

GENERAL SERVICE MAINTENANCE

- 1. Tires**
 - a. Check daily for cuts, bulges, unusual wear, objects between and embedded in tires.
 - b. Check inflation regularly; refer to inflation pressure rating on side of tires.
- 2. Rims**
 - a. Inspect lug nuts daily.
 - b. Re-torque after first 50-100 miles of service.
 - c. Check for rim slippage.
 - d. Periodically check wheel torque.
- 3. Hub Oil Level**
 - a. Check frequently – every 1000 miles.
 - b. Use SAE 80/90 or better for your application to replace or top up.
 - c. Change every 100,000 miles or once a year.
 - d. Service leaking seals immediately.
 - e. For more information refer to wheel bearing section of Trailer Axles.
- 4. Suspension**
 - a. Inspect daily, looking for broken or cracked leaves, loose or missing bolts and general condition.
 - b. Regularly check for worn bushings, loose parts, cracked welds, etc...
 - c. For air rides and lift suspensions, check condition of bags and shocks. Replace when needed.
 - d. For more information refer to suspension section.
- 5. Brake Chambers**
 - a. Frequent visual inspections are necessary. If a problem is sighted follow safety instructions in Brake Chamber section. Improper service or repair could cause severe injury or death.
- 6. Automatic Slack Adjusters**
 - a. Pre-trip inspections must include checking the movement of push rods with rods with slacks on each axle. With brakes applied, the angle of the push rod to the center line of slack and to the mounting face of brake chamber must be 90 degrees + -5 degrees.
- 7. Air Tanks**
 - a. Drain tanks daily to prevent buildup of moisture and contamination.
 - b. Refer to Pneumatic section for more information.
- 8. Glad Hands**
 - a. Keep clean. Check screen and rubber seal frequently.
 - b. When not in use if possible, cover with dummy glad hands.

9. Trailer Frame and Body

- a. After the first month and every 6 months thereafter inspect the trailer frame for cracks in structure and welds.
- b. Check for anything loose throughout the trailer.
- c. Check suspension welding and bolt torque, referring to proper section for ratings.
- d. Examine the king pin and end plate for unacceptable wear and tear.
- e. All welding repairs must be done by competent welders to manufacturers specifications.

10. Electrical

- a. Check lights daily, replace as needed using equivalent or better replacement.

11. General Inspection

- a. Inspect complete trailer (all systems) every six months.

12. Drain Holes in Fifth Wheel Plate

- a. Grease and dirt must be cleaned from all drain holes in fifth wheel plate. This check and service must be done weekly to prevent the plate from deteriorating due to build-up of water and other material trapped on top of coupler plate.

13. Turntable

- a. All screw connections are to be inspected at regular intervals for tightness and tightened if necessary.

ATTENTION

Maintain Originally Specified Tire Sizes

Titan Trailers recommends that the originally specified tire sizes always be used on your Titan trailer. Refer to your "Trailer Specification Sheet" provided in this manual for these specifications.

Changing the tire size will affect the suspension ride height range. This could result in clearance issues, especially when steering.

Please Note: Warranty will be voided for issues arising from the installation and use of the improper tire sizes.

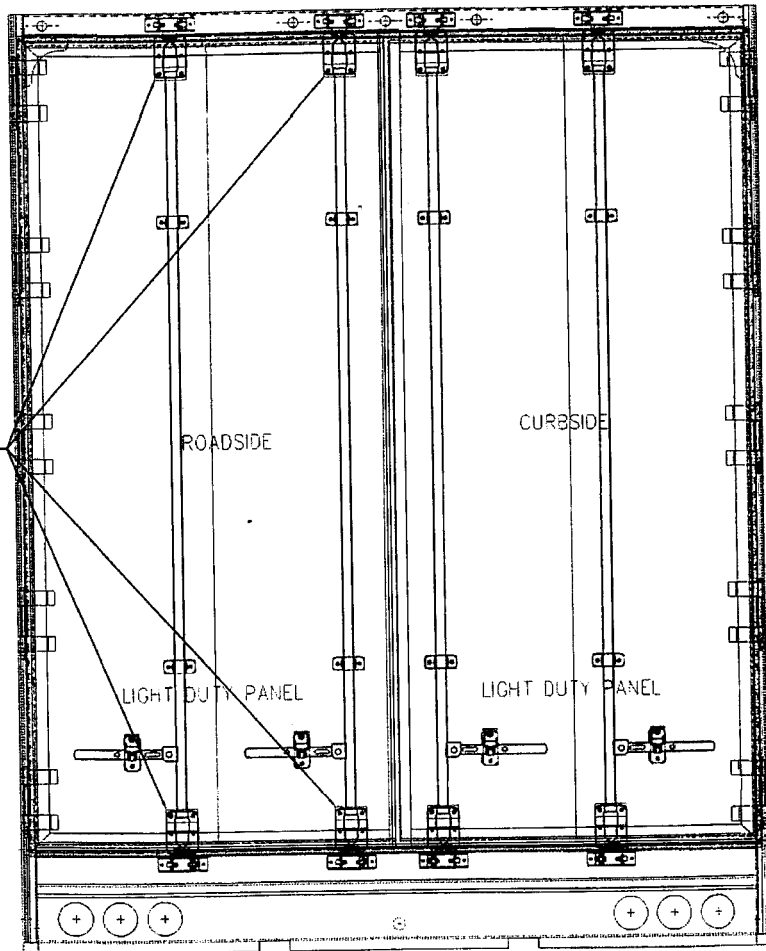


Strength Through Innovation

TITAN VAN STYLE DOORS

TO ENSURE PROPER PERFORMANCE OF YOUR VAN STYLE DOORS WE RECOMMEND THAT YOU PERIODICALLY MONITOR THE AMOUNT OF PLAY IN THE DOOR. THE CONSTANT MOVEMENT AND VIBRATION OF A TRAILER MAY CAUSE PREMATURE WEAR IF YOUR TRAILER DOORS ARE NOT PROPERLY TIGHTENED. TIGHTEN DOORS AS REQUIRED BY ADJUSTING THE LOCK-RODS WITH SHIMS.

USE SHIMS AT THESE LOCATIONS ON LEFT AND RIGHT DOORS



LUBRICATION

ALL TRAILERS – Grease – Low Temperature – Multi-purpose

Auto Slacks (See Brake Parts for Haldex Slacks)

- a) All are factory sealed and greased.
- b) Minimum suggested lubrication is every 3 months or 50,000 miles under ideal driving conditions.
- c) Under more extreme conditions (city driving, ice and salt) you should lubricate more frequently up to once a week.

Brake Cam Shaft

- a) Two grease nipples one at a slack spline end and the other at the spiders end
- b) Minimum suggested lubrication is once a month.
- c) Under more extreme conditions, lubricate more often as required.

Landing Gear

- a) Lube leg fittings twice a year.
- b) Lube two speed gear fittings twice a year minimum, more if necessary.

ALUMINUM AND STEEL DUMPS

Box Hinges

- a) For high dumping usage – minimum weekly lubrication.
- b) For less frequent operating – grease as required.

Hoist

- a) Grease nipple on top and bottom of cylinder.
- b) For high dumping usage – grease weekly
- c) For less frequent use – grease as required

Tailgate and Doors

- a) High dumping usage – grease weekly
- b) Less frequently – grease as required

WALKING FLOORS

Doors

- a) Once a month or as required.

TIPPERS

Tailgate Latching Underside

- a) As required depending on usage.

HOPPERS

Hopper Door Linkage

- a) Gear box, knuckle and shaft bearing as required depending on usage.

DOLLYS

Turntable Bearing

- a) The turntable bearing is to be lubricated via the grease nipples with BPW special long- life grease ECO-Li 91 (lithium complex grease) every 25000km, but at least after every 3 months (or after every 2-3 weeks under extreme operational conditions). The grease must not be mixed with other (calcium base or sodium base) lubricants.

PNEUMATIC

1. Be sure air supply is compatible with trailer requirements. With multi-axle trailers (three or more, with a lift) the recommended air displacement of compressor should be 16cfm with a compression cut in a 100-105 psi and a cut out at 120-125 psi. This will ensure the best operation of trailers air systems under most circumstances.
2. Drain "All Reservoirs Daily".
3. Make sure air supply is clean. Air supply should be free of oil, moisture and contaminants that will harm valves and other components of the system.
4. DO NOT contaminate air lines with any alcohol based products. Pouring alcohol in the air lines will cause lubrication on 'O Rings' in valves to dry up, resulting in seal deterioration and valve problems. This will directly and adversely affect trailer brakes, accessories and valve warranty.
5. Replacement hardware – hoses, tubing and fittings must be of equivalent size, length, type and strength of O.E.M/ (original equipment manufacturer).
6. Use only genuine original product replacements. Valves may look identical but there could be dramatic differences inside that may affect the systems.
7. Never disconnect a pressurized air line or plug. Be sure pressure has first been depleted.
8. Always block vehicles wheels when working under a trailer. Depleting a vehicle's air may, under certain circumstances cause it to roll.
9. Never exceed recommended air pressure. Maximum air pressure 125psi. Always wear glasses when working with air and never look directly into the air stream or direct at others.
10. Never re-plumb or replace valves with different ones unless by an authorized licensed trailer mechanic.

ANY CHANGE FROM ORIGINAL DESIGN COULD CAUSE THE TRAILER NOT TO CONFORM TO 'CMVSS OR FMVSS 121' REGULATIONS.



CAUTION LOW AIR PRESSURE

Running a Titan Trailer under a condition of low air pressure, under the recommended 100-105 psi cut in and 120-125 psi cutout, will adversely affect the operation of trailer systems in high usage times. Consequences of running with low air pressure could be:

1. Excessive wear on brake linings as spring brakes start to apply.
2. Excessive drum heating with dragging brakes.
3. Loss of control of lift axles since air will be directed to service brake system before other systems (protected to 75 psi)
4. Lift axle tires dragging, with the combination of little air in ride system and spring brakes activating, there will be no weight on axle to prevent dragging and no air to lift axle.

For Titan's multi-axle trailers we recommend that the tractor compressor's air displacement should no be less than 16 cm. This will ensure that best operation of the air systems under most circumstances.

Electronic Braking System (EBS)



Meritor WABCO, the leader in ABS technology, presents the newest product in its vehicle control systems offering...the electronic braking system (EBS).

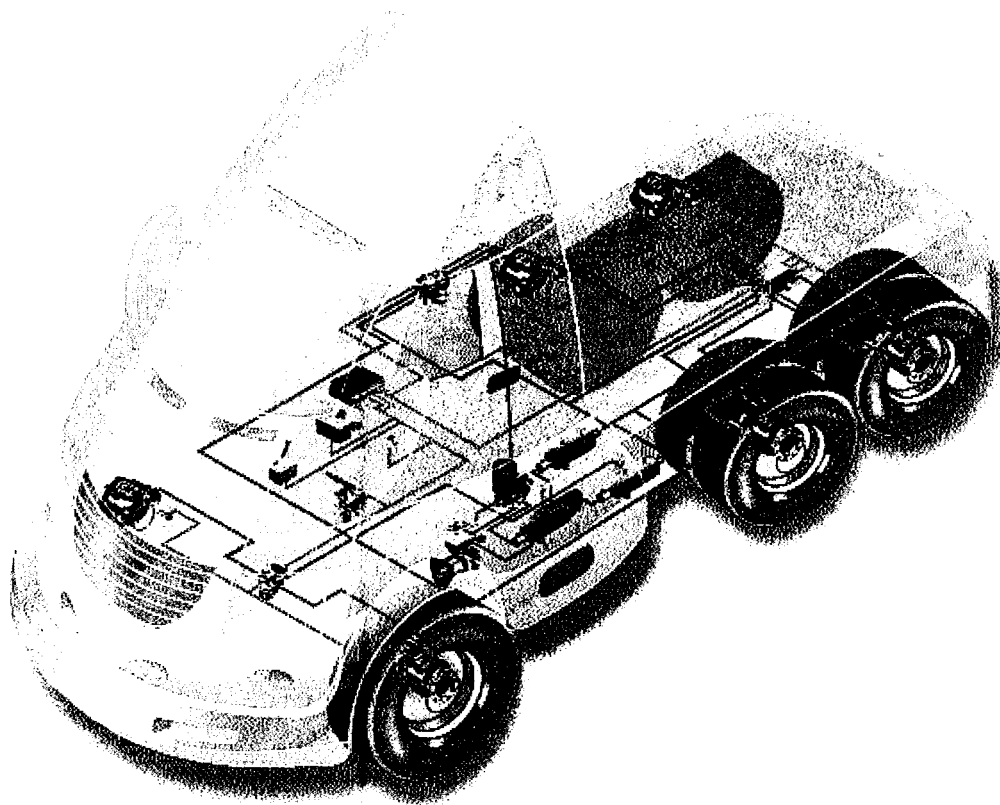
EBS, or "brake-by-wire," integrates anti-lock braking system (ABS) technology, automatic traction control (ATC) and other key vehicle control system features to offer the next generation of braking.

EBS utilizes electronics for the control side of the vehicle's braking system. More specifically, an electronic signal replaces the air signal sent by the brake pedal to activate the brakes, improving stopping distances and braking system performance. And, EBS will provide the platform for the advanced safety systems of the future.

Benefits of EBS

- Reduces number of brake system components and air lines
- Enhanced diagnostics of the complete braking system
- Detects brake fade and notifies the driver if wear levels become critical
- Provides more predictable braking control
- Shortened stopping distances
- Improved vehicle stability and driver control
- Brake "feel" like passenger car
- System control and diagnostics information transmitted over J1939 and J1587 data links

Complete Braking System With EBS



EBS Is the Foundation for Future Electronic Developments

- Electronic stability control (ESC) — Maintains stability and enhances performance during non-braking maneuvers, such as rapid lane change or cornering, as well as during braking situations.
- Improved brake wear through integrated control of retarders, equalization of lining wear and continuous adjustment of individual brake pressures.
- Provides capability for integrated adaptive cruise control (ACC) — a forward-looking detection system that automatically adjusts the vehicle cruise speed to create a safe following distance.

MERITOR WABCO

3331 West Big Beaver Road, Suite 300
Troy, MI 48084
www.arvinmeritor.com

Drivetrain Plus™ by ArvinMeritor



©2000 Meritor WABCO

Litho in U.S.A.

Issued 9-00
SP-20145 (426732/11900)

INFORMATION DOCUMENT

Directive 71/ 320 – Annex XIV
ECE Regulation 13/10

Trailer Anti-Lock Braking System
Information Document
ID_EB123_8

Electronically controlled Brake System (EBS)
for trailers

Trailer EBS E
Trailer EBS E with TCE

2S/ 2M - 4S/ 3M

			COPYRIGHT			WABCO		
			APPR. LEV.	DATE	NAME			
			COMPILER	15.01.2007	A. Stender	Trailer EBS E		
			2	15.01.2007	N. Witte			
			3					
			4					
			TRI		PRODUCT IDENTIFICATION NO.		DOC.NAME	SHEET
Name	REVISION	DATE			400 200 220 0	id_eb123_8.doc	1/43	

Introduction

Information document for Trailer EBS

This information document is produced in accordance to Annex XIV of Directive 71/320/EEC and Annex 19 of ECE R13. The information contained in this document is used for the type approval of the prescribed braking system.

1 General

1.1 Name of manufacturer

WABCO GmbH & CO. OHG
Vehicle Control Systems
An American Standard Company

WABCO Fahrzeugbremsen
Am Lindener Hafen 21
D-30453 Hannover

1.2 System name/model: Trailer EBS

1.3 System variant: E

Versions:

Trailer EBS E

Trailer EBS E with TCE*

* TCE: Trailer Central Electronic

Note: Regarding the description of the above mentioned different versions see paragraph 2.1.3 of ID_EBS.

1.4 System configurations

2S/2M, 2 sensors and one trailer modulator for 1- to 3-axle semi- and centre-axle trailer with air suspension or mechanical suspension.

2S/2M+SLV, 2 sensors, one trailer modulator and one select low valve for 2- to 3-axle semi- and centre-axle trailer with air suspension or mechanical suspension and one self-steering axle.

4S/2M, 4 sensors and one trailer modulator for 2- and 3-axle semi- and centre-axle trailer with air suspension or mechanical suspension.

4S/2M + 1M, 4 sensors, one trailer modulator and one ABS-relay valve for 3- to 4-axle semi-trailers and 3-axle centre-axle trailers with air suspension or mechanical suspension.

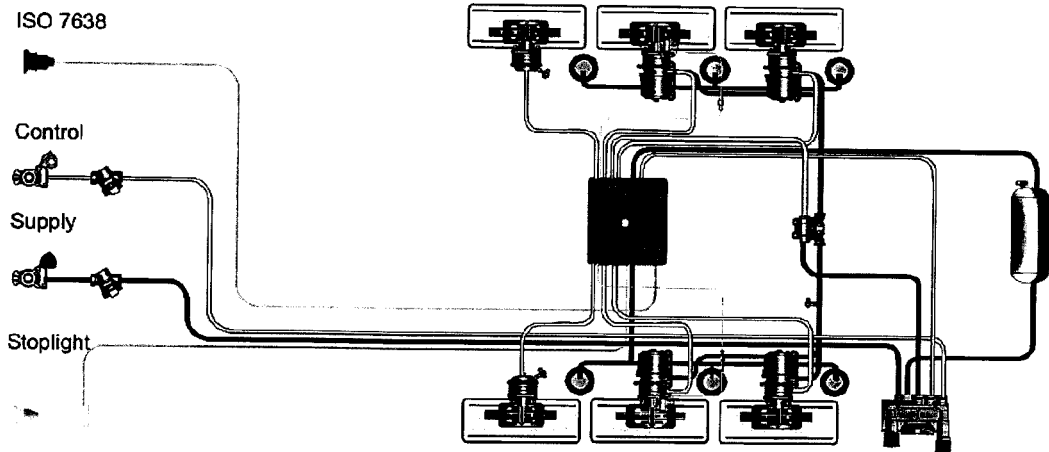
4S/3M, 4 sensors, one trailer modulator and one EBS-relay valve for 2- to 3-axle full trailers and 2- to 3-axle semi-trailer and 2- and 3-axle centre-axle trailer with air suspension or mechanical suspension.

1.5 Explanation of the basic functions and philosophy of the system

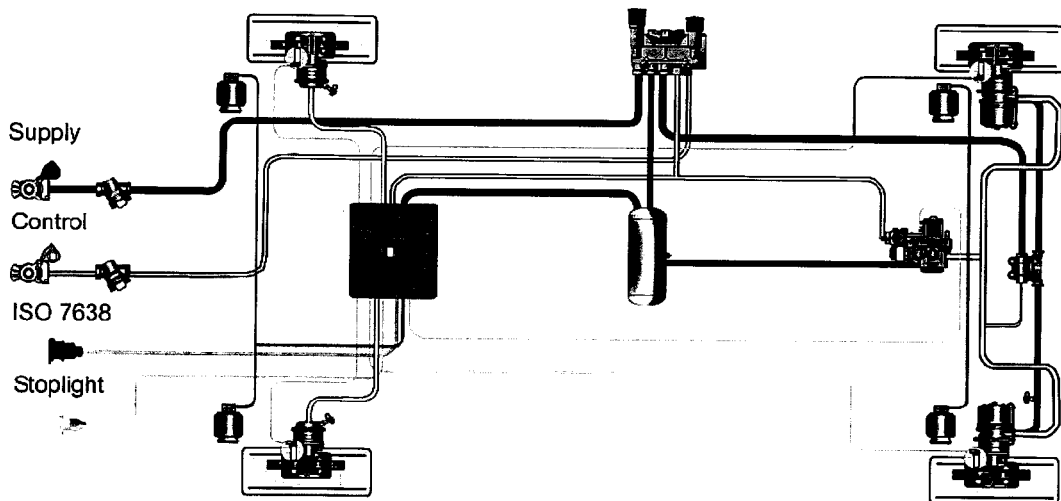
Electronically controlled braking system with load-dependent brake pressure regulation and automatic anti-lock device.

1.5.1 System structure

The standard EBS system for a three-axle semi-trailer is shown in the following figure. It controls the brake pressures electronically on each side. The system is made up of a dual-circuit trailer modulator (2) with digital data interface according to ISO 11992 to the EBS towing vehicle, an EBS relay emergency valve or Park Release Emergency Valve (PREV) (1), and the ABS sensors.



When used in full trailers or semi-trailers, with a steering axle, a system with an additional EBS relay valve (7) on the steering axles is used.



Trailers with this brake system are compatible with conventional and EBS-braked towing vehicles. They can be braked with pneumatic redundancy in the case of an EBS failure on the trailer. This results in three possible modes of operation:

a) Operation behind towing vehicles with EBS and extended (7 pin) ISO 7638 plug-type connection with CAN interface according to ISO 11992.

All EBS functions can be utilised. The driver's braking demand (set value) is transmitted via the data interface to the trailer vehicle.

b) Operation behind conventional towing vehicles with ISO 7638 plug-type connection, without CAN interface

All EBS functions can be used except for transmission of the demand value via the CAN interface. The demand value is specified by the pressure sensor in the relay emergency valve. This pressure sensor measures the trailer control line pressure.

c) Redundancy operation

1. without ISO 1185 or ISO 12098-powering

If the electrical power supply fails or is not plugged in the braking is controlled pneumatically, although **without load-dependent brake force control and without ABS function.**

2. with ISO 1185 or ISO 12098-powering as a safety function

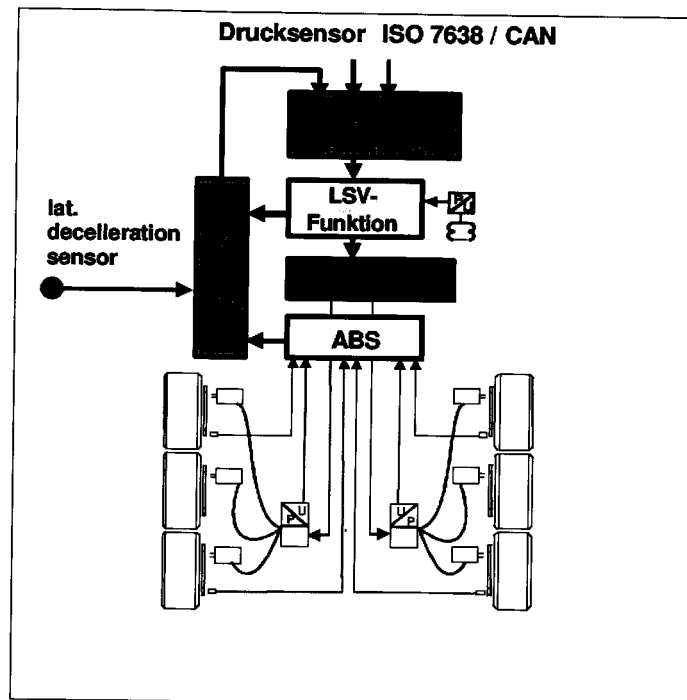
It is not allowed to use the trailer without the ISO 7638 connector. If the electrical power supply via ISO 7638 fails and the system is fitted by an ISO 1185 or ISO 12098-cable (optional feature), the system can be supplied by this optional connection (stoplight-powering). In this case only ABS and the load-dependent brake force control are in function with reduced performance.

1.5.1.1 Description of the EBS-functional blocks

The Trailer EBS mode of functioning can be described in terms of various sub-functions.

1.5.1.1.1 Selection of demand value

The demand value is the driver's braking request. When operated behind an EBS towing vehicle the trailer modulator obtains the demand value via the trailer interface from the EBS towing vehicle. If no demand value is available via the trailer interface, e.g. when operating the trailer behind a conventionally braked towing vehicle or if the trailer interface in the case of EBS combination is interrupted, a demand value is generated by measuring the control pressure. As a matter of priority, control is always the demand value via CAN.

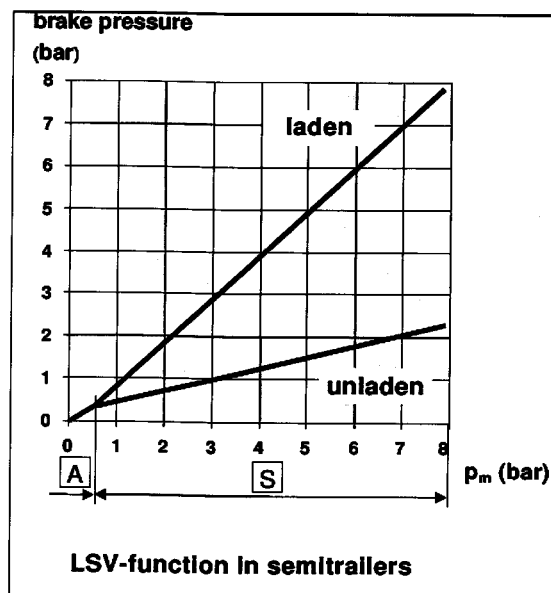


1.5.1.1.2 LSV- function

The Trailer EBS contains the **load-dependent brake force control**, a distinction being drawn between semi-trailers or centre-axle trailers and full trailers.

The current loading state is determined by sensing the air-suspension bellows pressure.

In case of semi-trailers, as at present, a static linear control function is used. The transmission function of brake pressure (p_{cyl}) to coupling head pressure (p_m) is broken down into two ranges:

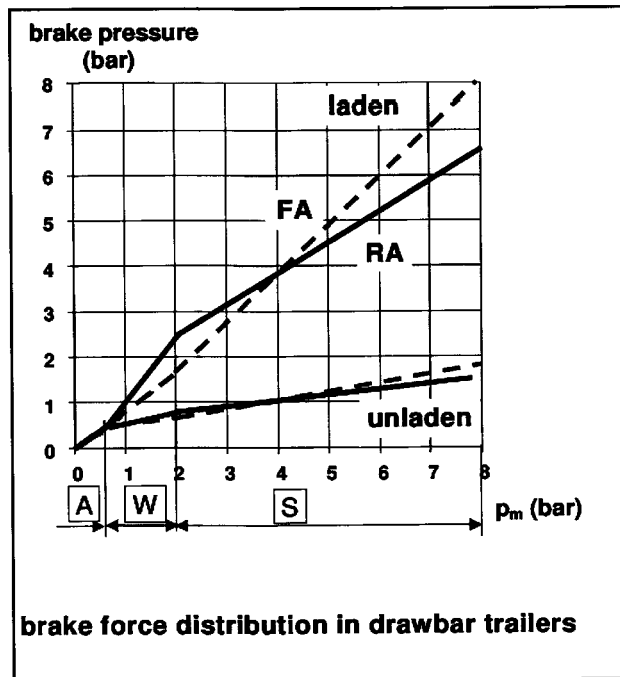


- A • Application range
- S • Stability range

In the example the brake cylinder pressure in the application range ($p_m = 0$ bar to $p_m = 0.8$ bar) rises from 0 to 0.4 bar. At $p_m = 0.8$ bar the threshold pressure of the wheel brake is reached, and the vehicle can start to generate brake force. The parameters for this point, in other words the response pressure of the whole trailer brake, can be set within the framework of the EEC bands.

Subsequently the brake pressure with laden vehicle follows the straight line which passes through the calculated value at $p_m = 6.5$ bar. With the unladen vehicle the response pressure is also modulated from $p_m = 0.8$ bar, and the brake pressure reduced in accordance with the load.

With a full trailer the brake force distribution, achieved on a software basis, replaces the two LSV valves, the adaptor valve on the front axle and the pressure limiting valve on the rear axle which are commonly used at present.



Here the transmission function is broken down into three ranges:

- **A** application range
- **W** wear range
- **S** stability range

At the end of the application range, the response pressures of the brakes are adjusted again, and these pressures may of course differ from axle to axle.

In the partial braking range the pressures are adjusted so as to optimise wear. For a full trailer with, for example, type 24 cylinders on the front axle and type 20 cylinders on the rear axle the pressure to the front axle is reduced in accordance with the design and raised on the rear axle. This ensures uniform loading of all wheel brakes more precisely than can be achieved with the adaptor valve currently used.

In the stability range, the pressures corresponding to equal utilisation of adhesion are adjusted as a function of the axle load.

The rear axle load is determined from the air-suspension bellows pressure. The front axle load is determined, without an axle load sensor, from the slip difference between the speed-sensed wheels.