

Anti-lock Brake Systems

A Brief Overview of Anti-lock Braking Systems (ABS)

Anti-lock brakes greatly enhance trailer stability while braking. Because a sliding wheel always leads, a brake lockup situation under manual braking can cause loss of control as the trailer slides sideways. Anti-lock brakes provide the electronic and physical control to prevent wheel lockup and the ensuing control problems. Although Anti-lock brakes may not necessarily help your operators stop over shorter distances, they are designed to help keep your operators in control while eliminating excessive tire wear and *flat spotting*.

NHTSA published final rules under FMVSS #121 & FMVSS #105 in March 1995 which set the timetable for implementation of Anti-lock brakes on new vehicles with GVWR's over 10,000 lbs.:

3/1/97 - All air-braked tractors

3/1/98 - All air-braked trucks, trailers and busses (includes air/hydraulic trailer systems)

3/1/99 - All hydraulically braked trucks and busses

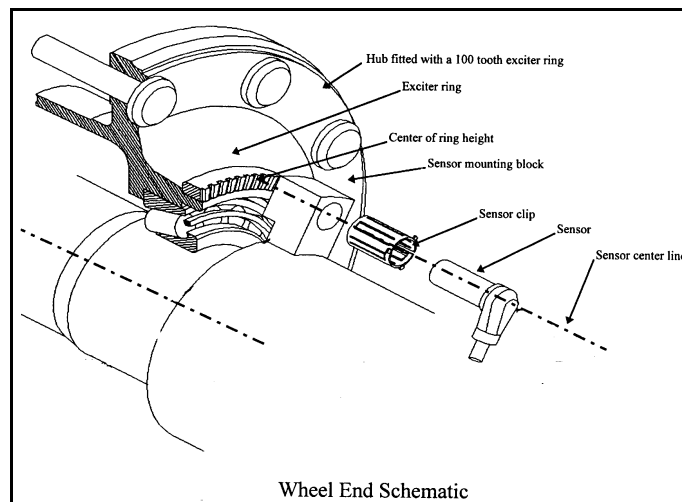
3/1/01 - All ABS trailer systems require a malfunction signal circuit to connect to the towing vehicle

Note: Electric, Hydraulic & Vacuum/Hydraulics trailer systems are not required to implement ABS

Anti-lock brakes are not new. In March 1975 FMVSS-121 mandated ABS on heavy duty air brake systems. These rules created havoc because of the lack of technology available to implement compliance. Customers were unwilling to pay for complex, unproven and expensive systems. Sales dropped and manufactures took the issue to court, and in 1978 the anti-lock requirements of FMVSS-121 were repealed. During this time ABS was being perfected in Europe, and by 1991, over 40% of heavy duty trucks in Europe were already equipped with ABS.

Current Implementations

Anti-lock brakes today use microprocessor technology to sense when the wheels are about to lock up under braking, and then controls the brake pressure and timing to prevent it. Each wheel must be controlled independently, although only one axle of a multi-axle configuration needs to be equipped with sensors. An exciter ring (sometimes referred to as a tone ring) is installed on the inside of the hub. A sensor *reads* the level of magnetism present as the teeth of the exciter ring pass it. Since they don't touch, there is no wear or friction between them. The sensors provide wheel speed information to the Electronic Control Unit (the ECU or system brain). Input from the sensors is used to determine if a wheel is about to lock during braking. If so, the system can release and apply the brake up to six times per second through the modulator valve.



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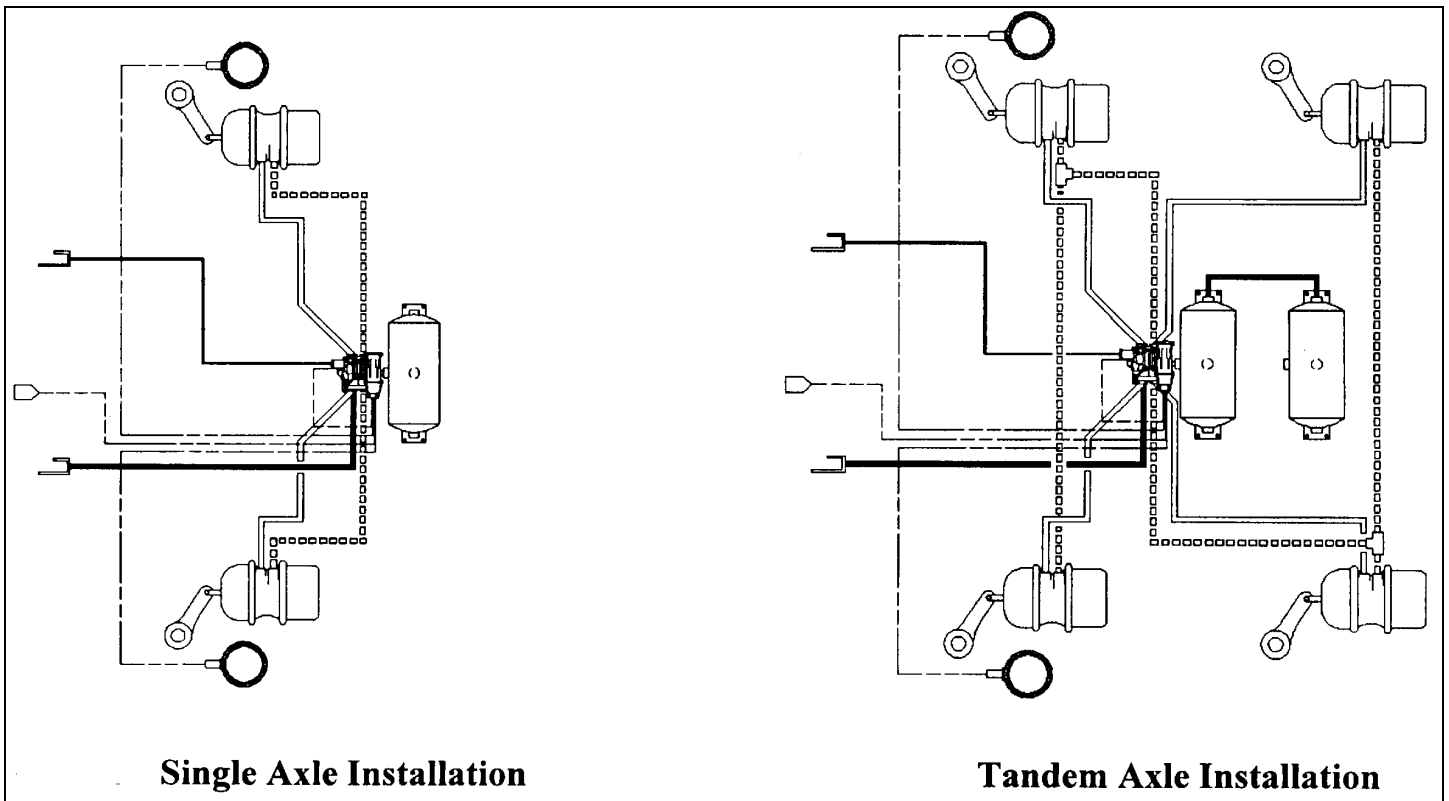
Phone 800.323.9147

Fax 800.833.3264

Anti-lock Brake Systems

Sauber Mfg. Systems

We use Dexter axles as standard equipment on our trailers. Dexter is the largest producer of general trailer axles in the country. Their air brake axles are provided *ABS Ready*. This means that the exciter ring and sensor attachment block is pre-installed on the axle. Our Dexter axles are set up for Haldex ABS components as standard equipment. Although other ABS vendors such as Bendix (Allied Signal) and Wabco (Rockwell) can be incorporated, Dexter and Sauber have chosen Haldex for their experience, knowledge and performance in anti-lock brake technology. They are the #1 trailer ABS system supplier in the world. Our standard system includes two sensors and one modulator valve. This is Haldex's Mod I Full Function system which has been installed in over 300,000 systems. In a tandem or triple axle system, the lead axle will be equipped with the sensors. Our air brake packages will continue to include spring brakes and automatic slack adjusters on all axles as standard equipment, just as in the past. The basic system layout shown below, illustrates both single and tandem axles. The requirement to provide a malfunction signal from the trailer ABS system to the towing vehicle is provided by a Power Line Carrier (PLC) radio frequency signal used over the blue, or power circuit.



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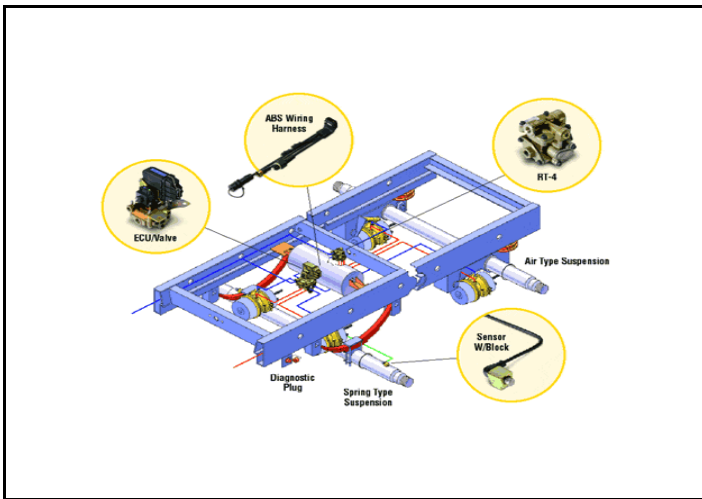
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Wiring & Troubleshooting

The system is powered by the center post of the trailer socket or plug. Therefore, your towing vehicles must be equipped with a *hot* center post. The system is checked upon vehicle power up. It can test itself sixty times before air from the tow vehicle gets to the trailer brake valves. A warning light is provided on the trailer side. It will illuminate briefly and will stay lit if any component is malfunctioning. The system is designed to maintain normal (non-ABS) braking operations until the problem is resolved. Although there are no batteries in the system, the electronic control unit (ECU) has a special microprocessor that can *remember* up to ninety-nine problems and keep them stored until they're fixed. A number displayed on the hand held display unit (DDU) identifies one of sixty-three fault codes - providing accurate and quick troubleshooting. This unit is available from Sauber Mfg. Co. and should be kept at each garage location expecting to service ABS brakes. All cables are sealed, weatherproof and polarized to provide high reliability and accurate diagnosis.



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