CHAPTER 06

Hydraulic Valves and Switches

FIGURE 6.1 A red brake warning lamp.

FIGURE 6.2 A leak in the hydraulic system causes unequal pressures between the two different brake circuits.
FIGURE 6.3 Most residual check valves are located under the tubing seals in the master cylinder outlet ports.

FIGURE 6.4 A movable contact brake fluid level switch.

FIGURE 6.5 A magnetic brake fluid level switch.
FIGURE 6.6 A wiring diagram of a typical red brake warning light circuit showing that the park brake switch is an input to the body control module (BCM) and the brake fluid level switch is an input directly to the instrument panel cluster (IPC).

FIGURE 6.7 Some proportioning valves are mounted directly to the master cylinder in the outlet to the rear brakes.

FIGURE 6.8 Typical proportioning valve pressure relationship. Note that, at low pressures, the pressure is the same to the rear brakes as is applied to the front brakes.
FIGURE 6.9 These two proportioning valves are found under the vehicle on this Dodge minivan.

FIGURE 6.10 A vehicle with a diagonal split braking system often uses a one-piece proportioning valve with two pistons, one for each rear wheel.

FIGURE 6.11 The proportioning valve piston can travel within the range shown without reducing pressure to the rear brakes.
FIGURE 6.12 At the split point, the proportioning valve piston closes the fluid passage through the valve.

FIGURE 6.13 A height-sensing proportioning valve provides the vehicle with variable brake balance.

FIGURE 6.14 A stepped cam is used to alter the split point of this height-sensing proportioning valve.
FIGURE 6.15 A proportioning valve pressure test can be performed using two pressure gauges—one to register the pressure from the master cylinder and the other gauge to read the pressure being applied to the rear brakes.

FIGURE 6.16 The ABS control module performs the functions of the metering and proportioning valves on most ABS equipped vehicles.

FIGURE 6.17 The metering valve may be a separate component or part of the combination valve.
FIGURE 6.18 A metering valve when the brakes are not applied. Notice the brake fluid can flow through the metering valve to compensate for brake fluid expansion and contraction that occurs with changes in temperature.

FIGURE 6.19 A metering valve under light brake pedal application.

FIGURE 6.20 A metering valve during a normal brake application.
FIGURE 6.21 This combination valve contains the pressure-differential valve, the metering valve, and the proportioning valve.

FIGURE 6.22 Combination valve containing metering, pressure-differential (warning switch), and proportioning valves all in one unit.

FIGURE 6.23 Typical two-function combination valves.
FIGURE 6.24 The brake pedal position (BPP) sensor (switch) and arm mounts to the brake pedal, under the dash.

FIGURE 6.25 With the plunger pressed in (pedal up), the meter should show an open circuit (switch open).

FIGURE 6.26 With the plunger released (pedal down), the switch should show very low resistance (switch closed).