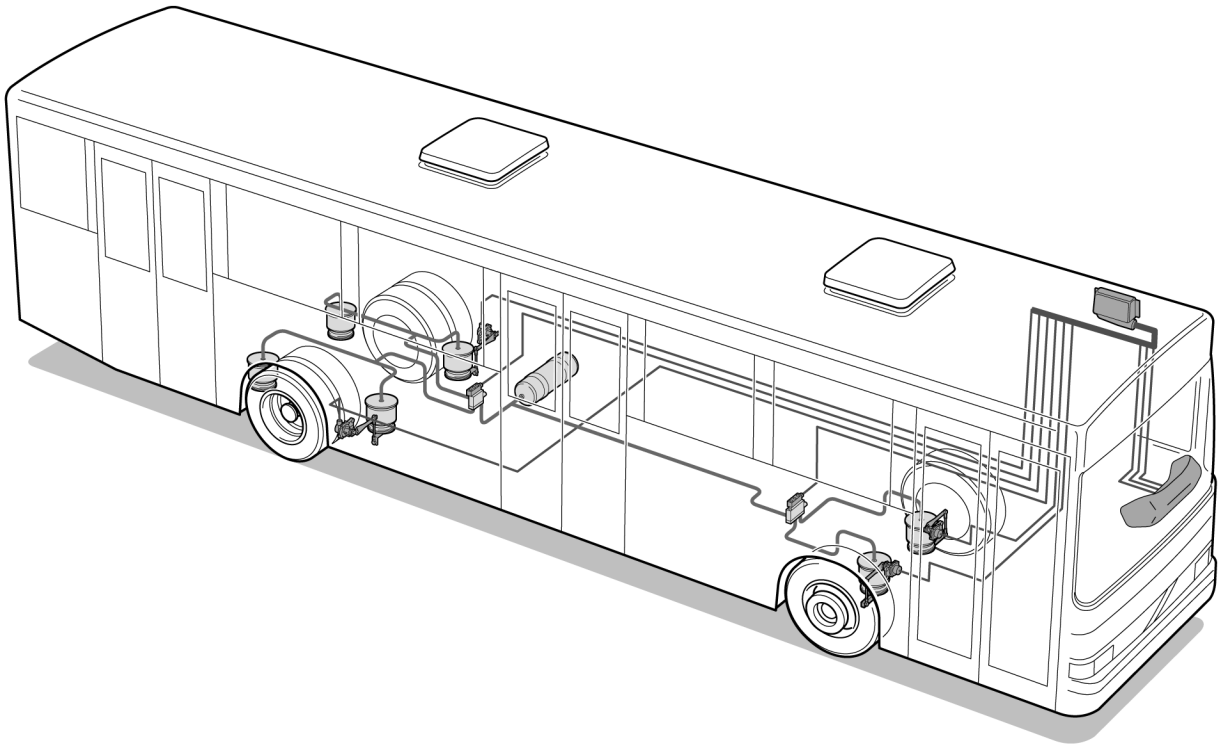
VOLVO
Volvo Bus Corporation
Göteborg, Sweden

Service Bulletin Buses

ECS, fault tracing, diagnose and programming

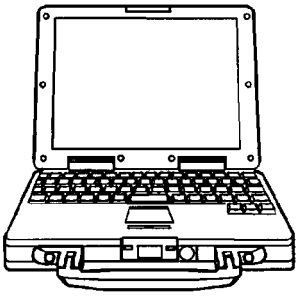


Contents

Tools

For information on ordering special tools, please refer to the special tools information, group 08.

Special tools



9998689
VCADS Pro

9990832
Volvo Bus External Application Toolbox is distributed on a CD disc and contains a number of applications that are handled via a common interface, including the ECS diagnose program, amongst others.

9998433
Diagnose interface ISO 9141. Converts signals between protocols ISO 9141 and RS 232.

9998960
Adapter for programming and diagnose

9998699
Measurement box 62-pin

9812519
Multimeter

9998534
Adapter cable for components, 4-pole

9998356
Adapter for the control unit

9998489
Adapter for oscilloscope function in VCADS Pro

Other tools

T7009679

70301428
Diskette with datasets

Design and Function

ECS, diagnose program

Main menu

Volvo Bus External Application Toolbox contains a number of applications that are handled via a common interface, including the ECS diagnose program, amongst others. The main menu presents information in three windows. The available operations are shown in the window to the left. The selected operation is run in the window to the right. The status window, at the bottom, shows information such as chassis ID, datasets, selected operation and communication status. The lamp to the right lights when communication with the vehicle is working.

When the first operation is selected after connecting up, the model, chassis number and control unit must be entered in the dialogue field. The forward control unit is default. Only articulated buses have a rear control unit.

Checks

Checking comprises reading off parameter values from the control unit Among other things that can be read off is the part number of the datasets.

Fault codes

Fault codes that are stored in the control unit can be read off and erased. The diagnose program has, however, no support for fault tracing or fault delimiting. Possible fault causes and remedies are described in the service information. The **Clear** button removes the fault code from the screen but does not erase it from the control unit memory.

Inputs, outputs and controls

This menu is used during measurement checking and adjustment of bellows height. It is possible to read off sensor values and control the solenoid valves from this menu.

The **Pulse** button opens a dialogue field where the pulse time can be selected, i.e. how long the solenoid valve is open. The time between the pulses is constant and is approx. 5 seconds. A longer pulse time allows the bellows to be filled or emptied faster. The **Normal** button sets the vehicle to the normal level. However, the control unit stops regulating as soon as all sensor values are within the range 2.34–2.66 V. In theory, all sensor values should then be close to 2.50 V, but due to the type of vehicle and load, the sensor value can vary somewhat from 2.50 V. The **Regulation On/Off** button connects the control unit regulation in and out. When the operation *Inputs, outputs and control* is selected, Regulation Off is set, so that the program can control the solenoid valves. When Regulation On is set, the values from the level sensors, including correction from normal level setting, are given. If the sensor values are to be read while driving, Regulation On must be selected. The **Clear** button zeroes the sensor values.

Datasets

Dataset programming is performed after exchange of the control unit or when the data sets have been updated. The datasets are not the same thing as the complete control unit software. The datasets are a collection of parameters that configure the ECS system.

Parameter

Customer parameters make it possible to configure the control unit software. The parameters that can be effected are those that control actions when the ECS system's switches are used, the type of kneeling used and the levels for raising, lowering and kneeling.

Normal level setting

The normal level setting is performed as the last stage when adjusting bellows height. The control unit then reads in the sensor values, which thereafter represent the normal level for each bellows. The control unit stores the sensor's divergence from the normal value 2.50 V. The sensor signal is then corrected with this value.

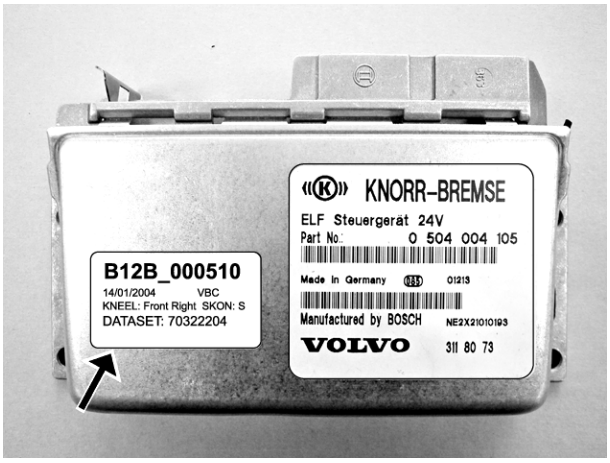
Articulated buses

Articulated buses have two ECS control units. To perform an operation with both control units: First perform the operation with one of the control units. Then press **Clear** in the toolbar. Change control unit in the Chassis ID dialogue in the toolbar. Repeat the operation.

Label

The system configuration is given on a label attached to the control unit. After programming the datasets, a new label must be printed. The language used on the labels is always English.

The label states model, chassis number, date, parameters KNEEL and SKON and the datasets.



T7009726

Malfunction

72912-2
ECS, read fault codes

For a description of the diagnose program, please refer to “ECS, diagnose program” page 5.

WARNING

When adapter 9998960 is connected to the diagnose outlet and the main power switch is on, the ECS is active independent of the key position.
Be careful when working with the ECS. The vehicle can drop unintentionally. Crushing risk!
Secure the vehicle with axle stands if work is to be performed under the vehicle.
The ECS always returns the vehicle to normal height when the engine is started.

WARNING

If the vehicle is supported on axle stands, disconnect the propeller shaft or remove one of the axle shafts before starting the engine.

Special tools: 9990832, 9998433, 9998689, 9998960

1
For vehicles with multiplex electrical systems:
Connect the VCADS Pro computer to the vehicle’s 16 pole diagnose outlet via diagnose interface 9998433 and adapter 9998960.

For vehicles with conventional electrical systems:
Connect the VCADS Pro computer to the 9 pole diagnose outlet “DIA” on the ECS control unit via diagnose interface 9998433.

2
Main power On.
For vehicles with conventional electrical systems:
Start the engine.

3
Start Volvo Bus External Application Toolbox.

4
Check that the correct datasets are stored in the control unit.

The part number of the dataset is read off via operation Operations> ECS > Check.

Articulated buses: Select forward or rear control unit. If necessary, repeat the process for the other control unit.

5
Go to menu Operations> ECS > Diagnose > Fault codes.

6
Read off and write down any fault codes.

The **Clear** button removes the fault code from the screen but does not erase it from the control unit memory.

7
Rectify any faults. The table below contains references to the service information fault code section.

Fault code	**Fault tracing**
Solenoid valve, left rear Solenoid valve, right rear Solenoid valve, front axle	“ECS solenoid valves, check” page 9
Supply voltage, level sensors	“ECS supply voltage, level sensors, check” page 11
Speed signal	“ECS speed signal, check” page 13
Level sensor signal, left rear Level sensor signal, right rear Level Sensor signal, left front Level sensor signal, right front	“ECS level sensor signals, check” page 14
Regulating time monitoring, left rear Regulating time monitoring, right rear Regulating time monitoring, front axle	“ECS level regulation fault, check” page 16
Switch fault	“ECS switch fault, check” page 17
Serial interface ISO diagnose Control unit fault (RAM) Control unit fault (ROM) Autotest Faulty interrupt Control unit fault (EEPROM)	“ECS control unit, check” page 19
Normal level setting fault	“ECS Normal level setting fault, check” page 20
Program run-time fault	“ECS Program run-time fault, check” page 21

8
Delete any fault codes.

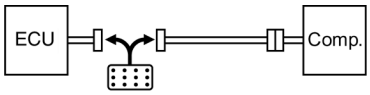
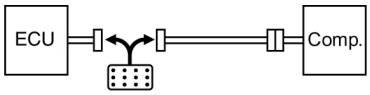
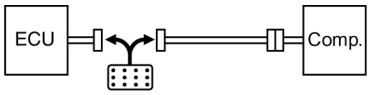
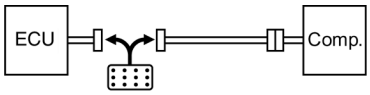
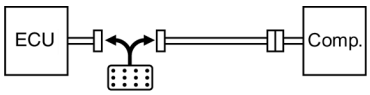
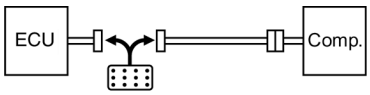
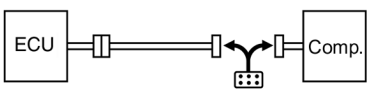
9
Check that the corrected faults do not set fault codes.

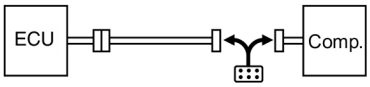
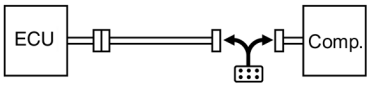
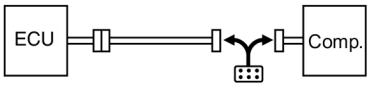
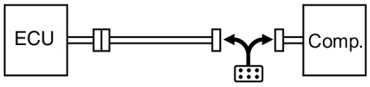
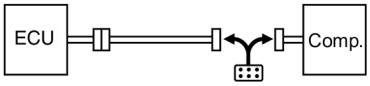
ECS solenoid valves, check

Component number:	6035F, 6035R, 6035T (articulated bus)
Wiring diagram:	See service information: Group 37 for each model respectively.
Adapter on component:	9998534
Adapter on control unit:	9998356
Conditions:	• Measurement box 9998699. • Multimeter 9812519. • Engine running, alternatively 9998960 connected to the diagnose outlet (powers ECS control unit).

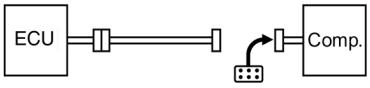
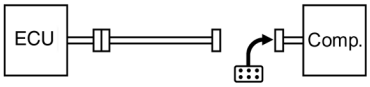
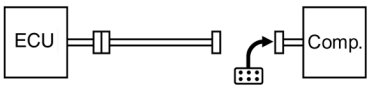
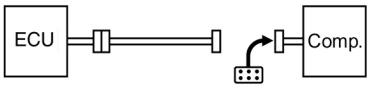
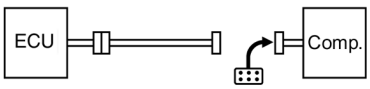
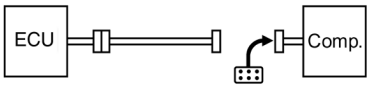
Fault code:	**Possible cause:**
• Solenoid valve, left rear • Solenoid valve, right rear • Solenoid valve, front axle	• Cable break between control unit and solenoid valve. • Oxidized connector pins. • Defective solenoid valve. • Control unit defective. Check voltage to control unit, see service information: Group 72. *IMPACT: Group 728, Repair, "ECS control unit, check before replacement".*

Voltage measurement

Measurements	**Measurement method**	**Measurement points**	**Expected value**	**Measured value**	**Other**
Supply cable valve 42 (VA), front solenoid valve block		3 - 18	U ≈ U_{bat}		Activate Raising
Supply cable valve 41 (Z), front and rear solenoid valve block		4 - 18	U ≈ U_{bat}		Activate Raising
Supply cable valve 43 (HR), rear solenoid valve block		21 - 18	U ≈ U_{bat}		Activate Raising
Supply cable valve 42 (HL), rear solenoid valve block		22 - 18	U ≈ U_{bat}		Activate Raising
Supply cable valve 43 (KN), front solenoid valve block		34 - 18	U ≈ U_{bat}		Activate Kneeling
Ground cable		35 - 18	U ≈ 0 V		
Valve Z, front solenoid valve block		1 - 4	U ≈ U_{bat}		Activate Raising

Measurements	Measurement method	Measurement points	Expected value	Measured value	Other
Valve VA, front solenoid valve block		2 - 4	$U \approx U_{bat}$		Activate Raising
Valve KN, front solenoid valve block		3 - 4	$U \approx U_{bat}$		Activate Raising
Valve Z, rear solenoid valve block		1 - 4	$U \approx U_{bat}$		Activate Raising
Valve HL, rear solenoid valve block		2 - 4	$U \approx U_{bat}$		Activate Raising
Valve HR, rear solenoid valve block		3 - 4	$U \approx U_{bat}$		Activate Raising

Resistance measurement

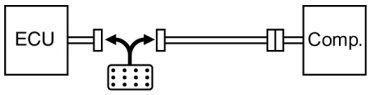
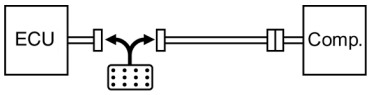
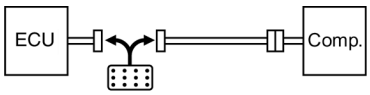
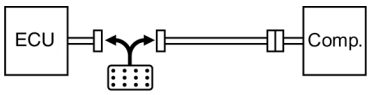
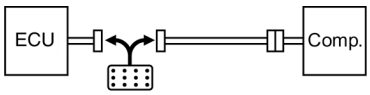
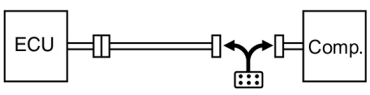
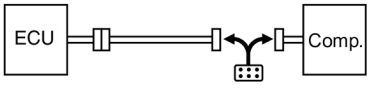
Measurements	Measurement method	Measurement points	Expected value	Measured value	Other
Valve Z, front solenoid valve block		1 - 4	$R \approx 75\ \Omega$		
Valve VA, front solenoid valve block		2 - 4	$R \approx 75\ \Omega$		
Valve KN, front solenoid valve block		3 - 4	$R \approx 75\ \Omega$		
Valve Z, rear solenoid valve block		1 - 4	$R \approx 75\ \Omega$		
Valve HL, rear solenoid valve block		2 - 4	$R \approx 75\ \Omega$		
Valve HR, rear solenoid valve block		3 - 4	$R \approx 75\ \Omega$		

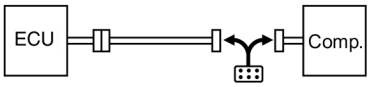
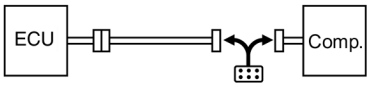
ECS supply voltage, level sensors, check

Component number:	7072FL, 7072FR, 7072RL, 7072RR, 7072TL (articulated), 7072TR (articulated)
Wiring diagram:	See service information: Group 37 for each model respectively.
Adapter on component:	9998534
Adapter on control unit:	9998356
Conditions:	• Measurement box 9998699. • Multimeter 9812519. • Engine running, alternatively 9998960 connected to the diagnose outlet (powers ECS control unit).

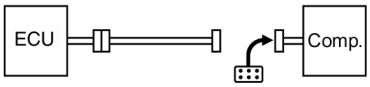
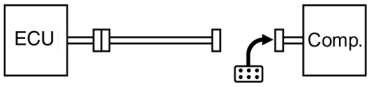
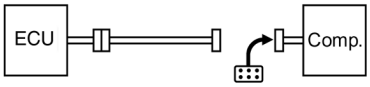
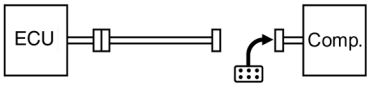
Fault code:	**Possible cause:**
• Supply voltage, level sensors	• Cable break between control unit and level sensor. • Oxidized connector pins. • Defective level sensor. • Control unit defective. Check voltage to control unit, see service information: Group 72. *IMPACT: Group 728, Repair, "ECS control unit, check before replacement".*

Voltage measurement

Measurements	**Measurement method**	**Measurement points**	**Expected value**	**Measured value**	**Other**
Supply voltage control unit		1 - 18	$U \approx U_{bat}$		
Supply cable level sensor, left rear		27 - 9	U ≈ 4.75–5.25 V		
Supply cable level sensor, right rear		28 - 26	U ≈ 4.75–5.25 V		
Supply cable level sensor, right front		29 - 14	U ≈ 4.75–5.25 V		
Supply cable level sensor, left front		30 - 31	U ≈ 4.75–5.25 V		
Supply cable level sensor, left front		2 - 1	U ≈ 4.75–5.25 V		
Supply cable level sensor, right front		2 - 1	U ≈ 4.75–5.25 V		

Measurements	Measurement method	Measurement points	Expected value	Measured value	Other
Supply cable level sensor, left rear		2 - 1	U ≈ 4.75–5.25 V		
Supply cable level sensor, right rear		2 - 1	U ≈ 4.75–5.25 V		

Resistance measurement

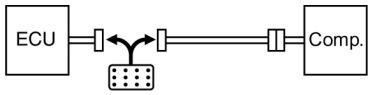
Measurements	Measurement method	Measurement points	Expected value	Measured value	Other
Potentiometer level sensor, left front		2 - 1	R ≈ 5.3 kΩ		
Potentiometer level sensor, right front		2 - 1	R ≈ 5.3 kΩ		
Potentiometer level sensor, left rear		2 - 1	R ≈ 5.3 kΩ		
Potentiometer level sensor, right rear		2 - 1	R ≈ 5.3 kΩ		

ECS speed signal, check

Component number:	-
Wiring diagram:	See service information: Group 37 for each model respectively.
Adapter on component:	-
Adapter on control unit:	9998356
Conditions:	• Multimeter 9812519 or oscilloscope 9998489. • Engine running, alternatively 9998960 connected to the diagnose outlet (powers ECS control unit).

Fault code:	**Possible cause:**
• Speed signal	• Oxidized connector pins. • Cable break between the control unit and speedometer or tachograph. On certain models, the signal goes via CECM-C. • Speed signal abnormally loaded. Measure with oscilloscope • Speedometer or tachograph defective. • Control unit defective. Check voltage to control unit, see service information: Group 72. *IMPACT: Group 728, Repair, "ECS control unit, check before replacement".*

Voltage measurement

Measurements	**Measurement method**	**Key position**	**Measurement points**	**Expected value**	**Measured value**	**Other**
Speed signal		II	32 - 18	U ≈ 0–5 V f ≈ 0–300 Hz		Voltage and frequency vary according to speed.
Speed-dependant pulse train. Measure with the multimeter or oscilloscope 9998489. See service information: Group 08. *IMPACT: Group 08, Tools, "Oscilloscope".*						

ECS level sensor signals, check

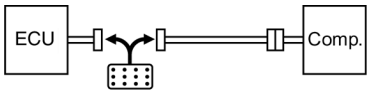
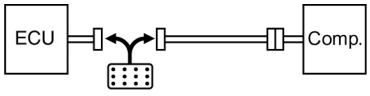
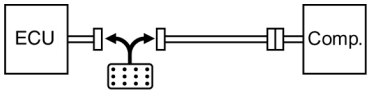
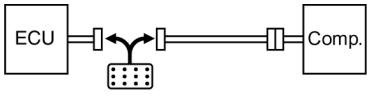
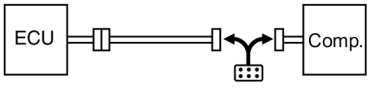
Component number:	7072FL, 7072FR, 7072RL, 7072RR, 7072TL (articulated), 7072TR (articulated)
Wiring diagram:	See service information: Group 37 for each model respectively.
Adapter on component:	9998534
Adapter on control unit:	9998356
Conditions:	• Measurement box 9998699. • Multimeter 9812519. • Engine running, alternatively 9998960 connected to the diagnose outlet (powers ECS control unit).

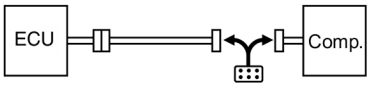
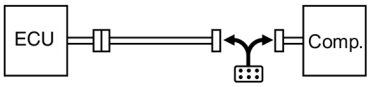
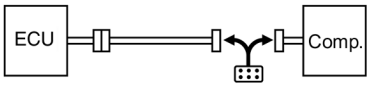
Fault code:	**Possible cause:**
• Level sensor signal, left rear • Level sensor signal, right rear • Level Sensor signal, left front • Level sensor signal, right front	• Oxidized connector pins. • Level sensor lever arm or link-rod damaged. • Cable break between control unit and level sensor. • Defective level sensor. • Control unit defective. Check voltage to control unit, see service information: Group 72. *IMPACT: Group 728, Repair, "ECS control unit, check before replacement"*.

⚠ WARNING

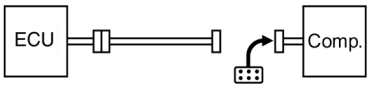
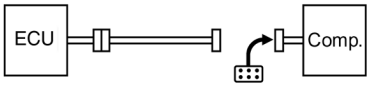
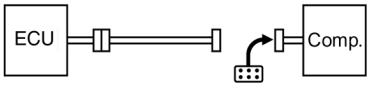
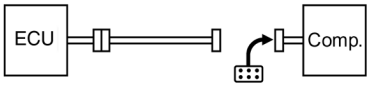
Be careful when working with the ECS. The vehicle can drop unintentionally. Crushing risk. Secure the vehicle with axle stands if work is to be performed under the vehicle. The ECS always returns the vehicle to normal height when the engine is started.

Voltage measurement

Measurements	**Measurement method**	**Measurement points**	**Expected value**	**Measured value**	**Other**
Input signal level sensor, left rear		10 - 18	U ≈ 2.34–2.66 V		
Input signal level sensor, right rear		11 - 18	U ≈ 2.34–2.66 V		
Input signal level sensor, left front		12 - 18	U ≈ 2.34–2.66 V		
Input signal level sensor, right front		13 - 18	U ≈ 2.34–2.66 V		
Input signal level sensor, left front		4 - 1	U ≈ 2.34–2.66 V		

Measurements	**Measurement method**	**Measurement points**	**Expected value**	**Measured value**	**Other**
Input signal level sensor, right front		4 - 1	U ≈ 2.34–2.66 V		
Input signal level sensor, left rear		4 - 1	U ≈ 2.34–2.66 V		
Input signal level sensor, right rear		4 - 1	U ≈ 2.34–2.66 V		

Resistance measurement

Measurements	**Measurement method**	**Measurement points**	**Expected value**	**Measured value**	**Other**
Potentiometer level sensor, left front		4 - 1	R ≈ 3.5–7.5 kΩ		Loosen and turn the level sensor's lever arm. The resistance should change continuously.
Potentiometer level sensor, right front		4 - 1	R ≈ 3.5–7.5 kΩ		
Potentiometer level sensor, left rear		4 - 1	R ≈ 3.5–7.5 kΩ		
Potentiometer level sensor, right rear		4 - 1	R ≈ 3.5–7.5 kΩ		

ECS level regulation fault, check

Component number:	7072FL, 7072FR, 7072RL, 7072RR, 7072TL (articulated), 7072TR (articulated)
Wiring diagram:	See service information: Group 37 for each model respectively.
Adapter on component:	-
Adapter on control unit:	-

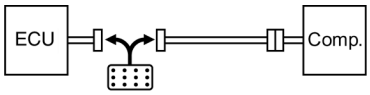
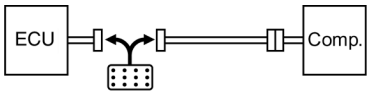
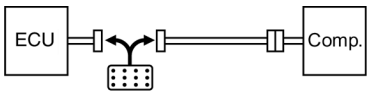
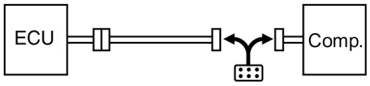
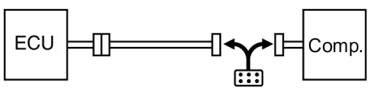
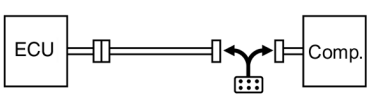
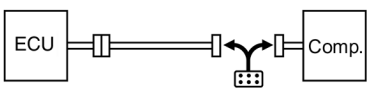
Fault code:	**Possible cause:**	**Measures:**
• Regulating time monitoring, left rear • Regulating time monitoring, right rear • Regulating time monitoring, front axle	• Leakage in compressed air system. • Damaged component in the ECS. • Incorrect dataset.	• Check the ECS for damage and leaks. • Check that the correct datasets are stored in the control unit.
The system continuously controls the height of the vehicle in accordance with the selected function (normal level, raising, lowering, kneeling) so that the sensor values lie close to the programmed values for the various functions. If the system cannot attain a programmed value within 4 minutes, a fault code is set “Regulation time monitoring” and the level regulation ceases.		

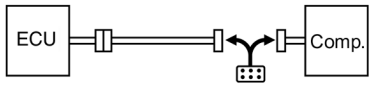
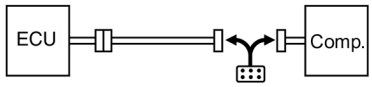
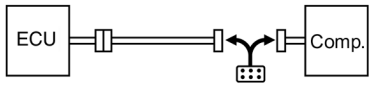
ECS switch fault, check

Component number:	1102 (Kneeling), 175 (Level regulation)
Wiring diagram:	See service information: Group 37 for each model respectively.
Adapter on component:	-
Adapter on control unit:	9998356
Conditions:	• Measurement box 9998699. • Multimeter 9812519. • Engine running, alternatively 9998960 connected to the diagnose outlet (powers ECS control unit).

Fault code:	**Possible cause:**
• Switch fault	• Cable break between control unit and switch. • Defective switch. • Incorrect dataset. • Control unit defective. Check voltage to control unit, see service information: Group 72. *IMPACT: Group 728, Repair, "ECS control unit, check before replacement".*

Voltage measurement

Measurements	**Measurement method**	**Measurement points**	**Expected value**	**Measured value**	**Other**
Input signal switch Kneeling		1 - 6	$U \approx U_{bat}$		Reset Kneeling
Input signal switch Level regulation and Kneeling		1 - 8	$U \approx U_{bat}$		Activate Raising or Kneeling
Input signal switch Level regulation and Kneeling		1 - 24	$U \approx U_{bat}$		Activate Lowering or Kneeling
Switch Kneeling		1 - 3	U ≈ 0 V		Activate Kneeling
Switch Kneeling		3 - ground	U ≈ 0 V		
Switch Kneeling		3 - 7	U ≈ 0 V		Reset Kneeling
Switch Level regulation		2 - ground	U ≈ 0 V		

Measurements	**Measurement method**	**Meas-urement points**	**Expected value**	**Measured value**	**Other**
Switch Level regulation		7 - ground	U ≈ 0 V		
Switch Level regulation		4 - 2	U ≈ 0 V		Activate Lowering
Switch Level regulation		5 - 2	U ≈ 0 V		Activate Raising

ECS control unit, check

Component number:	9002, 9002R (articulated bus)
Wiring diagram:	See service information: Group 37 for each model respectively.
Adapter on component:	-
Adapter on control unit:	-

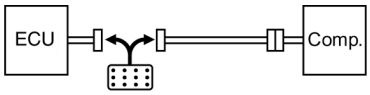
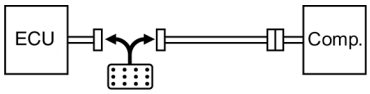
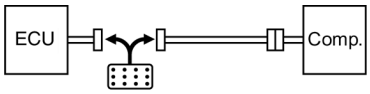
Fault code:	**Possible cause:**	**Measures:**
• Serial interface ISO diagnose • Control unit fault (RAM) • Control unit fault (ROM) • Autotest • Faulty interrupt	• Defective control unit	• Erase fault codes and read fault codes again. • Check voltage to control unit See service information: Group 72. *IMPACT: Group 728, Repair, "ECS control unit, check before replacement"*.
• Control unit fault (EEPROM)	• Incorrect dataset • Defective control unit	• Erase fault codes and read fault codes again. • Check that the correct dataset is stored in the control unit. • Check voltage to control unit See service information: Group 72. *IMPACT: Group 728, Repair, "ECS control unit, check before replacement"*.

ECS Normal level setting fault, check

Component number:	9002, 9002R (articulated bus)
Wiring diagram:	See service information: Group 37 for each model respectively.
Adapter on component:	-
Adapter on control unit:	9998356
Conditions:	• Measurement box 9998699. • Multimeter 9812519. • Engine running, alternatively 9998960 connected to the diagnose outlet (powers ECS control unit).

Fault code:	**Possible cause:**	**Measures:**
• Normal level calibration fault	• Sensor value outside range 2.34–2.66 V at normal level setting. • Pins 6, 8 or 24 grounded at normal level setting.	• Perform normal level setting. See service information: Group 72. *IMPACT: Group 720, Repair, "Bellows height, adjust"*.

Voltage measurement

Measurements	**Measurement method**	**Measurement points**	**Expected value**	**Measured value**	**Other**
Input signal switch Kneeling		6 - 18	U ≈ 18 V		Switch inactive
			U ≈ 0 V		Reset Kneeling
Input signal switch Level regulation and Kneeling		8 - 18	U ≈ 18 V		Switch inactive
			U ≈ 0 V		Activate Raising or Kneeling
Input signal switch Level regulation and Kneeling		24 - 18	U ≈ 18 V		Switch inactive
			U ≈ 0 V		Activate Lowering or Kneeling

ECS Program run-time fault, check

Component number:	9002, 9002R (articulated bus)
Wiring diagram:	See service information: Group 37 for each model respectively.
Adapter on component:	-
Adapter on control unit:	-

Fault code:	**Possible cause:**	**Measures:**
• Program run-time fault	• Control unit not working due to high load. • Defective control unit.	• Apply power to the control unit several times in succession at 60 second intervals. Engine running, alternatively connect 9998960 to the diagnose outlet (powers ECS control unit). • Check voltage to control unit See service information: Group 72. *IMPACT: Group 728, Repair, "ECS control unit, check before replacement"*.

Service Procedures

72922-2
ECS control unit, programming

For a description of the diagnose program, please refer to “ECS, diagnose program” page 5.

Dataset programming is performed after exchange of the control unit or when the data sets have been updated.

Preparations

- For information about the datasets in question, see service information: Group 72.
  IMPACT: Group 728, General information, “ECS, datasets”.

If the datasets in question are not available in the diagnose program, they can be found on diskette 70301428.

Programming dataset

⚠ WARNING

When adapter 9998960 is connected to the diagnose outlet and the main power switch is on, the ECS is active independent of the key position.
Be careful when working with the ECS. The vehicle can drop unintentionally. Crushing risk!
Secure the vehicle with axle stands if work is to be performed under the vehicle.
The ECS always returns the vehicle to normal height when the engine is started.

⚠ WARNING

If the vehicle is supported on axle stands, disconnect the propeller shaft or remove one of the axle shafts before starting the engine.

Special tools: 9990832, 9998433, 9998689, 9998960

1
For vehicles with multiplex electrical systems:
Connect the VCADS Pro computer to the vehicle’s 16 pole diagnose outlet via diagnose interface 9998433 and adapter 9998960.

For vehicles with conventional electrical systems:
Connect the VCADS Pro computer to the 9 pole diagnose outlet “DIA” on the ECS control unit via diagnose interface 9998433.

2
Main power On.
For vehicles with conventional electrical systems:
Start the engine.

3
Start Volvo Bus External Application Toolbox.

4
Go to menu Operations> ECS > Programming > Dataset.

Select the dataset in question from the list.

Articulated buses: Articulated buses have separate datasets for the front and rear control units. If necessary, repeat the process for the other control unit.

5
Select type of kneeling and Skon.

For information concerning parameter Skon, see “Switch configuration (Skon)” page 31.

6
Start programming.

The program displays a message when the programming is completed.

7
Articulated buses: Disconnect the control unit that should not be programmed.

8
Main power Off/On.

9
Print out a label

10
Make sure there are no stored fault codes.

11
Check the bellows heights.
See service information: Group 72.
IMPACT: Group 720, Repair, “Bellows height, check”.

When the control unit is programmed with a new dataset, the correction values from the most recent normal level setting are lost. This does not necessarily mean that the bellows heights need to be adjusted. The bellows heights are only adjusted if the measurement check is not approved.

72923-3
ECS customer parameter, setting

For a description of the diagnose program, please refer to “ECS, diagnose program” page 5.

WARNING

When adapter 9998960 is connected to the diagnose outlet and the main power switch is on, the ECS is active independent of the key position.
Be careful when working with the ECS. The vehicle can drop unintentionally. Crushing risk!
Secure the vehicle with axle stands if work is to be performed under the vehicle.
The ECS always returns the vehicle to normal height when the engine is started.

WARNING

If the vehicle is supported on axle stands, disconnect the propeller shaft or remove one of the axle shafts before starting the engine.

Programming of customer parameters is described in section:
“Read parameters” page 24
“Adjust high/low level” page 25
“Adjust kneeling level” page 27
“Change kneeling type” page 29
“Switch configuration (Skon)” page 31

Read parameters

Special tools: 9990832, 9998433, 9998689, 9998960

1
For vehicles with multiplex electrical systems:
Connect the VCADS Pro computer to the vehicle’s 16 pole diagnose outlet via diagnose interface 9998433 and adapter 9998960.

For vehicles with conventional electrical systems:
Connect the VCADS Pro computer to the 9 pole diagnose outlet “DIA” on the ECS control unit via diagnose interface 9998433.

2
Main power On.
For vehicles with conventional electrical systems:
Start the engine.

3
Start Volvo Bus External Application Toolbox.

4
Go to menu Operations> ECS > Check.

Articulated buses: Select forward or rear control unit. If necessary, repeat the process for the other control unit.

5
Start reading off parameter values.

Software part no.	Part number, software
Hardware part no.	Part number, hardware
Front Min	Low level front axle
Front Max	High level front axle
Rear Min	Low level rear axle
Rear Max	High level rear axle
Kneeling Front	Kneeling level front axle
Kneeling Rear	Kneeling level rear axle
Kneeling type	Kneeling type (see “Change kneeling type” page 29)
Skon	Switch configuration (see “Switch configuration (Skon)” page 31)

For buses without level lowering, the parameters Front/Rear Min are set to 2.50 V which corresponds to normal level.

Adjust high/low level

Note: If a control unit is to be programmed with both dataset and customer parameters, then the dataset should be programmed first.

Special tools: 9990832, 9998433, 9998689, 9998960

1
Check the bellows heights.
See service information: Group 72.
IMPACT: Group 720, Repair, “Bellows height, check”.

2
For vehicles with multiplex electrical systems:
Connect the VCADS Pro computer to the vehicle’s 16 pole diagnose outlet via diagnose interface 9998433 and adapter 9998960.

For vehicles with conventional electrical systems:
Connect the VCADS Pro computer to the 9 pole diagnose outlet “DIA” on the ECS control unit via diagnose interface 9998433.

3
Main power On.
For vehicles with conventional electrical systems:
Start the engine.

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4
Measure the distance between the front bumper and workshop floor.

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5
Measure the distance between the rear bumper and workshop floor.

6
Raise (or lower) the vehicle with the Level control switch.
Measure the distances between the bumpers and workshop floor again, front and rear.

7
Calculate the difference between normal and raised (or lowered) levels, front and rear.
Decide how large the differences should be after adjustment.
Note down the result.
Return to normal level with the switch.

8
Start Volvo Bus External Application Toolbox.

9
Check that the correct dataset is stored in the control unit.

The part number of the dataset is read off via operation Operations> ECS > Check.

Articulated buses: Select forward or rear control unit. If necessary, repeat the process for the other control unit.

10
Go to menu Operations> ECS > Programming > Parameter.

11
Select parameter:

Front Min	Low level front axle
Front Max	High level front axle
Rear Min	Low level rear axle
Rear Max	High level rear axle

12
Enter the new parameter value. A change of the parameter value by 0.01 V gives a level change of 1 mm.

13
Start programming.

The program displays a message when the programming is completed.

14
Main power Off/On.

15
Measure the difference between normal and raised (or lowered) levels, front and rear.

Repeat steps**4**–**15** until the levels are correct.

Adjust kneeling level

Note: If a control unit is to be programmed with both dataset and customer parameters, then the dataset should be programmed first.
Special tools: 9990832, 9998433, 9998689, 9998960

1
Check the bellows heights.
See service information: Group 72.
IMPACT: Group 720, Repair, "Bellows height, check".

2
For vehicles with multiplex electrical systems:
Connect the VCADS Pro computer to the vehicle's 16 pole diagnose outlet via diagnose interface 9998433 and adapter 9998960.

For vehicles with conventional electrical systems:
Connect the VCADS Pro computer to the 9 pole diagnose outlet "DIA" on the ECS control unit via diagnose interface 9998433.

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The distance is measured at the centre of the front door and should be max. 250 mm when kneeling right/left front, alternatively max. 270 mm when kneeling right/left side.

3
Main power On.
For vehicles with conventional electrical systems:
Start the engine.

4
Lower the bus using the Kneeling switch.
Measure the distance between the footstep in the door opening and workshop floor.
Decide how much the level is to be changed, upwards or downwards.
Return to normal level with the Kneeling switch.

5
Start Volvo Bus External Application Toolbox.

6
Check that the correct dataset is stored in the control unit.

The part number of the dataset is read off via operation Operations> ECS > Check.

Articulated buses: Select forward or rear control unit. If necessary, repeat the process for the other control unit.

7
Go to menu Operations> ECS > Programming > Parameter.

8
Select parameter:

Kneeling Front	Kneeling level front axle
Kneeling Rear	Kneeling level rear axle

9
Enter the new parameter value. A change of the parameter value by 0.01 V gives a level change of 1 mm.

10
Start programming.

The program displays a message when the programming is completed.

11
Main power Off/On.

12
Measure the distance between the footstep in the door opening and workshop floor when kneeling.

Repeat steps**4**–**12** until the levels are correct.

Change kneeling type

Note: If a control unit is to be programmed with both dataset and customer parameters, then the dataset should be programmed first.

Special tools: 9990832, 9998433, 9998689, 9998960

1
For vehicles with multiplex electrical systems:
Connect the VCADS Pro computer to the vehicle's 16 pole diagnose outlet via diagnose interface 9998433 and adapter 9998960.

For vehicles with conventional electrical systems:
Connect the VCADS Pro computer to the 9 pole diagnose outlet "DIA" on the ECS control unit via diagnose interface 9998433.

2
Main power On.
For vehicles with conventional electrical systems:
Start the engine.

3
Start Volvo Bus External Application Toolbox.

4
Check that the correct dataset is stored in the control unit.

The part number of the dataset is read off via operation Operations> ECS > Check.

Articulated buses: Select forward or rear control unit. If necessary, repeat the process for the other control unit.

5
Go to menu Operations> ECS > Programming > Parameter.

6
Select a kneeling type from the list.

FRONT	Front axle complete
FRONT L	Front axle left
FRONT R	Front axle right
SIDE L	Left side
SIDE R	Right side
REAR	Rear axle complete
REAR L	Rear axle left
REAR R	Rear axle right
WHOLE VEHICLE	Whole vehicle
NO KNEELING	No kneeling

Note: With articulated buses, the front and rear control units are programmed with values according to the table.

The rear control unit on articulated buses controls the trailer axle and a simulated front axle (to simulate the function of the front control unit).

	Front control unit	**Rear control unit**
Front	FRONT	NO KNEELING
Front Right	FRONT R	NO KNEELING
Front Left	FRONT L	NO KNEELING
Side Right	SIDE R	REAR R
Side Left	SIDE L	REAR L
Rear	NO KNEELING	REAR
Rear Right	NO KNEELING	REAR R
Rear Left	NO KNEELING	REAR L
Whole vehicle	WHOLE VEHICLE	WHOLE VEHICLE
No kneeling	NO KNEELING	NO KNEELING

7
Start programming.

The program displays a message when the programming is completed.

8
Main power Off/On.

9
Verify kneeling type.

Switch configuration (Skon)

Note: If a control unit is to be programmed with both dataset and customer parameters, then the dataset should be programmed first.

Special tools: 9990832, 9998433, 9998689, 9998960

1

For vehicles with multiplex electrical systems:
Connect the VCADS Pro computer to the vehicle's 16 pole diagnose outlet via diagnose interface 9998433 and adapter 9998960.

For vehicles with conventional electrical systems:
Connect the VCADS Pro computer to the 9 pole diagnose outlet "DIA" on the ECS control unit via diagnose interface 9998433.

2

Main power On.
For vehicles with conventional electrical systems:
Start the engine.

3

Start Volvo Bus External Application Toolbox.

4

Check that the correct dataset is stored in the control unit.

The part number of the dataset is read off via operation Operations> ECS > Check.

Articulated buses: Select forward or rear control unit. If necessary, repeat the process for the other control unit.

5

Go to menu Operations> ECS > Programming > Parameter.

6

Select one of the following configurations.

Configuration **S**
The vehicle is lowered to kneeling level when the lower part of the kneeling switch is depressed. The bus will stop being lowered when the switch is released. The vehicle remains at the current level. Lowering is resumed when the lower part of the kneeling switch is depressed again. Once the vehicle has reached the kneeling level, the switch can be released. The vehicle is raised to normal level when the upper part of the switch is depressed.

Configuration **D1**
The vehicle is lowered to kneeling level when the lower part of the kneeling switch is depressed. The vehicle returns to normal level if the switch is released before the vehicle has reached 80 % kneeling. Once the vehicle has reached the kneeling level, the switch can be released. The vehicle is raised to normal level when the upper part of the switch is depressed.

D1 is selected for vehicles in Germany, Austria, Switzerland and France. Select **S** for all other countries.

7
Start programming.

The program displays a message when the programming is completed.

8
Main power Off/On.

9
Verify switch function.