

# AIR SUSPENSION

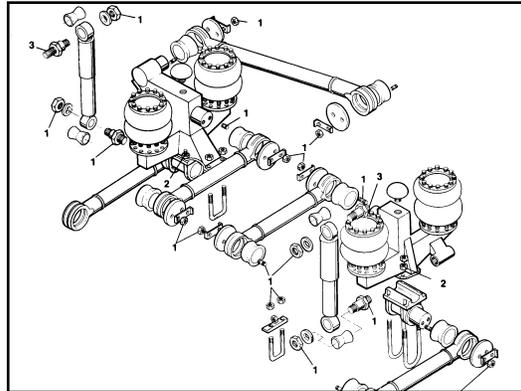
BUS SERVICE, INC.

July 2014

Volume 1, Issue 1

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*Typical air suspension breakdown*

One major component to a great ride on your coach is the quality of your suspension. There are many individual parts involved that work together to make up your main suspension system. Some of these parts include supports, air bellows, height control valves, radius rods and shock absorbers. When operating properly, the system works automatically to maintain a constant ride height, regardless of the load or how that load is distributed.

## Basic System Operation

Compressed air from the suspension air tank is supplied to the height control valves. A pressure protection valve will only allow the air out of that tank after the pressure is over 65 psi. This same pressure protection valve also acts as

a check valve to prevent air from leaving the suspension system and returning to the main air system. The height control valves distribute air to the bellows as needed.

During loading and unloading the height control valves regulate the amount of air that goes into, or is exhausted from, the bellows keeping the coach at its normal ride height.

The pressure in the air bellows varies automatically in proportion to vehicle height control valves when properly adjusted. There are valves located at both the front and the rear of the coach which maintain constant vehicle height for all load conditions. These height control valve levers are connected to axles by adjustable links.

The air bellows are rubberized assemblies that support the vertical load. Bellows are installed between beams in the coach body structure and suspension supports.

Suspension supports at front and rear axles are welded steel assemblies. The front suspension supports include bellows lower mounting plates and a bracket is welded to the right support for the upper radius and lateral stay rods. Rear suspension supports include mounting pins for lower radius rods, bellows, brakes chambers and height control valve links.

These are the basic components of the air system and their function. We will continue a bit further with their maintenance, etc.

## Special points of interest:

- ◆ Get to know your air suspension system
- ◆ Easy way to check for leaks
- ◆ Function of individual parts within your system
- ◆ News about upcoming newsletter

## System Maintenance

The air suspension system requires no lubrications, and with the exception and test procedures, it also requires very little maintenance.

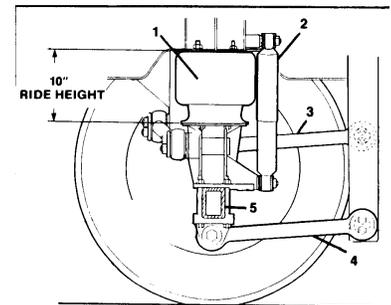
By accomplishing the inspection and test procedures at regularly scheduled intervals, any defects and issues may be found before the condition becomes bad enough to cause operator complaint or complete failure.

An important, yet easy part of system maintenance is draining air tanks. It keeps the system from accumulating moisture. In cold weather, an alcohol evaporator should also be installed to prevent any moisture from freezing.

Leakage can be checked by spraying a mixture of soap and water on all connections and bellows

mountings. Air leakage will produce soap bubbles. No leakage is permissible. Be sure to tighten all fittings as needed and release bellows etc as needed as well.

Visually inspect bellows for cracks, abrasions, and damage that might develop into a rupture. Replace with new bellows if needed. Piston surface should be smooth.



- 1. Air Spring
- 2. Shock Absorber
- 3. Upper Radius Rod
- 4. Lower Radius Rod
- 5. Axle

Front Suspension - MC-9



## Pressure Protection Valve

The pressure protection valve is located near the suspension air tank. It first allows for the filling of the brake system air. Then it allows pressure to build up in the suspension system.

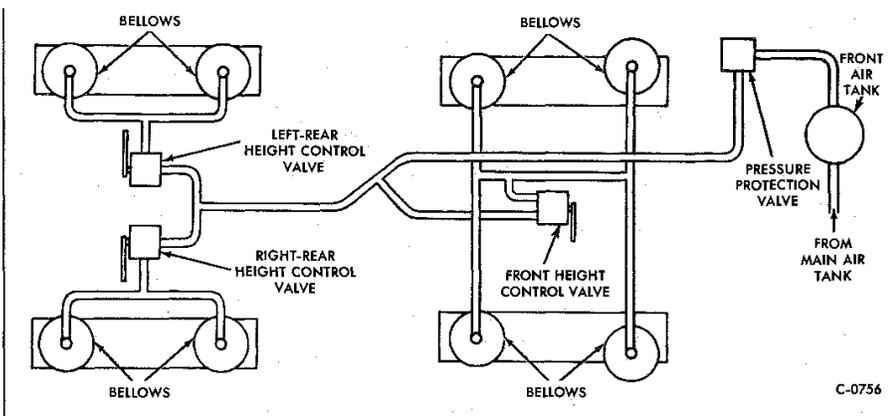
Another purpose of the valve is to prevent loss of brake system air pressure due to leaks in the suspension system.

The third purpose of the valve is to act as a check

valve for the air suspension system between tanks.

Even though the pressure protection valve is part of the brake system, it is an integral part of the air suspension system as well.

## Air Suspension Schematic

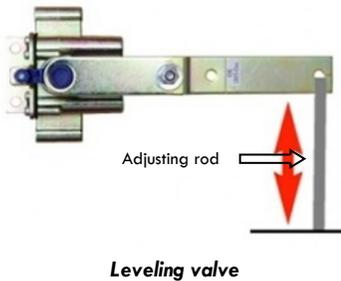


This diagram is a brief overview of a typical schematic for the air suspension on a coach. The air lines are not included in the diagram as they vary based on the type of coach.

Refer to your coach maintenance manual for the exact position and pressures for your valves.

Note: Schematic from GMC 4108 Maintenance Manual

C-0756



## Height Control Valves

Height control valves automatically maintain a vehicle's height by controlling the flow of air into and out of the air bellows. A delay piston in each valve provides a momentary delay in intake and exhaust valve action. This insures that air in the bellows is supplied and exhausted only during load changes and not during changes in road texture/driving.

Each valve contains an intake valve, air bellow outlet, exhaust valve, delay piston and an overtravel control body. The overtravel body has a spring-loaded piston which protects valve parts in the event that the lever is moved beyond operating conditions outside of the normal range. A check valve is in the air inlet tube of each inlet valve.

Once the coach is loaded, the coach body settles. Since the control valve is linked to the suspension, and the valve is bolted to the body, the valves moves downward with the body as the body is loaded. Through a series of actions, there is increased air pressure which expands the bellow and normal ride height is achieved. Once that happens, the exhaust valve closes, and the check valve in the inlet adapter prevents air from returning to the tank.

When the load decreases, the control valve allows air from the bellows flow through the open exhaust valve and out the exhaust fitting to be sent out into the atmosphere. As the compressed air is exhausted from the bellows, the body lowers until the overtravel lever and shaft are again in the normal position.

## Shock Absorbers

Shock absorbers are used on the front and rear axles. The type of mounting will differ depending on the coach type.

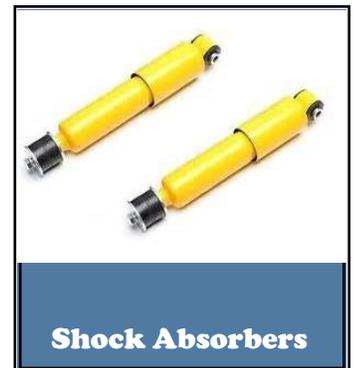
The operation of shock absorbers is relatively simple. Fluid contained within the shock is forced through a

restricted opening by a piston when the air bellows are expanded. Since fluids are not compressible under normal circumstances, the fluid takes a certain amount of time to flow through the restricted opening.

The main function of the

shock absorber is to regulate vehicle axle travel by dampening the rebound motion of the bellows.

Shock absorbers are of welded construction and therefore cannot be repaired. A poorly operating unit must be replaced.



**Air Bellow**

## Air Bellows

The air bellow can also be referred to as an air spring. It consists of a rubber bellow containing a column of compressed air which will function to provide support for a given load. It consists of a rubber bellow, upper piston, low piston and bumper, etc. It can be classified as convoluted type, rolling lobe type or sleeve type. The type of air spring on your coach will depend on your vehicle type. In the event that you have an Eagle coach, you won't have any bellows as a part of your air suspension system.

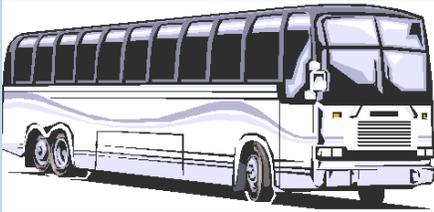
Regardless of the type of bellow you have, they all work on the same principle. The air springs contains a column of compressed air. When the load increases, the height of the air bellow decreases. The volume of the air column is reduced, the rigidity of the bellow is increased and the effect is that the bearing capacity of the bellow is increased. When the load decreases, the opposite holds true.

## Bus Service, Inc.

605 Road 26  
Sharon Springs, KS 67758

Toll Free Parts: 888-287-3499  
Tech Support: 785-891-3557  
Fax: 785-891-3529

E-mail: [busfixx@gmail.com](mailto:busfixx@gmail.com)  
Website: <http://www.busfixx.com>



Some systems have additional items such as air filters and check valves. The purpose of the filter is to keep out any foreign matter that may have made its way into the system. The check valve is designed to prevent the air pressure in the system from returning to the auxiliary air system. It is important to do regular scheduled maintenance on these items. In the event that the filter becomes clogged, it will inhibit the flow of air into and out of the system.

There are several troubleshooting guides and charts available for the leveling valves. Technical specifications are also available for all the major components within the air system.

A 12,000 mile service inspection sheet is available on our website. Air suspension maintenance items are included on this inspection sheet. Feel free to download it for your future reference.

Our store is on the Web!  
<http://stores.busfixx.com>

## BUS PARTS AND REPAIR SPECIALISTS



We all appreciate the beauty in a smooth ride on our coach. We also see some of the parts that work together to make that happen.

Remember to check them on a regular scheduled maintenance. Repair and replace any defective parts as soon as possible so as to prevent any additional damage or failure.

Remember to always use good safety procedures and to employ a mechanic when one is deemed necessary. While we would all like to be able to repair our own equipment, sometimes that is neither practical nor safe.

Be sure and check back for our next newsletter where we will continue our focus on the air system but our concentration will be primarily be on the air compressor.

Stay tuned for more and enjoy the rest of your summer!

If you have suggestions for additional newsletters or articles of interest, please feel free to send us an e-mail at [busfixx@gmail.com](mailto:busfixx@gmail.com).

Sources:

GMC 4108 Manual

MC-9 Manual