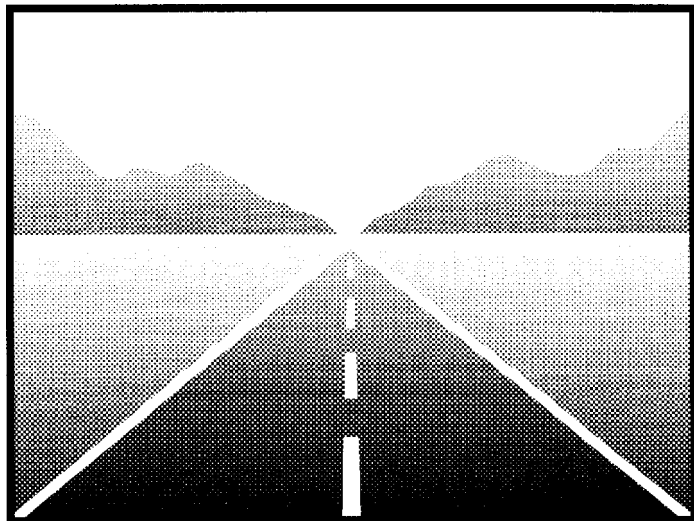
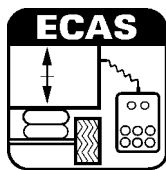


# WABCO



## ECAS For Trailers Operating Instructions



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## Introduction

The term "ECAS" stands for "Electronically Controlled Air Suspension".

Even conventional air suspension offers a lot of advantages compared with leafspring vehicles: increased comfort, protection of load and a constant chassis height.

With electronic control, a large number of additional system functions are available.

### Special features include:

- safe and easy operation of the system;
- reduced fuel consumption through minimizing air consumption whilst the vehicle is in motion;
- maintaining a constant chassis height when the vehicle is being driven **and** at any other selected level - e.g. that of the loading ramp.

This leaflet explains how the system is used and contains some additional information which may come in useful should you encounter a fault.

### **Safety Note**

The ECAS system is, by design, highly responsive. Drivers and service personal should pay due regard to this when working on the vehicle. Appropriate safety precautions should therefore be strictly observed.

## **System Functions**

Below we describe the features which can be implemented with ECAS. However, do remember that not every system contains all of those features. The type of system used (number of lifting axles, with/without air suspension on the front axle) determines which functions are available to you.

If you fill in the reply card (last page) we will let you know which functions are available on your vehicle.

### **Normal Level Control**

This is the basic function of the ECAS system.

ECAS is able to maintain not only the the normal ride height but also any other pre-selected level. This means that a vehicle set to the level of the loading ramp will maintain that level even in the process of being loaded or unloaded.

One or several distance sensors report the level of the chassis to the Electronic Control Unit (ECU). This ECU then compares that level with the defined index levels.

If there is a difference between the actual and the index levels, a solenoid valve is activated which rapidly adjusts the level of the chassis provided there is a sufficient pressure and energy supply.

### **Normal Level I**

By Normal Level we mean the level set by the vehicle manufacturers for normal driving operation. This normal level determines the overall vehicle

level which is tied to specified legal limits, and the level of the vehicle's centre of gravity which is of major importance to the vehicle's behaviour in terms of driving dynamics (i.e. braking, oscillation and cornering behaviour).

For safety reasons this normal level is controlled automatically once the vehicle exceeds a limit speed which can be set by the respective parameter.

### **Delayed Action**

When the vehicle is stationary and the ignition is on, control of the index value, if required, is achieved within seconds, for instance when the vehicle is being loaded. When the vehicle is moving, however, this index value control process is delayed for a certain period. The parameter for this delay can be adjusted. This parameter has been set in the ECU to a standard delay period of 60 seconds. Its effect is that any dynamic axle load cycles which occur in driving operation are transformed into

springing action and are not detected as a change in the load carried.

The detection of a change in the vehicle's load would result in the pressure in the air suspension bellows to be increased or decreased, and thus unnecessary air consumption.

### **Normal Level II**

This second normal level can be used if you want to take into account specific driving conditions.

Normal Level II can be changed either by actuating a switch, or automatically depending on the vehicle's speed. Examples:

- less air resistance and low centre of gravity at high speeds
- different tractor-trailer combination with adjustment of fifth wheel

## **Unloading Level / Normal Level III**

By means of a switch, an unloading level or a third normal level can be activated. This unloading level is only used for loading operations. A parameter can be set for a limit speed; as soon as this limit speed is exceeded, Normal Level I is activated automatically.

The switching contact for the unloading level can be linked to another system to achieve automatic action.

### **Examples for the Unloading Level:**

- For the unloading process, a tipper truck is lowered in order to prevent rapid rebound (caused by sudden unloading).
- A tanker is automatically brought into the position in which it is easier to completely empty the vehicle.

Normal Level III is a driving level, like Normal Level II. It can be activated either via a switch or the remote control unit.

Example for Normal Level III:

- different tractor-trailer combination with adaptation of the king pin level.

## **Remote Control Unit**

The use of the Remote Control Unit is described in detail in the section headed "Remote Control Unit".

## **Lateral Stabilizers**

For vehicles expected to have an uneven axle load distribution (e.g. load on one side only), variable spring rates can be achieved on the supporting bellows of one axle by separating the actuation for individual bellows.

For vehicles with evenly distributed loads (e.g. tank trucks), this is not really necessary.

## **Limits of height adjustments**

Any level adjustment is ended automatically when the set (calibrated) values for the upper and lower level limits have been reached.

## **Lifting Axle Control**

When the vehicle is stationary, the lifting axle is automatically lowered when the permissible load on the vehicle's main axle is exceeded in the loading process.

For safety reasons the lifting axle is lowered when the vehicle is parked and the ignition is switched off.

Usually the system is preset in such a way that the lifting axle is raised automatically when the vehicle is being unloaded.

If you intend to drive with your lifting axle lowered, for instance to improve the tracking stability of your vehicle, you can lower the lifting axle either via the remote control unit, or by actuating a separate switch.

## **Adjustment of Zero Position**

Raising the lifting axle can be combined with an increase of the normal level in order to improve clearance of the wheels on the lifting axle.

## **Traction Help**

Traction help can be implemented on semi-trailers with a lifting axle when the release of pressure in the suspension bellows causes an increased load on the king pin.

The increased load on the motor vehicle's driving axle greatly improves its traction force.

Traction Help is actuated by means of a switch or the remote control unit.

In Germany, the use of traction help is limited to a period of 90 seconds. This is followed by a restraint period of 50 seconds in which the traction help cannot be activated.

Upon coming into force of EC Guideline 97/27/EG, the legislation on traction help will change.

## **Overload protection**

To protect you from driving off with an overloaded vehicle, the vehicle manufacturer might activate an overload protection device.

If the pressure in the air suspension bellows becomes too great due to an excessive load, the chassis is lowered. The vehicle now has to be unloaded until the chassis can once again be raised by means of the remote control unit.

**Never drive off with the chassis lowered since this can severely damage both the vehicle and the load!**

## **Compensation for Tyre Deflection**

For heavy low loaders, not only are small wheels used to maintain the vehicle height, but very small wheels / chassis clearance are also employed.

If you do not have ECAS fitted, this could cause the chassis to make contact with the rubber buffers when the vehicle is heavily laden.

When the vehicle is being loaded, tyre deflection is also increased, causing the overall height of the vehicle to be reduced.

By means of pressure sensors, ECAS is able to perceive the weight of the vehicle's load. As the load increases, so will the distance between the axle and the chassis, thus achieving improved ride clearance at a constant vehicle height.

## The Remote Control Unit

(e.G. 446 056 117 0)



The various commands for the remote control unit are shown overleaf.

Depending on the type of system used, there are different types of remote control units available. The remote control unit shown in this illustration is the one with the largest possible number of functions. Operation of the unit for vehicles without front axle control is, however, similar.

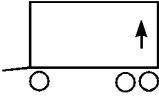
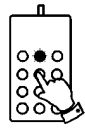
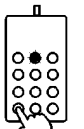
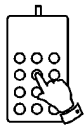
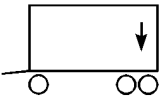
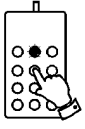
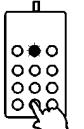
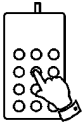
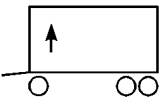
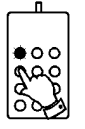
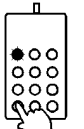
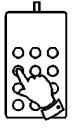
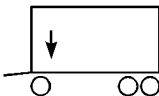
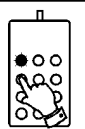
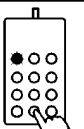
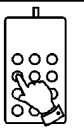
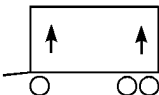
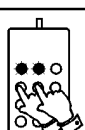
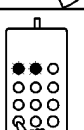
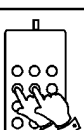
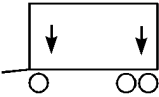
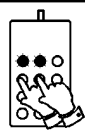
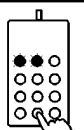
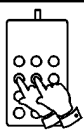
The functions of the remote control unit can only be initiated up to a certain limiting speed for which the parameter

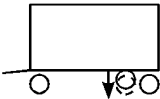
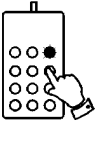
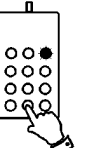
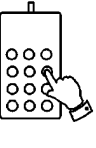
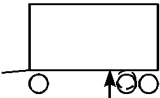
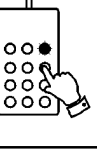
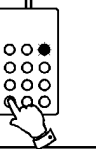
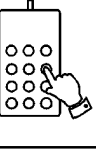
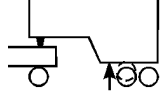
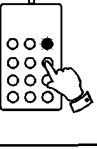
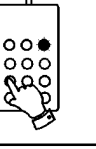
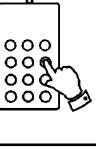
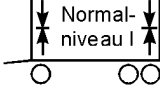

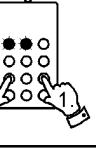
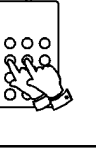
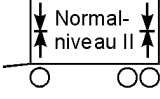


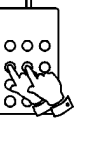
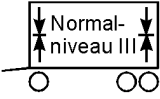
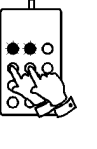
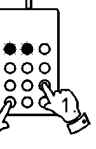
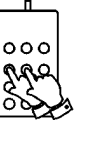
can be set. Stand-by operation is possible.

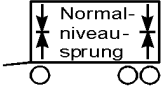

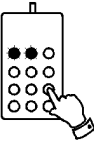

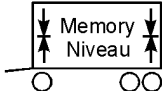

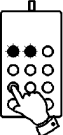

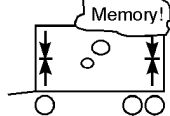

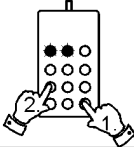

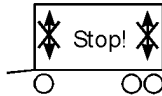
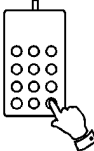
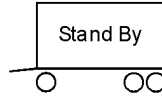
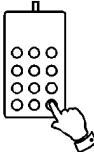
### Preselect Keys

On vehicles with full air suspension systems, it is possible to raise or lower all vehicle axles simultaneously, or individually, by pressing the appropriate keys. Preselection is done via the "front axle" or "rear axle" keys. An acknowledgement lamp is allocated to each of these keys.

Pressing the key once will activate preselection of the axle, and the acknowledgement lamp for the preselected axle will come on.

Motion	Switch on	Activate	Switch off
<p>raise chassis rear</p> 			
<p>lower chassis rear</p> 			
<p>raise chassis front</p> 			
<p>lower chassis front</p> 			
<p>raise chassis</p> 			
<p>lower chassis</p> 			

Motion	Switch on	Activate	Switch off
<p>lower lifting axle</p> 			
<p>raise lifting axle</p> 			
<p>traction help</p> 			
<p>activate Normal Level I</p> 			
<p>activate Normal Level II</p> 			
<p>activate Normal Level III</p> 			

Motion	Switch on	Activate	Switch off
<p>address current normal level</p> 			
<p>address memory level</p> 			
<p>store memory level</p> 			
<p>stop level change</p> 			
<p>stand-by operation</p> 			<p>Zündung "AUS"</p>

Simultaneously pressing the preselect keys for the front and rear axles will preselect both vehicle axles, and both acknowledgement lamps will come on.

By pressing the same key(s) again, the preselect function and the acknowledgement lamp(s) will be switched off.

### **Raising and Lowering of the Chassis**

By pressing the the "lower" or "raise" keys, the level of the chassis on the preselected axle(s) is changed immediately. This process ends when the key is released.

### **Raising and Lowering of the Lifting Axle**

If the lifting axle was selected, the "lower" key is used to lower the raised lifting axle, and the "raise" key is used to raise the lifting axle (provided this is possible, depending on the vehicle's load).

#### **Please Note:**

Lowering the lifting axle will switch off the facility for automatically raising the lifting axle. The indicator lamp will be on!

By raising the lifting axle or pressing the "normal level" key, automatic control of the lifting axle is reactivated.

### **Traction Help**

If the lifting axle was selected, the traction help function can be activated by pressing the 'M1' key.

### **Normal Levels**

The function described below applies to the whole of the vehicle when one axle has been preselected.

If the parameters have been set accordingly, the remote control unit can be used to activate Normal Levels I, II and III. By pressing the 'Normal Level' key **and** pushing another key at the same time, the desired normal level is activated.

In detail, this achieves:

- Normal Level I with key 'M1'
- Normal Level II with key 'M2'
- Normal Level III with 'Raise' key

Thus a normal level has been selected which is assumed to be the current normal level until another normal level has been selected. For activating the current normal level it is sufficient to briefly push the 'Normal Level' key.

### **Memory Levels**

By pressing the "stop" key and simultaneously one of the "M1" or "M2" memory keys, the previously-selected level can be stored as the memory level for the whole vehicle (front and rear in the case of draw-bar trailers).

By briefly pressing the memory key once again, the vehicle is brought to the level stored. This function always applies to the whole of the vehicle, irrespective of which axle has been preselected.

### **Stop**

When the "stop" key is pressed, all levelling control processes are stopped imme-

diately, and the present level is recognized as the index level.

If the ignition is switched off while the "stop" key is being pushed, the vehicle is in its stand-by mode (please also refer to the section on "Power Supply").

### **Use of Several Remote Control Units**

For controlling the trailer ECAS, a second remote control unit can be used (e.g. in the cab) in addition to the remote-control unit on the trailer. In order to ensure that only one of these control units communicates with the ECU, the data line leading to the ECU has to have a selection switch fitted for selecting one of the control units.

## Functions Of The Indicator Lamp

ECAS contains a comprehensive system monitoring facility.

On the one hand, this facility carries out frequent electronic checks of all of the system's components.

On the other hand it will check, for instance, after the pressure has increased in a bellows, whether the chassis is being raised as it should.

Any fault in the system will cause the indicator lamp to flash. Now, ECAS function is not completely given

The indicator lamp will come on and stay on if:

- the vehicle's chassis is not within its current Normal Level;
- the automatic lifting facility for the lifting axle has been switched off via the switch for "forced lowering of lifting axle", or via the remote control unit.

- traction help is activated.

In addition, the indicator lamp will flash for a few seconds every time the ignition is switched on.

When switching on the ignition you should keep an eye on the indicator lamp. If it goes off after a few seconds this means that the vehicle chassis is at its current normal level, the automatic lifting axle facility is in operation (if applicable), and no traction help is active. In short: the vehicle is ready to be driven off.

## Power Supply

The power supply for ECAS is provided by the ABS or the EBS ECU. From the "Diagnosis" socket (if ABS-VCS is in place) or the "DIA/ECAS/ISS" socket (if EBS is in place), a power supply cable leads to the ECAS ECU. On vehicles with ABS, ECAS also receives

the C3 signal via the power cable. On vehicles with EBS the power cable is used to transmit various kinds of information to ECAS, such as readings picked up by the pressure sensors, or speed signals.

ECAS is operational as soon as the ABS cable (ISO 7638) is plugged in and the ignition is switched on.

The ECAS can also be powered by a remote battery located on the trailer.

If this is the case you will usually find a switch on the trailer which will activate ECAS.

## Maintenance

ECAS is maintenance-free. Since the electronic control unit automatically monitors the components, only a visual inspection of the system is periodically necessary. When the indicator lamp flashes at any time - except in the course of diagnosis - this means that there is a defect.

When this happens, please drive in the workshop carefully. For more information on faults, please refer to the chapter below.

## Faults

ECAS is a very reliable system. If, however, you ever do detect a fault, the tables on the following pages will help you to find out if it can be rectified easily. If it is necessary to take the vehicle to the workshop, the system's diagnostic facility makes any fault easy to locate.

**Please note that the vehicle must not be loaden or unloaden while the indicator lamp flashes or ECAS is switched off.**

For information on authorized ECAS workshops near you, please call any WABCO subsidiary,

<b>Fault</b>	<b>Cause</b>	<b>Remedy</b>
The level cannot be changed via the remote control unit.	Ignition is off. No axle has been preselected.	Switch on ignition (or press the battery switch). Press the axle preselect key(s) in the top row of the remote control unit.
After switching on the ignition the indicator lamp stays on.	The chassis is outside its normal levels.	Press the middle preselect key and the "normal level" key on the remote control unit.
The chassis is at its normal level but the indicator lamp is still on.	Traction help is active or automatic operation of lifting axle is off.	Traction help will switch itself off. Automatic lifting axle operation is re-activated by raising the lifting axle or via the "normal level" function.
After switching on the ignition the indicator lamp stays on and then starts to flash.	The pressure in the air reservoir is insufficient for raising the chassis.	Wait for the governor on the towing vehicle to switch off, then select "normal level".
ECAS does not achieve the desired level. Indicator lamp is flashing.	The vehicle is standing on uneven ground, one of the air springs is preventing further movement	Switch ignition off and on again or select the "normal level" command on the remote control unit. If this fault occurs on an even road surface, please take the vehicle to a workshop.

<b>Fault</b>	<b>Cause</b>	<b>Remedy</b>
The indicator is flashing although the ignition has been switched off and on.	There is a fault in the system. However, emergency functions do work.	Using the remote control unit, bring your vehicle approximately to its normal level and then take it to the workshop.
The indicator lamp fails when switching on the ignition. Level control is operative.	Probably either the lamp or its wiring is defective.	Have the indicator lamp repaired.
The indicator lamp is off but the yellow ABS lamp is on.	The ABS power supply is not plugged in or defective.	Check ABS cables, plug-in connection and fuses for trailer ABS in the motor vehicle.
The indicator lamp fails when ignition is on. ABS is working, ECAS is not.	The ECAS fuse may be defective.	The ECAS fuse (5 amps) is located on the trailer, in the bottom housing of the ABS at the ECAS supply module.
The level is unsuitable for driving. Raising/lowering commands are ignored.	ECAS is unable to activate the solenoid valves; this may be due to a short.	Connect the test connections of the air bellows to a tyre inflation hose. By increasing or decreasing the pressure, move the vehicle's chassis to a level which permits you to drive to a workshop.

## ECAS Settings For Your Vehicle

Because of the large number of different types of trailers, the ECAS control electronics are adjustable and can thus be individually set for any vehicle

However, any spare unit must show exactly the same setting parameters.

WABCO has developed a service concept which ensures that the setting parameters are available if needed.

This concept, designed to support the vehicle manufacturers, is based on a data bank with setting parameters of all vehicles sold.

As you open the protective housing of ECAS you will see the cable plug in terminals and a silver sticker on the inside of the cover. The 10-digit reference number you find at the bottom of that sticker defines the set of parameters stored in the data bank.



Reference number

To ensure optimum use of your ECAS system, WABCO offers a service free of charge:

If you let us know the reference number on the sticker on the control electronics of your vehicle, please return the attached reply postcard, and we will send you a description of your system.

Amongst other things, this description will tell you at which vehicle speeds the level can be adjusted, and up to which speed the lifting axle can be lowered and traction help activated.

Should you be unable to locate the sticker on the black plate inside the cover, please let us know.



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