

## HYDRAULIC BRAKE BLEEDING

### DESCRIPTION

Hydraulic system bleeding is necessary any time air has been introduced into system. Bleed brakes at all 4 wheels if master cylinder lines have been disconnected or master cylinder has run dry. Bleeding may be done either by using pressure bleeding equipment or by manually pumping brake pedal and using bleeder tubes.

### MANUAL BLEEDING

Fill master cylinder, then install bleeder hose to first bleeder valve to be serviced. See *Bleeding Sequence*. Place other end of hose in clean glass jar, partially filled with clean brake fluid, so end of hose is submerged in fluid. Open bleeder valve  $\frac{3}{4}$ -1 turn. Depress brake pedal slowly through its full travel (except as noted in Bleeding Sequence chart). Close bleeder valve, then release pedal. Repeat procedure until flow of fluid shows no signs of air bubbles.

**NOTE** — Check fluid level in master cylinder frequently during bleeding sequence to ensure air does not enter system.

### PRESSURE TANK BLEEDING

Clean master cylinder cap and surrounding area, then remove cap. With pressure tank at least  $\frac{1}{3}$  full, connect master cylinder using suitable adapters. Attach bleeder hose to first bleeder valve to be serviced. See *Bleeding Sequence*. Place other end of hose in clean glass jar, partially filled with clean brake fluid, so end of hose is submerged in fluid. Open release valve on pressure bleeder. Unscrew valve  $\frac{3}{4}$ -1 turn, noting fluid flow. When fluid flow from bleeder valve into container is free of bubbles, close bleeder valve securely. Bleed remaining cylinders in correct sequence and in same manner. Remove pressure tank from master cylinder and check fluid level of master cylinder reservoir.

#### Bleeding Pressures<sup>①</sup>

Application	psi (kg/cm <sup>2</sup> )
BMW	
733i .....	56 (3.9)
All Others .....	28 (2.0)
Porsche .....	32 (2.3)
Renault .....	30 (2.1)
Volvo .....	50-60 (3.5-4.2)

① — For models not listed, refer to pressure tank manufacturer's specifications.

### BLEEDING SEQUENCE

Before bleeding system, exhaust all vacuum from power unit by depressing brake pedal several times. Bleed hydraulic system in the following sequence:

#### Bleeding Sequence

Application	Sequence
Audi & Volkswagen <sup>①</sup> .....	RR, LR, RF, LF
BMW <sup>②</sup> .....	Longest Line First
Chrysler Corp. Imports	
Champ & Colt Hatchback .....	LR, RF, RR, LF
All Others <sup>③</sup> .....	RR, LR, RF, LF
Courier <sup>④</sup> .....	Longest Line First
Datsun	
310 .....	Master Cyl., LR, RF, RR, LF
810 .....	Longest Line First
Pickup .....	Master Cyl., Comb. Valve, Longest Line First
All Others .....	Master Cyl., Longest Line First
Fiat .....	Longest Line First
Fiesta <sup>⑤</sup> .....	RF, LR, LF, RR
Honda .....	LF, RR, RF, LR
Jaguar <sup>⑥</sup> .....	LR, RR, Front
LUV .....	Shortest Line First
Mazda <sup>⑦</sup> .....	Longest Line First
Mercedes-Benz .....	Longest Line First
MG <sup>⑧</sup> .....	Shortest Line First
Peugeot <sup>⑨</sup> .....	Longest Line First
Porsche <sup>⑩</sup> .....	LR, RR, RF, LF
Renault .....	Longest Line First
Saab .....	LR, RF, RR, LF
Subaru .....	Master Cyl., LR, RF, RR, LF
Toyota .....	Longest Line First
Triumph	
Spitfire <sup>⑪</sup> .....	RR, LR, RF, LF
TR7 & TR8 <sup>⑫</sup> .....	RF, LF, RR, LR
Volvo <sup>⑬</sup> .....	LF, RF, RR, LR

- ① — Before bleeding rear brakes, push brake pressure regulator in direction of rear axle.
- ② — The 528i and 633Csi have 3 bleed valves on each front caliper. Bleed lower inboard valve first, then other 2 at same time.
- ③ — Arrow with rear drum brakes does not require bleeding of RR.
- ④ — Front and rear circuits are independent. Bleed each circuit separately.
- ⑤ — Container must be 12" (300 mm) higher than bleed valve. Before bleeding each rear wheel, apply parking brake; release after bleeding each rear wheel.
- ⑥ — Engine running at idle speed.
- ⑦ — GLC has independent front and rear circuits. Bleed each circuit separately.
- ⑧ — Before bleeding, disconnect and unscrew brake failure switch  $3\frac{1}{2}$  turns. Tighten and reconnect after bleeding.
- ⑨ — If pressure tank is used, bleed all wheels at same time.
- ⑩ — If equipped with inner and outer caliper bleed valves, bleed outer valve first, then inner.
- ⑪ — Use light pedal pressure. DO NOT use full pedal travel.
- ⑫ — Remove pressure differential switch before bleeding.
- ⑬ — Rear wheels must be higher than front wheels. Front calipers are each equipped with 3 bleed valves. Bleed all 3 valves at same time.