SECTION 4C

REAR BRAKE

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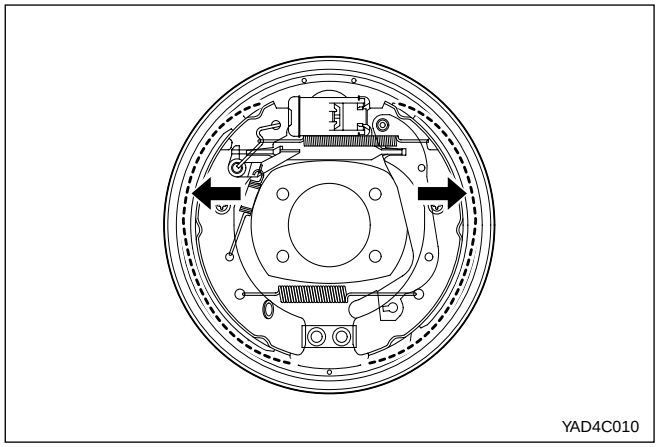
DESCRIPTION AND OPERATION

DRUM BRAKE

This drum brake assembly is a leading/trailing shoe design.



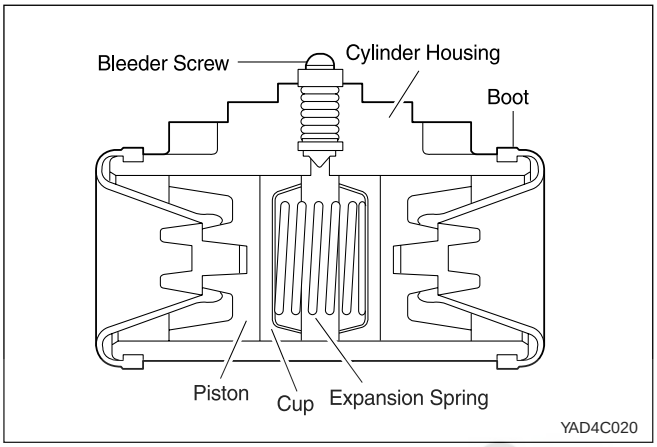
Both brake shoes are held against the wheel cylinder pistons by the lower return spring and the fixed anchor plate near the lower return spring. When the brakes are applied, the wheel cylinder pistons move both shoes out to contact the drum. With forward wheel rotation, the forward brake shoe will wrap into the drum and become selt-energized. With reverse wheel rotation, brake shoes is transferred to the anchor plate through the braking plate to the axle flange. Adjustment is automatic and occurs on any service brake application. Do not switch the position of shoes that have been in service, as this may render the self-adjustment feature inoperative and result in increased pedal travel.

The brake drum must have high abrasion resistance, heatproof, high stiffness, fatigue stiffness and strength enough not to make any deformation. The temperature of the drum surface comes up to 500 - 700 °C on brake operation by the friction with the lining. When the temperature of the drum surface continues to keep high, the friction coefficient goes down and the ‘fade development’ occurs. When the brake is applied often on the hill, any accident may be occur.

WHEEL CYLINDER

Both wheel cylinder diameters are same in order to balance the friction forces of both shoes.

The hydraulic pressure from the master cylinder is provided to the wheel cylinder and the piston in the wheel cylinder allows to push both shoes toward the drum resulted in generating the braking force.



1	Cylinder Housing	1	Cylinder Housing
2	Boot	2	Boot
3	Spring	3	Spring
4	Piston Cup	4	Piston Cup
5	Piston	5	Piston
6	Air Bleeder	6	Air Bleeder

BRAKE LINING

The brake lining is installed with the brake shoe and pushed toward the drum for applying the brake pedal.

Thus, lining must have high-heat tolerance, abrasion resistance and high friction coefficient.

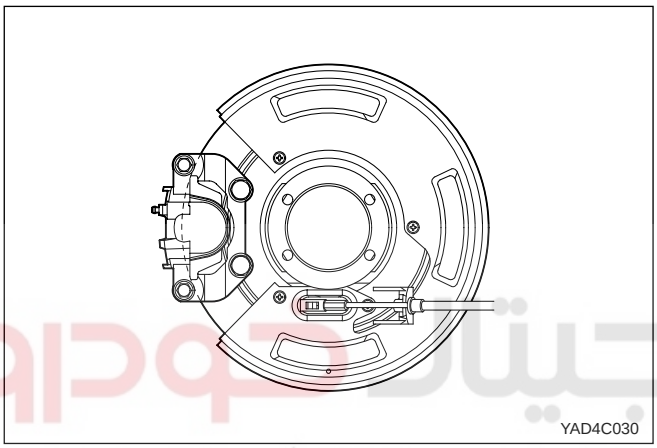
Brake Lining and Drum Clearance Automatic Control System

If the lining’s wear is excessive, the piston moves to long distance and the pedal travel increases. The clearance between the drum and the brake lining should be adjusted.

Generally the drum brake must be adjusted regularly and thus the clearance automatic control system enables to adjust the clearance between the brake lining and the drum resulting from brake lining wear.

DISC BRAKE

The disc brake uses at front wheel generally and recently has been using at rear wheel. The floating type caliper disc brake installed by this vehicle installs only brake cylinder per caliper at one side. When the master cylinder generates the hydraulic pressure, the piston pushes the pad in order to compress to the disc and at this time, the caliper is moved by this reaction resulted in pushing the pad at the other side to compress to the disc. Because the brake disc contacts atmospheric conditions and effect on good radiation, the braking variation keeps uniform forces, the uneven braking may not be generated on high speed driving.



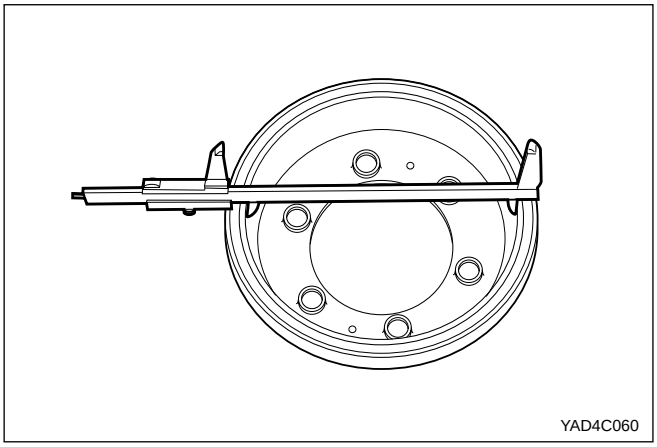
SPECIFICATIONS

Application	Drum Brake	Disc Brake	
		MANDO	Delphi Korea
Drum I.D.	Ø 254 mm	-	-
Shoe Type	Leading and Trailing	-	-
Lining Width x Length x Thickness	55 x 243 x 4.7 mm	-	-
Wheel Cylinder I.D.	Ø 23.81 mm	-	-
Caliper Cylinder I.D.	-	Ø 42.9 mm	Ø 42 mm
Brake Pad Thickness	-	10 mm	10 mm
Disc Thickness	-	10.4 mm	10.4 mm

DIAGNOSTIC INFORMATION AND PROCEDURES

Symptom	Possible Cause	Action
Poor Braking	Lining Wear, Hardening	Replace
	Oil Or Water Contamination On The Lining	Replace or Repair
	Inoperative Wheel Cylinder	Replace
	Inoperative Clearance Automatic Control System	Repair
Uneven Braking	Lining Wear, Hardening	Adjust
	Oil Or Water Contamination On The Lining	Replace or Repair
	Inoperative Wheel Cylinder	Replace
	Inoperative Clearance Automatic Control System	Repair
Dragging Brake	Damage Of The Brake Shoe Return Spring	Replace
	Inoperative Wheel Cylinder Returning	Replace
Excessive Pedal Travel	Lining Wear	Replace
	Inoperative Clearance Automatic Control System	Repair
Noise and Vibration When Brake Applied	Lining Wear, Hardening	Replace
	Foreign Material Inside Drum	Clean
	Loosen The Brake Plate Bolt	Tighten
	Drum Deformation Or Surface Damage	Replace
Inoperative Parking Brake	Lining Wear, Hardening	Replace
	Oil Contamination On The Lining	Replace
	Inoperative Clearance Automatic Control System	Repair

INSPECTION

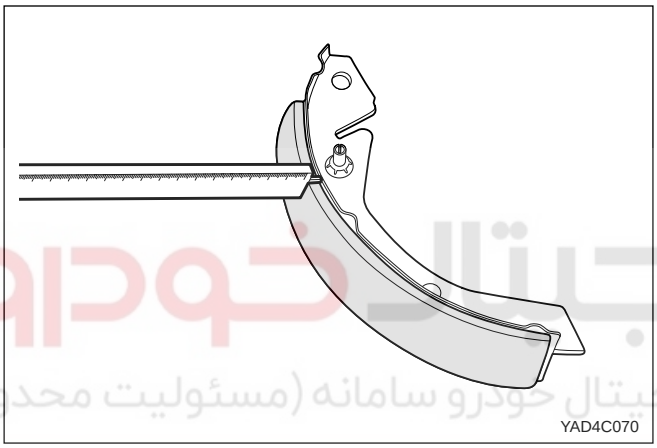

YAD4C060

DRUM BRAKE TYPE

1. Inspect the drum for crack or damage or deformation.
2. Measure the inside diameter.

Inside Diameter	Wear Limit
Ø 254 mm	Ø 255.5 mm

- Measure two more position.

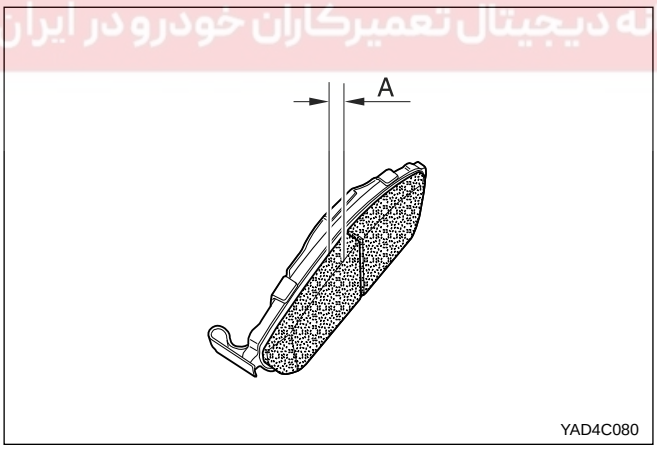

YAD4C070

Brake Lining

1. Inspect the surface hardening or excessive wear of the lining. Inspect the lining for stain with oil.
2. Measure the lining thickness.

Wear Limit	1 mm

- If the measured value is below the limit value, replace the brake lining.



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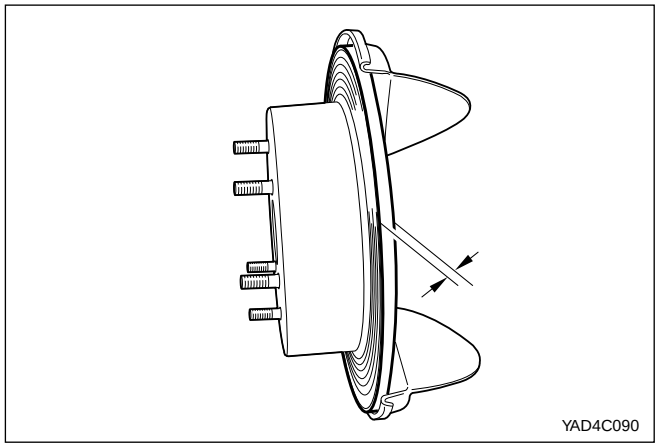
DISC BRAKE TYPE

Pad Thickness

1. Remove the front wheel.
2. If the measured value is below the limit value, replace the pad.

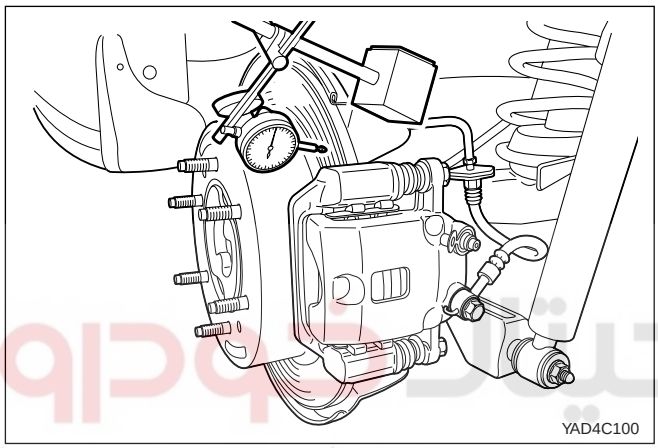
Wear Limit	2 mm


YAD4C090

Brake Disc Thickness

1. Measure the thickness of the rotor at four or more points around the circumference of the disc.
2. If the thickness of the brake disc is below the specified value, replace the brake disc.

Disc Thickness Limit	8.5 mm


YAD4C100

Brake Disc Run Out

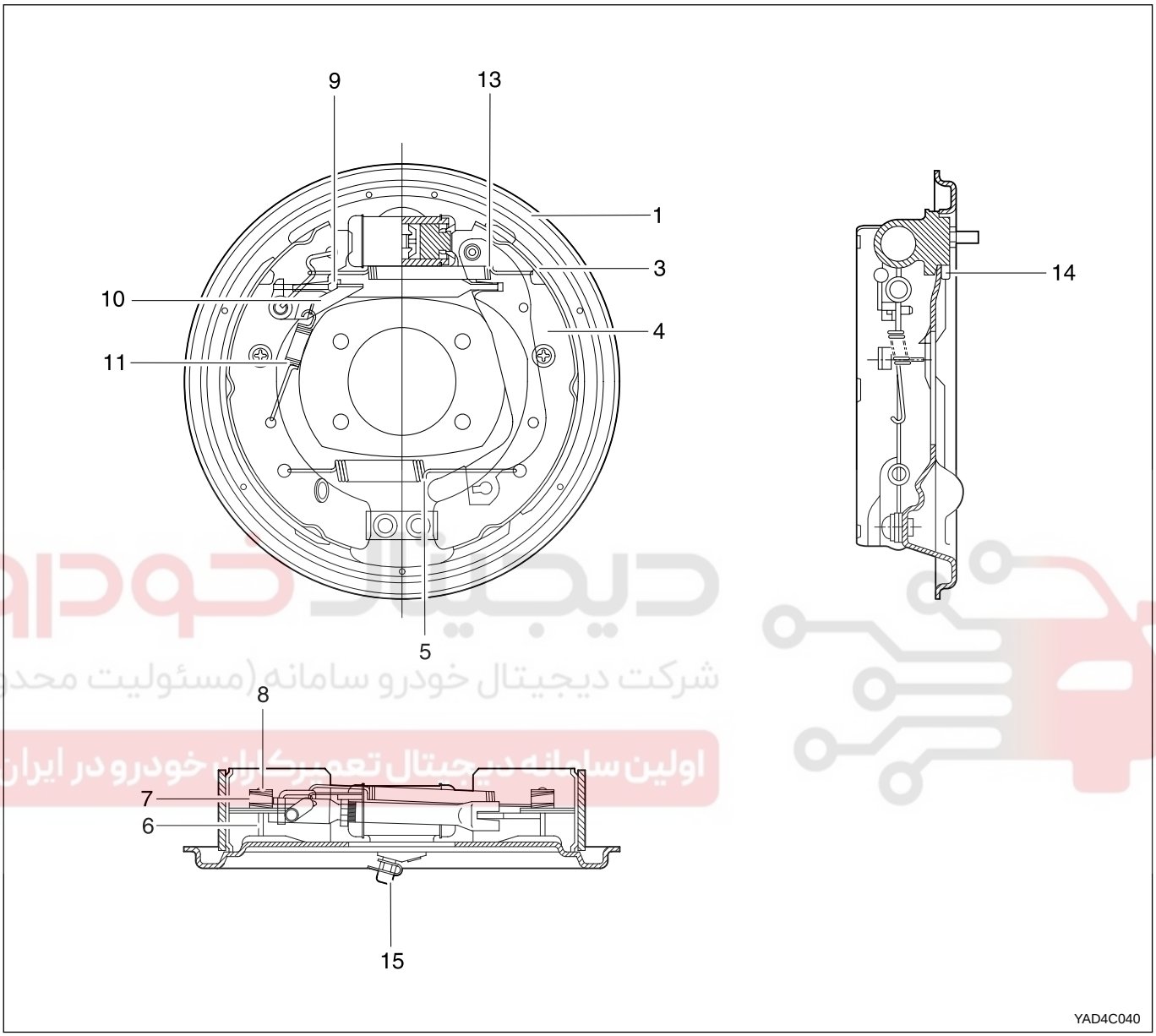
1. Set a dial indicator to the brake disc side and measure the run out by rotating the disc.

Run Out Limit	On-Vehicle	Max. 0.07 mm
	Disc only	Max. 0.03 mm

2. If lateral run out exceeds the specification, replace the brake disc to prevent the pedal's vibration at braking.

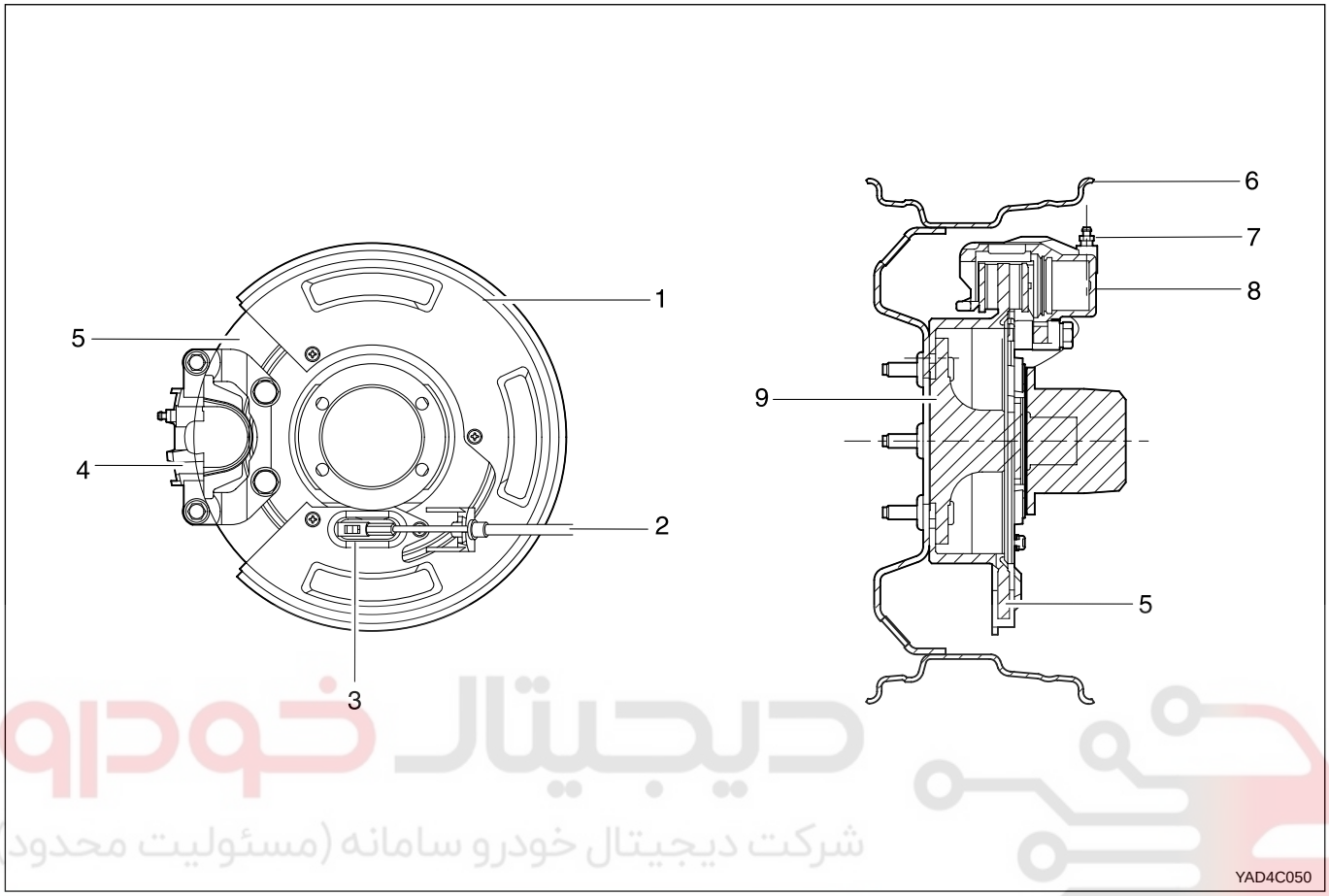
CROSS SECTIONAL VIEW

DRUM BRAKE (KDAC)



1 Backing Plate
2 Wheel Cylinder
3 Brake Shoe Lining
4 Brake Shoe
5 Lower Return Spring (Lower Shoe Spring)
6 Retainer Spring Pin
7 Compression Spring
8 Retainer Spring Plate
9 Adjuster Assembly
10 Adjuster Lever
11 Return Spring (Adjuster)
13 Upper Return Spring (Upper Shoe Spring)
14 Bolt
15 Air Bleeder Nipple

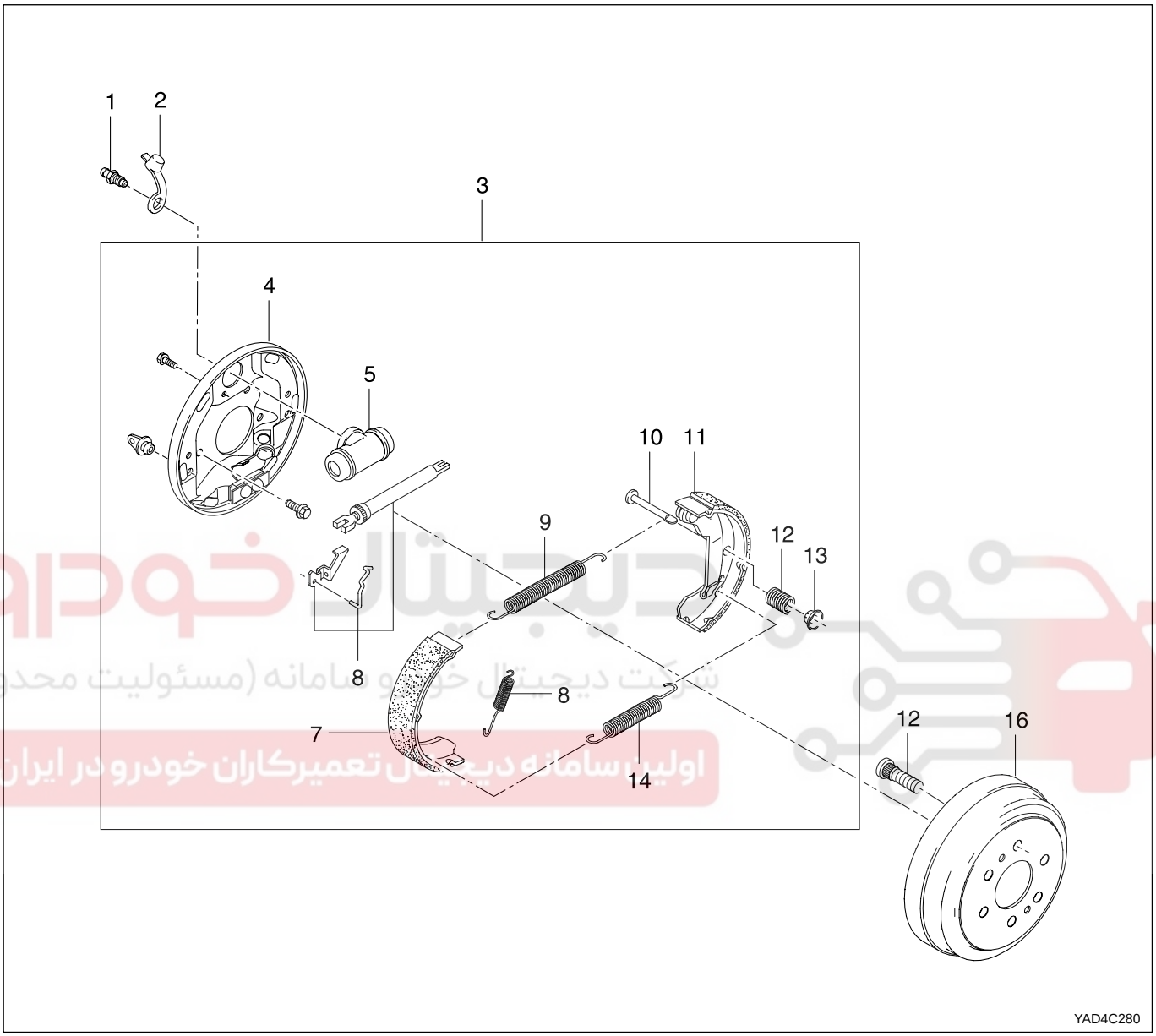
DISC BRAKE



1 Backing Plate
2 Parking Cable
3 Parking Cable Lever
4 Caliper Assembly
5 Disc
6 Wheel
7 Air Bleeder Nipple
9 Shaft Assembly

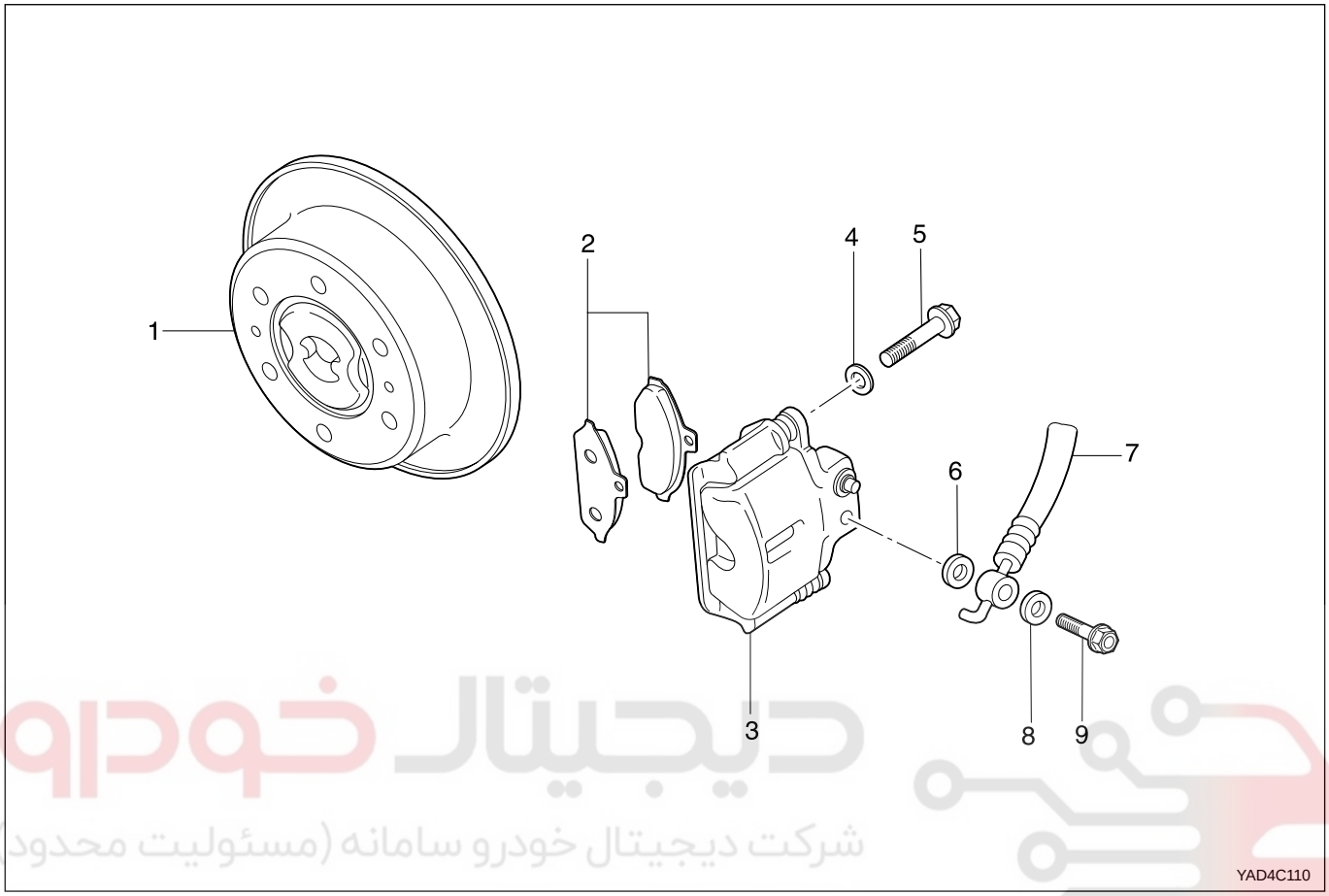
COMPONENT LOCATOR

DRUM BRAKE



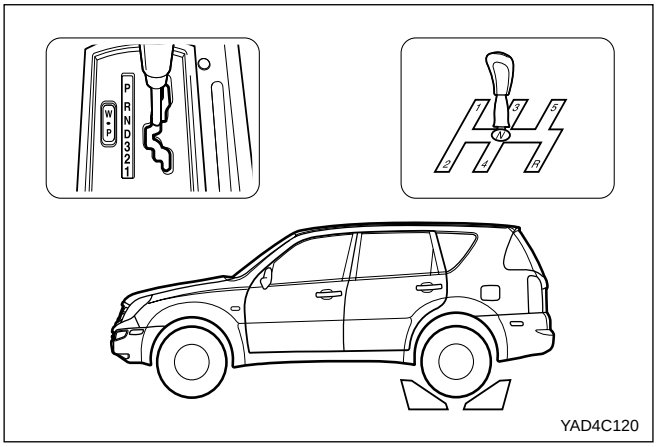
1 Bleeder Screw
2 Bleeder Screw Cap
3 Rear Brake Assembly
4 Rear Brake Plate
5 Wheel Cylinder
6 Strut Assembly (Clearance Automatic Control System)
7 Brake Leading Shoe
8 Middle Return Spring
9 Upper Return Spring
10 Brake Shoe Retaining Spring Pin
11 Trailing Shoe
12 Brake Shoe Retaining Spring
13 Brake Shoe Retaining Spring Cap
14 Lower Return Spring
15 Hub Bolt
16 Rear Brake Drum

DISC BRAKE



1	Rear brake disc assembly		6	Gasket	Replace
2	Brake pad		7	Brake hose	
3	Brake caliper		8	Gasket	Replace
4	Gasket	Replace	9	Hose bolt	8 - 18 N•m
5	Bolt	20 N•m (15 lb-ft)			

RERAIR INSTRUCTIONS



YAD4C120

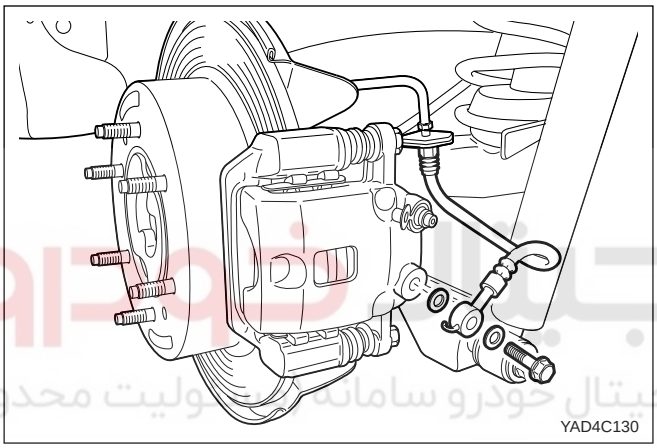
ON-VEHICLE SERVICE

DISC BRAKE ASSEMBLY

Removal Procedure

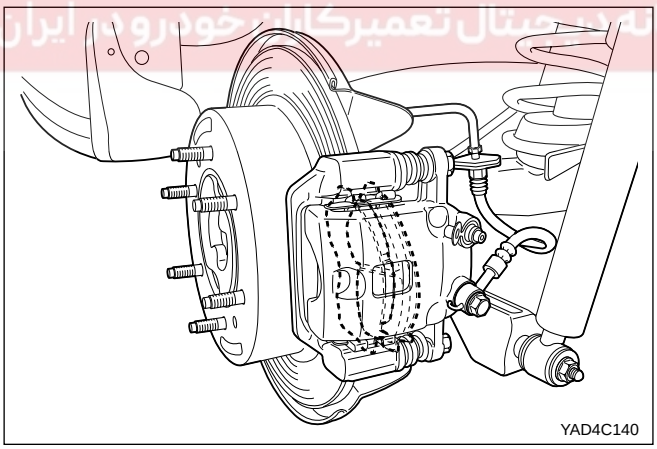
1. Remove the rear wheel.

   Notice:
   - Park the vehicle on the flat ground and fix the vehicle not to move it.
   - Release the parking brake.
   - Position the transmission in NEUTRAL.

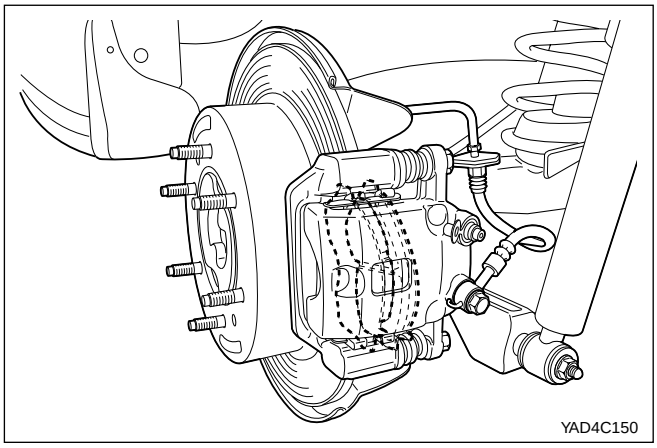

YAD4C130

2. Remove the brake hose from the rear brake caliper.

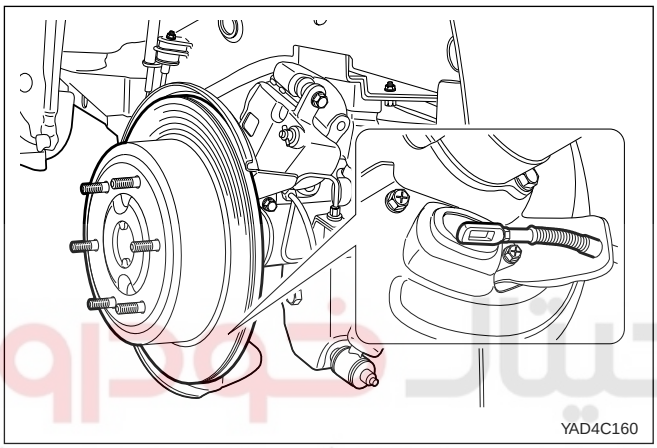
   Notice: Be carefully to prevent the brake fluid loss and contamination.


YAD4C140

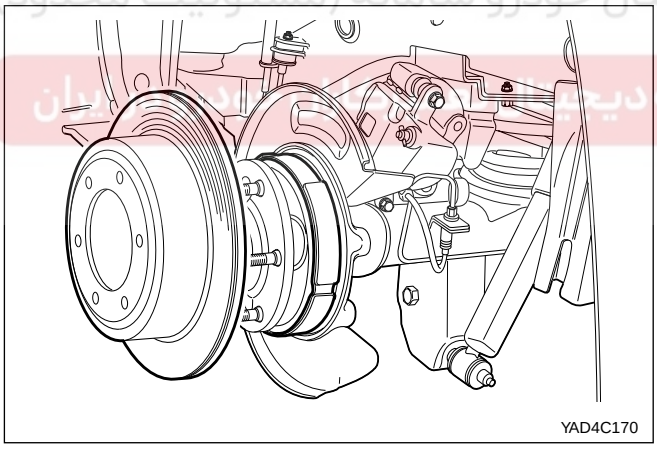
3. Remove the caliper cylinder mounting bolt and remove the disc pad and the cylinder.


YAD4C150

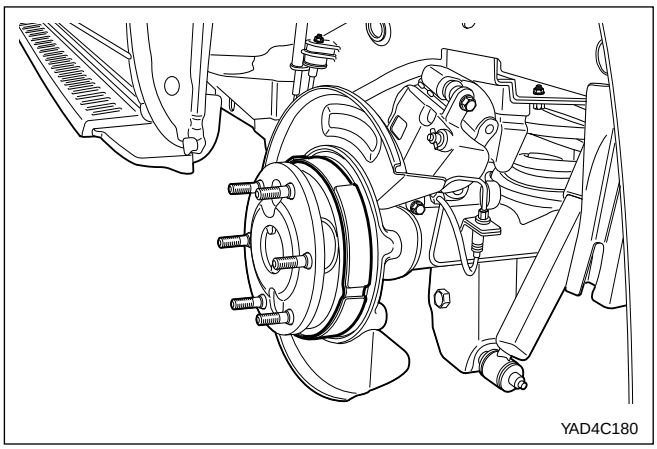
4. Remove the caliper mounting bolt and remove the caliper assembly.


YAD4C160

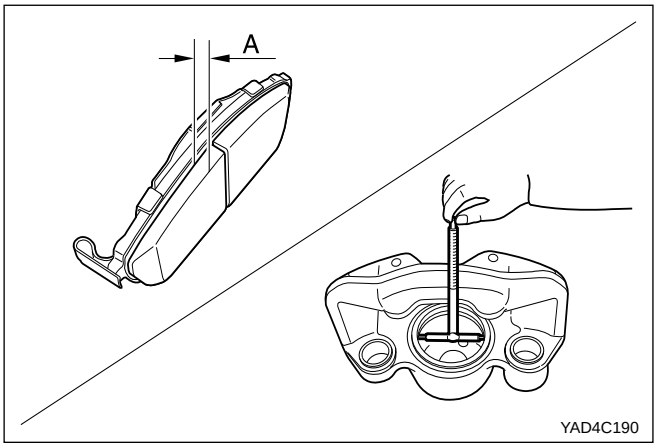
5. Disconnect the parking brake cable from the parking brake lever.


YAD4C170

6. Remove the brake disc.


YAD4C180

7. Using the rubber hammer, hit to separate the parking brake lining lightly and move the lining upward.



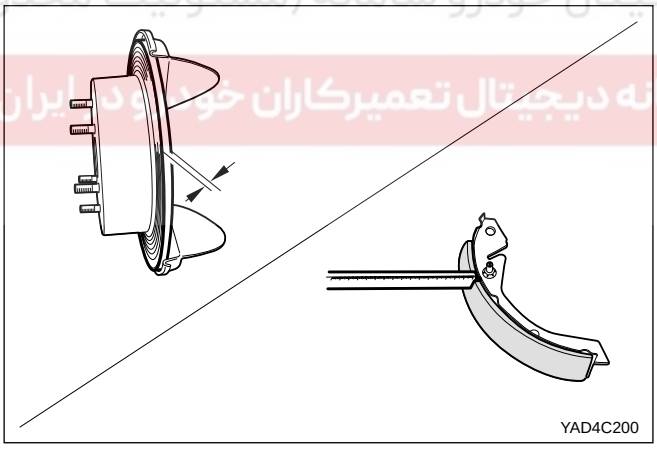
Inspection

1. Clean the dissembled parts and visually check the followings;
   - Wear, rust and damage on the cylinder and piston
   - Damage, crack on the caliper body and damage, wear on the guide pin
   - Pad uneven wear and oil contamination
   - Boot's damage and tear

2. Inspect the brake pad thickness.

Pad Thickness	Max wear Limit
10 mm	2 mm

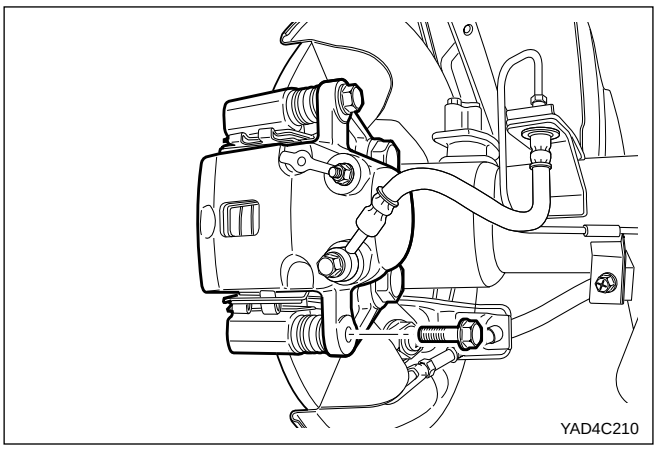
Notice: If the thickness of both pads is not same, replace both pads at the same time.



3. Inspect the disc thickness.

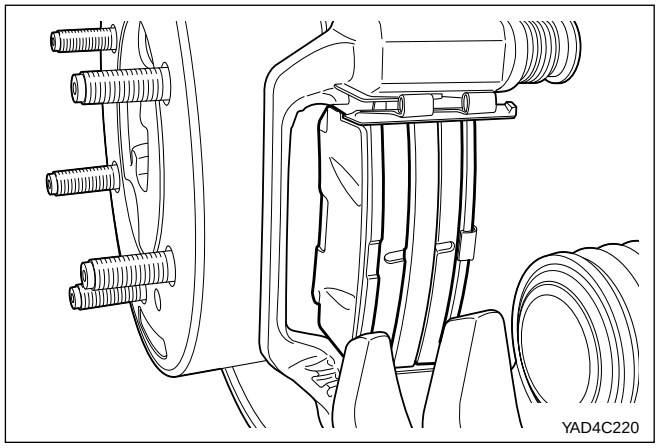
Pad Thickness	Max wear Limit
10.4 mm	8.5 mm

4. Inspect the disc plate's scratch and deformation.

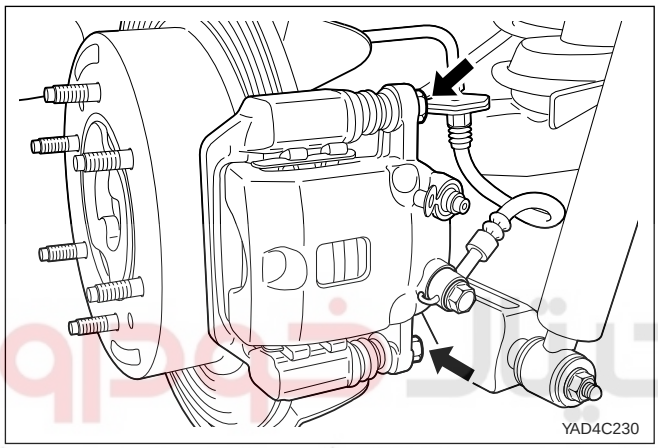


Brake Pad

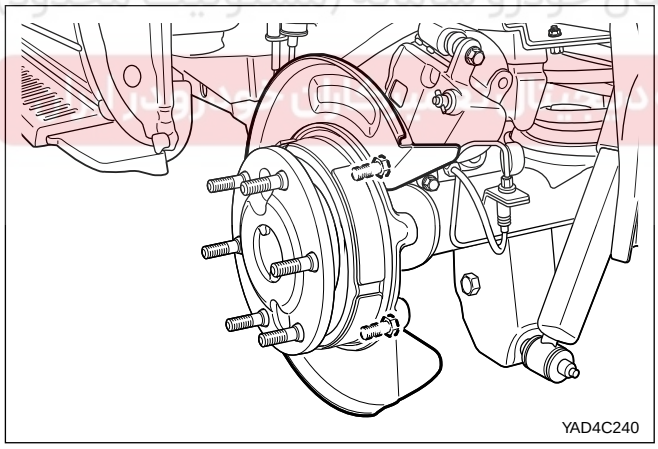
1. Remove the cylinder mounting bolt (lower) at the brake caliper.
2. Raise and fix the caliper assembly at the proper position not to cause any damage in the hoses or others.



3. Remove the brake pad and replace the new pad.



4. Install the caliper cylinder assembly and tighten the retaining bolt.



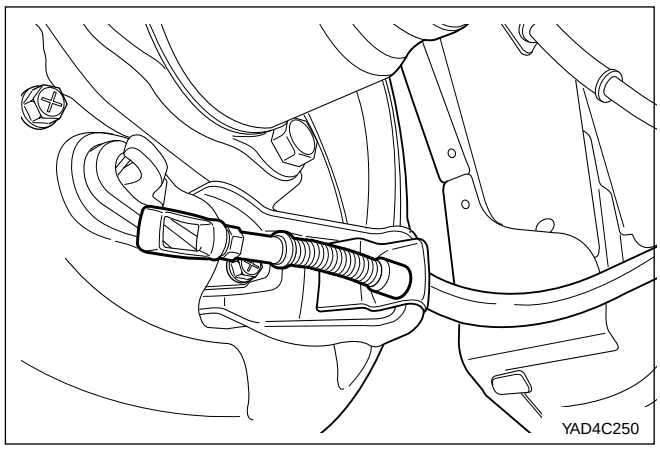
Installation Procedure

1. Install the brake lining between the backing plate and the flange.

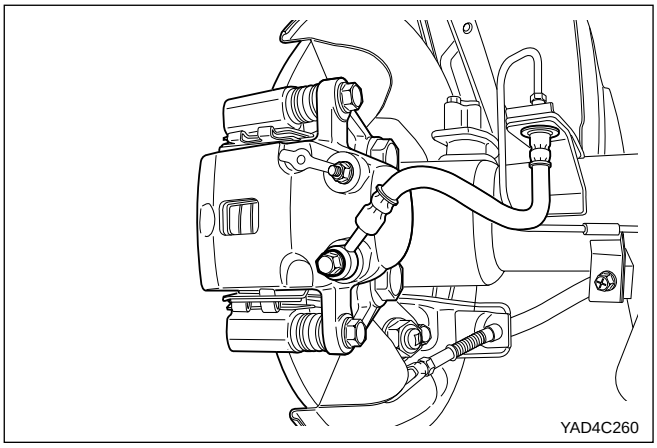
Installation Notice

Tightening Torque	4 - 8 N•m (35 - 71 lb-in)

Notice: Apply a certain amount of grease on the parking brake lining surface.



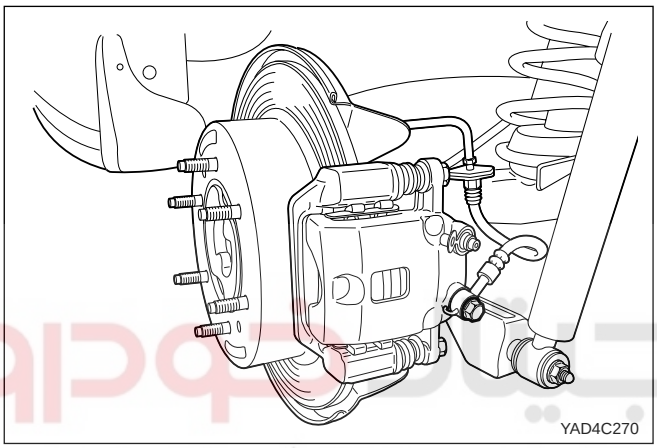
2. Install the brake disc and connect the parking brake cable to the lever.


YAD4C260

3. Install the caliper to the brake disc.

Installation Notice

Tightening Torque	4 - 8 N•m (35 - 71 lb-in)


YAD4C270

4. Install the brake hose.

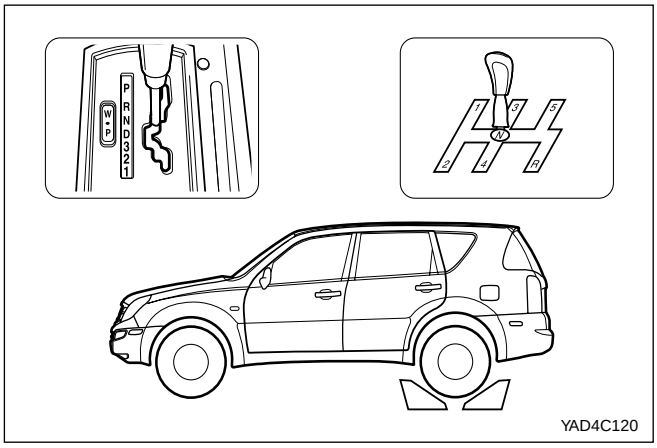
Notice: The washer should be replaced new part.

5. Tighten the air bleeder screw.

Installation Notice

Tightening Torque	7 - 13 N•m (62 - 115 lb-in)

6. Bleed the brake system after replacement.



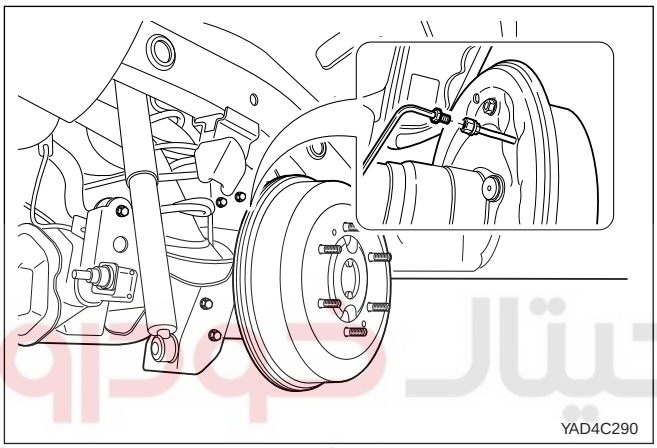
YAD4C120

DRUM BRAKE ASSEMBLY

1. Remove the tires

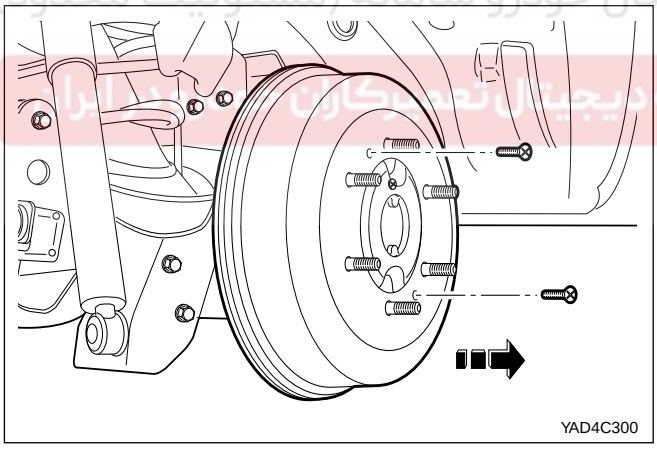
   Notice:

   - Park the vehicle on the flat ground and fix the vehicle not to move it.
   - Position the transmission in NEUTRAL.

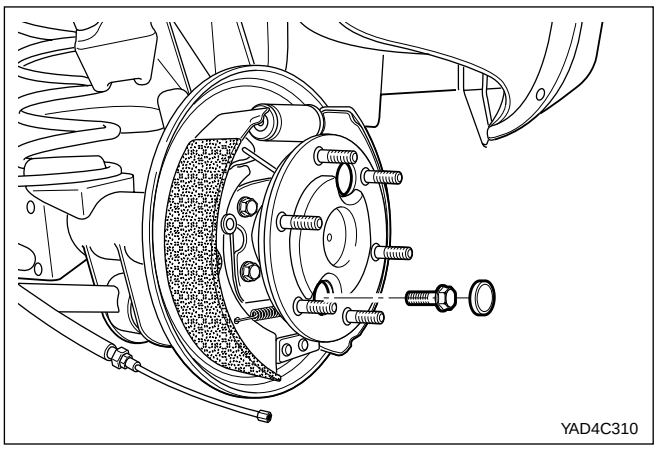

YAD4C290

2. Disconnect the brake pipe from the rear brake.

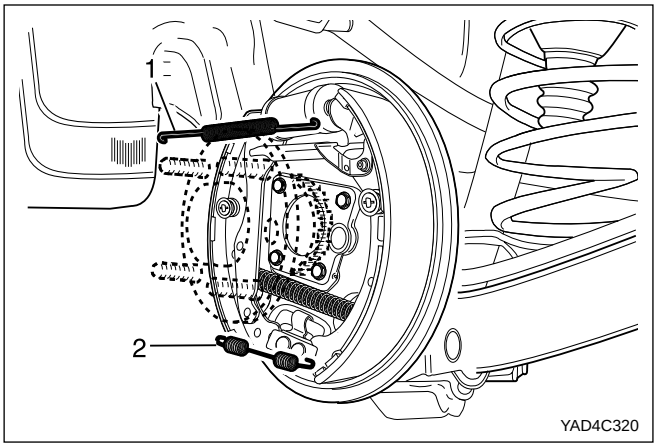
   Notice: Be carefully to prevent the brake fluid loss and contamination.


YAD4C300

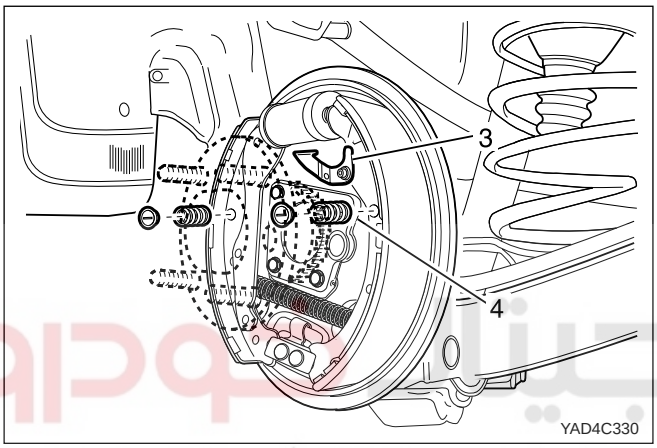
3. Insert the bolt (M8) to the service hole of the brake drum and remove the brake drum.

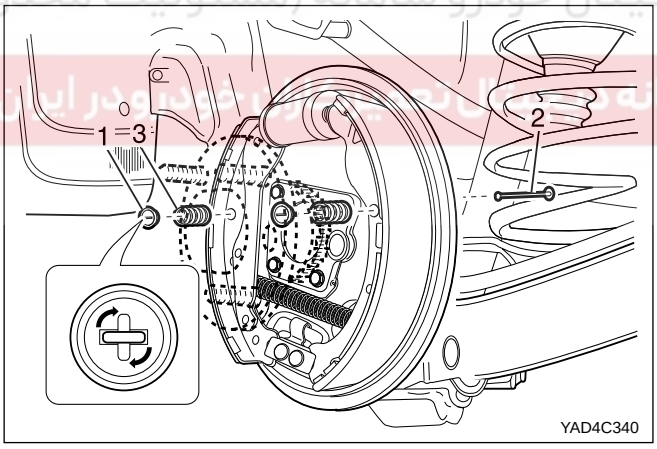

YAD4C310

4. Remove the service hole plug of the axle shaft.

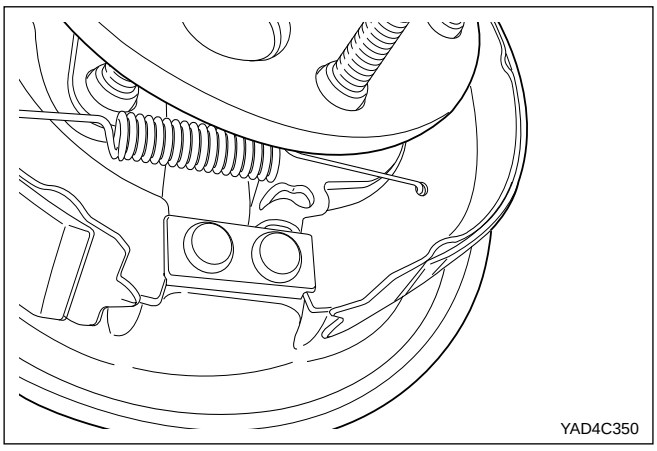


5. Remove the return spring.
   (1) Disconnect the upper return spring.
   (2) Disconnect the lower return spring.
   (3) Disconnect the lever spring.
   (4) Disconnect the adjuster lever from the adjuster.

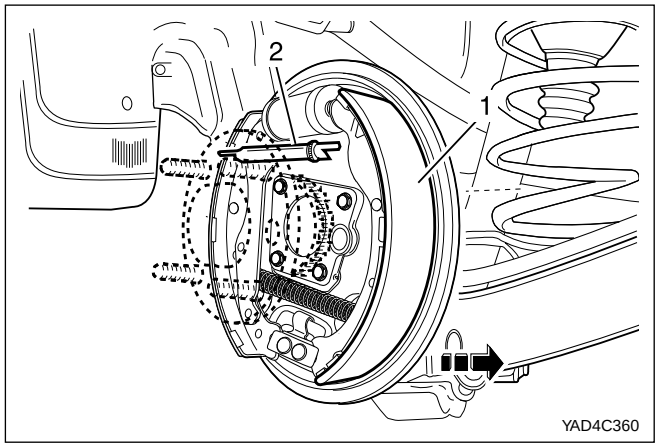




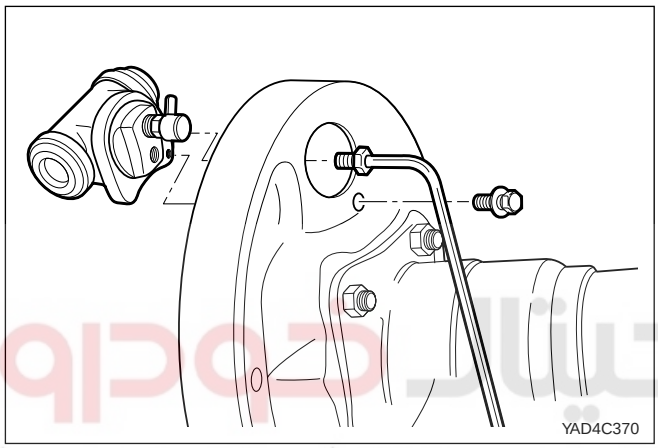
6. Rotate the lining shoe hold down-washer in the plug hole of the axle shaft flange and disconnect the pin and the spring.



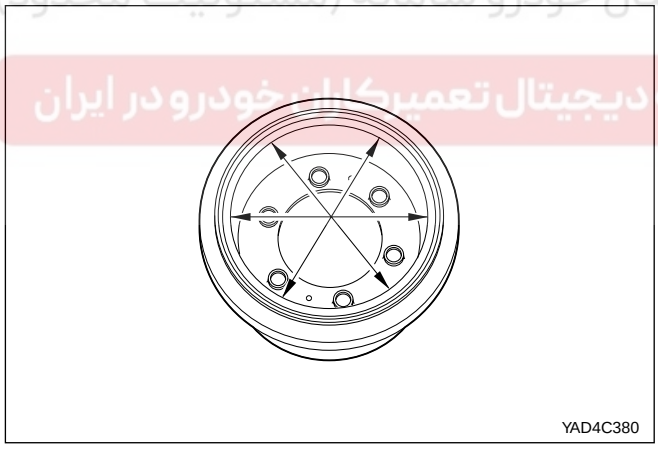
7. Disconnect the parking cable from the parking lever.



8. Disconnect the brake lining and adjuster lever.



9. Remove the wheel cylinder mounting bolt and remove the wheel cylinder.

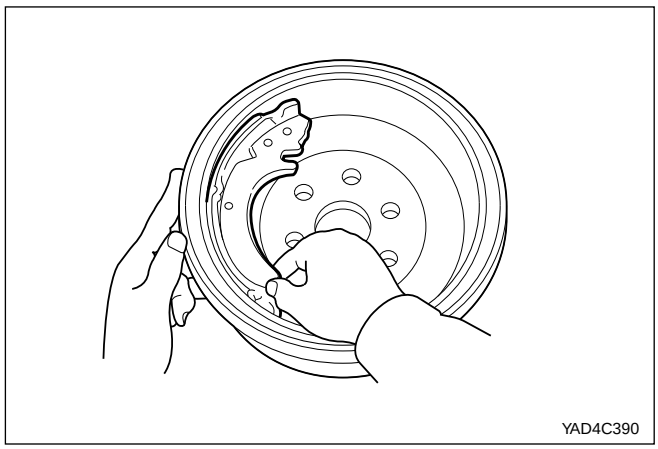


Inspection

1. Measure the inside diameter of the brake drum and replace as needed.

I.D.	Wear Limit
Ø 254 mm	Ø 255.5 mm

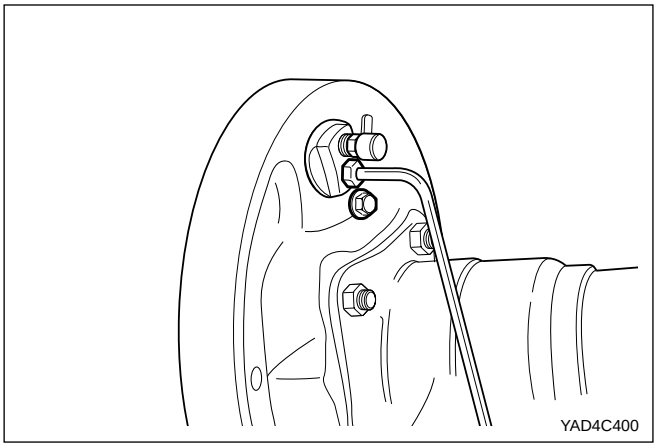
Notice: Measure two more position.



2. Inspect the surface between the lining and brake.

   Mark the brake drum inside using chalk and scrub the shoe & lining assembly. If there is excessive contact problem, replace the shoe & lining assembly or the brake drum.

   Notice: Clean any chalk mark after inspection complete.

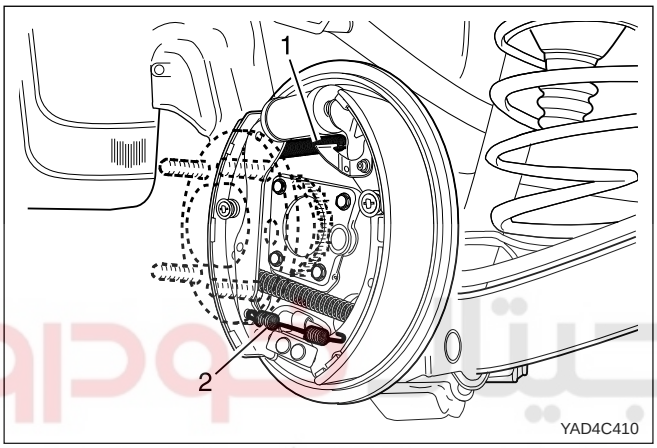


Installation Procedure

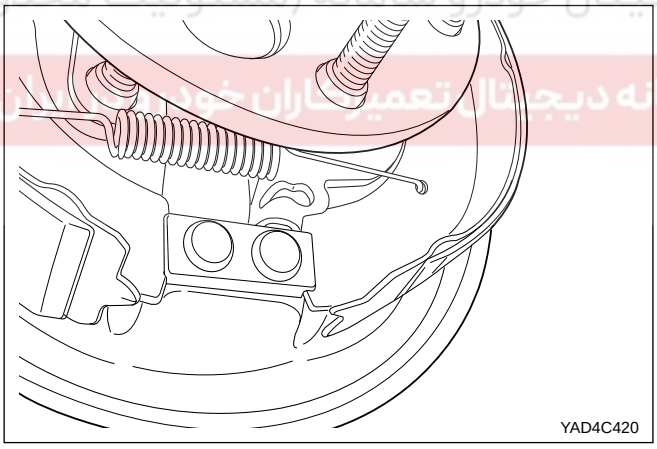
1. Install the wheel cylinder to the backing plate.

Installation Notice

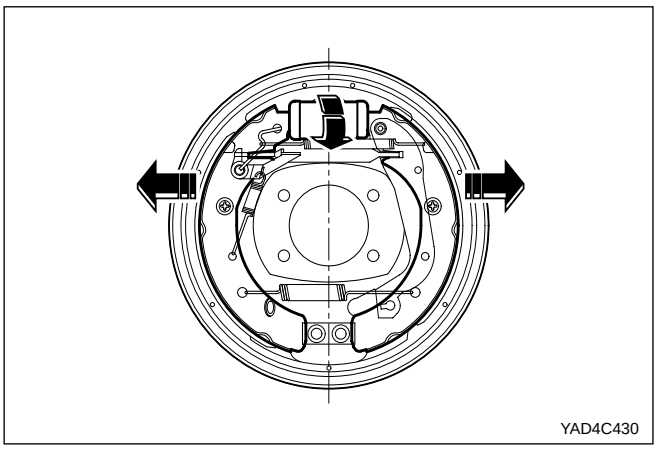
Tightening Torque	8 - 12 N•m (71 - 106 lb-in)



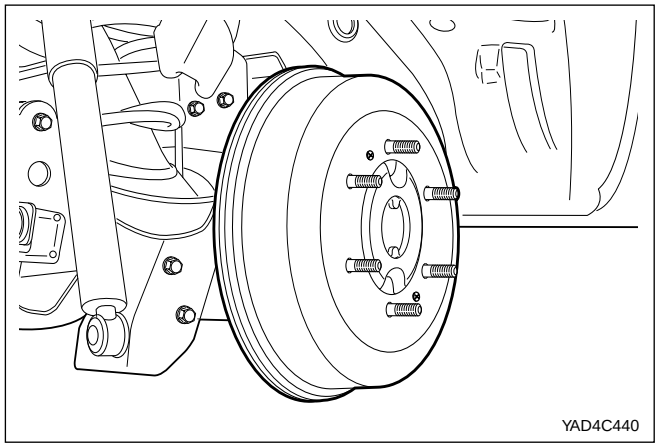
2. Install both brake linings between the wheel cylinder and the bottom anchor plate. And then install adjuster and each return spring.



3. Connect the parking cable.

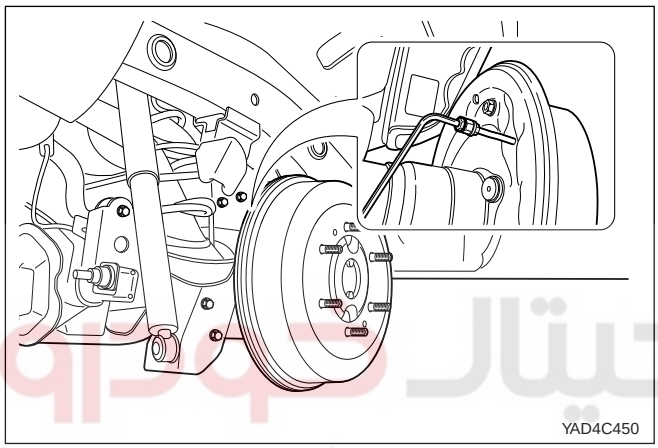


4. The outside diameter of the lining set to Ø 253.08 - Ø 253.50 mm by rotating the adjuster screw.


YAD4C440

5. Install the plate and drum to the axle shaft sequently.
6. Check that the brake drum is rotated properly by hand.

   Notice: Adjust the adjuster screw as needed.


YAD4C450

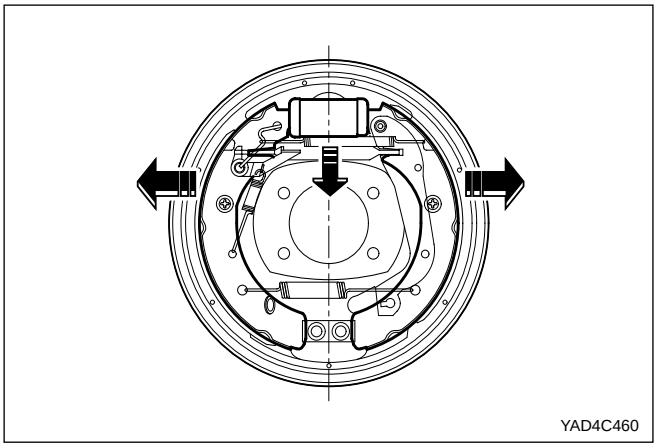
7. Connect the brake pipe to the wheel cylinder.

   Installation Notice

Tightening Torque	15 - 19 N•m (11 - 14 lb-ft)

8. Bleed the brake system and verify the parking brake operation.

   Install the tire.

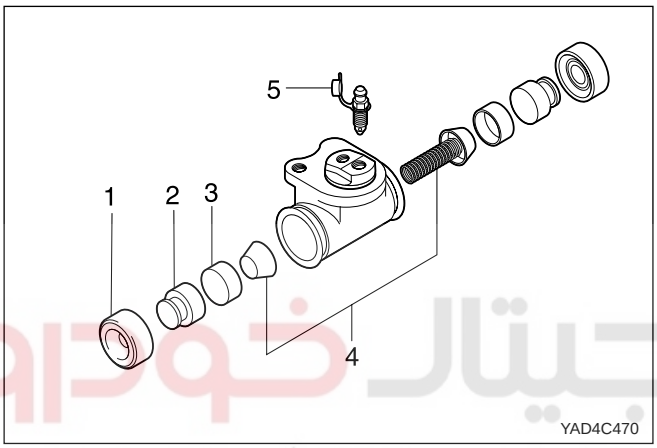

YAD4C460

UNIT REPAIR

WHEEL CYLINDER

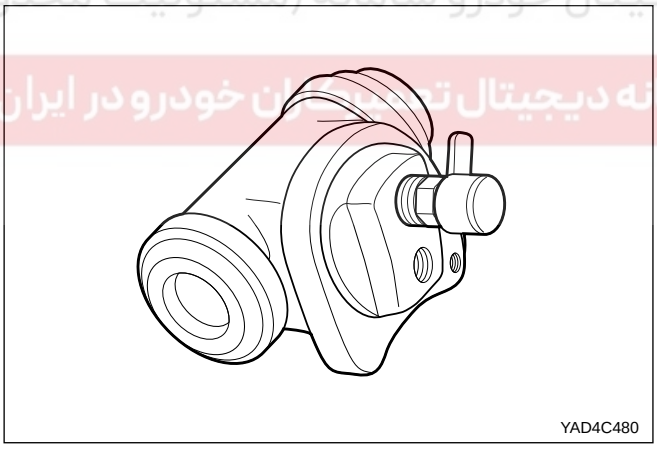
Disassembly Procedure

1. Remove the upper brake return spring and remove the wheel cylinder with pulling the upper lining outside.



YAD4C470

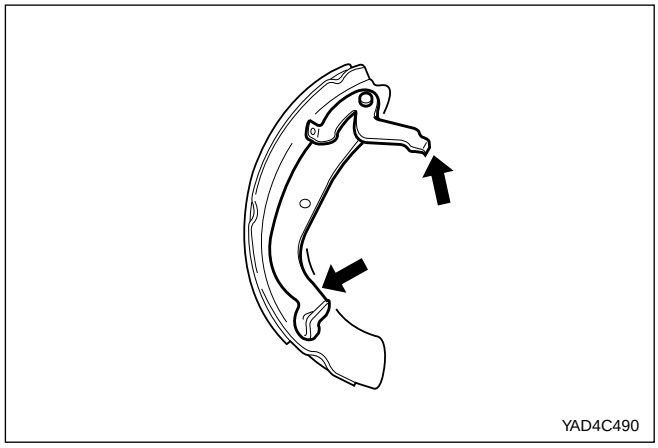
2. Disassembly the wheel cylinder assembly.
   - Remove the dust boot and do not reuse them (1).
   - Remove the piston (2).
   - Remove the piston cup and do not reuse it (3).
   - Remove the spring assembly (4).
   - Remove the bleeder screw (5).
3. Clean all the parts with the denatured alcohol. Dry the parts with unlubricated compressed air.


YAD4C480

4. Installation should follow the removal procedure in the reverse order.
5. Tighten the bleeder screw and wheel cylinder as specified torque.

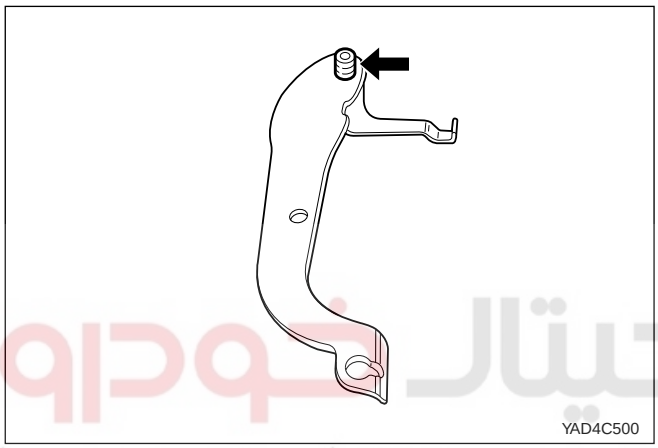
Bleeder Screw	7 - 10 N•m (62 - 89 lb-in)
Wheel Cylinder Mounting Bolt	8 - 12 N•m (71 - 106 lb-in)

Notice: Lubricate the new seals, the piston, the piston cup and the wheel cylinder bore with clean brake fluid before assembly.


YAD4C490

PARKING BRAKE LEVER

1. Disconnect the parking brake lever and the adjuster lever from the lining.


YAD4C500

2. Pull out the lever pin (arrow) and Disconnect the the parking brake lever and the adjuster lever.
3. Installation should follow the removal procedure in the reverse order.