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TECHNİCAL GUİDE

ECAS Solenoid Valve: Faults, Replacement & Maintenance Guide

A truck sitting low on one side or a trailer that will not settle to ride height points to the ECAS solenoid valve block: diagnosis, replacement and calibration.

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If the rear of a tractor unit is sitting lower on one side, an air spring is deflating on only one side, or the vehicle just won't settle to its ride height when you turn the ignition on, one of the first places to check in the field is the ECAS solenoid valve block. On heavy commercial vehicles and trailers, this valve is the "bridge between the brain and the muscles" of the air suspension; the ECU processes the signal coming from the height sensor, and the solenoids adjust chassis height by filling and venting the air springs. In this guide, we cover the valve's operating principle, fault symptoms, diagnosis and replacement steps, and maintenance points in plain field language and honestly.

E-E-A-T note: This document was prepared by the VADEN technical team, drawing on field and service experience with heavy commercial vehicle air suspension systems. The torque, pressure and setting values given here are typical references; for exact values, always rely on the vehicle's/trailer's OE service manual and the documentation of the system manufacturer (WABCO/Knorr-Bremse type ECAS). Last updated: September 2026. Component sizing is based on the relevant international standard family (ISO/EN/DIN/SAE) and the manufacturer OE specification.

What Is an ECAS Solenoid Valve (Electronic Level Control Valve)? Its Function and Operating Principle

The ECAS solenoid valve is the electro-pneumatic valve block that, in an electronic level control (Electronically Controlled Air Suspension) system, fills or vents the air springs (bellows/air cushions) according to the signals from the ECU, thereby automatically adjusting chassis/trailer height. In short, it is the electronic and far more precisely controlled version of the mechanical levelling valve (the mechanical "level valve").

The system works through the coordination of three main components: *sensing* (height sensors), *decision* (ECU) and *actuation* (the solenoid valve block and the air springs). The height sensor continuously measures the distance between the chassis and the axle; the ECU compares this value with the target ride height and, if there is a deviation, energises the relevant solenoid coil. When the solenoid opens, either air flows from the air tank into the air spring (the vehicle rises) or the air in the air spring is vented to atmosphere through the exhaust port (the vehicle lowers). Once the target is reached, the ECU de-energises the coil, the valve closes, and that height is maintained.

- **Solenoid valve block:** The coil-operated valve group that controls fill/vent direction; usually one channel per axle/air spring.
- **Height (level) sensor:** A sensor that measures the axle-to-chassis distance angularly/linearly, linked to the axle via a mechanical arm.
- **ECU / ECAS module:** The electronic control unit that processes the signals and drives the valves; it stores target heights and fault codes in its memory.
- **Air spring (cushion):** The elastic element that raises/lowers the chassis as its pressure changes.
- **Supply line and tank:** The circuit that delivers dry air, having passed through the dryer, to the valve.

The difference between the valve, the sensor and the module

These three parts are often confused in the field. The **valve** is the mechanical-electrical part that physically directs the air. The **sensor** only measures; it does not pass air. The **module/ECU**, on the other hand, is electronic; it has no contact with air and makes the decisions. In a "vehicle won't rise" complaint, the fault may lie in any of the three; that is why, in diagnosis, it is essential to read codes with a diagnostic tool and to verify signal and pressure.

Differences between solo tractor, trailer and bus applications

On tractor units, ECAS generally manages rear axle height and the lift axle function. On trailers, ramp alignment, raise-lower and single/dual level memory come to the fore. On buses, functions such as "kneeling" and door-side lowering are added. The number of channels on the valve block and the software vary accordingly.

The valve performs this task together with the air springs and levelling valves; to read a symptom at system level rather than component level, the heavy-duty air suspension failures guide is complementary.

System types and the aftermarket-equivalent context

Criterion	Single channel / simple ECAS	Multi channel / full ECAS
Typical use	Trailer, light control	Tractor, bus, multi-axle
Number of channels	1–2	3 and above
Function	Level maintenance	Level + lift axle + memory + kneeling
Number of sensors	1	2–4
Aftermarket-equivalent context	WABCO-type / Knorr-Bremse-type ECAS equivalent	WABCO-type / Knorr-Bremse-type ECAS equivalent

Part number verification: ECAS valve blocks differ from one another in terms of channel count, port layout and software matching. If a valve with the wrong channel/port configuration is fitted, the system throws a fault or the height adjustment goes wrong. Before ordering, always compare the vehicle's/trailer's OE part number, the chassis (VIN) information and the reference on the existing valve; the WABCO/Knorr brand names are cited only for the purpose of aftermarket-equivalent matching.

Fault Symptoms and Diagnosis

ECAS faults are most often grouped under the heading "the vehicle won't settle to the correct height", but the root cause may be the valve, the sensor, an air leak or the electrics. The table below matches field symptoms with possible causes and verification methods.

Symptom	Possible Cause	Check / Verification
Vehicle won't rise / lift at all	Valve fill channel blocked, coil faulty, no supply pressure	Measure tank pressure; check whether control voltage reaches the coil; read codes with a diagnostic tool

Symptom	Possible Cause	Check / Verification
Vehicle won't lower / stays permanently high	Exhaust/vent channel stuck, valve seized, sensor signal fixed	Send a vent command from the diagnostic tool; listen for air escaping from the exhaust port
One side low / vehicle leaning to one side	Leak in the air spring on that side, blocked channel or faulty sensor arm	Compare the air spring pressures on both sides; check the sensor arm angle
Height constantly changing (hunting)	Unstable sensor signal, internal valve leak, loose connection	Monitor the sensor value in live data; look for fluctuation in air spring pressure
Air leaking constantly / compressor running too much	Internal valve leak, port O-ring, air spring/fitting leak	Foam/soap test; monitor pressure drop with the ignition off
ECAS warning lamp / fault code present	Coil open/short circuit, sensor out of range, supply fault	Read DTCs; verify wiring harness and connectors by resistance/voltage measurement
Lift axle not working	Relevant valve channel or control output faulty	Trigger the lift axle command from the diagnostic tool; test the relevant coil

Reading codes with a diagnostic tool

The ECAS system stores its own fault codes (DTC). Work should always begin by reading codes with a diagnostic tool; codes such as wiring break, coil short circuit or sensor range fault narrow the search significantly. Clearing the codes and checking whether they return after a road test helps distinguish a permanent fault from an intermittent contact fault.

Actuator test and live data

Most diagnostic tools have an actuator test that triggers the valve channels one by one. In this test, when a fill/vent command is given, you observe whether the relevant air spring actually fills and vents. By monitoring the sensor height and the target value side by side in live data, you distinguish whether the sensor or the valve is at fault.

Mechanical and pneumatic verification

If the electronics are sound, the problem may be on the pneumatic side. Supply pressure, the health of the air dryer, port O-rings and air spring leaks are checked with a foam test. An internal valve leak most often reveals itself by the vehicle slowly sinking even with the ignition off.

Further reading

For a plain-language technical overview of this subject, see the reference article on Wikipedia. Always confirm specific figures and procedures against the vehicle manufacturer service data.

Replacement / Installation Steps

PPE and safety: The air suspension system contains pressurised gas; if an air spring vents suddenly, the chassis drops rapidly. Before starting work, secure the vehicle on level ground with suitably rated stands/chocks, chock the wheels and release the system pressure. Wear protective goggles and gloves. Do not disconnect any air fitting before the pressure is released.

1. **Secure the vehicle:** Park on level ground, apply the parking brake, chock the wheels; support the chassis mechanically if necessary.
2. **Switch off the ignition and depressurise the system:** Set ECAS to the off position, and release the air tank and air spring pressure in a controlled manner at the point specified by the manufacturer.
3. **Disconnect the battery/supply:** Cut the relevant supply to prevent electrical arcing and unintended valve triggering.
4. **Mark the valve and its connections:** Label the electrical connector and every air line so they match the port numbers; take photographs. Connecting the wrong port is the most common mistake.
5. **Remove the electrical connector:** Detach the connector without damaging the locking tab; note any corrosion/looseness on the pins.
6. **Remove the air lines:** Loosen the fittings in port order; cap the line ends to prevent dirt/swarf from getting inside.
7. **Remove the old valve:** Take out the mounting bolts/clamp and remove the valve block; inspect the condition of the gasket and O-rings.
8. **Prepare the new valve:** Compare the port layout of the new VADEN valve with the old one; use new O-rings/gaskets and keep the port faces clean.
9. **Fit the valve:** Seat the block in place and tighten the fasteners to the manufacturer's torque value, progressively; do not strain the body.
10. **Reconnect the lines and connector:** Following the labels, connect each air line to the correct port, tighten the fittings to the specified torque, and lock the electrical connector.
11. **Pressurise, calibrate and test:** Fill the system, carry out a leak test, perform the height calibration (ride height setting) with the diagnostic tool, and try the functions (raise/lower/lift) one by one.

Points to Watch Out For (Common Mistakes)

Skipping calibration: If ride height calibration is not carried out after a valve or sensor is replaced, the vehicle stays at the wrong height; this affects both driving safety and axle

load/brake balance. Calibration is the step at which the job is considered complete — it cannot be skipped.

Mixing up the air line ports: If the positions of the fill, vent and air spring ports are swapped, the vehicle reacts in the opposite direction (it lowers when it should raise). Always label and photograph before disassembly.

- Removing a fitting without releasing the system pressure — risk of sudden chassis movement and injury.
- Reusing old/worn O-rings and gaskets — internal leak and the compressor running constantly.
- Leaving the port openings uncapped and letting dirt/moisture in — internal valve seizure.
- Fitting an equivalent with an incompatible channel count/software — codes, faults and wrong function.
- Fitting the sensor arm at the wrong angle — wrong height reference.
- Over-tightening the fittings and straining the plastic body/threads — cracks and leaks.
- Handing the vehicle over after replacement without an actuator test and a road test.

Technical Values and Check Points

The values below are **typical/general references** for heavy commercial vehicle ECAS systems; exact values vary by vehicle and valve type, and the manufacturer's service manual takes precedence.

Parameter	Typical Reference Range	Note
System/supply pressure	~8–12.5 bar (~116–181 psi)	Tank and circuit pressure; varies with the regulator
Air spring working pressure	~0.5–8 bar	Variable with load and level
Supply voltage	24 V DC (heavy commercial)	12 V systems also exist
Solenoid coil resistance	~in the order of tens of ohms (typical)	OE data sheet for the exact value; check for open/short circuit
Operating temperature	~ -40 °C to +80 °C	Depending on the component and ambient conditions
Ride height tolerance	The ± mm band specified by the manufacturer	Set by calibration

Typical references for mounting torques (exact value in the service manual):

Connection	Typical Torque Range	Note
Valve mounting bolt	~8–25 Nm	Varies with bolt diameter and body
Air fitting / connection	Manufacturer's value (usually hand + specified torque)	Do not strain the plastic body

Connection	Typical Torque Range	Note
Electrical connector lock	No torque, locks with a click	Do not force

Tip: For a leak test, switch off the ignition and let the system sit for a while; if the air spring pressure drops noticeably, an internal leak or a port O-ring leak is a strong possibility. Apply the foam test around the ports and to the fittings.
Field checklist:

- Is the tank/supply pressure within the manufacturer's range?
- Is the air dryer healthy, and is there moisture/oil in the line?
- Are the connector pins clean, corrosion-free and locked?
- Is the sensor arm at the correct angle, free of play and undamaged?
- Does every channel fill and vent in the actuator test?
- After calibration, is the ride height equal on both sides?

Maintenance and Service Life

The greatest enemies of the ECAS solenoid valve are moisture, oil and dirt. A healthy air preparation circuit (a working air dryer, a clean filter, regular tank draining) directly extends the valve's service life. The valve rarely fails on its own; the dirty/moist air behind it seizes it internally and makes it leak.

- Replace the air dryer cartridge at the interval recommended by the manufacturer; moist air is the most frequent shortener of the valve's life.
- Drain the tanks automatically/manually on a regular basis, discharging accumulated water and oil.
- Periodically check the sensor arms and linkage joints; play leads to a height error.
- Inspect the connector and wiring harness for corrosion, chafing and looseness.
- At each service, read and clear the ECAS fault codes; track recurring codes.
- Carry out a periodic leak test around the fittings and ports.

With correct air preparation and regular checks, the ECAS valve runs trouble-free for many years. Taking early symptoms (a slowly sinking chassis, an uneven stance, frequent compressor running) seriously preserves the life of the valve and its neighbouring components and heads off bigger faults.

A robust ECAS solenoid valve that keeps chassis height stable and safe is a cornerstone of heavy commercial vehicle and trailer suspension. A replacement carried out with the right diagnosis, the right part and calibration preserves both ride comfort and load/brake balance. The VADEN ORIGINAL ECAS Solenoid Valve (Electronic Level Control Valve) product family provides reliable level control in heavy commercial vehicle and trailer air suspensions, with equivalent options that can be matched to WABCO/Knorr-type systems.

Shop this part: ECAS Solenoid Valve

This document is for information only; in practice the vehicle manufacturer's current service manual and safety instructions apply. Values are general references for common heavy-duty systems; use the relevant OE service document for model-specific figures.