Body Electrical System Servicing in Section 9A"
Parts	Installation, damage	
Other parts that can be checked visually		

Scan Tool Data

S6RW0C6304007

NOTE

When P/S motor is cold condition (that is, armature coil of P/S motor is not heated), normal value with asterisk (*) mark in the following table is displayed on scan tool

Scan tool data	Vehicle condition		Normal condition
☞ Power Supply Voltage	Ignition switch ON		10 – 14 V
☞ Sensor Power Supply			7.4 – 10 V
☞ Sensor (Main) Torque	Engine running at idle speed	Steering wheel at fully turned to left	-10.5 – 0 N·m
		Steering wheel at free	0 N·m
		Steering wheel at fully turned to right	0 – 12.85 N·m
☞ Sensor (Sub) Torque	Engine running at idle speed	Steering wheel at fully turned to left	0 – 10.65 N·m
		Steering wheel at free	0 N·m
		Steering wheel at fully turned to right	-12.85 – 0 N·m
☞ Control Torque	Engine running at idle speed	Steering wheel at fully turned to left	-7.22 – 0 N·m
		Steering wheel at free	0 N·m
		Steering wheel at fully turned to right	0 – 7.16 N·m
☞ Target Motor Current	Engine running at idle speed	Steering wheel at free	0 A
		Steering wheel at fully turned to left or right	*45 – 60 A
☞ Measured MOT Current	Engine running at idle speed	Steering wheel at free	0 A
		Steering wheel at fully turned to left or right	*45 – 60 A
☞ Vehicle Speed	Engine running and vehicle at stop		0 km/h
☞ Engine Speed	Engine running at idle speed after warming up		700 ± 50 rpm
☞ Motor Drive Voltage	Engine running at idle speed	Steering wheel at free	0.8 – 1 V
		Steering wheel at fully turned to right	*5.5 – 8.5 V
☞ System Power Status	Ignition switch ON		ON
☞ IGN switch Status			ON
☞ Torque sensor Status	Engine running at idle speed		ON
☞ Fail Safe FET Status			ON

Scan Tool Data Definitions**Power Supply Voltage**

This parameter indicates battery positive voltage.

Sensor Power Supply (Torque Sensor Power Supply, V)

This parameter indicates the power supply voltage which the P/S control module supplies to the torque sensor.

Sensor (Main) Torque (Torque Sensor Main Torque, N·m)

The torque sensor is installed to detect the steering force and the steering direction. It consists of two potentiometers and the main torque sensor is one of these.

Sensor (Sub) Torque (Torque Sensor Sub Torque, N·m)

The torque sensor is installed to detect the steering force and the steering direction. It consists of two potentiometers and the sub-torque sensor is one of these. Its output characteristics are compared with those of the main torque sensor.

Control Torque (N·m)

This parameter is an internal parameter of the P/S control module. It is obtained by computing the torque sensor input signal.

Target Motor Current (Motor Control Current, A)

Based on the input signal, the P/S control module determines the assist amount and controls the current to the motor suitable for that assist amount. This parameter indicates that control value.

Measured MOT Current (Motor Monitor Current, A)

This parameter indicates the actually measured value of the current flowing to the motor. The motor circuit condition is diagnosed by comparing this parameter with "Motor Control" parameter described previously.

Vehicle Speed (km/h, MPH)

Vehicle speed signal is fed from BCM. P/S control module determines the amount of power assist based on this vehicle speed signal and the torque sensor signal.

Engine Speed (rpm)

Engine speed signal is fed from the ECM so that it can be used for trouble diagnosis of the electric power steering system.

Motor Drive Voltage (V)

This parameter indicates the voltage between motor terminals.

System Power Status (EPS System Power, ON, OFF)

This parameter indicates input status of EPS system power supply.

IGN switch Status (ON, OFF)

This parameter indicates the condition of the power supply through the ignition switch.

Torque sensor Status (ON, OFF)

This parameter indicates the output status of the torque sensor power supply.

Fail Safe FET Status (ON, OFF)

This parameter indicates the status of the motor drive power supply circuit.

P/S System Symptom Diagnosis

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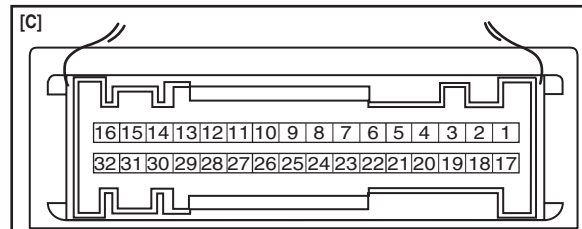
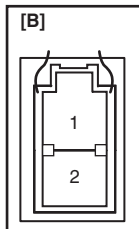
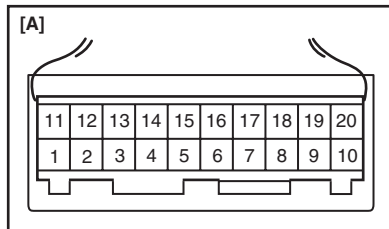
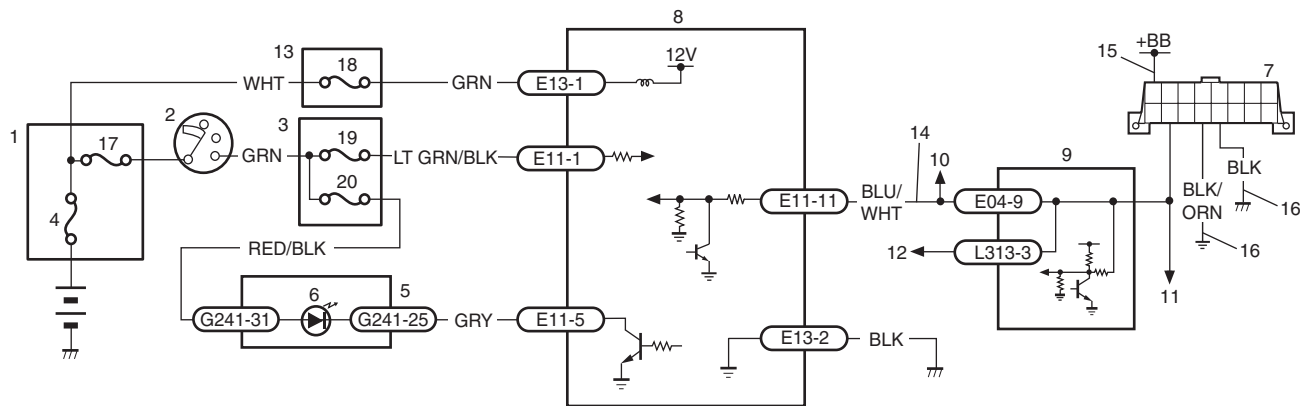
This section describes trouble diagnosis of the P/S system parts whose trouble is not indicated by the on-board diagnostic system (self-diagnostic function). When no malfunction is indicated by the on-board diagnostic system (self-diagnosis function) and assuredly those steering basic parts as described in "Steering Symptom Diagnosis in Section 6A" are all in good condition, check the following power steering system parts which may be a possible cause for each symptom of the steering.

Condition	Possible cause	Correction / Reference Item
Steering wheel feels heavy (Perform "Steering Force Check:" before diagnosis.)	Steering wheel installed improperly (twisted)	<i>Install steering wheel correctly.</i>
	Poor performance of P/S motor	<i>Check P/S motor referring to "P/S Motor and Its Circuit Inspection".</i>
	Poor performance of torque sensor	<i>Check torque sensor referring to "Torque Sensor and Its Circuit Inspection".</i>
	Steering gear case assembly malfunction	<i>Replace steering gear case assembly.</i>
Steering wheel feels heavy momentarily when turning it to the left or right	Poor performance of vehicle speed signal from BCM	<i>Check vehicle speed signal circuit referring to "DTC C1121 / C1123 / C1124: Vehicle Speed Signal Circuit Failure".</i>
	Steering gear case assembly malfunction	<i>Replace steering gear case assembly.</i>
Poor recovery from turns	Poor performance of torque sensor	<i>Check torque sensor referring to "Torque Sensor and Its Circuit Inspection".</i>
	Steering gear case assembly malfunction	<i>Replace steering gear case assembly.</i>
Vehicle pulls to one side during straight driving	Poor performance of torque sensor	<i>Check torque sensor referring to "Torque Sensor and Its Circuit Inspection".</i>
	Steering gear case assembly malfunction	<i>Replace steering gear case assembly.</i>
Abnormal noise	P/S motor (built in steering gear case assembly) malfunction	<i>Replace steering gear case assembly.</i>
No idle up	P/S control module faulty	<i>Check P/S control module referring to "Inspection of P/S Control Module and Its Circuits".</i>

DLC and Its Communication Check (No communication to P/S Control Module)

S6RW0C6304009

Wiring Diagram



I6RW0C630002-01

[A]: P/S control module connector No.1 "E11" (viewed from harness side)	6. "EPS" warning light	14. Serial data circuit
[B]: P/S control module connector No.2 "E13" (viewed from harness side)	7. Data link connector (DLC)	15. DLC power supply circuit
[C]: Combination meter connector "G241" (viewed from harness side)	8. P/S control module	16. DLC ground circuit
1. Main fuse box	9. BCM	17. "IGN" fuse
2. Ignition switch	10. To HVAC control module	18. "P/S" fuse
3. Junction block assembly	11. To ABS control module	19. "IG1 SIG" fuse
4. Main fuse	12. To SDM	20. "MTR" fuse
5. Combination meter	13. Individual circuit fuse box No.1	

Troubleshooting

Step	Action	Yes	No
1	<p>"EPS" warning light check</p> <p>1) Turn ignition switch to ON position.</p> <p>Does "EPS" warning light turn on?</p>	Go to step 3.	Go to "EPS" Warning Light Does Not Come ON with Ignition Switch Turned ON before Engine Starts".
2	<p>Scan tool condition check</p> <p>1) Make sure that SUZUKI scan tool is as follows.</p> <ul style="list-style-type: none"> • Correct PCMCIA card (software) is used. • There are no deformation and wear for DLC cable terminals. • Connection for DLC cable terminals is in good condition. <p>Are they OK?</p>	Go to step 3.	Repair or replace defective part.

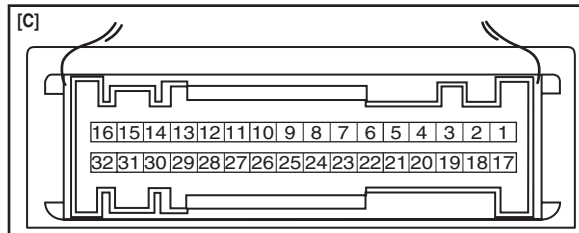
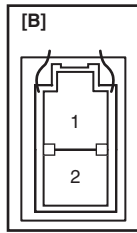
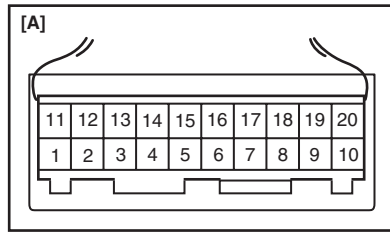
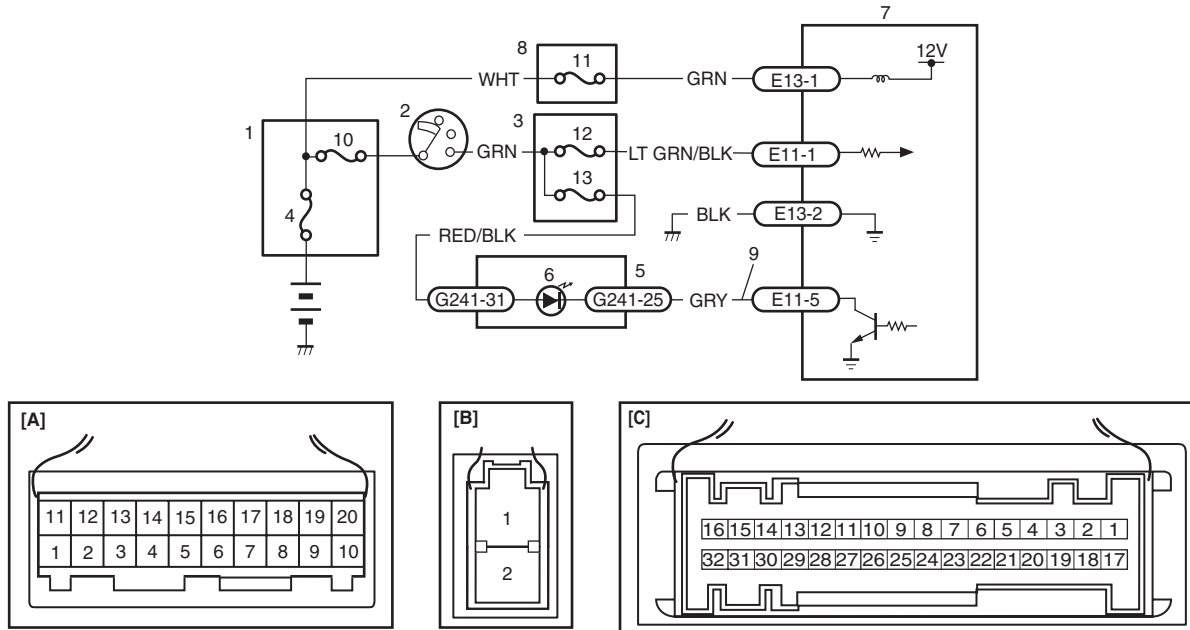
Step	Action	Yes	No
3	<p>Communication check</p> <ol style="list-style-type: none"> 1) Check DLC terminal for deformation and wear. 2) If it is in good condition, connect SUZUKI scan tool to DLC with ignition switch tuned OFF. 3) Check if communication is possible by making communication with other control modules (BCM, ABS, HVAC control module or SDM). <p><i>Is it possible to communicate with the other control modules?</i></p>	Go to Step 4.	Go to Step 6.
4	<p>Serial communication circuit check</p> <ol style="list-style-type: none"> 1) With ignition switch turned OFF, disconnect "E11" connector from P/S control module and check for proper connection at P/S control module connector terminal. 2) If connections are OK, check that "Serial data circuit" is as follows. <ul style="list-style-type: none"> • Wiring resistance of "Serial data circuit" wire between DLC connector and P/S control module connector is less than 1 Ω. <p><i>Is it resistance less than 1 Ω?</i></p>	Go to Step 5.	"Serial data circuit" is open or high resistance.
5	<p>P/S control module power and ground circuit check</p> <ol style="list-style-type: none"> 1) Check power supply circuit and ground circuit for P/S control module referring to "P/S Control Module Power Supply and Ground Circuit Check". <p><i>Is check result in good condition?</i></p>	Substitute a known-good P/S control module and recheck.	Repair or replace defective circuit.
6	<p>DLC power and ground circuit check</p> <ol style="list-style-type: none"> 1) Check power supply circuit and ground circuit for DLC connector as follows. <ul style="list-style-type: none"> • Voltage of "DLC connector power supply circuit" between DLC connector terminal and vehicle body ground is 10 –14 V with ignition switch turned ON. • Wire resistance of each "DLC connector ground circuit" between DLC connector terminal and vehicle body ground is less than 1 Ω. <p><i>Is check result in good condition?</i></p>	Go to Step 7.	Repair or replace defective circuit.
7	<p>Serial communication circuit check</p> <ol style="list-style-type: none"> 1) With ignition switch turned OFF, disconnect "E11" connector from P/S control module and check for terminal to P/S control module connector. 2) If connections are OK, check that "Serial data circuit" is as follows. <ul style="list-style-type: none"> • Insulation resistance of "Serial data circuit" wire is infinity between its terminal and other terminals at P/S control module connector. • Insulation resistance of "Serial data circuit" wire is infinity between its terminal and vehicle body ground. <p><i>Is circuit in good condition?</i></p>	Go to Step 8.	Repair or replace defective circuit.

Step	Action	Yes	No
8	Scan tool operation check 1) Check if communication is possible by making communication with other vehicles. <i>Is it possible to communicate with the other vehicle?</i>	Scan tool is in good condition, check intermittent trouble referring to "Intermittent and Poor Connection Inspection in Section 00".	Recheck PCMCIA card and DLC cable for faulty condition. If they are OK, scan tool is faulty.

“EPS” Warning Light Does Not Come ON with Ignition Switch Turned ON before Engine Starts

S6RW0C6304010

Wiring Diagram



i6RW0C630003-01

[A]: P/S control module connector No.1 "E11" (viewed from harness side)	4. Main fuse	10. "IGN" fuse
[B]: P/S control module connector No.2 "E13" (viewed from harness side)	5. Combination meter	11. "P/S" fuse
[C]: Combination meter connector "G241" (viewed from harness side)	6. "EPS" warning light	12. "IG1 SIG" fuse
1. Main fuse box	7. P/S control module	13. "MTR" fuse
2. Ignition switch	8. Individual circuit fuse box No.1	
3. Junction block assembly	9. "EPS" warning light circuit	

Circuit Description

Operation (ON/OFF) of "EPS" warning light is controlled by P/S control module through combination meter. If the P/S system is in good condition, P/S control module turns "EPS" warning light ON at the ignition switch ON, and then turns it OFF at the engine start. If an abnormality in the system is detected, "EPS" warning light is turned ON continuously by P/S control module. If P/S control module is disconnected, "EPS" warning light is not turned ON.

Troubleshooting

Step	Action	Yes	No
1	<p>“EPS” warning light power supply check</p> <p>1) Turn ignition switch ON.</p> <p><i>Do the other warning light come on?</i></p>	Go to Step 2.	“GRN”, “RED/BLK” wire circuit or circuit fuse for combination meter is open or short to ground.
2	<p>Fuse check</p> <p>1) Turn ignition switch OFF.</p> <p>2) Remove and inspect circuit fuse for P/S control module.</p> <p><i>Is fuse in good condition?</i></p>	Reinstall fuse, and then go to Step 3.	Check “GRN” wire circuit for short to ground. If OK, replace fuse.
3	<p>P/S control module power supply and ground circuit check</p> <p>Check power supply circuit and ground circuit for P/S control module referring to “P/S Control Module Power Supply and Ground Circuit Check”.</p> <p><i>Is check result in good condition?</i></p>	Go to Step 4.	Repair or replace defective circuit.
4	<p>Combination meter power supply circuit check</p> <p>1) Remove combination meter and disconnect combination meter connector (“G241”) with ignition switch turned OFF.</p> <p>2) Check for proper connection to the combination meter at “G241-31” terminal.</p> <p>3) If OK, check voltage between “G241-31” (“RED/BLK” wire) terminal and body ground with ignition switch ON.</p> <p><i>Is it 10 – 14 V?</i></p>	Go to Step 5.	“RED/BLK” wire circuit is open or short to ground.
5	<p>“EPS” warning light circuit resistance check</p> <p>1) Check for proper connection to the combination meter at “G241-25” terminal and P/S control module at “E11-5” terminal.</p> <p>2) Check that “EPS warning light circuit” is as follows.</p> <ul style="list-style-type: none"> • Insulation resistance of “EPS warning light circuit” wire is infinity between its terminal and each terminal at combination meter connector. • Wiring resistance of “EPS warning light circuit” wire is less than 1 Ω. • Insulation resistance of “EPS warning light circuit” wire is infinity between its terminal and vehicle body ground. <p><i>Is circuit in good condition?</i></p>	“GRY” wire circuit is open.	Go to Step 6.
6	<p>“EPS” warning light circuit voltage check</p> <p>1) Connect combination meter connector (“G241”) with ignition switch turned OFF.</p> <p>2) Check for voltage between “E11-5” (“GRY” wire) terminal and body ground with ignition switch ON.</p> <p><i>Is it 10 – 14 V?</i></p>	Replace the P/S control module.	Replace the combination meter.

“EPS” Warning Light Remains ON Steady after Engine Starts

S6RW0C6304011

Wiring Diagram

Refer to ““EPS” Warning Light Does Not Come ON with Ignition Switch Turned ON before Engine Starts”.

Circuit Description

Operation (ON/OFF) of “EPS” warning light is controlled by P/S control module through combination meter. If the P/S system is in good condition, P/S control module turns “EPS” warning light ON at the ignition switch ON, and then turns it OFF at the engine start. If an abnormality in the system is detected, “EPS” warning light is turned ON continuously by P/S control module. If P/S control module is disconnected, “EPS” warning light is not turned ON.

Troubleshooting

Step	Action	Yes	No
1	Check DTC referring to “DTC Check”. <i>Is there any DTC(s) (NO CODES on SUZUKI scan tool)?</i>	Go to applicable DTC diag. flow.	Go to Step 2.
2	“EPS” warning light circuit check 1) With ignition switch turned OFF, disconnect P/S control module connector. 2) Check for proper connection to the P/S control module at “E11-5” terminal. 3) If OK, then turn ignition switch to ON position. <i>Does “EPS” warning light turn ON?</i>	Go to Step 3.	Replace P/S control module.
3	Combination meter ground circuit check 1) Remove combination meter and disconnect combination meter connector with ignition switch turned OFF. 2) Check combination meter connector for proper connection. 3) If connections are OK, check that “EPS warning light circuit” is as follows. <ul style="list-style-type: none"> • Insulation resistance of “EPS warning light circuit” wire is infinity between its terminal and each terminal at combination meter connector. • Insulation resistance of “EPS warning light circuit” wire is infinity between its terminal and vehicle body ground. <i>Is circuit in good condition?</i>	Replace combination meter.	Repair defective circuit.

DTC C1111 / C1113 / C1115: Torque Sensor Circuit Failure

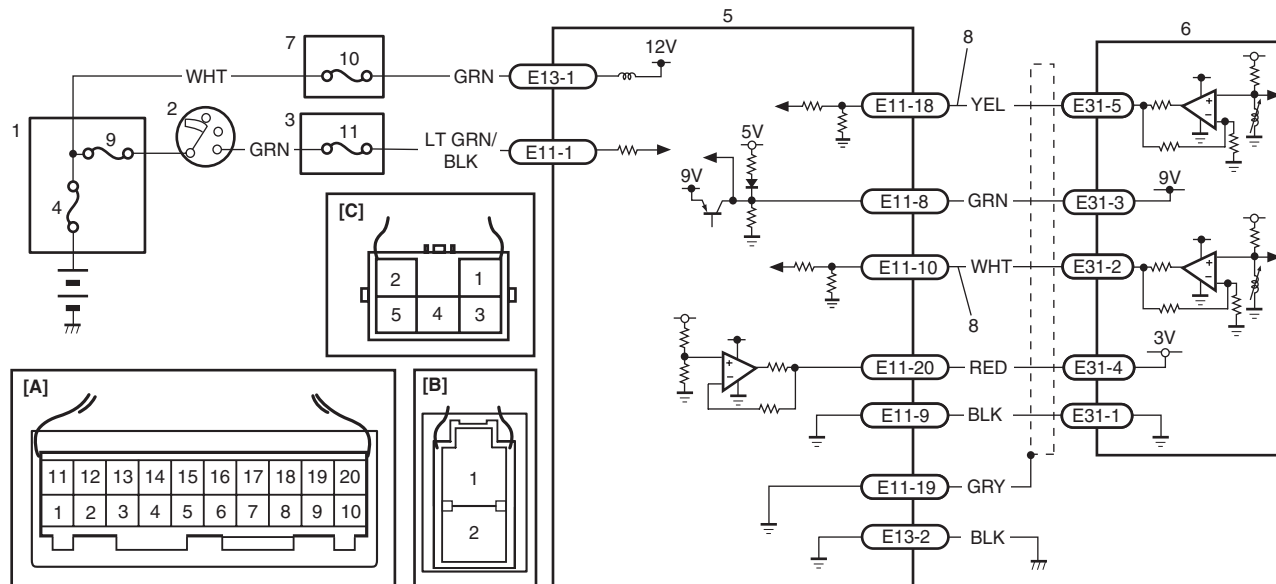
S6RW0C6304012

DTC C1111: Steering Torque Sensor (Main) Circuit Voltage

DTC C1113: Steering Torque Sensor (Main and Sub) Circuit Correlation

DTC C1115: Steering Torque Sensor (Sub) Circuit Voltage

Wiring Diagram



I6RW0C630004-02

[A]: P/S control module connector No.1 "E11" (viewed from harness side)	3. Junction block assembly	8. Torque sensor signal circuit
[B]: P/S control module connector No.2 "E13" (viewed from harness side)	4. Main fuse	9. "IGN" fuse
[C]: Torque sensor connector "E31" (viewed from harness side)	5. P/S control module	10. "P/S" fuse
1. Main fuse box	6. Torque sensor	11. "IG1 SIG" fuse
2. Ignition switch	7. Individual circuit fuse box No.1	

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
<p>DTC C1111: Circuit voltage of sensor main is more than 4.5 V or less than 0.5 V (1 driving cycle detection logic)</p> <p>DTC C1113: Difference between steering torque calculated based on sensor main signal and steering torque calculated based on sensor sub signal is more than 4.9 N·m or Difference between instantaneous value and average value of steering torque calculated based on sensor main signal and steering torque calculated based on sensor sub signal is more than 2.94 N·m (1 driving cycle detection logic)</p> <p>DTC C1115: Circuit voltage of sensor sub signal is more than 4.5 V or less than 0.5 V (1 driving cycle detection logic)</p>	<ul style="list-style-type: none"> • Torque sensor signal circuit • Torque sensor • P/S control module

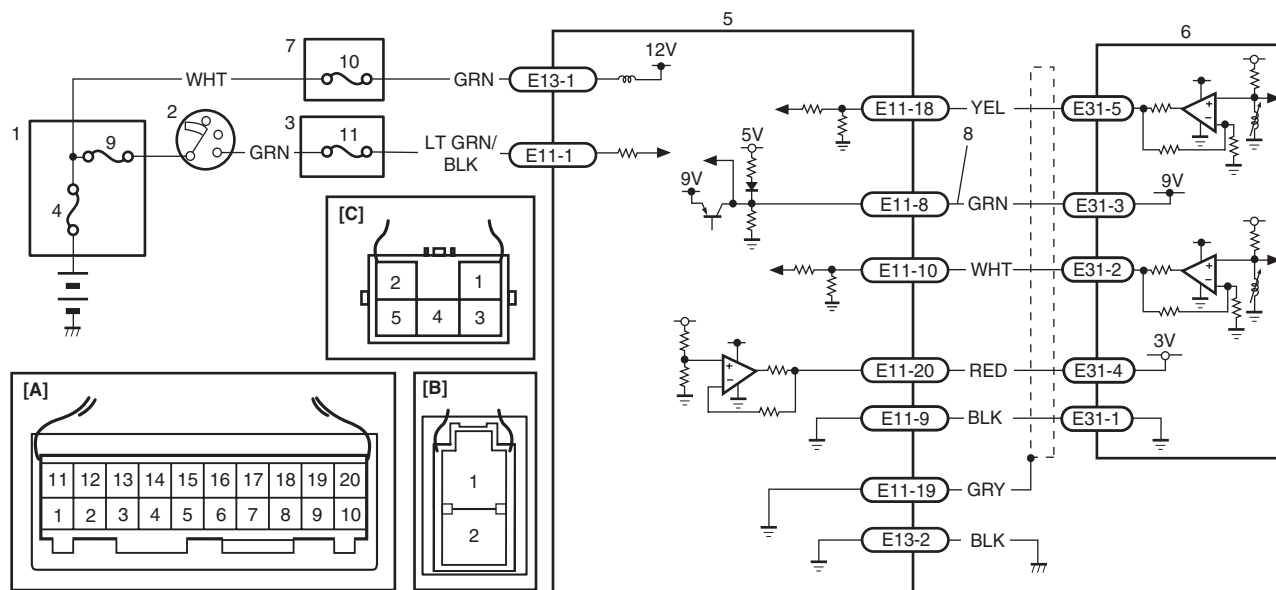
DTC Troubleshooting

Step	Action	Yes	No
1	Was "EPS System Check" performed?	Go to Step 2.	Go to "EPS System Check".
2	DTC check <i>Is DTC C1153 or C1116 indicated, together?</i>	Go to applicable diag. flow.	Go to Step 3.
3	Torque sensor signal circuit check 1) With ignition switch turned OFF, disconnect torque sensor connector. 2) Check for voltage between following terminal with ignition switch ON. <ul style="list-style-type: none"> • "E11-18" ("YEL" wire) terminal and body ground • "E11-10" ("WHT" wire) terminal and body ground <i>Is it about 0 V?</i>	Go to Step 4.	Torque sensor signal circuit is shorted to other circuit.
4	Torque sensor circuit check 1) Disconnect P/S control module connector. 2) Check that torque sensor signal circuit is as follows. <ul style="list-style-type: none"> • Insulation resistance of wire harness is infinity between "Torque sensor signal circuit" terminal and other terminal at torque sensor connector. • Wiring harness resistance of "Torque sensor signal circuit" is less than 1 Ω. • Insulation resistance between "Torque sensor signal circuit" and vehicle body ground is infinity. <i>Is circuit in good condition?</i>	Go to Step 5.	Repair or replace defective circuit.
5	Torque sensor check 1) Connect connectors to P/S control module and torque sensor with ignition switch turned OFF. 2) Check torque sensor out put voltage referring to "Torque Sensor and Its Circuit Inspection". <i>Is torque sensor in good condition?</i>	Substitute a known-good P/S control module and recheck.	Go to Step 6.
6	P/S control module resistance check 1) With ignition switch turned OFF, disconnect torque sensor connector. 2) Check for resistance between following terminal with ignition switch ON. <ul style="list-style-type: none"> • "E11-18" ("YEL" wire) terminal and body ground • "E11-10" ("WHT" wire) terminal and body ground <i>Is it about 1 kΩ?</i>	Replace steering gear case.	Replace P/S control module.

DTC C1116: Steering Torque Sensor Power Supply Circuit

S6RW0C6304013

Wiring Diagram



I6RW0C630005-02

[A]: P/S control module connector No.1 "E11" (viewed from harness side)	3. Junction block assembly	8. Torque sensor power supply circuit
[B]: P/S control module connector No.2 "E13" (viewed from harness side)	4. Main fuse	9. "IGN" fuse
[C]: Torque sensor connector "E31" (viewed from harness side)	5. P/S control module	10. "P/S" fuse
1. Main fuse box	6. Torque sensor	11. "IG1 SIG" fuse
2. Ignition switch	7. Individual circuit fuse box No.1	

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
Circuit voltage of torque sensor 9 V power supply is less than 7 V (1 driving cycle detection logic)	<ul style="list-style-type: none"> Torque sensor 9 V power supply circuit Torque sensor P/S control module

DTC Troubleshooting

Step	Action	Yes	No
1	Was "EPS System Check" performed?	Go to Step 2.	Go to "EPS System Check".
2	DTC check <i>Is DTC C1153 indicated, together?</i>	Go to applicable DTC diag. flow.	Go to Step 3.
3	Torque sensor power supply voltage check 1) With ignition switch turned OFF, disconnect torque sensor connector. 2) Check for voltage between "E31-3" ("GRN" wire) terminal and body ground with ignition switch ON. <i>Is it approx. 9 V?</i>	Go to Step 4.	Go to Step 5.
4	Torque sensor power supply voltage check 1) With ignition switch turned OFF, connect torque sensor connector. 2) Check for voltage between "E11-8" ("GRN" wire) terminal and body ground with ignition switch ON. <i>Is it approx. 9 V?</i>	Substitute a known-good P/S control module and recheck.	Replace steering gear case.
5	Torque sensor power supply circuit check 1) Check that torque sensor power supply circuit is as follows. <ul style="list-style-type: none"> • Insulation resistance of wire harness is infinity between "Torque sensor power supply circuit" terminal and each other terminal at torque sensor connector. • Wiring harness resistance of "Torque sensor power supply circuit" is less than 1 Ω. • Insulation between "Torque sensor power supply circuit" and vehicle body ground is infinity. <i>Is circuit in good condition?</i>	Replace P/S control module.	Repair or replace defective circuit.

DTC C1121 / C1123 / C1124: Vehicle Speed Signal Circuit Failure

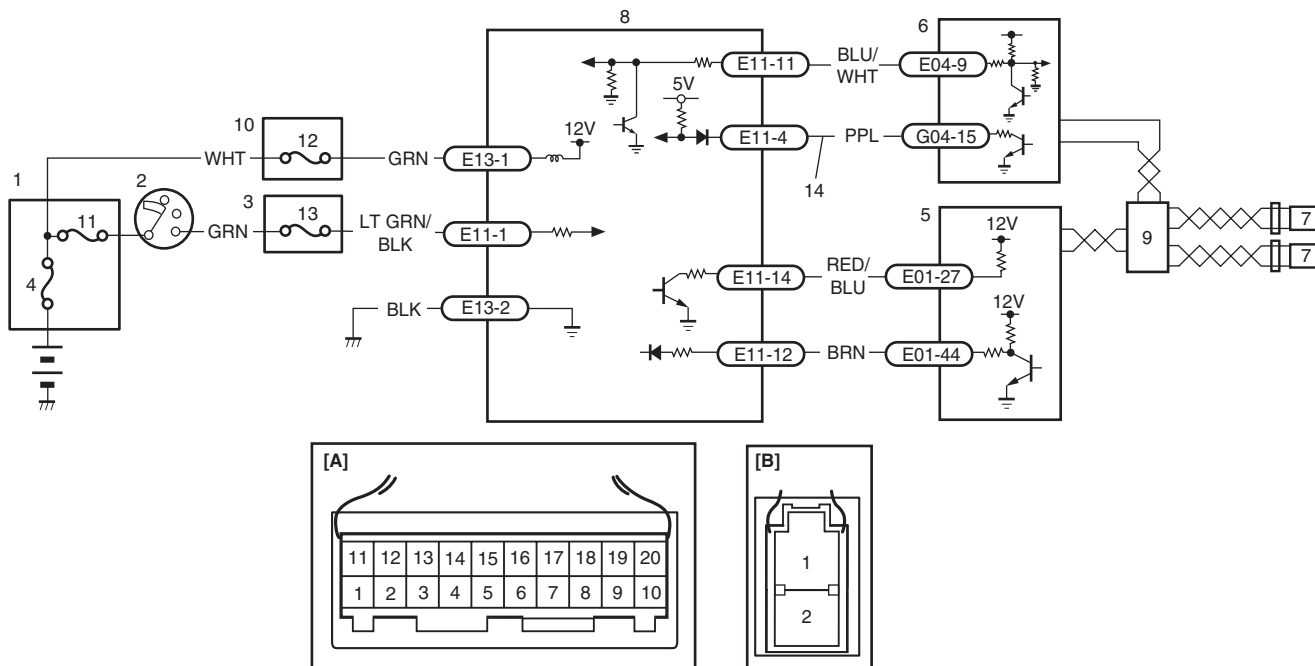
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DTC C1121: No Vehicle Speed Signal (60 Seconds or More)

DTC C1123: No Vehicle Speed Signal (30 Seconds or More)

DTC C1124: Vehicle Speed Performance (Impossible Deceleration)

Wiring Diagram



I6RW0C630006-01

[A]: P/S control module connector No.1 "E11" (viewed from harness side)	5. ECM	11. "IGN" fuse
[B]: P/S control module connector No.2 "E13" (viewed from harness side)	6. BCM	12. "P/S" fuse
1. Main fuse box	7. Front left/right wheel speed sensor	13. "IG1 SIG" fuse
2. Ignition switch	8. P/S control module	14. Vehicle speed signal
3. Junction block assembly	9. ABS control module	
4. Main fuse	10. Individual circuit fuse box No.1	

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
<p>DTC C1121: Vehicle speed signal is 0 km/h even though engine speed is more than 4000 rpm for more than 60 seconds continuously (before elapse of 5 min from engine start) or Vehicle speed signal is 0 km/h even though engine speed is more than 2500 rpm for more than 60 seconds continuously (after elapse of 5 min for engine start). (1 driving cycle detection logic but "EPS" warning light does not light up)</p> <p>DTC C1123: Vehicle speed signal is 0 km/h with continuously more than 3 driving cycles even though engine speed is more than 4000 rpm for more than 30 seconds continuously (before elapse of 5 min from engine start) or Vehicle speed signal is 0 km/h with continuously more than 3 driving cycles even though engine speed is more than 2500 rpm for more than 30 seconds continuously (after elapse of 5 min for engine start). (3 driving cycle detection logic)</p> <p>DTC C1124: Vehicle speed signal is less than 5 km/h for more than 5 seconds continuously with more than specified deceleration speed (-20 m/s^2) from over 20 km/h. (1 driving cycle detection logic but "EPS" warning light does not light up)</p>	<ul style="list-style-type: none"> • Vehicle speed signal circuit • BCM • ECM • ABS control module • P/S control module • CAN communication line circuit

DTC Troubleshooting

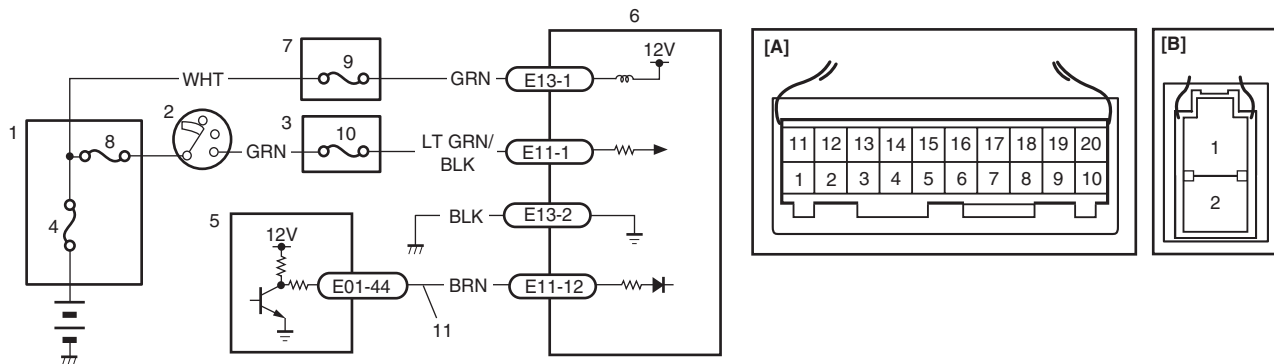
Step	Action	Yes	No
1	<i>Was "EPS System Check" performed?</i>	Go to Step 2.	Go to "EPS System Check".
2	<p>DTC check</p> <p>1) Check ABS control module and BCM for DTC referring to "DTC Check in Section 4E" and "DTC Check in Section 10B".</p> <p><i>Is there any DTC(s) detected?</i></p>	Go to applicable DTC diag. flow.	Go to Step 3.
3	<p>DTC check</p> <p>1) Check ECM for DTC referring to "DTC Check in Section 1A".</p> <p><i>Is there any DTC(s) detected?</i></p>	Go to applicable DTC diag. flow.	Go to Step 4.
4	<p>Vehicle speed signal circuit check</p> <p>1) With ignition switch turned OFF, disconnect connectors from BCM.</p> <p>2) Check BCM connector for proper connection.</p> <p>3) If OK, turn ON ignition switch, measure voltage between "G04-22" wire terminal of BCM connector and body ground.</p> <p><i>Is voltage 4 – 5 V?</i></p>	Go to Step 5.	Go to Step 6.

Step	Action	Yes	No
5	BCM voltage check 1) With ignition switch turned OFF, connect BCM connector. 2) Check BCM for vehicle speed signal output referring to "Inspection of P/S Control Module and Its Circuits". <i>Is it in good condition?</i>	Replace P/S control module.	Replace BCM.
6	Vehicle speed signal circuit check 1) Check that vehicle speed signal circuit is as follows. <ul style="list-style-type: none"> • Insulation resistance of wire harness is infinity between "Vehicle speed signal" terminal and other terminal at P/S control module connector. • Wiring harness resistance of "Vehicle speed signal" circuit is less than 1Ω. • Insulation resistance between "Vehicle speed signal" circuit and vehicle body ground is infinity. • Circuit voltage between "Vehicle speed signal" circuit and ground circuit is 0 – 1 V with ignition switch turned ON. <i>Is it in good condition?</i>	Replace P/S control module.	Repair or replace defective circuit.

DTC C1122: Engine Speed Signal

S6RW0C6304015

Wiring Diagram



I6RW0C630007-01

[A]: P/S control module connector No.1 "E11" (viewed from harness side)	4. Main fuse	9. "P/S" fuse
[B]: P/S control module connector No.2 "E13" (viewed from harness side)	5. ECM	10. "IG1 SIG" fuse
1. Main fuse box	6. P/S control module	11. Engine speed signal circuit
2. Ignition switch	7. Individual circuit fuse box No.1	
3. Junction block assembly	8. "IGN" fuse	

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
Engine speed signal is less than 220 rpm for more than 0.8 seconds. or Engine speed signal is less than 220 rpm for more than 20 seconds continuously even though vehicle speed signal is more than 50 km/h. (1 driving cycle detection logic)	<ul style="list-style-type: none"> • Engine speed signal circuit • ECM • P/S control module

DTC Troubleshooting

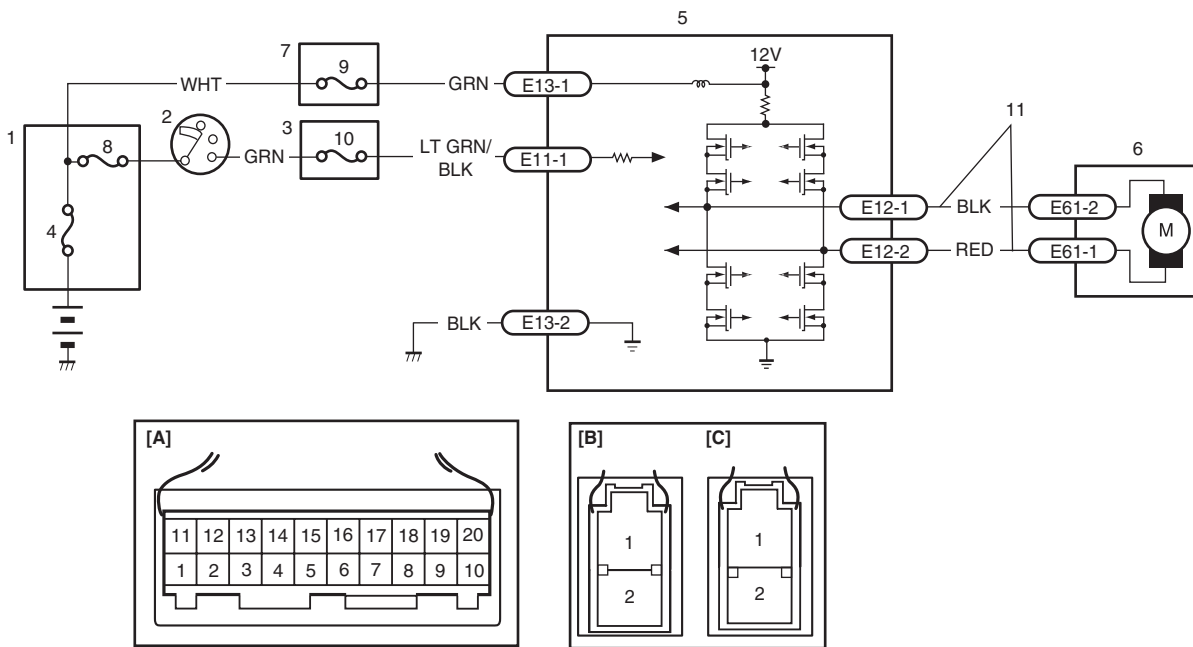
Step	Action	Yes	No
1	Was "EPS System Check" performed?	Go to Step 2.	Go to "EPS System Check".
2	DTC check 1) Check ECM for DTC referring to "DTC Check in Section 1A". <i>Is there any DTC(s) detected?</i>	Go to applicable DTC diag. flow.	Go to Step 3.
3	Engine speed signal circuit check 1) With ignition switch turned OFF, disconnect P/S control module connector. 2) Check P/S control module connector for proper connection. 3) If OK, turn ON ignition switch, measure voltage between "E11-12" wire terminal of P/S control module connector and vehicle body ground. <i>Is voltage 10 – 14 V?</i>	Go to Step 4.	Go to Step 5.
4	ECM voltage check 1) With ignition switch turned OFF, connect P/S control module and ECM connectors. 2) Check engine speed signal output referring to "Inspection of ECM and Its Circuits in Section 1A". <i>Is it in good condition?</i>	Substitute a known-good P/S control module and recheck.	Substitute a known good ECM and recheck.
5	Engine speed signal circuit check 1) Disconnect ECM connector. 2) Check that engine speed signal circuit is as follows. <ul style="list-style-type: none"> • Insulation resistance of wire harness is infinity between "Engine speed signal circuit" terminal and other terminal at P/S control module connector. • Wiring harness resistance of "Engine speed signal circuit" is less than 1Ω. • Insulation resistance between "Engine speed signal circuit" and vehicle body ground is infinity • Circuit voltage between "Engine speed signal circuit" and ground circuit is 0 – 1 V with ignition switch turned ON. <i>Is it in good condition?</i>	Substitute a known good ECM and recheck.	Repair or replace defective circuit.

DTC C1141 / C1142 / C1143 / C1145: Motor Circuit Failure

S6RW0C6304016

- DTC C1141: P/S Motor Circuit Voltage**
- DTC C1142: P/S Motor Circuit Range/Performance**
- DTC C1143: P/S Motor Circuit Current Too High**
- DTC C1145: P/S Motor Circuit Current Too Low**

Wiring Diagram



I6RW0C630008-01

[A]: P/S control module connector No.1 "E11" (viewed from harness side)	2. Ignition switch	7. Individual circuit fuse box No.1
[B]: P/S control module connector No.2 "E13" (viewed from harness side)	3. Junction block assembly	8. "IGN" fuse
[C]: P/S control module connector No.3 "E12" (viewed from harness side)	4. Main fuse	9. "P/S" fuse
[D]: Motor connector "E61" (viewed from harness side)	5. P/S control module	10. "IG1 SIG" fuse
1. Main fuse box	6. P/S motor	11. Motor circuit

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
<p>DTC C1141: Voltage between both motor drive circuit is more than 8.5 V or less than 0.2 V for 0.5 second continuously while motor is not driven. (1 driving cycle detection logic)</p> <p>DTC C1142: Measured motor drive current is more than 10 A as compared with target motor drive current. (1 driving cycle detection logic)</p> <p>DTC C1143: Measured motor drive current is more than 65 A. (1 driving cycle detection logic)</p> <p>DTC C1145: Measured motor drive current is less than 2 A continuously for more than 3 seconds even though target motor drive current is more than 4 A. or Measured motor drive current is less than 0.8 A for total 1 second even though motor control duty is more than 90% when target motor drive current is less than 8 A. (1 driving cycle detection logic)</p>	<ul style="list-style-type: none"> • P/S motor circuit • P/S motor • Torque sensor • P/S control module

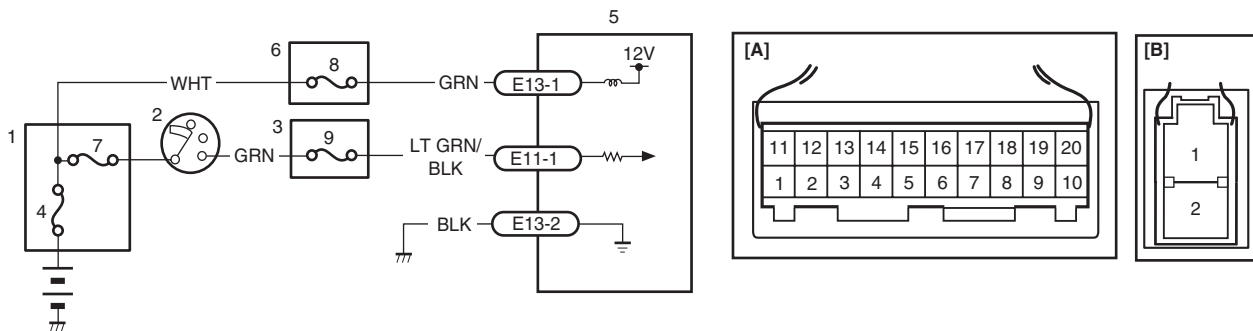
DTC Troubleshooting

Step	Action	Yes	No
1	Was "EPS System Check" performed?	Go to Step 2.	Go to "EPS System Check".
2	DTC check Is DTC C1153 and/or C1155 indicated, together?	Go to applicable DTC diag. flow.	Go to Step 3.
3	Power supply and ground circuit check 1) Check P/S control module power supply and ground circuit referring to "P/S Control Module Power Supply and Ground Circuit Check". Is it in good condition?	Go to Step 4.	Repair or replace defective circuit.
4	Motor circuit check 1) With ignition switch turned OFF, disconnect P/S control module connector No.3 and P/S motor connector. 2) Check P/S control module connector and P/S motor connector for proper connection. 3) If OK, check for open, short and/or high resistance in motor circuit between P/S control module and P/S motor. Refer to "Electrical Circuit Inspection Procedure in Section 00". Are they in good condition?	Go to Step 5.	Repair motor circuit.
5	P/S motor check 1) Check P/S motor referring to "P/S Motor and Its Circuit Inspection". Is P/S motor in good condition?	Substitute a known-good P/S control module and recheck.	Replace the steering gear case assembly and recheck.

DTC C1153: P/S Control Module Power Supply Circuit

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Wiring Diagram



I6RW0C630009-01

[A]: P/S control module connector No.1 "E11" (viewed from harness side)	3. Junction block assembly	7. "IGN" fuse
[B]: P/S control module connector No.2 "E13" (viewed from harness side)	4. Main fuse	8. "P/S" fuse
1. Main fuse box	5. P/S control module	9. "IG1 SIG" fuse
2. Ignition switch	6. Individual circuit fuse box No.1	

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
Power supply voltage of P/S control module is less than 9 V for 5 seconds continuously while engine speed is more than 600 rpm. (1 driving cycle detection logic)	<ul style="list-style-type: none"> • P/S control module power supply circuit • Battery • Generator • P/S control module

DTC Troubleshooting

Step	Action	Yes	No
1	Was "EPS System Check" performed?	Go to Step 2.	Go to "EPS System Check".
2	Battery voltage check 1) Check circuit fuse for P/S control module. 2) If OK, measure voltage between positive (+) battery terminal and vehicle body ground with engine running. <i>Is voltage 10 V or more?</i>	Go to Step 3.	Check charging system referring to "Generator Test (Undercharged Battery Check) in Section 1J".
3	P/S control module power supply circuit check Check power supply circuit and ground circuit for P/S control module referring to "P/S Control Module Power Supply and Ground Circuit Check". <i>Is check result in good condition?</i>	Substitute a known-good P/S control module and recheck.	Repair defective circuit.

DTC C1155: P/S Control Module Internal Failure

S6RW0C6304018

Wiring Diagram

Refer to "DTC C1153: P/S Control Module Power Supply Circuit".

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
Internal memory (EEPROM) is data error. (In this case, "EPS" warning light does not light up) or Internal circuit is faulty. or Power supply voltage of P/S control module exceeded 17.5 V (1 driving cycle detection logic)	<ul style="list-style-type: none"> • Generator • P/S control module

DTC Troubleshooting

Step	Action	Yes	No
1	Was "EPS System Check" performed?	Go to Step 2.	Go to "EPS System Check".
2	P/S control module power supply and ground circuit check Check power supply circuit and ground circuit for P/S control module referring to "P/S Control Module Power Supply and Ground Circuit Check". <i>Is check result in good condition?</i>	Go to Step 3.	Repair or replace defective circuit.
3	Battery voltage check 1) Check voltage between positive (+) battery terminal and vehicle body ground with engine speed at 3000 rpm. <i>Is voltage 15.5 V or less?</i>	Replace P/S control module.	Check charging system referring to "Generator Test (Overcharged Battery Check) in Section 1J".

P/S Control Module Power Supply and Ground Circuit Check

S6RW0C6304019

Wiring Diagram

Refer to "DTC C1153: P/S Control Module Power Supply Circuit".

DTC Troubleshooting

Step	Action	Yes	No
1	<p>Circuit fuse check</p> <p>1) Disconnect P/S control module connector with ignition switch turned OFF.</p> <p>2) Check for proper connection to P/S control module connector at "E13-1", "E13-2" and "E11-1" terminals.</p> <p>3) If OK, check "P/S" fuse and "IG1 SIG" fuse for blowing.</p> <p><i>Are "P/S" fuse and "IG1 SIG" fuse in good condition?</i></p>	Go to Step 2.	Replace fuse (s) and check for short in circuits connected to fuse(s).
2	<p>Power supply circuit check</p> <p>1) Measure voltage between "E13-1" terminal of P/S control module connector and body ground.</p> <p><i>Is voltage 10 – 14 V?</i></p>	Go to Step 3.	"GRN" or "WHT" wire is open circuit.
3	<p>Ignition signal check</p> <p>1) Turn ignition switch to ON position.</p> <p>2) Measure voltage between "E11-1" terminal of P/S control module connector and body ground.</p> <p><i>Is voltage 10 – 14 V?</i></p>	Go to Step 4.	"LT GRN / BLK" or "GRN" wire is open circuit.
4	<p>P/S control module ground circuit check</p> <p>1) Turn ignition switch to OFF position.</p> <p>2) Disconnect connectors from P/S control module.</p> <p>3) Measure resistance between "E13-2" terminals of P/S control module connector and body ground.</p> <p><i>Is resistance 1Ω or less?</i></p>	Go to Step 5.	"BLK" wire is open or high resistance circuit.
5	<p>P/S control module ground circuit check</p> <p>1) Connect connectors to P/S control module.</p> <p>2) Start engine.</p> <p>3) Measure voltage between "E13-2" terminals of P/S control module connector and body ground when steering wheel fully turned to left or right.</p> <p><i>Is voltage 0.3 V or less?</i></p>	P/S Control Module Power Supply and Ground Circuit is in good condition.	"BLK" wire is high resistance circuit.

Inspection of P/S Control Module and Its Circuits

The P/S control module and its circuits can be checked at the P/S control module wiring couplers by measuring voltage and resistance.

⚠ CAUTION

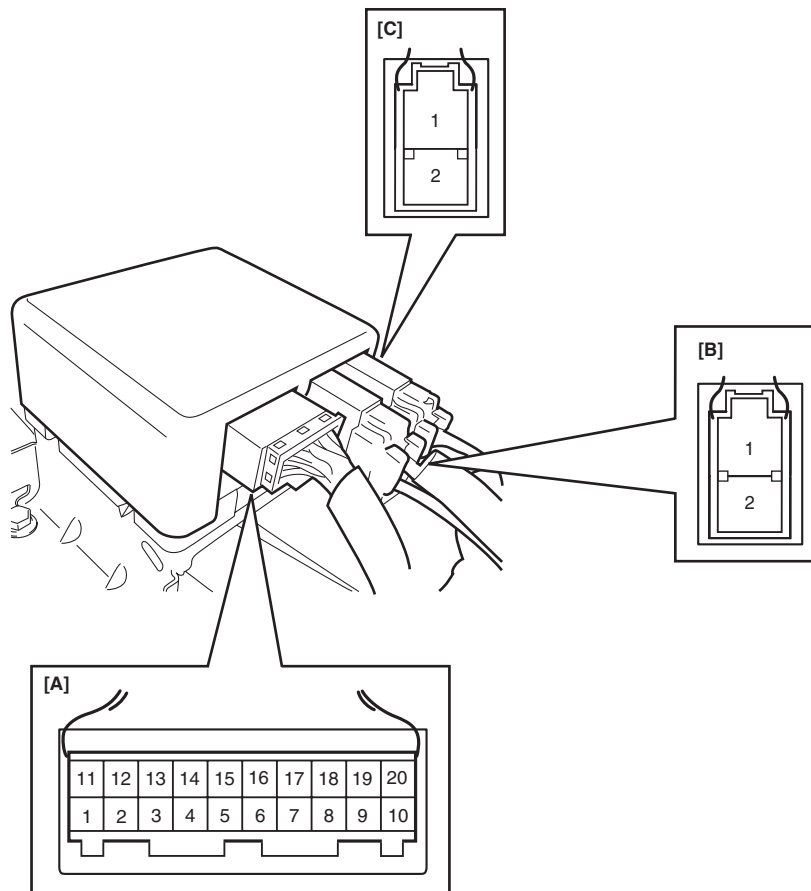
P/S control module cannot be checked by itself. It is strictly prohibited to connect voltmeter or ohmmeter to the P/S control module with connectors disconnected from the P/S control module.

Voltage Check

- 1) Remove console box.
- 2) Check for voltage at each terminal with connectors connected to the P/S control module.

NOTE

As each terminal voltage is affected by the battery voltage, confirm if the battery voltage is 11 V or more when ignition switch is ON.



[A]: P/S control module connector No.1 "E11" (viewed from harness side)
[B]: P/S control module connector No.2 "E13" (viewed from harness side)
[C]: P/S control module connector No.3 "E12" (viewed from harness side)

Terminal	Wire color	Circuit	Normal voltage	Condition
E11-1	LT GRN/BLK	Ignition switch signal for P/S control module	10 – 14 V	Ignition switch ON
E11-2	—	—	—	—
E11-3	—	—	—	—
E11-4	PPL	Vehicle speed signal	*0 – 1 V ↑↓ 8 – 14 V (“Reference waveform No.6” under “Inspection of BCM and Its Circuits in Section 10B”)	<ul style="list-style-type: none"> Ignition switch ON Front left tire turned quickly with right tire locked
E11-5	GRY	“EPS” warning light	0 V 0 – 14 V	Ignition switch ON Engine running
E11-6	—	—	—	—
E11-7	—	—	—	—
E11-8	GRN	9 V power supply for torque sensor	About 9 V	<ul style="list-style-type: none"> Ignition switch ON Voltage between “E11-8” and “E11-9” terminals
E11-9	BLK	Ground for torque sensors	—	—
E11-10	WHT	Torque sensor signal (Sub)	About 2.5 – 4.0 V	<ul style="list-style-type: none"> Steering wheel with left turn Out put voltage varies linearly depending on steering force
			About 2.5 V	Steering wheel at free
			About 1.0 – 2.5 V	<ul style="list-style-type: none"> Steering wheel with right turn Out put voltage varies linearly depending on steering force
E11-11	BLU	Serial communication circuit for data link connector	—	—
E11-12	BRN	Engine speed signal	*0 – 1 V ↑↓ 8 – 14 V (“Reference waveform No.26 and No.27” under “Inspection of ECM and Its Circuits in Section 1A”)	Engine idling
E11-13	—	—	—	—
E11-14	RED/BLU	P/S active signal (idle up signal)	About 12 V	Ignition switch ON
			0 – 1 V	Engine idling and turned steering wheel to the right or left until it stops
E11-15	—	—	—	—
E11-16	—	—	—	—
E11-17	—	—	—	—
E11-18	YEL	Torque sensor signal (Main)	About 1.0 – 2.5 V	<ul style="list-style-type: none"> Steering wheel with left turn Out put voltage varies linearly depending on steering force
			About 2.5 V	Steering wheel at free
			About 2.5 – 4.0 V	<ul style="list-style-type: none"> Steering wheel with right turn Out put voltage varies linearly depending on steering force
E11-19	GRY	Ground for shield wire	—	—

Terminal	Wire color	Circuit	Normal voltage	Condition
E11-20	RED	Reference sensor power supply for torque sensor	About 3.0 – 3.5 V	<ul style="list-style-type: none"> Ignition switch ON Check voltage between “E11-20” and “E11-9” terminals
E12-1	BLK	Motor output 1	*0 – 1 V ↑↓ 10 – 14 V (“Reference waveform No.1: ”, “Reference waveform No.2: ” and “Reference waveform No.3: ”)	<ul style="list-style-type: none"> Engine idling and steering wheel at straight position Voltage between “E12-1” and vehicle body ground
E12-2	RED	Motor output 2	*0 – 1 V ↑↓ 10 – 14 V (“Reference waveform No.1: ”, “Reference waveform No.2: ” and “Reference waveform No.3: ”)	<ul style="list-style-type: none"> Engine idling and steering wheel at straight position Voltage between “E12-2” and vehicle body ground
E13-1	GRN	Main power supply for internal memory and P/S motor	10 – 14 V	—
E13-2	BLK	Ground for P/S control module	Below 0.3 V	—

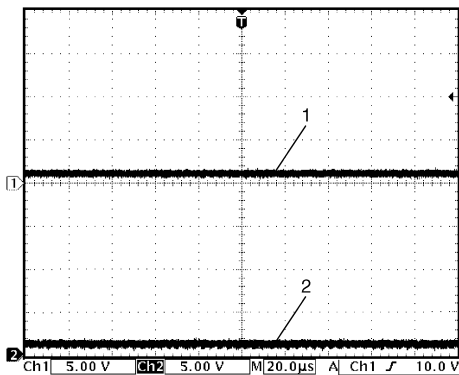
NOTE

*: The voltage of this circuit may not be checked by voltmeter. If so, use oscilloscope.

Reference waveform No.1

Motor output signal 1(1), Motor output signal 2(2), with engine idling

Measurement terminal	CH1: “E12-1” to vehicle body ground CH2: “E12-2” to vehicle body ground
Oscilloscope setting	CH1: 5 V/DIV, CH2: 5 V/DIV TIME: 20 μs/DIV
Measurement condition	<ul style="list-style-type: none"> Engine is idling and steering wheel at straight position



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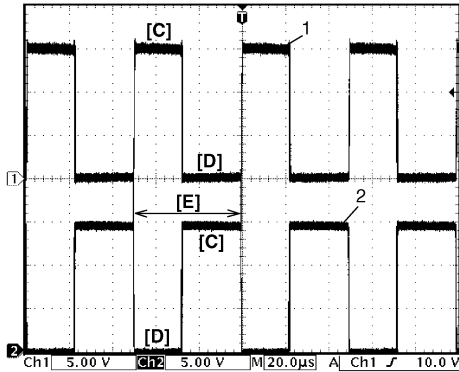
6C-34 Power Assisted Steering System:

Reference waveform No.2

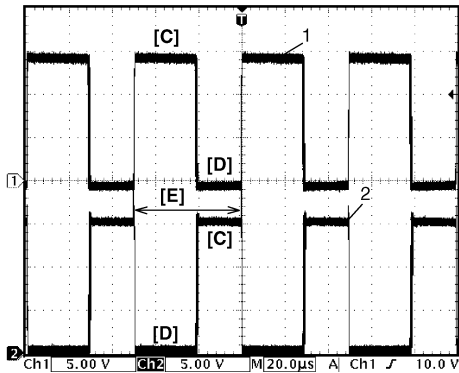
Motor output signal 1(1), Motor output signal 2(2), with engine idling

Measurement terminal	CH1: "E12-1" to vehicle body ground CH1: "E12-2" to vehicle body ground
Oscilloscope setting	CH1: 5 V/DIV, CH2: 5 V/DIV TIME: 20 μ s/DIV
Measurement condition	• Engine is idling and steering wheel is turned to left or right at turning speed of 90° /sec

[A]



[B]



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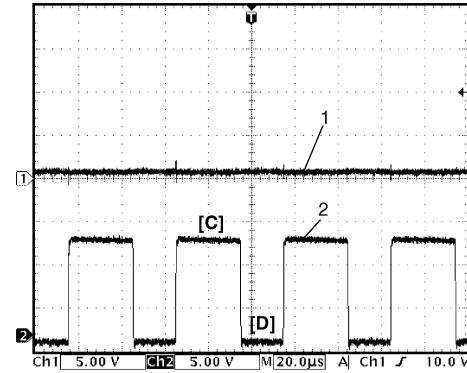
[A]:	Steering wheel is turned left at turning speed of 90° /sec
[B]:	Steering wheel is turned right at turning speed of 90° /sec
[C]:	12 V ON
[D]:	GND ON
[E]:	1 duty cycle

Reference waveform No.3

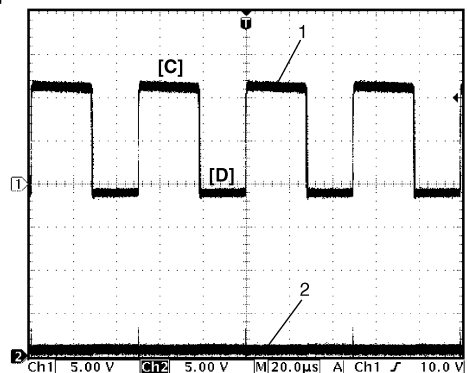
Motor output signal 1(1), Motor output signal 2(2), with engine idling

Measurement terminal	CH1: "E12-1" to vehicle body ground CH1: "E12-2" to vehicle body ground
Oscilloscope setting	CH1: 5 V/DIV, CH2: 5 V/DIV TIME: 20 μ s/DIV
Measurement condition	• Engine is idling and steering wheel is kept fully turned to left or right until it stops

[A]



[B]



I6RS0B630019-01

[A]:	Steering wheel is kept fully turned left unit it stops
[B]:	Steering wheel is kept fully turned right unit it stops
[C]:	12 V ON
[D]:	GND ON

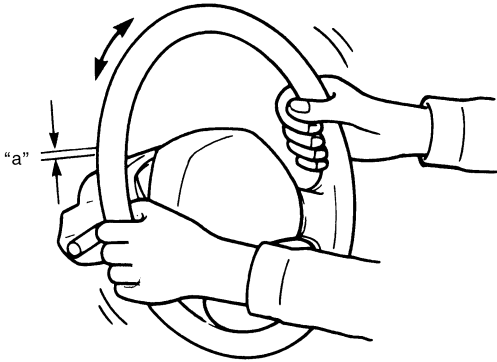
Steering Wheel Play Check

S6RW0C6304021

- Check steering wheel for looseness or rattle by moving it in its shaft direction and lateral direction. If found defective, repair or replace.
- Check steering wheel for play, holding vehicle in straight forward condition on the ground with engine stopped. If steering wheel play is not within specification, inspect as follows and replace if found defective.
 - Tie-rod end ball stud for wear (Ball stud should move when more than 0.2 N·m (2 kg-cm, 0.44 lb-ft) torque is applied.)
 - Lower ball joint for wear
 - Steering shaft joint for wear
 - Steering pinion or rack gear for wear or breakage
 - Each part for looseness

Steering wheel play “a”

: 0 – 30 mm (0 – 1.18 in.)



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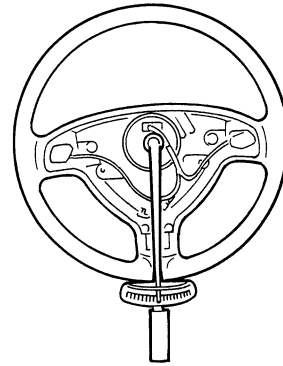
Steering Force Check

S6RW0C6304022

- 1) Place vehicle on level road and set steering wheel at straight-ahead position.
- 2) Check if tire inflation pressure is as specified referring to the tire placard.
- 3) Remove driver air bag (inflator) module referring to “Driver Air Bag (Inflator) Module Removal and Installation in Section 8B”.
- 4) Start engine.
- 5) With engine idling, measure steering force by turning torque wrench.

Steering force

: Less than 6.4 N·m (0.64 kgf-m, 4.6 lb-ft)



I3RM0A630022-01

- 6) Install driver air bag (inflator) module referring to “Driver Air Bag (Inflator) Module Removal and Installation in Section 8B”.

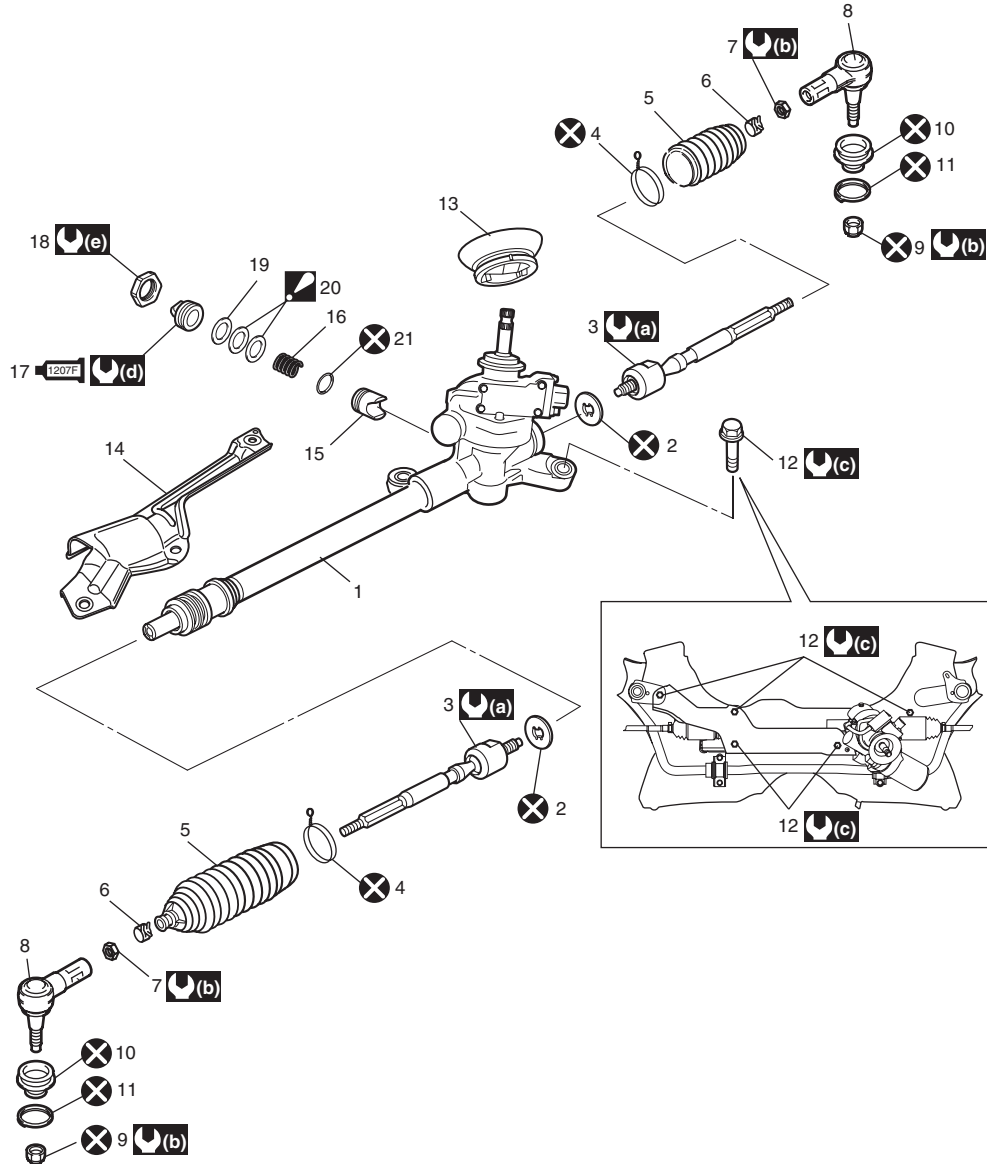
Repair Instructions

Steering Gear Case Assembly Components

S6RW0C6306001

NOTE

The figure shows left-hand steering vehicle. For right-hand steering vehicle the figure is symmetrical.



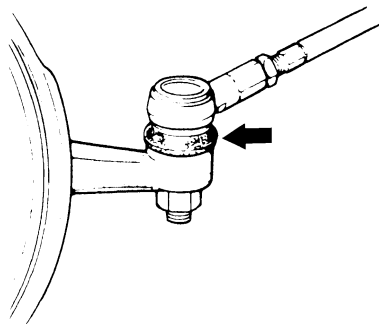
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1. Steering gear case	10. Boot	19. Washer
2. Tie-rod lock washer	11. Clip	20. Spring washer : Make sure of the direction of installation referring to "Steering Rack Plunger Removal and Installation".
3. Tie-rod	12. Steering gear case mounting bolt : Refer to "Steering Gear Case Assembly Removal and Installation".	21. O-ring
4. Wire	13. Steering gear case grommet	(a) : 75 N·m (7.5 kgf·m, 54.5 lb-ft)
5. Boot	14. Member bracket	(b) : 45 N·m (4.5 kgf·m, 32.5 lb-ft)
6. Rack boot clip	15. Steering rack plunger	(c) : 70 N·m (7.0 kgf·m, 51.0 lb-ft)
7. Tie-rod end lock nut	16. Steering rack plunger spring	(d) : Refer to "Steering Rack Plunger Removal and Installation".
8. Tie-rod end	17. Steering rack damper screw : Apply sealant 99000-31250 to all around thread part of rack damper screw.	(e) : 60 N·m (6.0 kgf·m, 43.5 lb-ft)
9. Tie-rod end nut	18. Steering rack damper lock nut	(X) : Do not reuse.

Tie-Rod End Boot On-Vehicle Inspection

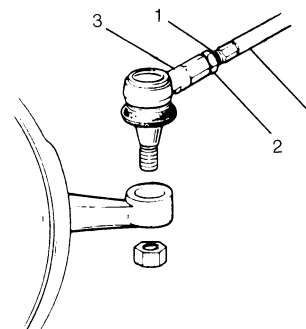
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Check boot for crack and damage. If any defect is found, replace it with a new one.



I3RM0A630024-01

- 4) For ease of adjustment after installation, make marking (1) of tie-rod end lock nut (2) position on tie-rod end thread. Then, loosen lock nut and remove tie-rod end (3) from tie-rod (4).



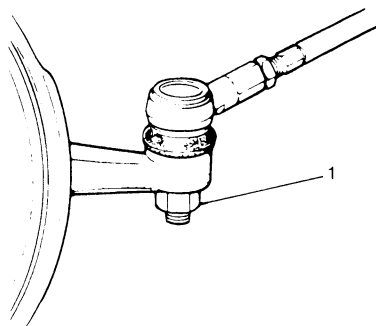
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Tie-Rod End Removal and Installation

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Removal

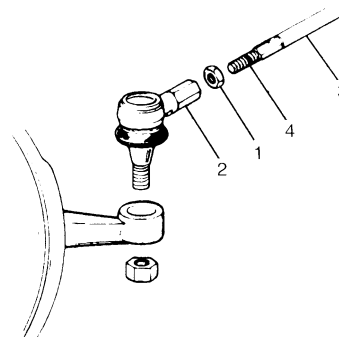
- 1) Hoist vehicle, and then remove front wheel.
- 2) Remove tie-rod end nut (1) from steering knuckle.



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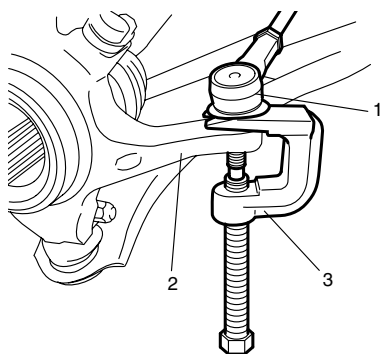
Installation

- 1) Install tie-rod end lock nut (1) and tie-rod end (2) to tie-rod (3). Align lock nut with mark (4) on tie-rod thread.



I4RS0A630042-01

- 3) Disconnect tie-rod end (1) from knuckle (2) using puller (3).

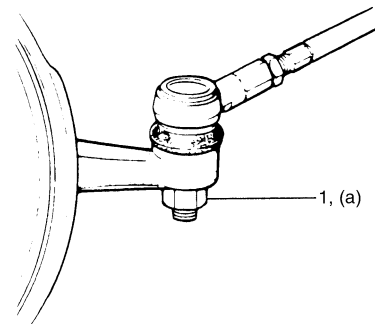


I4RS0A630040-01

- 2) Connect tie-rod end to knuckle. Tighten tie-rod end nut (1) to specified torque.

Tightening torque

Tie-rod end nut (a): 45 N·m (4.5 kgf-m, 32.5 lb-ft)



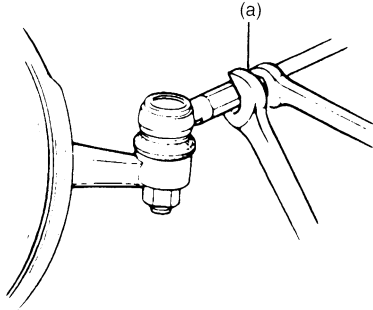
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6C-38 Power Assisted Steering System:

- 3) Inspect for proper toe referring to "Front Wheel Alignment Inspection and Adjustment in Section 2B".
- 4) After confirming proper toe, tighten tie-rod end lock nut to specified torque.

Tightening torque

Tie-rod end lock nut (a): 45 N·m (4.5 kgf-m, 32.5 lb-ft)



I3RM0A630030-01

- 5) Tighten wheel bolts to specified torque and lower hoist.

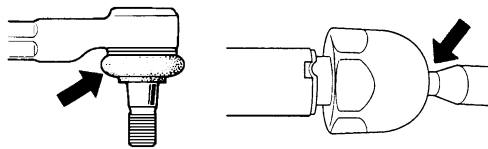
Tightening torque

Wheel bolt: 85 N·m (8.5 kgf-m, 61.5 lb-ft)

Tie-Rod End Inspection

S6RW0C6306004

- Inspect for play in ball joint.
 - Inspect for play in rack end ball joint.
- In either case, if found defective, replace.

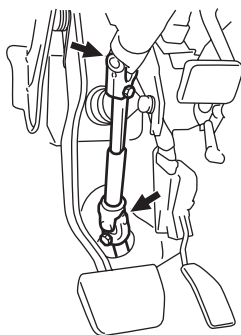


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Steering Shaft Joint On-Vehicle Inspection

S6RW0C6306005

Check shaft joint for wear, breakage and any other damage and replace if any defect exists.



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Steering Gear Case Assembly Removal and Installation

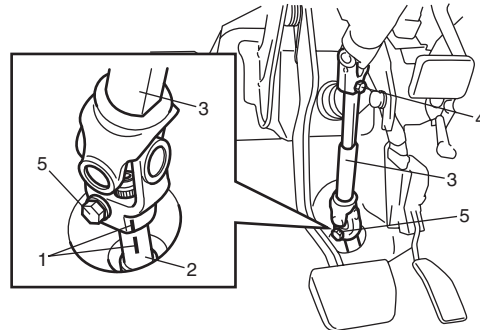
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Removal

⚠ CAUTION

Be sure to set front wheels (tires) in straight direction and remove ignition key from key cylinder before performing the following steps, otherwise, contact coil of air bag system may get damaged.

- 1) Remove steering joint cover.
- 2) Make alignment marks (1) on pinion shaft (2) and joint of steering lower shaft (3) for a guide during reinstallation.
- 3) Loosen joint bolt (steering column side) (4) and remove joint bolt (pinion shaft side) (5) and disconnect steering lower shaft (3) from pinion shaft (2).

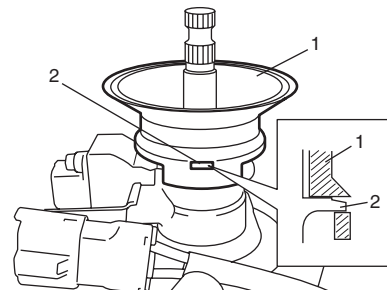


I4RS0B630013-01

- 4) Disconnect torque sensor connector and P/S motor connector from steering gear case.
- 5) Remove front suspension frame with steering gear case referring to "Front Suspension Frame, Stabilizer Bar and/or Bushing Removal and Installation (2WD Model) in Section 2B" or "Front Suspension Frame, Stabilizer Bar and/or Bushing Removal and Installation (4WD Model) in Section 2B", and then remove steering gear case.

Installation

- 1) Install grommet (1) as shown in figure.



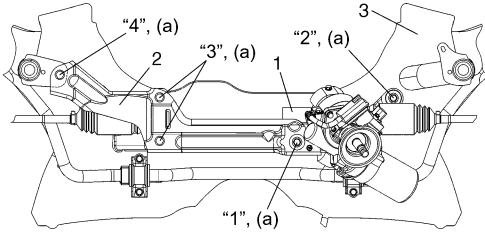
I5RW0A630018-02

2. Protrusion

- 2) Install steering gear case to suspension frame (3) as follows.
 - a) Set member bracket (2) to steering gear case (1).
 - b) Install all steering gear case mounting bolts by hand.
 - c) Tighten steering mounting bolts in numerical order and specified torque.

Tightening torque

Steering gear case mounting bolt (a): 70 N·m (7.0 kgf-m, 51.0 lb-ft)

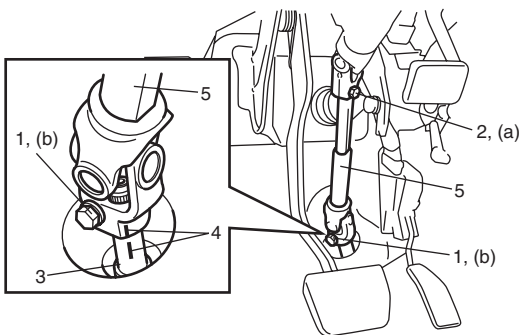


- 3) Install front suspension frame with steering gear case to vehicle referring to Steps 4) – 22) of “Front Suspension Frame, Stabilizer Bar and/or Bushing Removal and Installation (2WD Model) in Section 2B” or “Front Suspension Frame, Stabilizer Bar and/or Bushing Removal and Installation (4WD Model) in Section 2B”, and then install steering gear case to vehicle.
- 4) Connect torque sensor connector and P/S motor connector to steering gear case.
- 5) Be sure that steering wheel and brake discs (right & left) are all straight-ahead position and then insert steering lower shaft (5) into steering pinion shaft (3) with matching marks (4).
- 6) Tighten steering shaft joint lower bolt (1) and upper bolt (2) to specified torque (tighten lower side first and then tighten upper side).

Tightening torque

Steering lower shaft assembly upper joint bolt (a): 25 N·m (2.5 kgf-m, 18.5 lb-ft)

Steering lower shaft assembly lower joint bolt (b): 25 N·m (2.5 kgf-m, 18.5 lb-ft)



- 7) Install steering joint cover.

Steering Rack Boot Inspection

S6RW0C6306007

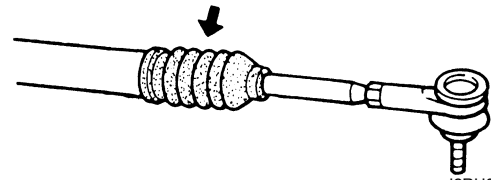
Hoist vehicle.

Inspect each boot for tear. A torn boot allows entry of dust and water which can cause wear to steering rack and pinion to produce noise as well as rust to result in malfunction of steering system.

Even if boot tear is small, replace with new one.

Also, check each boot for dent. If there is a dent, keep boot in most compressed state for some seconds to correct dent.

Boots should be visually inspected for any damage, dent and tear during every periodical inspection at specified intervals and whenever vehicle is hoisted for any other purpose.

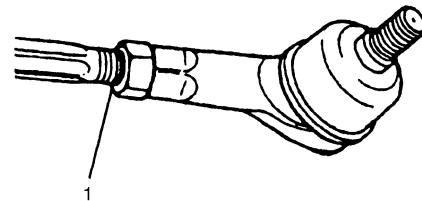


Tie-Rod / Rack Boot Removal and Installation

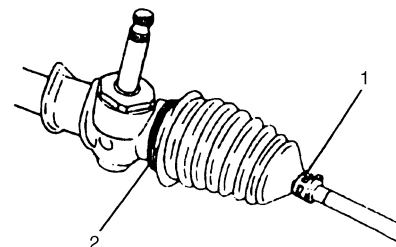
S6RW0C6306008

Removal

- 1) Remove steering gear case assembly referring to “Steering Gear Case Assembly Removal and Installation”.
- 2) Remove member bracket from steering gear case assembly.
- 3) For ease of adjustment after installation, make marking (1) of tie-rod end lock nut position of tie-rod thread.

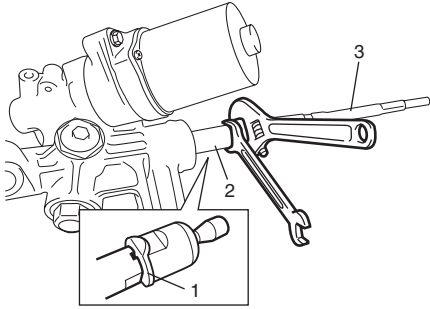


- 4) Loosen tie-rod end lock nut and remove tie-rod end.
- 5) Remove boot band (2) and clip (1).
- 6) Remove boot from tie-rod.



6C-40 Power Assisted Steering System:

- 7) Unbend bent part of tie-rod lock washer (1).
- 8) Remove tie-rod (3) from rack (2).



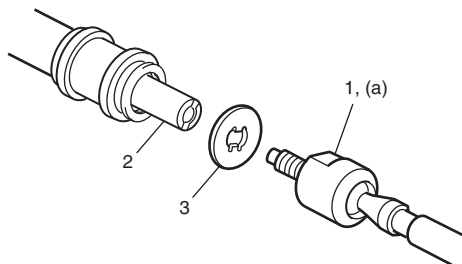
I5RW0A630021-01

Installation

- 1) Install tie-rod (1) and new tie-rod lock washer (3) to rack (2).
- 2) Hold rack with soft jawed vise and tighten tie-rod to specified torque.

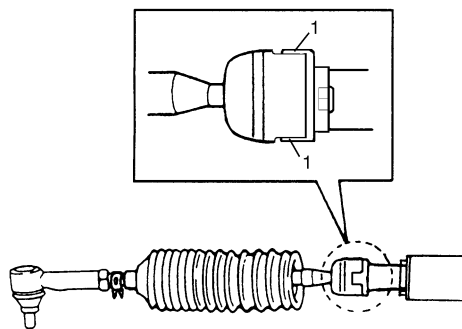
Tightening torque

Tie-rod (a): 75 N·m (7.5 kgf-m, 54.5 lb-ft)



I6RW0B630019-01

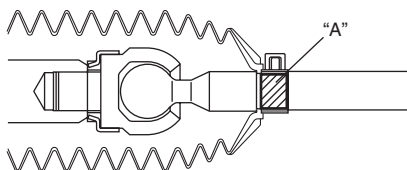
- 3) Bend lock washer at 2 places (1) as shown in figure.



I4RS0A630035-01

- 4) Apply grease "A" to boot inside as shown in figure. Position boot properly in grooves of gear case (or rack side mount) and tie-rod. After this, check to ensure that boot is free from twist and dent.

"A": Grease 99000-25050 (SUZUKI Super Grease E)



I7RW01632010-01

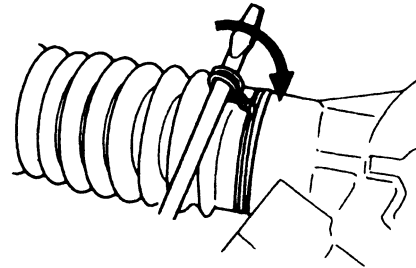
Edited by Foxit PDF Editor
Copyright (c) by Foxit Software Company, 2004
For Evaluation Only.

- 5) Clamp boot with clip and wire. Wire should be new and should go around the boot twice. Pull its both ends together by screwdriver or such and make sure that the wire won't be crossed. Then twist the ends 4 – 5 times, the twisted ends should be bent in the circumferential direction.

NOTE

After clamping, make sure that the boot installation part is fixed.

If the boot turns easily by hand, tighten with higher torque to fix it firmly.

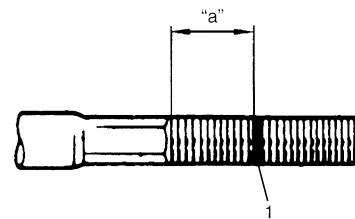


IYSQ01630035-01

- 6) Install tie-rod end lock nut and tie-rod end to tie-rod. Position lock nut to marking (1) made in removal.

NOTE

When tie-rod was replaced, measure length "a" on removed tie-rod and use it on new replacement tie-rod so as to position lock nut properly.



I3RM0A630052-01

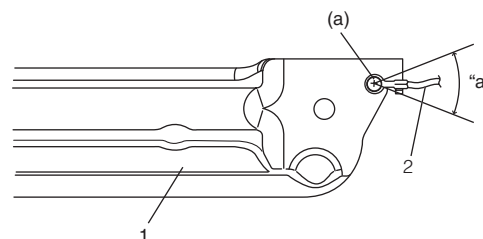
- 7) Install member bracket (1), and then install earth cable (2) as shown in figure.

Angle "a"

: Within 20°

Tightening torque

Earth cable bolt (a): 4.0 N·m (0.4 kgf-m, 2.8 lb-ft)



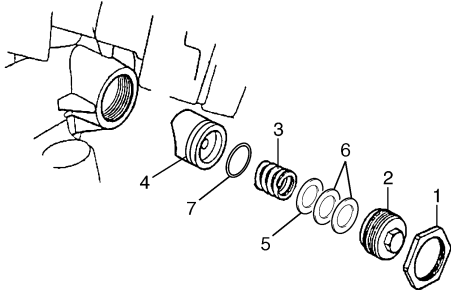
I6RW0C630011-01

Steering Rack Plunger Removal and Installation

S6RW0C6306009

Removal

- 1) Loosen lock nut (1) with holding damper screw (2).
- 2) Remove lock nut (1), rack damper screw (2), rack plunger spring (3), washer (5), spring washers (6), O-ring (7) and rack plunger (4).



I5RW0A630024-02

Installation

- 1) Install plunger (1), new O-ring (6), washer (4), spring washers (5) and spring (2) as shown.

NOTE

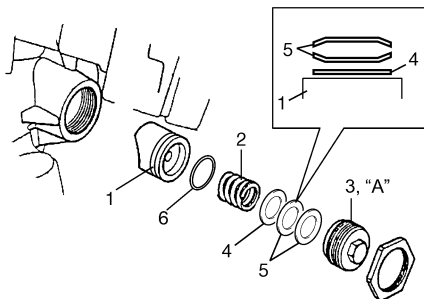
Do not wipe off grease previously applied to new plunger.

- 2) Apply sealant to rack damper screw (3) and tighten them as follows.
 - a) Tighten damper screw to 25 N·m (2.5 kgf·m, 18.0 lb·ft).
 - b) Loosen damper screw until 180°.
 - c) Retighten damper screw to 3.9 N·m (0.39 kgf·m, 3.0 lb·ft).
 - d) After tightening rack damper screw to specified torque, turn it back by 10° or less.

“A”: Water tight sealant 99000–31250 (SUZUKI Bond No.1207F)

Tightening torque

Rack damper screw (a): Tighten 25 N·m (2.5 kgf·m, 18.0 lb·ft) and loosen 180° and then tighten 3.9 N·m (0.39 kgf·m, 3.0 lb·ft) and turn it back by 10° or less by the specified procedure.



I5RW0A630025-03

- 3) Pinion rotation torque should be checked with rack position centered.

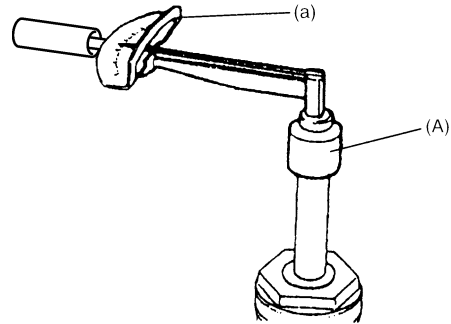
Also, check if rack as a whole moves smoothly.

Special tool

(A): 09944–18220

Tightening torque

Rotation torque of pinion (a): 2.2 N·m (0.22 kgf·m, 1.5 lb·ft)



I3RM0A630055-02

- 4) After adjustment, tighten lock nut to specified torque with holding damper screw at the position.

Tightening torque

Steering rack damper lock nut: 60 N·m (6.0 kgf·m, 43.5 lb·ft)

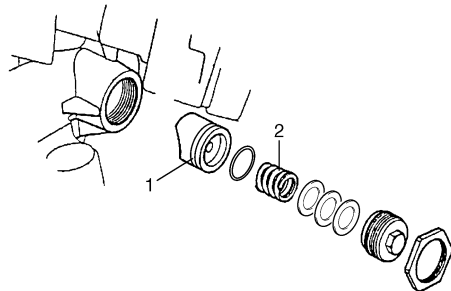
Steering Rack Plunger Inspection

S6RW0C6306010

NOTE

Do not wipe off grease applied to rack plunger which is removed.

- Inspect rack plunger (1) for wear or damage.
- Inspect rack plunger spring (2) for deterioration. If any abnormality is found, replace.

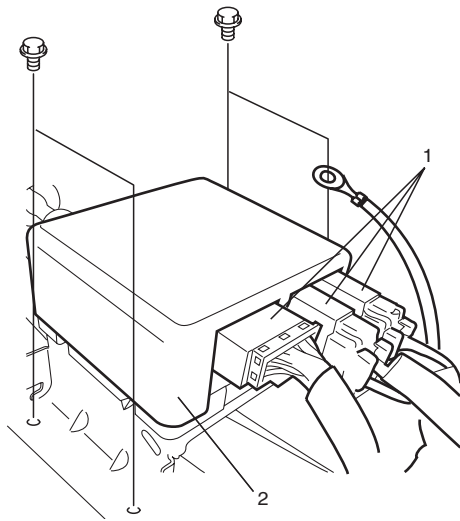


I5RW0A630026-02

P/S Control Module Removal and Installation

S6RW0C6306011

Removal



I5RW0A630027-01

- 1) Disconnect negative cable at battery.
- 2) Remove console box.
- 3) Disconnect connectors (1) from P/S control module.
- 4) Remove P/S control module and bracket (2) from floor panel.
- 5) Separate P/S control module and bracket.

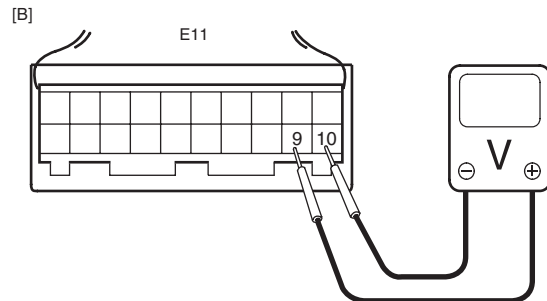
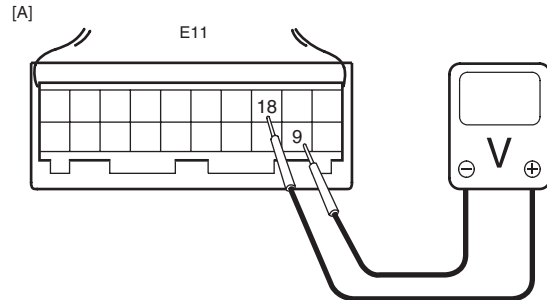
Installation

Reverse removal procedure.

Torque Sensor and Its Circuit Inspection

S6RW0C6306012

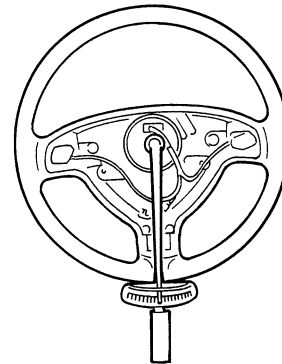
- 1) Check that torque sensor circuit is in good condition referring to Step 2 to 3 of "DTC C1111 / C1113 / C1115: Torque Sensor Circuit Failure". If check result is not satisfactory, repair torque sensor circuit.
- 2) Remove console box.
- 3) With ignition switch turned OFF, connect scan tool to DLC or connect voltage tester between "E11-18" – "E11-9" (main sensor) or "E11-10" – "E11-9" (sub sensor) with connected connector to P/S control module.



I7RW01632021-01

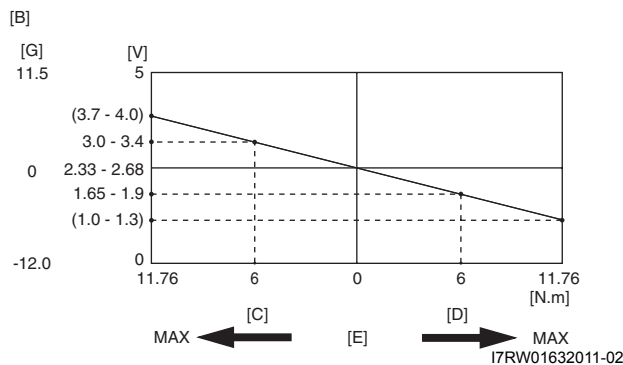
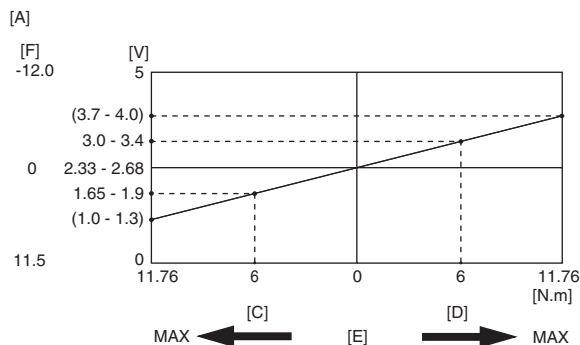
[A]: Main sensor	[B]: Sub sensor
------------------	-----------------

- 4) Set torque wrench to steering wheel referring to "Steering Force Check" for checking steering force.



I3RM0A630022-01

- 5) Turn ON ignition switch without engine running and select scan tool "Data List" mode due to checking "Sensor (Main) Torque" and "Sensor (Sub) Torque" displayed on scan tool when steering wheel turned left and right (if used).
- 6) Check that characteristic of torque sensor (main and sub) output voltage or scan tool data and steering force is as following graph when steering wheel is turned left and right. If sensor voltage or scan tool data is out of specified value or does not vary linearly as the following graph, check EPS control module and its circuit referring to "Inspection of P/S Control Module and Its Circuits".
 If they are OK, replace steering gear case assembly.



[A]: Main sensor
[B]: Sub sensor
[C]: Steering force at left turn
[D]: Steering force at right turn
[E]: Steering wheel at free
[F]: "Sensor (Main) Torque" in "Data List" displayed on scan tool
[G]: "Sensor (Sub) Torque" in "Data List" displayed on scan tool

P/S Motor and Its Circuit Inspection

S6RW0C6306013

- 1) Check motor circuit referring to Step 2 to 3 of "DTC C1141 / C1142 / C1143 / C1145: Motor Circuit Failure". If check result is not satisfactory, repair motor circuit.
- 2) Disconnect motor connector from steering gear case assembly with ignition switch turned OFF.
- 3) Check for resistance between terminals of motor connector.
 If check result is not as specified, check P/S motor harness for continuity. If it is OK, replace steering gear case assembly.

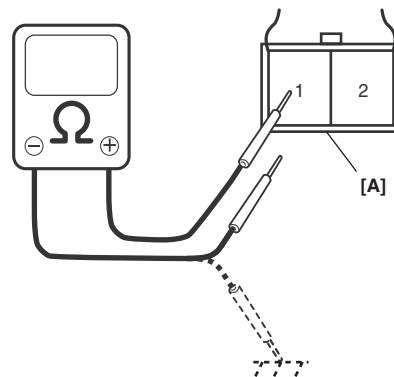
Motor circuit resistance

"E12-1" and "E12-2" (For motor)	Approx. 1 Ω
---------------------------------	-------------

- 4) Check for insulation between each terminal of motor connector and body ground.
 If check result is not as specified, check P/S motor harness for insulation. If it is OK, replace steering gear case assembly.

Motor circuit resistance

Each terminal and body ground	No continuity
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I6RW0C630012-02

[A]: Motor connector "E12" (viewed from harness side)

6C-44 Power Assisted Steering System:

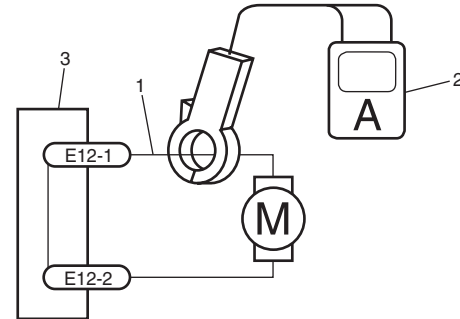
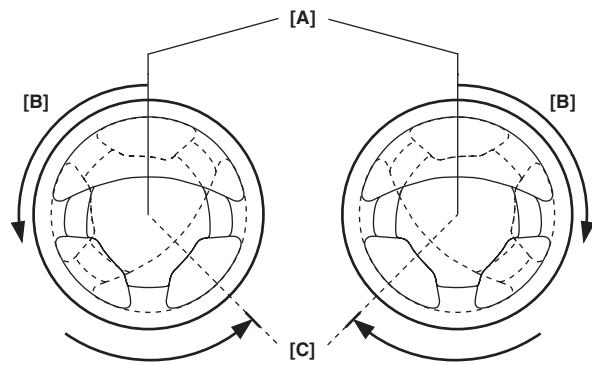
- 5) Hoist vehicle
- 6) Check that steering wheel turns to left and right smoothly. If steering wheel does not turn smoothly, inspect and repair defective steering and suspension parts.
- 7) Connect "E12" connector with ignition switch turned OFF.
- 8) Using ammeter (2), check that P/S motor current (1) is as following table with idling engine. If check result is not satisfactory, check P/S control module for torque sensor signal and P/S motor output referring to "Inspection of P/S Control Module and Its Circuits". If they are OK, replace steering gear case assembly.

NOTE

When P/S motor is cold condition (that is, armature coil of P/S motor is not heated), motor current in the following table can be measured

Motor current at hoisted vehicle (reference value)

Condition	When steering wheel is left at straight position: [A]	When steering wheel is turned left or right by turning speed with 90° /sec: [B]	When steering wheel is kept fully turned left or right until it stops.: [C]
Motor current	Approx. 0 A	Approx. 0 – 5 A	Approx. 45 – 60 A



I7RW01632012-01

3. P/S control module

Specifications

Tightening Torque Specifications

S6RW0C6307001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Tie-rod end nut	45	4.5	32.5	☞
Tie-rod end lock nut	45	4.5	32.5	☞
Wheel bolt	85	8.5	61.5	☞
Steering gear case mounting bolt	70	7.0	51.0	☞
Steering lower shaft assembly upper joint bolt	25	2.5	18.5	☞
Steering lower shaft assembly lower joint bolt	25	2.5	18.5	☞
Tie-rod	75	7.5	54.5	☞
Earth cable bolt	4.0	0.4	2.8	☞
Rack damper screw	Tighten 25 N·m (2.5 kgf·m, 18.0 lb·ft) and loosen 180° and then tighten 3.9 N·m (0.39 kgf·m, 3.0 lb·ft) and turn it back by 10° or less by the specified procedure.			☞
Rotation torque of pinion	2.2	0.22	1.5	☞
Steering rack damper lock nut	60	6.0	43.5	☞

NOTE

The specified tightening torque is also described in the following.
 “Steering Gear Case Assembly Components”

Reference:

For the tightening torque of fastener not specified in this section, refer to “Fasteners Information in Section 0A”.

Special Tools and Equipment

Recommended Service Material

S6RW0C6308001


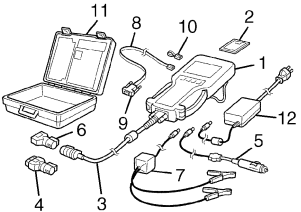
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI Super Grease E	P/No.: 99000-25050	☞
Water tight sealant	SUZUKI Bond No.1207F	P/No.: 99000-31250	☞

NOTE

Required service material is also described in the following.
 “Steering Gear Case Assembly Components”

Special Tool

S6RW0C6308002

09944-18220 Pinion torque checking socket ☞		SUZUKI scan tool — This kit includes following items. 1. Tech 2, 2. PCMCIA card, 3. DLC cable, 4. SAE 16/19 adapter, 5. Cigarette cable, 6. DLC loop back adapter, 7. Battery power cable, 8. RS232 cable, 9. RS232 adapter, 10. RS232 loop back connector, 11. Storage case, 12. ☞ / ☞	
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