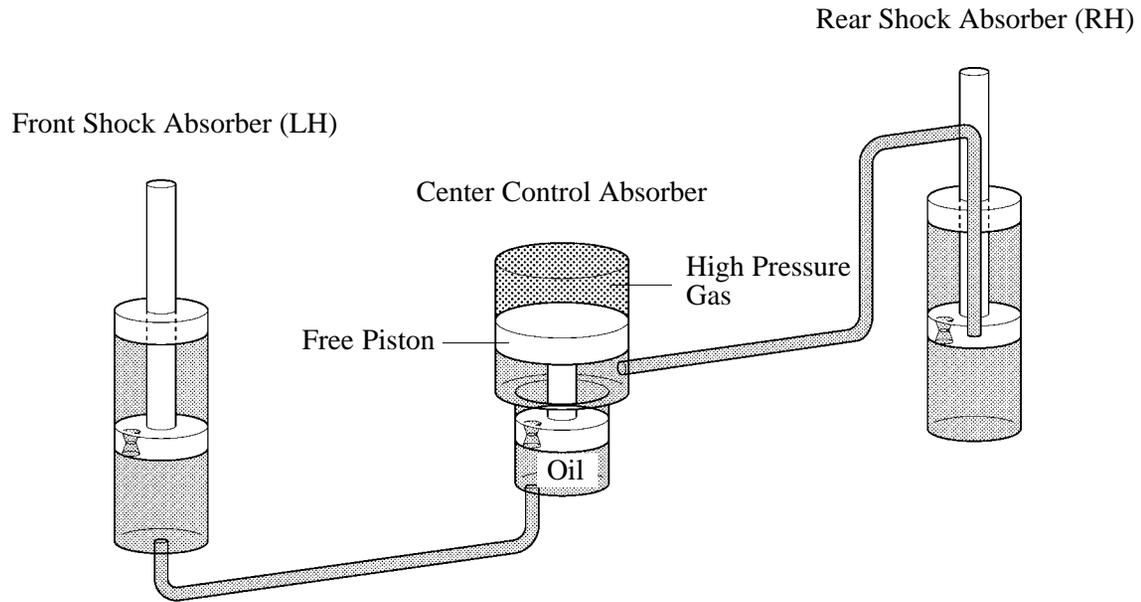


3. X-REAS (Relative Absorber System)

General

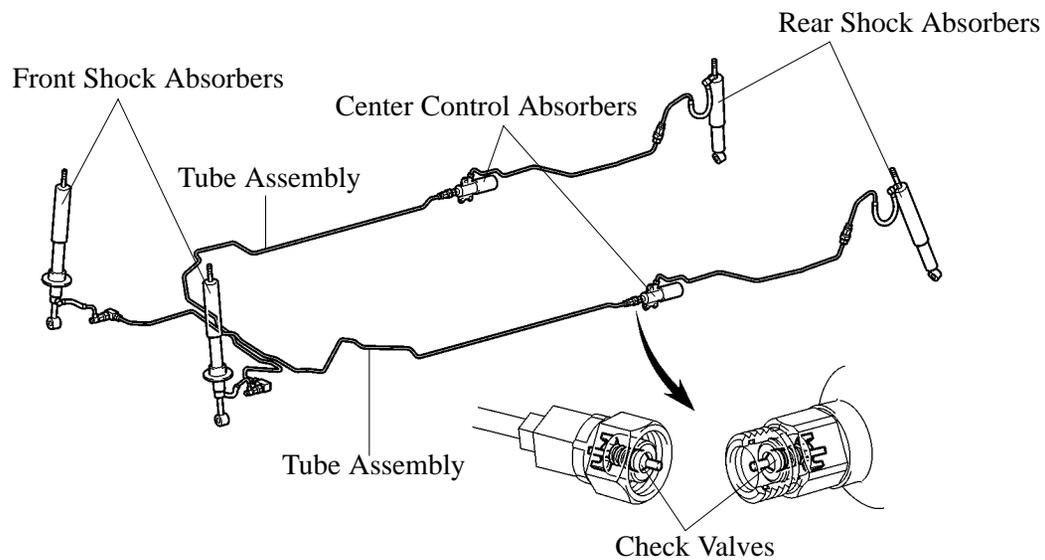
- The oil passages of the front and rear shock absorbers of the X-REAS are connected diagonally, with a center control absorber interposed. This ensures a linear and smooth response to the rolling and pitching of the vehicle, thus realizing riding comfort and controllability at high levels.

► System Diagram ◀



232CH09

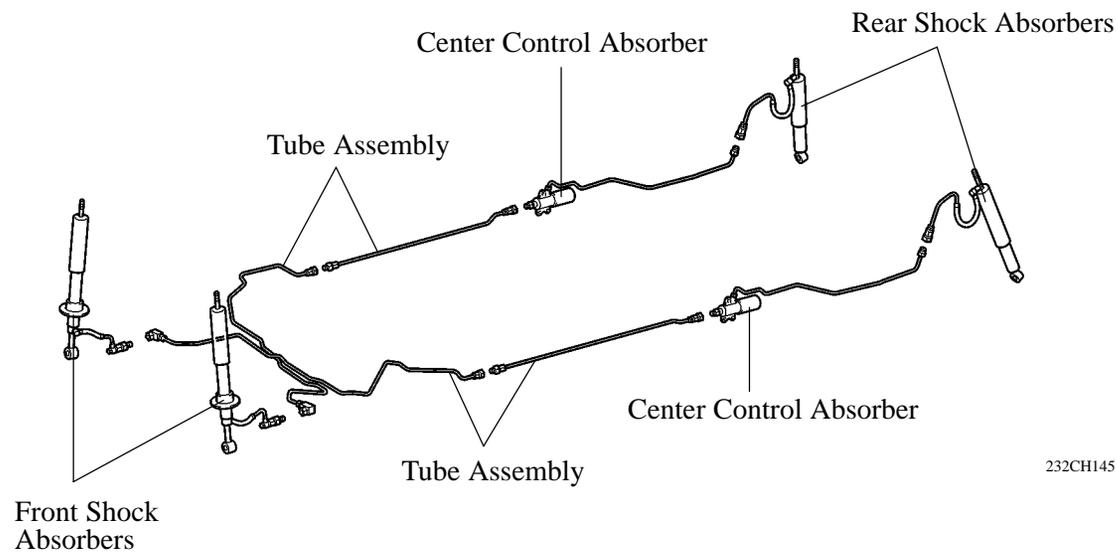
- This system consists of front shock absorber, rear shock absorber, center control absorber, and tube assembly.
- Oil is filled in the components and a check valve is built in the joint portion, for serviceability.



232CH08

Service Tip

- The X-REAS is supplied in the form of front shock absorbers, rear shock absorbers, center control absorbers, and tube assemblies. (The tube assemblies consist of 2 parts.)
- Oil bleeding and changing cannot be implemented for X-REAS. Parts exchanging operation due to the oil leakage should be done all as a set (front shock absorber, rear shock absorber, center control absorber, and tube assembly).
- Oil is filled in each supply part. Excessive pressure may cause oil leakage, so pay thorough attention when handling.

**Supply Parts****— Precautions for Handling Parts —**

- Never loosen the union bolt for a shock absorber hose.
- When carrying a shock absorber or a center control absorber, make sure to hold it by the absorber proper. Never hold the absorber by its hose or tube, causing the absorber to dangle.
- Never attempt to push and compress the piston rod of a shock absorber before installing the shock absorber.
- Because these parts are filled with oil, store them in an area that is not exposed to extreme temperature changes.
- Make sure to prevent the tubes of these parts from bending.

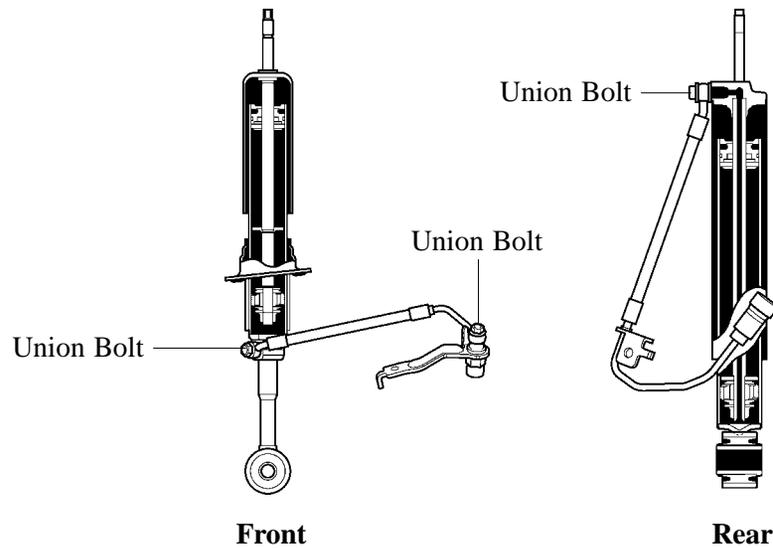
— Precautions for Replacing X-REAS Parts —

- Before removing or reinstalling a component, make sure that the front or rear shock absorber to which the component is connected is in the fully extended state.
- An individual component may be replaced only when the system is repaired for the first time, provided that there is no oil leakage. During the second and subsequent repairs, the entire system (consisting of front shock absorbers, rear shock absorbers, center control absorbers, and tube assemblies) must be replaced as a unit, because of the likelihood of oil leakage from the joints.

For details, refer see the 2003 4Runner Repair Manual (Pub. No. RM1001U).

Front and Rear Shock Absorbers

Single-cylinder type front and rear shock absorbers are used.



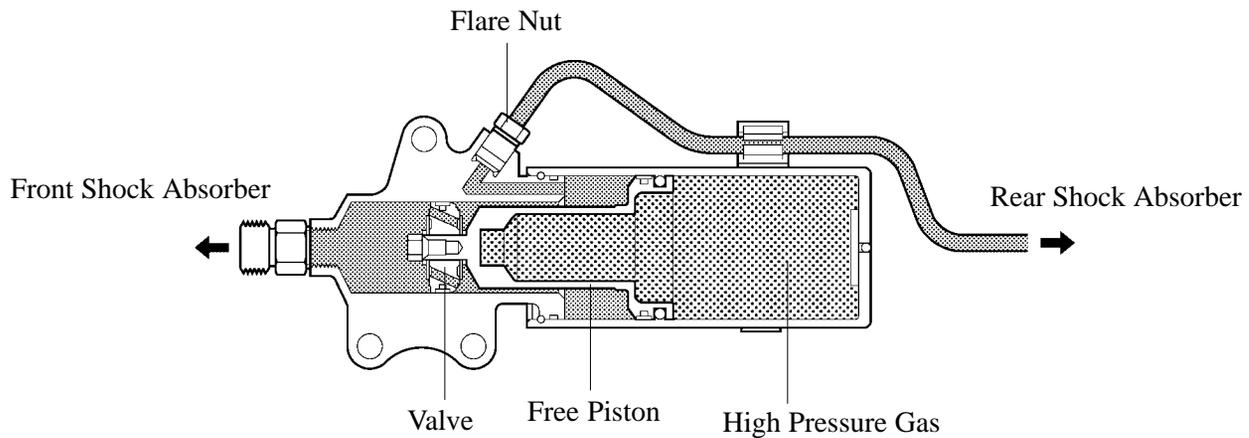
232CH10

Service Tip

Drain the oil by loosening the union bolt for the shock absorber before discarding a shock absorber.

Center Control Absorber

In order to apply a damping force to the 2 shock absorbers that are connected to the center control absorber, the center control absorber consists of a valve, free piston, and gas chamber.



232CH11

Service Tip

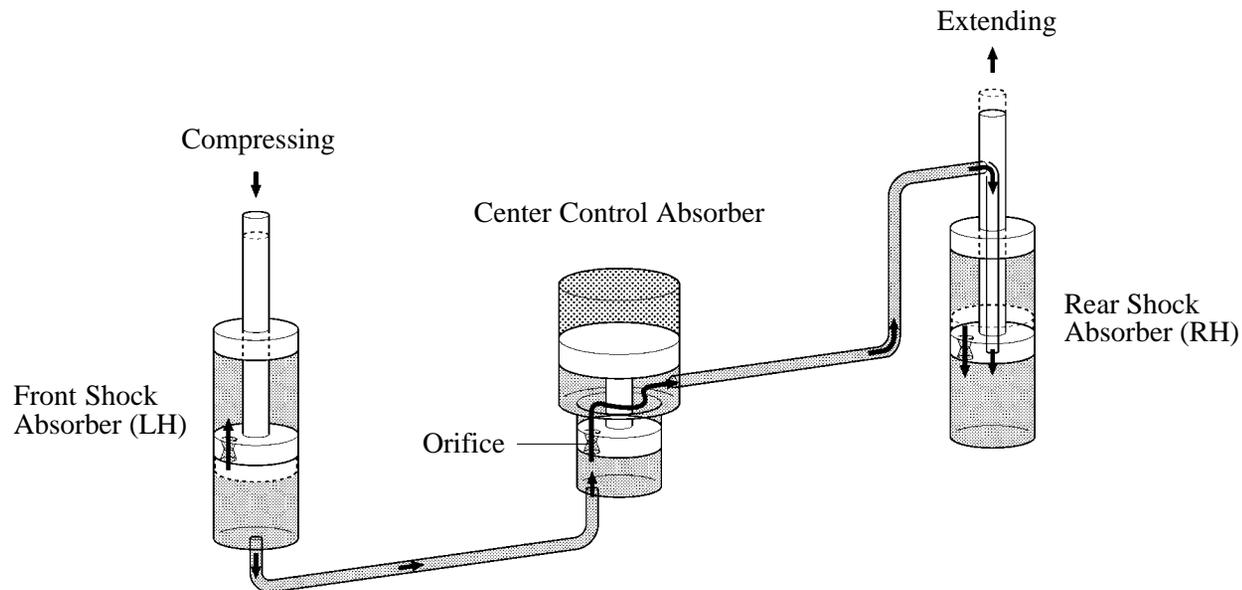
The procedure for discarding a center control absorber is as follows:

- To prevent hazardous conditions, make sure to empty the gas from the center control absorber before discarding a high-pressure (N₂) gas sealed shock absorber. For details, see the 2003 4Runner Repair Manual.
- Drain the oil by loosening the union bolt for the shock absorber before discarding it.

Operation

1) Diagonally Opposite Phase

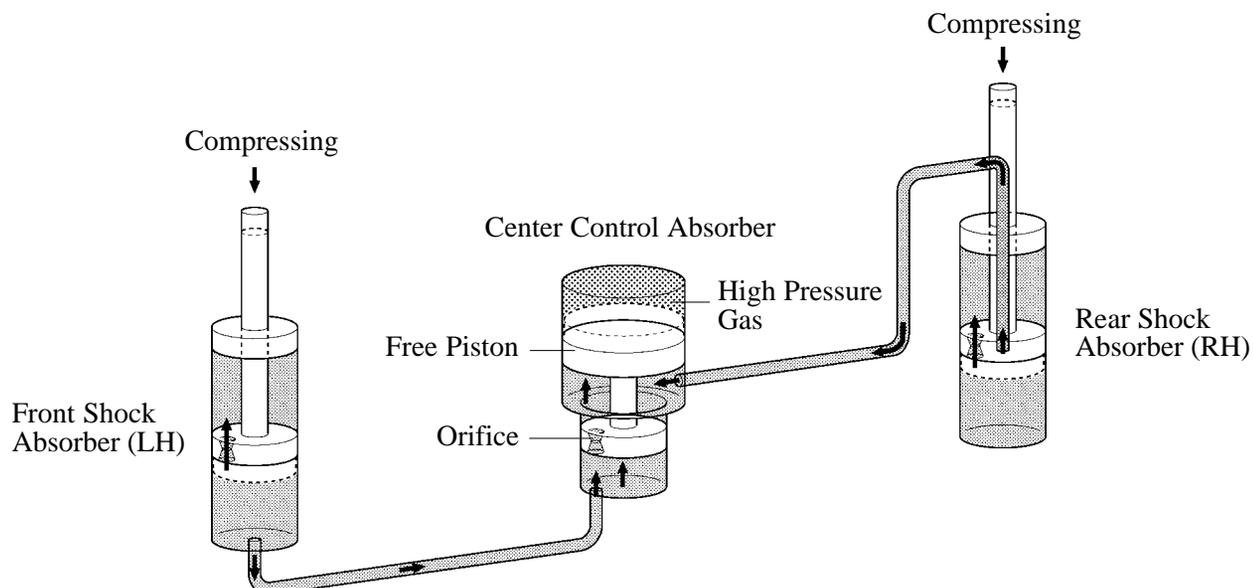
If a directional difference is created in the pistons of the two connected shock absorbers due to the tilting of the vehicle through rolling or pitching, a part of oil, which corresponds to the volumetric change that occurs in the compressing shock absorber, flows into the center control absorber. The oil passes through the orifice in the center control absorber and flows into the extending shock absorber. The resulting flow resistance acts as a damping force in addition to the damping force that is generated by connected shock absorbers.



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2) Diagonally Same Phase

If the two connected shock absorbers are compressed in the same direction and with the same amount of piston stroke, such as when the vehicle is driven over a bump, a part of oil flows into the center control absorber. However, oil will pass through the orifice because of the even oil inflow. The resulting pressure acts entirely on the free piston and it makes shock absorbing, without generating a damping force.



232CH13

3) Diagonally Same Phase with Different Piston Speeds

If two diagonally connected shock absorbers have the same phase but their piston speeds differ, the oil flows into the center control absorber, causing the free piston to move only in the amount that corresponds to the volume of oil that has flowed in. Because the volume of oil that flows in differs, the volume of oil that corresponds to the difference passes through the orifice. The resulting flow resistance acts as a damping force in addition to the damping force that is generated by the connected shock absorbers.

