
SUSPENSION AND AXLE

TIRE AND WHEEL	SA-1
FRONT WHEEL ALIGNMENT	SA-3
REAR WHEEL ALIGNMENT	SA-7

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.

TIRE AND WHEEL INSPECTION

SA6CC-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 ² , psi)	Rear kPa (kgf/cm ² , psi)
Vehicle speed is not concerned	230 (2.3, 33)	210 (2.1, 30)

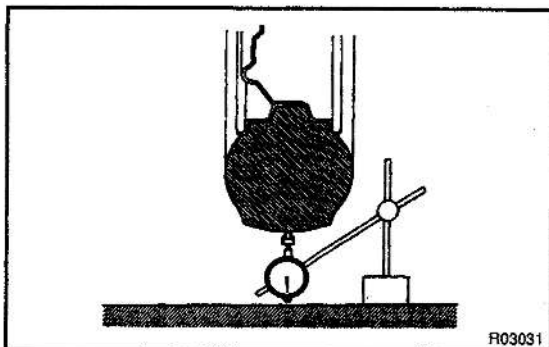
Vehicle load up to 5 passengers

155/ 80R 13:

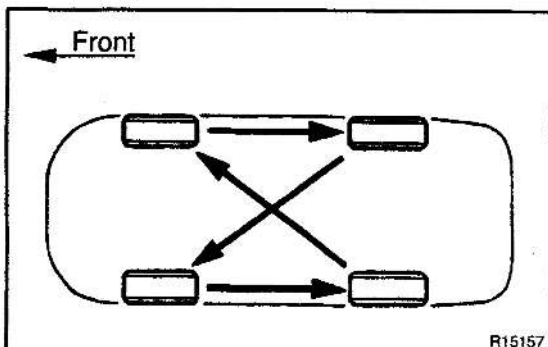
Vehicle speed	Front kPa (kgf/cm ² , psi)	Rear kPa (kgf/cm ² , psi)
Under 160 km/h (100 mph)	230 (2.3, 33)	210 (2.1, 30)
160 km/h (100 mph) or over	230 (2.3, 33)	230 (2.3, 33)

175/ 65R 14:

Vehicle speed	Front kPa (kgf/cm ² , psi)	Rear kPa (kgf/cm ² , 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)



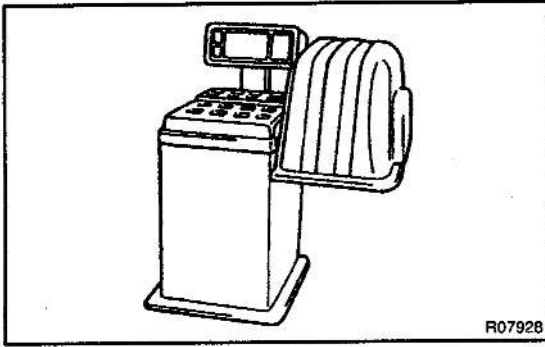
(b) Using a dial indicator, check the tire runout.
Tire runout: 1.0 mm (0.039 in.) or less



2. ROTATING TIRES

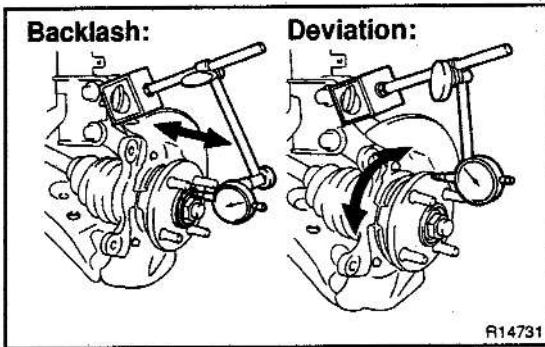
HINT:

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.

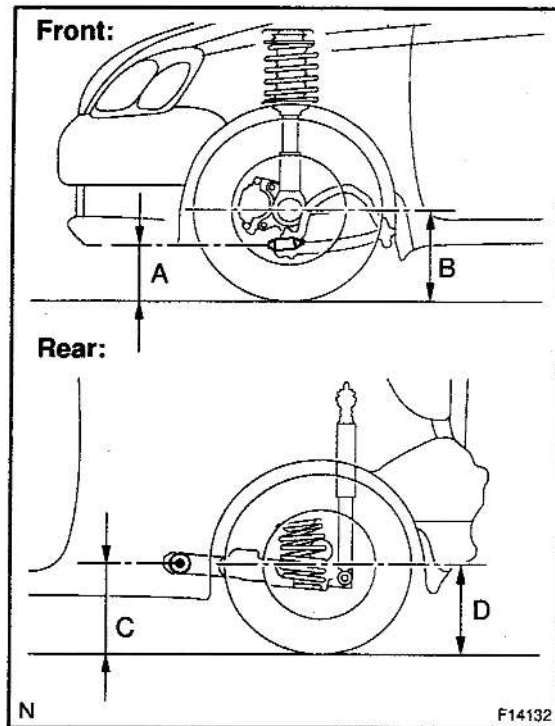
5. CHECK FRONT SUSPENSION FOR LOOSENESS

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:

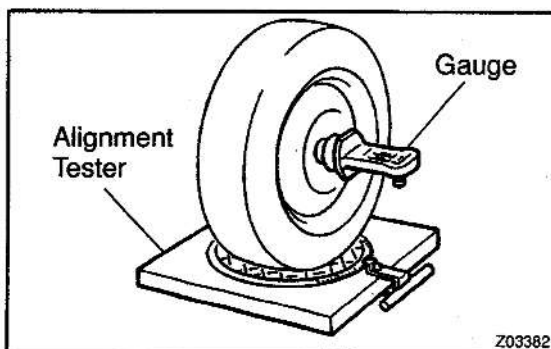
Front: B – A

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

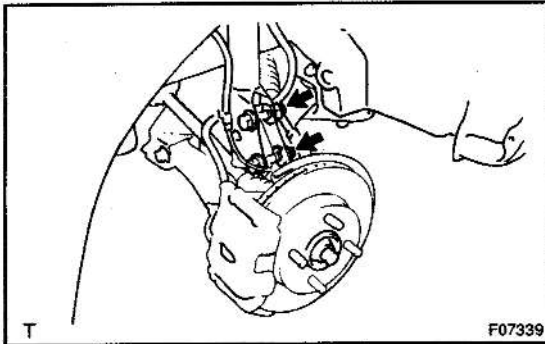
If the caster and steering axis inclination are not within the specified values, after the camber has been correctly adjusted, recheck the suspension parts for damaged and/or worn out parts.

4. ADJUST CAMBER

NOTICE:

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

(a) Remove the front wheel.

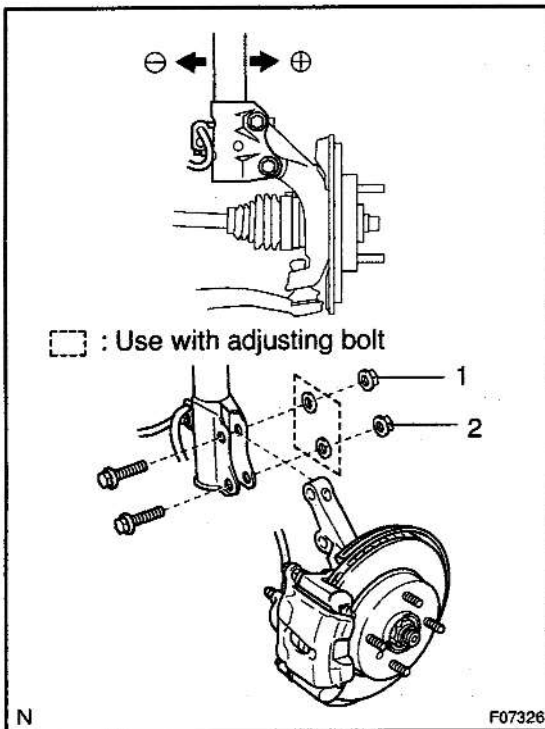


(b) Remove the 2 nuts on the lower side of the shock absorber.

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'			●		●	●

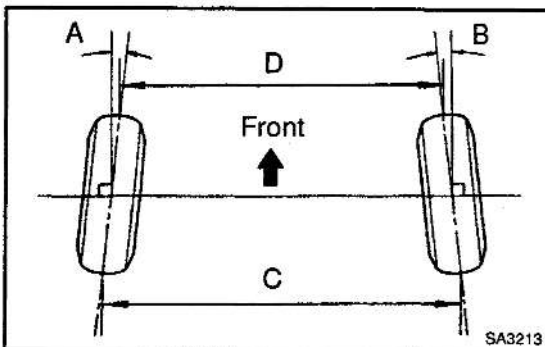
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- (i) Do the steps mentioned above again. At step (b), replace 1 or 2 selected bolts.

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 ± 2 mm (0 ± 0.08 in.)
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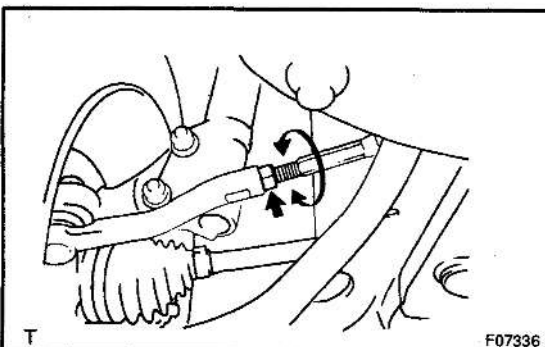
If the toe-in is not within the specified value, adjust it at the rack ends.

6. ADJUST TOE-IN

- Remove the rack boot set clips.
- Loosen the tie rod end lock nuts.
- Turn the right and left rack ends by an equal amount to adjust the toe-in.

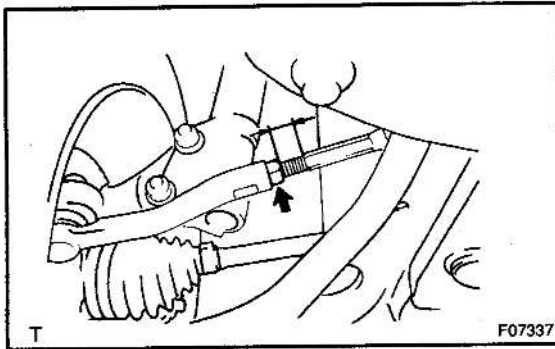
HINT:

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

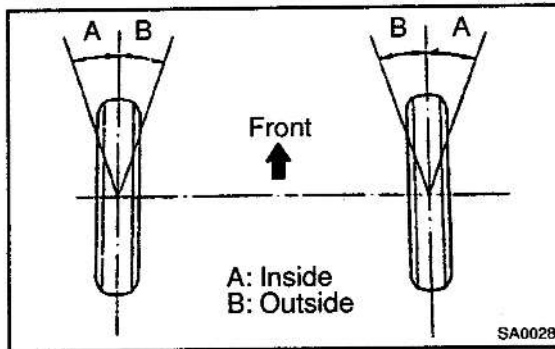
- (e) Torque the tie rod end lock nuts.

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

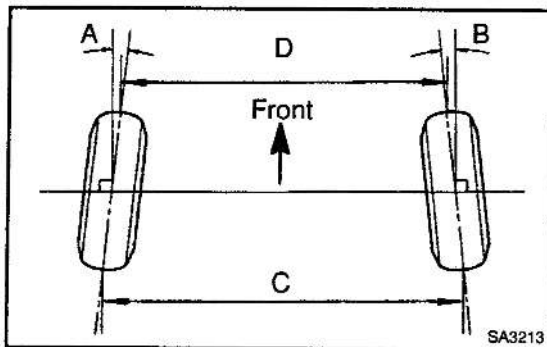
Camber:

(EUROPE DIESEL):

Camber	$-0^{\circ}56' \pm 25'$ ($-0.93^{\circ} \pm 0.42^{\circ}$)
Right-left error	30' (0.5°) 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 ± 2.3 mm (0.11 ± 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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