

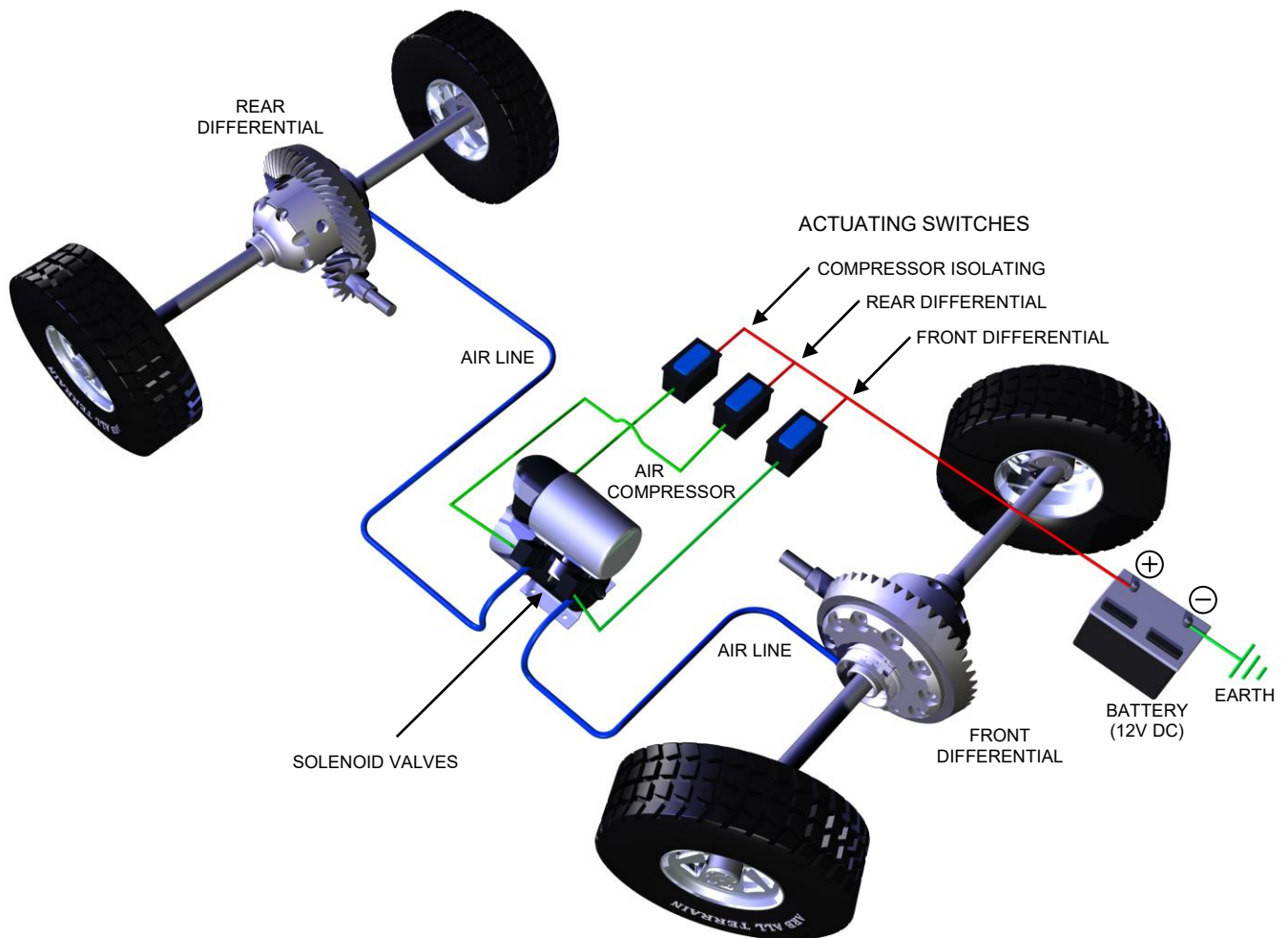
1.2 FUNCTIONAL DESCRIPTION

OVERVIEW

The ARB Air Locker is a replacement differential carrier that can either operate as a conventional differential, or lock both rear (or front) axle shafts together allowing maximum drive torque to be transmitted to both wheels. The locking function is controlled from the vehicle dashboard by the driver. Front axle Air Lockers can be locked when traversing slippery surfaces giving maximum traction, or unlocked on high traction surfaces to retain full control of the steering. As a safety feature, the front differential cannot be locked unless the rear differential has first been locked.

SYSTEM

Since the Air Locker is pneumatically actuated, an onboard compressor, or other air supply, is required. The schematic diagram below shows the component layout.



The air compressor is started with the air compressor switch, and a pressure switch maintains the air pressure in the reservoir between 585kPa [85psi] and 690kPa [100psi]. When the Air Locker switch is operated, the relevant pneumatic solenoid valve opens, allowing compressed air down the line to the differential.

1.2 FUNCTIONAL DESCRIPTION

DIFFERENTIAL

Although the Air Locker is a replacement differential, the original equipment manufacturer's (OEM) ring gear can usually be installed with the original ring gear bolts. Generally, at least one original carrier bearing is also reused. The side gears inside the differential carrier are broached with the same splines as those on the original differential so that the original axle shafts can usually be used unmodified. The ring and pinion backlash and carrier bearing preload is set in the same manner as on the original differential, and the set-up of the ring and pinion gear set can be performed directly from the vehicle manufacturer's service manual by any experienced technician.

A bulkhead fitting is installed into a drilled and tapped port in the differential housing to take compressed air to the Air Locker. Air is forced into the differential through the seal housing which utilizes Viton rotary seals to transfer air pressure to the differential carrier even while it is rotating. Compressed air passes from the seal housing through a port in the Air Locker adjacent to the bearing journal, and into an annular groove containing a pneumatic seal. Air pressure behind this seal overcomes the force of the return springs which actuates the clutch gear. The clutch gear meshes between the splined side gear and the differential carrier, preventing the entire gear set from rotating. Since no differential action can take place, both drive axles are now mechanically 'locked' to the ring gear.

When the Air Locker switch is turned off, the solenoid valve closes the port from the compressor, and opens the exhaust port allowing the air in the differential to be exhausted. The return springs force the clutch gear back to its original position, disengaging the clutch gear from the splined side gear, freeing the internal gears so that they can once again provide the same normal differential action as the original open factory differential.

