

SCANIA

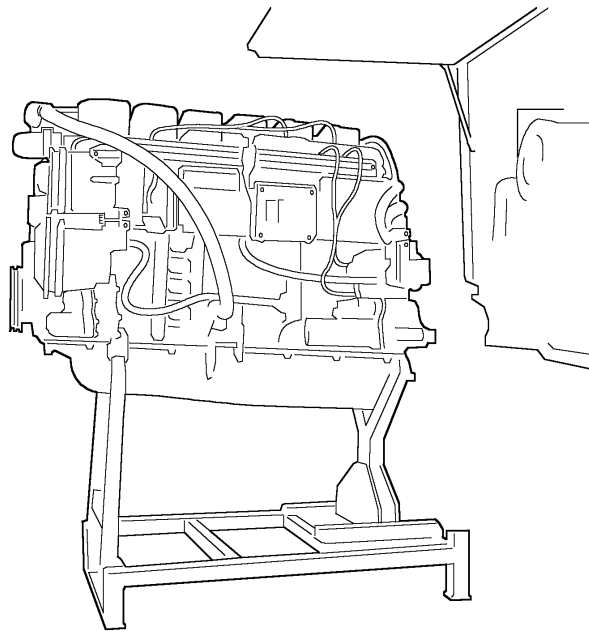
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Issue 2 **en**

11 and 12 litre engines

K bus

Removing and fitting



121 588

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Removing the engine

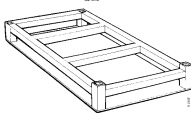
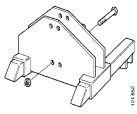
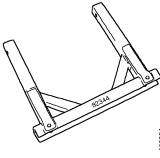
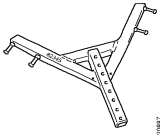
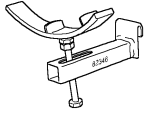
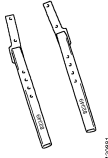
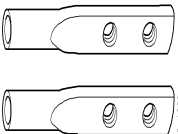
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Removing the engine

Special tools

Number	Designation	Illustration	Tool board
82 316	Engine support		
2 271 841	Rear lower engine support		
2 271 840	Front lower engine support		
2 271 842	Rear upper engine support		
82 346	Gearbox support		
2 271 843	Front upper engine support		
99 302	Tips		

Other tools

Number	Designation
584 054	Torque wrench
587 585	Pliers

Preface

The booklet describes the removal and fitting of an engine with unit injectors. The work is, however, carried out in a similar way on engines with an injection pump.

Preparatory work

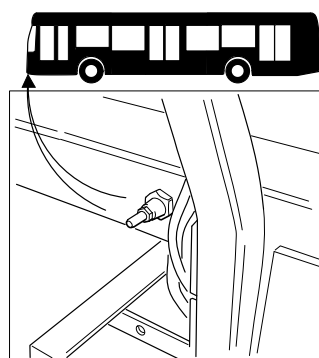
IMPORTANT! Clean the engine before starting the work. Always use protecting plugs, cover plates, etc. to plug exposed connections and openings so that dirt does not penetrate into hoses or pipes.

IMPORTANT! Help protect our environment. Avoid spillage. Use a suitable container.

Note: The work of removing and fitting the engine should be carried out using wheel lifts.

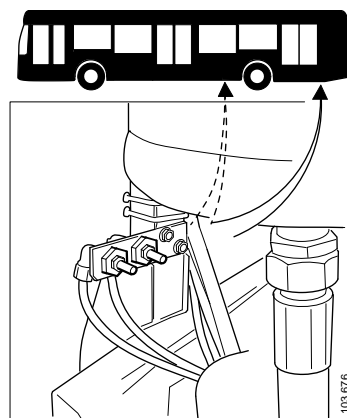
Preparatory work

- 1 Lower the suspension by releasing the air from the bellows. There is one bleeder nipple for the front axle and there are two for the rear axle.



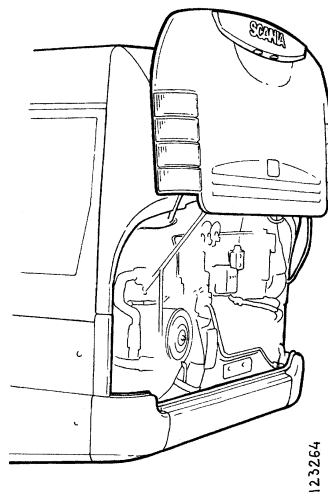
Front bleed nipples on vehicles with ELC

- 2 Remove the negative battery cable.
- 3 Remove the floor cover over the engine and the floor cover over the gearbox.



Rear bleed nipples on vehicles with ELC

- 4 Open the rear engine cover on the bus.
- 5 Remove the rear bumper.

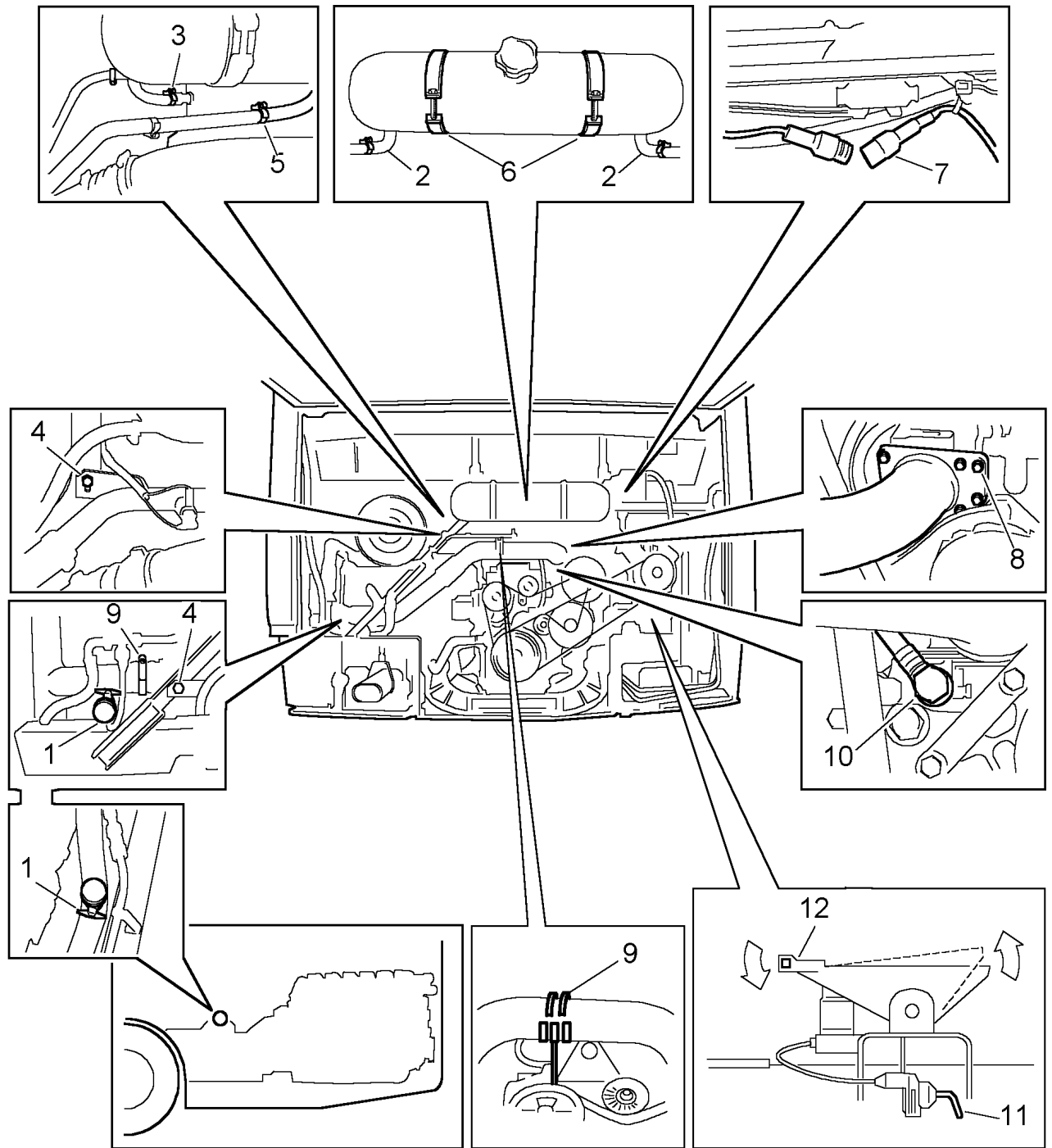


123254

Rear engine cover

Pos.	Designation	Comments
1	2 heating system valves	Note: Close the valves for the bus heating system. Drain the cooling system. IMPORTANT! Use a suitable container.
2	2 bleeder hoses on expansion tank	Disconnect the bleeder hoses, one on each side of the expansion tank.
3	Coolant hose	Undo the clamp and disconnect the coolant hose at the front of the engine.
4	Coolant pipe bolts	Remove the screws.
5	Coolant pipe	Undo the coolant hose clamp on the coolant pipe from the expansion tank and disconnect the hose.
6	Expansion tank clamps	Undo the expansion tank clamps and tie up the expansion tank at a level above the rocker covers.
7	Connector C516	Separate connector C516 and cut off the straps. Connector C516 is located at the front on the same bracket as the expansion tank.
8	Charge air pipe bolts	Remove the charge air pipe bolts on the intake manifold. It may be necessary to remove the alternator bracket to access the charge air pipe bolts.
9	Charge air pipe clamps	Undo the clamps and remove the charge air pipe.
10	Fuel pipe union	Remove the union and disconnect the fuel pipe.
11	Air spring valve for A/C	If the vehicle is equipped with A/C, turn the tap on the valve and release the air from the air springs.
12	A/C mounting plate	Turn the compressor mounting plate and remove the compressor drive belt

Removing parts through the rear engine cover

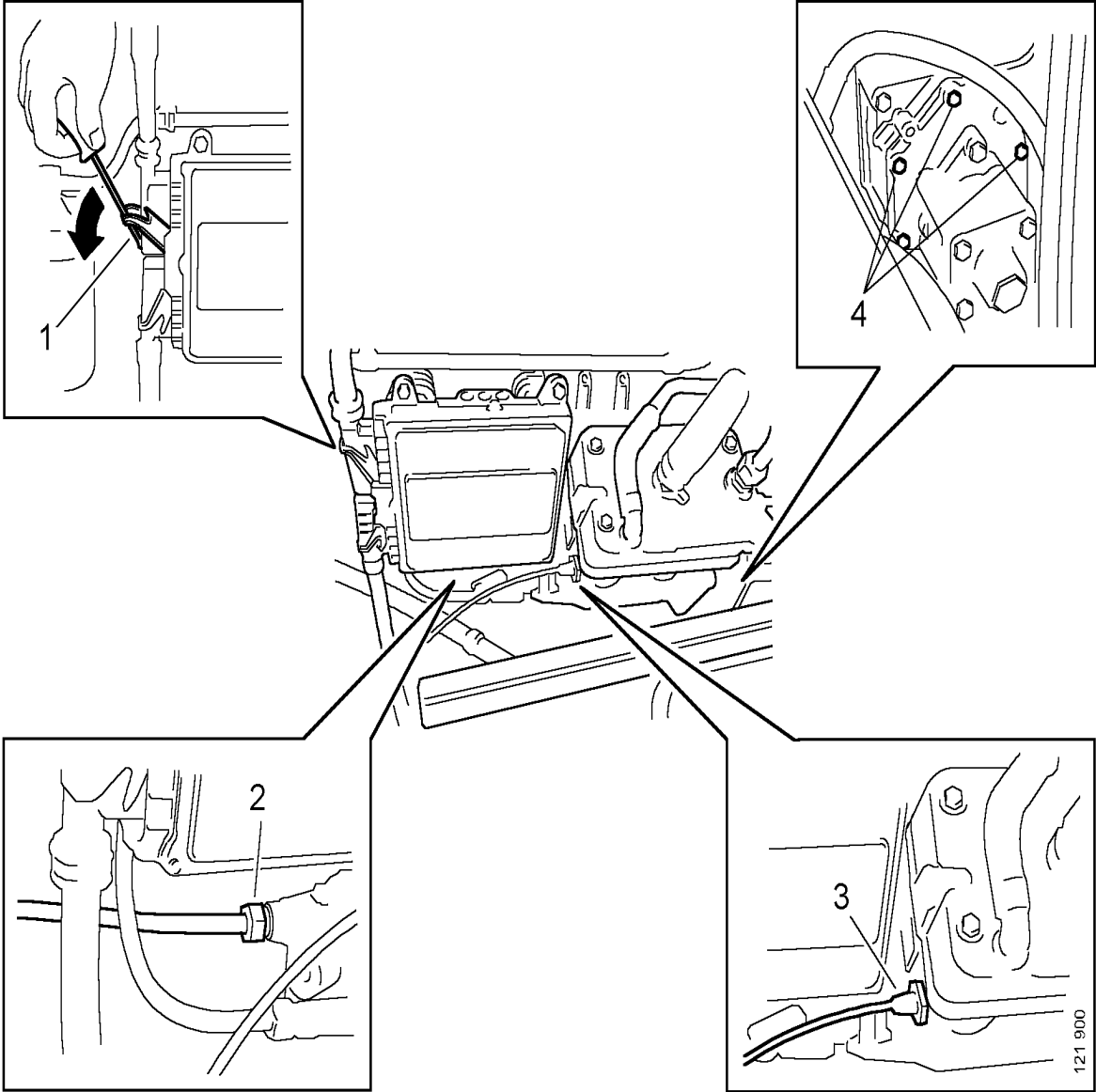


121 899

Right side cover

Pos.	Designation	Comments
1	Engine control unit connector	Remove the connector from the engine control unit.
2	Fuel return pipe	Separate and plug the fuel pipe.
3	Compressor relief hose	Remove the compressor relief hose from the compressor.
4	Power steering pump bolts	Remove the 3 upper bolts on the power steering pump.

Removing parts through the right side cover

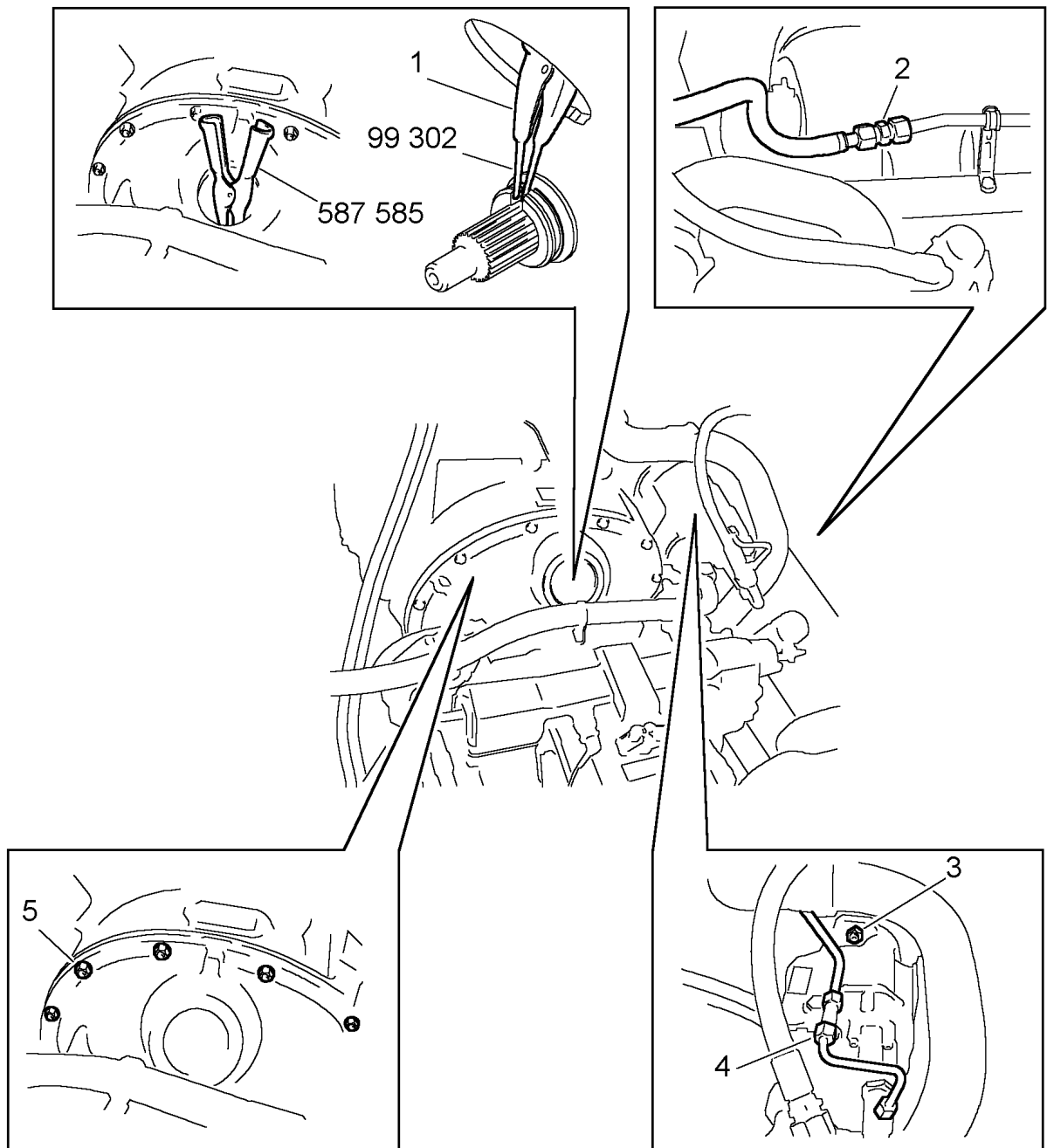


Floor cover over gearbox

Pos.	Designation	Comments
1*)	Clutch retaining ring *)	Fit pliers 587 585 with tips 99 302. *)
2	Cooling coil pipe	Disconnect pipe from cooling coil.
3	Hydraulic pump nut	Remove the upper nut on the hydraulic pump.
4	Hydraulic line	Separate and plug the narrow hydraulic line leading to the thermostat at the hydraulic pump.
5	Nuts	Remove the upper nuts which hold together the engine and gearbox.

*) On some vehicles with alternative equipment it may be easier to fit the pliers 587 585 for the clutch retaining ring from below. Alternatively a 15 mm diameter flattened pipe can be used to hold together the clutch retaining ring.

Removing parts through the floor cover over the gearbox

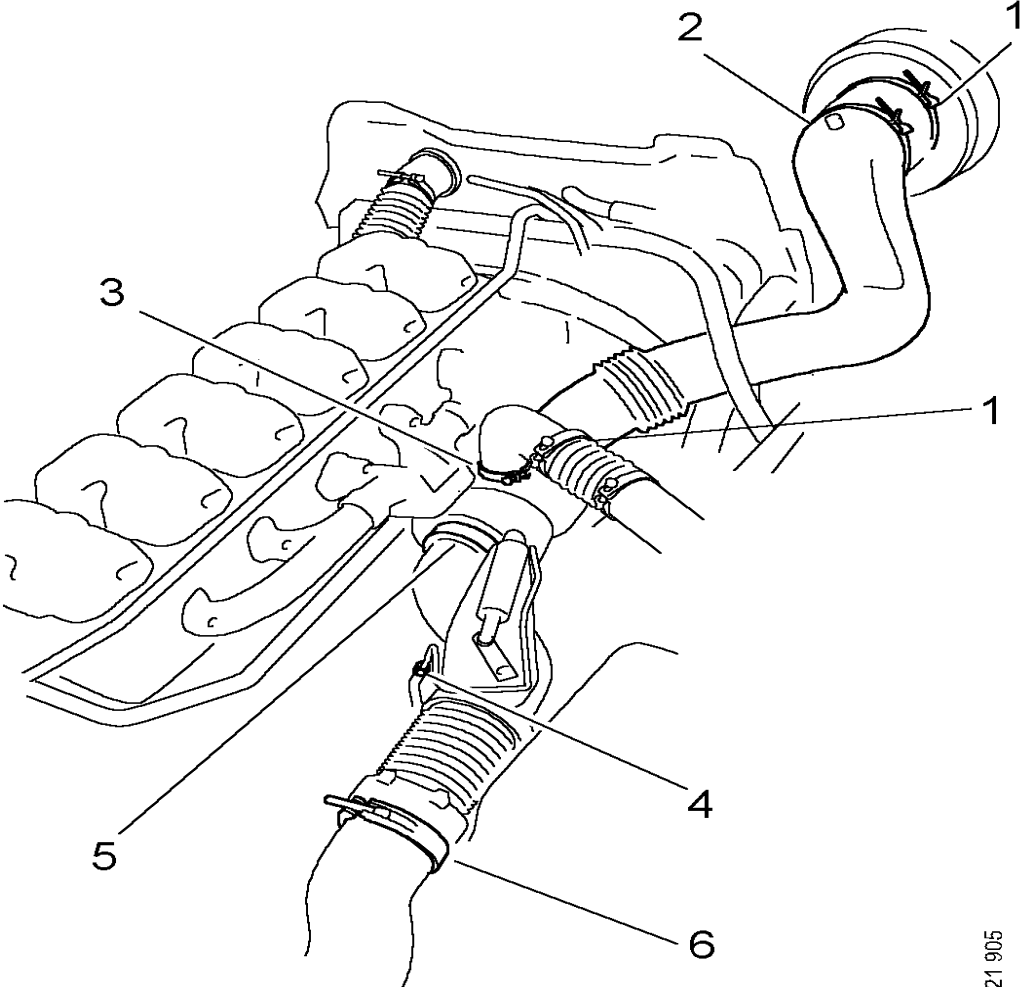


121 902

Floor cover over engine

Pos.	Designation	Comments
1	Air cleaner pipe clamps	Undo the clamps and disconnect the bellows from the air cleaner.
2	Air cleaner pipe	Remove the pipe between the air cleaner and turbocharger unit.
3	V-clamp	Disconnect and fold aside the charge air pipe between the charge air cooler and turbocharger unit.
4	Compressed air pipe	Separate the compressed air pipe for the operating air to the exhaust brake.
5	V-clamp	Undo the exhaust pipe V-clamp on the turbocharger unit.
6	V-clamp	Undo the V-clamp for the flexible exhaust pipe and remove the exhaust pipe with the exhaust brake.

Removing parts through the floor cover over the engine



121 905

From below



WARNING!

Always use stands to support the vehicle when working under a vehicle. Always place axle stands under the frame when working underneath vehicles with air suspension. Empty the air bellows.

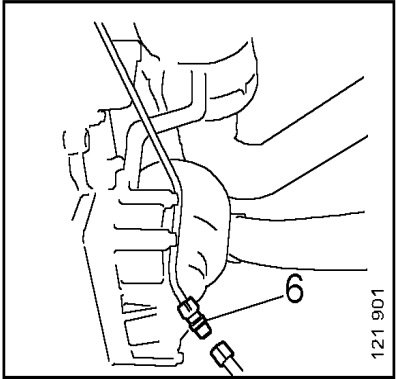
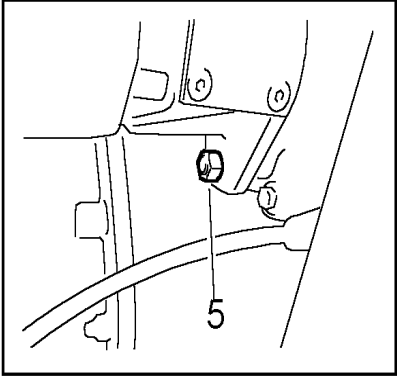
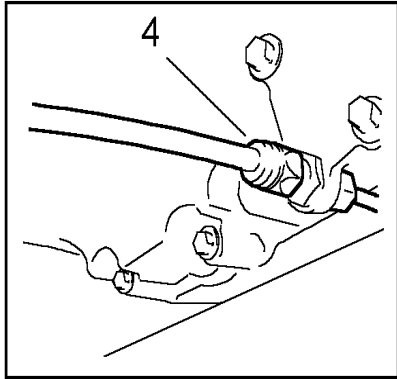
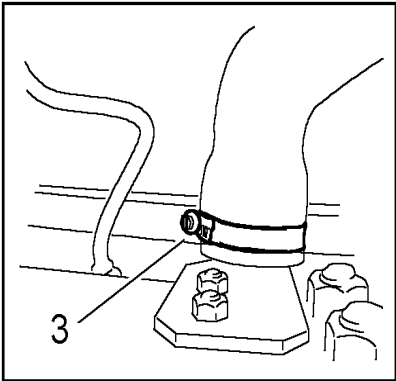
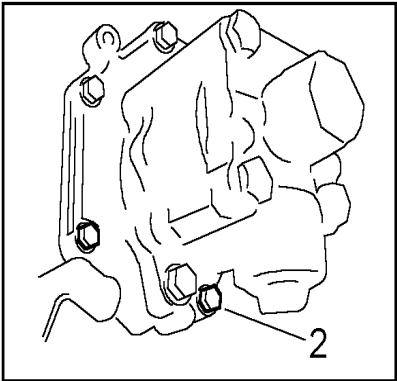
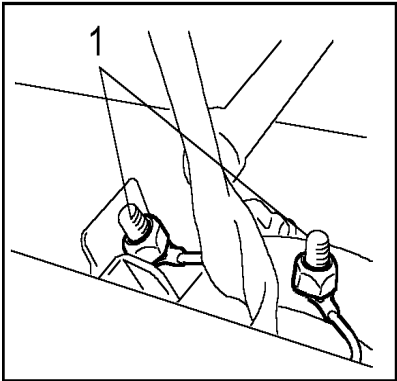
Raise the vehicle using wheel lifts.

Remove cover plates and covers beneath the engine and gearbox.

Drain oil from the engine and remove the oil filter.

Pos.	Designation	Comments
1	Starter motor connection	Disconnect the positive cable from the junction block in the frame beside the starter motor. Disconnect the negative cable.
2	Bolts	Remove the remaining bolts on the power steering pump.
3	Coolant hose	Remove the lower coolant hose.
4	Compressed air pipe	Separate the compressed air pipe for the operating air to the exhaust brake on the front side of the bracket.
5	Nut	Remove the lower nut on the hydraulic pump.
6	Hydraulic line	Separate and plug the hydraulic line to the fan.

Removing parts from below

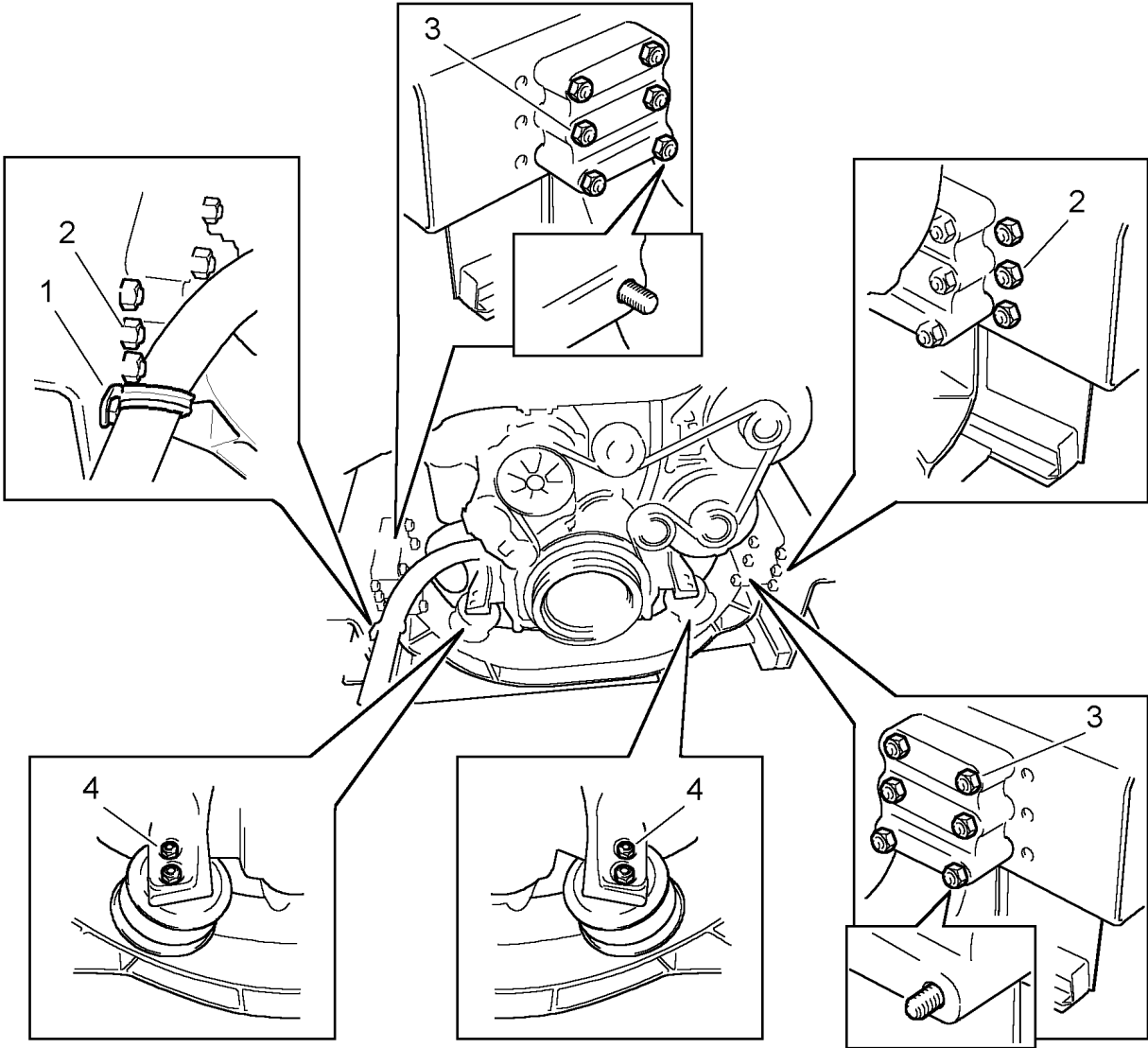


Crossmember and engine brackets

Lower the vehicle so that you can access the bolts for the crossmember and engine brackets.

Pos.	Designation	Comments
1	Clamp bolt	Remove the clamp screw and place the crankcase ventilation hose to one side.
2	Bolts in frame	Remove the 3 bolts on each side of the frame behind the rear crossmember.
3	Crossmember bolts	Also remove all the crossmember bolts apart from one on each side. Allow one bolt to remain in each corner. The engine remains suspended by the last bolts.
4	Engine insulator nuts	Remove the upper engine insulator nuts.

Removing the crossmember and engine brackets



121 903

Engine support

Pos.	Designation	Comments
1	Gearbox bracing tool 82 346	Fit gearbox bracing tool 82 346 on the frame member which goes under the flywheel housing.
2*)	Rear upper engine support 2 271 842*)	Fit the rear upper engine support 2 271 842*).
3	Front upper engine support 2 271 843	Fit the front upper engine support 2 271 843.
4	Rear lower engine support 2 271 841	Fit the rear lower engine support 2 271 841 to the rear upper engine support 2 271 842.
5	Front lower engine support 2 271 840	Fit the front lower engine support 2 271 840 to the front upper engine support 2 271 843.
6	Engine support 82 316	Roll in engine support 82 316 using a pallet lifter.

*) Screw in bolts a little into the holes in the engine so that the tool remains suspended.

Lower the vehicle with the wheel lifts so that you fit the height between the upper and lower strut of the engine support to suitable holes. It may be necessary to correct the height individually on the front and rear engine supports to obtain the horizontal position on the vehicle which corresponds to an engine inclination of 4 degrees.

Raise the engine stand to relieve the pressure on the engine insulators. Remove the last two bolts in the crossmember, and remove it.

Remove the last nuts which hold the engine and gearbox together and separate the engine and gearbox.

Adjust the height of gearbox bracing tool 82 346 so that the gearbox is lying on the support.

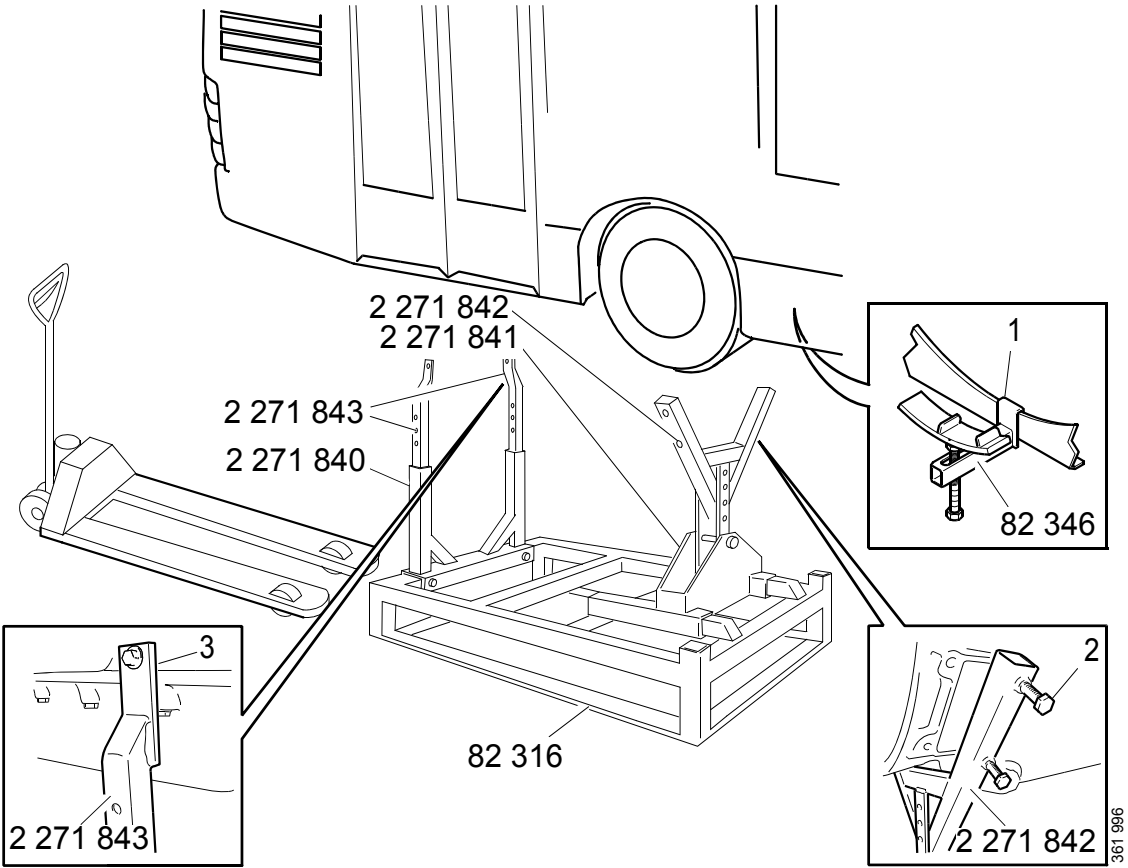
Check that the hydraulic pumps are disconnected from the engine. Check that the hydraulic pumps are not caught anywhere.

Tie up the hydraulic pumps so that they are not suspended by the hoses.

Pull out the engine from the engine compartment.

Use overhead hoists to move the engine from the engine stand.

Fitting the engine support and removing the engine



Fitting the engine

Specifications

Designation	Tightening torques
Crossmember bolt	210 Nm
Engine bracket bolts	47 Nm
V-clamp bolts	8 Nm
Bolts to attach gearbox to engine	47 Nm

The following tightening torques apply in general unless otherwise specified:

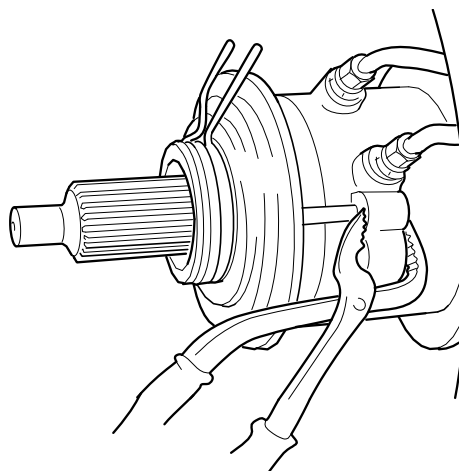
	Tightening torques
M5 thread	6.7 Nm
M6 thread	10.2 Nm
M8 thread	26 Nm
M10 thread	50 Nm
M12 thread	92 Nm
M14 thread	149 Nm

Preparations

Manual gearbox

Note: Replace clutch retaining ring. Check that the puller ring and its securing ring are intact and are correctly seated. Oil the spring pins with anticorrosive oil. Push the slave cylinder end into the assembly position until the spring pin is level with the rear edge of the heel.

- Align the engine and push it into position. When the slave cylinder end engages with the diaphragm spring locking device an audible click is heard.



Automatic gearbox

- Position the flywheel so that one of the flex plate holes is directly in front of the access hole in the flywheel housing.
- Then turn the torque converter so that the holes in the torque converter and flex plate are aligned. Insert a screwdriver as a centering tool.

Fitting

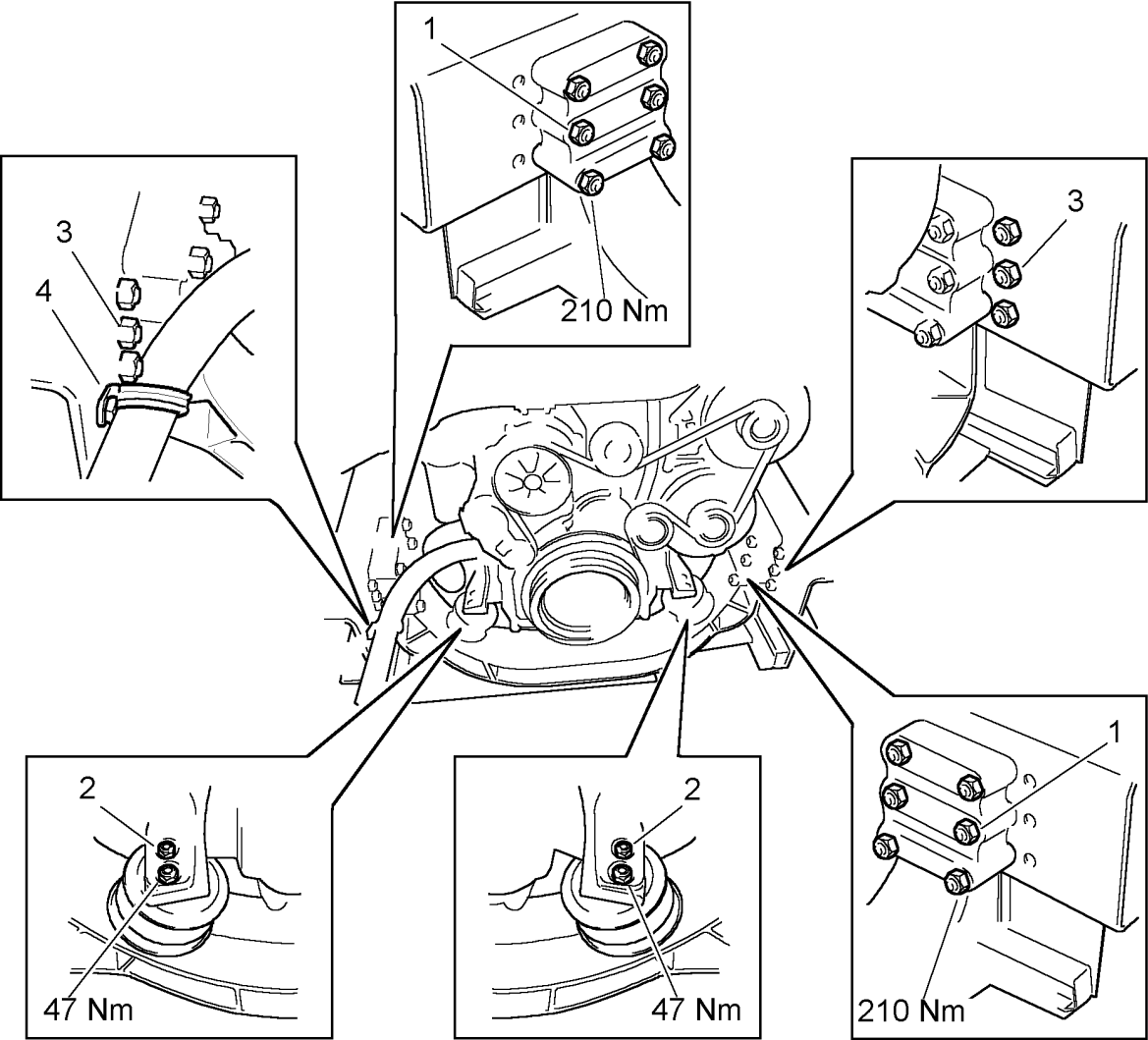
Push the engine into the engine compartment with the pallet lifter.

Fit the power steering pump and hydraulic pump when there are approximately 10-15 cm left before the engine and gearbox make contact, or as much as the hoses will allow.

Crossmember

Pos.	Designation	Comments
1	Crossmember bolts	Fit the crossmember and tighten the bolts to 210 Nm.
2	Engine bracket nuts	Lower the engine in the engine brackets and tighten the nuts on both engine brackets to 47 Nm.
3	Bolts in frame	Fit the bolts in the frame.
4	Clamp bolt	Fit the bolt and clamp for the crankcase ventilation hose.

Fitting the crossmember



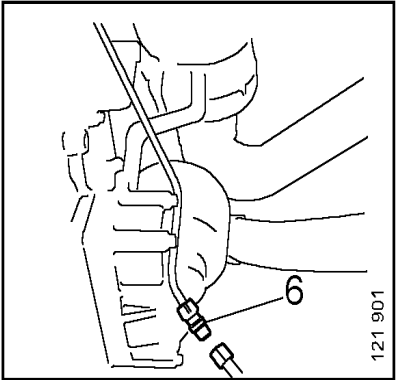
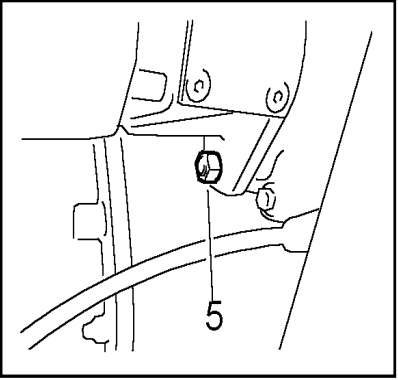
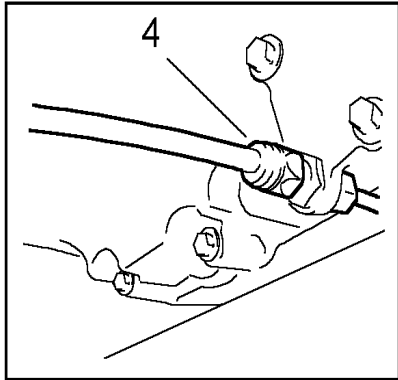
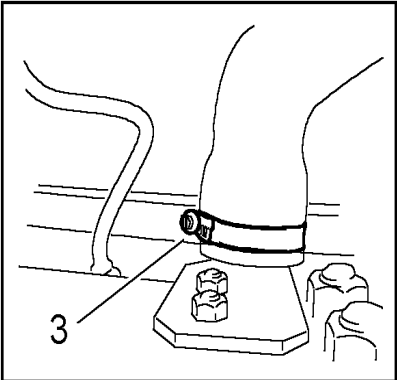
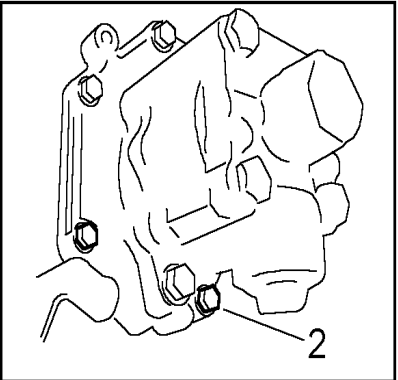
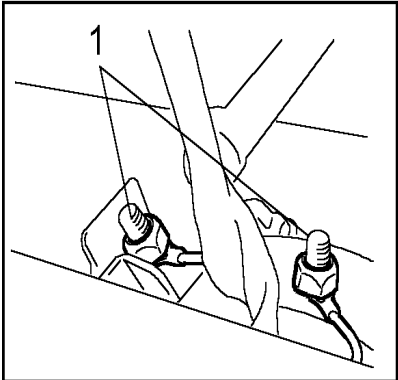
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From below

Lower and remove the pallet lifter and all engine and gearbox supports.

Pos.	Designation	Comments
1	Starter motor connection	Fit the positive cable in the junction box in the frame beside the starter motor. Fit the negative cable.
2	Power steering pump bolts	Fit the power steering pump bolts.
3	Coolant hose	Fit the lower coolant hose.
4	Compressed air pipe	Fit the compressed air pipe for the operating air to the exhaust brake.
5	Hydraulic pump nut	Fit the lower nut on the hydraulic pump.
6	Hydraulic line	Assemble the hydraulic line to the fan.

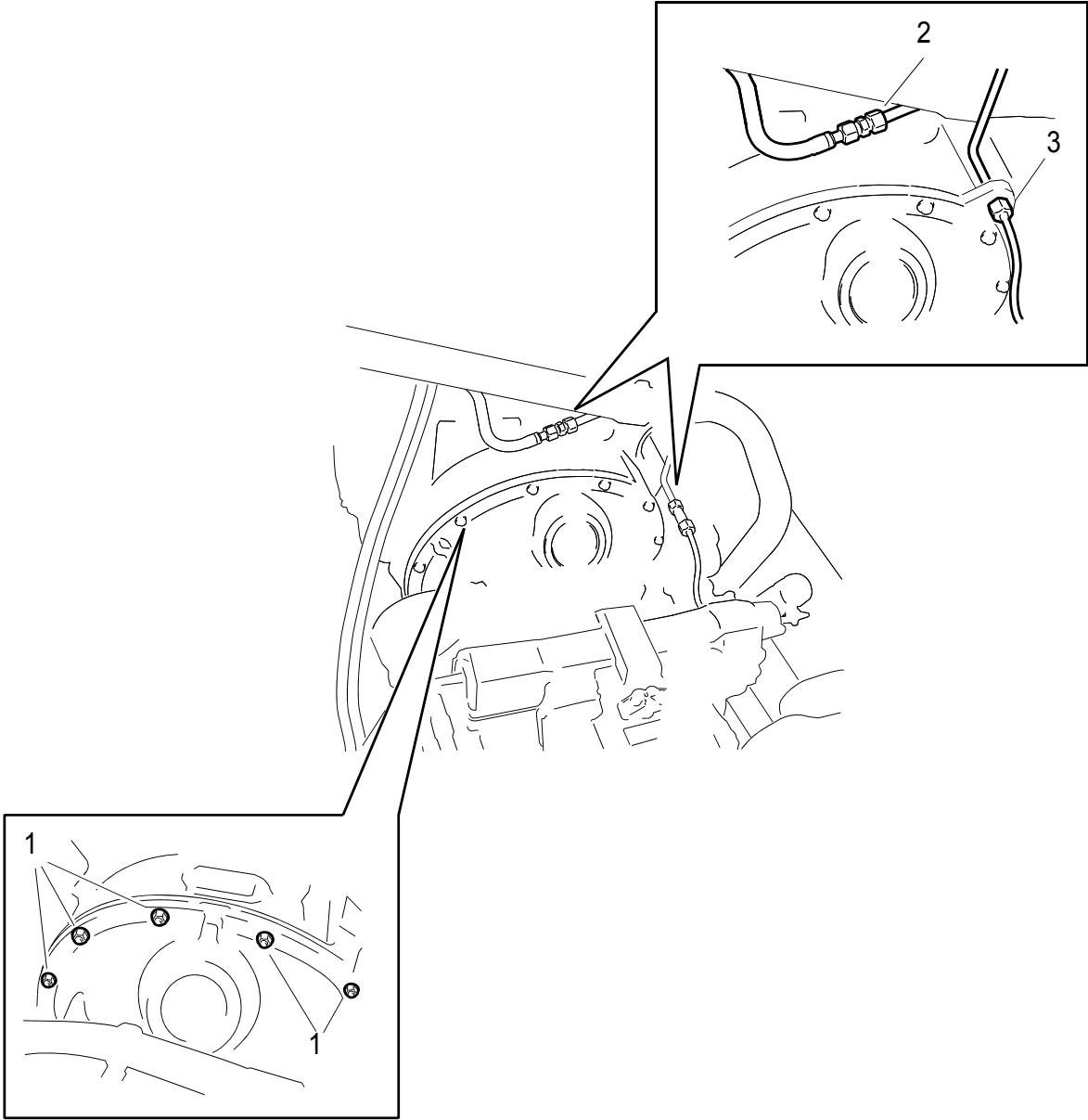
Fitting parts from below



Floor cover over gearbox

Pos.	Designation	Comments
1	Cooling coil pipe	Fit the compressed air pipe to the cooling coil.
2	Hydraulic pump nut	Fit the upper nut on the hydraulic pump.
3	Hydraulic line to hydraulic pump	Fit the hydraulic line to the hydraulic pump.
4	Nuts for gearbox and engine	Fit the upper nuts on the gearbox. Tightening torque 47 Nm.

Fitting parts through the floor cover over the gearbox

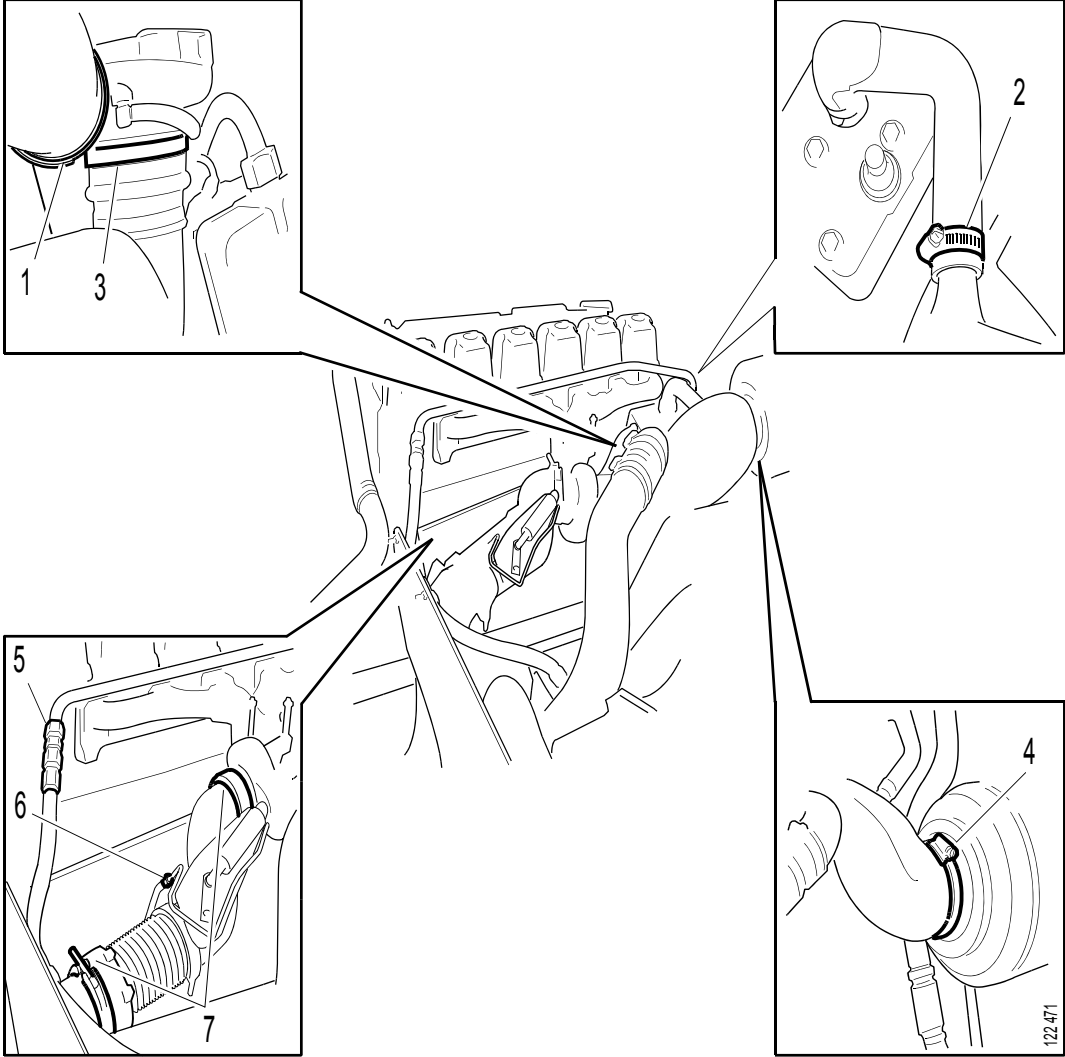


122 472

Floor cover over engine

Pos.	Designation	Comments
1	Air cleaner pipe	Fit the pipe between the air cleaner and turbocharger unit.
2	Air cleaner pipe clamps	Fit the bellows and pipe clamps between the turbocharger unit and air cleaner.
3	Charge air cooler pipe	Fit the pipe between the charge air cooler and turbocharger unit. Tighten the V-clamp to 8 Nm.
4	Exhaust pipe V-clamps	Fit the flexible exhaust pipe with the exhaust brake. Tighten the V-clamps to 8 Nm.
5	Compressed air pipe	Fit the compressed air pipe for the operating air to the exhaust brake.

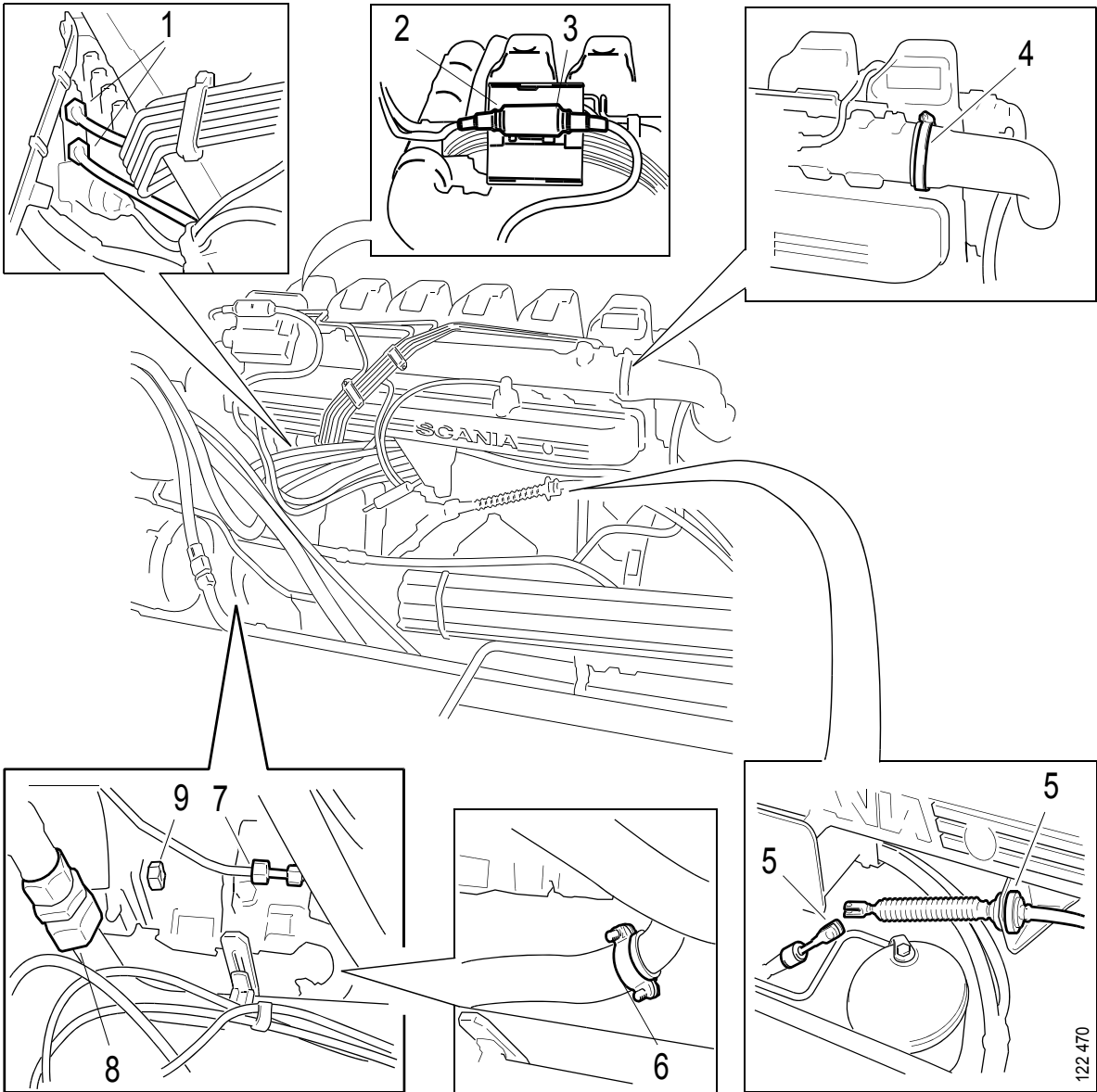
Fitting parts through the floor cover over the engine



Right side cover

Pos.	Designation	Comments
1	Engine control unit connector	Fit the connector in the engine control unit.
2	Fuel pipe	Fit the fuel pipe.
3	Compressor relief hose	Fit the compressor relief hose.
4	Power steering pump bolts	Fit the upper three bolts on the power steering pump.

Fitting parts through the right side cover



Rear engine cover

Pos.	Designation	Comments
1	Pipe between intake manifold and charge air cooler	Fit the pipe between the charge air cooler and intake manifold. IMPORTANT! Renew the sealing ring.
2	Fuel pipe union	Fit the fuel pipe. Replace the seals.
3	Pipe clamps between intake manifold and charge air cooler	Fit the clamps and tighten to 8 Nm.
4	Coolant hose	Fit the coolant hose at the front of the engine.
5	Coolant pipe bolts	Fit the coolant pipe bracket bolts
6	Connector C516	Assemble connector C516.
7	Expansion tank clamps	Fit clamps onto expansion tank.
8	Coolant pipe	Fit the coolant pipe on the expansion tank.
9	Bleeder hoses	Fit the bleeder hoses on both sides of the expansion tank.
10	A/C mounting plate	Fold down the A/C compressor mounting plate and fit the AC compressor drive belt.
11	Air spring valve for A/C	Close the valve for the A/C compressor air spring.
12	2 heating system valves	Open the valves for the vehicle heating system.

Fit the rear bumper.

Fit the negative battery cable.

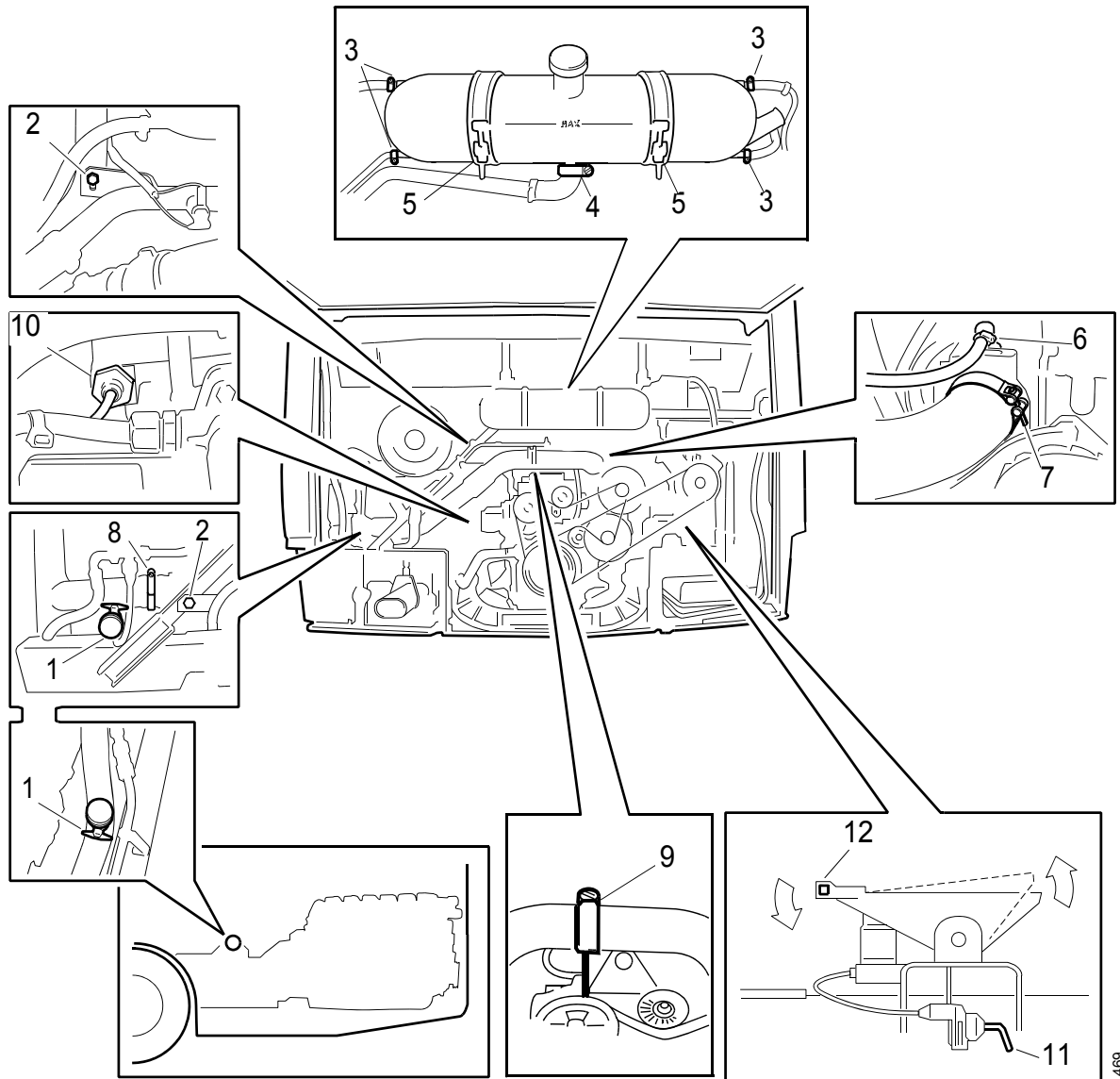
Fit a new oil filter and fill with engine oil. See Group 0.

Fill with coolant. See Group 2.

Bleed the fuel system. See Group 3.

Fit the cover plates and covers beneath the engine.

Fitting parts through the rear engine cover



122 469