

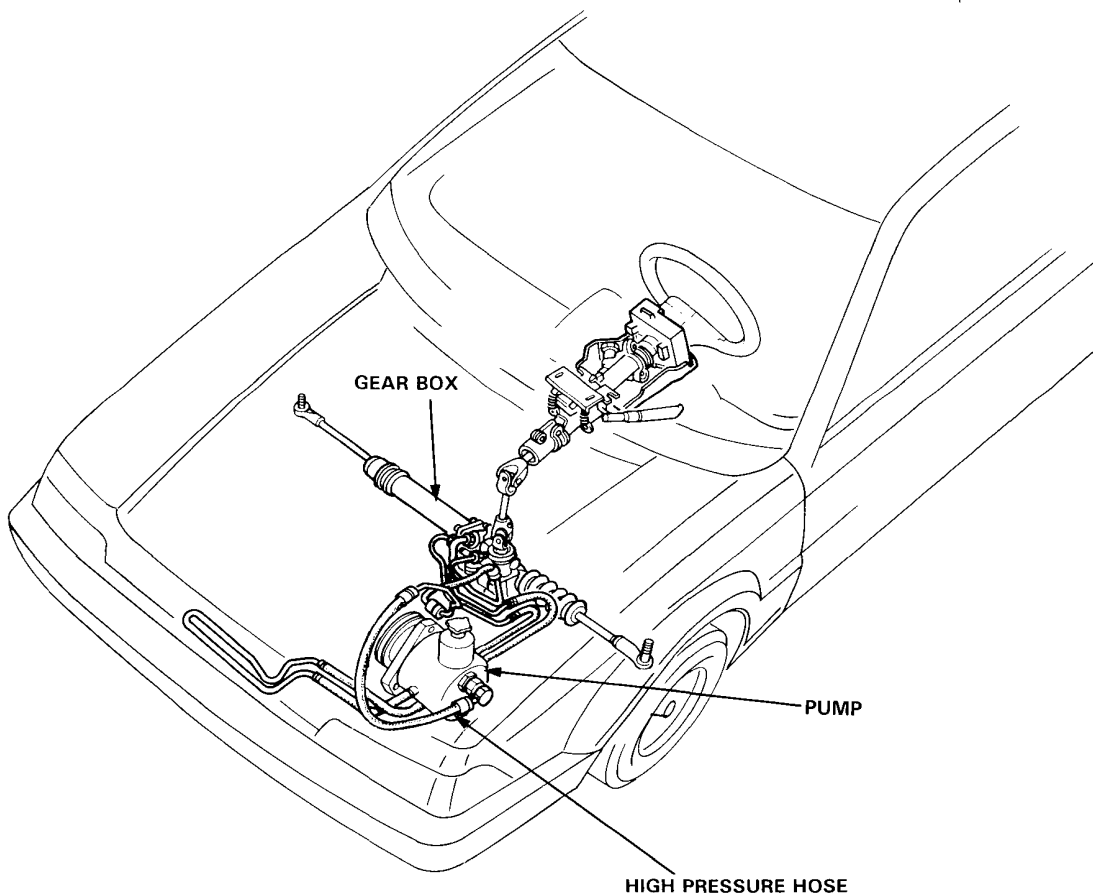


# Operation

## Description

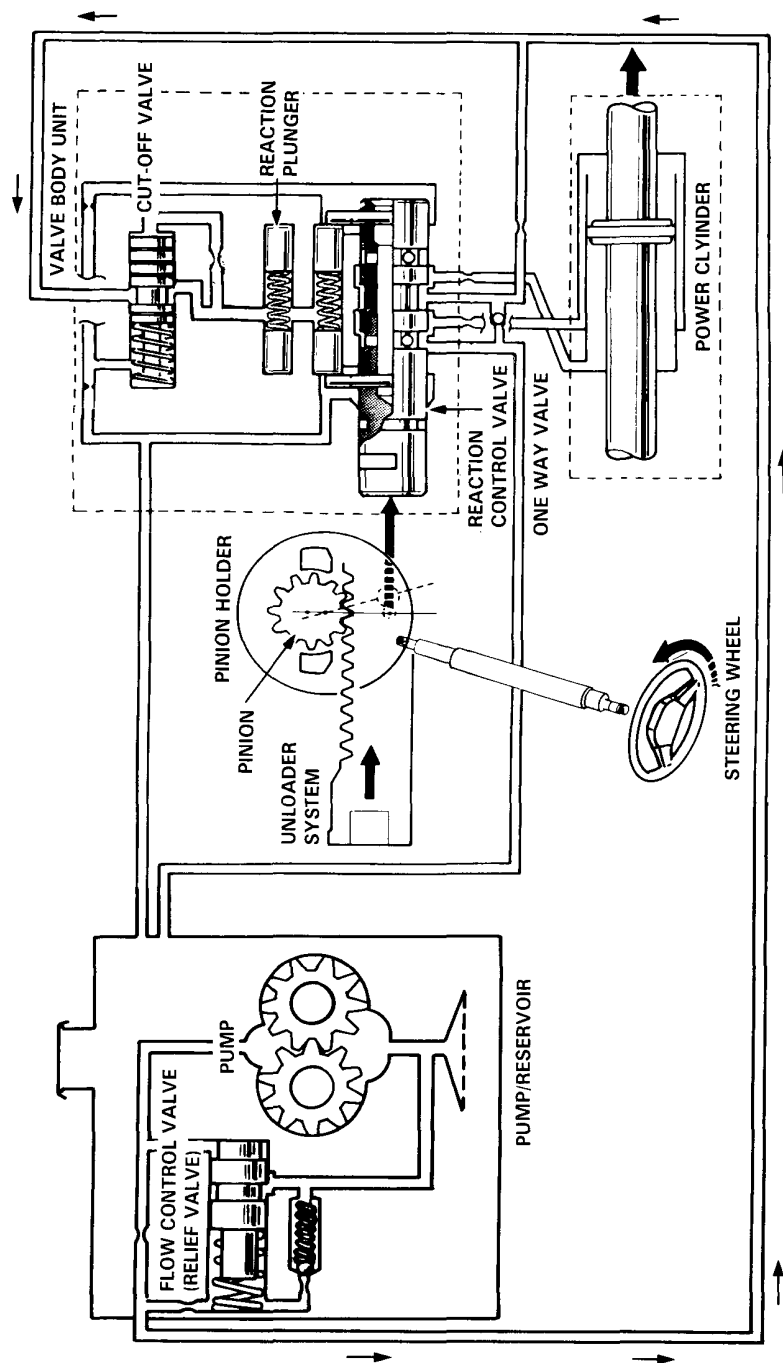
The power steering is rack and pinion type. The power operating assembly is integral with the steering gear. Road feel is maintained throughout the entire speed range of the vehicle.

NOTE: L/H shown, R/H similar



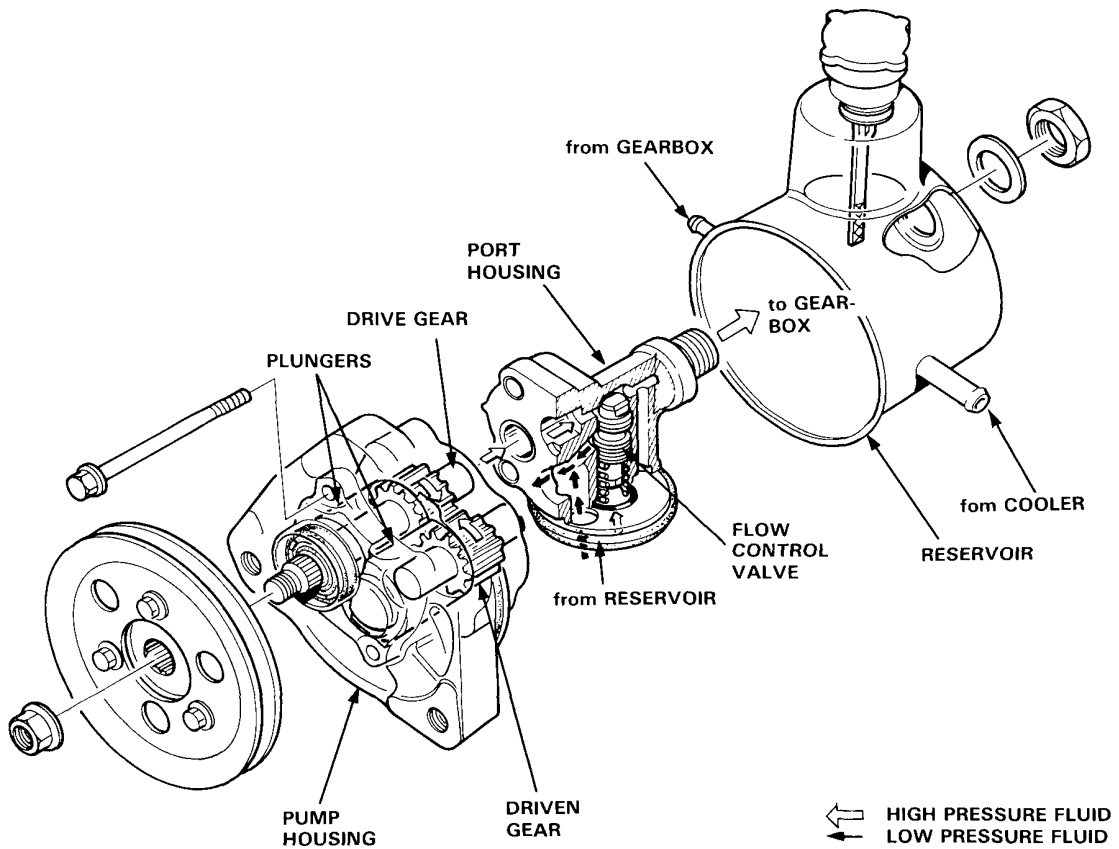
# Operation

## Flow Circuit



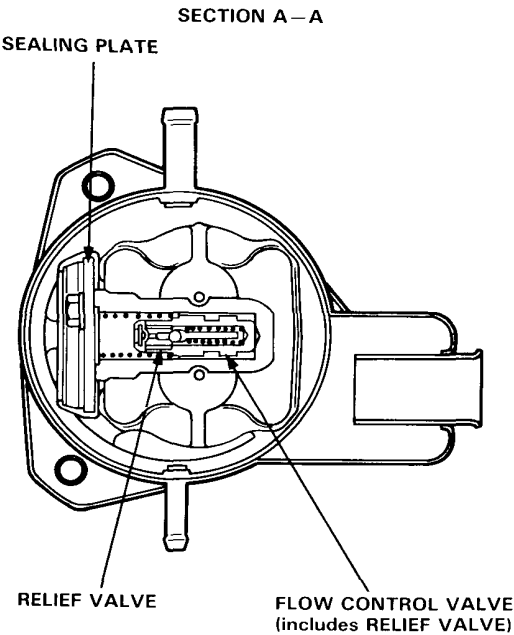
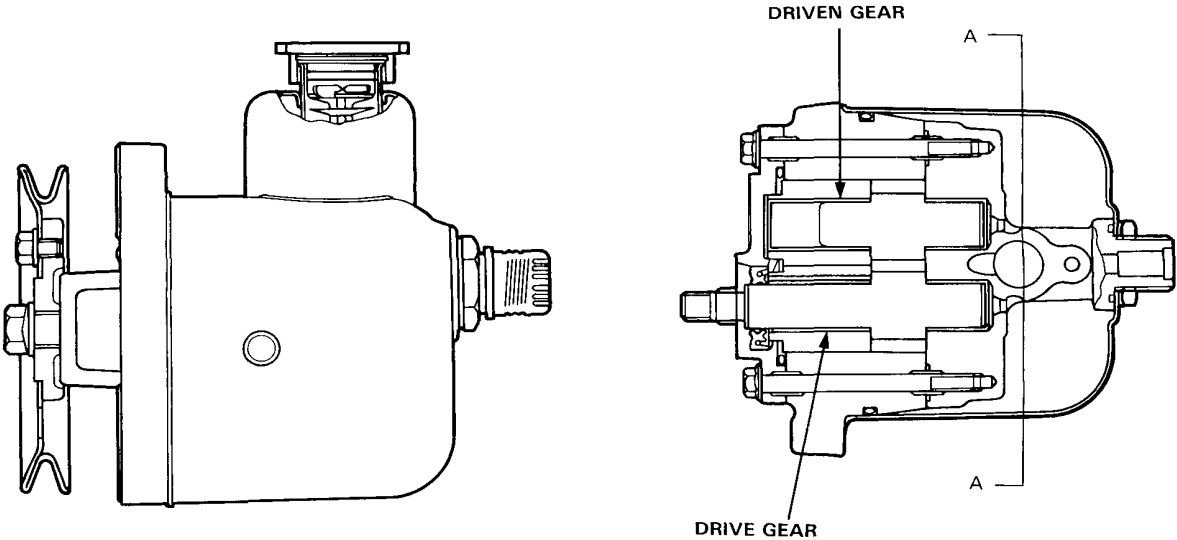
## Pump

The pump is located at the left side of the engine cylinder head. It is a constant displacement spur gear type integral with the reservoir, and driven by the crankshaft through a V-belt. A relief valve in the pump housing returns excess fluid to the pump inlet. The pump housing and port housing are made of aluminum for light-weight construction.



# Operation

## Pump (cont'd)





## Pump

### Flow Control

Fluid from the pump runs through a metering orifice to the valve body. This creates a pressure differential between the pump and valve body sides of the orifice.

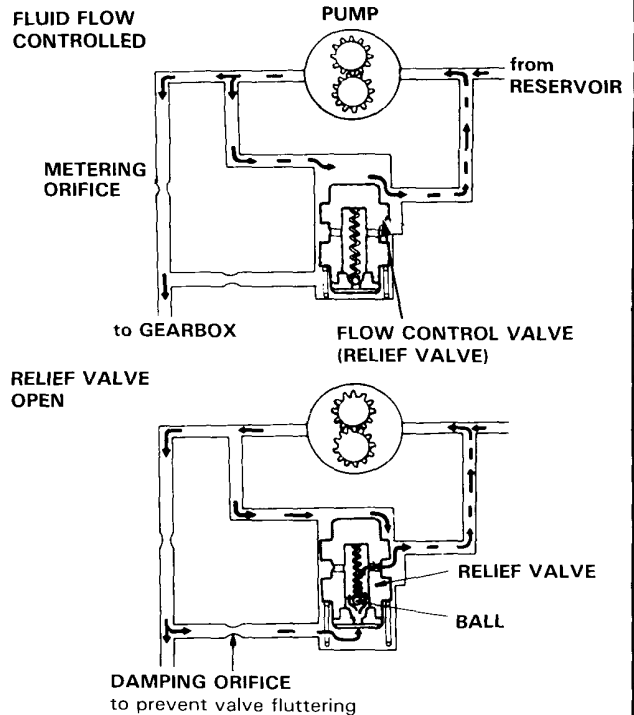
When pressure in the pump side is higher than the force of the spring holding the flow control valve closed, it pushes the valve down (open), and excess fluid returns to the pump inlet. The combined effect of the metering orifice and the flow control valve provides a relatively constant flow of fluid to the valve body.

### Pressure Relief

As pressure on the valve body side builds up, it pushes the relief valve ball (inside the flow control valve) up against its spring.

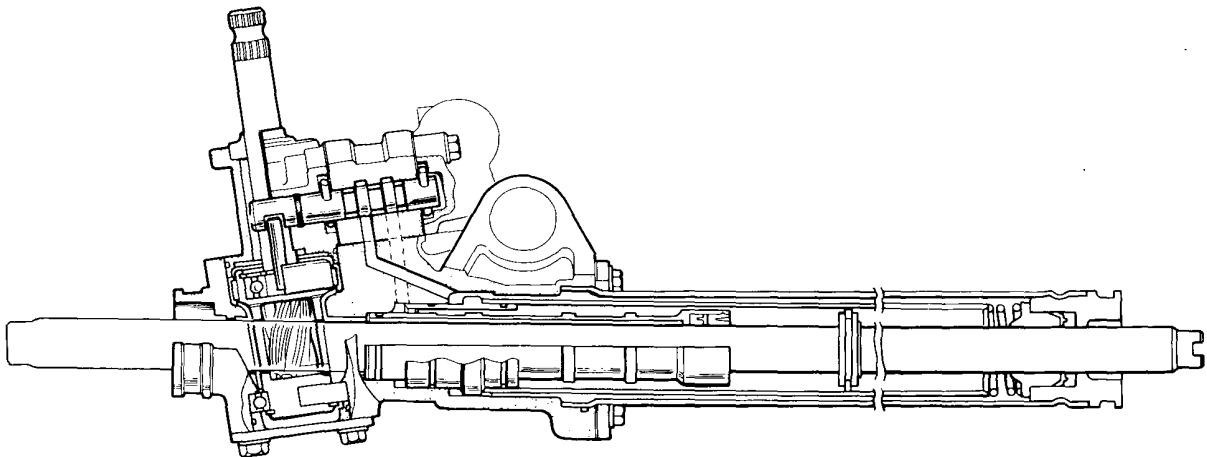
As the pressure under the flow control valve drops, the relief valve ball is closed by its spring, and the flow control valve is forced down again, allowing excess fluid from the pump side to return to the inlet.

This flow control valve-relief valve cylinder keeps pump output pressure between 80–90 kg/cm<sup>2</sup>.



## Gearbox

The steering gear is a self-contained rack and pinion type with the power cylinder placed in line with the steering rack. The power cylinder has an outer wall which serves as a fluid passage to eliminate external piping. The control valve is located at the top of the steering gearbox.



(cont'd)

# Operation

## Gearbox (cont'd)

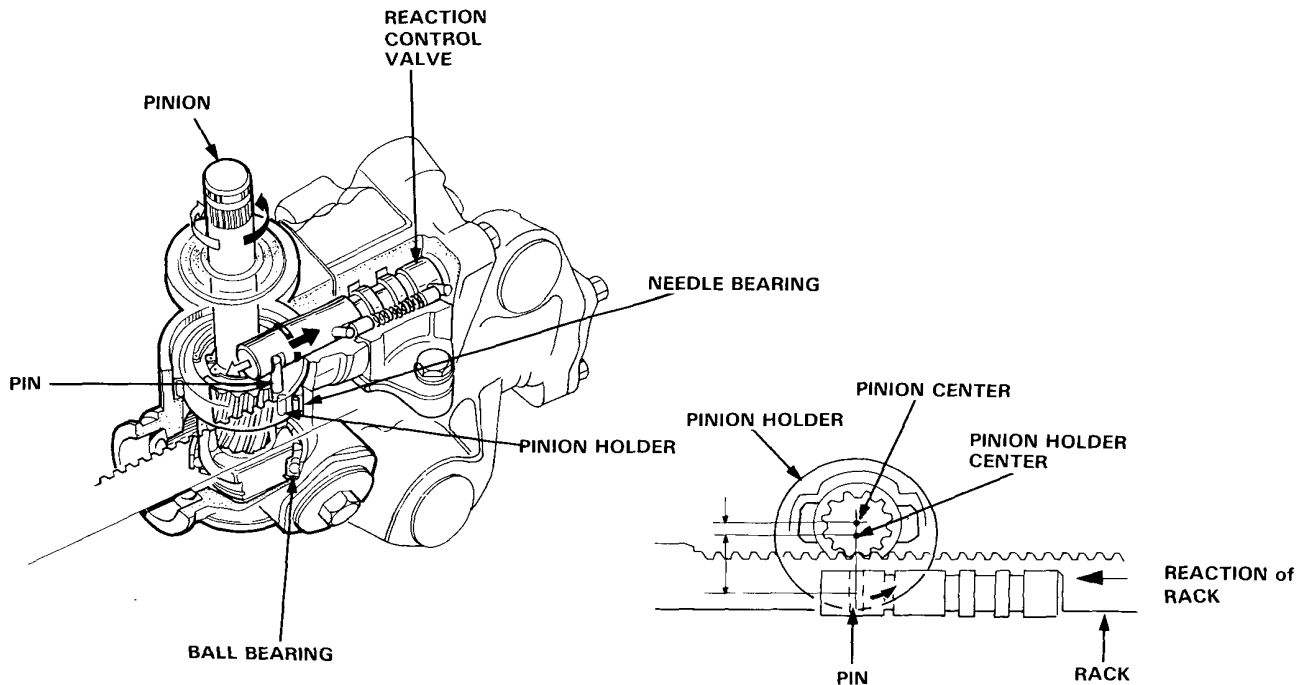
### Valve Body Unit

In the power steering unit, the method used to direct a single source of fluid pressure in either of two directions (for left or right turns) involves the pinion gear transferring a "message" of direction to the fluid control valve.

The pinion is mounted slightly off-center in a pair of bearings, which are in turn mounted in a pinion holder cylinder that rotates, centered in its own outer bearings. At the bottom of the pinion holder is a pin, which fits in a slot in the control valve.

As the pinion is turned (to turn left or right), because it is off-centered it also moves slightly along the rack. This movement is transferred to the holder. The pin in the holder then moves the control valve, to direct fluid pressure to either side of the rack power cylinder.

The back edges of the pinion holder hit stops cast into both sides of the gear housing to avoid pushing the control valve too far in either direction. The front edge of the pinion holder cuts off assist at full lock.



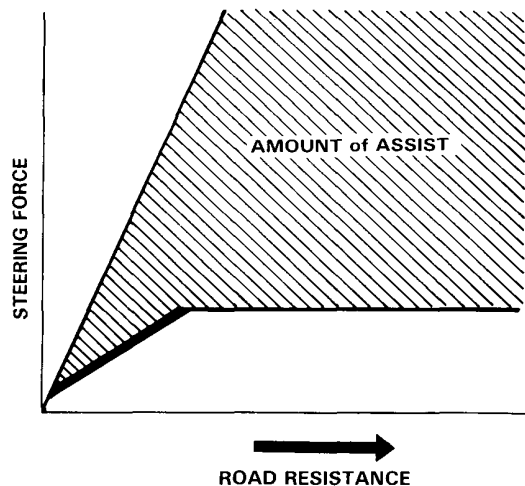
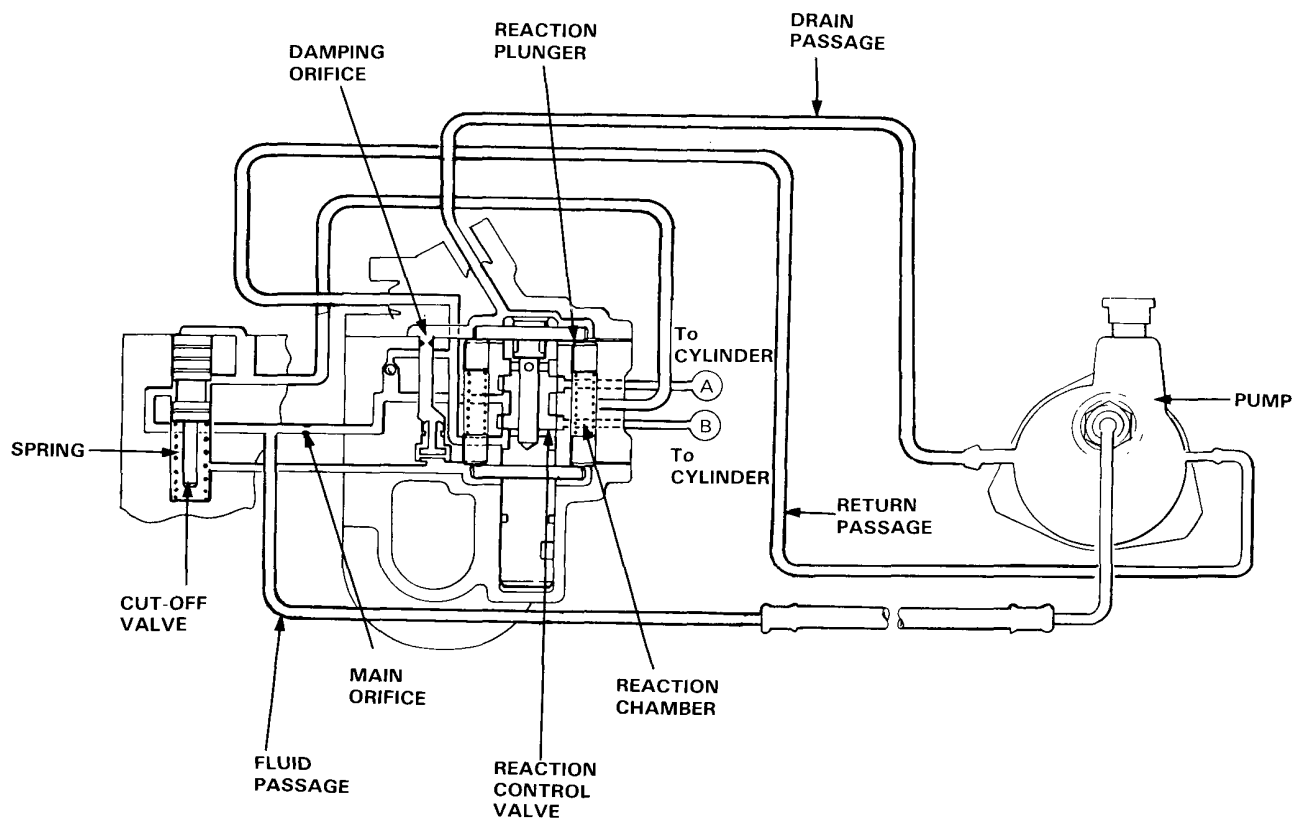


# Operation

## Gearbox (cont'd)

### Turns at Medium or High Speed

At medium or high speed, pump pressure is not high enough to force the cut-off valve to rise. Fluid from the pump will then work its way around the cut-off valve and flow directly into the reaction chambers. This gives essential "road feel."







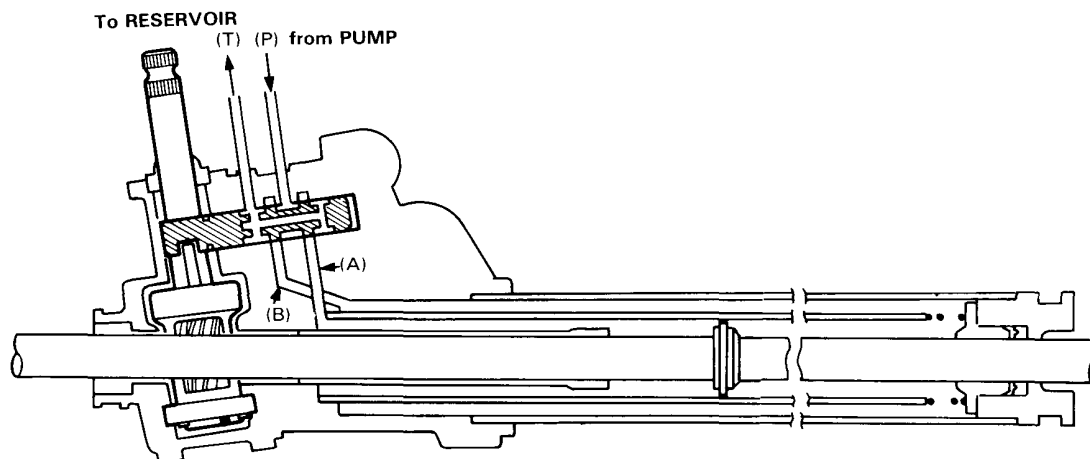
## Power Cylinder

### Straight Ahead (Steering Wheel not Turned)

When the car is stationary, or when it is moving straight ahead, fluid from the pump will expand the reaction plungers, assisted by the plunger springs, allowing the reaction control valve to remain in the neutral position.

When the reaction control valve is in neutral, it opens the ports, connecting the pump passage (P) to the reservoir through the right and left turn passages (A and B) of the power cylinder.

In this position, the only pressure built up in the pump passage is that produced by the main orifice.



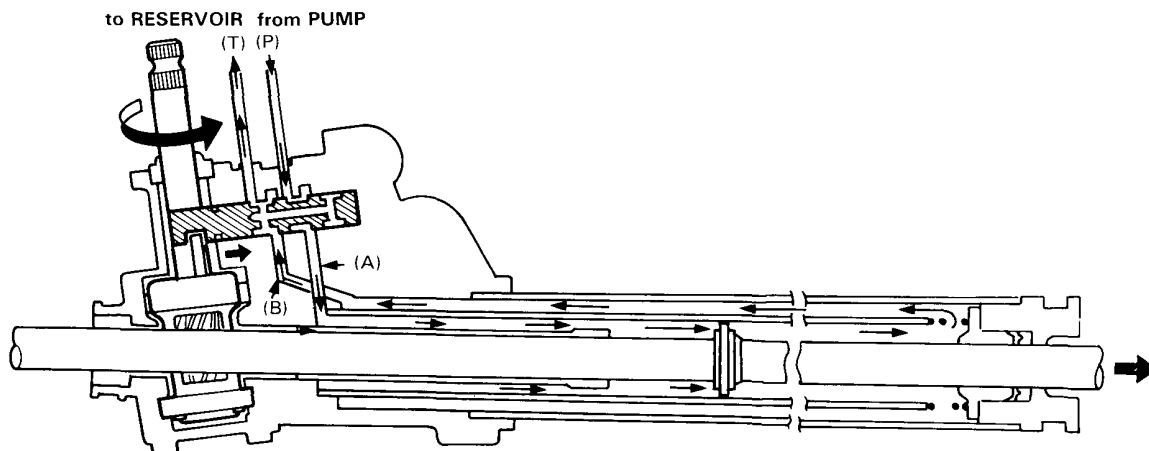
### Left Turn

When the steering wheel is turned to the left, the reaction control valve is moved to the right, compressing the reaction plungers.

This connects the left turn passage (A) of the power cylinder to the pump passage (P), and connects the right turn passage (B) of the power cylinder to the reservoir passage (T).

Fluid now flows into the power cylinder. Thus, the fully hydraulic pressure developed by the pump is applied to the left turn side of the piston in the cylinder.

As the piston is moved to the right the fluid in the right side of the piston is returned to the reservoir.



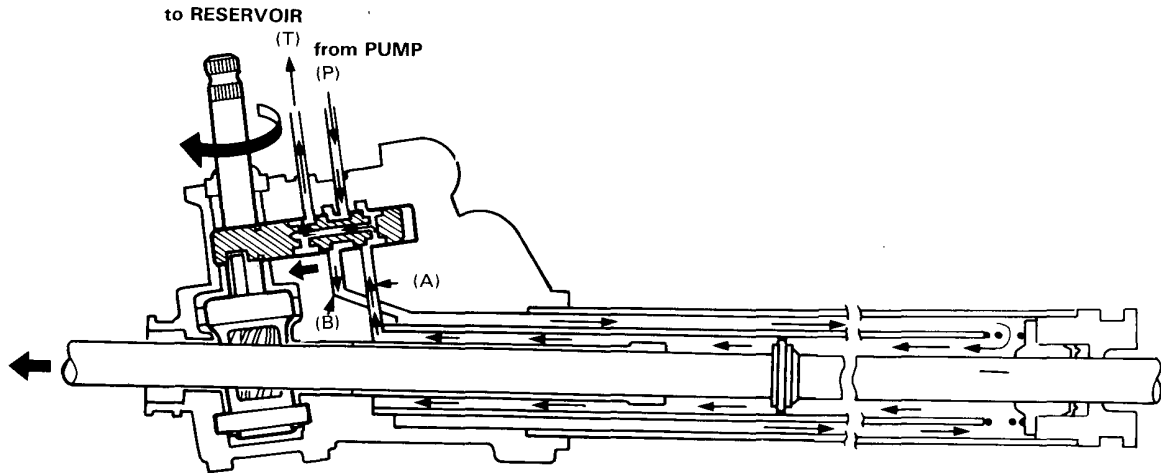
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# Operation

## Gearbox (cont'd)

### Right Turn

A right turn will produce the same action using the right turn chamber of the power cylinder.



### Return to Straight Ahead

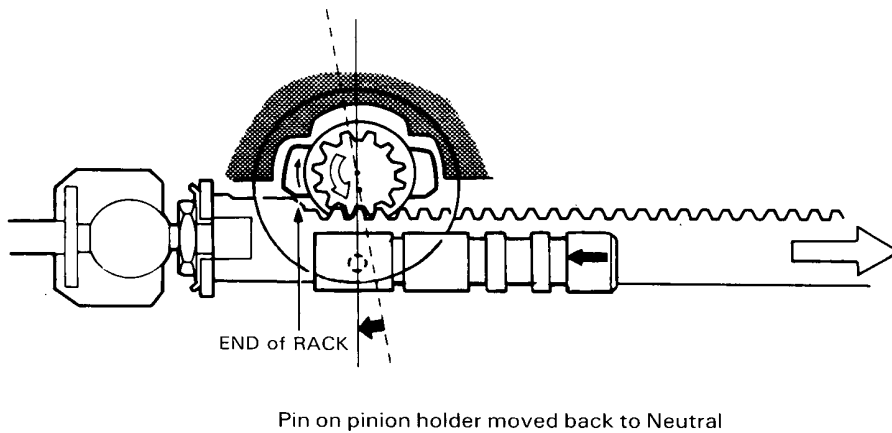
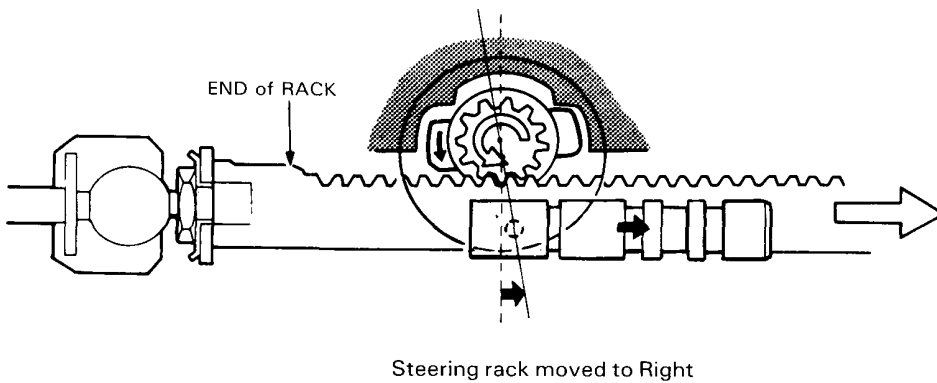
When the steering wheel is returned to the straight ahead position, the reaction control valve returns to its neutral position, and the reaction plungers are expanded by the power steering fluid and the tension of the plunger springs.

## Unloader System

The control valve shifts the direction of fluid flow when the steering wheel is turned right or left.

However, when the wheel is turned to right or left lock at parking speed, the edge of the pinion holder rides up on the end of the rack, moving the pin in the opposite direction which pulls the control valve back to neutral.

This keeps pump pressure from building up (which could cause idle speed to drop), and improves steering feel by increasing resistance at left and right lock.



(cont'd)

# Operation

## Gearbox (cont'd)

### One-way Valve (Vacuum Check Valve)

When the wheel is turned with the pump stopped (engine not running), negative pressure develops in the pump circuit. To compensate for this, a one-way check valve is provided in the circuit between the pump and low pressure side of the control valve.

As the wheel is turned, the valve lets the oil recirculate through the control valve and power cylinder without returning to the reservoir.

This prevents fluid in the reservoir from rising and allows adequate steering effort.

