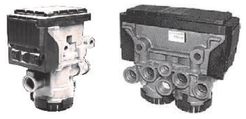
ELECTRONIC BRAKING SYSTEM

EBS AXLE MODULATOR

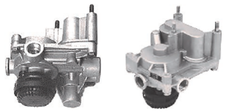


View	Kager Unit Nº	Description	Cross Ref. Nº
1.	48 232 021 9	**EBS -** *One Channel Modulator*	K023219
2.	48 200 002 3	**EBS -** *Two Channel Modulator*	K020023

EBS BACKUP RELAY VALVE

View	Kager Unit Nº	Description	Cross Ref. Nº
1.	48 205 106 0B	**MERCEDES: EBS -** *Backup Relay Valve*	

EBS PROPORTIONAL RELAY VALVE



View	Kager Unit Nº	Description	Cross Ref. Nº
1.	48 020 005 0	**MERCEDES/ DAF/ MAN: EBS -** *Proportional Relay Valve*	480 202 005 0
2.	48 020 004 0	**MERCEDES/ DAF/ MAN/ IVECO: EBS -** *Proportional Relay Valve*	480 202 004 0

EBS TRAILER CONTROL VALVE

View	Kager Unit Nº	Description	Cross Ref. Nº
1.	48 204 001 0	**MERCEDES/ DAF: EBS -** *Trailer Control Valve*	480 204 001 0
2.	48 204 002 0	**MERCEDES/ DAF: EBS -** *Trailer Control Valve*	480 204 002 0
3.	48 144 293 7	**SCANIA 4, 5 SERIES TRUCK, 3, 4 SERIES BUS: EBS -** *Trailer Control*	K000089

EBS ***Enhances Vehicle Safety by Means of Reducing the Stopping Distance, Achieving Improved Braking Stability and Monitoring the Brake System.***

Configuration of EBS System

1. Central Module:
Controls and Monitors the electronically controlled braking system.

2. Brake Signal Transmitter:
Replacing the Foot Valve produces electrical and pneumatic signals increasing and decreasing the air pressure of the electronically controlled braking system. Has dual pneumatic and electric circuits.

3. Proportional Relay Valve:
Is used to Modulate the braking pressure on the vehicles front axle.

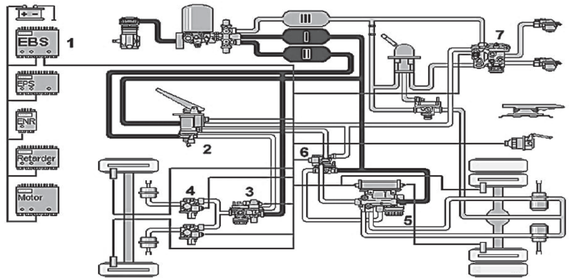
4. ABS Solenoid Valve

5. Rear Axle Modulator:
Controls the Spring brake pressure on both sides of either the rear single or dual axle.

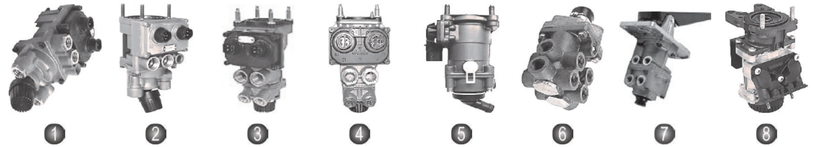
6. Back up Relay Valve:
The 3/2 Relay Valve is used to used to supply and remove air from the spring brakes on the rear axle.

7. Trailer Control Valve:
Used to modulate the coupling head pressures.

Diagram of EBS Brake System for 4X2 Truck



EBS FOOT BRAKE VALVE *(BRAKE SIGNAL TRANSMITTER)*



View	Kager Unit Nº	Description	Cross Ref. Nº
1.	41 48 011 0B	**MERCEDES: EBS -** *Foot Brake Valve*	480 001 011 0
2.	48 001 500 0	**DAF: EBS -** *Foot Brake Valve*	480 001 500 0
3.	48 003 004 0B	**DAF: EBS -** *Foot Brake Valve*	480 003 004 0
4.	48 001 011 0B	**MERCEDES: EBS -** *Foot Brake Valve*	480 003 000 0
5.	41 48 620 4B	**VOLVO: EBS -** *Foot Brake Valve*	0486 2000 04
6.	41 48 443 6B	**MERCEDES/ DAF/ SCANIA: EBS -** *Foot Brake Valve*	MB4436
7.	41 31 860 4B	**VOLVO: EBS -** *Foot Brake Valve*	461 318 604 0
8.	48 494 502 0B	**RENAULT: EBS -** *Foot Brake Valve*	461 494 502 0

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Caliper Kits
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KAGER PRODUCTS

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Slack Adjusters

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ELECTRONICALLY CONTROLLED AIR SUSPENSION

ECAS *CONCEPT AND COMPONENTS*

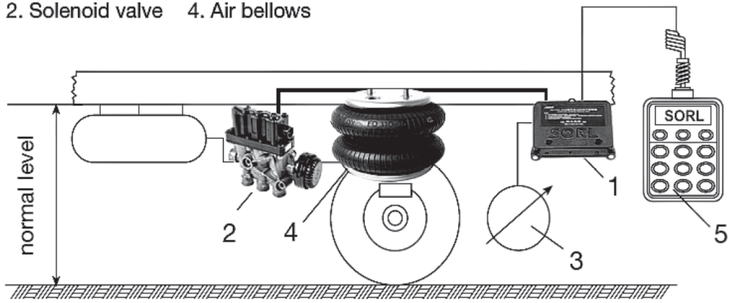
ECAS system is mainly composed of an ECU, Height Sensors (minimum 1 for 1 point control), Solenoid Valve Module, Remote Control Unit (RCU), Pressure Sensors, etc.

The Height Sensors continuously monitor the distance between the chassis and the relevant axles, the signal containing this information being provided to the ECU at short intervals. The ECU also receives other signals, such as speed, braking state, state of the door, air bellows pressure, etc …

The basic scope of ECAS is to balance any control deviations. Control deviations are caused either by changes in the load or by changes in the nominal values (e.g. from the RCU). These control deviations cause the distance between the vehicle's axle and the vehicle body to change. ECAS balances these control deviations by means of leveling control, the Solenoid Valve controlled by the ECU increasing or reducing the pressure in the relevant air bellows.

ECAS Control Circuit

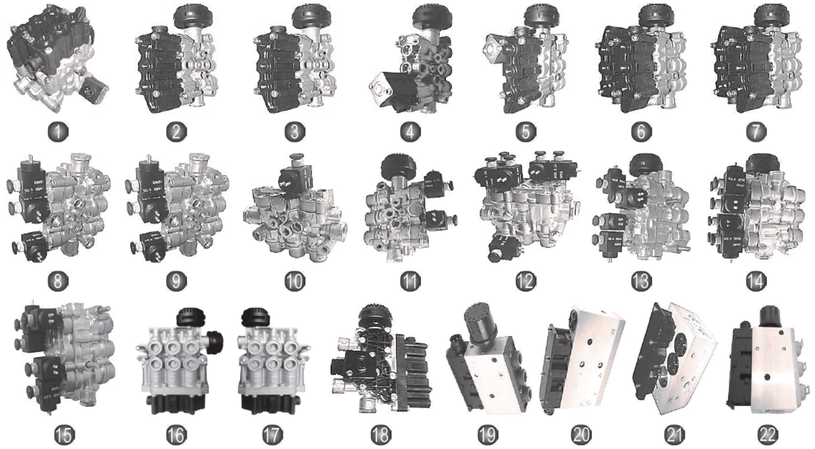
1. ECU
2. Solenoid valve
3. Distance sensor
4. Air bellows
5. Remote control unit



ECAS HEIGHT SENSORS

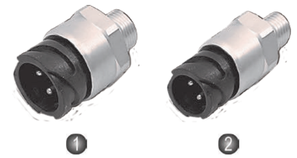
View	Kager Unit Nº	Description	Cross Ref. Nº
1.	92 050 011 0	**MERCEDES/ DAF/ MAN/ IVECO/RVI/SCANIA: HEIGHT SENSOR -** *Rod Max* **100°**	441 050 011 0
2.	92 050 008 0	**MERCEDES/ DAF/ MAN/ IVECO: HEIGHT SENSOR -** *Socket M24X1,DC 5 - 15V*	441 050 008 0
3.	92 050 1230B	**MAN: HEIGHT SENSOR**	441 050 123 0
4.	92 050 100 0B	**DAF/RVI: HEIGHT SENSOR**	441 050 100 0
5.	92 050 012 0B	**VOLVO: LEVEL SENSOR**	K013741N00
6.	92 050 140 0	**MAN: LEVEL SENSOR**	050 4002 11400

ECAS SOLENOID VALVES



View	Kager Unit Nº	Description	Cross Ref. Nº
1.	48 900 056 0	**MERCEDES / DAF/ MAN/ IVECO/ VOLVO: ECAS Solenoid Valve -** *All Ports M22X1.5, DC 24V, Max Working Pressure 20bar*	472 900 0560
2.	48 900 053 0	**MERCEDES/ DAF/ MAN/ IVECO: ECAS Solenoid Valve -** *All Ports M22X1.5, DC 24V, Max Working Pressure 20bar*	472 900 0530
3.	48 900 063 0	**DAF/ IVECO: ECAS Solenoid Valve -** *All Ports M22X1.5, DC 24V, Max Working Pressure 20bar*	472 900 0630
4.	48 900 054 0	**MAN/ RVI: ECAS Solenoid Valve -** *Port 12 M16X1.5, Ports14,22,23 M22X1.5, Max Working Pressure 20bar*	472 900 0540
5.	48 900 057 0	**MAN: ECAS Solenoid Valve -** *All Ports M22X1.5, Max Working Pressure 20bar*	472 900 0570
6.	48 900 110 0	**DAF/ IVECO: ECAS Solenoid Valve -** *All Ports M22X1.5, DC 24V, Max Working Pressure 20bar*	472 900 1100
7.	48 900 112 0	**DAF/ SCANIA: ECAS Solenoid Valve -** *All Ports M22X1.5, DC 24V, Max Working Pressure 20bar*	472 900 1120
8.	48 900 001 0	**MERCEDES/ DAF/ MAN/ IVECO: ECAS Solenoid Valve -** *All Ports M22X1.5, DC 24V, Electrical Connection 3Xm27X1*	472 900 0010
9.	48 900 060 0	**MAN/ SCANIA: ECAS Solenoid Valve -** *Port 12 m16X1.5, All Other Ports M22X1.5, DC 24V, Electrical Connection 3Xm27X1*	472 900 0060
10.	48 900 021 0	**MERCEDES/ DAF/ RVI: ECAS Solenoid Valve -** *Port M22X1.5, M16X1.5, DC 24V*	472 900 0210
11.	47 880 030 0	**DAF/ MAN/ RVI: ECAS Solenoid Valve -** *All Ports M22X1.5, DC 24V*	472 900 0300
12.	48 900 059 0	**RVI/ IVECO: ECAS Solenoid Valve -** *All Ports M22X1.5, DC 24V, Electrical Connection 5Xm27X1*	472 900 0590
13.	48 900 052 0	**SCANIA: ECAS Solenoid Valve -** *All Ports M22X1.5, DC 24V*	472 900 0520
14.	48 900 101 0	**DAF/ MAN/ RVI: ECAS Solenoid Valve -** *All Ports M22X1.5, DC 24V*	472 900 1010
15.	48 900 102 0	**DAF/ MAN/ SCANIA: ECAS Solenoid Valve -** *All Ports M22X1.5, DC 24V*	472 900 1020
16.	48 905 118 0	**SCANIA: ECAS Solenoid Valve -** *All Ports M22X1.5, Installation Bolt 2XM8, DC 24V, With Two Silences*	472 905 1180
17.	48 905 111 0	**MERCEDES/ DAF/ MAN/ IVECO: ECAS Solenoid Valve -** *All Ports M22X1.5, Installation Bolt 2XM8, DC 24V*	472 905 1110
18.	48 880 064 0	**MERCEDES / DAF: ECAS Solenoid Valve -** *All Ports M22X1.5, DC 24V, Working Pressure 5-13bar*	472 880 0640
19.	48 100 003 0	**VOLVO: Pressure Control Valve -** *All Ports M16X1.5, DC 24V*	050 11000 31000
20.	48 100 004 1	**ALERO BUS : Pressure Control Valve -** *All Ports M16X1.5, DC 24V*	050 11000 41000
21.	48 100 003 0	**VOLVO: Pressure Control Valve -** *All Ports M16X1.5, DC 24V, Working Pressure 5-13 bar*	050 11000 52000
22.	48 100 002 9	**VOLVO: Pressure Control Valve -** *B7R, B10M, All Ports M16X1.5, DC 24V*	050 11000 29000

ECAS PRESSURE SENSORS



View	Kager Unit Nº	Description	Cross Ref. Nº
1.	13 044 015 0	**DAF/ MAN/ IVECO/ VOLVO : PRESSURE SENSOR -** *Port Thread M16X1.5, DC 8-32V*	44 104 0015 0
2.	13 044 108 0	**UNIVERSAL : PRESSURE SENSOR -** *Port Thread M16X1.5, DC 8-32V*	44 104 4108 0

ECU *ELECTRONIC CONTROL UNIT*

ECU Electronic Control Unit, is usually installed in the cab or inside a protected environment. It stores control parameters, and continuously monitors inputs from Height Sensors, Pressure Sensors *(Switches)*, Wheel Speed Sensors. By elaborating the above input signals it controls the vehicle height and other functions *(i.e. Kneeling, LA, Traction Help)*.
It features a self-diagnostic software package, with detection and storage of system faults.

1ST Generation: Used on Buses and Trucks.

Only supports the CAN Speed
Applicable models: Air Suspension Bus and Truck Except with Lifting Axle Control.
Control Mode Bus: 3 points, 2 points control.
Truck: 3 points, 2 points, 1 point control.

Functions:
Bus: Kneeling Function, Height Adjustment Depending on Speed, Manual Button Control, Standby Control, etc.
Truck: Height Adjustment Depending on Speed *(Full Air Suspension)*, Button Control, Standby Control, etc.

2ND Generation: Used on Buses and Trucks.

Only supports the CAN Internet
Applicable models: Air Suspension Bus and Truck.
Control Mode Bus: 3 points, 2 points control.
Truck: 3 points, 2 points, 1 point control.

Functions:
Bus: Left and Right Side Kneeling, Height Adjustment depending on speed, Button Control, Standby Control, etc.
Truck: Height Adjustment Depending on Speed *(Full Air Suspension)*, Button Control, Standby Control, since the recognition Buffer Height, adjust the Deviation Control, Lifting Axle, etc.

RCU Compatible with WABCO System

The hand-held remote control has several functions:

- Raising and lowering the vehicle suspension
- Returning vehicle to normal ride level
- Stopping all OptiRide™ functions
- Driver ability to preset and store up to two separate chassis heights

Basic Functions available in the RCU

Used for standing operations, can be used to change nominal values in the ECU.