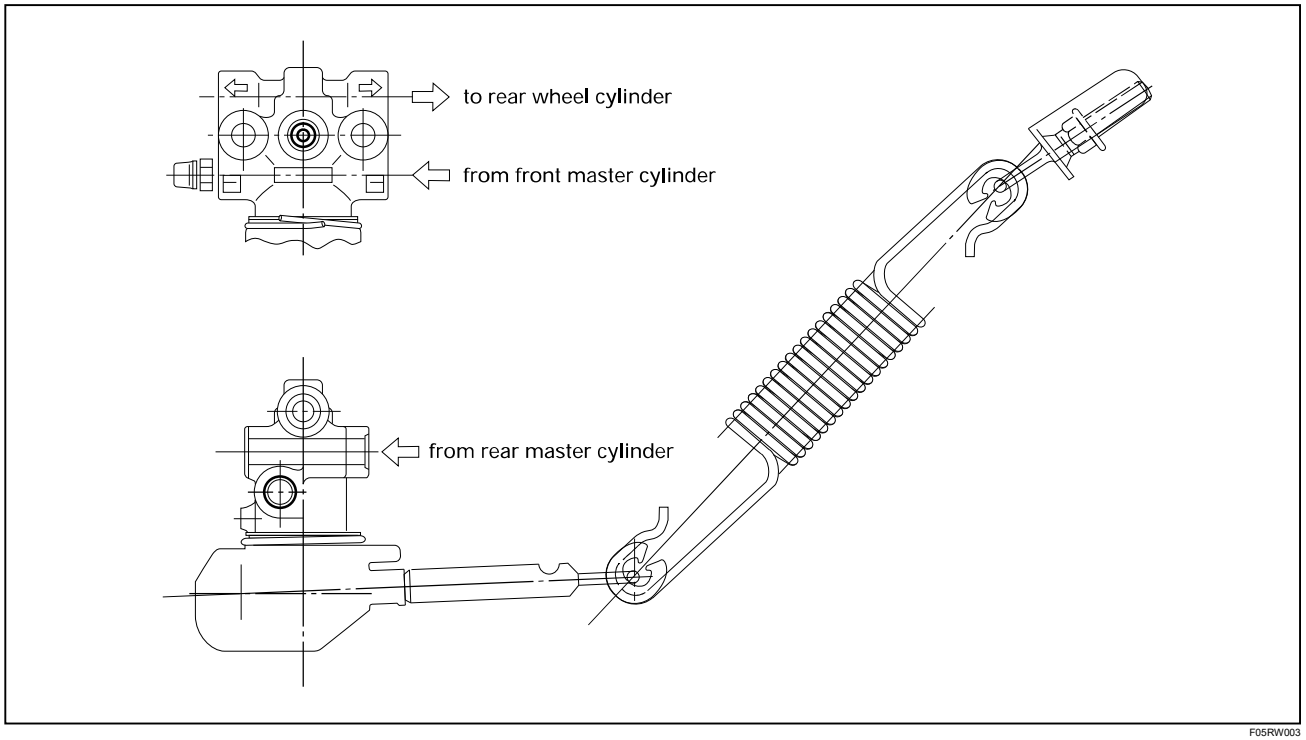
LOAD SENSING PROPORTIONING VALVE (LSPV) (FOR EUROPE AND SOUTH AFRICA)



F05RW003

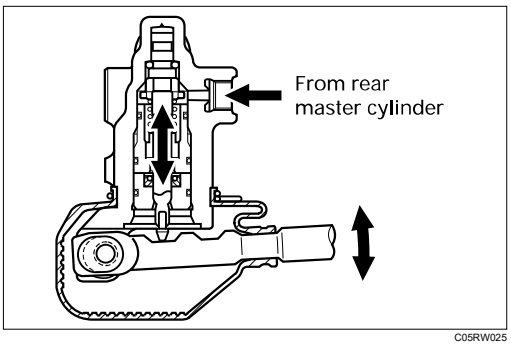
Structure and Operation

The following is an explanation of the structure and operation of the linkage type load sensing device. This device controls the fluid pressure to the rear brakes in accordance with changes in rear axle load (vertical displacements of the rear axle springs).

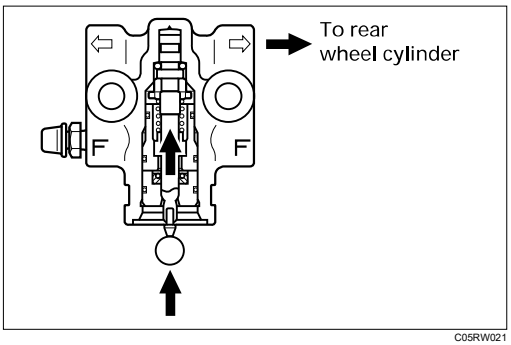
- Structure

  This device consists of a load sensing lever and a valve.

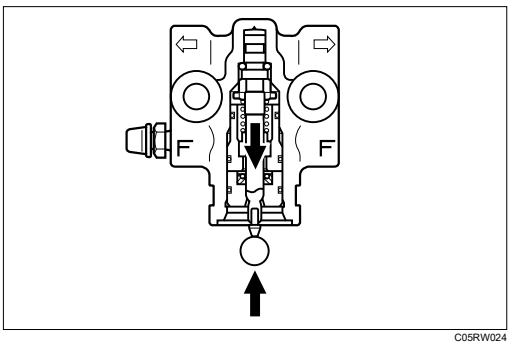
  The valve is mounted through a bracket to the frame. One end of the load sensing lever is fixed to the valve at the frame and the other end to the rear axle housing through a spring.



C05RW025



C05RW021



C05RW024

- Operation

1) Outline

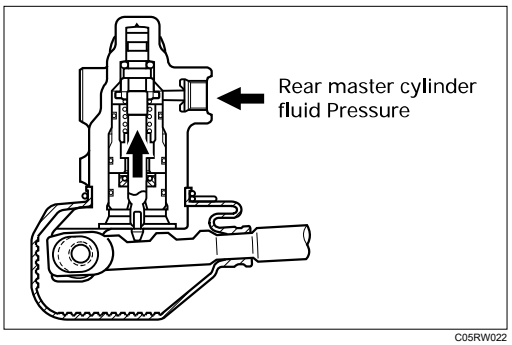
When the L.S.P.V. (Load Sensing Proportioning Valve) detects a change in load weight, the load sensing lever moves. Its reaction force is transmitted to the bottom of the load sensing valve to secure an optimum rear wheel cylinder fluid pressure break point in proportion to the actual load weight.
Besides, if the front brake system should fail, the devices is designed to prevent the master cylinder fluid pressure from decreasing and to apply it directly to the rear wheel cylinder to obtain a sufficient braking performance.

2) Operation

(1) When the fluid pressure is under the break point.
The fluid pressure of the rear master cylinder passes through a clearance between the valve seal and the piston and acts on the rear wheel cylinder. At this moment, a downward force is applied to the piston. However, the compression spring force and reaction force of the load sensing lever keep the piston in the upper position by pushing upwards. (See the left figure.)

(2) When the fluid pressure is equal to the break point.
As the rear wheel cylinder pressure increases, it surpasses the compression spring force and reaction force of the load sensing lever, causing the pistion to move downwards, so that the pistion butts against the valve seal to shut off the fluid line between the master cylinder and rear wheel cylinder. (See the left figure.)

(3) When the fluid pressure is over the break point.
When the fluid pressure increases further, the piston moves upwards. The moment the piston comes apart from the valve seal, fluid pressure is applied to the rear wheel cylinder and the piston moves downwards so that the fluid line is shut off again. This process goes on repeatedly to control the fluid pressure to the rear wheel cylinder.



(4) When the front brake system fails.
When there is a failure in the front brake system, the fluid pressure from the front master cylinder decreases. As a result, the balance between the front and rear brake side fluid pressures is lost at the control valve sleeve so that the control valve sleeve moves upwards.
The control valve sleeve strikes against the piston, thereby pushing the piston upwards.
Accordingly, the fluid pressure of the rear master cylinder is not decreased and is applied directly to the rear wheel cylinder to secure a sufficient braking performance of the rear brakes. (See the left figure.)

Valve Maintenance
In the case of fluid leak or other abnormalities, faulty valve should be replaced.

Note:
The load sensing proportioning valve is not repairable and must be replaced as a complete assembly.

ADJUSTMENT PROCEDURE OF LSPV

1. Adjust the rear axle weight by loading the laggage compartmemt as necessary.

Rear Axle Weight	N (kg / lb)
10,300 (1,050 / 2,315)	

Note:
The rear axle weight should be adjusted to the specified value with a man seated in the driver seat.

2. Check the rear wheel cylinder fluid pressure. Install the pressure gauge on bleeder screws on the front and rear brakes.
   a. Depress the brake pedal slowly until the front wheel cylinder fluid pressure reaches 7845 kPa (80 kg/cm^2 / 114 psi)

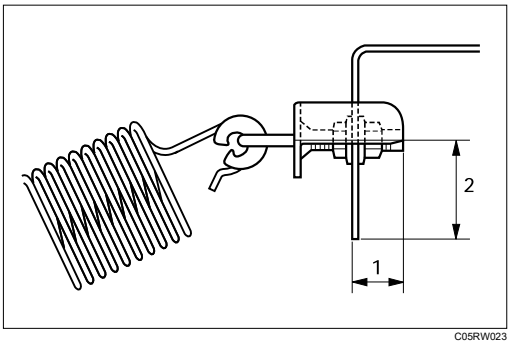
      Note:

      - **The brake pedal should be depressed gradually until specified pressure is reached without pumping or adjusting foot pressure.**
      - **If the front wheel cylinder fluid pressure rises abobe 7845 kPa (80 kg/cm^2 / 114 psi), release the pedal fully, then depress the pedal again.**

   b. Hold the front wheel cylinder fluid pressure at 7845 kPa (80 kg/cm^2 / 114 psi) for 2 seconds, check the rear wheel cylinder fluid pressure.

Rear wheel cylinder fluid pressure	kPa (kg/cm^2 / psi)
6374±539 (65±5.5 / 924±78)	

   c. If the rear wheel cylinder fluid pressure is not within the specified range, adjust the fluid pressure.



C05RW023

3. Adjust the rear wheel cylinder fluid pressure. The fluid pressure can be adjusted by the bolt projection (1) or bolt projection (2).
   a. If the fluid pressure is lower than specified range, increase the dimention (1) or (2).
   b. If the fluid pressure is higher than the specified range, decrease the dimention (1) or (2).

      Reference:

      Dimention (1): The fluid pressure can be adjusted about 196 kPa (2 kg/cm^2 / 28 psi) by one turning of the nut.

      Dimention (2): The fluid pressure can be adjusted about 98 kPa (1 kg/cm^2 / 14 psi) by sliding the bolt position (per 1 mm / 0.039 in).

4. Check the rear wheel cylinder fluid pressure. If the rear wheel cylinder fluid pressure is not within the specified range, try the adjustment again.
5. Bleed the brake hydraulic line and check the fluid leak.