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# SUSPENSION AND AXLE

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## REFER TO FOLLOWING REPAIR MANUALS:

Manual Name	Pub. No.
YARIS / ECHO Chassis and Body Repair Manual	RM685E
YARIS / ECHO Chassis and Body Repair Manual Supplement (Aug., 1999)	RM737E
YARIS / ECHO Chassis and Body Repair Manual Supplement (Jan., 2001)	RM838E

NOTE: The above pages contain only the points which differ from the above listed manuals.

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# TIRE AND WHEEL INSPECTION

SA0CC-15

## 1. INSPECT TIRE

(a) Check the tires for wear and proper inflation pressure.

**Cold tire inflation pressure**

**(EUROPE DIESEL):**

**Vehicle load up to 2 passengers**

Vehicle speed	Front kPa (kgf/cm <sup>2</sup> , psi)	Rear kPa (kgf/cm <sup>2</sup> , psi)
Vehicle speed is not concerned	230 (2.3, 33)	210 (2.1, 30)

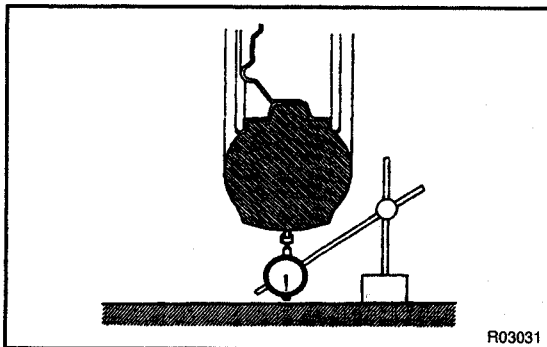
**Vehicle load up to 5 passengers**

**155/ 80R 13:**

Vehicle speed	Front kPa (kgf/cm <sup>2</sup> , psi)	Rear kPa (kgf/cm <sup>2</sup> , psi)
Under 160 km/h (100 mph)	230 (2.3, 33)	210 (2.1, 30)
160 km/h (100 mph) or over	230 (2.3, 33)	230 (2.3, 33)

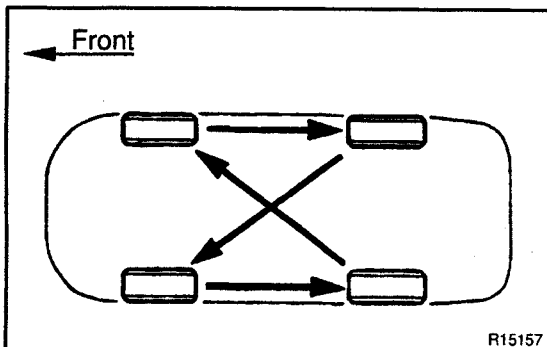
**175/ 65R 14:**

Vehicle speed	Front kPa (kgf/cm <sup>2</sup> , psi)	Rear kPa (kgf/cm <sup>2</sup> , psi)
Under 160 km/h (100 mph)	230 (2.3, 33)	210 (2.1, 30)
160 km/h (100 mph) or over	230 (2.3, 33)	220 (2.2, 32)



(b) Using a dial indicator, check the tire runout.

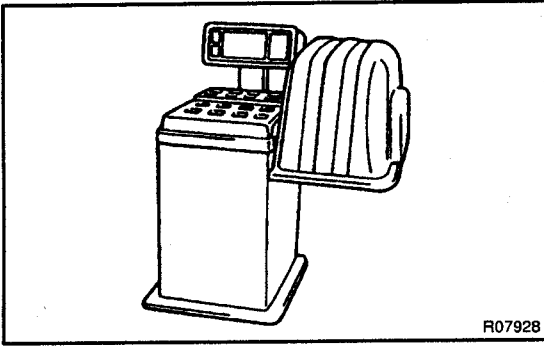
**Tire runout: 1.0 mm (0.039 in.) or less**



## 2. ROTATING TIRES

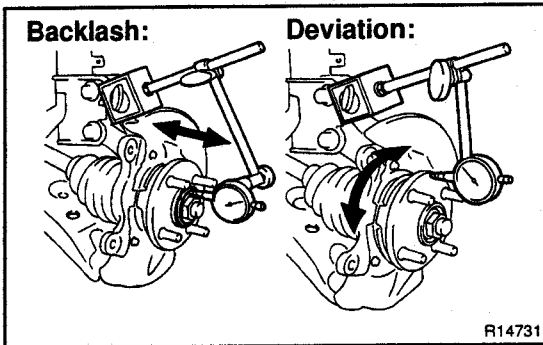
**HINT:**

See the illustration for where to rotate each tire.



### 3. INSPECT WHEEL BALANCE

- (a) Check and adjust the Off-the-car balance.
  - (b) If necessary, check and adjust the On-the-car balance.
- Imbalance after adjustment: 8.0 g (0.018 lb) or less**



### 4. CHECK WHEEL BEARING LOOSENESS

- (a) Using a dial indicator, check the backlash near the center of the axle hub.

**Maximum: 0.05 mm (0.0020 in.)**

If the backlash exceeds the maximum, replace the bearing.

- (b) Using a dial indicator, check the deviation at the surface of the axle hub outside the hub bolt.

**Maximum: 0.07 mm (0.0028 in.)**

If the deviation exceeds the maximum, replace the axle hub.

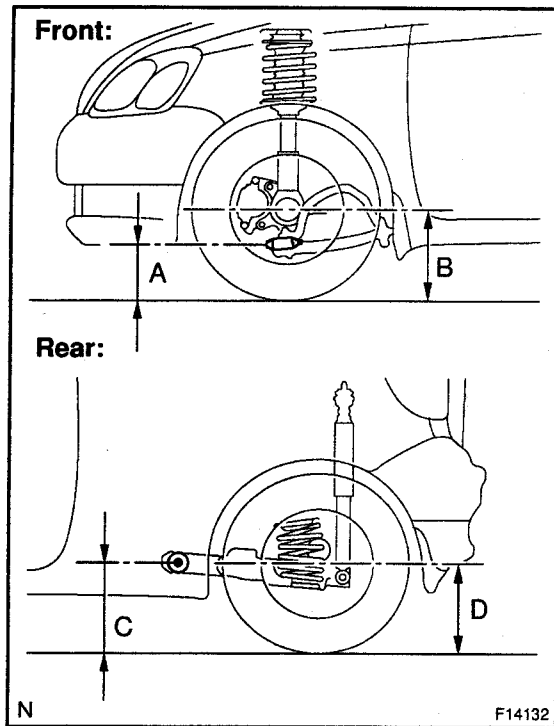
### 5. CHECK FRONT SUSPENSION FOR LOOSENESS

### 6. CHECK STEERING LINKAGE FOR LOOSENESS

### 7. CHECK BALL JOINT FOR LOOSENESS

### 8. CHECK SHOCK ABSORBER WORKS PROPERLY

- Check if oil leaks
- Check mounting bushings for wear
- Bounce front and rear of the vehicle



## FRONT WHEEL ALIGNMENT INSPECTION

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### 1. MEASURE VEHICLE HEIGHT

Vehicle height:

(EUROPE DIESEL):

Front vehicle height	Rear vehicle height
85 mm (3.35 in.)	9 mm (0.35 in.)

Measuring points:

A: Ground clearance of the front lower suspension arm mounting bolt center.

B: Ground clearance of the front wheel center

C: Ground clearance of the rear axle beam mounting bolt center

D: Ground clearance of the rear wheel center

Vehicle height:

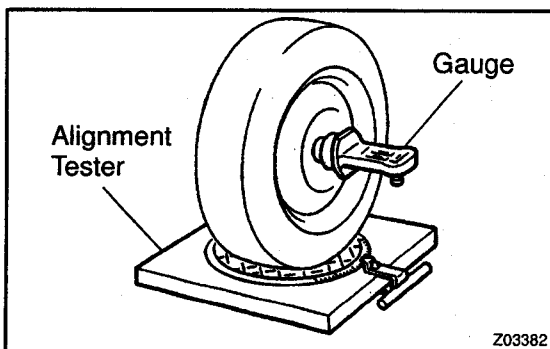
Front: B – A

Rear: D – C

### NOTICE:

**Before inspecting the wheel alignment, adjust the vehicle height to the specified value.**

If the vehicle height is not the specified value, try to adjust it by pushing down on or lifting the body.



### 2. INSTALL CAMBER-CASTER-KINGPIN GAUGE OR POSITION VEHICLE ON WHEEL ALIGNMENT TESTER

Follow the specific instructions of the equipment manufacturer.

### 3. INSPECT CAMBER, CASTER AND STEERING AXIS INCLINATION

Camber, caster and steering axis inclination:

(EUROPE DIESEL):

Camber	Right-left error	$-0^{\circ}35' \pm 45'$ ( $-0.58^{\circ} \pm 0.75^{\circ}$ ) 45' (0.75°) or less
Caster	Manual steering	$0^{\circ}34' \pm 45'$ ( $0.57^{\circ} \pm 0.75^{\circ}$ )
	Power steering	$1^{\circ}33' \pm 45'$ ( $1.55^{\circ} \pm 0.75^{\circ}$ )
	Right-left error	45' (0.75°) or less
Steering axis inclination		$10^{\circ}04' \pm 45'$ ( $10.07^{\circ} \pm 0.75^{\circ}$ )
	Right-left error	45' (0.75°) or less

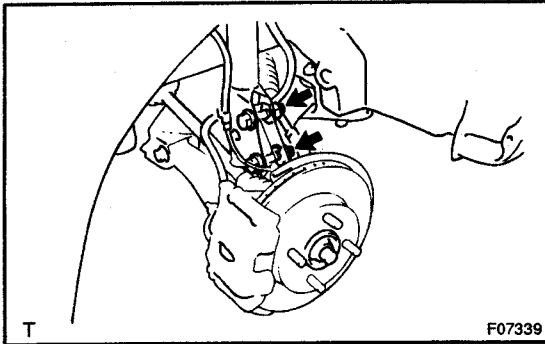
If the caster and steering axis inclination are not within the specified values, after the camber has been correctly adjusted, re-check the suspension parts for damaged and/or worn out parts.

#### 4. ADJUST CAMBER

##### NOTICE:

After the camber has been adjusted, inspect the toe-in.

- (a) Remove the front wheel.



- (b) Remove the 2 nuts on the lower side of the shock absorber.

If reusing the bolts and/or nuts, coat the threads of nuts with engine oil.

- (c) Clean the installation surfaces of the shock absorber and the steering knuckle.  
(d) Temporarily install the 2 nuts.

- (e) Adjust the camber by pushing or pulling the lower side of the shock absorber in the direction in which the camber adjustment is required.

- (f) Tighten the nuts.

**Torque: 132 N·m (1,350 kgf·cm, 97 ft·lbf)**

- (g) Install the front wheel.

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

- (h) Check the camber.

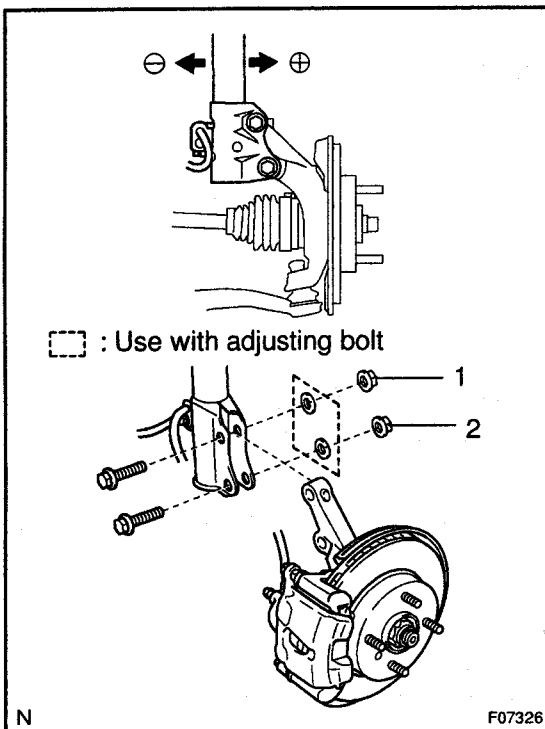
##### HINT:




- Try to adjust the camber to the center of the specified value.
- Adjusting value for the set bolts is 6' – 30' (0.1° – 0.5°).

If the camber is not within the specified value, using the following table, estimate how much additional camber adjustment will be required, and select the camber adjusting bolt.

##### NOTICE:

**Tighten the adjusting bolt with a washer and a new nut.**



Bolt  Adjusting Value	Set Bolt		Adjusting Bolt			
	90105-14140		90105-14146		90105-14147	
			1 Dot 		2 Dots 	
	1	2	1	2	1	2
15'	●			●		
30'	●					●
45'			●			●
1°00'			●		●	●

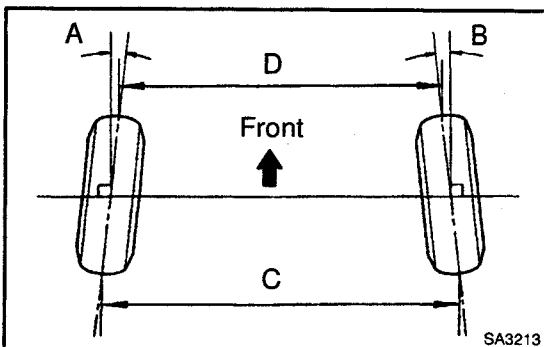
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- (i) Do the steps mentioned above again. At step (b), replace 1 or 2 selected bolts.

HINT:

When replacing the 2 bolts, replace 1 bolt for each time.



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## 5. INSPECT TOE-IN

Toe-in:

(EUROPE DIESEL):

Toe-in (total)	A + B: $0^\circ \pm 12'$ ( $0^\circ \pm 0.2^\circ$ ) C - D: $0 \pm 2$ mm ( $0 \pm 0.08$ in.)
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If the toe-in is not within the specified value, adjust it at the rack ends.

## 6. ADJUST TOE-IN

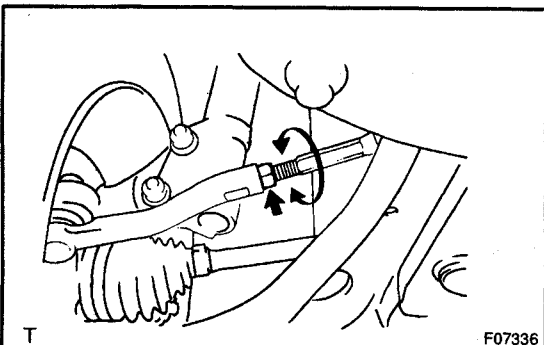
- (a) Remove the rack boot set clips.

- (b) Loosen the tie rod end lock nuts.

- (c) Turn the right and left rack ends by an equal amount to adjust the toe-in.

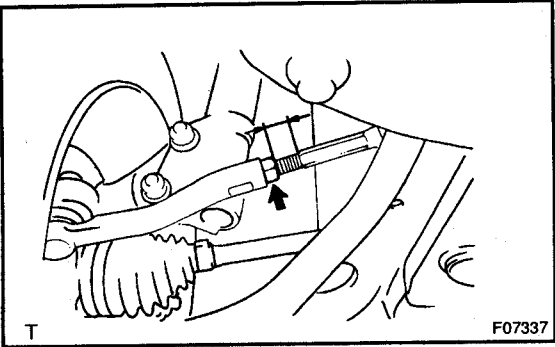
HINT:

Try to adjust the toe-in to the center of the specified value.



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(d) Make sure that the lengths of the right and left rack ends are the same.

**Rack end length difference: 1.5 mm (0.059 in.) or less**

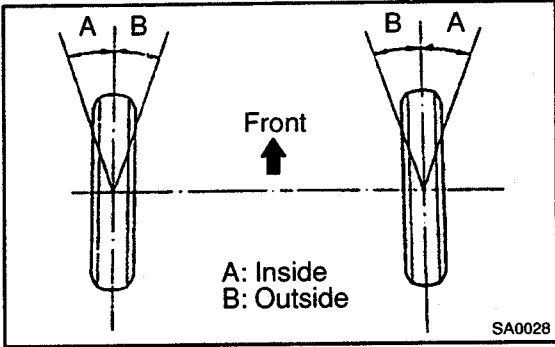
(e) Torque the tie rod end lock nuts.

**Torque: 47 N·m (480 kgf·cm, 35 ft·lbf)**

(f) Place the boots on the seats and install the clips.

**HINT:**

Make sure that the boots are not twisted.



**7. INSPECT WHEEL ANGLE**

Turn the steering wheel fully and measure the turning angle.

**Wheel turning angle:**

**(EUROPE DIESEL):**

	Manual steering	Power steering
Inside wheel	$36^{\circ}59' \pm 2^{\circ}$ ( $36.98^{\circ} \pm 2^{\circ}$ )	$36^{\circ}59' \pm 2^{\circ}$ ( $36.98^{\circ} \pm 2^{\circ}$ )
Outside wheel: Reference	$32^{\circ}10' (32.17^{\circ})$	$32^{\circ}20' (32.28^{\circ})$

If the right and left inside wheel angles differ from the specified value, check the right and left rack end lengths.



## REAR WHEEL ALIGNMENT INSPECTION

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### 1. MEASURE VEHICLE HEIGHT (See page SA-3)

#### NOTICE:

Before inspecting the wheel alignment, adjust the vehicle height to the specified value.

### 2. INSPECT CAMBER

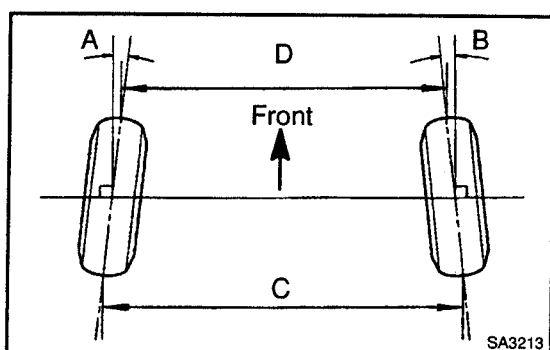
#### Camber:

#### (EUROPE DIESEL):

Camber	$-0^{\circ}56' \pm 25'$ ( $-0.93^{\circ} \pm 0.42^{\circ}$ )
Right-left error	30' ( $0.5^{\circ}$ ) or less

If the measured value is not within the specified value, inspect the suspension parts for damage and/or wear and replace them if necessary because camber is not adjustable.

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### 3. INSPECT TOE-IN

#### Toe-in:

#### (EUROPE DIESEL):

Toe-in (total)	A + B: $0^{\circ}19' \pm 15'$ ( $0.32^{\circ} \pm 0.25^{\circ}$ ) C - D: $2.9 \pm 2.3$ mm ( $0.11 \pm 0.09$ in.)
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If the toe-in is not within the specified value, inspect and replace the suspension parts as necessary.

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