

Two-Line Trailer Air Braking Systems

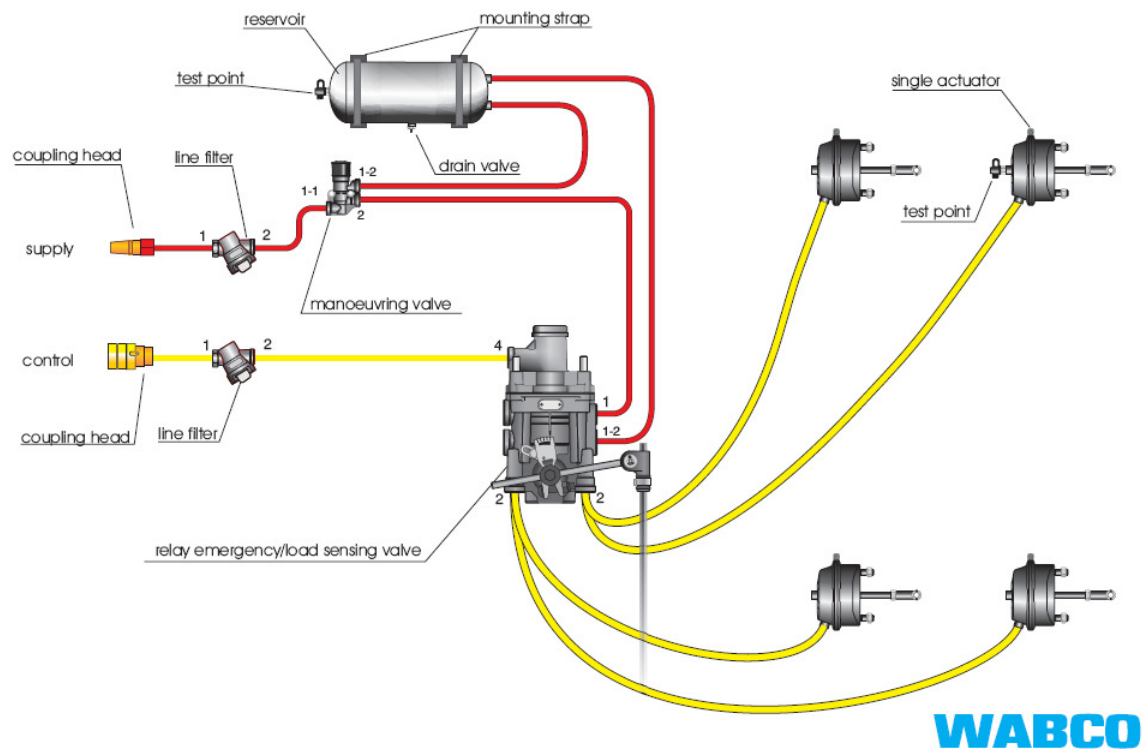
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WABCO produce brake control systems, as well as foundation brakes, and the presentation mainly covers the controlling aspects of the two-line trailer air braking system. However, without the foundation brake having a suitable braking capacity, it is impossible to achieve the desired rates of deceleration which are needed to stop heavier and faster agricultural tractor / trailer combinations.

Having trailers with increased braking capacity is good for everyone, as this allows the combinations to stop more quickly, increasing safety. This also reduces the lifetime cost of the tractor's braking system, saving the owner money. Brakes found on commercial trailers already have the higher capacity, and brakes of this type are needed to meet the greater braking demands.

Trailers which under-brake can cause a stability problem known as jack-knifing, whilst trailers which over-brake can also suffer from another stability problem known as trailer swing. It is therefore desirable to have a combination with matched rates of deceleration, and to achieve this WABCO produce a range of controlling valves, as well as safety systems.

Two-line trailer air braking systems can be very simple in design, but are still full of features which are needed to make them safe. A typical system for a tandem trailer looks like the layout below, although the most basic system can be simplified even further.



The braking torque is generated by controlling the pressure which is released into the brake chamber. In the brake chamber is a rubber diaphragm which acts on a pushrod. The pushrod is connected to an s-cam via a lever (this lever normally includes a wear adjuster, and this adjuster can also be automatic) and the torque is transferred into the brake via this s-cam. A variety of brake chamber sizes, as well as different lever lengths are used to generate the correct torque for the brake, resulting in enough braking effort to stop the laden trailer at the desired deceleration. In order to get a progressive brake (smooth action), air pressures are controlled by the valves.

Standard features like “emergency braking” use the stored air pressure in the trailer’s tank to quickly apply the trailer’s brakes, should the trailer become parted from the tractor. The trailer should stop almost instantly, as the brakes operate fully and quickly.

An automatic load sensing device detects the load on the suspension, and it makes sure that the trailer is not over braked when the trailer is not fully loaded. This means that the trailer always gets the correct amount of braking for its load, and this helps in preventing the brakes from locking up during heavy braking. As this is automatic, it is not reliant upon the operator to guess the weight. The load sensing valve also reduces tyre wear, as a result of correctly controlling the braking forces.

ABS can also be added to the trailer and is designed to increase safety and stability, as the brakes should not lock when road surface is slippery. A trailer can have an ABS system, without the tractor having one, as long as the tractor provides electrical power to the trailer. The correct power supply can easily be retro-fitted to any tractor which does not already have one. Although ABS stops the wheels from locking, it is not designed to reduce tyre wear. Trailers with ABS and no load sensing are likely to experience more tyre wear, than trailers with load sensing.

Two-line air braking systems are used on all commercial trailers, making the components very common. This means that these components are readily available from most commercial vehicle parts distributors, reducing the potential for costly down-time.