HYDRAULIC SYSTEM CONTROL VALVES

DESCRIPTION

All vehicles have some type of hydraulic system control valve or warning switch within the brake hydraulic system. Unit is usually mounted on frame or firewall adjacent to master cylinder. The front and rear brake lines are routed through this valve to their respective caliper or wheel cylinder. Vehicles with drum brakes only use a pressure differential brake warning switch only. Vehicles equipped with disc brakes use a combination pressure differential warning switch with a proportioning valve, or a metering valve, or both.

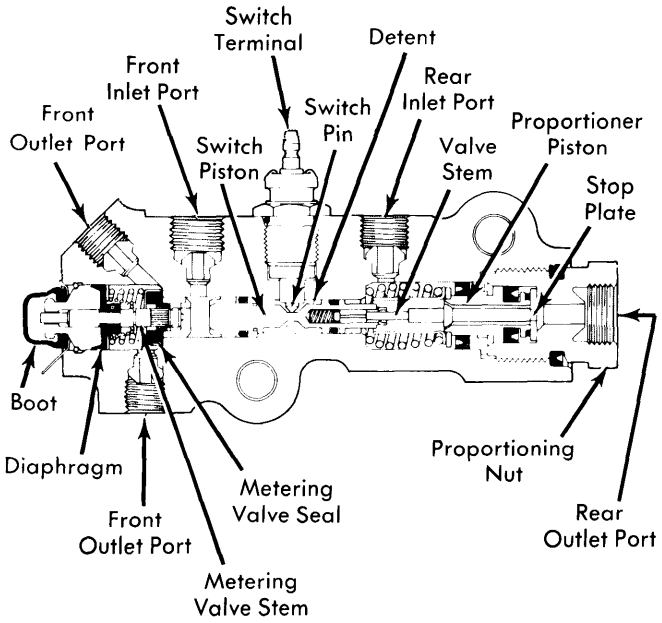

Fig. 1 Sectional View of Typical Hydraulic Control Valve

OPERATION

PRESSURE DIFFERENTIAL BRAKE WARNING SWITCH

This switch is used to warn vehicle operator that one of the hydraulic systems has failed. When hydraulic pressure is equal in both front and rear systems, switch piston remains centered and does not contact terminal in switch. If pressure fails in system, hydraulic pressure moves piston toward failed side. Shoulder of piston then contacts switch terminal to provide ground for brake warning light.

PROPORTIONING VALVE

Valve operates by restricting, at a given ratio, hydraulic pressure to rear brakes when system hydraulic pressure reaches a certain point. This improves front-to-rear brake balance at high speed braking, when a percentage of rear weight is transfered to front wheels. Valve reduces rear brake pressure, and delays rear wheel skid. On light brake application, valve allows full hydraulic pressure to rear brakes.

METERING VALVE

This valve holds off pressure to front disc brakes to allow rear drum brake shoes to overcome return spring pressure and make contact with rear drums. This prevents locking front brakes on slippery or icy surfaces under light braking conditions. Valve has no effect on front brake pressure during hard braking conditions.

TESTING

BRAKE WARNING LIGHT SYSTEM

Electrical Circuit – Disconnect wire from switch terminal and ground wire to chassis. Turn ignition switch "ON". Warning light should come on. If lamp does not light, bulb or wiring circuit is defective. Replace bulb or wiring as necessary. If lamp lights, turn off ignition and reconnect wire.

Warning Light Switch – Attach a bleeder hose to bleeder screw at either rear brake. Immerse other end of hose in container with brake fluid. Turn ignition "ON". Open bleeder screw while pressure is being applied to brake pedal. Warning lamp should light. Close bleeder screw before pressure is released from pedal. Reapply pedal pressure (moderate to heavy). Light should go out. Repeat test on front brake system. System should function in same manner. Turn ignition "OFF". If lamp does not light during test on either system, but electrical system checked good, the warning light switch portion of valve is defective.

SERVICING

All hydraulic system switches and valves are non-adjustable and non-serviceable. If any part of valve is found to be defective, entire unit must be replaced.

RESETTING SWITCH

All Models (Exc. IHC) – After failed side of system has been repaired, applying brake pedal with moderate force will hydraulically recenter piston and turn off brake warning light.

IHC – After failed side of system has been repaired, disconnect wire at switch and remove switch. This will allow pistons to recenter themselves. Reinstall and tighten switch in valve.

REMOVAL & INSTALLATION

ALL MODELS

Removal – Disconnect brake warning light connection at switch. Disconnect all brake hydraulic lines at valve. Cover open ends of line to prevent dirt from entering system. Remove valve mounting bolts. Remove valve from vehicle.

Installation – To install control valve, reverse removal procedure. Bleed brake system. *See Hydraulic Brake Bleeding in this Section.* Recenter brake warning light piston as previously outlined.