

## SECTION 4B

# FRONT BRAKE

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دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

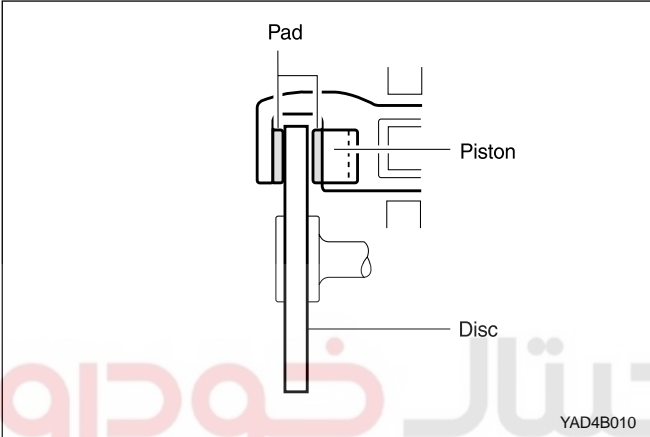
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



DESCRIPTION AND OPERATION

CALIPER

This caliper has a single bore and is mounted to the steering knuckle with two mounting bolts. Hydraulic pressure, created by applying the brake pedal, is converted by the caliper to a stopping force. This force acts equally against the piston and the bottom of the caliper bore to move the piston outward and to slide the caliper inward, resulting in a clamping action on the rotor. This clamping action forces the linings against the rotor, creating friction to stop the vehicle.



CLEARANCE CALIBRATION

When the hydraulic pressure is applied to the piston, the piston moves leftward. The piston seal, which extent considerable pressure against the piston, moves with cylinder.

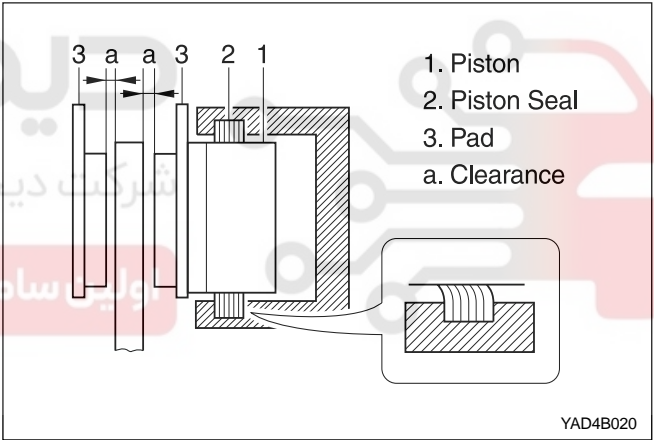
However, as a part of the piston seal is fixed into a groove in the cylinder shape of the seal is as shown in below figure, distorted toward the piston moving direction.

When the pressure is taken off from the brake pedal and the hydraulic pressure is released from the piston, a restoring elastic force is generated at the seal and pushes the piston rightward and back it in original position.

As the pads wear away and the clearance between rotor and pads become larger, the piston moves larger.

The seal then could change in shape further, but since end of the seal is fixed into the groove in the cylinder, the distortion is limited to the same amount as previously described.

The piston moves further to cover the distance of clearance. As the piston returns by the same distance and the rubber seal recovers its original shape, the clearance between the rotor and pads are maintained in original condition.



SPECIFICATIONS

|                       | MANDO                | Delphi Korea |
|-----------------------|----------------------|--------------|
| Application           | Ventilated Disc Type | ←            |
| Caliper Cylinder I.D. | Ø 60 mm              | ←            |
| Pad Thickness         | 10 mm                | ←            |
| Disc Thickness        | 24 mm                | ←            |

## DIAGNOSTIC INFORMATION AND PROCEDURES

| Condition                              | Possible Cause                        | Action             |
|--|---------------------------------------|--------------------|
| Poor Braking                           | Pad Wear, Hardening                   | Replace            |
|  | Oil Or Water Contamination On The Pad | Replace and Repair |
|  | Inoperative Caliper                   | Replace            |
| Uneven Braking                         | Pad Wear, Hardening                   | Replace            |
|  | Oil Or Water Contamination On The Pad | Replace and Repair |
|  | Uneven Wear Or Twisted Of The Disc    | Replace            |
|  | Inoperative Caliper                   | Replace            |
| Dragging Brake                         | Inoperative Caliper Returning         | Replace            |
| Excessive Pedal Travel                 | Pad Wear                              | Replace            |
| Noise and Vibration When Brake Applied | Pad Wear, Hardening                   | Replace            |
|  | Damage On The Disc                    | Replace            |
|  | Interference Of The Dust Cover        | Repair             |
|  | Loose Caliper Mounting Bolts          | Tighten            |

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

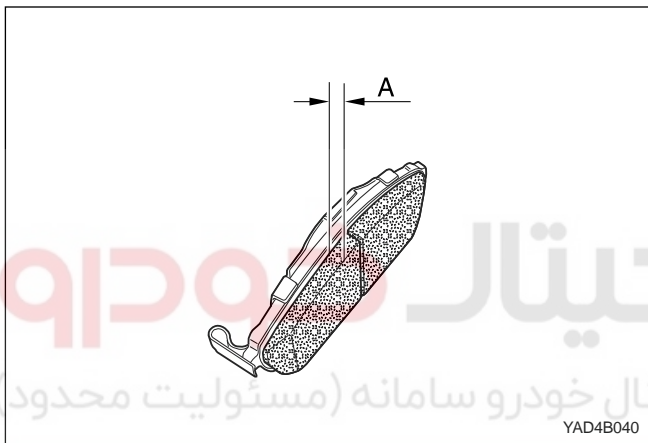
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



## INSPECTION

Clean the disassembled parts and visually check the followings;

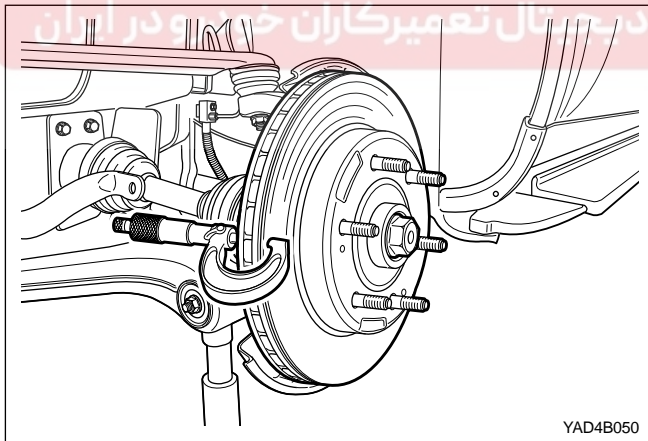
- Wear, rust and damage on the cylinder and piston
- Damage, crack on the caliper body and damage, wear on the guide pin
- Pad uneven wear and oil contamination
- Boot's damage and tear
- Disc plate's scratch and bending



### PAD THICKNESS

1. Remove the front wheel.
2. Measure the thickness and replace as needed.

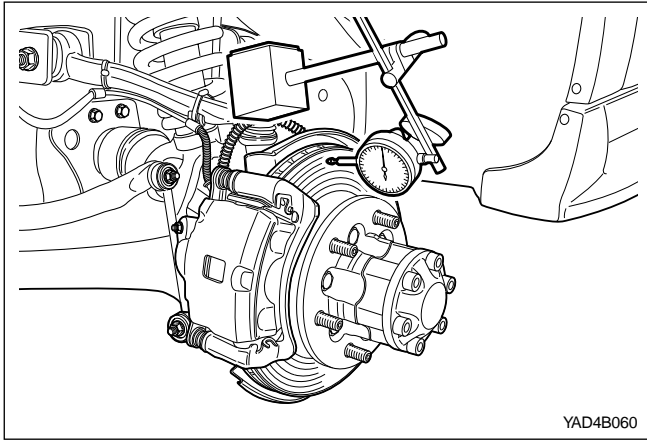
| Thickness | Max wear Limit |
|-----------|----------------|
| 10 mm     | 2 mm           |



### BRAKE DISC THICKNESS

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

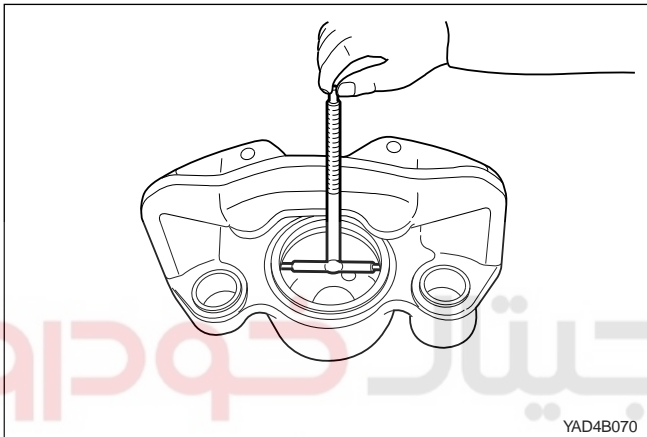
| Thickness | Max wear Limit |
|-----------|----------------|
| 24 mm     | 22 mm          |



## BRAKE DISC RUN OUT

1. Fasten a dial indicator to the brake disc side and measure the run out by rotating the disc.
2. If lateral run out exceeds the specification, replace the brake disc to prevent the pedal's vibration at braking.

|               |                      |
|---------------|----------------------|
| Run Out Limit | 0.03 mm (Disc only)  |
|               | 0.07 mm (On vehicle) |



## CALIPER HOUSING I.D

| Application |            | Spec.     |
|-------------|------------|-----------|
| Non-ABS/ABS | I.D        | Ø 60.0 mm |
|             | Wear Limit | Ø 61.0 mm |

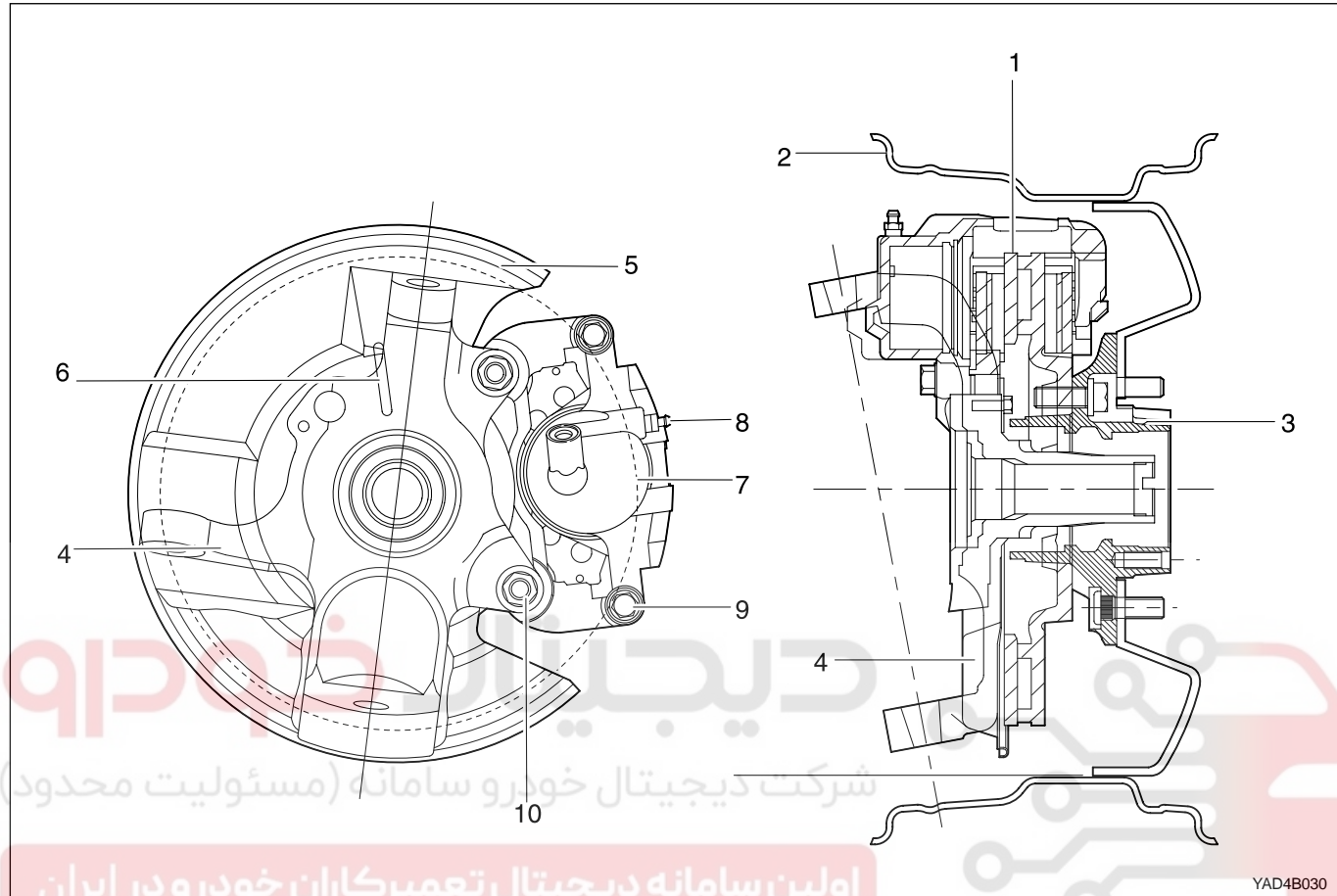
دیجیتال خودرو  
شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



## COMPONENT LOCATOR

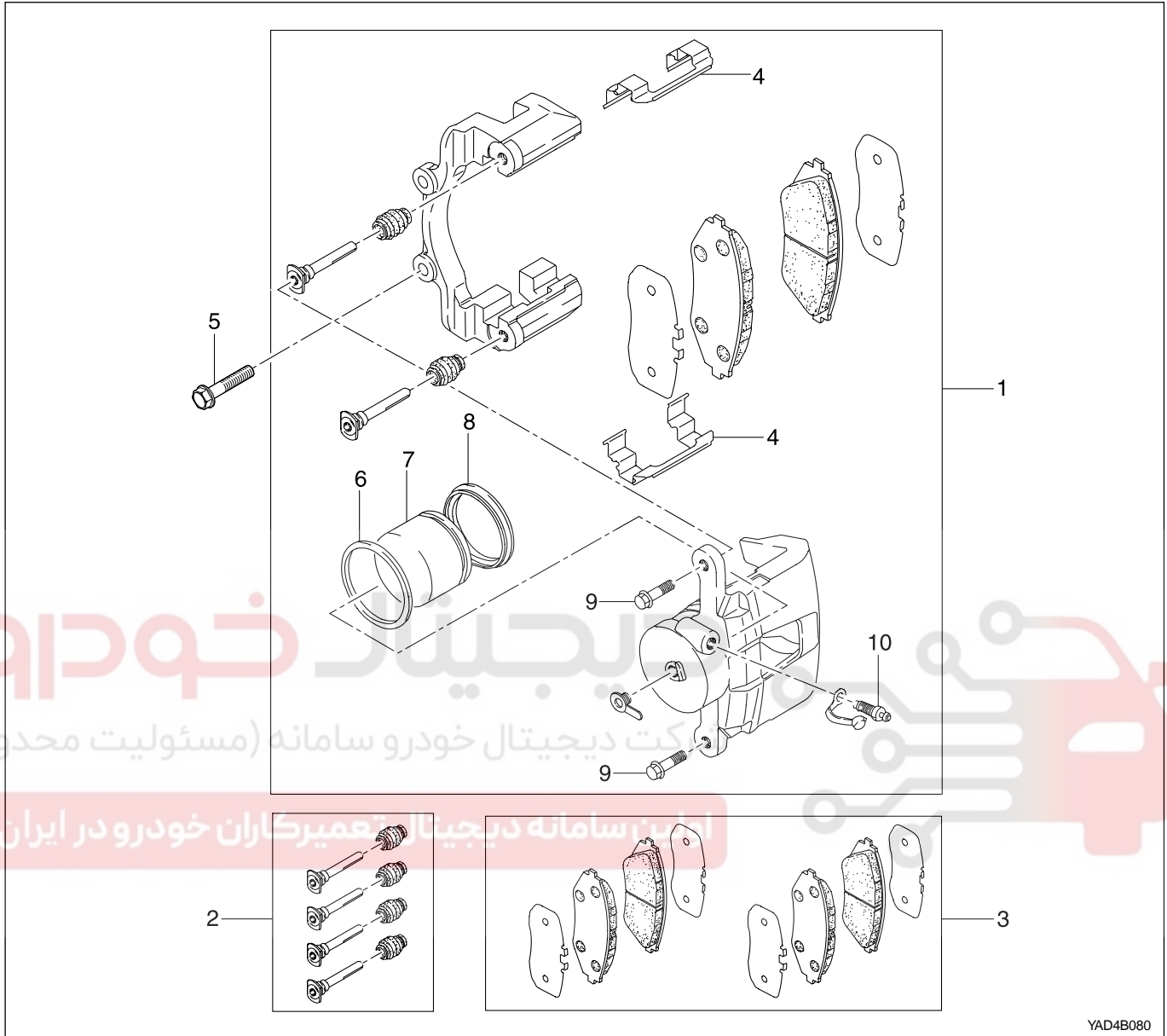
## CROSS-SECTIONAL VIEW



- 1 Brake Disc
- 2 Wheel (Rim)
- 3 Hub Range
- 4 Knuckle
- 5 Dust Shield

- 6 Vacuum Hose Nipple
- 7 Caliper
- 8 Brake Fluid Nipple
- 9 Caliper Guide Bolt
- 10 Caliper Bolt

## FRONT CALIPER BRAKE



YAD4B080

- 1 Brake Caliper Assembly
- 2 Guide Rod Set
- 3 Brake Pad
- 4 Brake Pad Spring
- 5 Caliper Mounting Bolt

- 6 Piston Seal
- 7 Piston
- 8 Piston Boot
- 9 Caliper Guide Rod Bolt
- 10 Bleeder Screw



## REPAIR INSTRUCTIONS

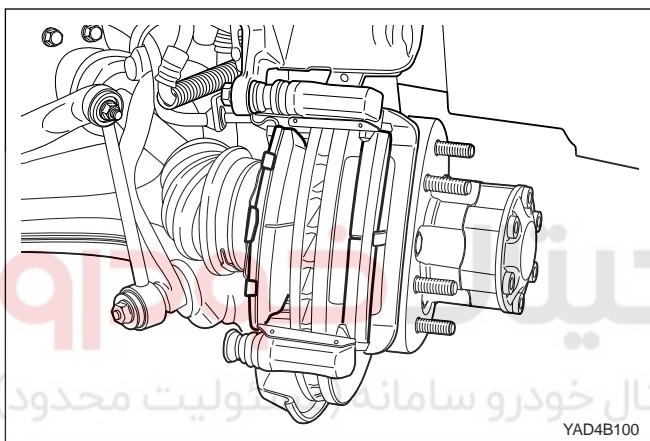
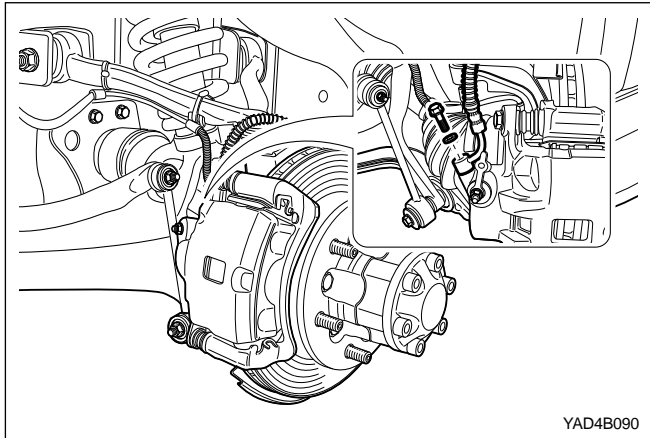
### ON-VEHICLE SERVICE

#### FRONT BRAKE

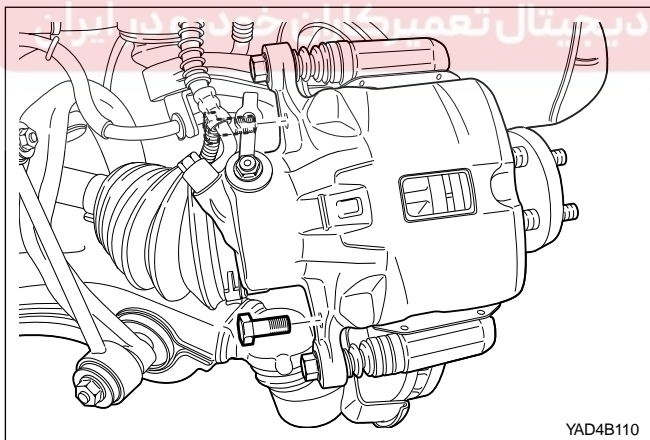
##### Removal Procedure

1. Remove the front wheel and remove the brake hose from the brake caliper.

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

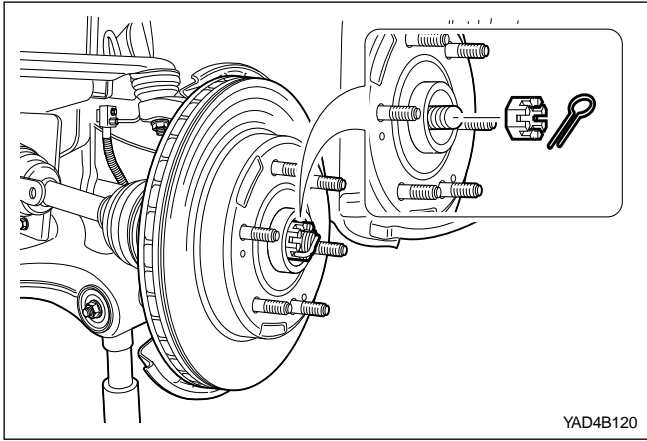


2. Remove the cylinder mounting bolt and remove the disc pad and the cylinder.

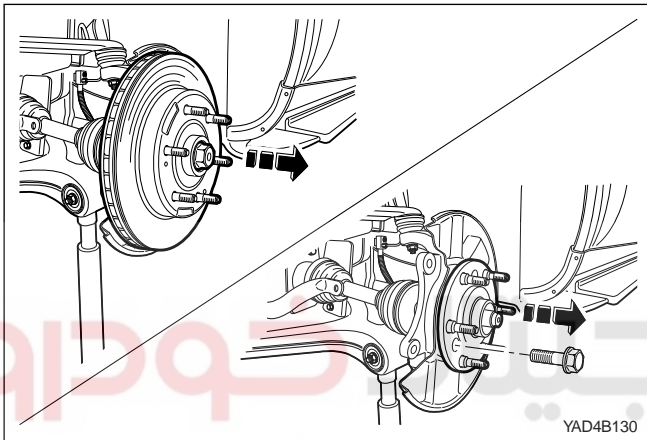


3. Remove the caliper mounting bolt and remove the caliper assembly.

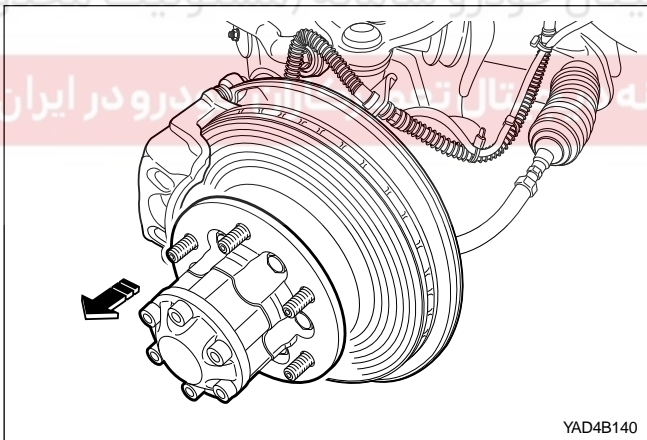




4. Remove the brake disc (Full-time 4WD)
5. Pull out the cotter pin from the front hub assembly and remove the lock nut. (Full-time 4WD)



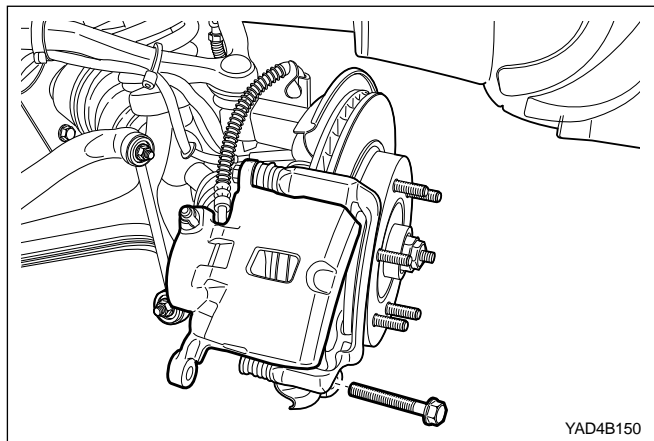
6. Remove the hub assembly mounting bolt and remove the hub assembly.



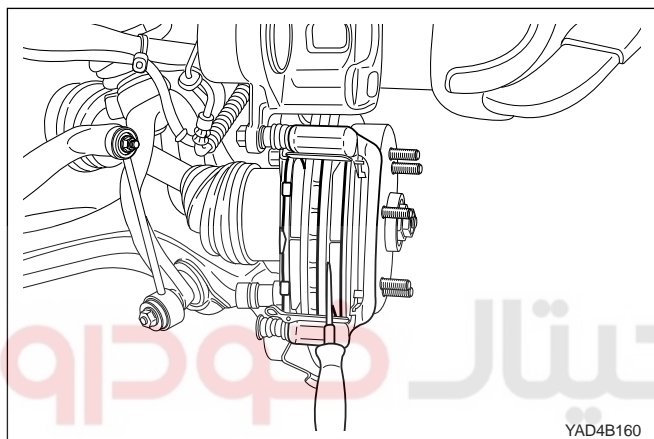
**Notice:** For part-time 4WD, remove the locking hub assembly and hub range before removing the brake disc.

## BRAKE PAD REPLACEMENT

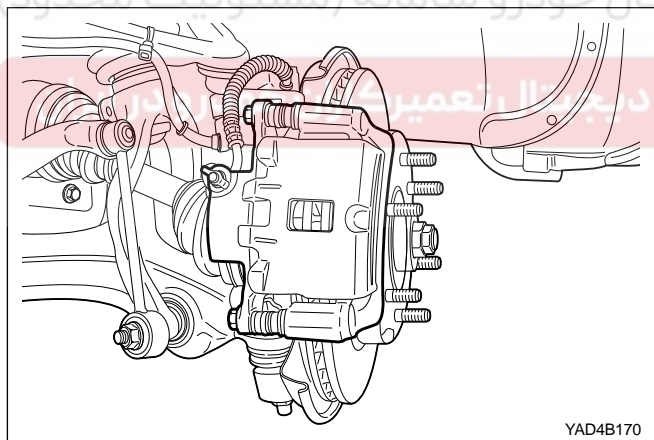
1. Remove lower mounting bolt of the brake caliper cylinder.



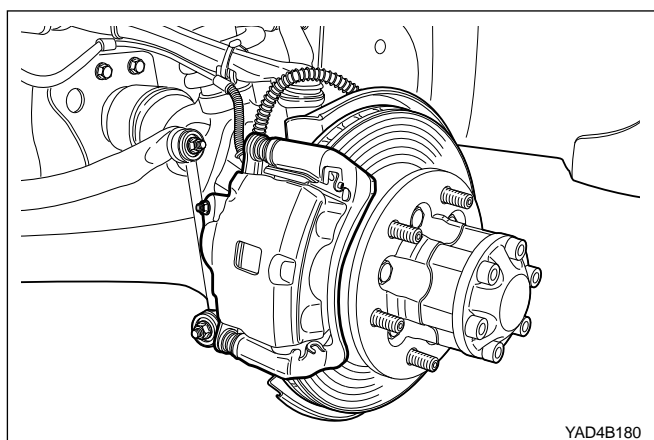
2. Move the caliper cylinder assembly upward and fix it to prevent hose damage.



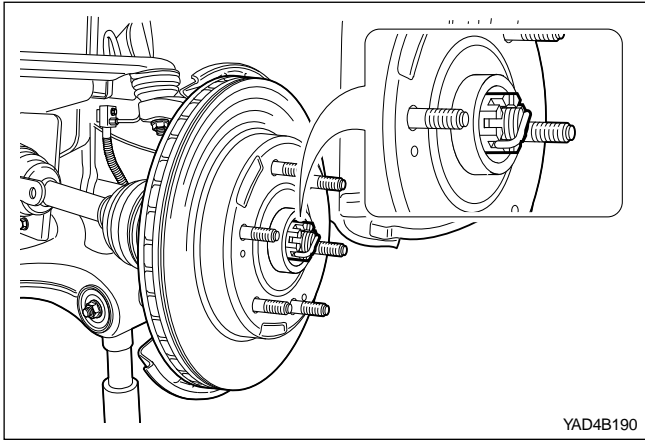
3. Remove the brake pad and replace the new pad.
4. Install the caliper cylinder assembly and fasten the lower bolt.



Full-time

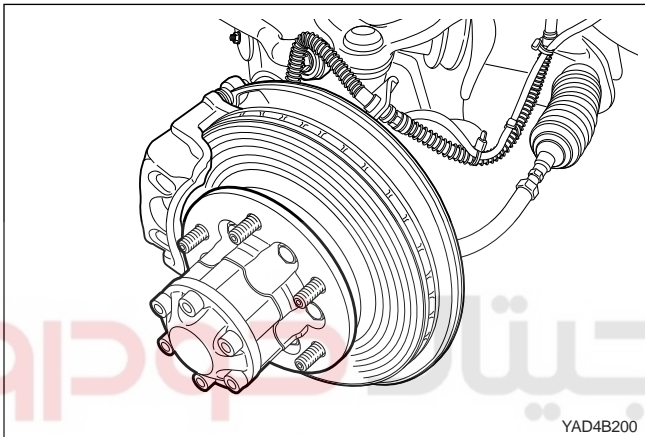


Part-time

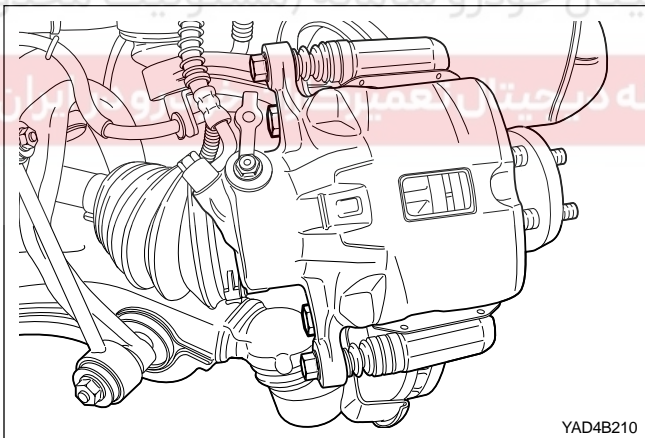


### Installation Procedure

1. Install the front brake disc assembly to the knuckle and fasten the lock nut as specified torque (full-time 4WD).



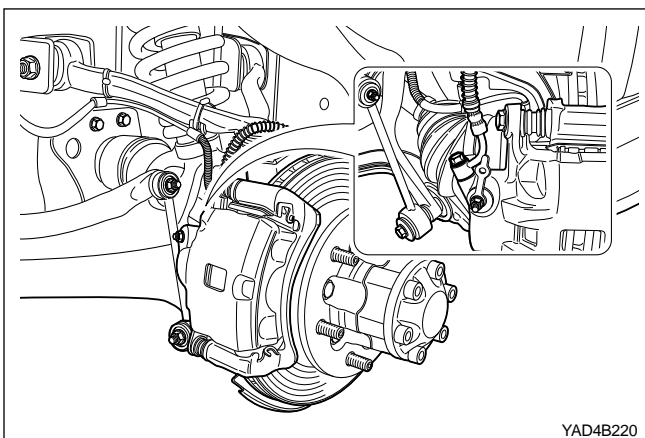
Install the front brake disc to the knuckle and install the locking hub & hub range. Fasten the mounting bolt (part-time 4WD).

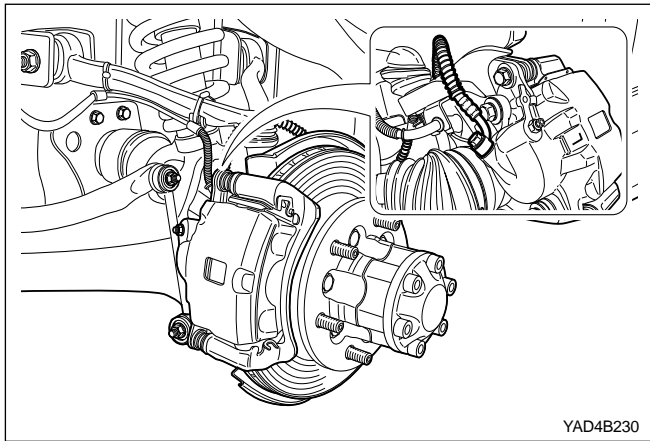


2. Install the caliper assembly to the front disc and fasten the caliper mounting bolt.

### Installation Notice

|                   |                                 |
|-------------------|---------------------------------|
| Tightening Torque | 85 - 105 N•m<br>(63 - 79 lb-ft) |
|-------------------|---------------------------------|





3. Connect the brake hose to the caliper cylinder.

**Installation Notice**

Tightening Torque

7 - 13 N•m  
(62 - 115 lb-in)**Notice:** The washer should be replaced new part.

4. Bleed the brake system after replacement.

# دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

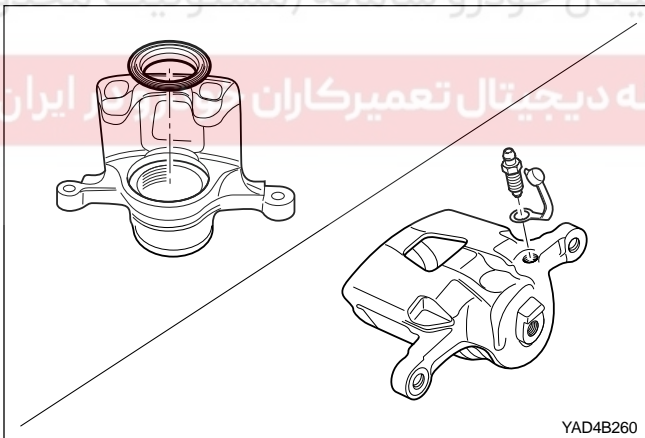
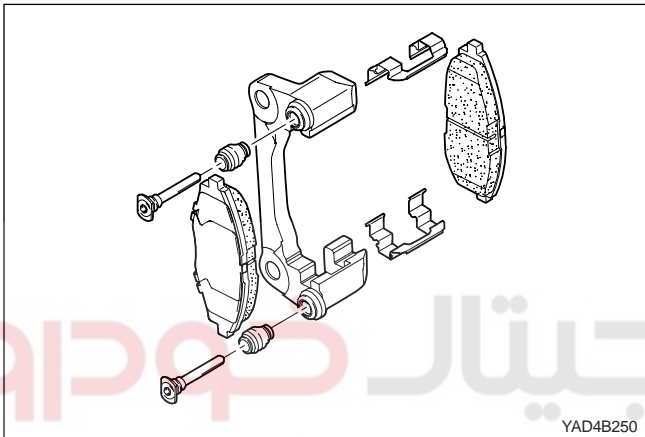
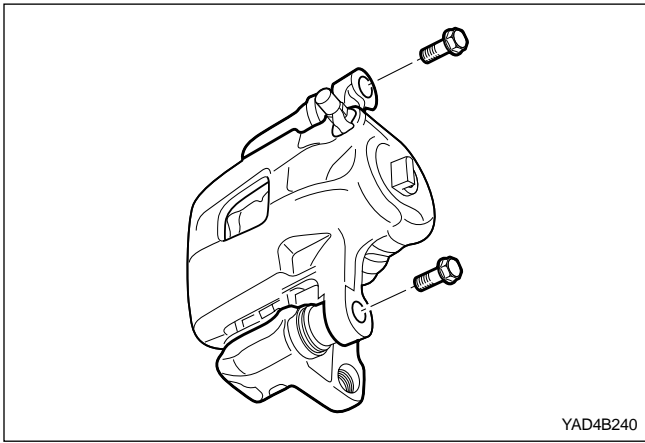


## UNIT REPAIR

### BRAKE CALIPER

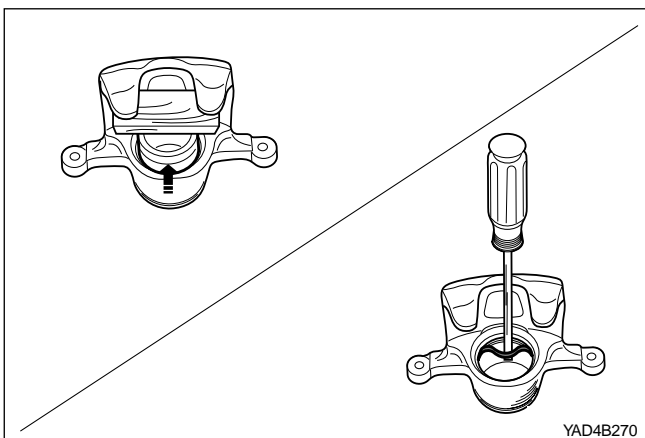
#### Disassembly Procedure

1. Remove the caliper assembly.
2. Separate the cylinder assembly and carrier.
  - Remove the guide rod bolt.
  - Separate the cylinder assembly and carrier.



3. Disassemble the carrier.
  - Remove the pad.
  - Remove the spring.
  - Remove the guide rod and the boot.

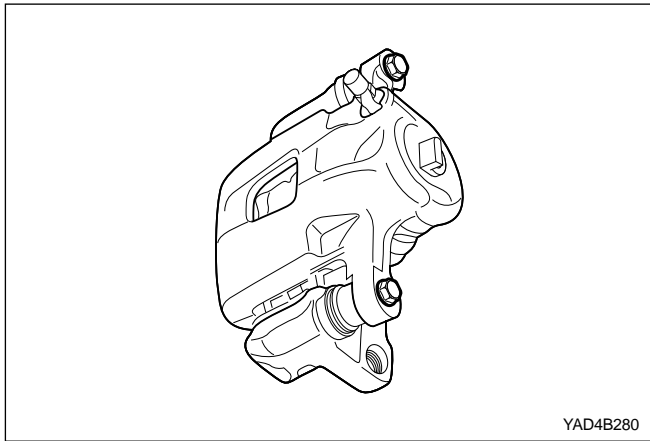
4. Remove the cylinder assembly.
  - Remove the bleeder plug.
  - Remove the bleeder plug cap.
  - Remove the piston boot.



- Using the compressed air, blow out the piston from housing.

**Notice:** Do not face in the direction of removing.

- Remove the piston.
- Remove the piston seal.



### Assembly Procedure

1. Installation should follow the removal procedure in the reverse order.

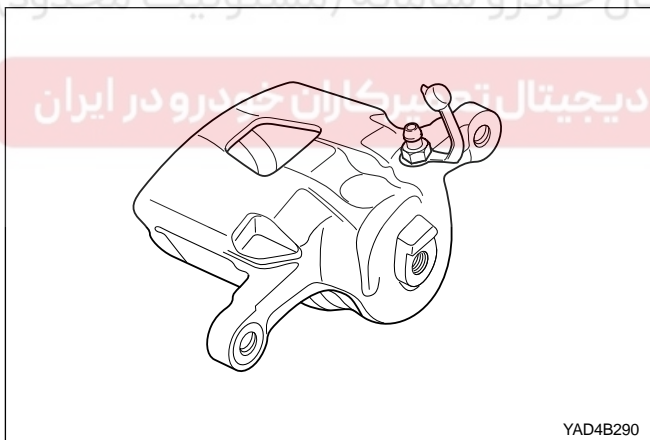
**Notice:** Clean all the parts in denatured alcohol or brake fluid. Dry the parts with unlubricated compressed air and blow out all the passages in the housing and the bleeder valve.

Apply the brake fluid on the surface of the piston and cylinder.

2. Fasten the guide rod bolt as specified torque.

### Installation Notice

|                   |                                |
|-------------------|--------------------------------|
| Tightening Torque | 22 - 32 N•m<br>(16 - 24 lb-ft) |
|-------------------|--------------------------------|



3. Fasten the bleeder screw as specified torque.

### Installation Notice

|                   |                                |
|-------------------|--------------------------------|
| Tightening Torque | 7 - 13 N•m<br>(62 - 115 lb-in) |
|-------------------|--------------------------------|