

# Brakes

## FIAT

### Spider 2000 & X1/9

#### DESCRIPTION

Brake system is hydraulically operated, using a tandem master cylinder. Spider 2000, uses a vacuum power brake unit. All models use single piston, sliding caliper, 4-wheel disc brakes.

All front and rear brake applications are self-adjusting. Spider 2000 uses a pressure differential valve in the rear brake circuit. Parking brakes are cable actuated, and operate on rear brake assembly.

#### ADJUSTMENT

##### PARKING BRAKE

1) Pump service brakes several times to seat pistons, then fully release parking brake lever. Pull parking brake lever up 3-4 notches.

2) Tighten nut on equalizer until rear wheels lock (X1/9 models have an opening provided in floor pan under body for access to equalizer).

3) Release parking brake, and ensure rear wheels rotate freely. Repeat adjustment procedure if rear wheels drag.

##### BRAKE WARNING LIGHT

1) A dual warning light is mounted on dash. Light should glow when parking brake lever is pulled 1 notch and go off when lever is fully released (ignition on).

2) To check warning circuit, release parking brake (ignition on) and ensure light is off. Lift master cylinder reservoir cover until level indicator is above fluid level; light should glow.

##### BRAKE PRESSURE REGULATOR

###### Spider 2000

1) Bring end of torsion bar (E) to distance shown in Fig. 1 from buffer resting surface. Use a jack to raise body to gain appropriate height, or place weight in passenger seat before tightening.

2) Lift dust boot (C) and check contact of regulator piston (D) with torsion bar end (E).

3) Pivot regulator body on screw (A) until piston (D) is just touching torsion bar end (E).

4) First, tighten screw (B) and then screw (A) in all the way. Connect link (G) to torsion bar eye end (E) with screw and nut while inserting rubber bushings and spacer.

**NOTE:** Fluid inlet from master cylinder must be connected to lower union (R) and fluid line to rear brakes must be connected to upper union (S).

#### REMOVAL & INSTALLATION

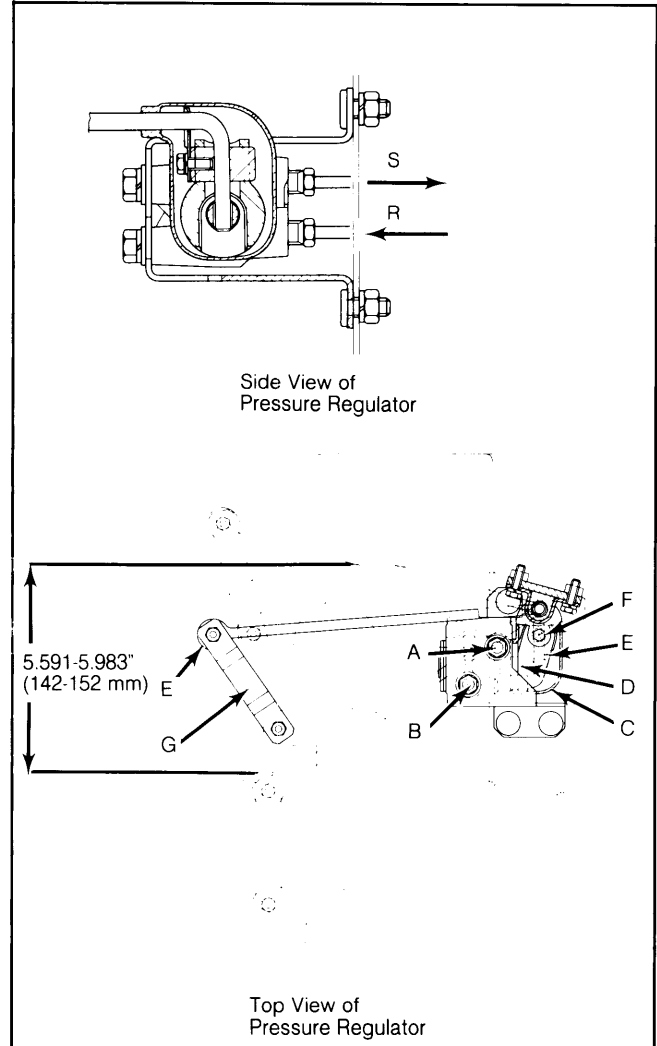
##### DISC BRAKE CALIPERS & PADS

###### Removal

1) Raise and support vehicle. Remove wheels. Disconnect brake line from caliper assembly, and plug.

2) Remove cotter pins from locking blocks. Using a drift, drive out locking blocks, and remove caliper. Remove disc pads and springs. When servicing rear disc brakes, parking brake cable must be disconnected.

**Fig. 1: Brake Pressure Regulator Measurement and Adjustment Points for Spider 2000**



**NOTE:** Vehicle must not be loaded if drive-on type lift is used to support vehicle.

**NOTE:** Pads must be replaced when worn to .079" (2 mm) from original thickness.

##### Installation

1) To install, reverse removal procedure and note the following: Inside and outside pads may differ. Ensure distance between pad inner surfaces is not less than .413" (10.5 mm).

2) In most instances 2 different types of pads are available. DO NOT mix pad types. Locking block contact areas must be lubricated with lithium based grease containing zinc oxide (N.L.G.C.).

##### BRAKE ROTOR

###### Removal

1) Remove caliper as previously outlined. Mount a dial indicator so plunger is .08" (2 mm) from outer edge of rotor and check runout.

2) Remove caliper support bracket from support plate (front), or from axle housing (rear).

## FIAT (Cont.)

3) Remove bolts mounting rotor to hub. Remove hub plate (if equipped). Using a puller or drift, remove rotor from hub.

### Installation

Fit rotor onto wheel hub, install attaching bolts and tighten evenly.

### REAR BRAKE DRUM

#### Removal

Raise and support vehicle. Remove tire and wheel. Remove locating pin and attaching bolt. Remove brake drum, releasing shoe adjustment if required.

#### Installation

To install, reverse removal procedure.

### MASTER CYLINDER

#### Removal (Spider 2000)

1) While holding brake fluid level sensor, unscrew reservoir cover and remove assembly. Siphon fluid from reservoir.

2) Gently rock reservoir from side to side and remove. Disconnect and plug hydraulic lines. Remove mounting nuts, and remove master cylinder from power brake unit.

#### Installation

To install, reverse removal procedure and bleed hydraulic system.

#### Removal (X1/9)

Remove steering column. See *Steering Column Removal in STEERING Section*. Disconnect hydraulic lines from reservoir. Remove mounting nuts and slide unit off supports. Disconnect outlet lines from master cylinder, and remove cylinder.

#### Installation

To install, reverse removal procedure and bleed hydraulic system.

### POWER BRAKE UNIT

#### Removal (Spider 2000)

1) Remove master cylinder as previously outlined. Loosen vacuum hose clamp and remove vacuum hose from power brake unit.

2) Remove cotter pin, lock nut, and washer from operating rod clevis at brake pedal. Remove brake unit mounting nuts, and remove power brake unit.

#### Installation

To install, reverse removal procedure and note the following: After installing master cylinder, bleed hydraulic system.

## OVERHAUL

### BRAKE CALIPERS

#### Disassembly (Front)

With caliper assembly on bench, remove dust boot. Apply light air pressure to brake fluid inlet union, to remove piston from caliper. Remove piston seal from groove in cylinder bore.

**NOTE:** Be careful not to scratch cylinder bore during removal process.

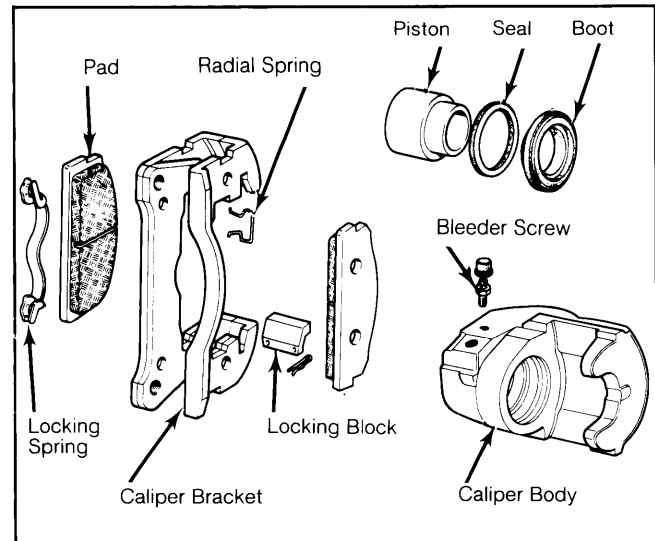
#### Cleaning & Inspection

Clean all components in solvent (Fiat LDC). Inspect each part for damage or excessive wear. Replace seals and dust boots.

### Reassembly

Fit piston seal in caliper. Apply a small amount of brake fluid to caliper bore and piston. Insert piston to bottom end of caliper bore. Position dust boot on caliper body. Fit caliper body into caliper bracket and reinstall on vehicle.

Fig. 2: Exploded View of Front Brake Caliper



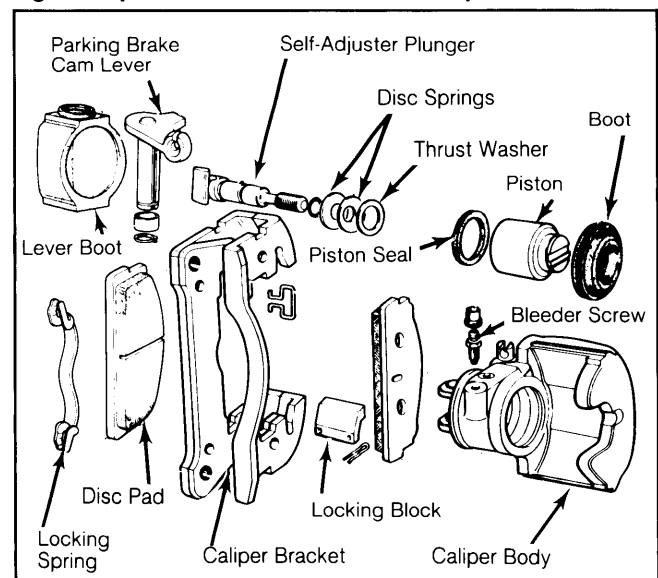
Replace all piston seals and dust boots.

#### Disassembly (Rear)

1) With caliper assembly on work bench, remove dust boot. With a screwdriver, separate piston from plunger.

2) Remove piston seal from groove in piston cylinder bore. Remove cam lever, pivot pin and lever. Lift out self-adjusting plunger, plunger seal, disc spring, and spring thrust washer.

Fig. 3: Exploded View of Rear Brake Caliper



Align piston slot so it is opposite bleeder screw.

# Brakes

## FIAT (Cont.)

### Cleaning & inspection

Clean all components in solvent (Fiat LDC). Inspect each part for damage or excessive wear. Replace all piston seals and dust boots.

### Reassembly

1) Fit self-adjusting plunger complete with seal, disc springs, and thrust washer. Fit parking brake cam lever complete with pivot pin.

2) Fit pivot pin bushing and snap ring. Fit piston sealing ring into caliper cylinder.

3) Screw piston into cylinder until fully seated. Align piston slot so it is opposite bleeder screw. Refit dust boot.

### MASTER CYLINDER

#### Disassembly

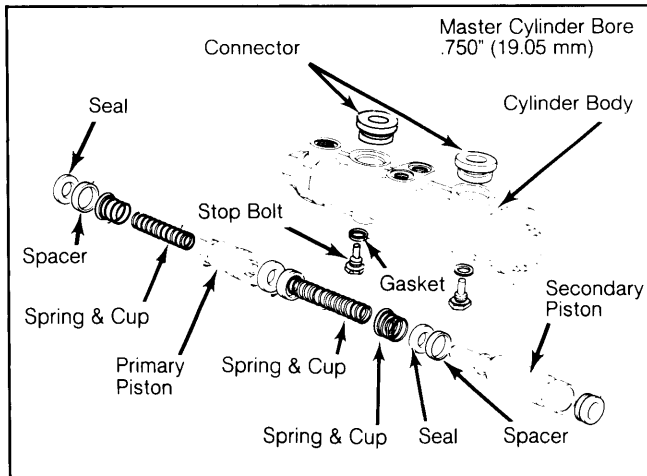
1) Remove connectors, and cylinder bore dust boot. Remove stop bolts and seals.

2) Remove set screws, and end plug (if equipped). Remove piston assemblies, return springs, cups, seals, and spacers.

#### Inspection

Clean and thoroughly dry all parts, then inspect for wear or damage. Light scoring may be removed by honing, make sure honing does not alter size of cylinder diameter. Replace all rubber pieces each time overhaul is performed.

Fig. 4: Exploded View of Fiat Master Cylinder



Replace all rubber pieces when overhaul is performed.

#### Reassembly

To reassemble, reverse disassembly procedure and lightly coat all components with brake fluid before reassembly.

### POWER BRAKE UNIT

#### Disassembly (Spider 2000)

1) With power brake unit removed from vehicle, remove check valve and grommet from front shell. Place wooden blocks on both master cylinder mounting studs and 4 power brake mounting studs, then place unit in a vise. Slowly tighten vise until rear shell can be rotated clear of front shell locking tabs.

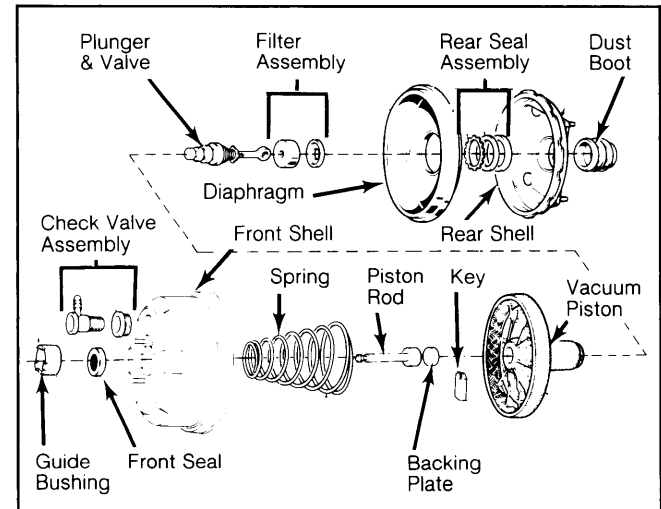
2) Separate front and rear shells. Slowly release vise until spring pressure is released, then remove power brake unit. Remove dust boot from rear shell. Remove filter assembly. Remove key to remove plunger and valve. See Fig. 5.

3) Separate diaphragm from rear shell. Remove rear seal assembly. Remove guide bushing front seal, vacuum piston, piston rod, backing plate, and spring from front shell. DO NOT disturb adjustment of piston rod.

#### Inspection

Manufacturer recommends replacement of the following parts during overhaul: Backing plate, seals, filter assembly, diaphragm, and boot. Inspect all other parts for wear or damage and replace as necessary.

Fig. 5: Exploded View of Power Brake Unit



Do not disturb adjustment of piston rod.

#### Reassembly

To reassemble power brake unit, reverse disassembly procedure and note the following: After reassembly, adjust tip of push rod so it extends past the surface of front cover by .032-.040" (.825-1.025 mm). Adjust by turning nut.

### DISC BRAKE ROTOR SPECIFICATIONS

Application	Disc Diameter In. (mm)	Lateral Runout In. (mm)	Parallelism In. (mm)	Original Thickness In. (mm)	Min. Refinish Thickness In. (mm)	Discard Thickness In. (mm)
Spider 2000	8.94 (227)	.006 (.15)	.....	.392-.400 (9.95-10.20)	.368 (9.35)	.354 (9.0)
	8.94 (227)	.006 (.15)	.....	.392-.400 (9.95-10.20)	.372 (9.45)	.354 (9.0)
X1/9	8.94 (227)	.10 (.25)	.....	.421-429 (10.7-10.9)	.368 (9.35)	.354 (9.0)