4-13 Air Pressure System

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4-13.1 Description and Operation

An engine-driven compressor supplies the air pressure system on your coach. It provides pneumatic power for brakes, suspension, and numerous accessories. This complex, but efficient system is not intended to be totally leak free. After overnight parking, you may notice a significant loss of pressure on the air pressure front/rear gauge, or in systems connected to auxiliary air. This condition is normal, and in fact, our air leakage tolerance is tighter than most manufacturers within the heavy-duty equipment industry. Once the engine is running, the engine-driven compressor will quickly build up the system to the correct pressure.

4-13.1.1 Air Brakes

Your coach is equipped with dual service air brake systems for front and rear, with integral fail/safe operation; and manual/automatic rear spring (parking) brakes. The service brakes are completely independent systems, each including a reservoir and separate distribution lines and valves. The reservoirs are pressurized from a single compressor. Both service brake systems are brought into operation each time the brake treadle is depressed to slow or stop the coach. Reservoir pressure for each service brake system is monitored by a respective pressure gauge on the front panel; system failure(s) are indicated by low-pressure readings, illumination of the Low Air failure lamp and sounding of a buzzer.

4-13.1.2 Operation

When the coach is parked, and the engine is off, the rear spring brake will normally be set by operating the parking brake. The spring brakes cannot be fully released until the air pressure is above 65 psi. These brakes are in the released position when the control is pushed in. In the event that there is a loss of air pressure, the spring brakes will set automatically at the brake-applied position, and will not release until the air reserve has again built up to required value. Consequently, there will be a normal delay, after the coach is first started, while the compressor builds up pressure before the brakes can be released and the coach driven. When the brake treadle is depressed to slow or stop the coach, reservoir air is applied simultaneously to both front and rear service brakes to effect the braking action. The spring brakes are held in a released position by the air pressure supplied from the associated reservoir tank.

!!CAUTION: Do not attempt to drive the coach until system pressure is above 90 psi.

4-13.1.3 Brake Failures

To compensate for normal lining wear, each brake system is individually self-adjusting.

Fail/safe features provide protection against brake system failures. If the front brakes fail, operating the brake treadle still activates the rear service brakes to provide stopping capability.

If a failure occurs in the rear, the front service brakes and rear spring brakes provide braking action.

In the unlikely event of a failure where both service-braking systems are disabled, the rear spring brakes will apply automatically and bring the vehicle to a stop. As a safety factory, the coach should not be driven until any type of brake failure is corrected.

NOTE: With the front brake system service reservoir fully charged, enough air pressure is available to provide for four full releases of the rear spring brakes. This will allow the coach to be brought to a safe position until repairs can be accomplished.

4-13.1.4 Anti-Lock Brakes

In addition to the above, a four-channel anti-lock brake system for the steer and drive axles are installed. In the event one of the wheels begins to lock up under severe braking conditions, the anti-lock system will detect this situation and gradually remove air pressure from the brake chamber until the wheel begins to turn. This will help assure smooth braking action and minimize wheel lockup.

4-13.1.5 Air Suspension System

Air suspension bags cushion the front and rear axles. Ride height is automatically maintained by height control valves. Dumping these air bags when the vehicle is parked allows the rubber bumpers to come together and eliminate vehicle springiness. A switch, located on the lower left side of the LOWER DASH PANEL, controls dumping and filling of air bags. The SUSP. DUMP switch controls the front and rear suspension.

NOTE: The accessory air tank must contain at least 65 psi pressure for the DUMP switch to function. The accessory air tank pressure does not register on the dash air pressure gauges.

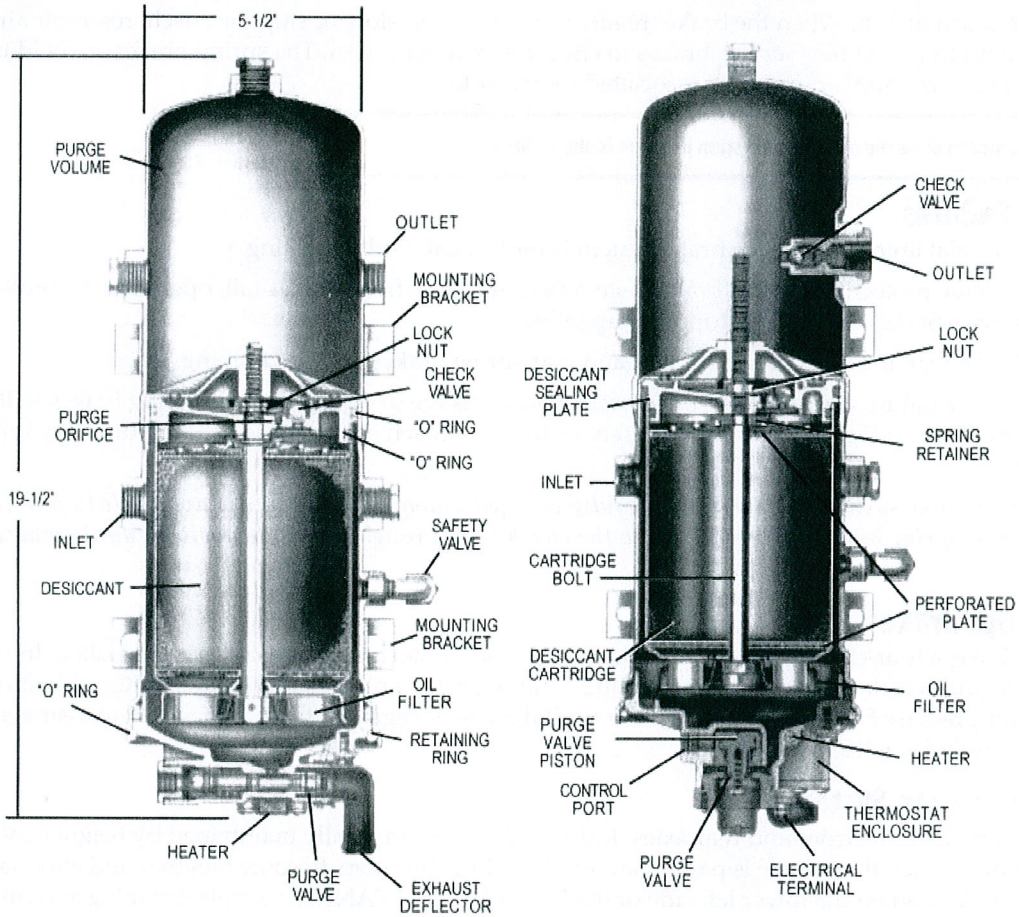
Moving the SUSP. DUMP switch away from the UP position applies air pressure to air pilot-operated valves on the suspension system. The pilot air shifts the valves, cutting off the air supply to the air bags and allows the air in the bags to escape. After the suspension system has been dumped and the ignition is turned on, a buzzer and a warning pilot light is illuminated on the dash to warn the driver that the system is dumped and not to drive the vehicle until the SUSP. DUMP switch is set to the UP position.

4-13.1.6 Additional Air-Operated Equipment

Besides providing the compressed air supply for the coach braking and suspension systems, the compressor also provides the air supply for the stepwell cover and entrance door lock, all via separately controlled solenoid switches operated from the dash, or at other locations throughout the coach. (This compressed air source is furnished from the front right side reservoir.) A compressed air outlet fitting and air gun are contained in a rear storage compartment on the road side of the coach, convenient for inflating tires, and so on. A Schrader valve (air connection) is available in the engine compartment to allow the air system to be pressurized from a "shop" source without the necessity of starting the engine. Two possible types of air dryers may be installed on the coach, either the AD-1 or the AD-2. Both are similar with just minor differences.

4-13.2 Compressed Air System Air Dryer

The air dryer unit collects and removes moisture and contaminants from the compressor air output before the air reaches the reservoirs. This unit is different from a reservoir drain or an after cooler in that it provides dry air for the brake system by eliminating the possible accumulation of condensate in the system reservoirs. Note that each reservoir also has a drain cock on the bottom for draining accumulated moisture. This assures a long maintenance-free life for air brake system components due to the removal of system contaminants.



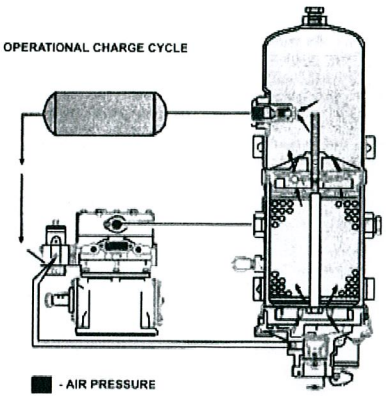
The air dryer is located between the compressor discharge (output) line and the compressed air reservoirs. A safety valve mounted in the air dryer housing assembly protects against excessive pressure buildup. The desiccant cartridge and pleated paper oil filters are easily removable and replaceable as a complete serviceable unit. The desiccant "Beads" which provide the drying action have a large capacity for absorption due to their combined surface area. In addition, an internal thermostatically controlled heating element prevents freeze ups on the purge rail valve when the unit is used during sub-freezing temperatures.

The desiccant beads, which are referred to as the "drying bed", are a drying substance that has the unique property of exposing a tremendous surface area in proportion to its bulk. One pound of the desiccant beads has about two million square feet of adsorptive area made up of a large number of submicroscopic cavities in each bead. Each desiccant bead adsorbs or collects moisture.

Purging of the dryer is automatic, exhausting combined oil and water residue to the atmosphere. At the same time that the contaminants are purged, the reverse airflow across the desiccant material removes the accumulated moisture and reactivates the desiccant. Refer to the following paragraphs for a explanation of basic operation of the air dryer including the charge cycle as well as the purge cycle.

4-13.2.1 Operation

The operation of the Air Dryer can best be described by separating the operation into two cycles; the charge cycle and the purge cycle.



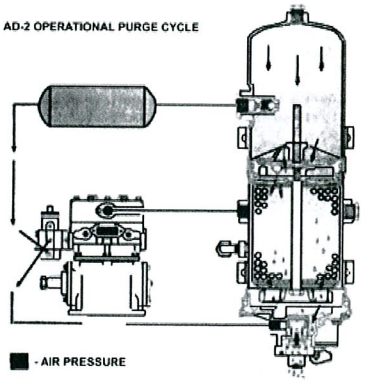
Charge Cycle Compressor in Compressing Cycle - With the compressor in its "loaded" or compressing cycle, air from the compressor enters the Air Dryer through the discharge line. When the air , along with the water and contaminants, enter the Air Dryer, the velocity or speed of the air reduces substantially and much of the entrained liquid drops to the bottom or sump of the Air Dryer. The initial air flow is toward the bottom of the dryer, but air flow direction changes 180° at the bottom of the Air Dryer, dropping some water and oil.

The air now passes through the oil separator filter which removes oil and foreign material but does not remove water vapor. At this point, the air remains saturated with water.

The filtered air and vapors penetrate the desiccant drying bed and the adsorption process begins. Water vapor is removed from the air by the desiccant.

The unsaturated "dry" air passes through the ball check valve and purge orifice into the purge volume. From the purge volume air flows through an outlet check valve, and into the first reservoir.

NOTE: The AD-1 Air Dryer does not incorporate an integral outlet check valve. The single check valve in an AD-1 installation would be located in the line between the AD-1 outlet port and the first reservoir.



Purge Cycle: When desired system pressure is reached, the governor cuts out, pressurizing the unloader cavity of the compressor which unloads the compressor (non-compressing cycle). The line connecting the governor unloader port to the end cover purge valve port (bottom of the Air Dryer) is also pressurized, opening the exhaust of the purge valve to atmosphere. With the exhaust of the purge valve open, contaminants in the discharge line and dryer sump are purged, or forced past the open exhaust out to atmosphere.

The reverse air flows across the desiccant and starts the removal process of moisture from the desiccant surface. Dry air flowing from the purge volume through the purge orifice and across the drying bed further dries the desiccant.

The combination of these reverse flows strips the water vapor from the desiccant (drying bed). This normally takes between 15-30 seconds.

The desiccant becomes activated from this cycle and is now ready for another charge cycle, which occurs when the compressor returns to the compressing cycle. It is for this reason the air dryer must be purged for 30 seconds, after receiving moisture saturated air for a maximum of 90 seconds from a 12 CFM compressor.

▲**WARNING:** This air dryer is intended to remove moisture and other contaminants normally found in the air brake system. Do not inject alcohol, anti-freeze, or other de-icing substances into or upstream of the air dryer. Alcohol is removed by the dryer, but reduces the effectiveness of the device to dry air. Use of other substances can damage the air dryer and may void the warranty.

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