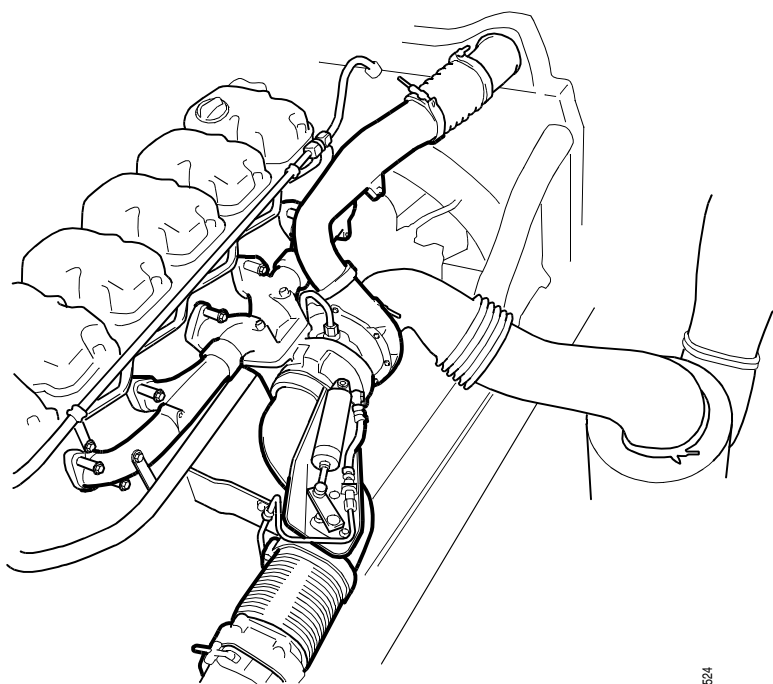


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Issue 2 en

Exhaust brake and White smoke limiter



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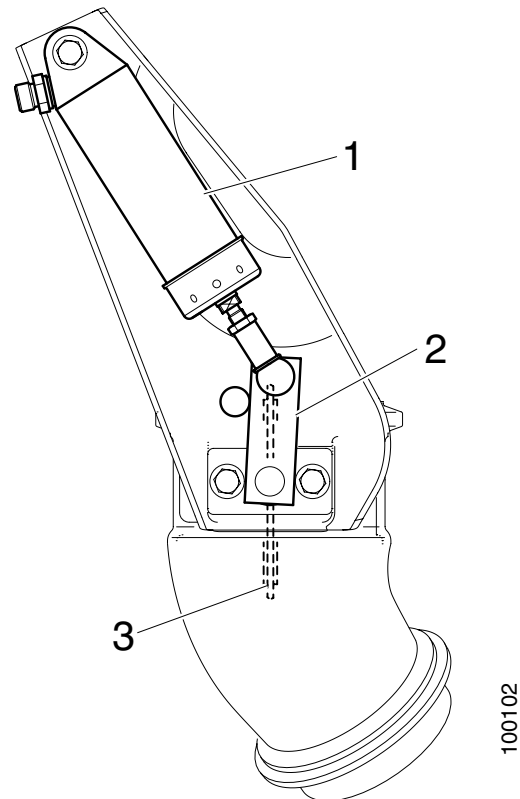
Function description

Exhaust brake

The exhaust brake is used to increase braking power in order to save the service brakes.

It comprises a valve in the exhaust manifold that is opened and closed by a control cylinder. The engine brake power increases when the valve is closed.

The valve is located on a shaft that is mounted offset so that the exhaust gas pressure will assist in opening the valve.



1 Control cylinder

2 Shaft with lever

3 Valve

White smoke limiter

Starting a cold engine in cold surroundings will generate large amounts of white smoke due to unconsumed fuel following with the exhaust gases. This can be counteracted by partially closing the exhaust brake valve.

The white smoke limiter is available only in combination with an EEB control unit on trucks. On buses, the white smoke limiter is available both with and without control unit.

Noise damper

Note: Applies to trucks only.

On vehicles intended for markets with noise level stipulations, a noise damper is fitted to reduce noise during exhaust braking.

The damper, which is mounted in the engine air intake, restricts the flow of air through the engine and thereby reduces the noise.

Activation of exhaust brake

The exhaust brake can be activated in five different ways.

- 1 Manually with a switch on the floor without control unit.

The valve is then completely open or completely closed. In this case, the exhaust brake cannot be combined with a white smoke limiter.

- 2 Manually with a switch on the floor with control unit.

The valve can be set in intermediate positions and not only fully open or fully closed. The exhaust brake is combined with a white smoke limiter.

- 3 Automatically with brake pedal, with control unit.

A signal from a switch on the brake pedal is sent to the control unit, which activates the exhaust brake. The driver can deselect automatic activation with a switch on the instrument panel. The exhaust brake is combined with a white smoke limiter.

- 4 Both automatically with brake pedal and manually with a switch on the floor, with control unit.

The driver can deselect automatic activation with a switch on the instrument panel. The exhaust brake is combined with a white smoke limiter.

- 5 If the vehicle is fitted with a retarder, the exhaust brake can also be activated with a signal from the retarder control unit. (Applies to Scania Retarder only).

The retarder must be in lever position 5.

The driver can deselect automatic activation with a switch on the instrument panel.

When activated, the exhaust brake will be applied somewhat harder for the first few seconds.

Control unit

If the exhaust brake is controlled by a control unit, the system is called EEB, Electronic Exhaust Brake.

The control unit is located under the instrument panel next to the flasher relay.

The control unit monitors the engine speed and disengages the exhaust brake if it drops below 800 rpm. The valve is then opened completely and cannot be closed again until the engine speed has increased to 900 rpm but never earlier than two seconds after it opened.

A new control unit with four different pressure modes for controlling the proportional valve has been introduced. The same vehicle software supports both these two modes, however. One mode applies to D11/12/16, where pin 7 on the control module is grounded. The other mode applies to D9/14 and buses where pin 7 on the control module is not grounded.

The control module does not generate error codes and cannot be connected to Scania Diagnos. It is possible to troubleshoot, however, by measuring the voltage on the various pins, see pages 8-11.

Activation of white smoke limiter

The white smoke limiter is activated by the driver with a switch on the instrument panel. It can only be activated when the parking brake is applied.

The control module ensures the white smoke limiter starts at reduced pressure when the engine starts and works at full effect after 20 seconds to prevent stalling.

The white smoke limiter functions up to an engine speed of max. 1500 rpm.

On buses without EEB, the white smoke limiter can be activated with a switch inside the bus. Current then passes to the solenoid valve that controls the exhaust brake pneumatic cylinder. The exhaust brake valve then closes for white smoke limiting.

The difference to vehicles with EEB is that the valve does not close gradually but closes completely at once.

Opticruise

If the vehicle is fitted with Opticruise, it must have an exhaust brake with control unit, EEB. This is used to lower and synchronise the engine speed during gear changing.

Requests from Opticruise are superior to manual and automatic exhaust braking and white smoke limiting.

Alternatives

The following combinations are available:

Vehicle equipment:		Exhaust brake controlled by:
White smoke limiter		EEB control unit
No white smoke limiter	Retarder	Retarder
	No retarder	Switch
White smoke limiter on bus without EEB		Switch

Airflow path to exhaust brake

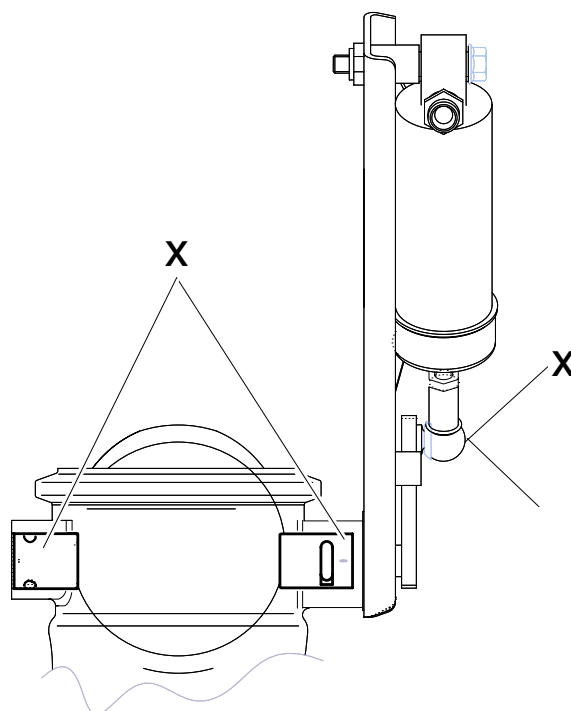
See Workshop Manual, Compressed air circuit diagram, Exhaust brake, group 10.

Miscellaneous

A wiring diagram can be found in Workshop Manual, group 16.

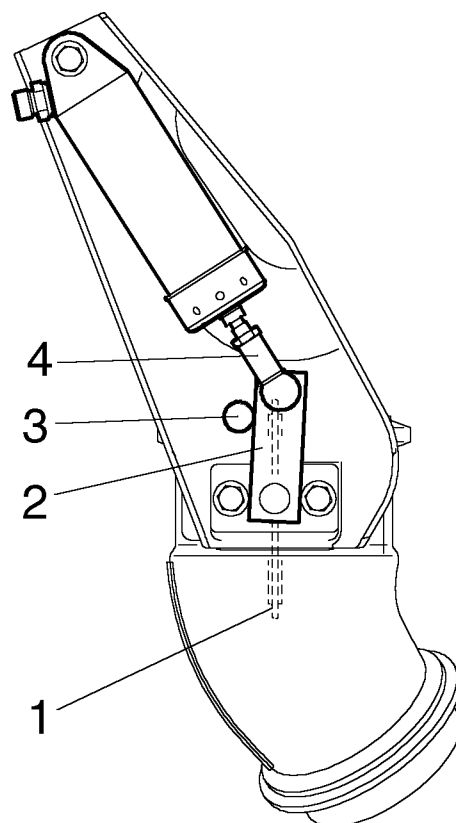
Lubricating

Lubricate bushes and link (marked "X" in the figure) with grease, part no. 814241.



Adjusting

- 1 Starting point: The valve 1 is completely open and the valve shaft lever 2 is against the stop 3.
- 2 Undo the lock nut securing the link 4.
- 3 Tension the control cylinder return spring by screwing in the link towards the cylinder 2-3 turns.
- 4 Tighten the lock nut.



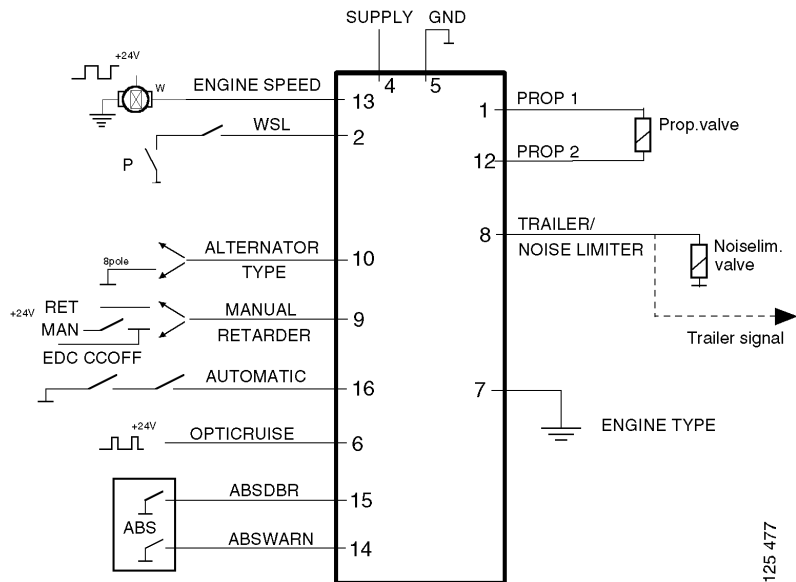
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Control unit connections

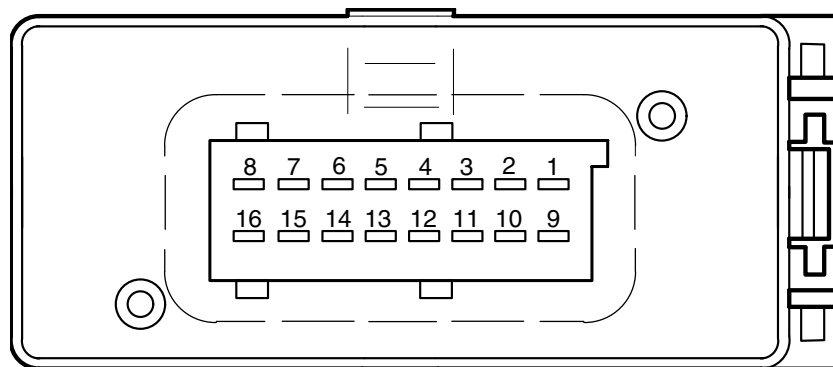
Pin location, see figures on next page.

Pin no.	Pin designation	Note
1	PROP 1	Output to proportional valve.
2	WSL	White smoke limiter.
3	-	Not used.
4	SUPPLY	Voltage supply (+).
5	GND	Ground connection (-).
6	OPTICRUISE	PWM signal from Opticruise control unit.
7	ENGINE TYPE 1	Optional, engine type.
8	TRAILER / NOISELIMITER	Output to noise limiter valve.
9	MANUAL / RETARDER	Signal from retarder or switch.
10	ALTERNATOR TYPE	Optional, one of two alternator types.
11	-	Not used.
12	PROP 2	Return signal from proportional valve.
13	ENGINE SPEED	Engine speed, alternator signal W.
14	ABS-WARN	ABS warning, system error.
15	ABS-DBR	ABS active.
16	AUTOMATIC	Signal from switch on brake pedal.

Pin location



Pin numbering and control unit designation.



Pin numbering in connector to control unit.

Control unit input and output signals

Input signals

Signal use	Signal transmitter	Signal type	Pin no.	Pin designation
Activate white smoke limiter programme.	Switch	Earthing (0 V)	2	WSL
Request engagement or disengagement of exhaust brake from Opticruise system.	Opticruise control unit	PWM signal	6	OPTICRUISE
Request manual exhaust brake programme.	Retarder control unit or floor switch	+24 V	9	MANUAL / RETARDER
Specify alternator type 8-pin. (does not apply to vehicles with 6-pole alternator or vehicles with COO).	Ground cable	Earthing (0 V)	10	ALTERNATOR TYPE
Specify engine speed.	Alternator signal W	Frequency	13	ENGINE SPEED
Specify error alarm from ABS function.	ABS control unit	Earthing (0 V)	14	ABS-WARN
Specify that ABS function is activated.	ABS control unit	Earthing (0 V)	15	ABS-DBR
Request automatic exhaust brake via brake pedal.	Switch	Earthing (0 V)	16	AUTOMATIC
Specify engine type.	Ground cable	Earthing (0 V)	7	ENGINE TYPE 1

Output signals

Signal use	Signal receiver	Signal type	Pin no.	Pin designation
Request regulation of exhaust manifold valve.	Proportional valve	Current regulated, pulsed (0-1000 mA)	1	PROP 1
Control of return current from pin 1.	Proportional valve	Current regulated, pulsed (0-1000 mA)	12	PROP 2
Request closing of noise damper.	Solenoid valve	+24 V	8	TRAILER / NOISE LIMITER

Other connections	Signal transmitter / Signal receiver	Signal type	Pin no.	Pin designation
Voltage supply IN.	Via starter lock (15 supply) and fuse 4	+24 V	4	SUPPLY
Control unit ground connection.	Ground connection G7	Earthing (0 V)	5	GND

Troubleshooting the EEB control unit

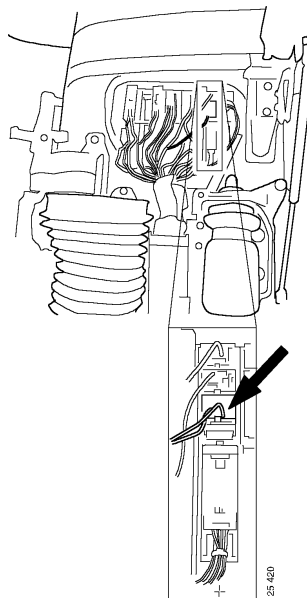
General

Note: This troubleshooting procedure applies only to vehicles with exhaust brake and EEB control unit.

The exhaust brake and white smoke limiter are controlled by measuring the current to the proportional valve as well as the input air pressure (system pressure) and output air pressure to and from the proportional valve.

- Measure the output air pressure from the proportional valve using a T-piece and 15-bar pressure gauge.
- Connect an ammeter to connector C6 at the front of the vehicle alternatively by the proportional valve, or to the EEB control unit in the central electric unit.
- All measurements are done at normal system pressure (9.3 bar).

See location of C6 connector indicated by the arrow in the illustration.



Control of white smoke limiter

- 1 Apply the parking brake.
- 2 Put the white smoke limiter switch in position "on".
- 3 Start the engine.
- 4 The current should now rise slowly to around 320 mA and the pressure to around 3 bar.

Note: The white smoke limiter build up depends on the ignition. Stop the engine and restart it if the measurement needs to be done again.

Control of exhaust brake

General

When activated, the exhaust brake will act somewhat harder for the first few seconds. The current will then reach a peak value and subsequently drop to a lower stable value. Both of these values are to be measured during the test.

The same applies to the proportional valve output air pressure.

All vehicles

The white smoke limiter must be switched off.

Vehicles with floor switch

- 1 Depress the switch on the floor.
- 2 Note the current and air pressure readings.

Vehicles with automatic exhaust brake

- 1 Put the exhaust brake switch in position "AUT".
- 2 Start the engine.
- 3 Depress and hold down the brake pedal.

Note: Brake first and then accelerate or the engine will stall.

- 4 Rev up the engine and then allow it to drop to 900 rpm.
- 5 Note the current and air pressure readings.

Vehicle with retarder

- 1 Put the exhaust brake switch in position "AUT".
- 2 Pull the retarder lever to position 5.
- 3 Note the current and air pressure readings.

Vehicle with Opticruise

- 1 Activate the exhaust brake via Opticruise using Scania Diagnos.
- 2 Note the current and air pressure readings. The proportional valve should now be fully active.

Values, current to proportional valve

D9/14	Peak value mA	Stabilised value mA	Peak value bar	Stabilised value bar
Foot button	605	520	7.2	6.5
"AUT" switch	605	520	7.2	6.5
Retarder	605	520	7.2	6.5
Opticruise	1000	1000	7.2	6.5

D11/12/16	Peak value mA	Stabilised value mA	Peak value bar	Stabilised value bar
Foot button	605	550	7.2	6.5
"AUT" switch	605	550	7.2	6.5
Retarder	605	550	7.2	6.5
Opticruise	1000	1000	7.2	6.5

Tolerance for "Peak value mA" and "Stable value mA" is ± 10 mA.

Tolerance for "Peak value bar" and "Stable value bar" is -0.1 to +0.2 bar.

