11 25 651 Replacing piston rings of a piston

NOTICE

The description is for one component only. The procedure is identical for all further components.

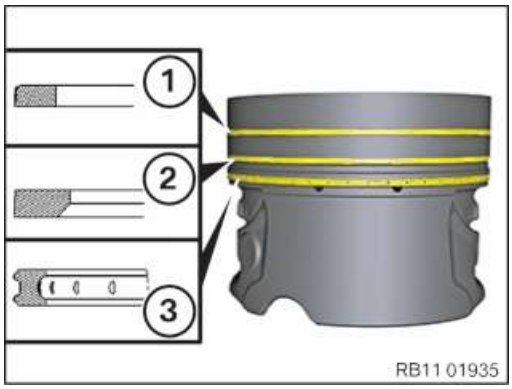
1 – Check side clearance of piston rings

RISK OF DAMAGE

Damage to the piston rings.

Piston rings can bend or break due to large applications of force.

- Handle piston rings carefully.
- Only bend piston ring up lightly.

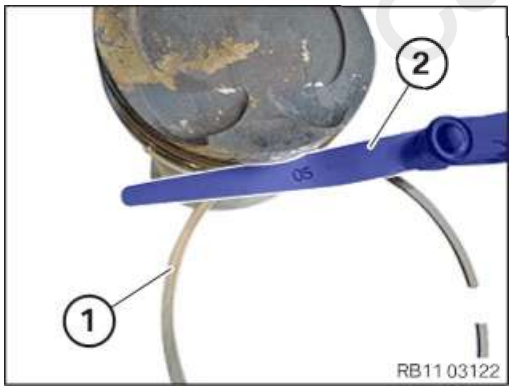


TECHNICAL INFORMATION

- Note the installation position of the component. The component may be installed in various installation positions.

- Mounting orientation of the piston rings:

Position number	Description
1	1. Piston ring (plain rectangular compression ring)
2	2. Piston ring (taper faced piston ring)
3	3. Piston ring (oil scraper ring with spiral expander)



Check

- Install all piston rings (1) consecutively as shown in the piston ring groove. Measure the side clearance with a feeler gauge (2).

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desired state

- The side clearance of the piston rings is within the tolerance.

Side clearance of piston rings

Clean all components before measuring the side clearance.	
Side clearance of the plain rectangular compression ring	0,17 mm ... 0,27 mm
Side clearance of the taper faced piston ring	0.30 mm ... 0.50 mm
Side clearance of the oil scraper ring with spiral expander	0.2 mm ... 0.4 mm

Result

» The side clearance of the piston rings is outside of the tolerance.

Measure

- Renew the piston ring.

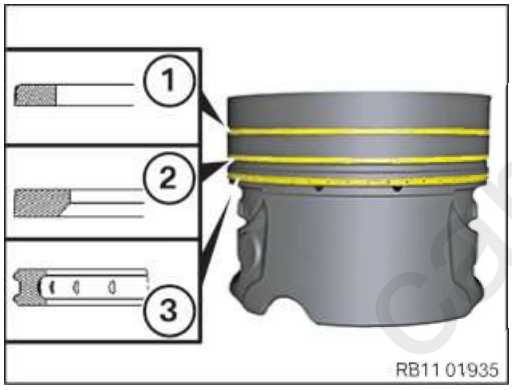
2 – Remove the piston rings

RISK OF DAMAGE

Damage to the piston rings.

Piston rings can bend or break due to large applications of force.

- Handle piston rings carefully.
- Only bend piston ring up lightly.

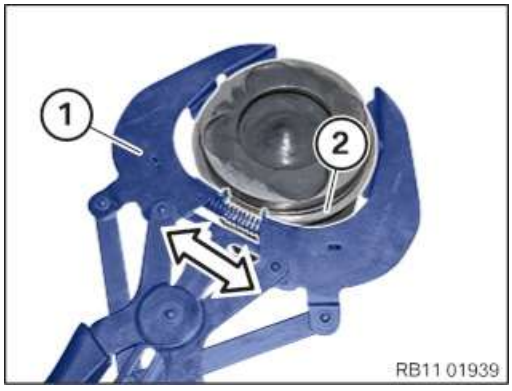


TECHNICAL INFORMATION

- Note the installation position of the component. The component may be installed in various installation positions.

- Mounting orientation of the piston rings

Position number	Description
1	1. Piston ring (plain rectangular compression ring)
2	2. Piston ring (taper faced piston ring)
3	3. Piston ring (oil scraper ring with spiral expander)



- Remove all piston rings (2) with standard piston ring pliers (1).
- Store all piston rings (2) in the proper order.

3 – Measure the end clearance of the piston rings

Prerequisite

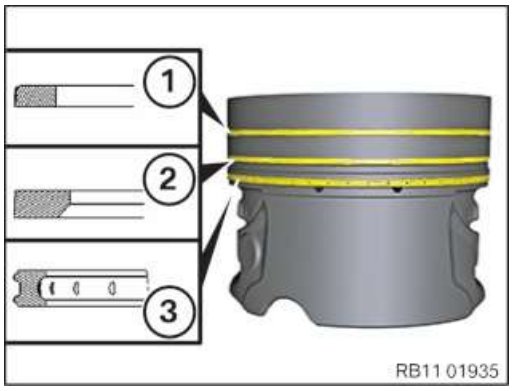
Cylinder barrel is cleaned. Cylinder was measured and is within the permissible tolerances.

RISK OF DAMAGE

Damage to the piston rings.

Piston rings can bend or break due to large applications of force.

- Handle piston rings carefully.
- Only bend piston ring up lightly.

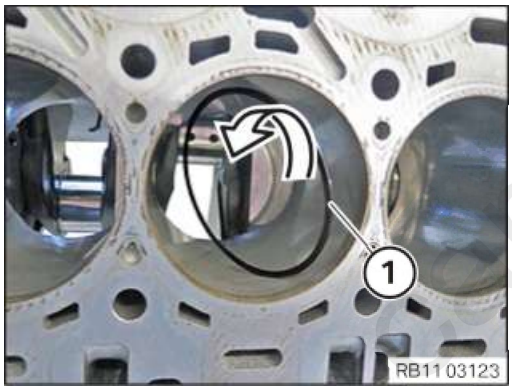


TECHNICAL INFORMATION

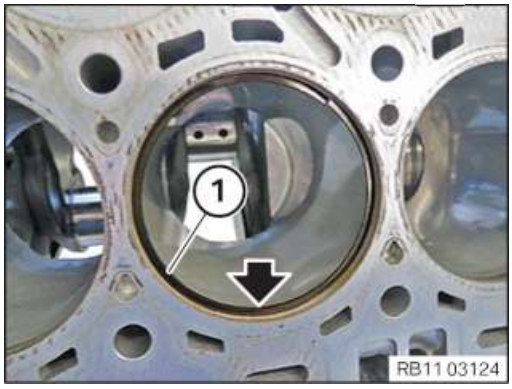
- Note the installation position of the component. The component may be installed in various installation positions.

- Mounting orientation of the piston rings

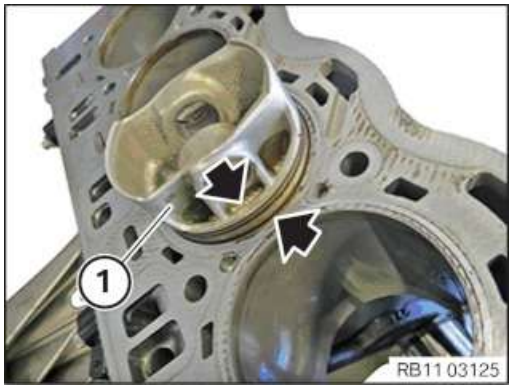
Position number	Description
1	1. Piston ring (plain rectangular compression ring)
2	2. Piston ring (taper faced piston ring)
3	3. Piston ring (oil scraper ring with spiral expander)



- Insert all piston rings (1) into the cylinder to be measured in consecutive order and rotate by 90°.

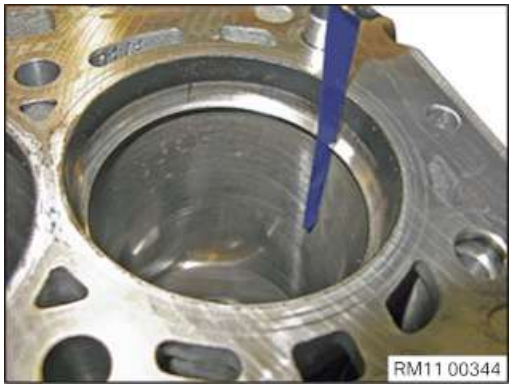


- Position all piston rings (1) in the cylinder barrel in consecutive order below the top dead centre (arrow).



- Consecutively push in all piston rings in parallel with the help of the piston (1) up to the last annular groove.

Check



- Measure the end clearance of all piston rings in consecutive order with a feeler gauge as shown.

desired state

- The end clearance of the piston rings is within the tolerance.

End clearance of the piston rings

Before measuring the end clearance, make sure the cylinder is within the permissible tolerance.	
End clearance of the plain rectangular compression ring	0,13 mm ... 0,17 mm
End clearance of the taper faced piston ring	0,0045 mm ... 0,12 mm
End clearance of the oil scraper ring with spiral expander	cannot be measured

Result

» The end clearance of the piston rings is outside of the tolerance.

Measure

- Renew the piston rings.

  Parts: Piston ring

4 – Install the piston rings

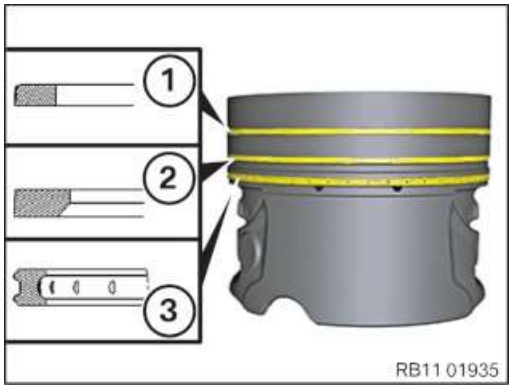
RISK OF DAMAGE

Damage to the piston rings.

Piston rings can bend or break due to large applications of force.

- Handle piston rings carefully.
- Only bend piston ring up lightly.

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TECHNICAL INFORMATION

- Note the installation position of the component. The component may be installed in various installation positions.

- Mounting orientation of the piston rings

Position number	Description
1	1. Piston ring (plain rectangular compression ring)
2	2. Piston ring (taper faced piston ring)
3	3. Piston ring (oil scraper ring with spiral expander)



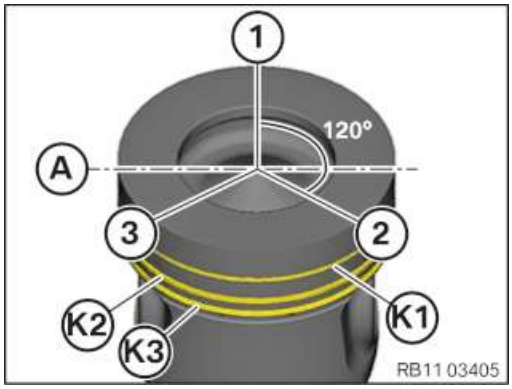
- Install the plain rectangular compression ring (1) and the taper faced piston ring (2) with the labelling (QR-Code or GOE TOP) pointing up.
- The oil scraper ring with spiral expander can be installed in any position.



- Install all piston rings (2) with commonly available piston ring pliers (1).

5 – Aligning piston rings

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Position number	Description
1	12 o'clock position
2	4 o'clock position
3	8 o'clock position
A	Axis of gudgeon pin
K1	1. Piston ring (plain rectangular compression ring)
K2	2. Piston ring (taper faced piston ring)
K3	3. Piston ring (oil scraper ring with spiral expander)

Align the contact points of all piston rings by 120° each.

Do not position contact points over axis of gudgeon pin (A).

Piston ring	Align at the following position
Plain rectangular compression ring (K1)	Align at the 12 o'clock position (1)
Taper faced piston ring (K2)	Align at the 4 o'clock position (2)
Oil scraper ring with spiral expander (K3)	Align at the 8 o'clock position (3)

Additional Information

Overview Technical Data

Side clearance of piston rings	Used in step 1
Clean all components before measuring the side clearance.	
Side clearance of the plain rectangular compression ring	0,17 mm ... 0,27 mm
Side clearance of the taper faced piston ring	0.30 mm ... 0.50 mm
Side clearance of the oil scraper ring with spiral expander	0.2 mm ... 0.4 mm

End clearance of the piston rings	Used in step 3
Before measuring the end clearance, make sure the cylinder is within the permissible tolerance.	
End clearance of the plain rectangular compression ring	0,13 mm ... 0,17 mm
End clearance of the taper faced piston ring	0,0045 mm ... 0,12 mm
End clearance of the oil scraper ring with spiral expander	cannot be measured

Links

Repair instructions	Used in step
11 25 000 Removing and installing/replacing all pistons	

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11 28 075 Removing and installing/replacing the drive belt for starter generator

PRELIMINARY WORK

1 – Removing the acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover/design cover.

Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover/design cover.

- Disassemble or mount the acoustic cover/design cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover/design cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Unclip the acoustic cover (1) from the holders in the indicated area towards the top.

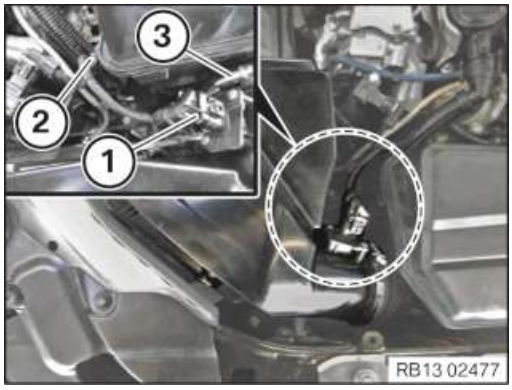
2 – Removing the clean air pipe with the resonator

WARNING

Hot surfaces.

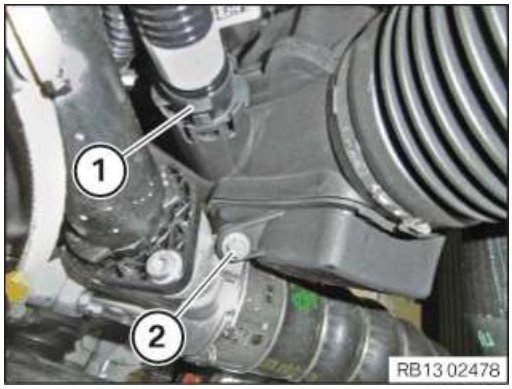
Risk of burning!

- Perform all work only on components that have cooled down.

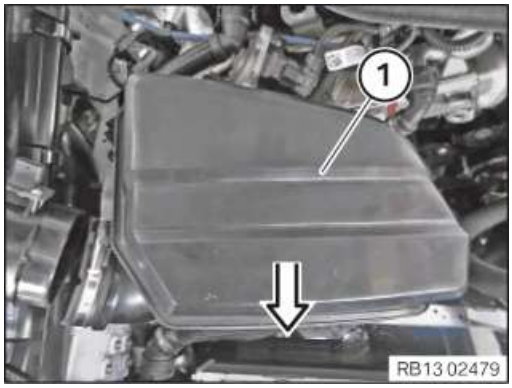


- Unlock plug connection (1) and disconnect.
- Loosen clamp (2).
- Unfasten clamp (3).
- Separate the clean air pipe with resonator from the intake filter housing.

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- Unlock engine ventilation line (1), disconnect it and place it aside.
- Loosen screw (2).



- Press and hold clean air pipe with resonator (1) in the direction of the arrow.



- Unlock and loosen clamp (1).



- Feed out and remove clean air pipe with resonator (1) in the direction of the arrow.

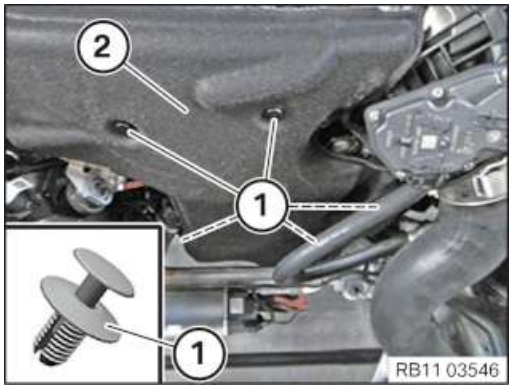
3 – Remove acoustic cover of the front engine

WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.



- Release and remove expanding rivet (1).
- Guide the acoustic cover (2) out and remove.

MAIN WORK

4 – Removing the drive belt for the starter motor generator

CAUTION

Spring preload.

Danger of injury!

- The use of the specified special tool (tool) is mandatory.
- The described operation must be carried out properly.

CAUTION

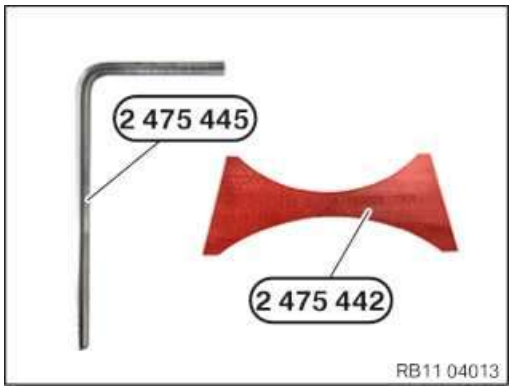
Component with preload.

Danger of injury!

- Reduce preload as far as possible before disassembly. Relieve component.

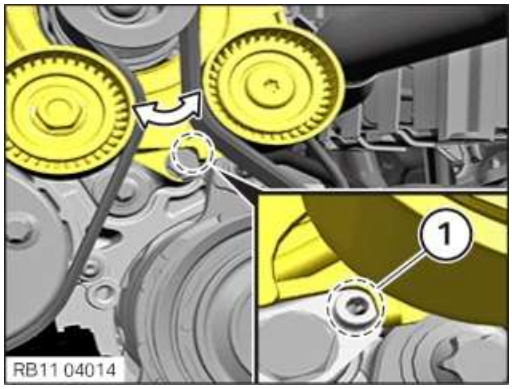
TECHNICAL INFORMATION

The drive belt must be replaced if contaminated with coolant- and oil residues.

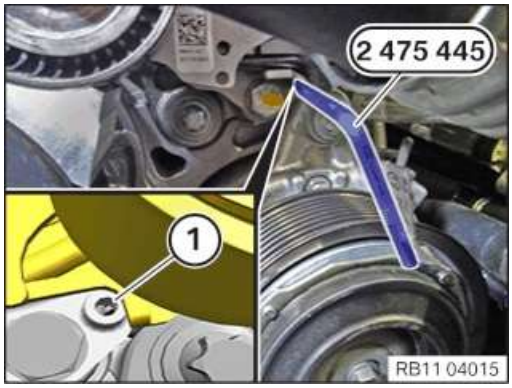


- Prepare the special tool 2 475 442 and the special tool 2 475 445.

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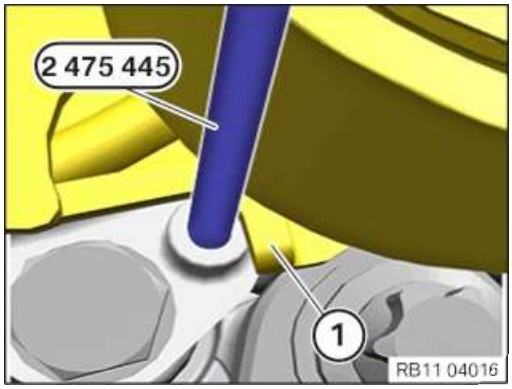


- Position the belt tensioner in the direction of the arrow so that the bore hole is visible in the area (1).

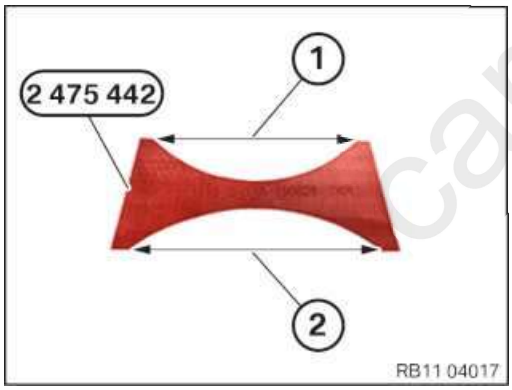


- Guide in the special tool 2 475 445 and install it in the bore hole (1).

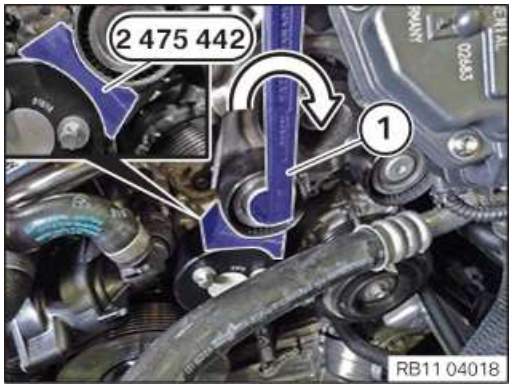
  The special tool 2 475 445 must rest against the starter motor generator.



- Ensure that the belt tensioner (1) is supported on the special tool 2 475 445.



- Ensure that the radius (1) of the special tool 2 475 442 supports the tensioning pulley of the belt tensioner.
- Ensure that the radius (2) of the special tool 2 475 442 is supported on the belt pulley of the coolant pump.

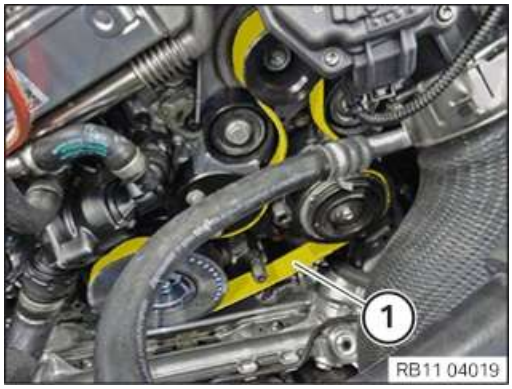


TECHNICAL INFORMATION

Conduct the following operation with the assistance of a second person.

- Twist the tensioning pulley (1) in the direction of the arrow.
- Guide in and install the special tool 2 475 442 between the belt pulley of the coolant pump and the tensioning pulley.

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TECHNICAL INFORMATION

If the drive belt is reused: Mark direction of travel and reinstall drive belt in same direction of travel.

- Guide out and remove the drive belt (1) for the starter motor generator.

5 – Installing the drive belt for the starter motor generator

CAUTION

Spring preload.

Danger of injury!

- The use of the specified special tool (tool) is mandatory.
- The described operation must be carried out properly.

CAUTION

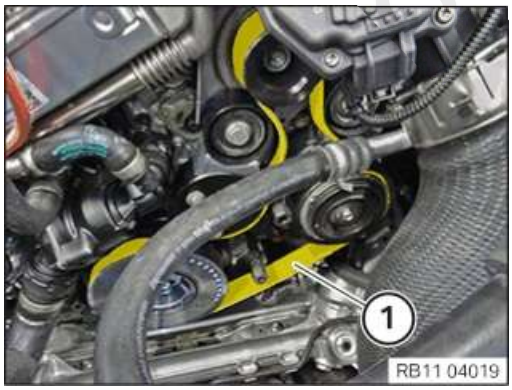
Component with preload.

Danger of injury!

- Reduce preload as far as possible before disassembly. Relieve component.

TECHNICAL INFORMATION

The drive belt must be replaced if contaminated with coolant- and oil residues.

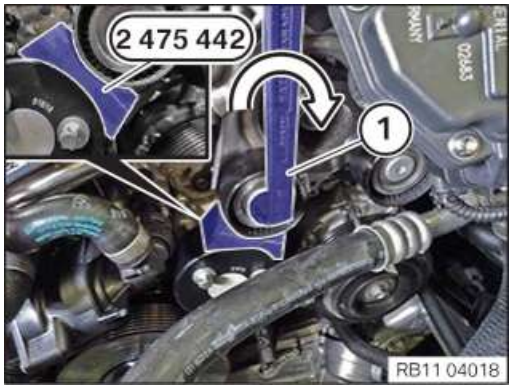


TECHNICAL INFORMATION

If the drive belt is reused: Mark direction of travel and reinstall drive belt in same direction of travel.

- Feed in and install the drive belt (1) for the starter motor generator.

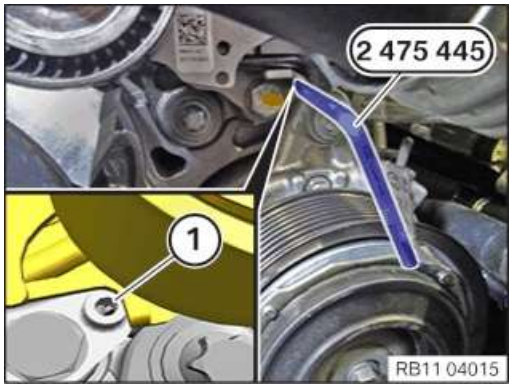
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TECHNICAL INFORMATION

Conduct the following operation with the assistance of a second person.

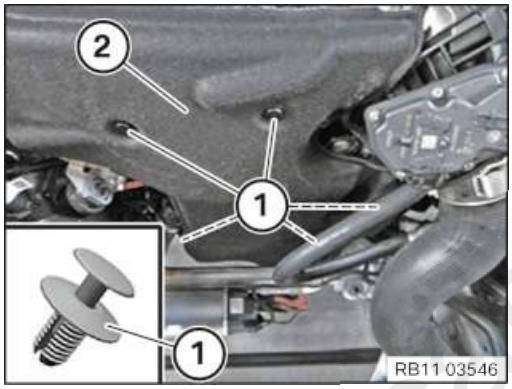
- Turn the tensioning pulley in (1) in the direction of arrow.
- Feed out the special tool 2 475 442 between the belt pulley of the coolant pump and the tensioning pulley and remove it.



- Feed out the special tool 2 475 445 from the bore hole (1) and remove it.

POSTPROCESSES

6 – Install acoustic cover for the engine, front



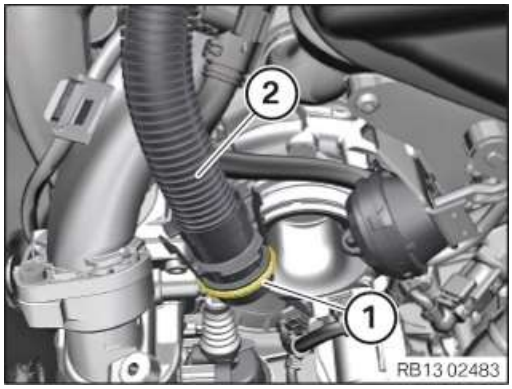
- Feed the acoustic cover (2) in and install.
- Secure the acoustic cover (2) with the expanding rivets (1).

7 – Installing the clean air pipe with resonator



- Check the sealing ring (1) on the exhaust turbocharger for damage and renew if necessary.

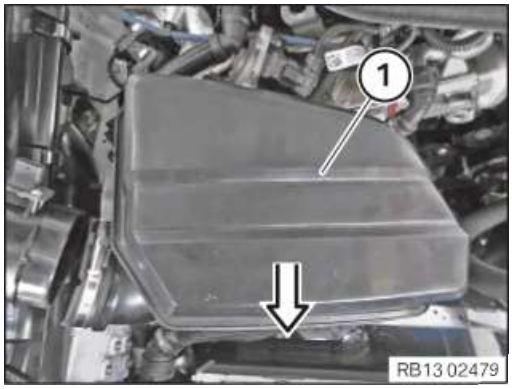
Cardiagn.com



- Check the sealing ring (1) for the engine ventilation line (2) for damage and renew where required.



- Feed in and install clean air pipe with resonator (1) in the direction of the arrow.

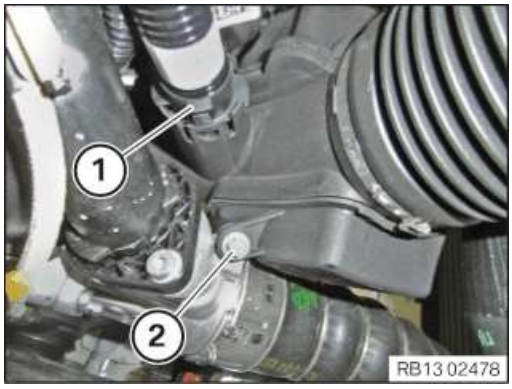


- Press and hold clean air pipe with resonator (1) in the direction of the arrow.



- Attach and lock the clamp (1).

  The clamp (1) must engage audibly.

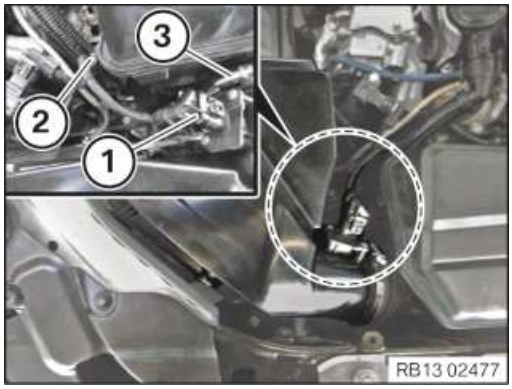


- Tighten down screw (2).

Clean air pipe to exhaust turbocharger

M6X20		Tightening torque	8 Nm

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- Connect the clean air pipe with resonator to the intake filter housing.
- Tighten clamp (3).

Clean air pipe to upper section of intake filter housing

Clamp		Tightening torque	3 Nm

- Secure clamps (2).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

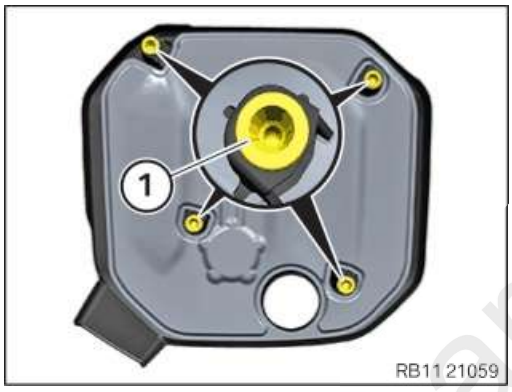
8 – Install acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover/design cover.

Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover/design cover.

- Disassemble or mount the acoustic cover/design cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover/design cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Check the acoustic cover for correct fit of the rubber mounts (1).



- Clip in the acoustic cover (1) into the holders in the indicated areas.

Additional Information

Overview of Tightening Torques

Clean air pipe to exhaust turbocharger Used in step 7

M6X20		Tightening torque	8 Nm

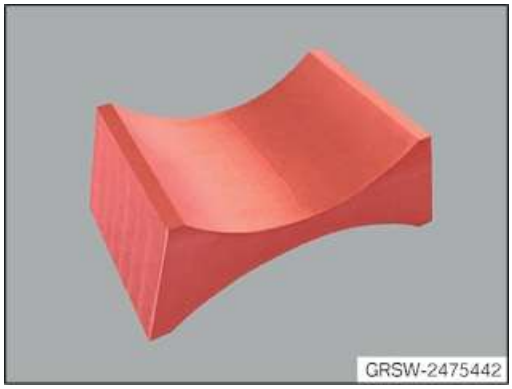
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Clean air pipe to upper section of intake filter housing Used in step 7

Clamp		Tightening torque	3 Nm

Overview of Special Tools

2 475 442 Removal and installation tool



Common Used in step 45

Usage	For removing and installing the drive belt of the ancillary components.
Included in the tool or work	
Storage location	A8
Replaced by	
In connection with	83302475445
SI-Number	01 19 19 (668)

2 475 445 Pin



Common Used in step 45

Usage	Tool for drive belt of 48 V ancillary components
Included in the tool or work	
Storage location	A8
Replaced by	
In connection with	83302475442 83302475444
SI-Number	01 19 19 (668)

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11 28 020 Replacing alternator drive belt tensioner

PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

2 – Removing the throttle body

WARNING

Hot surfaces.

Risk of burning!

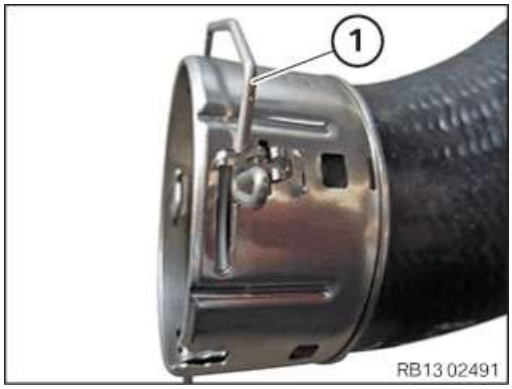
- Perform all work only on components that have cooled down.

RISK OF DAMAGE

Electrostatic discharge.

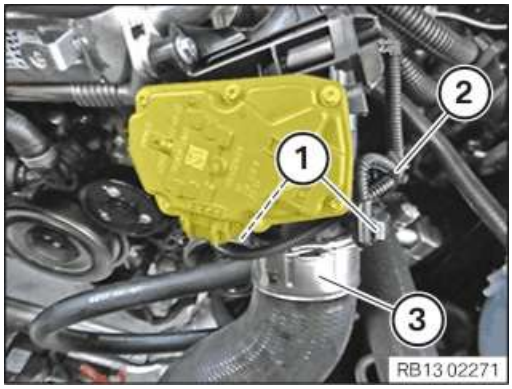
Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 ... Notes for ESD protection (electrostatic discharge)



- Unlock clamp (1) and engage in this position.

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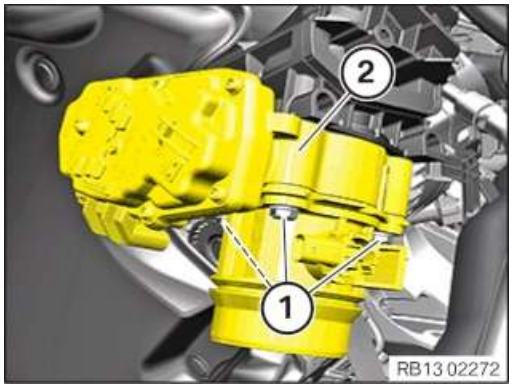


- Unlock and disconnect plug connections (1).

NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- Loosen clamp (2).
- Unlock and disconnect the pressure pipe (3).



- Loosen screws (1).
- Remove throttle body (2).

3 – Removing the acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover/design cover.

Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover/design cover.

- Disassemble or mount the acoustic cover/design cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover/design cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Unclip the acoustic cover (1) from the holders in the indicated area towards the top.

4 – Removing the clean air pipe with the resonator

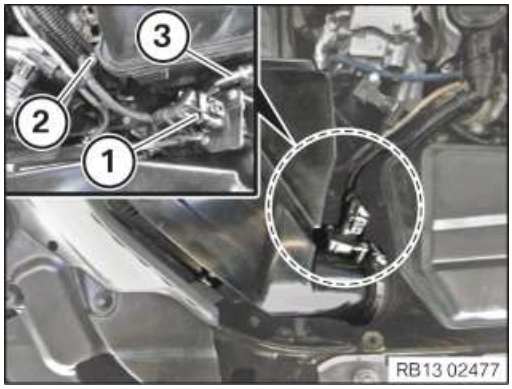
WARNING

Hot surfaces.

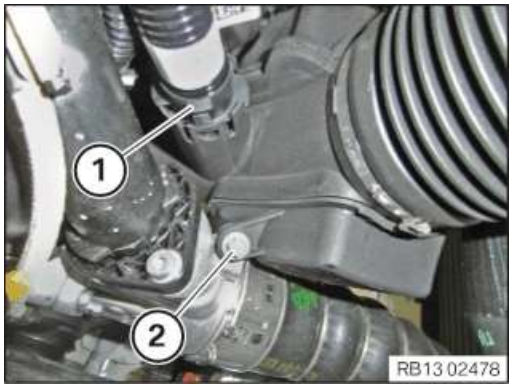
Risk of burning!

- Perform all work only on components that have cooled down.

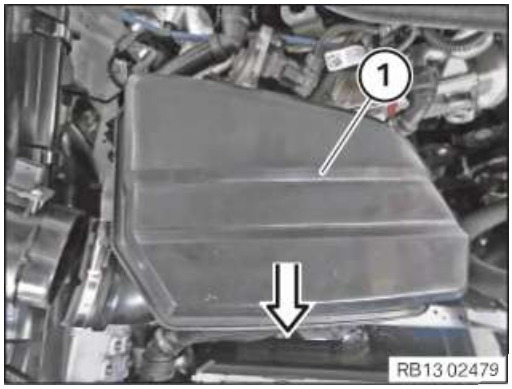
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- Unlock plug connection (1) and disconnect.
- Loosen clamp (2).
- Unfasten clamp (3).
- Separate the clean air pipe with resonator from the intake filter housing.



- Unlock engine ventilation line (1), disconnect it and place it aside.
- Loosen screw (2).



- Press and hold clean air pipe with resonator (1) in the direction of the arrow.



- Unlock and loosen clamp (1).



- Feed out and remove clean air pipe with resonator (1) in the direction of the arrow.

5 – Remove acoustic cover of the front engine

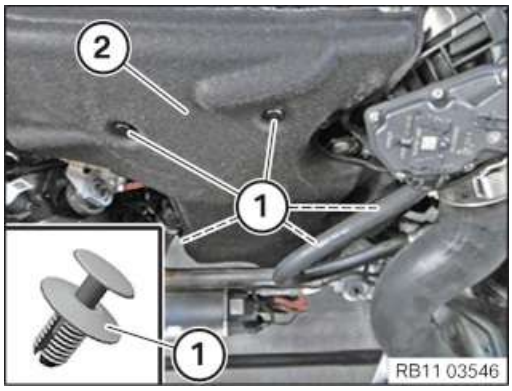
rdiagn.com

WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.



- Release and remove expanding rivet (1).
- Guide the acoustic cover (2) out and remove.

6 – Removing the drive belt for alternator

CAUTION

Spring preload.

Danger of injury!

- The use of the specified special tool (tool) is mandatory.
- The described operation must be carried out properly.

CAUTION

Component with preload.

Danger of injury!

- Reduce preload as far as possible before disassembly. Relieve component.

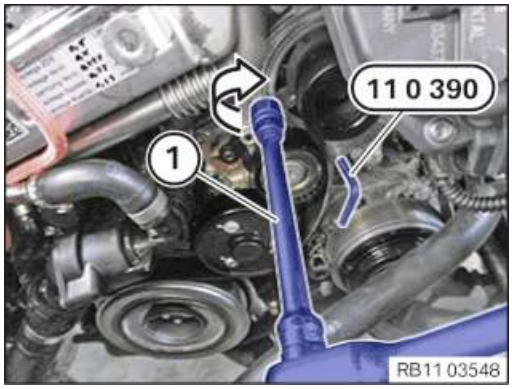
TECHNICAL INFORMATION

If the drive belt is reused: Mark direction of travel and reinstall drive belt in same direction of travel.

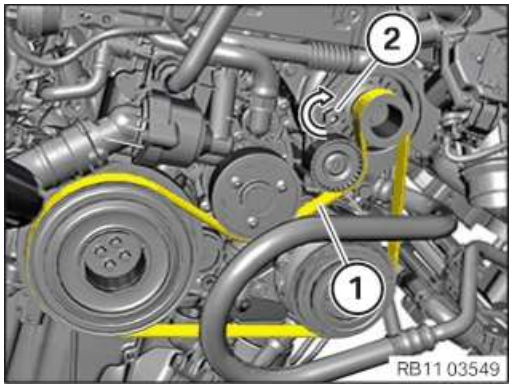
TECHNICAL INFORMATION

The drive belt must be replaced if contaminated with coolant- and oil residues.

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- If reusing the drive belt for alternator: Mark the direction of rotation.
- Relax the belt tensioner in the direction of the arrow using a standard tool (1).
- Fix the belt tensioner with the special tool 0 496 268 (11 0 390).



- Relieve belt tensioner at hexagon head (2) in direction of arrow up to limit position.
- Guide out and remove drive belt for alternator (1).

7 – Removing the alternator

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.
- Detach battery earth lead from battery.
- With auxiliary batteries: Detach all battery earth leads from additional batteries.

RISK OF DAMAGE

Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

- Do not pull on the wires when disconnecting connectors and plug connections.

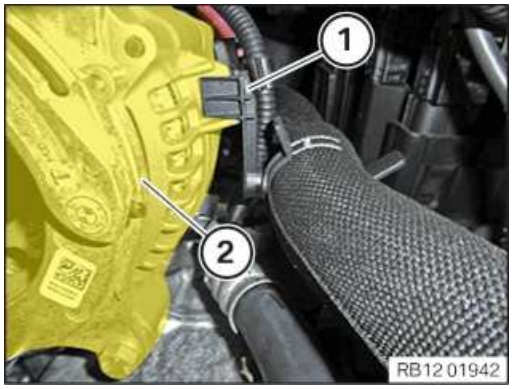
RISK OF DAMAGE

Electrostatic discharge.

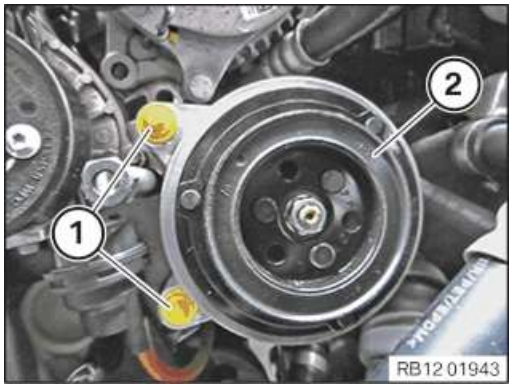
Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 ... Notes for ESD protection (electrostatic discharge)

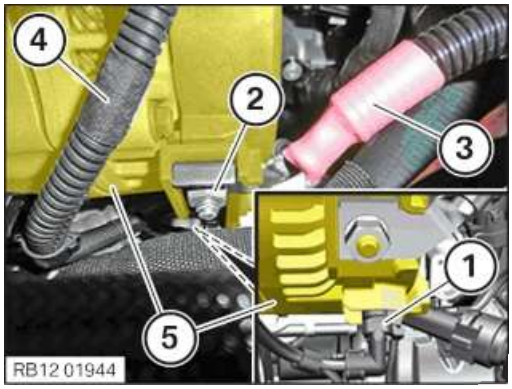
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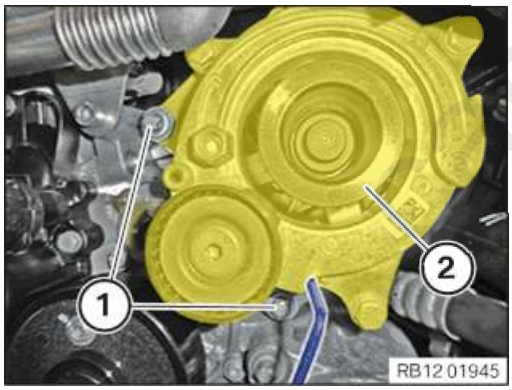
- Release the bracket (1) from the alternator (2).



- Loosen screws (1).
- Slide the air conditioning compressor (2) out and set it aside.



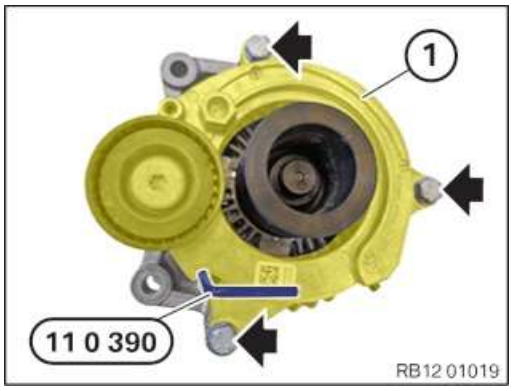
- Unlock the plug connection (1) and disconnect it from the alternator (5).
- Release the nut (2) on the alternator (5).
- Feed out positive battery cable (3) and put to one side.
- Remove the wiring harness section (4) and put to one side.



- Loosen screws (1).
- Guide out alternator (2) and remove.

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8 – Replace the belt tensioner



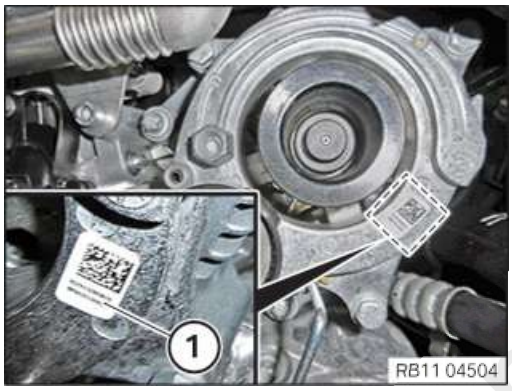
- Remove screws (arrows).
- Feed out the belt tensioner (1) on the alternator and remove it.
- Remove special tool 0 496 268 (11 0 390).

▸ **Replacing the belt tensioner**

TECHNICAL INFORMATION

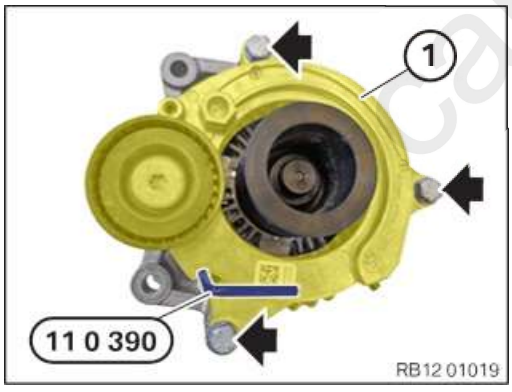
If **parts of the belt drive** are renewed, then the correct drive belt **must** be determined in the Electronic Parts Catalogue by using the part number of the belt tensioner. Mixed installation is not permitted.

The drive belt and the belt tensioner may have to be renewed.



- Note the part number (1) of the belt tensioner.
- Select the belt tensioner based on the part numbers read from the Electronic Parts Catalogue.

  Parts: Belt tensioner
- If necessary, renew the drive belt .



- Feed in the belt tensioner (1) at the alternator and install it.
- Tighten screws (arrows).

Belt tensioner to alternator/starter generator

M8X30		Tightening torque	28 Nm

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9 – Installing the alternator

CAUTION

Improper routing of the positive battery cable.

Risk of short circuits!

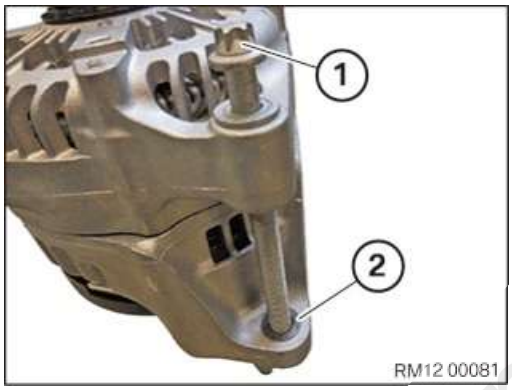
- Route the positive battery cable without abrasions and do not trap.

RISK OF DAMAGE

Improper routing of cables and wiring harnesses.

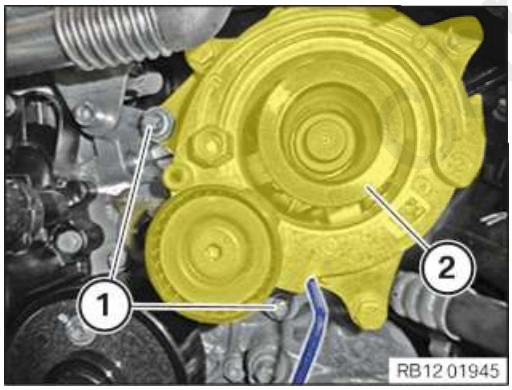
Trapped, crushed or damaged cables may cause short circuits and malfunctions.

- Route all cables without abrasions, do not trap and crush.



▸ **Prepare for the installation of the alternator**

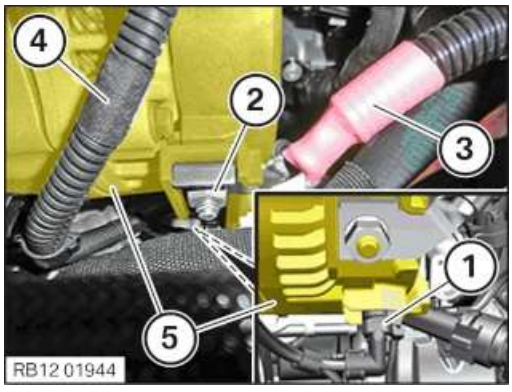
- Screw the screw (1) into the threaded support sleeve (2).
- Slightly press back the threaded support sleeve (2) using the bolt (1).
- Once again unscrew the screw (1) from the threaded support sleeve (2).



- Insert and install the alternator (2).
- Tighten the screws (1).

Alternator to component carrier

M10x75		Tightening torque	38 Nm
M10x125		Tightening torque	38 Nm
M10x90		Tightening torque	38 Nm



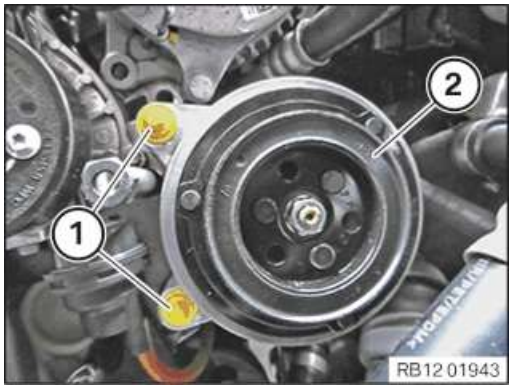
- Guide in the wiring harness section (4) and install.
- Insert and install the positive battery cable (3).
- Tighten the nut (2) on the alternator (5).

Positive battery cable to the alternator

M8		Tightening torque	19 Nm

- Connect the plug (1) with the alternator (5) and lock.

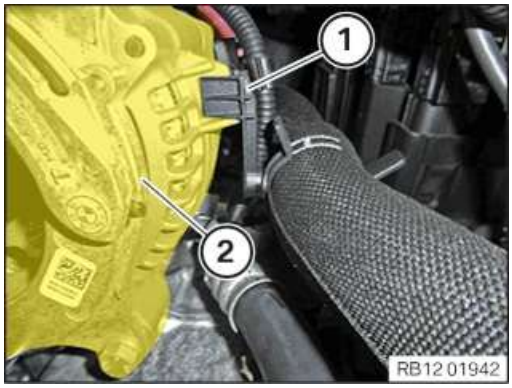
  The connector (1) must engage audibly.



- Insert and install the air conditioning compressor (2).
- Tighten the screws (1).

Air conditioning compressor in component carrier

M10		Tightening torque	38 Nm



- Secure holder (1) to alternator (2).

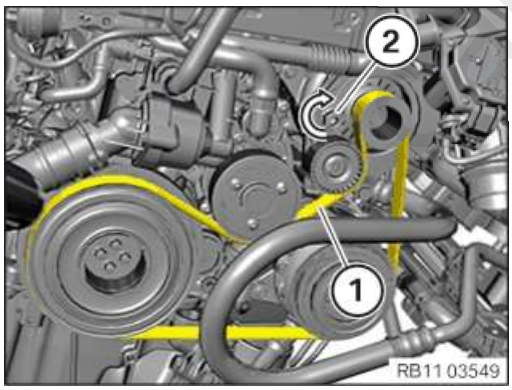
10 – Installing the drive belt for alternator

TECHNICAL INFORMATION

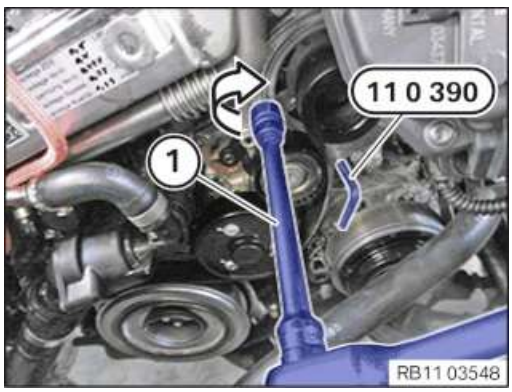
If the drive belt is reused: Mark direction of travel and reinstall drive belt in same direction of travel.

TECHNICAL INFORMATION

The drive belt must be replaced if contaminated with coolant- and oil residues.

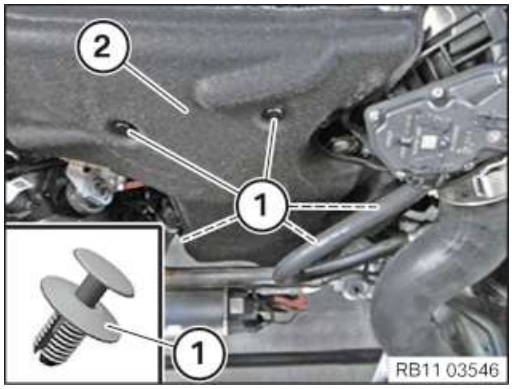


- Check drive belt for alternator (1) for coolant and oil residues and, if necessary, renew it.
- Relieve belt tensioner at hexagon head (2) up to limit position in direction of arrow.
- Install drive belt for alternator (1).



- Increase the preload of the belt tensioner using conventional tool (1) in the direction of arrow until the special tool 0 496 268 (11 0 390) can be removed.
- Remove special tool 0 496 268 (11 0 390).
- Stretch the drive belt for the alternator.

11 – Install acoustic cover for the engine, front

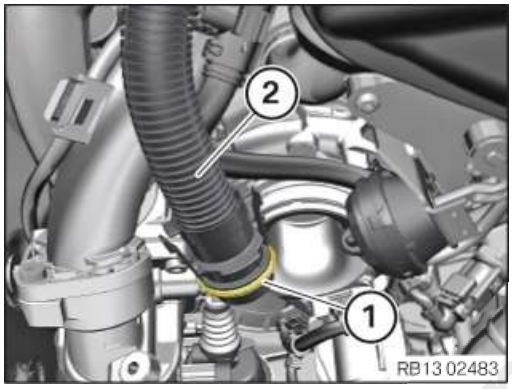


- Feed the acoustic cover (2) in and install.
- Secure the acoustic cover (2) with the expanding rivets (1).

12 – Installing the clean air pipe with resonator



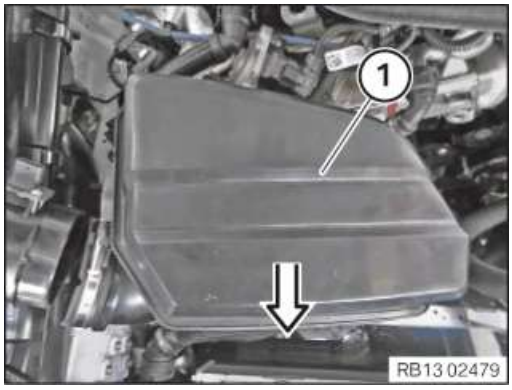
- Check the sealing ring (1) on the exhaust turbocharger for damage and renew if necessary.



- Check the sealing ring (1) for the engine ventilation line (2) for damage and renew where required.



- Feed in and install clean air pipe with resonator (1) in the direction of the arrow.

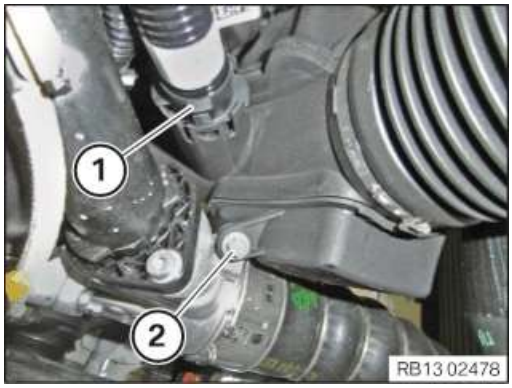


- Press and hold clean air pipe with resonator (1) in the direction of the arrow.



- Attach and lock the clamp (1).

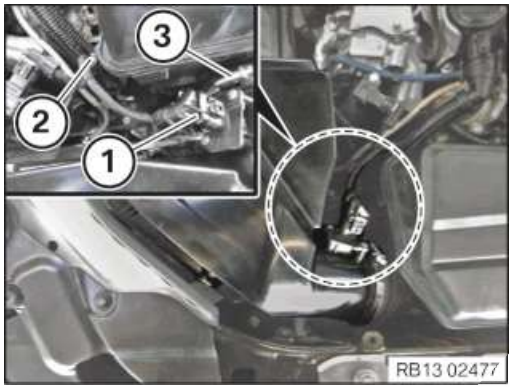
  The clamp (1) must engage audibly.



- Tighten down screw (2).

Clean air pipe to exhaust turbocharger

M6X20		Tightening torque	8 Nm



- Connect the clean air pipe with resonator to the intake filter housing.
- Tighten clamp (3).

Clean air pipe to upper section of intake filter housing

Clamp		Tightening torque	3 Nm

- Secure clamps (2).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

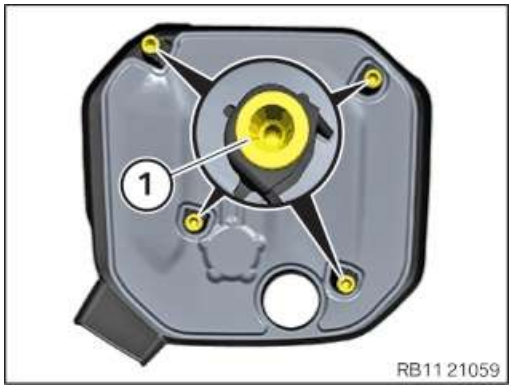
13 – Install acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover/design cover.

Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover/design cover.

- Disassemble or mount the acoustic cover/design cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover/design cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



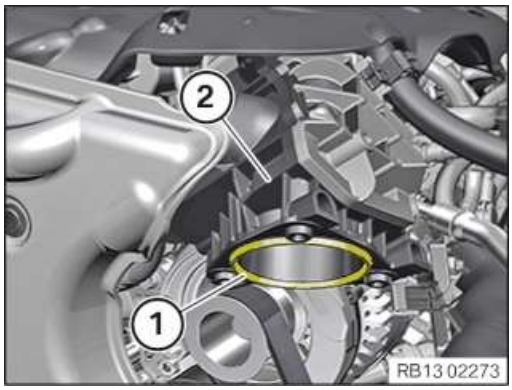
- Check the acoustic cover for correct fit of the rubber mounts (1).

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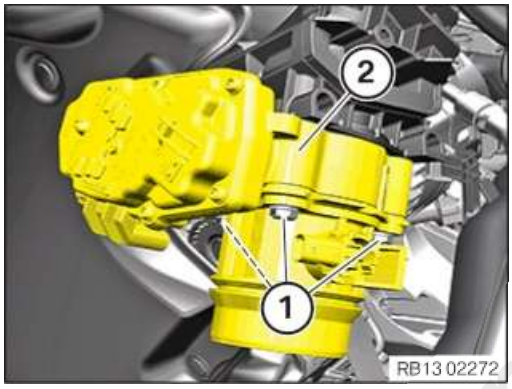
- Clip in the acoustic cover (1) into the holders in the indicated areas.

14 – Installing the throttle body



- Renew the sealing ring (1) on the intake plenum .

  Parts: Sealing ring



- Feed in and install the throttle body (2).
- Tighten the screws (1).

Throttle body to intake plenum

6x50	Tightening torque	8 Nm

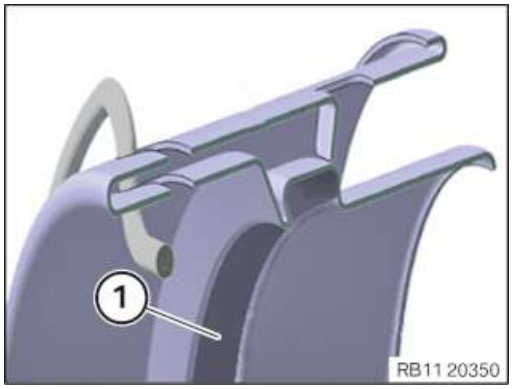


- Check the seal (1) for damage, renew if necessary.

▸ **Replacing damaged seal**

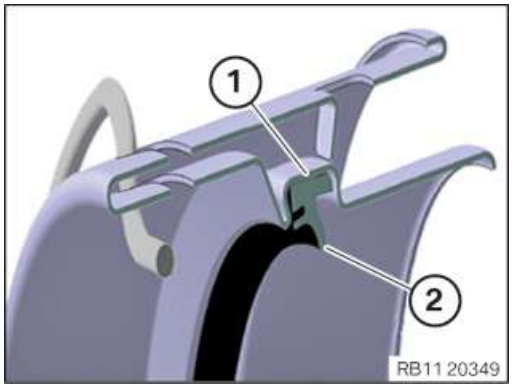
TECHNICAL INFORMATION

Do not use pointed or sharp-edged tools for the installation and/or removal.



- Remove damaged seal.
- Clean gasket groove (1) with a dry towel.

  The gasket groove (1) must be clean.



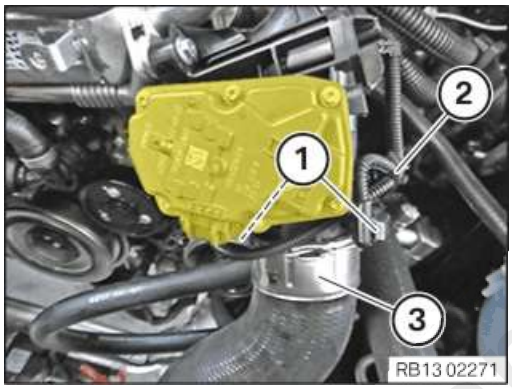
- Renew gasket.

  Parts: Gasket
- Install seal dry without lubricant or mounting agent.

TECHNICAL INFORMATION

Incorrect assembly is possible. Ensure correct installation position.

- Feed in and install the seal.
- Make sure the seal is correctly installed in the gasket groove (1).
- Make sure that the sealing lip (2) is directed inwards as shown.



- Connect the pressure pipe (3) and lock.

  The pressure pipe (3) must engage audibly.

NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- Secure clamps (2).
- Connect connectors (1) and lock.

  The connectors (1) must engage audibly.



- Lock clamp (1).

15 – Connecting all battery earth leads

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- See additional information.

Additional Information

Overview of Tightening Torques

Belt tensioner to alternator/starter generator			Used in step 8
M8X30		Tightening torque	28 Nm

Alternator to component carrier			Used in step 9
M10x75		Tightening torque	38 Nm
M10x125		Tightening torque	38 Nm
M10x90		Tightening torque	38 Nm

Positive battery cable to the alternator			Used in step 9
M8		Tightening torque	19 Nm

Air conditioning compressor in component carrier			Used in step 9
M10		Tightening torque	38 Nm

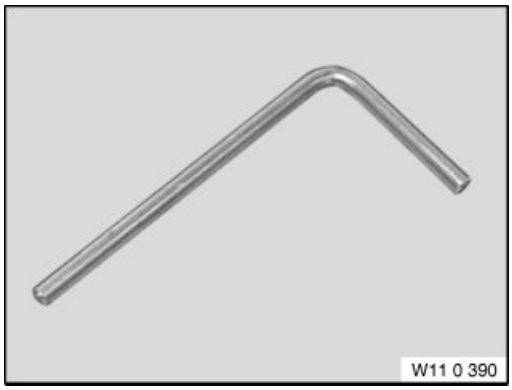
Clean air pipe to exhaust turbocharger			Used in step 12
M6X20		Tightening torque	8 Nm

Clean air pipe to upper section of intake filter housing			Used in step 12
Clamp		Tightening torque	3 Nm

Throttle body to intake plenum			Used in step 14
6x50		Tightening torque	8 Nm

Overview of Special Tools

0 496 268 (11 0 390) Pin



Common	Used in step 6810
Usage	(roll pin) For securing new tensioning pulley (poly-V belt)
Included in the tool or work	
Storage location	B24
Replaced by	
In connection with	
SI-Number	01 15 07 (390)

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Links

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	115
61 20 900 Disconnecting and connecting battery earth lead	115
61 20 900 Disconnecting and connecting battery earth lead	115
61 20 900 Disconnecting and connecting battery earth lead	115
61 20 900 Disconnecting and connecting battery earth lead	115
61 20 900 Disconnecting and connecting battery earth lead	115
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	115
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61 20 900 Disconnecting and connecting battery earth lead	115
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	115
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	115
61 20 900 Disconnecting and connecting battery earth lead	115
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	115
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	115
61 20 900 Disconnecting and connecting battery earth lead	115
61 20 900 Disconnecting and connecting battery earth lead	115
61 20 900 Disconnecting and connecting battery earth lead	115
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61 20 900 Disconnecting and connecting battery earth lead	115
61 20 900 Disconnecting and connecting battery earth lead	115
61 20 900 Disconnecting and connecting battery earth lead	115
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61 20 900 Disconnecting and connecting battery earth lead	115

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61 20 900 Disconnecting and connecting battery earth lead	115
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	115
61 20 900 Disconnecting and connecting battery earth lead	115
61 20 900 Disconnecting and connecting battery earth lead	115
61 20 900 Disconnecting and connecting battery earth lead	115
61 35 ... Notes on ESD protection (Electro Static Discharge)	27
61 35 ... Notes on ESD protection (Electro Static Discharge)	279

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11 28 060 Replacing belt tensioner of drive belt for air conditioning compressor

PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

2 – Removing the throttle body

WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.

RISK OF DAMAGE

Electrostatic discharge.

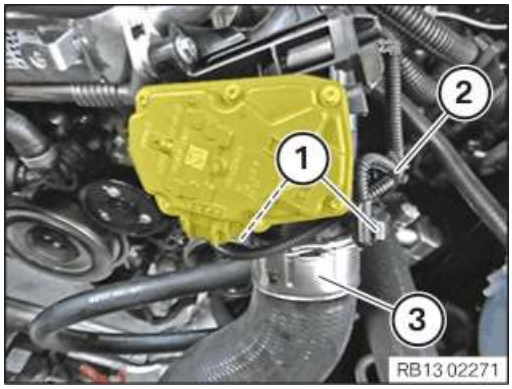
Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 ... Notes for ESD protection (electrostatic discharge)



- Unlock clamp (1) and engage in this position.

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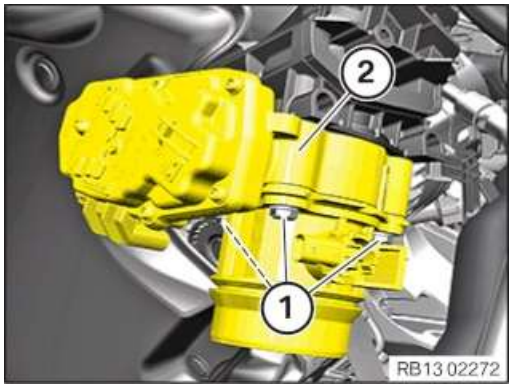


- Unlock and disconnect plug connections (1).

NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- Loosen clamp (2).
- Unlock and disconnect the pressure pipe (3).



- Loosen screws (1).
- Remove throttle body (2).

3 – Removing the acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover/design cover.

Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover/design cover.

- Disassemble or mount the acoustic cover/design cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover/design cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Unclip the acoustic cover (1) from the holders in the indicated area towards the top.

4 – Removing the clean air pipe with the resonator

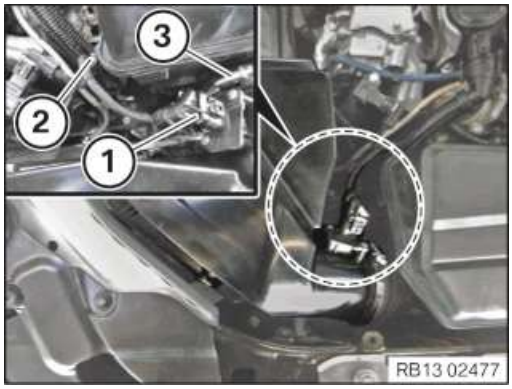
WARNING

Hot surfaces.

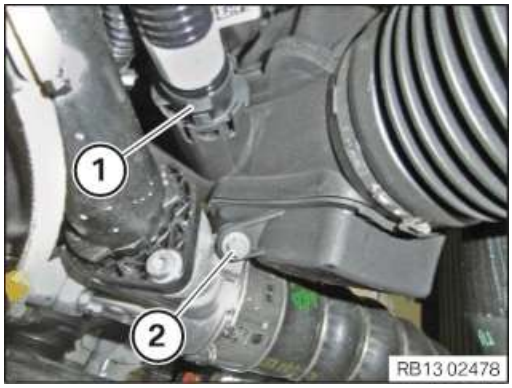
Risk of burning!

- Perform all work only on components that have cooled down.

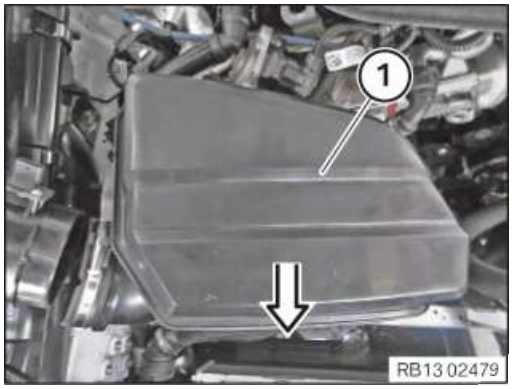
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- Unlock plug connection (1) and disconnect.
- Loosen clamp (2).
- Unfasten clamp (3).
- Separate the clean air pipe with resonator from the intake filter housing.



- Unlock engine ventilation line (1), disconnect it and place it aside.
- Loosen screw (2).



- Press and hold clean air pipe with resonator (1) in the direction of the arrow.



- Unlock and loosen clamp (1).



- Feed out and remove clean air pipe with resonator (1) in the direction of the arrow.

5 – Remove acoustic cover of the front engine

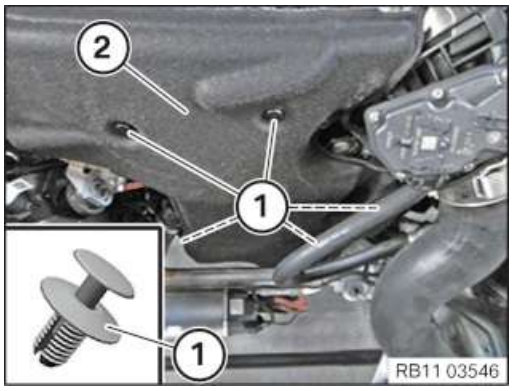
rdiagn.com

WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.



- Release and remove expanding rivet (1).
- Guide the acoustic cover (2) out and remove.

6 – Removing the drive belt for alternator

CAUTION

Spring preload.

Danger of injury!

- The use of the specified special tool (tool) is mandatory.
- The described operation must be carried out properly.

CAUTION

Component with preload.

Danger of injury!

- Reduce preload as far as possible before disassembly. Relieve component.

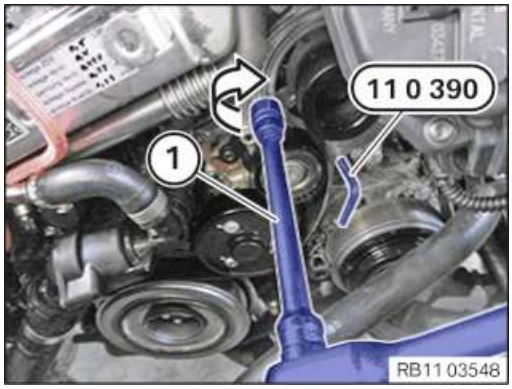
TECHNICAL INFORMATION

If the drive belt is reused: Mark direction of travel and reinstall drive belt in same direction of travel.

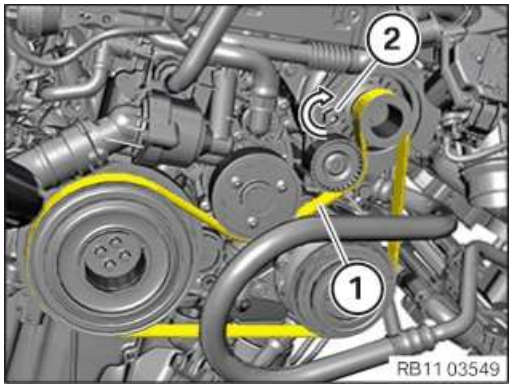
TECHNICAL INFORMATION

The drive belt must be replaced if contaminated with coolant- and oil residues.

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- If reusing the drive belt for alternator: Mark the direction of rotation.
- Relax the belt tensioner in the direction of the arrow using a standard tool (1).
- Fix the belt tensioner with the special tool 0 496 268 (11 0 390).



- Relieve belt tensioner at hexagon head (2) in direction of arrow up to limit position.
- Guide out and remove drive belt for alternator (1).

7 – Removing the alternator

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.
- Detach battery earth lead from battery.
- With auxiliary batteries: Detach all battery earth leads from additional batteries.

RISK OF DAMAGE

Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

- Do not pull on the wires when disconnecting connectors and plug connections.

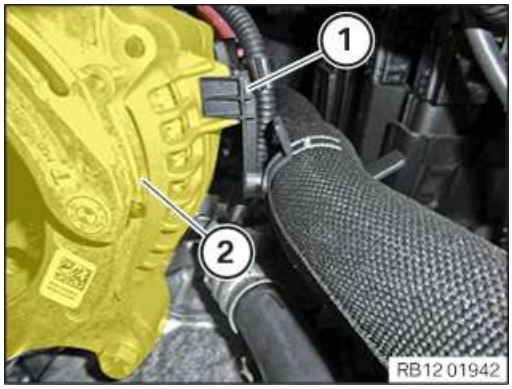
RISK OF DAMAGE

Electrostatic discharge.

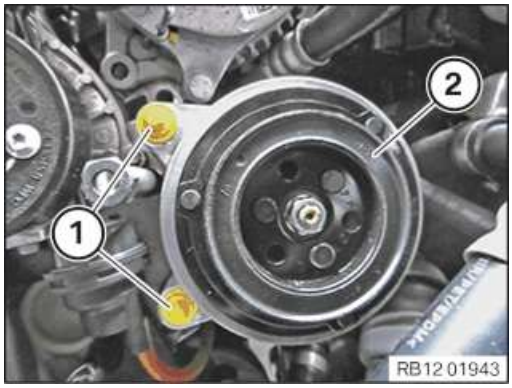
Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 ... Notes for ESD protection (electrostatic discharge)

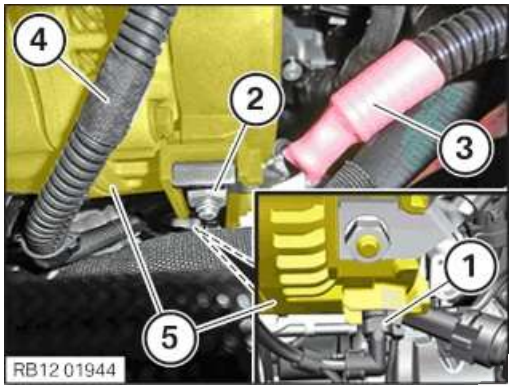
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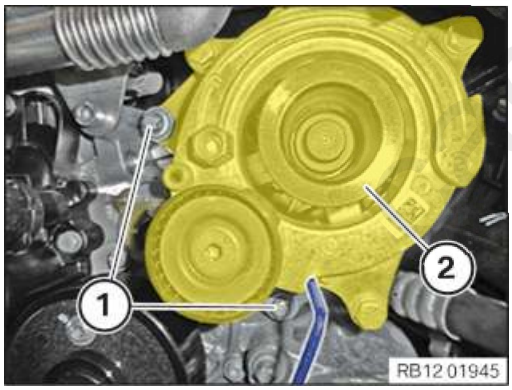
- Release the bracket (1) from the alternator (2).



- Loosen screws (1).
- Slide the air conditioning compressor (2) out and set it aside.



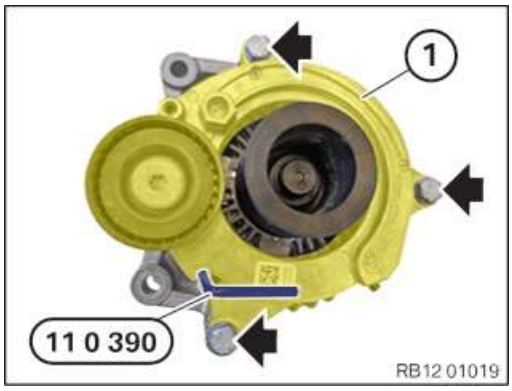
- Unlock the plug connection (1) and disconnect it from the alternator (5).
- Release the nut (2) on the alternator (5).
- Feed out positive battery cable (3) and put to one side.
- Remove the wiring harness section (4) and put to one side.



- Loosen screws (1).
- Guide out alternator (2) and remove.

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8 – Replace the belt tensioner



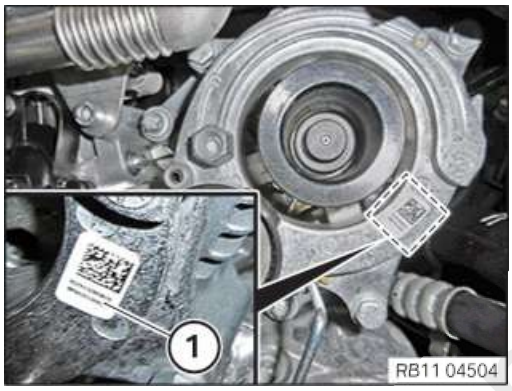
- Remove screws (arrows).
- Feed out the belt tensioner (1) on the alternator and remove it.
- Remove special tool 0 496 268 (11 0 390).

▸ **Replacing the belt tensioner**

TECHNICAL INFORMATION

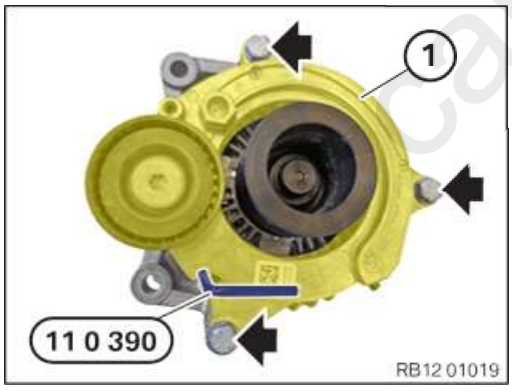
If **parts of the belt drive** are renewed, then the correct drive belt **must** be determined in the Electronic Parts Catalogue by using the part number of the belt tensioner. Mixed installation is not permitted.

The drive belt and the belt tensioner may have to be renewed.



- Note the part number (1) of the belt tensioner.
- Select the belt tensioner based on the part numbers read from the Electronic Parts Catalogue.

  Parts: Belt tensioner
- If necessary, renew the drive belt .



- Feed in the belt tensioner (1) at the alternator and install it.
- Tighten screws (arrows).

Belt tensioner to alternator/starter generator

M8X30		Tightening torque	28 Nm

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9 – Installing the alternator

CAUTION

Improper routing of the positive battery cable.

Risk of short circuits!

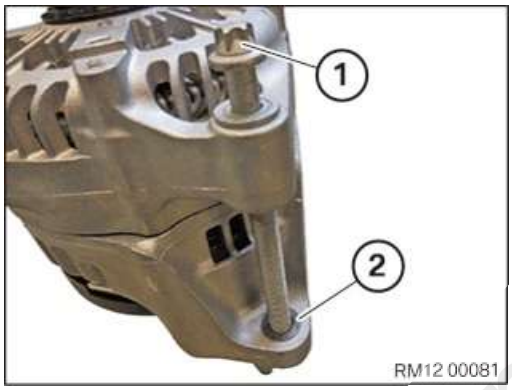
- Route the positive battery cable without abrasions and do not trap.

RISK OF DAMAGE

Improper routing of cables and wiring harnesses.

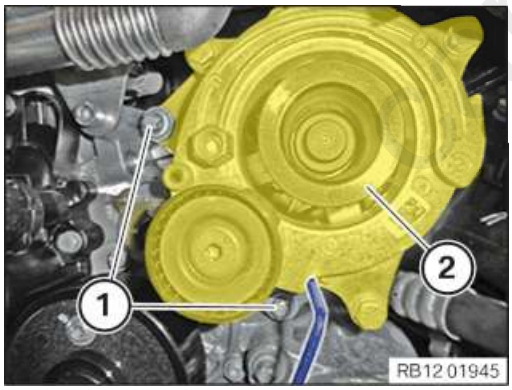
Trapped, crushed or damaged cables may cause short circuits and malfunctions.

- Route all cables without abrasions, do not trap and crush.



▸ **Prepare for the installation of the alternator**

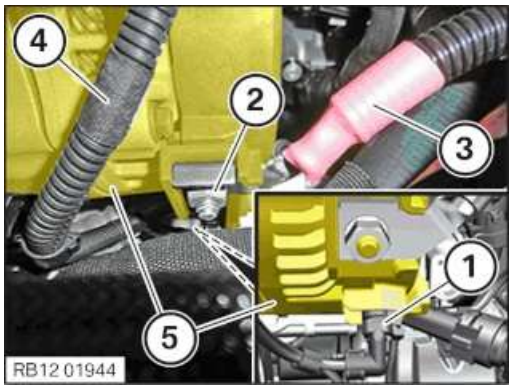
- Screw the screw (1) into the threaded support sleeve (2).
- Slightly press back the threaded support sleeve (2) using the bolt (1).
- Once again unscrew the screw (1) from the threaded support sleeve (2).



- Insert and install the alternator (2).
- Tighten the screws (1).

Alternator to component carrier

M10x75		Tightening torque	38 Nm
M10x125		Tightening torque	38 Nm
M10x90		Tightening torque	38 Nm



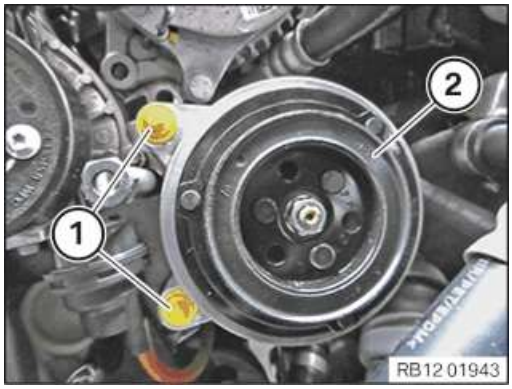
- Guide in the wiring harness section (4) and install.
- Insert and install the positive battery cable (3).
- Tighten the nut (2) on the alternator (5).

Positive battery cable to the alternator

M8		Tightening torque	19 Nm

- Connect the plug (1) with the alternator (5) and lock.

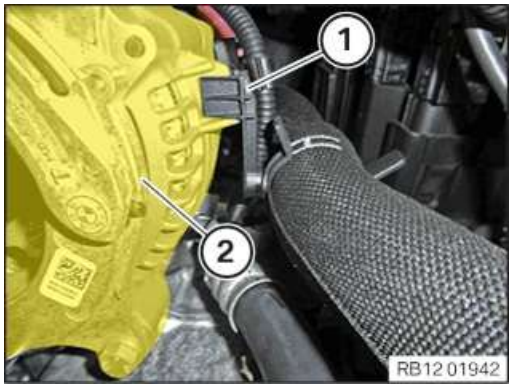
  The connector (1) must engage audibly.



- Insert and install the air conditioning compressor (2).
- Tighten the screws (1).

Air conditioning compressor in component carrier

M10		Tightening torque	38 Nm



- Secure holder (1) to alternator (2).

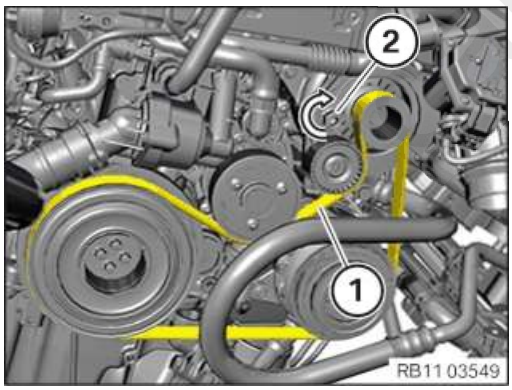
10 – Installing the drive belt for alternator

TECHNICAL INFORMATION

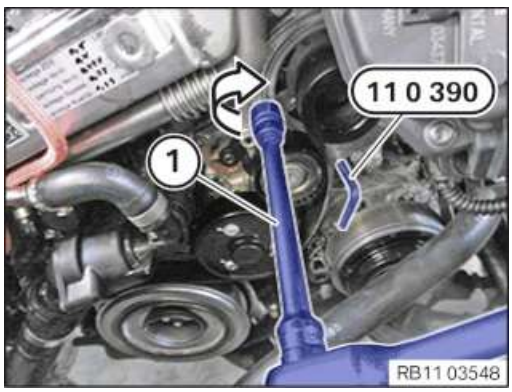
If the drive belt is reused: Mark direction of travel and reinstall drive belt in same direction of travel.

TECHNICAL INFORMATION

The drive belt must be replaced if contaminated with coolant- and oil residues.

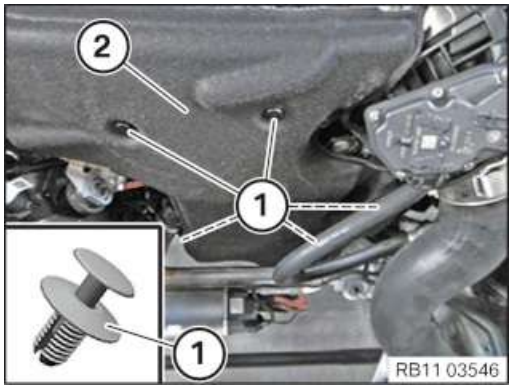


- Check drive belt for alternator (1) for coolant and oil residues and, if necessary, renew it.
- Relieve belt tensioner at hexagon head (2) up to limit position in direction of arrow.
- Install drive belt for alternator (1).



- Increase the preload of the belt tensioner using conventional tool (1) in the direction of arrow until the special tool 0 496 268 (11 0 390) can be removed.
- Remove special tool 0 496 268 (11 0 390).
- Stretch the drive belt for the alternator.

11 – Install acoustic cover for the engine, front

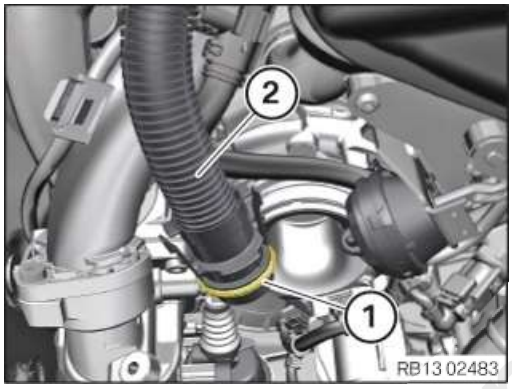


- Feed the acoustic cover (2) in and install.
- Secure the acoustic cover (2) with the expanding rivets (1).

12 – Installing the clean air pipe with resonator



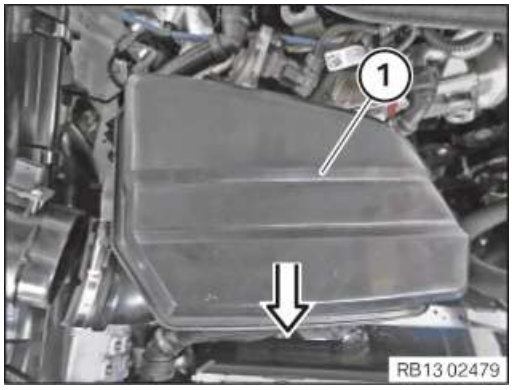
- Check the sealing ring (1) on the exhaust turbocharger for damage and renew if necessary.



- Check the sealing ring (1) for the engine ventilation line (2) for damage and renew where required.



- Feed in and install clean air pipe with resonator (1) in the direction of the arrow.

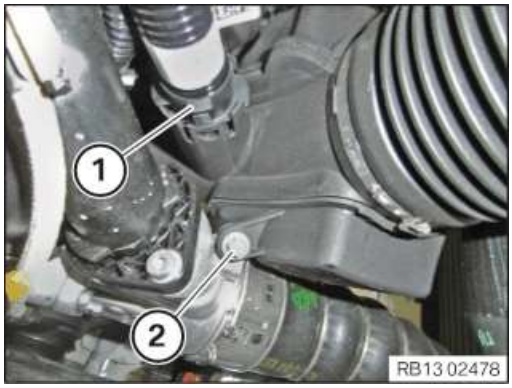


- Press and hold clean air pipe with resonator (1) in the direction of the arrow.



- Attach and lock the clamp (1).

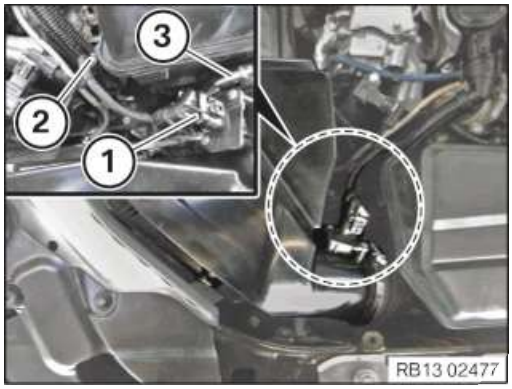
  The clamp (1) must engage audibly.



- Tighten down screw (2).

Clean air pipe to exhaust turbocharger

M6X20		Tightening torque	8 Nm



- Connect the clean air pipe with resonator to the intake filter housing.
- Tighten clamp (3).

Clean air pipe to upper section of intake filter housing

Clamp		Tightening torque	3 Nm

- Secure clamps (2).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

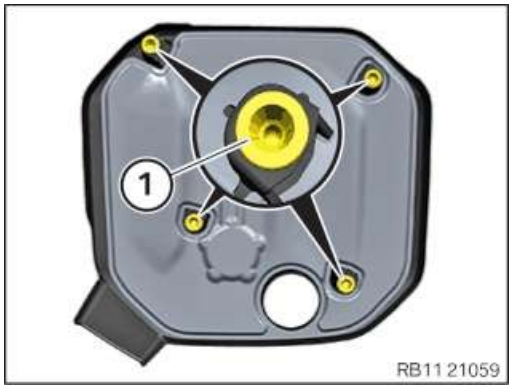
13 – Install acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover/design cover.

Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover/design cover.

- Disassemble or mount the acoustic cover/design cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover/design cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



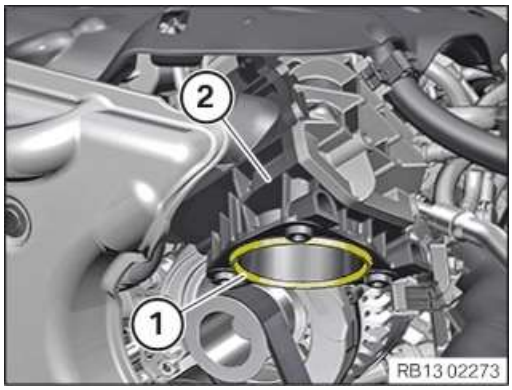
- Check the acoustic cover for correct fit of the rubber mounts (1).

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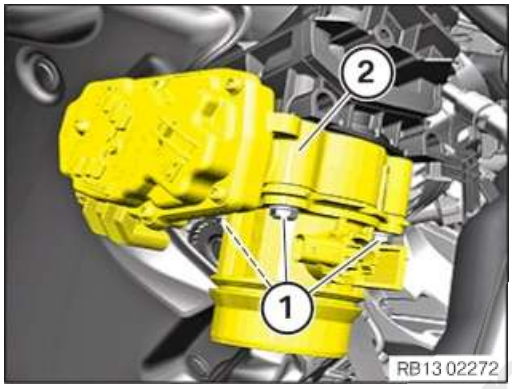
- Clip in the acoustic cover (1) into the holders in the indicated areas.

14 – Installing the throttle body



- Renew the sealing ring (1) on the intake plenum .

  Parts: Sealing ring



- Feed in and install the throttle body (2).
- Tighten the screws (1).

Throttle body to intake plenum

6x50	Tightening torque	8 Nm

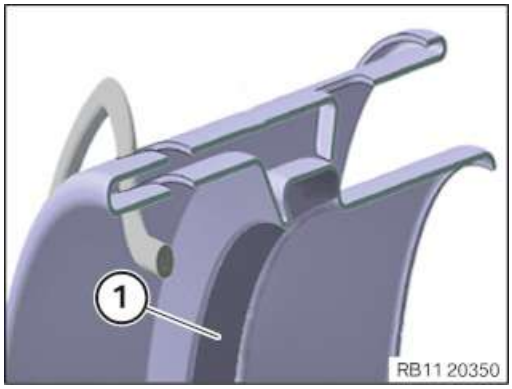


- Check the seal (1) for damage, renew if necessary.

▸ **Replacing damaged seal**

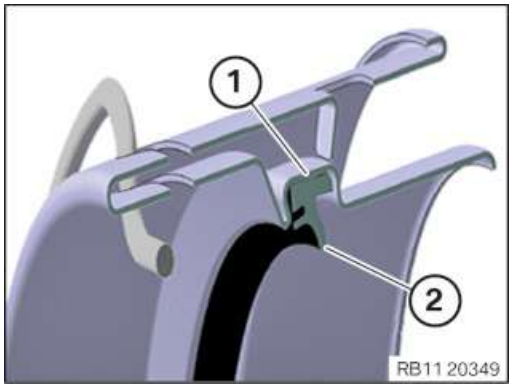
TECHNICAL INFORMATION

Do not use pointed or sharp-edged tools for the installation and/or removal.



- Remove damaged seal.
- Clean gasket groove (1) with a dry towel.

  The gasket groove (1) must be clean.



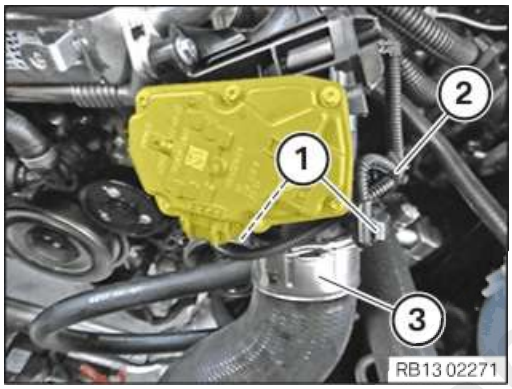
- Renew gasket.

  Parts: Gasket
- Install seal dry without lubricant or mounting agent.

TECHNICAL INFORMATION

Incorrect assembly is possible. Ensure correct installation position.

- Feed in and install the seal.
- Make sure the seal is correctly installed in the gasket groove (1).
- Make sure that the sealing lip (2) is directed inwards as shown.



- Connect the pressure pipe (3) and lock.

  The pressure pipe (3) must engage audibly.

NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- Secure clamps (2).
- Connect connectors (1) and lock.

  The connectors (1) must engage audibly.



- Lock clamp (1).

15 – Connecting all battery earth leads

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- See additional information.

Additional Information

Overview of Tightening Torques

Belt tensioner to alternator/starter generator			Used in step 8
M8X30		Tightening torque	28 Nm

Alternator to component carrier			Used in step 9
M10x75		Tightening torque	38 Nm
M10x125		Tightening torque	38 Nm
M10x90		Tightening torque	38 Nm

Positive battery cable to the alternator			Used in step 9
M8		Tightening torque	19 Nm

Air conditioning compressor in component carrier			Used in step 9
M10		Tightening torque	38 Nm

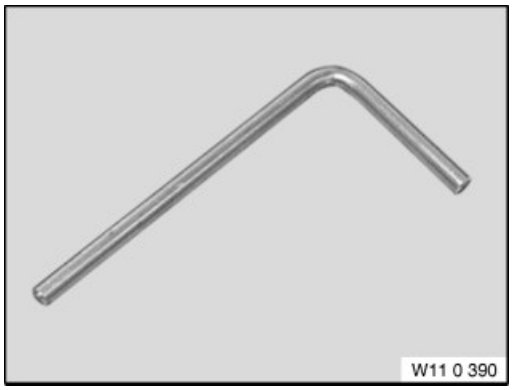
Clean air pipe to exhaust turbocharger			Used in step 12
M6X20		Tightening torque	8 Nm

Clean air pipe to upper section of intake filter housing			Used in step 12
Clamp		Tightening torque	3 Nm

Throttle body to intake plenum			Used in step 14
6x50		Tightening torque	8 Nm

Overview of Special Tools

0 496 268 (11 0 390) Pin



Common	Used in step 6810
Usage	(roll pin) For securing new tensioning pulley (poly-V belt)
Included in the tool or work	
Storage location	B24
Replaced by	
In connection with	
SI-Number	01 15 07 (390)

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Links

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	115
61 20 900 Disconnecting and connecting battery earth lead	115
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61 20 900 Disconnecting and connecting battery earth lead	115
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	115
61 20 900 Disconnecting and connecting battery earth lead	115
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61 35 ... Notes on ESD protection (Electro Static Discharge)	27
61 35 ... Notes on ESD protection (Electro Static Discharge)	279

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11 28 050 Replacing drive belt for air conditioning compressor

PRELIMINARY WORK

1 – Removing the acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover/design cover.

Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover/design cover.

- Disassemble or mount the acoustic cover/design cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover/design cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Unclip the acoustic cover (1) from the holders in the indicated area towards the top.

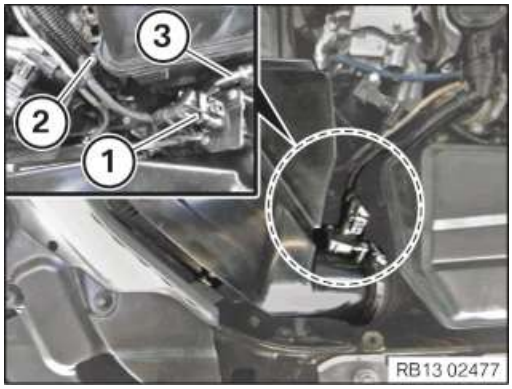
2 – Removing the clean air pipe with the resonator

WARNING

Hot surfaces.

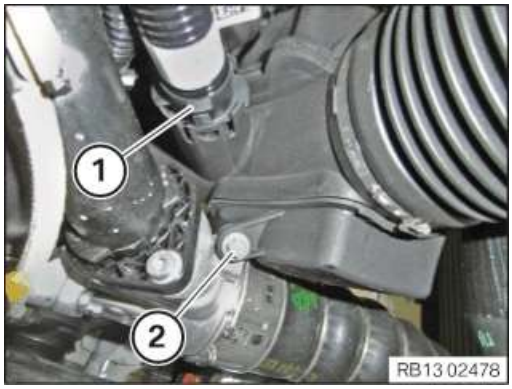
Risk of burning!

- Perform all work only on components that have cooled down.

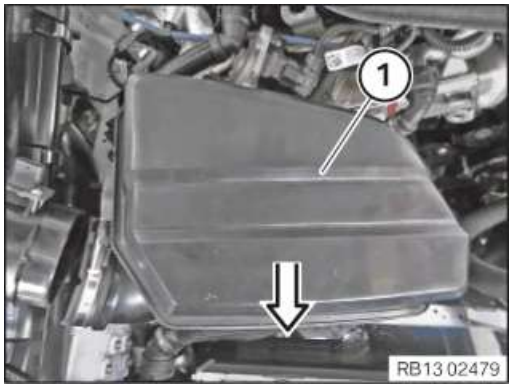


- Unlock plug connection (1) and disconnect.
- Loosen clamp (2).
- Unfasten clamp (3).
- Separate the clean air pipe with resonator from the intake filter housing.

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- Unlock engine ventilation line (1), disconnect it and place it aside.
- Loosen screw (2).



- Press and hold clean air pipe with resonator (1) in the direction of the arrow.



- Unlock and loosen clamp (1).



- Feed out and remove clean air pipe with resonator (1) in the direction of the arrow.

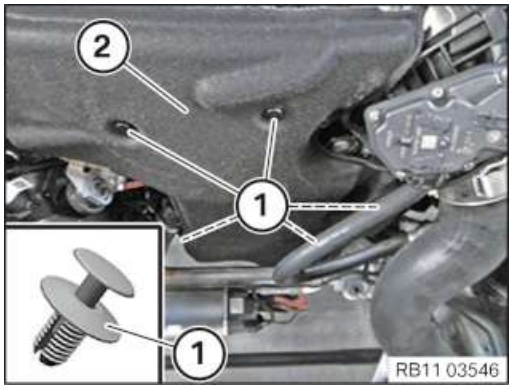
3 – Remove acoustic cover of the front engine

WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.



- Release and remove expanding rivet (1).
- Guide the acoustic cover (2) out and remove.

MAIN WORK

4 – Removing the drive belt for the starter motor generator

CAUTION

Spring preload.

Danger of injury!

- The use of the specified special tool (tool) is mandatory.
- The described operation must be carried out properly.

CAUTION

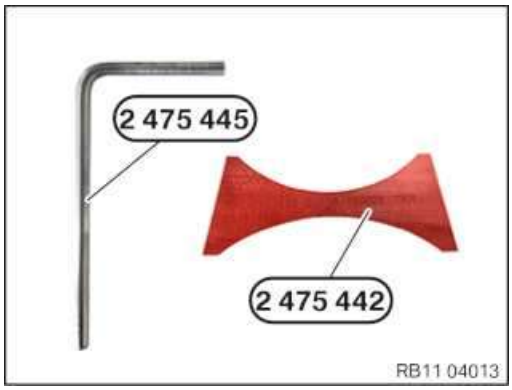
Component with preload.

Danger of injury!

- Reduce preload as far as possible before disassembly. Relieve component.

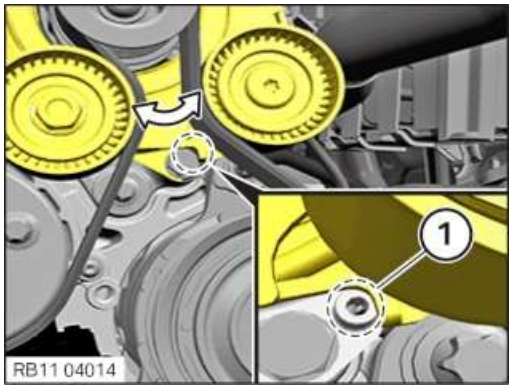
TECHNICAL INFORMATION

The drive belt must be replaced if contaminated with coolant- and oil residues.

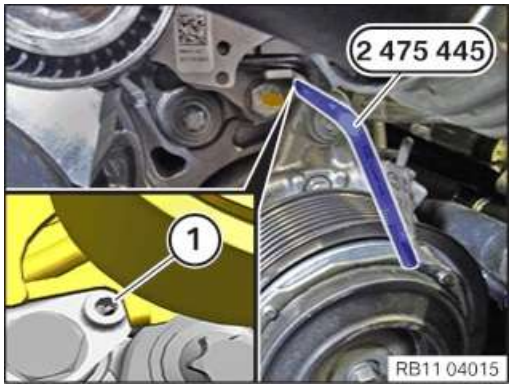


- Prepare the special tool 2 475 442 and the special tool 2 475 445.

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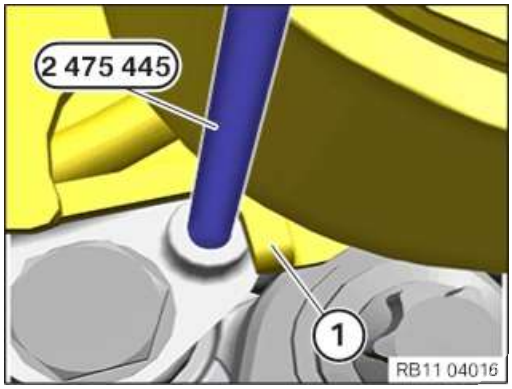


- Position the belt tensioner in the direction of the arrow so that the bore hole is visible in the area (1).

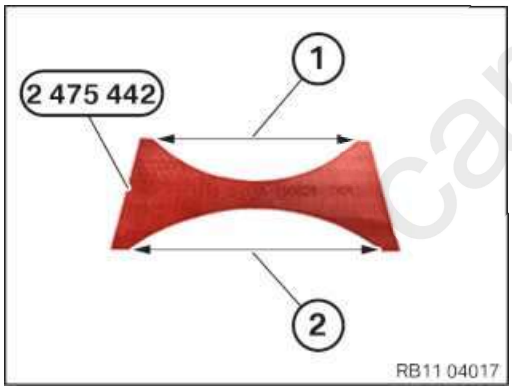


- Guide in the special tool 2 475 445 and install it in the bore hole (1).

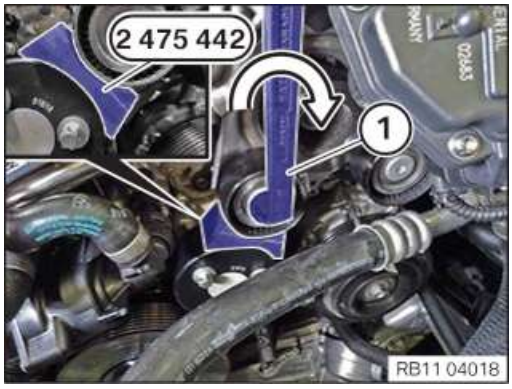
  The special tool 2 475 445 must rest against the starter motor generator.



- Ensure that the belt tensioner (1) is supported on the special tool 2 475 445.



- Ensure that the radius (1) of the special tool 2 475 442 supports the tensioning pulley of the belt tensioner.
- Ensure that the radius (2) of the special tool 2 475 442 is supported on the belt pulley of the coolant pump.

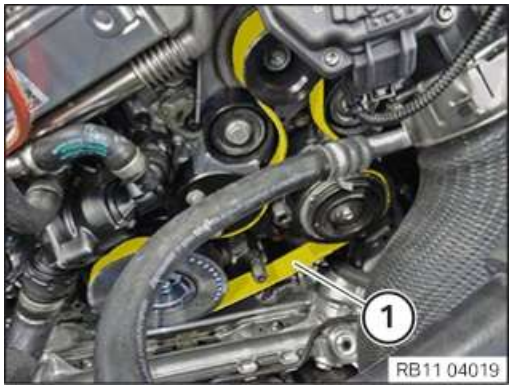


TECHNICAL INFORMATION

Conduct the following operation with the assistance of a second person.

- Twist the tensioning pulley (1) in the direction of the arrow.
- Guide in and install the special tool 2 475 442 between the belt pulley of the coolant pump and the tensioning pulley.

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TECHNICAL INFORMATION

If the drive belt is reused: Mark direction of travel and reinstall drive belt in same direction of travel.

- Guide out and remove the drive belt (1) for the starter motor generator.

5 – Installing the drive belt for the starter motor generator

CAUTION

Spring preload.

Danger of injury!

- The use of the specified special tool (tool) is mandatory.
- The described operation must be carried out properly.

CAUTION

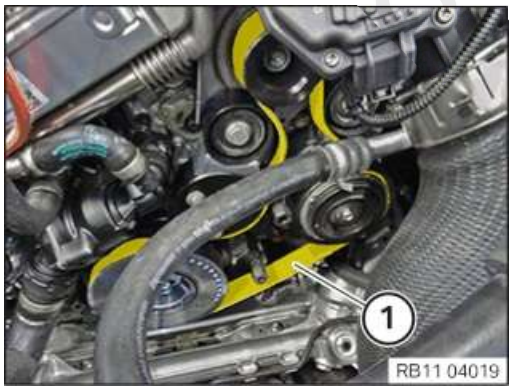
Component with preload.

Danger of injury!

- Reduce preload as far as possible before disassembly. Relieve component.

TECHNICAL INFORMATION

The drive belt must be replaced if contaminated with coolant- and oil residues.

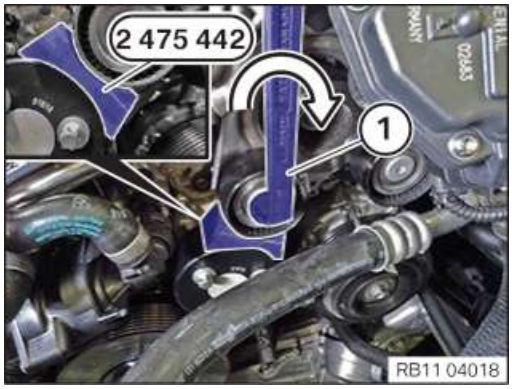


TECHNICAL INFORMATION

If the drive belt is reused: Mark direction of travel and reinstall drive belt in same direction of travel.

- Feed in and install the drive belt (1) for the starter motor generator.

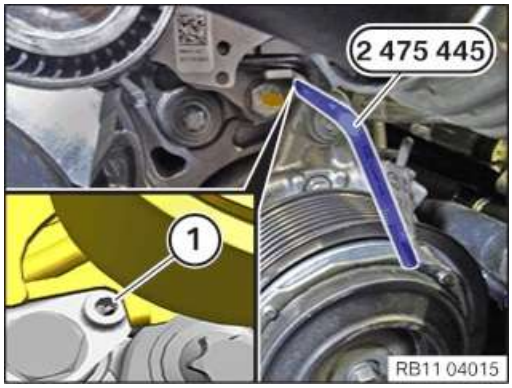
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TECHNICAL INFORMATION

Conduct the following operation with the assistance of a second person.

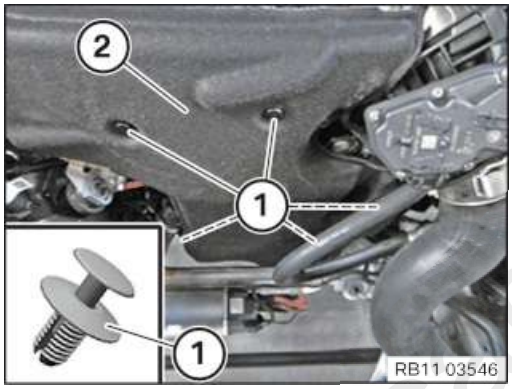
- Turn the tensioning pulley in (1) in the direction of arrow.
- Feed out the special tool 2 475 442 between the belt pulley of the coolant pump and the tensioning pulley and remove it.



- Feed out the special tool 2 475 445 from the bore hole (1) and remove it.

POSTPROCESSES

6 – Install acoustic cover for the engine, front



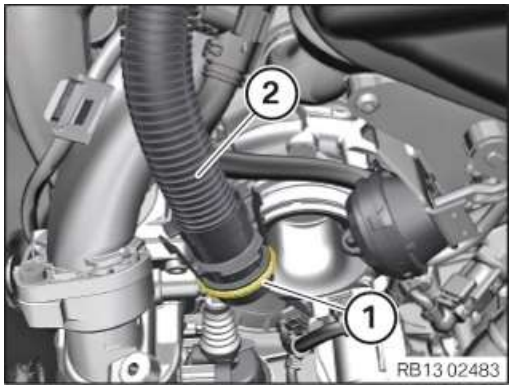
- Feed the acoustic cover (2) in and install.
- Secure the acoustic cover (2) with the expanding rivets (1).

7 – Installing the clean air pipe with resonator



- Check the sealing ring (1) on the exhaust turbocharger for damage and renew if necessary.

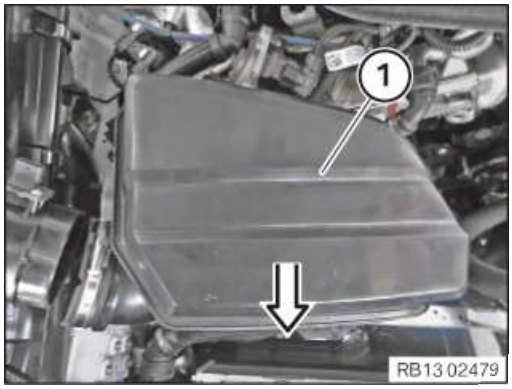
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- Check the sealing ring (1) for the engine ventilation line (2) for damage and renew where required.



- Feed in and install clean air pipe with resonator (1) in the direction of the arrow.

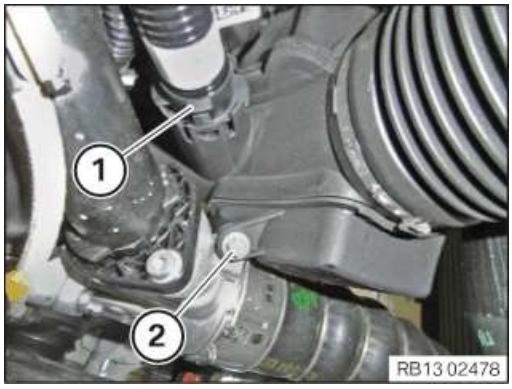


- Press and hold clean air pipe with resonator (1) in the direction of the arrow.



- Attach and lock the clamp (1).

  The clamp (1) must engage audibly.

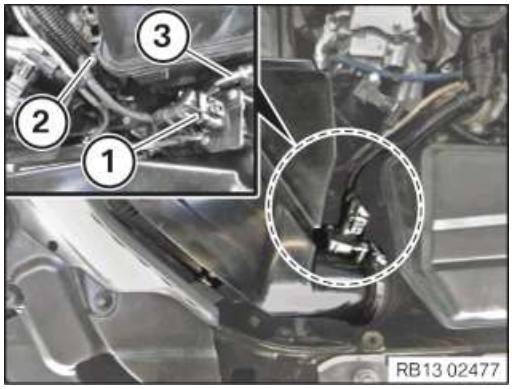


- Tighten down screw (2).

Clean air pipe to exhaust turbocharger

M6X20		Tightening torque	8 Nm

rdiagn.com



- Connect the clean air pipe with resonator to the intake filter housing.
- Tighten clamp (3).

Clean air pipe to upper section of intake filter housing

Clamp		Tightening torque	3 Nm

- Secure clamps (2).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

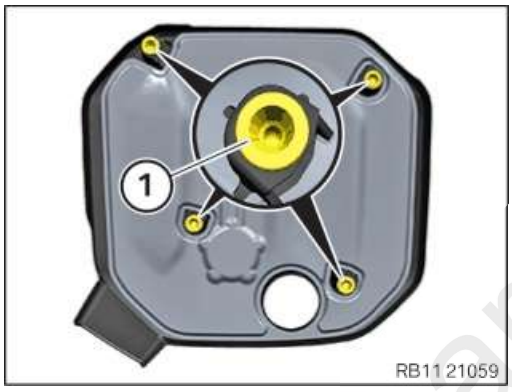
8 – Install acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover/design cover.

Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover/design cover.

- Disassemble or mount the acoustic cover/design cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover/design cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Check the acoustic cover for correct fit of the rubber mounts (1).



- Clip in the acoustic cover (1) into the holders in the indicated areas.

Additional Information

Overview of Tightening Torques

Clean air pipe to exhaust turbocharger Used in step 7

M6X20		Tightening torque	8 Nm

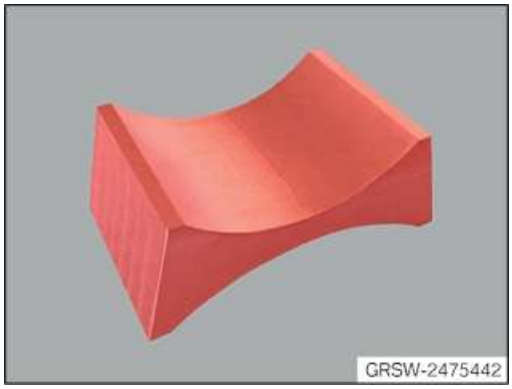
ardiagn.com

Clean air pipe to upper section of intake filter housing Used in step 7

Clamp		Tightening torque	3 Nm

Overview of Special Tools

2 475 442 Removal and installation tool



Common Used in step 45

Usage	For removing and installing the drive belt of the ancillary components.
Included in the tool or work	
Storage location	A8
Replaced by	
In connection with	83302475445
SI-Number	01 19 19 (668)

2 475 445 Pin



Common Used in step 45

Usage	Tool for drive belt of 48 V ancillary components
Included in the tool or work	
Storage location	A8
Replaced by	
In connection with	83302475442 83302475444
SI-Number	01 19 19 (668)

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11 28 050 Replacing drive belt for air conditioning compressor

PRELIMINARY WORK

1 – Removing the acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover/design cover.

Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover/design cover.

- Disassemble or mount the acoustic cover/design cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover/design cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Unclip the acoustic cover (1) from the holders in the indicated area towards the top.

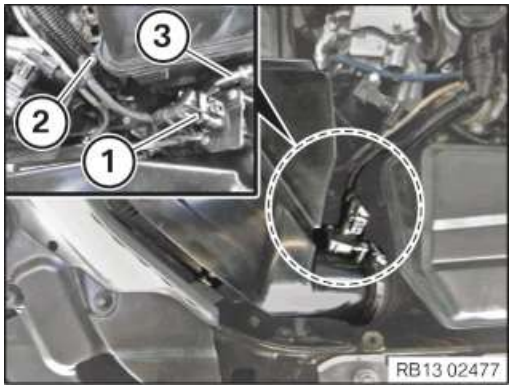
2 – Removing the clean air pipe with the resonator

WARNING

Hot surfaces.

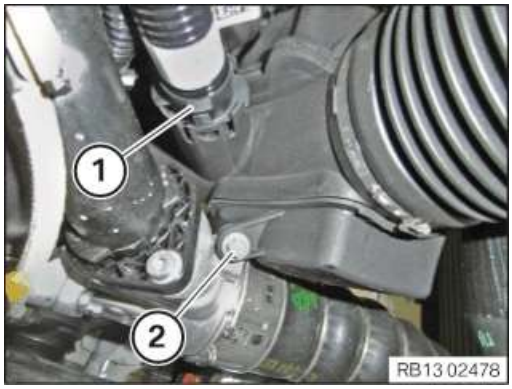
Risk of burning!

- Perform all work only on components that have cooled down.

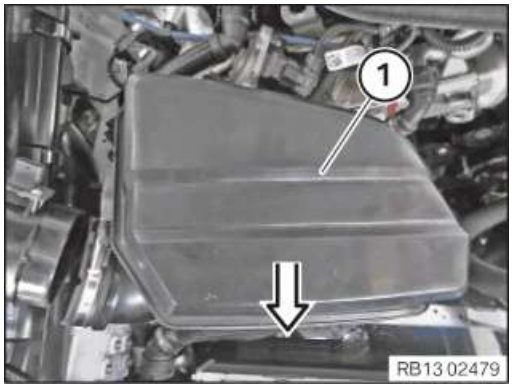


- Unlock plug connection (1) and disconnect.
- Loosen clamp (2).
- Unfasten clamp (3).
- Separate the clean air pipe with resonator from the intake filter housing.

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- Unlock engine ventilation line (1), disconnect it and place it aside.
- Loosen screw (2).



- Press and hold clean air pipe with resonator (1) in the direction of the arrow.



- Unlock and loosen clamp (1).



- Feed out and remove clean air pipe with resonator (1) in the direction of the arrow.

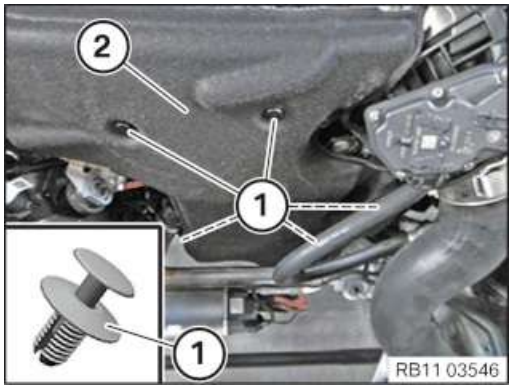
3 – Remove acoustic cover of the front engine

WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.



- Release and remove expanding rivet (1).
- Guide the acoustic cover (2) out and remove.

MAIN WORK

4 – Removing the drive belt for alternator

CAUTION

Spring preload.

Danger of injury!

- The use of the specified special tool (tool) is mandatory.
- The described operation must be carried out properly.

CAUTION

Component with preload.

Danger of injury!

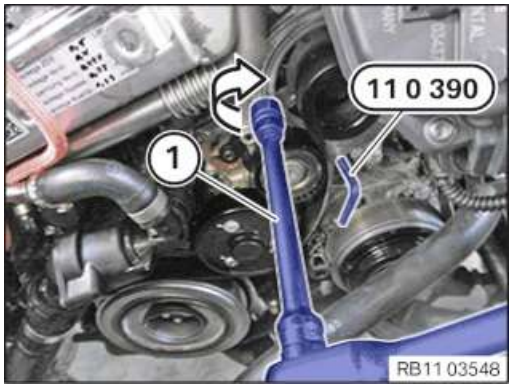
- Reduce preload as far as possible before disassembly. Relieve component.

TECHNICAL INFORMATION

If the drive belt is reused: Mark direction of travel and reinstall drive belt in same direction of travel.

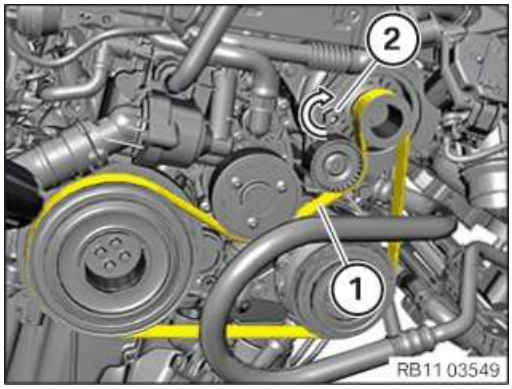
TECHNICAL INFORMATION

The drive belt must be replaced if contaminated with coolant- and oil residues.



- If reusing the drive belt for alternator: Mark the direction of rotation.
- Relax the belt tensioner in the direction of the arrow using a standard tool (1).
- Fix the belt tensioner with the special tool 0 496 268 (11 0 390).

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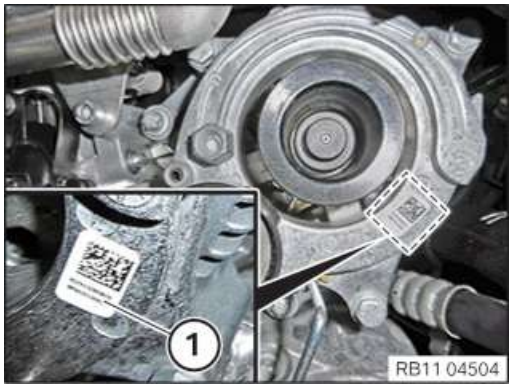
- Relieve belt tensioner at hexagon head (2) in direction of arrow up to limit position.
- Guide out and remove drive belt for alternator (1).

5 – Replacing the drive belt

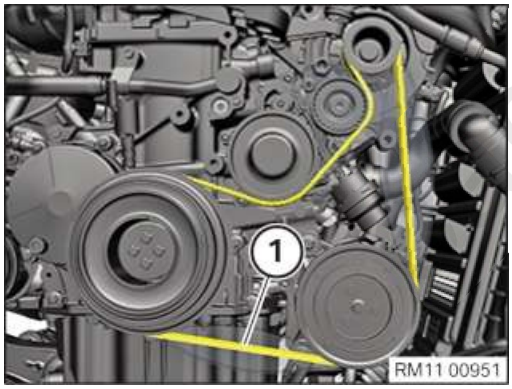
TECHNICAL INFORMATION

If **parts of the belt drive** are renewed, then the correct drive belt **must** be determined in the Electronic Parts Catalogue by using the part number of the belt tensioner. Mixed installation is not permitted.

The drive belt and the belt tensioner may have to be renewed.



- Note the part number (1) of the tensioning device.



- Select the drive belt (1) using the part numbers read from the Electronic Parts Catalogue.
- Renew the drive belt (1).

  Parts: Drive belt
- If necessary, renew the belt tensioner.

6 – Installing the drive belt for alternator

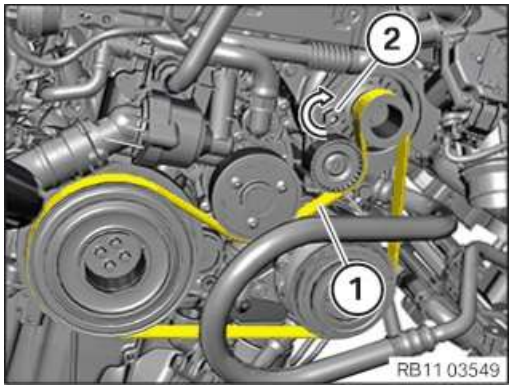
TECHNICAL INFORMATION

If the drive belt is reused: Mark direction of travel and reinstall drive belt in same direction of travel.

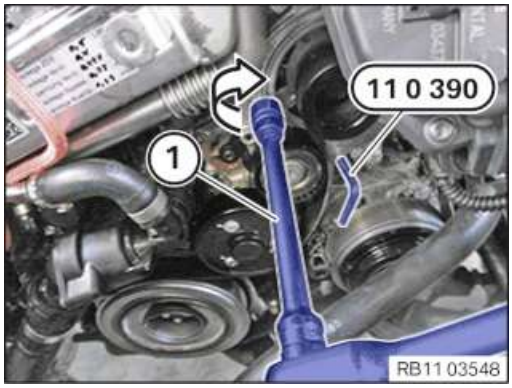
TECHNICAL INFORMATION

The drive belt must be replaced if contaminated with coolant- and oil residues.

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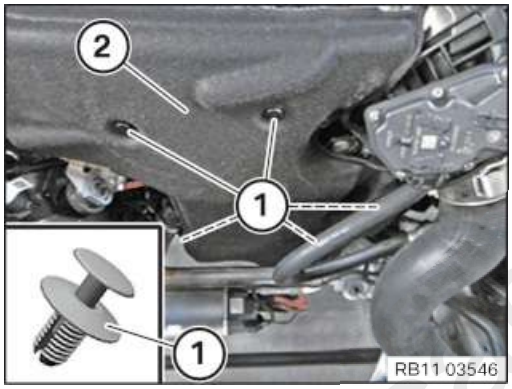
- Check drive belt for alternator (1) for coolant and oil residues and, if necessary, renew it.
- Relieve belt tensioner at hexagon head (2) up to limit position in direction of arrow.
- Install drive belt for alternator (1).



- Increase the preload of the belt tensioner using conventional tool (1) in the direction of arrow until the special tool 0 496 268 (11 0 390) can be removed.
- Remove special tool 0 496 268 (11 0 390).
- Stretch the drive belt for the alternator.

POSTPROCESSES

7 – Install acoustic cover for the engine, front



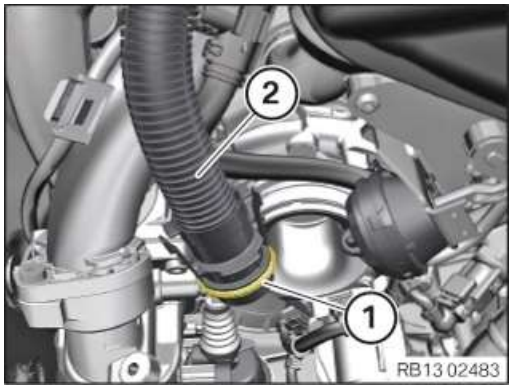
- Feed the acoustic cover (2) in and install.
- Secure the acoustic cover (2) with the expanding rivets (1).

8 – Installing the clean air pipe with resonator



- Check the sealing ring (1) on the exhaust turbocharger for damage and renew if necessary.

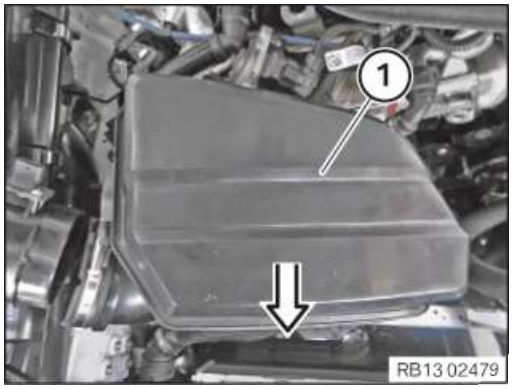
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- Check the sealing ring (1) for the engine ventilation line (2) for damage and renew where required.



- Feed in and install clean air pipe with resonator (1) in the direction of the arrow.

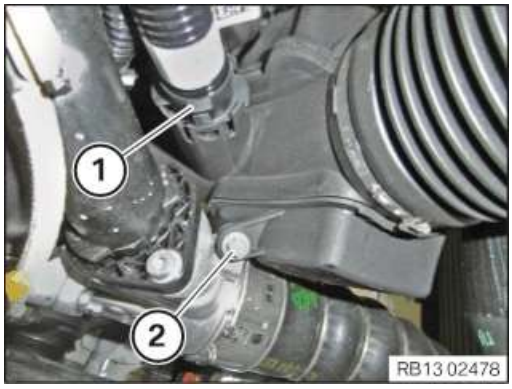


- Press and hold clean air pipe with resonator (1) in the direction of the arrow.



- Attach and lock the clamp (1).

  The clamp (1) must engage audibly.

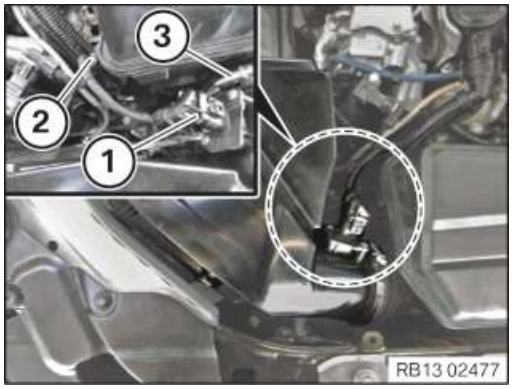


- Tighten down screw (2).

Clean air pipe to exhaust turbocharger

M6X20		Tightening torque	8 Nm

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- Connect the clean air pipe with resonator to the intake filter housing.
- Tighten clamp (3).

Clean air pipe to upper section of intake filter housing

Clamp		Tightening torque	3 Nm

- Secure clamps (2).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

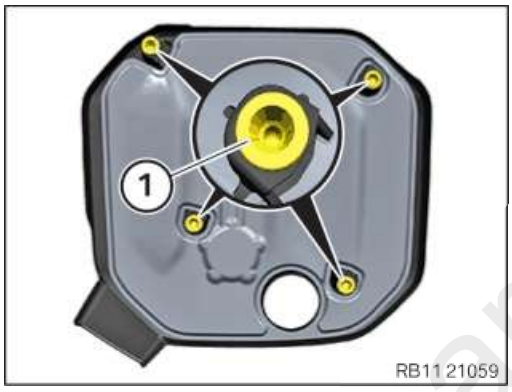
9 – Install acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover/design cover.

Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover/design cover.

- Disassemble or mount the acoustic cover/design cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover/design cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Check the acoustic cover for correct fit of the rubber mounts (1).



- Clip in the acoustic cover (1) into the holders in the indicated areas.

Additional Information

Overview of Tightening Torques

Clean air pipe to exhaust turbocharger Used in step 8

M6X20		Tightening torque	8 Nm

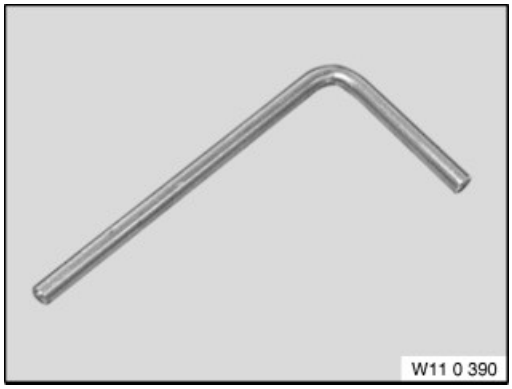
ardiagn.com

Clean air pipe to upper section of intake filter housing Used in step 8

Clamp		Tightening torque	3 Nm

Overview of Special Tools

0 496 268 (11 0 390) Pin



Common Used in step 46

Usage	(roll pin) For securing new tensioning pulley (poly-V belt)
Included in the tool or work	
Storage location	B24
Replaced by	
In connection with	
SI-Number	01 15 07 (390)

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11 28 010 Replacing drive belt for alternator

PRELIMINARY WORK

1 – Removing the acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover/design cover.

Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover/design cover.

- Disassemble or mount the acoustic cover/design cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover/design cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Unclip the acoustic cover (1) from the holders in the indicated area towards the top.

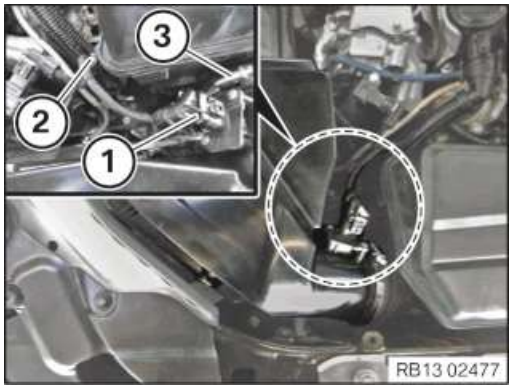
2 – Removing the clean air pipe with the resonator

WARNING

Hot surfaces.

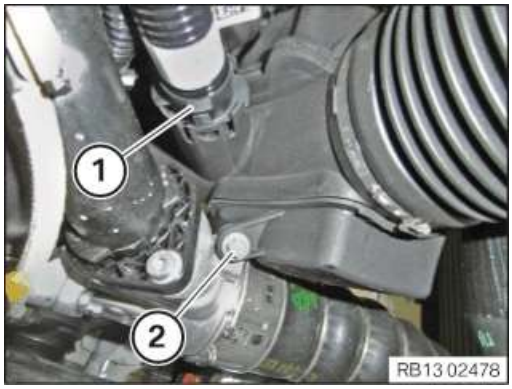
Risk of burning!

- Perform all work only on components that have cooled down.

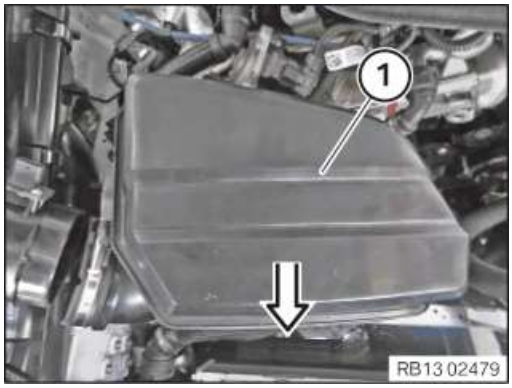


- Unlock plug connection (1) and disconnect.
- Loosen clamp (2).
- Unfasten clamp (3).
- Separate the clean air pipe with resonator from the intake filter housing.

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- Unlock engine ventilation line (1), disconnect it and place it aside.
- Loosen screw (2).



- Press and hold clean air pipe with resonator (1) in the direction of the arrow.



- Unlock and loosen clamp (1).



- Feed out and remove clean air pipe with resonator (1) in the direction of the arrow.

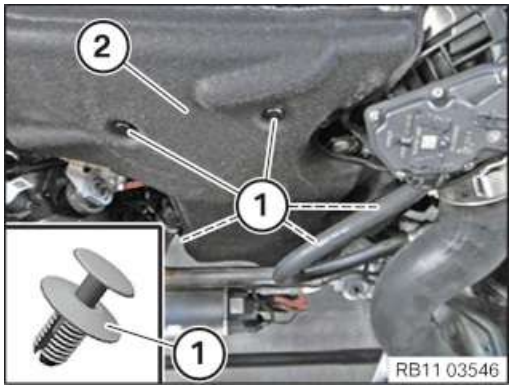
3 – Remove acoustic cover of the front engine

WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.



- Release and remove expanding rivet (1).
- Guide the acoustic cover (2) out and remove.

MAIN WORK

4 – Removing the drive belt for alternator

CAUTION

Spring preload.

Danger of injury!

- The use of the specified special tool (tool) is mandatory.
- The described operation must be carried out properly.

CAUTION

Component with preload.

Danger of injury!

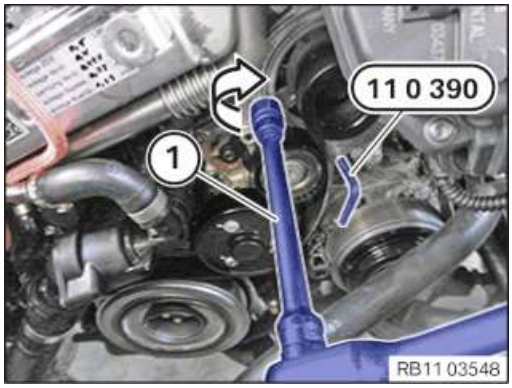
- Reduce preload as far as possible before disassembly. Relieve component.

TECHNICAL INFORMATION

If the drive belt is reused: Mark direction of travel and reinstall drive belt in same direction of travel.

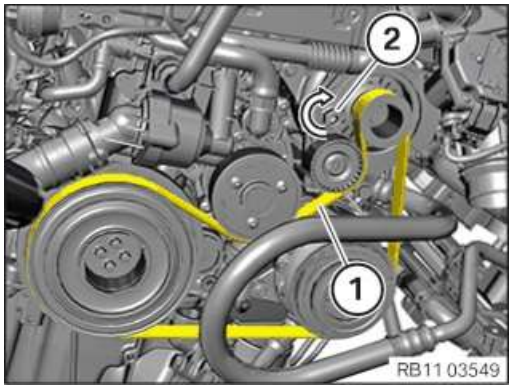
TECHNICAL INFORMATION

The drive belt must be replaced if contaminated with coolant- and oil residues.



- If reusing the drive belt for alternator: Mark the direction of rotation.
- Relax the belt tensioner in the direction of the arrow using a standard tool (1).
- Fix the belt tensioner with the special tool 0 496 268 (11 0 390).

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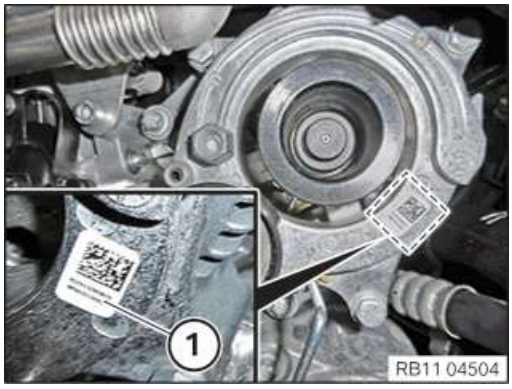
- Relieve belt tensioner at hexagon head (2) in direction of arrow up to limit position.
- Guide out and remove drive belt for alternator (1).

5 – Replacing the drive belt

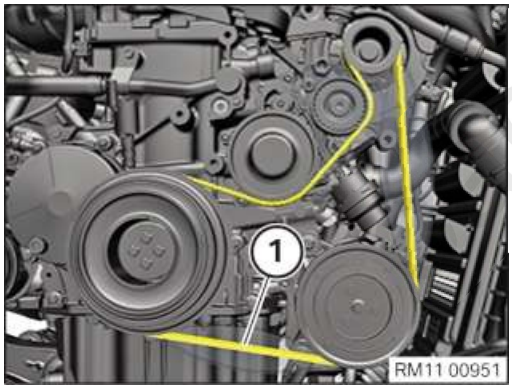
TECHNICAL INFORMATION

If **parts of the belt drive** are renewed, then the correct drive belt **must** be determined in the Electronic Parts Catalogue by using the part number of the belt tensioner. Mixed installation is not permitted.

The drive belt and the belt tensioner may have to be renewed.



- Note the part number (1) of the tensioning device.



- Select the drive belt (1) using the part numbers read from the Electronic Parts Catalogue.
- Renew the drive belt (1).

  Parts: Drive belt
- If necessary, renew the belt tensioner.

6 – Installing the drive belt for alternator

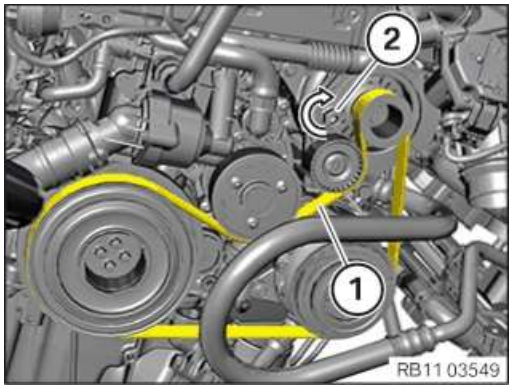
TECHNICAL INFORMATION

If the drive belt is reused: Mark direction of travel and reinstall drive belt in same direction of travel.

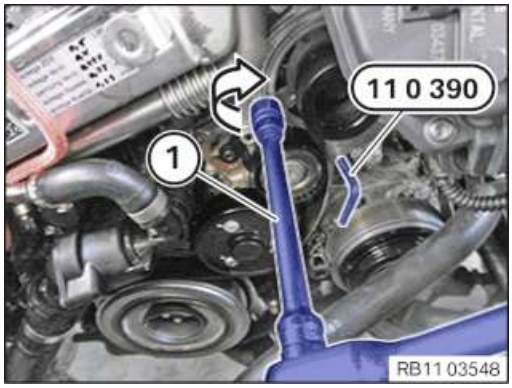
TECHNICAL INFORMATION

The drive belt must be replaced if contaminated with coolant- and oil residues.

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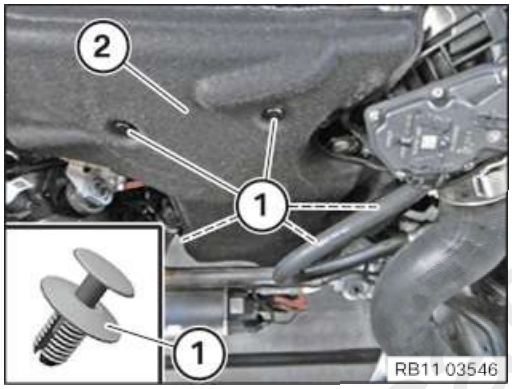
- Check drive belt for alternator (1) for coolant and oil residues and, if necessary, renew it.
- Relieve belt tensioner at hexagon head (2) up to limit position in direction of arrow.
- Install drive belt for alternator (1).



- Increase the preload of the belt tensioner using conventional tool (1) in the direction of arrow until the special tool 0 496 268 (11 0 390) can be removed.
- Remove special tool 0 496 268 (11 0 390).
- Stretch the drive belt for the alternator.

POSTPROCESSES

7 – Install acoustic cover for the engine, front



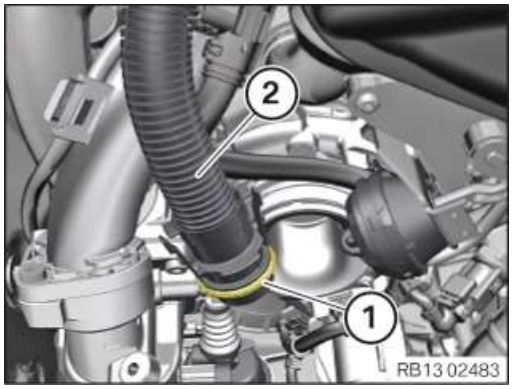
- Feed the acoustic cover (2) in and install.
- Secure the acoustic cover (2) with the expanding rivets (1).

8 – Installing the clean air pipe with resonator



- Check the sealing ring (1) on the exhaust turbocharger for damage and renew if necessary.

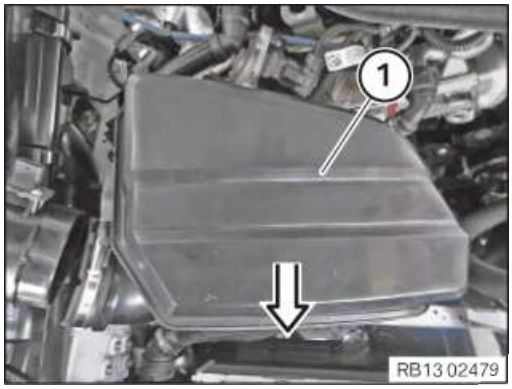
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- Check the sealing ring (1) for the engine ventilation line (2) for damage and renew where required.



- Feed in and install clean air pipe with resonator (1) in the direction of the arrow.

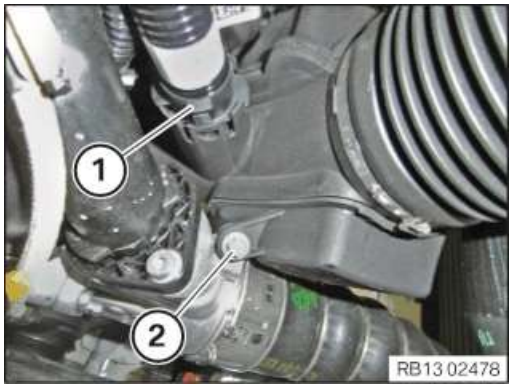


- Press and hold clean air pipe with resonator (1) in the direction of the arrow.



- Attach and lock the clamp (1).

  The clamp (1) must engage audibly.

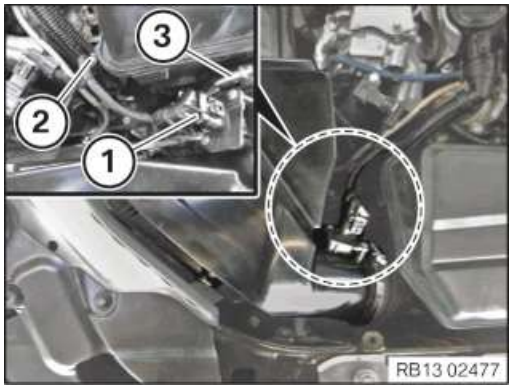


- Tighten down screw (2).

Clean air pipe to exhaust turbocharger

M6X20		Tightening torque	8 Nm

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- Connect the clean air pipe with resonator to the intake filter housing.
- Tighten clamp (3).

Clean air pipe to upper section of intake filter housing

Clamp		Tightening torque	3 Nm

- Secure clamps (2).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

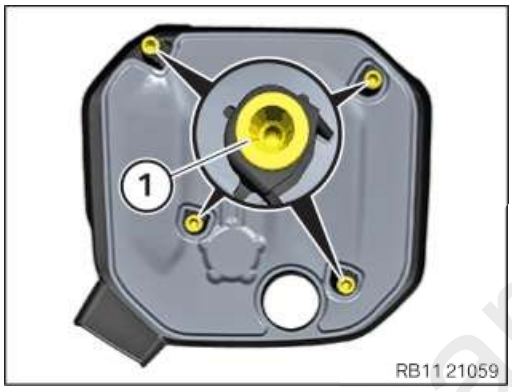
9 – Install acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover/design cover.

Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover/design cover.

- Disassemble or mount the acoustic cover/design cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover/design cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Check the acoustic cover for correct fit of the rubber mounts (1).



- Clip in the acoustic cover (1) into the holders in the indicated areas.

Additional Information

Overview of Tightening Torques

Clean air pipe to exhaust turbocharger Used in step 8

M6X20		Tightening torque	8 Nm

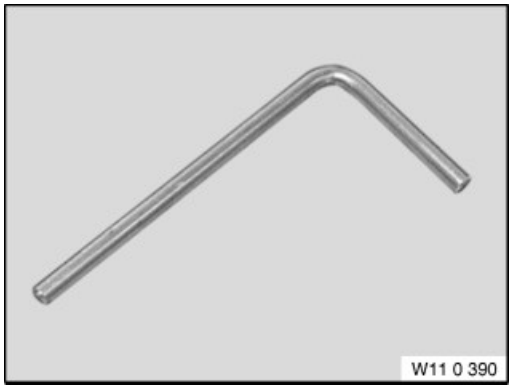
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Clean air pipe to upper section of intake filter housing Used in step 8

Clamp		Tightening torque	3 Nm

Overview of Special Tools

0 496 268 (11 0 390) Pin



Common Used in step 46

Usage	(roll pin) For securing new tensioning pulley (poly-V belt)
Included in the tool or work	
Storage location	B24
Replaced by	
In connection with	
SI-Number	01 15 07 (390)

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11 28 076 Replacing the belt tensioner for drive belt of starter generator

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.
- Detach battery earth lead from battery.
- With auxiliary batteries: Detach all battery earth leads from additional batteries.

RISK OF DAMAGE

Damage to battery terminal, the safety battery terminal or the intelligent battery sensor (IBS).

Damaged battery terminals can lead to malfunctions or vehicle electrical system faults.

- Pull off battery terminal from battery pole by carefully moving to and fro. Do not pry off using a tool.

PRELIMINARY WORK

1 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no battery charger** is connected to the jump start terminal point in the engine compartment.
- For vehicles with additional electrical systems (48 V electrical system, high-voltage vehicle electrical system), it is mandatory to deactivate them **before** disconnecting the vehicle battery.

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.

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RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.

TECHNICAL INFORMATION

Follow notes for 48-V battery. See further information 6120 ... Notes on 48-V battery.



- Deactivate the 48V electrical system by opening the bonnet.

  The deactivation takes place automatically.



Check

TECHNICAL INFORMATION

Zero voltage (48V electrical system is switched off) is displayed only in PAD mode.

- Press the START-STOP button quickly 3 times without stepping on the brake pedal to establish the PAD mode.
- Check isolation from the supply in the instrument cluster in PAD mode.

desired state

- The Check Control message "48V electrical system switched off." (1) is displayed.

Result

» **The absence of voltage** cannot be determined by means of the Check Control message "48V electrical system switched off:" (1). Work is not permitted to be started.

Measure

- Carry out the service function "48 V electrical system deactivation".
  - Vehicle management > Service functions > Voltage supply > Deactivate 48 V electrical system

Only when the Check Control message “48 V electrical system switched off.” (1) is displayed in the instrument cluster is it permitted to disconnect the 12 V battery.

If the absence of voltage is not indicated clearly, contact Technical Support.

Result

» The Check Control message signals that the 48V electrical system has been switched off.

Measure

- Exit PAD mode by pressing the START-STOP button once without depressing the brake pedal.

  The work “Disconnecting the negative battery cable of the 48-V battery” can be started.



- Unlock and disconnect plug connection (1) of the CAN bus.
- Release the clip (2).



- Loosen nut (1).
- Pull off negative battery cable (2) of the 48-V battery from the negative battery terminal, set it aside and secure it.



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

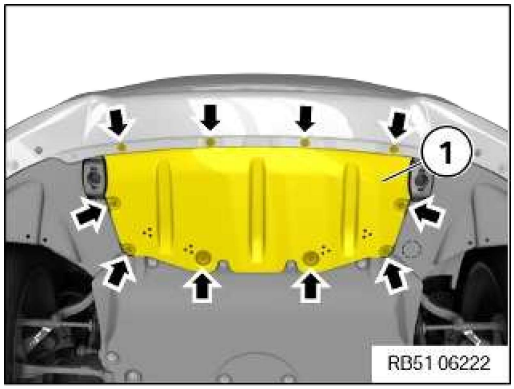
- Cover the vehicle battery with the special tool as shown.
- Position the battery earth lead (1) as shown.

2 – Disconnecting all battery earth leads



- See additional information.

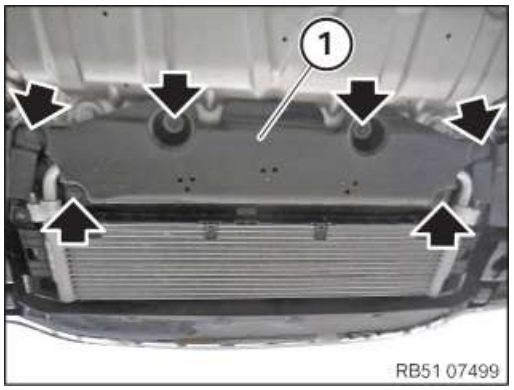
3 – Removing the front underbody protection



- **Version A:**

  Remove screws (arrows).

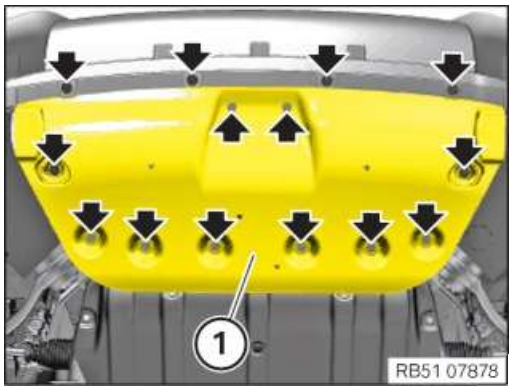
  Feed front underbody protection (1) backwards out of the bumper panel.



- **Version B:**

  Remove screws (arrows).

  Guide out front underbody protection (1) and remove it.

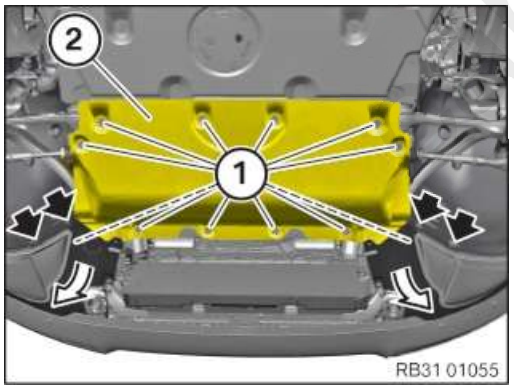


- **Version C:**

  Remove screws (arrows).

  Guide out front underbody protection (1) and remove it.

4 – Remove the underbody protection of the steering gear



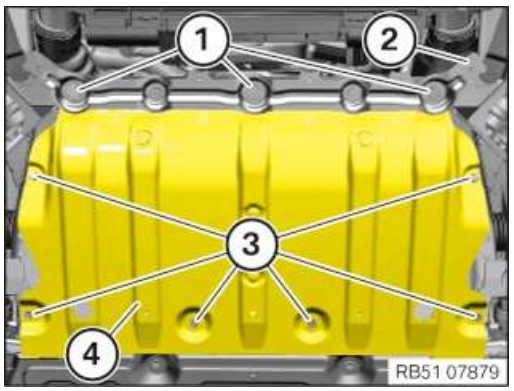
- **Version A:**

  Unscrew the screws (arrows) of the wheel arch cover on the wheel arch cover.

  Fold the bottom wheel arch cover to the side.

  Loosen screws (1).

  Remove the underbody protection (2) of the steering gear.



- **Version B:**

  Loosen screws (1).

  Remove the holder (2) for the underride protection.

  Loosen screws (3).

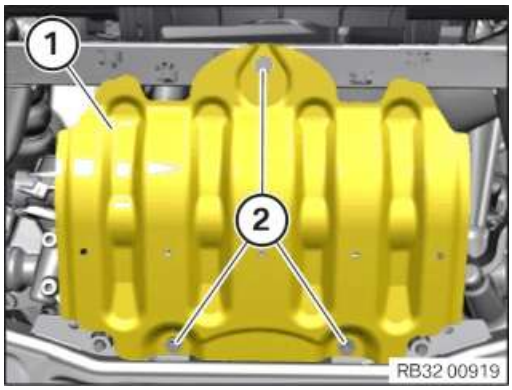
  Feed out and remove the underbody protection (4) of the steering gear.

5 – If installed: Removing the steering underbody protection

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Prerequisite

Front underbody protection has been removed.



- Loosen screws (2).
- Remove underbody protection (1).

6 – Removing the acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover/design cover.

Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover/design cover.

- Disassemble or mount the acoustic cover/design cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover/design cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Unclip the acoustic cover (1) from the holders in the indicated area towards the top.

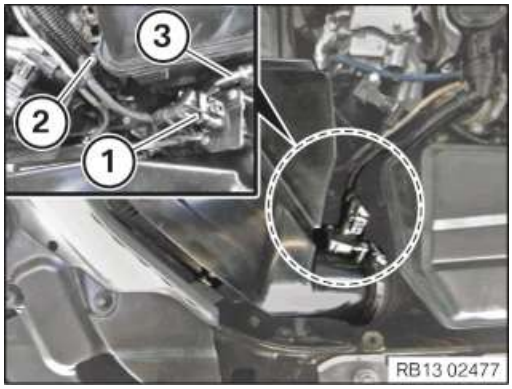
7 – Removing the clean air pipe with the resonator

WARNING

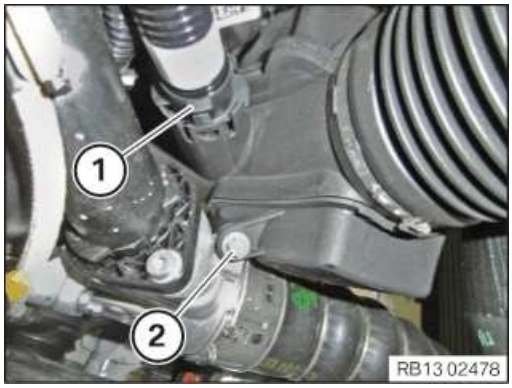
Hot surfaces.

Risk of burning!

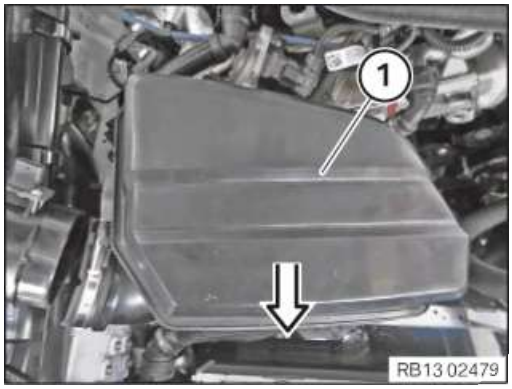
- Perform all work only on components that have cooled down.



- Unlock plug connection (1) and disconnect.
- Loosen clamp (2).
- Unfasten clamp (3).
- Separate the clean air pipe with resonator from the intake filter housing.



- Unlock engine ventilation line (1), disconnect it and place it aside.
- Loosen screw (2).



- Press and hold clean air pipe with resonator (1) in the direction of the arrow.



- Unlock and loosen clamp (1).



- Feed out and remove clean air pipe with resonator (1) in the direction of the arrow.

8 – Draining the coolant from the high-temperature cooling system

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WARNING

Hot fluids.

Risk of scalding!

- Conduct all work in the vehicle wearing appropriate personal protective equipment only.

CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.

TECHNICAL INFORMATION

Life-long fill of coolant!

Do not reuse used coolant.

When replacing and removing components which rely on the corrosion protection effect of the coolant, it is essential to change the coolant. The cooling system must therefore be emptied and refilled.

In the case of other removal work involving the draining of part quantities of coolant, the coolant level must be topped up with new coolant.

TECHNICAL INFORMATION

Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.



- Loosen sealing cap (1).

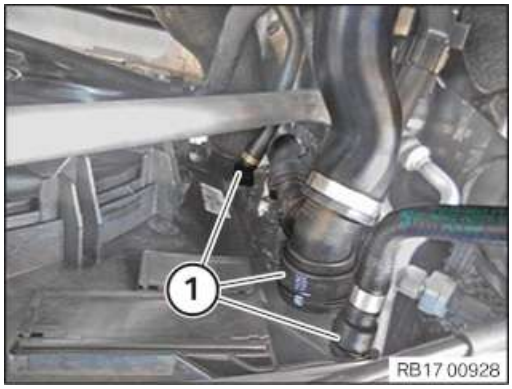
▸ **Avoiding damage to the starter generator due to escaping coolant**

RISK OF DAMAGE

Escaping coolant on the starter generator.

Damage and operating failure of the starter generator.

- Cover the starter generator with suitable, watertight auxiliary materials.
- Close off line connections with seal plugs.
- If necessary: Flush the leaked coolant from the starter generator with at least 1 l water.



NOTICE

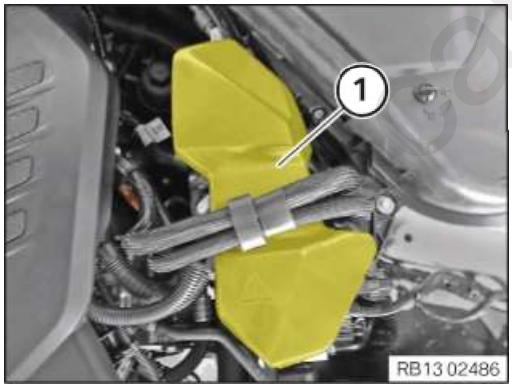
Schematic diagram is for example purposes. Some parts may differ in certain details.

- Unlock all coolant lines (1) and detach.
- Catch and dispose of escaping coolant.



- Unlock and loosen coolant line (1).
- Catch and dispose of escaping coolant.

9 – Remove the cover for the DDE control unit



- Pull off, guide out and remove cover (1) upwards.

10 – Remove DDE control unit

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 ... Notes for ESD protection (electrostatic discharge)

TECHNICAL INFORMATION

In a warranty case, you must always provide a fault memory printout with the defective part, even if the fault memory does not contain an entry.

TECHNICAL INFORMATION

Follow instructions for removing and installing control units.

For additional information see: 12 00 ... Notes on removal and installation of control units

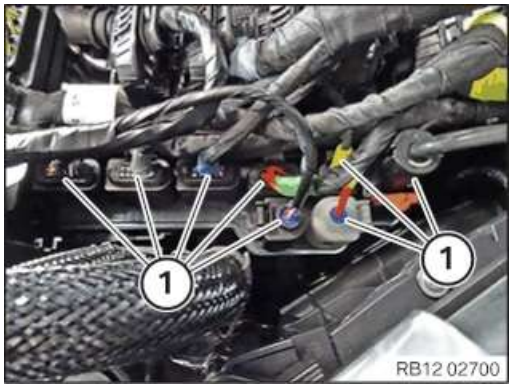
TECHNICAL INFORMATION

Disconnecting control units may cause fault code entries and functional limitations. Fault code entries must be read out and deleted if necessary.

TECHNICAL INFORMATION

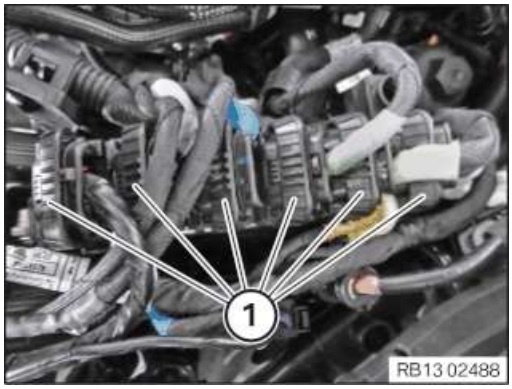
Control unit must be programmed after it is replaced.

For additional information see: 61 00 ... Programming/encoding control unit(s)

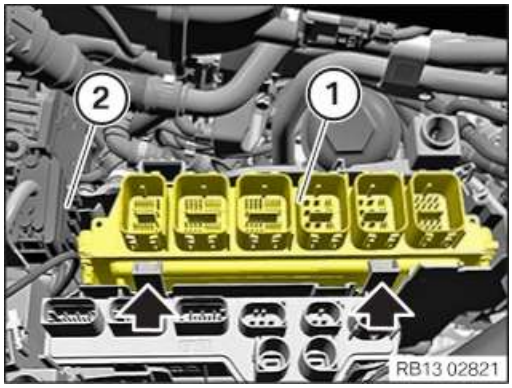


- Unlock plug connections (1) and disconnect.

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- Unlock and disconnect plug connections (1).



- Release the latch mechanisms (arrows).
- Ensure that the plug connection is (2) not damaged.
- Feed out the DDE control unit (1) **carefully** and remove.

11 – Removing the integrated supply module (PDM) partially

Prerequisite

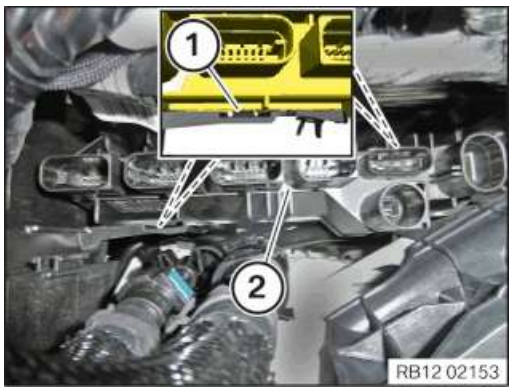
Engine control unit is removed.

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 ... Notes for ESD protection (electrostatic discharge)



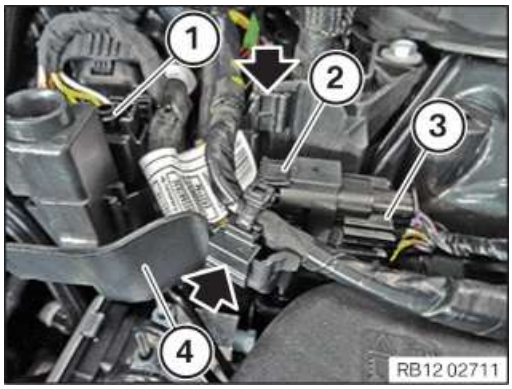
- Loosen the latch mechanisms (1).
- Feed out and remove the integrated supply module (PDM) (2) upwards.

12 – Removing the control unit holder

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TECHNICAL INFORMATION

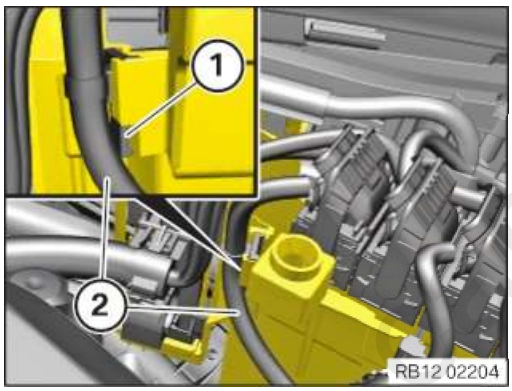
The number of connectors on the described component may vary depending on the equipment specification.
If necessary, unlock all other connectors and disconnect or connect and lock respectively.



- Unlock plug connection (1) and disconnect.
- Unlock plug connection (2) and disconnect.
- Release the connector (3) and disconnect from the control unit holder (4).
- Release the clamps (arrows).



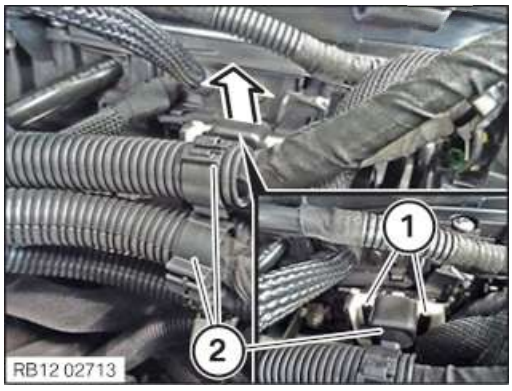
- Unlock plug connection (1) and disconnect.



- Unlock and loosen the cable clip (1).
- Remove the wiring harness section (2) and put to one side.

NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

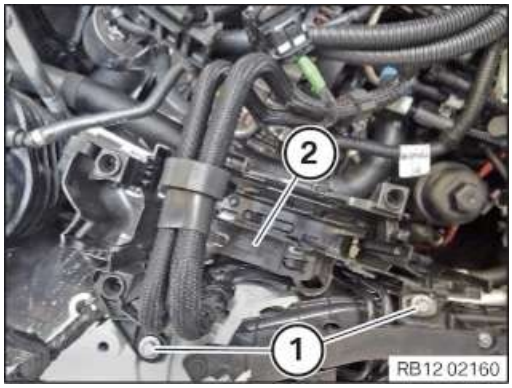


- Unlock the locks (1) .
- Guide out the cable clip (2) in the direction of arrow and set aside.

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- Unlock the lock (arrow).
- Feed out the cable clip (1) upwards and set it aside.



- Loosen screws (1).
- Guide out and remove the control unit holder (2).

13 – Releasing the wiring harness section with the starter generator lines partially

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

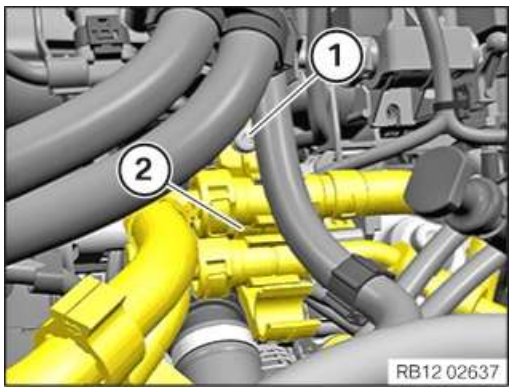
- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 ... Notes for ESD protection (electrostatic discharge)

RISK OF DAMAGE

Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

- Do not pull on the wires when disconnecting connectors and plug connections.

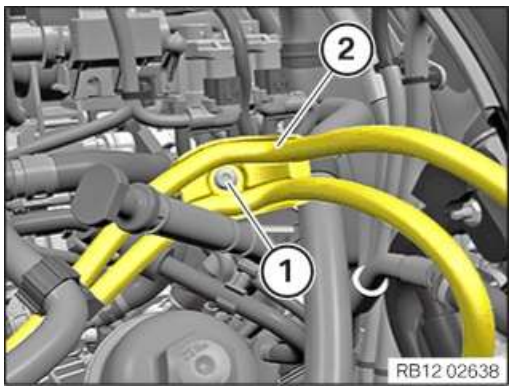


- Release the screw (1).
- Guide out fuel lines (2) and set them aside.

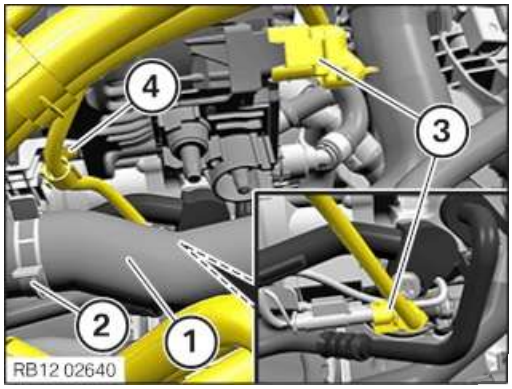
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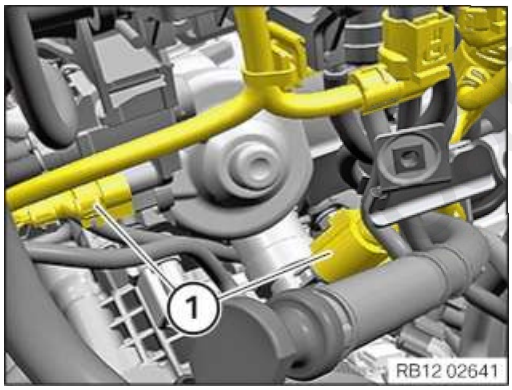
- Guide out and remove the lid (1).
- Release the nuts (2) and (3).
- Feed out positive battery cables (4) and place to one side.
- Loosen clamp (5).
- Thread out holder (2) and set aside.



- Release the screw (1).
- Guide out the positive battery cables (2) and set them aside.



- Release the coolant line (1) from the holder (2) .
- Unlock plug connections (3) and disconnect.
- Loosen clamp (4).



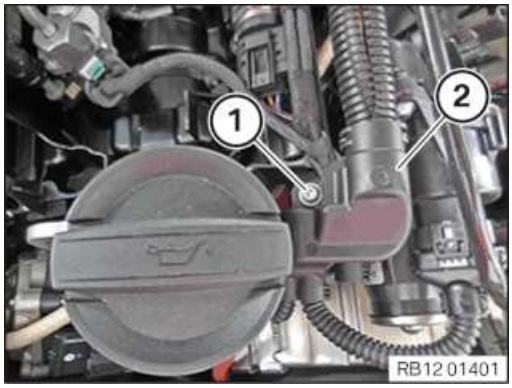
- Unlock and disconnect plug connections (1).



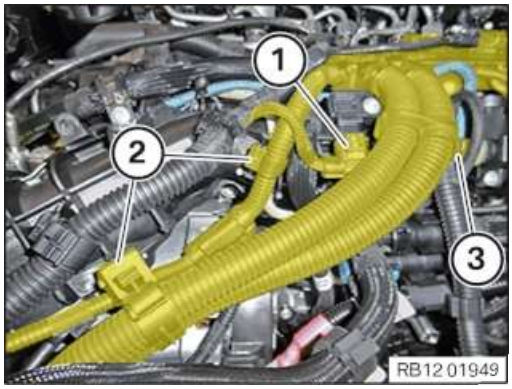
- Unlock and loosen connector (1).



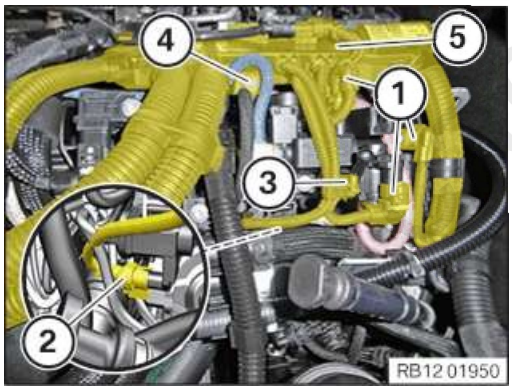
- Unlock plug connection (1) and disconnect.



- Loosen screw (1).
- Remove the wiring harness section (2) and put to one side.



- Unlock plug connection (1) and disconnect.
- Loosen clamps (2).
- Loosen clamp (3).



- Unlock and disconnect the plug connection (1).
- Unlock and disconnect the plug connection (2).
- Loosen clamp (3).
- Loosen screw (4).
- Guide out wiring harness section (5) as far as possible and set it aside.

14 – Removing the throttle body

WARNING

Hot surfaces.

Risk of burning!

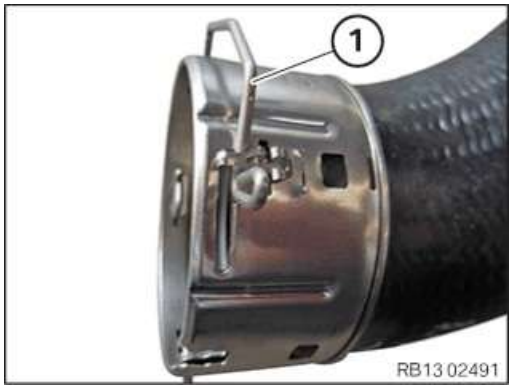
- Perform all work only on components that have cooled down.

RISK OF DAMAGE

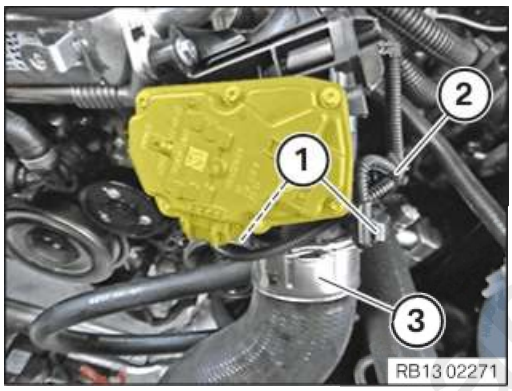
Electrostatic discharge.

Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 ... Notes for ESD protection (electrostatic discharge)



- Unlock clamp (1) and engage in this position.

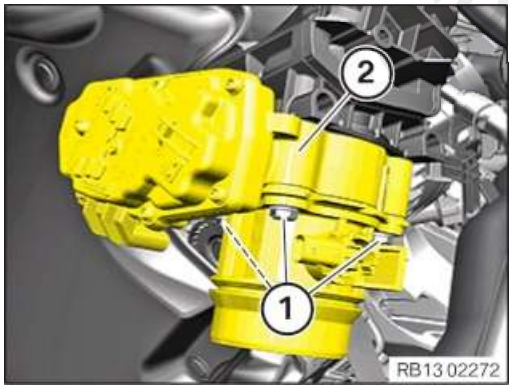


- Unlock and disconnect plug connections (1).

NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- Loosen clamp (2).
- Unlock and disconnect the pressure pipe (3).



- Loosen screws (1).
- Remove throttle body (2).

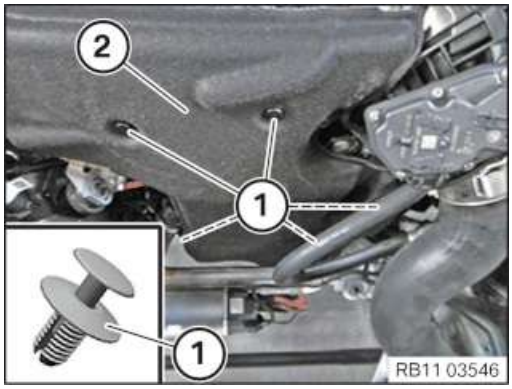
15 – Remove acoustic cover of the front engine

WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.



- Release and remove expanding rivet (1).
- Guide the acoustic cover (2) out and remove.

16 – Removing the drive belt for the starter motor generator

CAUTION

Spring preload.

Danger of injury!

- The use of the specified special tool (tool) is mandatory.
- The described operation must be carried out properly.

CAUTION

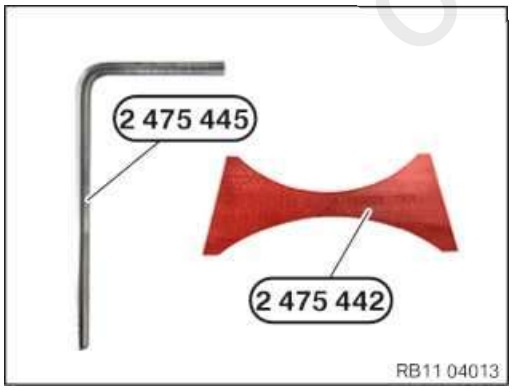
Component with preload.

Danger of injury!

- Reduce preload as far as possible before disassembly. Relieve component.

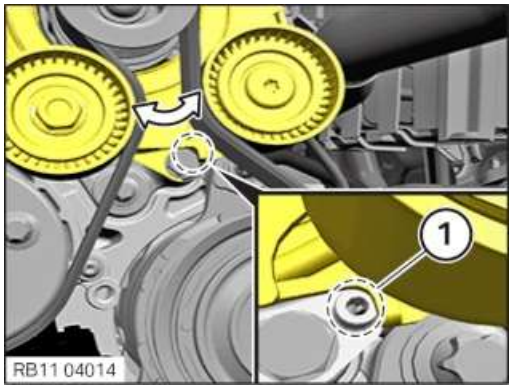
TECHNICAL INFORMATION

The drive belt must be replaced if contaminated with coolant- and oil residues.

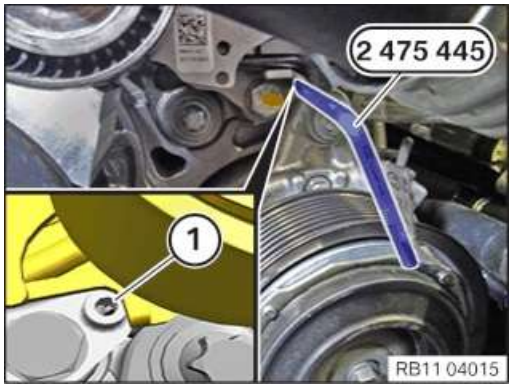


- Prepare the special tool 2 475 442 and the special tool 2 475 445.

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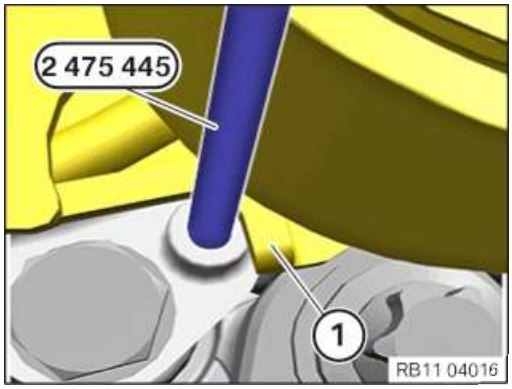


- Position the belt tensioner in the direction of the arrow so that the bore hole is visible in the area (1).

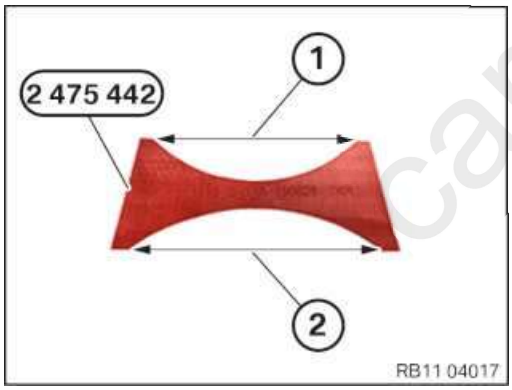


- Guide in the special tool 2 475 445 and install it in the bore hole (1).

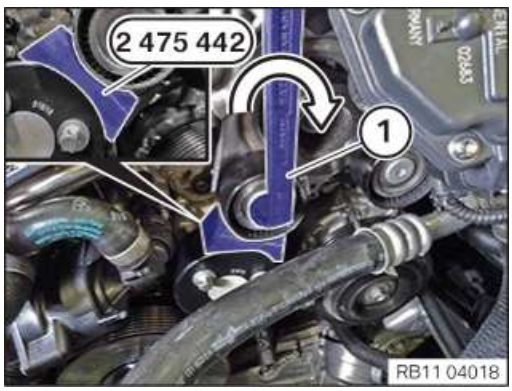
  The special tool 2 475 445 must rest against the starter motor generator.



- Ensure that the belt tensioner (1) is supported on the special tool 2 475 445.



- Ensure that the radius (1) of the special tool 2 475 442 supports the tensioning pulley of the belt tensioner.
- Ensure that the radius (2) of the special tool 2 475 442 is supported on the belt pulley of the coolant pump.

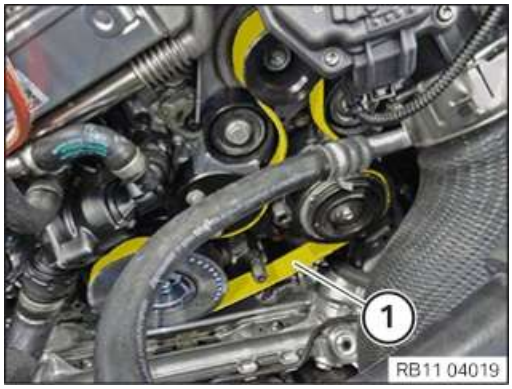


TECHNICAL INFORMATION

Conduct the following operation with the assistance of a second person.

- Twist the tensioning pulley (1) in the direction of the arrow.
- Guide in and install the special tool 2 475 442 between the belt pulley of the coolant pump and the tensioning pulley.

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TECHNICAL INFORMATION

If the drive belt is reused: Mark direction of travel and reinstall drive belt in same direction of travel.

- Guide out and remove the drive belt (1) for the starter motor generator.

17 – Removing the starter motor generator

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.
- Detach battery earth lead from battery.
- With auxiliary batteries: Detach all battery earth leads from additional batteries.

RISK OF DAMAGE

Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

- Do not pull on the wires when disconnecting connectors and plug connections.

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 ... Notes for ESD protection (electrostatic discharge)

▸ **Avoiding damage to the starter generator due to escaping coolant**

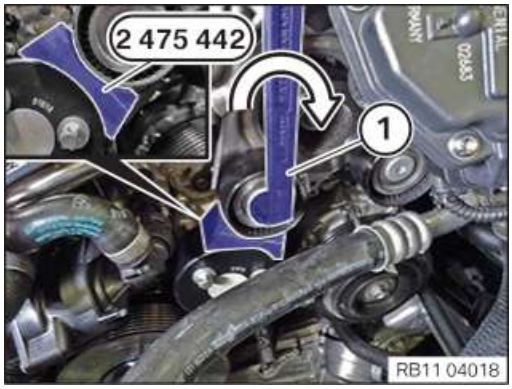
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RISK OF DAMAGE

Escaping coolant on the starter generator.

Damage and operating failure of the starter generator.

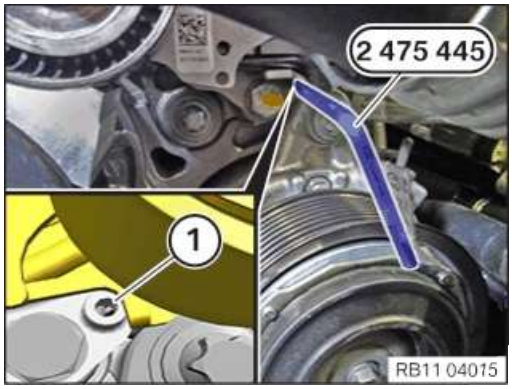
- Cover the starter generator with suitable, watertight auxiliary materials.
- Close off line connections with seal plugs.
- If necessary: Flush the leaked coolant from the starter generator with at least 1 l water.



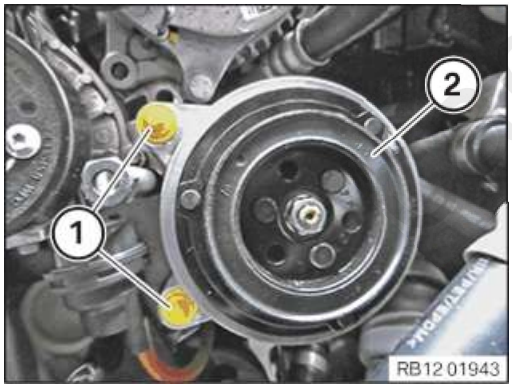
TECHNICAL INFORMATION

Conduct the following operation with the assistance of a second person.

- Twist the tensioning pulley (1) in the direction of the arrow.
- Feed out the special tool 2 475 442 between the belt pulley of the coolant pump and the tensioning pulley and remove it.



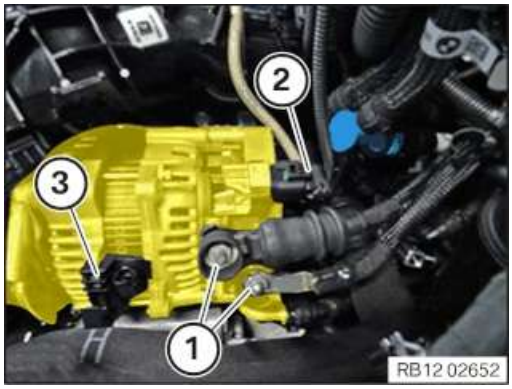
- Feed out the special tool 2 475 445 from the bore hole (1) and remove it.



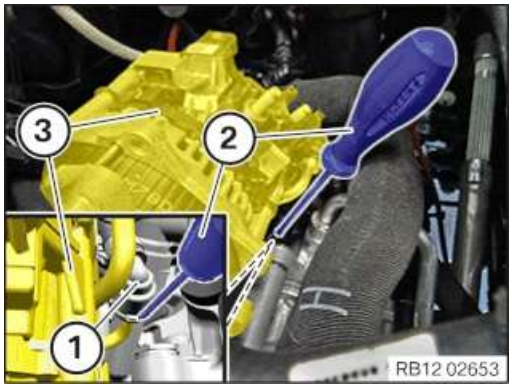
- Loosen screws (1).
- Slide the air conditioning compressor (2) out and set it aside.



- Guide out and remove the lid (1).



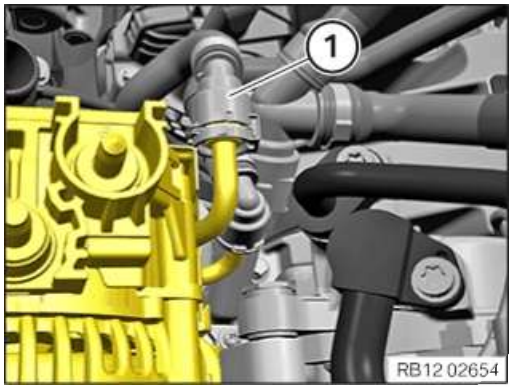
- Release nuts (1).
- Unlock plug connection (2) and disconnect.
- Loosen the holder (3).



TECHNICAL INFORMATION

Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.

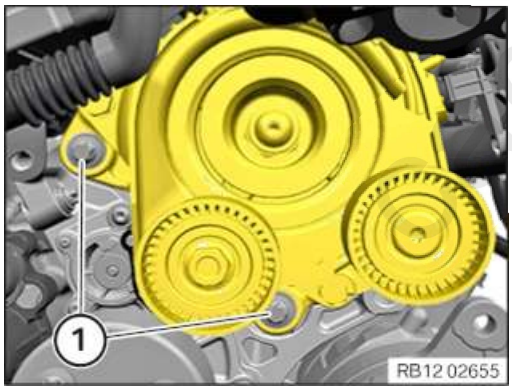
- Unlock and pull off the coolant line (1) with a screwdriver (2).
- Catch and dispose of escaping coolant.



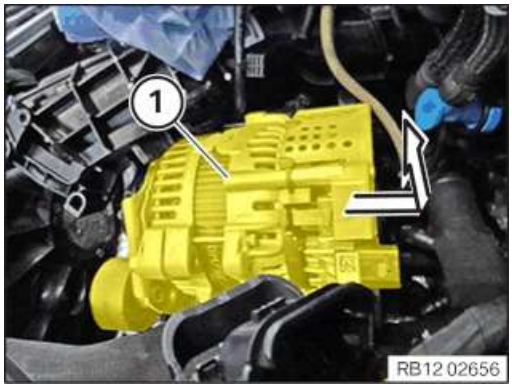
TECHNICAL INFORMATION

Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.

- Unlock and remove the coolant line (1).
- Catch and dispose of escaping coolant.



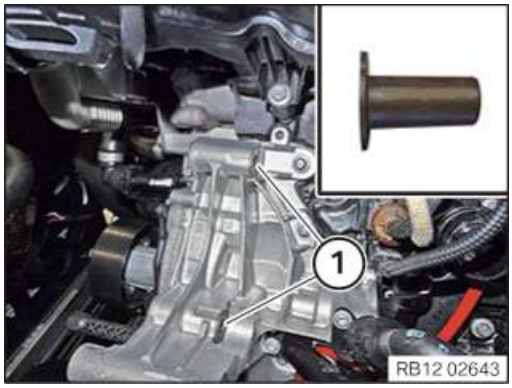
- Loosen screws (1).



- Feed out and remove the starter motor generator (1) in the direction of arrow.



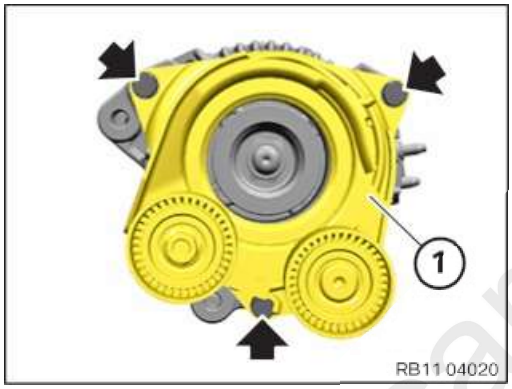
- Feed out and remove the bush (1).



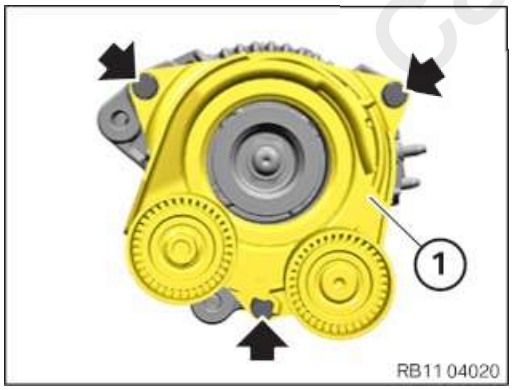
- Feed out and remove the bush (1).

MAIN WORK

18 – Replacing the belt tensioner of the starter generator



- Remove screws (arrows).
- Feed out the belt tensioner (1) at the starter generator and remove.



- Feed in and install the belt tensioner (1) on the starter generator.
- Tighten screws (arrows).

Belt tensioner to alternator/starter generator

M8X30		Tightening torque	28 Nm

POSTPROCESSES

19 – Installing the starter motor generator

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CAUTION

Improper routing of the positive battery cable.

Risk of short circuits!

- Route the positive battery cable without abrasions and do not trap.

RISK OF DAMAGE

Improper routing of cables and wiring harnesses.

Trapped, crushed or damaged cables may cause short circuits and malfunctions.

- Route all cables without abrasions, do not trap and crush.

▸ **Avoiding damage to the starter generator due to escaping coolant**

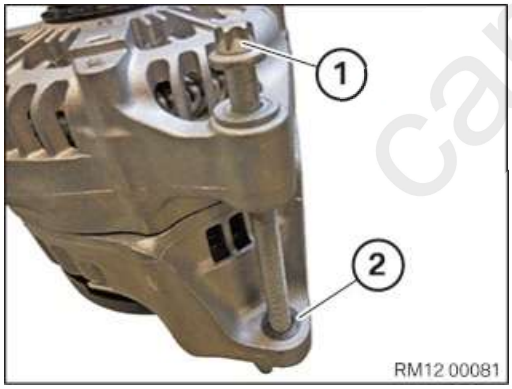
RISK OF DAMAGE

Escaping coolant on the starter generator.

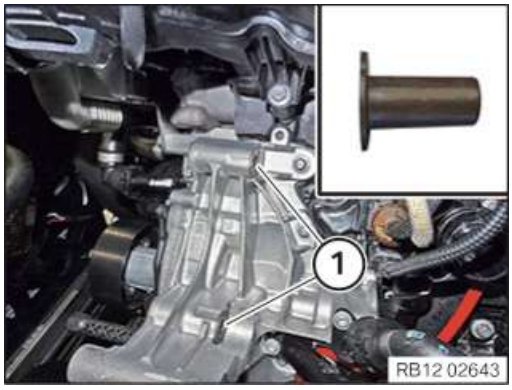
Damage and operating failure of the starter generator.

- Cover the starter generator with suitable, watertight auxiliary materials.
- Close off line connections with seal plugs.
- If necessary: Flush the leaked coolant from the starter generator with at least 1 l water.

▸ **Prepare for the installation of the alternator**



- Screw the screw (1) into the threaded support sleeve (2).
- Slightly press back the threaded support sleeve (2) using the bolt (1).
- Once again unscrew the screw (1) from the threaded support sleeve (2).



- Renew the bushes (1).

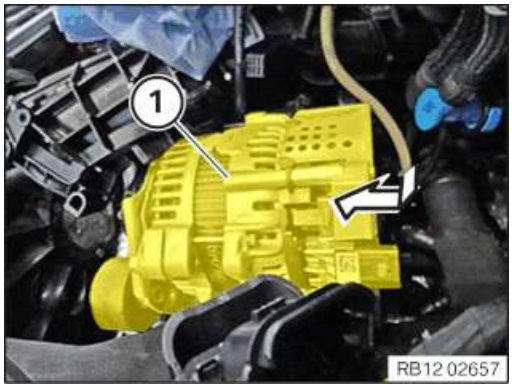
  Parts: Bushes
- Guide in and install the bushes (1).

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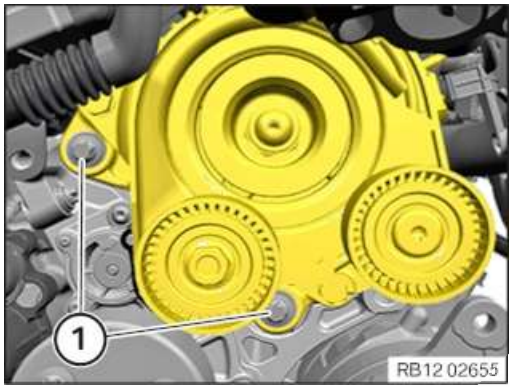


- Renew the bushes (1).

  Parts: Bushes
- Guide in and install the bushes (1).



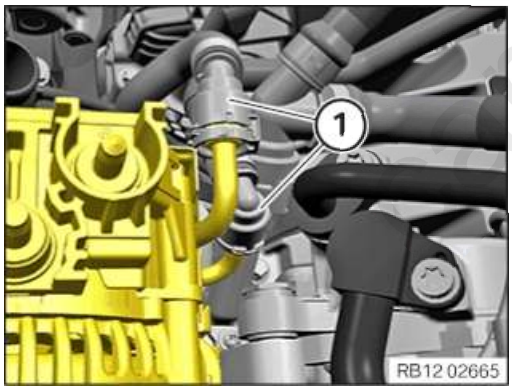
- Guide in and install the starter motor generator (1) in the direction of the arrow.



- Tighten the screws (1).

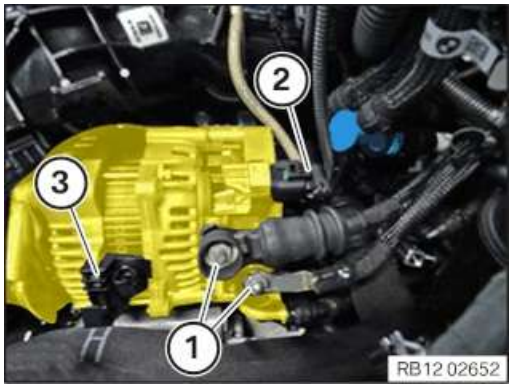
Alternator to component carrier

M10x75		Tightening torque	38 Nm
M10x125		Tightening torque	38 Nm
M10x90		Tightening torque	38 Nm



- Connect and lock the coolant lines (1).

  The coolant lines (1) must engage audibly.



- Fasten the holder (3).
- Connect connectors (2) and lock.

  The connector (2) must engage audibly.
- Renew nuts (1).

  Parts: Nuts
- Tighten nuts (1).

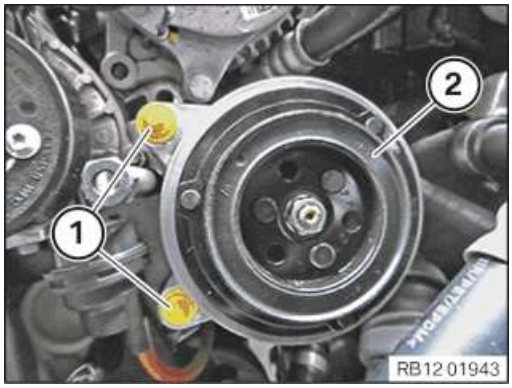
Battery positive lead on the starter motor generator

M8		Tightening torque	19 Nm

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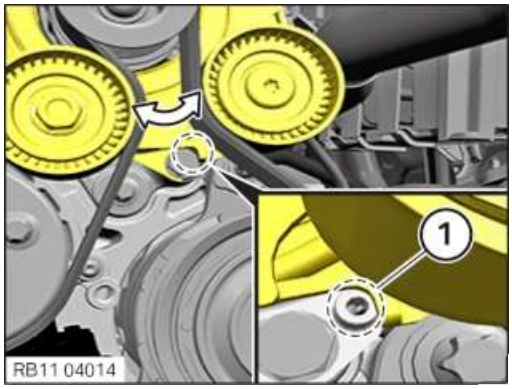
- Guide in and install the lid (1).



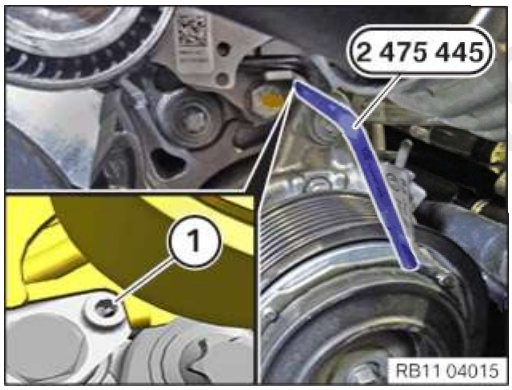
- Insert and install the air conditioning compressor (2).
- Tighten the screws (1).

Air conditioning compressor in component carrier

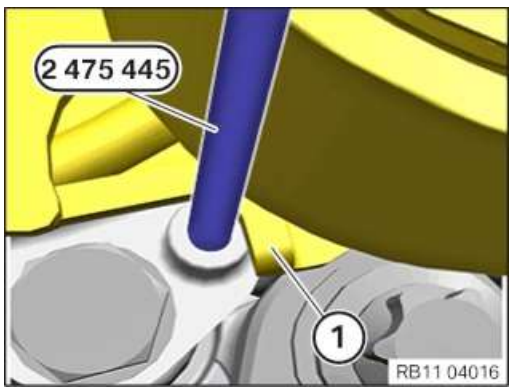
M10		Tightening torque	38 Nm



- Position the belt tensioner so that the bore hole is visible in the area (1).

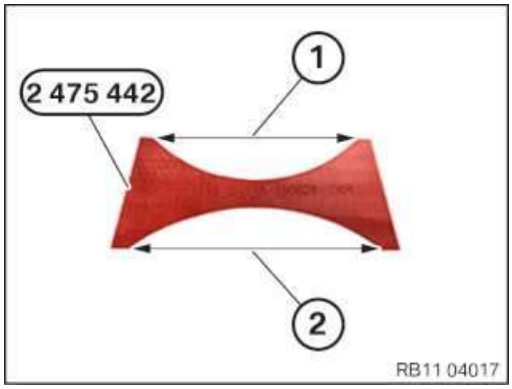


- Guide in the special tool 2 475 445 and install it in the bore hole (1).
  The special tool 2 475 445 must rest against the starter motor generator.

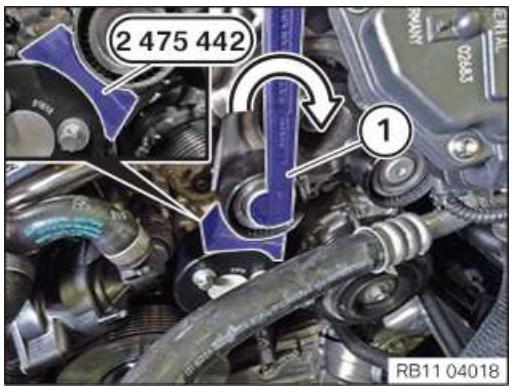


- The belt tensioner (1) must be supported on the special tool 2 475 445.

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- The radius (1) of the special tool 2 475 442 supports the tensioning pulley of the belt tensioner.
- The radius (2) of the special tool 2 475 442 is supported on the belt pulley of the coolant pump.



TECHNICAL INFORMATION

Conduct the following operation with the assistance of a second person.

- Twist the tensioning pulley (1) in the direction of the arrow.
- Guide in and install the special tool 2 475 442 between the belt pulley of the coolant pump and the tensioning pulley.

20 – Installing the drive belt for the starter motor generator

CAUTION

Spring preload.

Danger of injury!

- The use of the specified special tool (tool) is mandatory.
- The described operation must be carried out properly.

CAUTION

Component with preload.

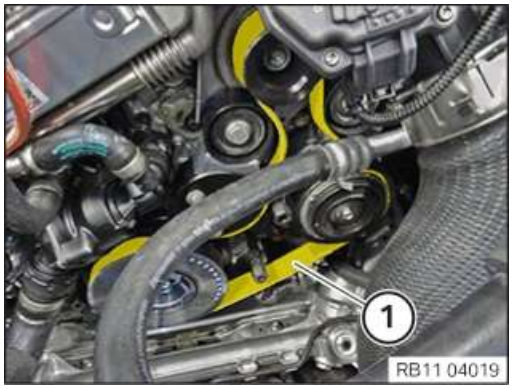
Danger of injury!

- Reduce preload as far as possible before disassembly. Relieve component.

TECHNICAL INFORMATION

The drive belt must be replaced if contaminated with coolant- and oil residues.

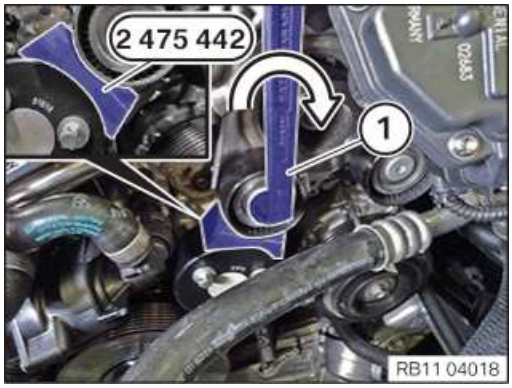
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TECHNICAL INFORMATION

If the drive belt is reused: Mark direction of travel and reinstall drive belt in same direction of travel.

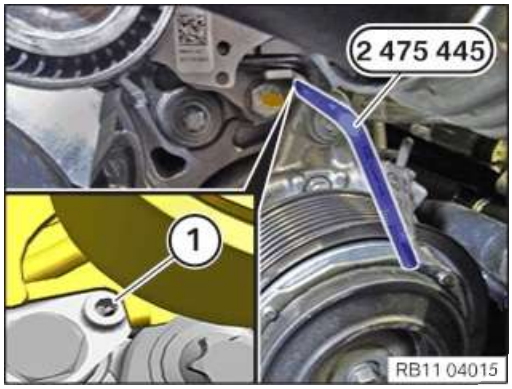
- Feed in and install the drive belt (1) for the starter motor generator.



TECHNICAL INFORMATION

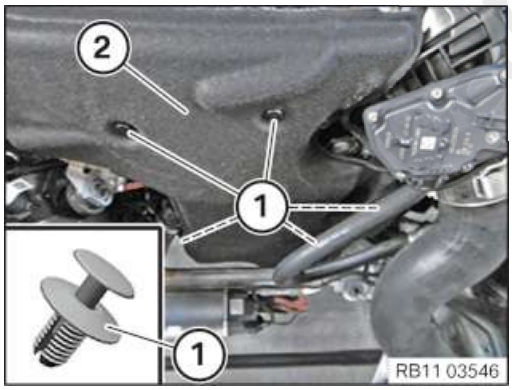
Conduct the following operation with the assistance of a second person.

- Turn the tensioning pulley in (1) in the direction of arrow.
- Feed out the special tool 2 475 442 between the belt pulley of the coolant pump and the tensioning pulley and remove it.



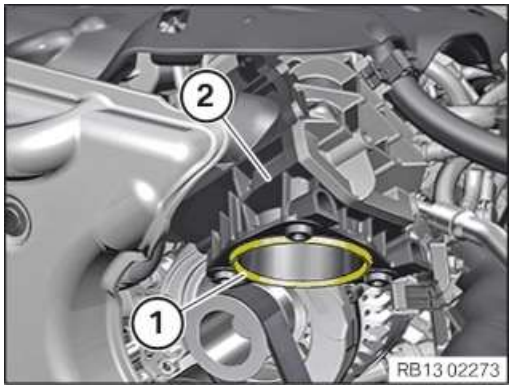
- Feed out the special tool 2 475 445 from the bore hole (1) and remove it.

21 – Install acoustic cover for the engine, front



- Feed the acoustic cover (2) in and install.
- Secure the acoustic cover (2) with the expanding rivets (1).

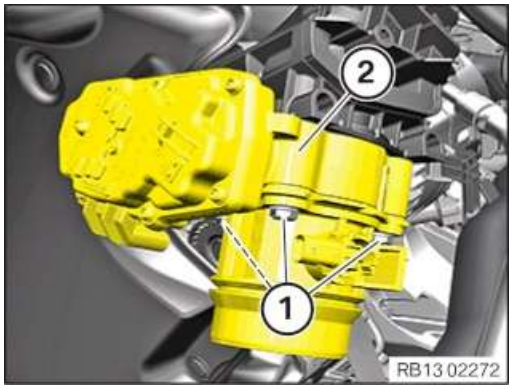
22 – Installing the throttle body



- Renew the sealing ring (1) on the intake plenum .

  Parts: Sealing ring

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- Feed in and install the throttle body (2).
- Tighten the screws (1).

Throttle body to intake plenum

6x50		Tightening torque	8 Nm

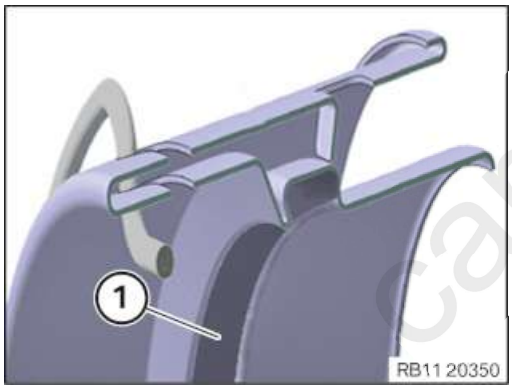


- Check the seal (1) for damage, renew if necessary.

▸ **Replacing damaged seal**

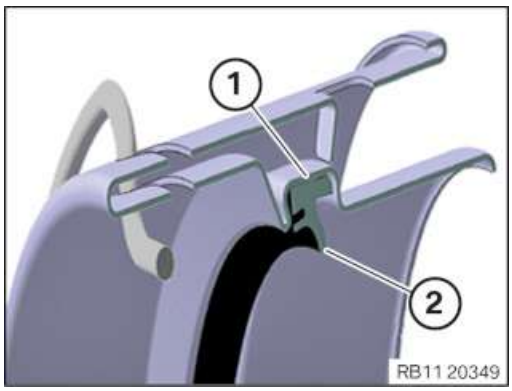
TECHNICAL INFORMATION

Do not use pointed or sharp-edged tools for the installation and/or removal.



- Remove damaged seal.
- Clean gasket groove (1) with a dry towel.

  The gasket groove (1) must be clean.



- Renew gasket.

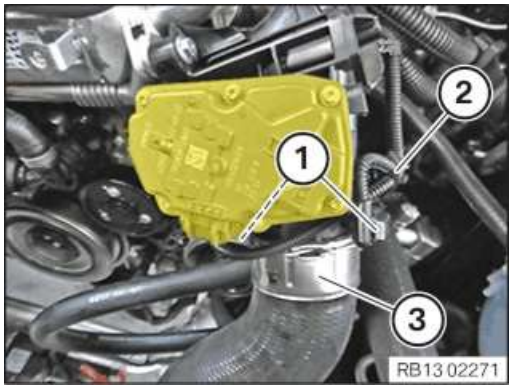
  Parts: Gasket
- Install seal dry without lubricant or mounting agent.

TECHNICAL INFORMATION

Incorrect assembly is possible. Ensure correct installation position.

- Feed in and install the seal.
- Make sure the seal is correctly installed in the gasket groove (1).
- Make sure that the sealing lip (2) is directed inwards as shown.

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- Connect the pressure pipe (3) and lock.

  The pressure pipe (3) must engage audibly.

NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- Secure clamps (2).
- Connect connectors (1) and lock.

  The connectors (1) must engage audibly.



- Lock clamp (1).

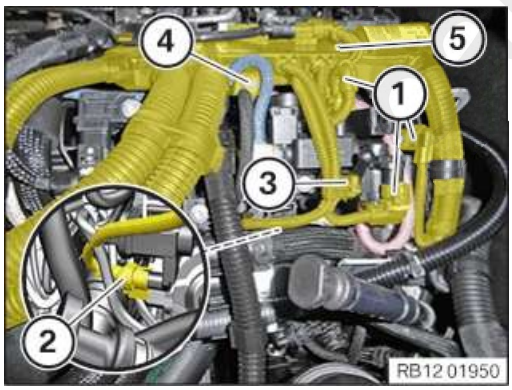
23 – Partially securing the wiring harness section with the starter generator cables

RISK OF DAMAGE

Improper routing of cables and wiring harnesses.

Trapped, crushed or damaged cables may cause short circuits and malfunctions.

- Route all cables without abrasions, do not trap and crush.



- Guide in the wiring harness section (5) and install.
- Tighten down screw (4).

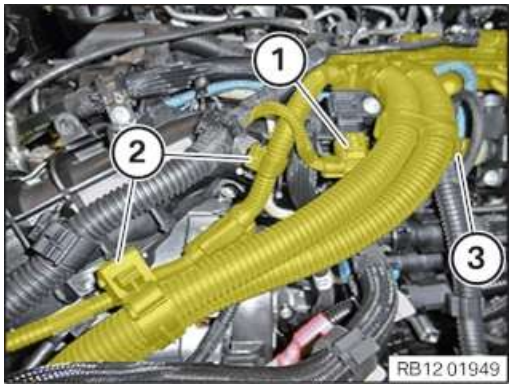
Wiring harness section to manifold

TS5x20		Tightening torque	3,6 Nm

- Secure clamps (3).
- Connect connectors (2) and lock.

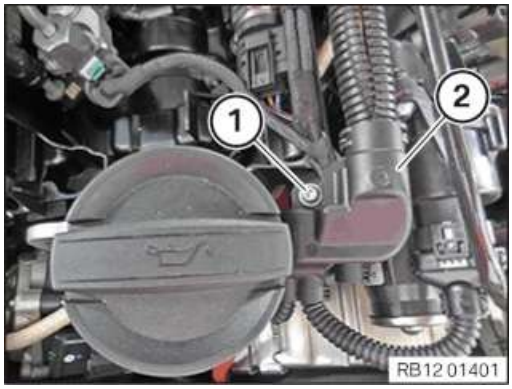
  The connector (2) must engage audibly.
- Connect connectors (1) and lock.

  The connectors (1) must engage audibly.



- Secure clamps (3).
- Secure clamps (2).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.



- Guide in the wiring harness section (2) and install.
- Tighten down screw (1).

Wiring harness section to cylinder head cover

TS5x20		Tightening torque	3,6 Nm



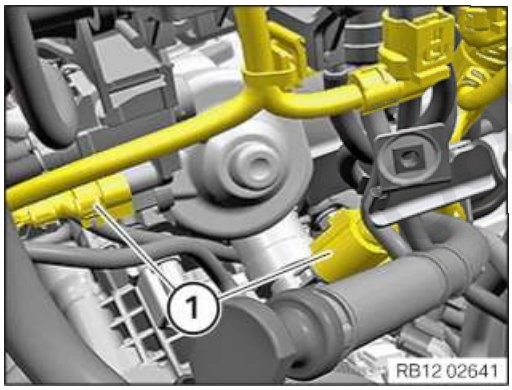
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.



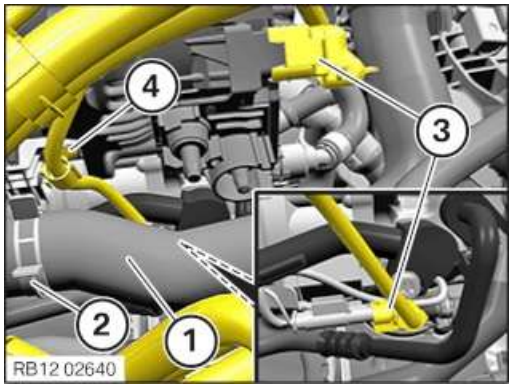
- Connect the connector (1) and lock it.

  The connector (1) must engage audibly.



- Connect connectors (1) and lock.

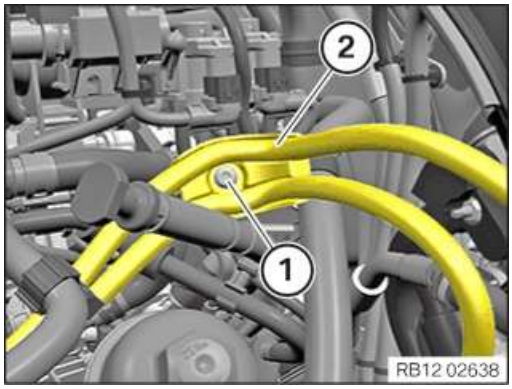
  The connectors (1) must engage audibly.



- Secure the clamp (4).
- Connect connectors (3) and lock.

  The connectors (3) must engage audibly.
- Feed the coolant line (1) into the holder (2) and install it.

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- Feed in and position the positive battery cables (2) .
- Tighten down screw (1).

Standard screw connection M6

M6		Tightening torque	8 Nm



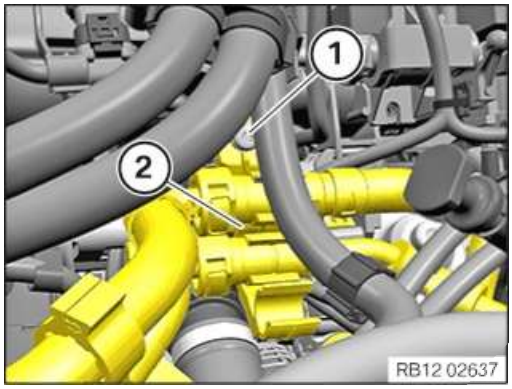
- Feed in and install the positive battery cable (4).
- Feed in and position the positive battery cables (4) .
- Renew the nuts (3) and (2).

  Parts: Nuts
- Tighten nuts (3) and (2).

Battery positive lead on the starter motor generator

M8		Tightening torque	19 Nm

- Guide in and install the lid (1).



- Insert and install the holder (2).
- Tighten down screw (1).

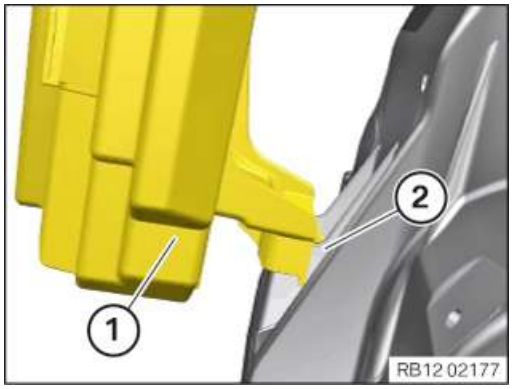
Holder on intake plenum

TS6X20		Tightening torque	5 Nm

24 – Installing the control unit holder

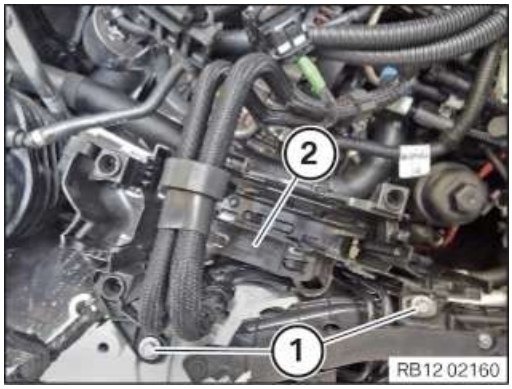
TECHNICAL INFORMATION

The number of connectors on the described component may vary depending on the equipment specification.
If necessary, unlock all other connectors and disconnect or connect and lock respectively.



- Make sure the bottom control unit holder (1) is inserted correctly into the fixture (2).

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- Guide in and install control unit holder (2).
- Tighten the screws (1).

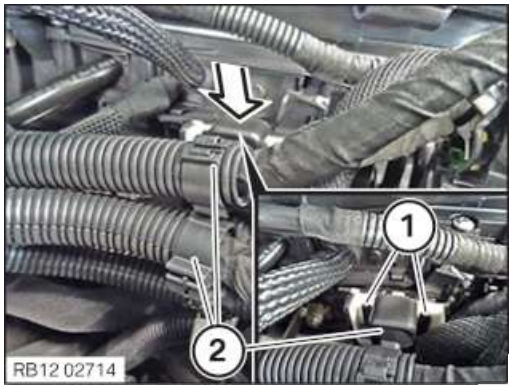
Control unit holder

M6		Tightening torque	8 Nm



- Feed in and install the cable clip (1).

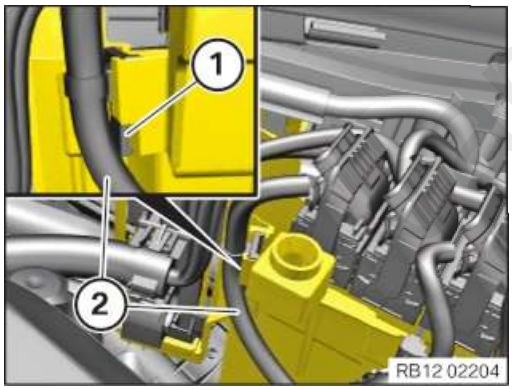
  Lock (arrow) must audibly engage.



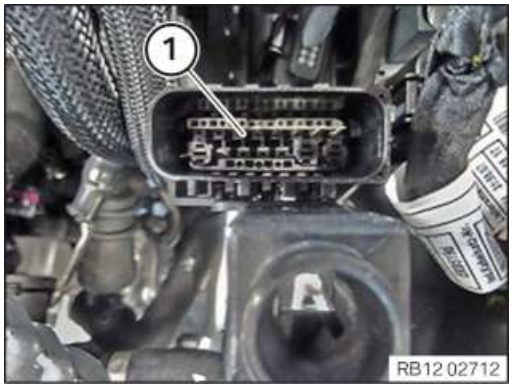
NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- Guide in cable clip (2) in the direction of the arrow and install it.
- Ensure that the locks (1)engage audibly.

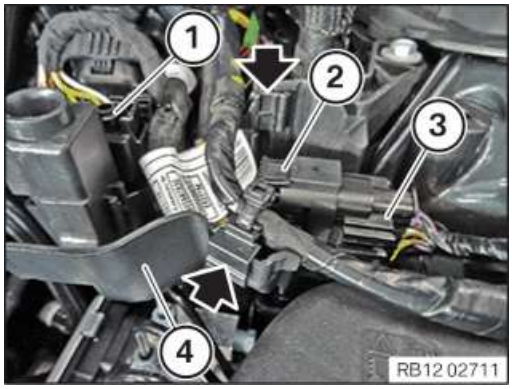


- Guide in the wiring harness section (2) and install.
- Connect and lock the cable clip (1).



- Feed in and install the connector (1).

  The connector (1) must engage audibly.



- Connect connector (3) to control unit holder (4) and lock it.

  The connector (3) must engage audibly.
- Connect connectors (2) and lock.

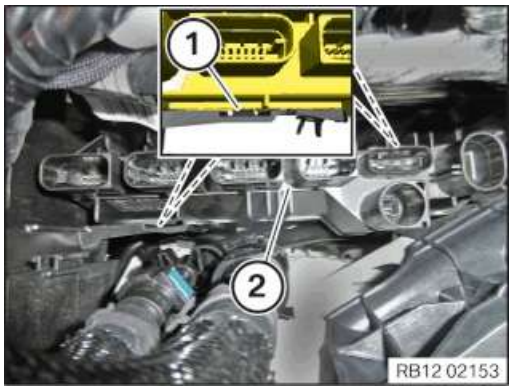
  The connector (2) must engage audibly.
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.
- Secure the clamps (arrows).

25 – Installing the integrated supply module (PDM) partially

Prerequisite

Engine control unit has been removed.



- Insert and install the integrated supply module (PDM) (2).

  The latch mechanisms (1) must engage audibly.

26 – Install DDE control unit

TECHNICAL INFORMATION

If the DDE control unit or an injector has been replaced, it will also be necessary to carry out injection quantity compensation. The adjustment value (7-position letter/number code) is engraved on each injector.

TECHNICAL INFORMATION

Follow instructions for removing and installing control units.

For additional information see: 12 00 ... Notes on removal and installation of control units

TECHNICAL INFORMATION

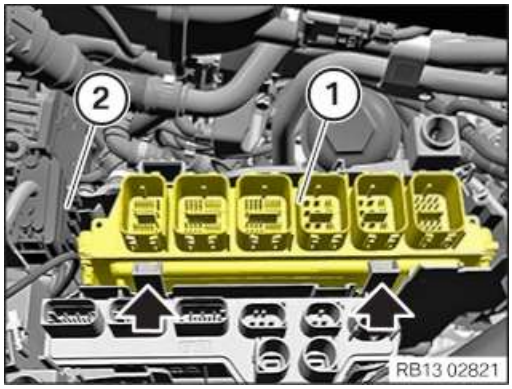
Control unit must be programmed after it is replaced.

For additional information see: 61 00 ... Programming/encoding control unit(s)

TECHNICAL INFORMATION

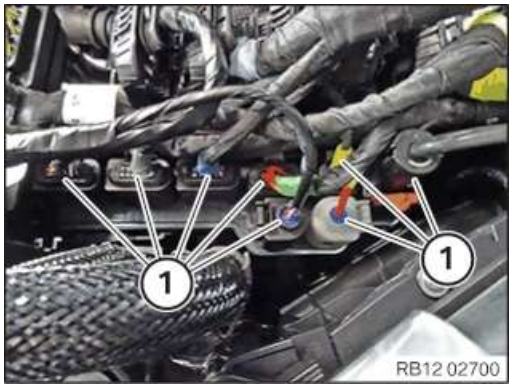
Disconnecting control units may cause fault code entries and functional limitations. Fault code entries must be read out and deleted if necessary.

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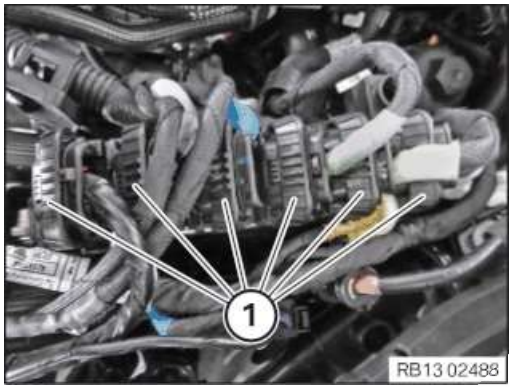
- Make sure that the plug connection (2) does not get damaged.
- Insert the DDE control unit (1) **carefully** and install it.

  The latch mechanisms (arrows) must engage audibly.



- Connect connectors (1) and lock.

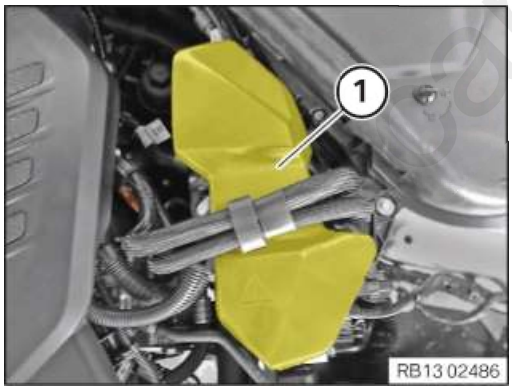
  The connectors (1) must engage audibly.



- Connect connectors (1) and lock.

  The connectors (1) must engage audibly.

27 – Install the cover for the DDE control unit



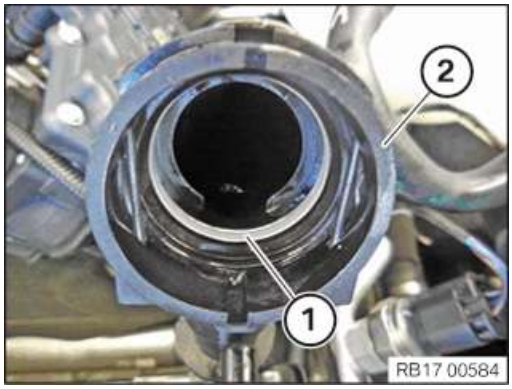
- Insert and install cover (1) into guides.

28 – Connecting the coolant lines

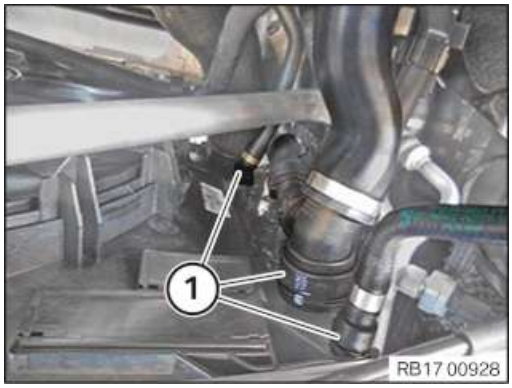
TECHNICAL INFORMATION

Make sure that the connections are locked correctly. The locks must engage audibly.

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- Check the sealing ring (1) of the coolant line (2) for damage and renew where required.



NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

- Connect and lock the coolant lines (1).

  The coolant lines (1) must engage audibly.



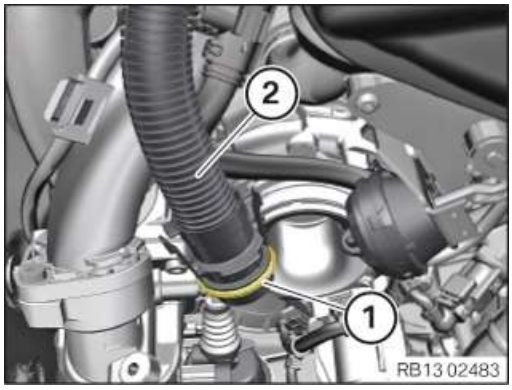
- Connect and lock coolant line (1).

  The coolant line (1) must audibly engage.

29 – Installing the clean air pipe with resonator



- Check the sealing ring (1) on the exhaust turbocharger for damage and renew if necessary.

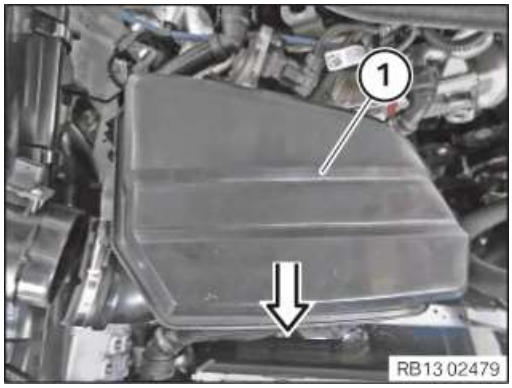


- Check the sealing ring (1) for the engine ventilation line (2) for damage and renew where required.

rdiagn.com



- Feed in and install clean air pipe with resonator (1) in the direction of the arrow.

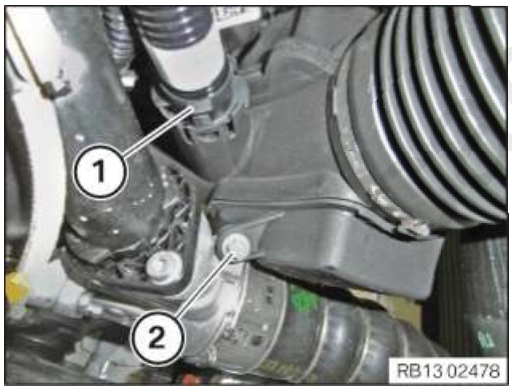


- Press and hold clean air pipe with resonator (1) in the direction of the arrow.



- Attach and lock the clamp (1).

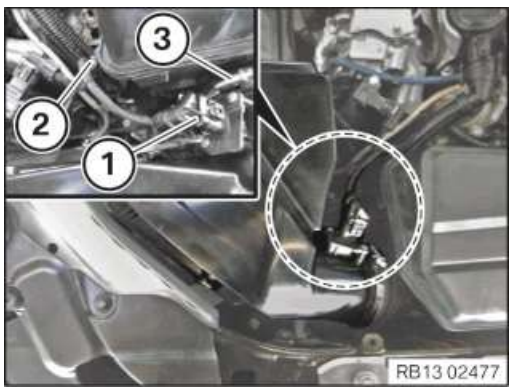
  The clamp (1) must engage audibly.



- Tighten down screw (2).

Clean air pipe to exhaust turbocharger

M6X20		Tightening torque	8 Nm



- Connect the clean air pipe with resonator to the intake filter housing.
- Tighten clamp (3).

Clean air pipe to upper section of intake filter housing

Clamp		Tightening torque	3 Nm

- Secure clamps (2).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

30 – Install acoustic cover

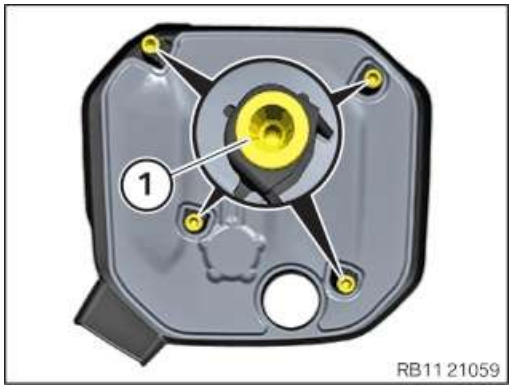
fdiagn.com

RISK OF DAMAGE

Damage to the acoustic cover/design cover.

Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover/design cover.

- Disassemble or mount the acoustic cover/design cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover/design cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Check the acoustic cover for correct fit of the rubber mounts (1).



- Clip in the acoustic cover (1) into the holders in the indicated areas.

31 – Connecting all battery earth leads



- See additional information.

32 – Activating the 48 V electrical system

Prerequisite

Ignition is switched off.

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RISK OF DAMAGE

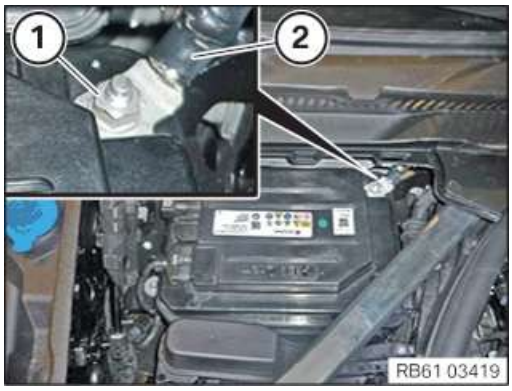
Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.



- Lift battery earth lead (1).
- Remove special tool .



- Release the negative battery cable (2) of the 48-V battery from the mounting.
- Position the negative battery cable (2) of the 48-V battery on the negative battery terminal.
- Tighten nut (1).

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



- Connect the connector (1) of the CAN bus and lock it.
- Clip in clip (2).



- Activate the 48V electrical system by closing the bonnet.

  The activation takes place automatically.

33 – Filling and bleed the high-temperature coolant circuit



TECHNICAL INFORMATION

It is **mandatory** to fill the cooling system before bleeding.

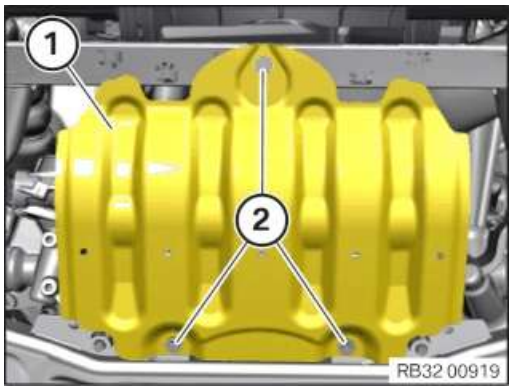
Fill **both** the circuits for high and low-temperature coolant circuits.

- See additional information.

34 – If installed: Install underbody protection of the steering

Prerequisite

Front underbody protection has been removed.



- Position underbody protection (1).
- Tighten the screws (2).

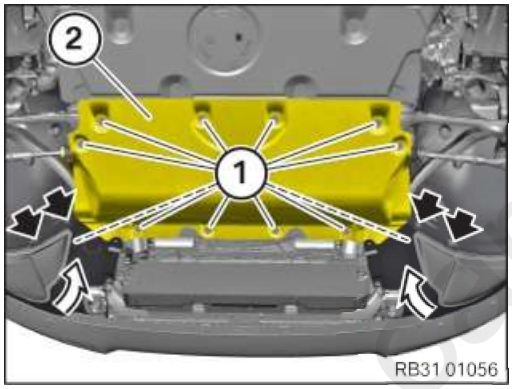
Underbody protection, steering, to front axle support

Multi-purpose boltM10		Tightening torque	56 Nm

Underbody protection, steering, to front axle support

Hexagon bolt M6		Tightening torque	8 Nm

35 – Install the underbody protection of the steering gear



- **Version A:**

  Position the underbody protection (2) of the steering gear.

  Tighten the screws (1).

Underbody protection of the steering gear

Hexagon screw for thermoplastic		Tightening torque	2.6 Nm
Hexagon bolt M6x20		Tightening torque	8 Nm

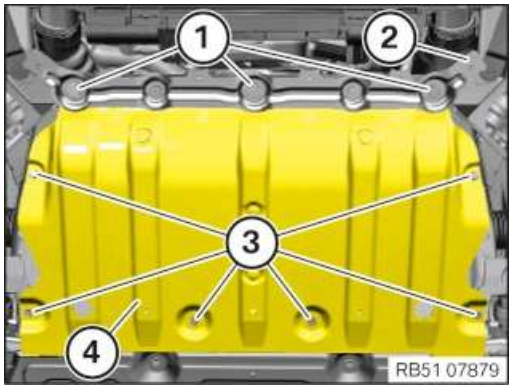
- Position the bottom wheel arch cover.

  Tighten the screws (arrows) of the lower wheel arch cover on the wheel arch cover.

Wheel arch trim panel, front

Thermoplastic hexagon screw		Tightening torque	2,6 Nm

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- **Version B:**

  Feed in the underbody protection (4) of steering gear and install it.

  Tighten the screws (3).

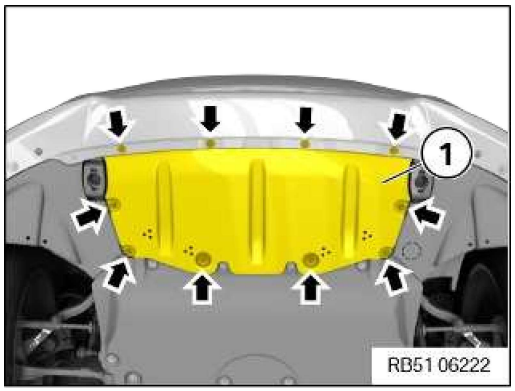
Underbody protection of the steering gear

Hexagon screw for thermoplastic		Tightening torque	2.6 Nm
Hexagon bolt M6x20		Tightening torque	8 Nm

- Position the holder (2) for the underride protection.

  Tighten the screws (1).

36 – Installing the front underbody protection



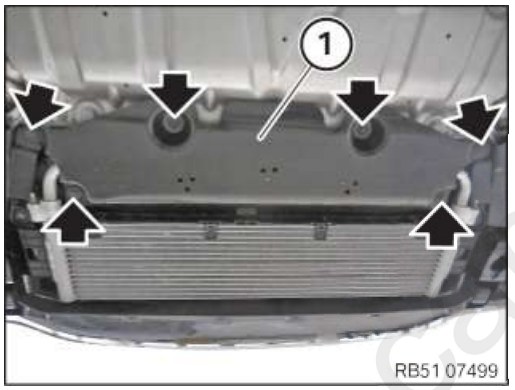
- **Version A:**

  Feed in the front underbody protection (1) towards the front under the bumper panel and position.

  Tighten screws (arrows).

Underbody protection front

Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm



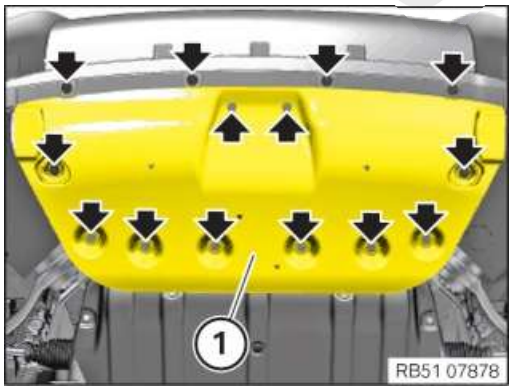
- **Version B:**

  Feed in and position the front underbody protection (1).

  Tighten screws (arrows).

Underbody protection front

Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm



- **Version C:**

  Feed in and install front underbody protection (1).

  Tighten screws (arrows).

Underbody protection front

Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Additional Information

Overview of Tightening Torques

Belt tensioner to alternator/starter generator Used in step 18

M8X30		Tightening torque	28 Nm

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Alternator to component carrier			Used in step 19
M10x75		Tightening torque	38 Nm
M10x125		Tightening torque	38 Nm
M10x90		Tightening torque	38 Nm

Battery positive lead on the starter motor generator			Used in step 1923
M8		Tightening torque	19 Nm

Air conditioning compressor in component carrier			Used in step 19
M10		Tightening torque	38 Nm

Throttle body to intake plenum			Used in step 22
6x50		Tightening torque	8 Nm

Wiring harness section to manifold			Used in step 23
TS5x20		Tightening torque	3,6 Nm

Wiring harness section to cylinder head cover			Used in step 23
TS5x20		Tightening torque	3,6 Nm

Standard screw connection M6			Used in step 23
M6		Tightening torque	8 Nm

Holder on intake plenum			Used in step 23
TS6X20		Tightening torque	5 Nm

Control unit holder			Used in step 24
M6		Tightening torque	8 Nm

Clean air pipe to exhaust turbocharger			Used in step 29
M6X20		Tightening torque	8 Nm

Clean air pipe to upper section of intake filter housing			Used in step 29
Clamp		Tightening torque	3 Nm

Negative battery cable to 48-V battery			Used in step 32
Nut M8		Tightening torque	19 Nm

Underbody protection, steering, to front axle support			Used in step 34
Multi-purpose boltM10		Tightening torque	56 Nm

Underbody protection, steering, to front axle support			Used in step 34
Hexagon bolt M6		Tightening torque	8 Nm

Underbody protection of the steering gear			Used in step 35
Hexagon screw for thermoplastic		Tightening torque	2.6 Nm
Hexagon bolt M6x20		Tightening torque	8 Nm

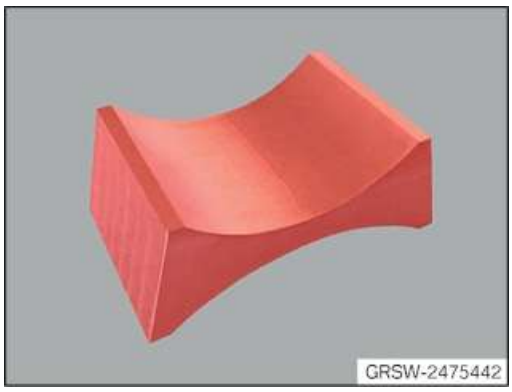
Wheel arch trim panel, front			Used in step 35
Thermoplastic hexagon screw		Tightening torque	2,6 Nm

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Underbody protection front			Used in step 36
Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Overview of Special Tools

2 475 442 Removal and installation tool



Common	Used in step 16171920
Usage	For removing and installing the drive belt of the ancillary components.
Included in the tool or work	
Storage location	A8
Replaced by	
In connection with	83302475445
SI-Number	01 19 19 (668)

2 475 445 Pin



Common	Used in step 16171920
Usage	Tool for drive belt of 48 V ancillary components
Included in the tool or work	
Storage location	A8
Replaced by	
In connection with	83302475442 83302475444
SI-Number	01 19 19 (668)

Links

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Notes on 48-V battery	132

General repair instructions	Used in step
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11 28 060 Replacing the belt tensioner of drive belt for air conditioning compressor

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.
- Detach battery earth lead from battery.
- With auxiliary batteries: Detach all battery earth leads from additional batteries.

RISK OF DAMAGE

Damage to battery terminal, the safety battery terminal or the intelligent battery sensor (IBS).

Damaged battery terminals can lead to malfunctions or vehicle electrical system faults.

- Pull off battery terminal from battery pole by carefully moving to and fro. Do not pry off using a tool.

PRELIMINARY WORK

1 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no battery charger** is connected to the jump start terminal point in the engine compartment.
- For vehicles with additional electrical systems (48 V electrical system, high-voltage vehicle electrical system), it is mandatory to deactivate them **before** disconnecting the vehicle battery.

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.

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RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.

TECHNICAL INFORMATION

Follow notes for 48-V battery. See further information 6120 ... Notes on 48-V battery.



- Deactivate the 48V electrical system by opening the bonnet.

  The deactivation takes place automatically.



Check

TECHNICAL INFORMATION

Zero voltage (48V electrical system is switched off) is displayed only in PAD mode.

- Press the START-STOP button quickly 3 times without stepping on the brake pedal to establish the PAD mode.
- Check isolation from the supply in the instrument cluster in PAD mode.

desired state

- The Check Control message "48V electrical system switched off." (1) is displayed.

Result

» **The absence of voltage** cannot be determined by means of the Check Control message "48V electrical system switched off:" (1). Work is not permitted to be started.

Measure

- Carry out the service function "48 V electrical system deactivation".
  - Vehicle management > Service functions > Voltage supply > Deactivate 48 V electrical system

Only when the Check Control message “48 V electrical system switched off.” (1) is displayed in the instrument cluster is it permitted to disconnect the 12 V battery.

If the absence of voltage is not indicated clearly, contact Technical Support.

Result

» The Check Control message signals that the 48V electrical system has been switched off.

Measure

- Exit PAD mode by pressing the START-STOP button once without depressing the brake pedal.

  The work “Disconnecting the negative battery cable of the 48-V battery” can be started.



- Unlock and disconnect plug connection (1) of the CAN bus.
- Release the clip (2).



- Loosen nut (1).
- Pull off negative battery cable (2) of the 48-V battery from the negative battery terminal, set it aside and secure it.



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

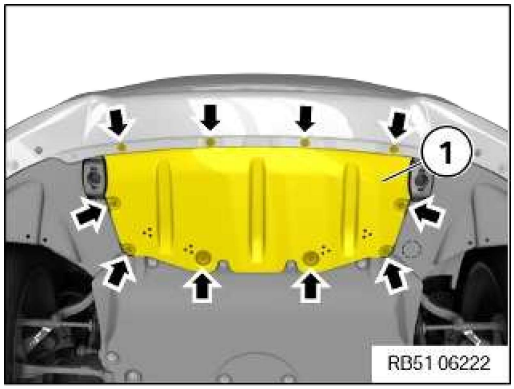
- Cover the vehicle battery with the special tool as shown.
- Position the battery earth lead (1) as shown.

2 – Disconnecting all battery earth leads



- See additional information.

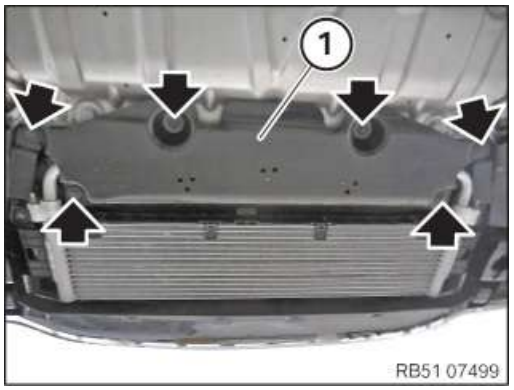
3 – Removing the front underbody protection



- **Version A:**

  Remove screws (arrows).

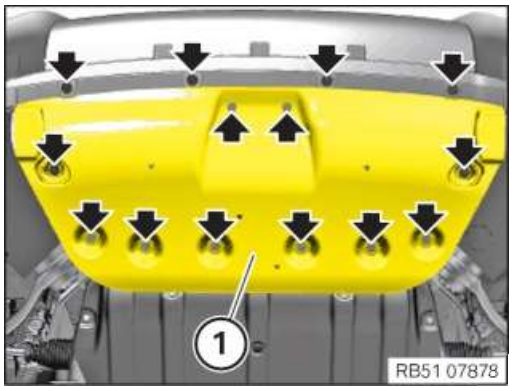
  Feed front underbody protection (1) backwards out of the bumper panel.



- **Version B:**

  Remove screws (arrows).

  Guide out front underbody protection (1) and remove it.

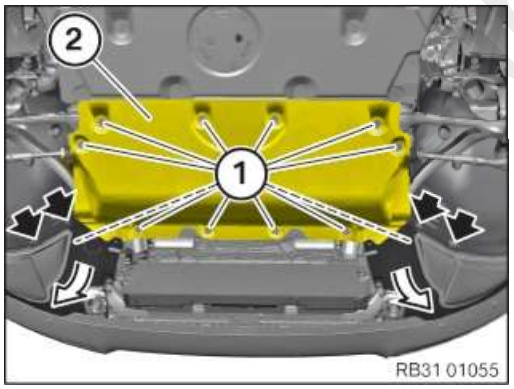


- **Version C:**

  Remove screws (arrows).

  Guide out front underbody protection (1) and remove it.

4 – Remove the underbody protection of the steering gear



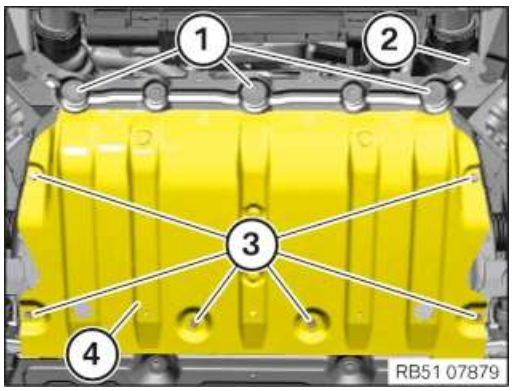
- **Version A:**

  Unscrew the screws (arrows) of the wheel arch cover on the wheel arch cover.

  Fold the bottom wheel arch cover to the side.

  Loosen screws (1).

  Remove the underbody protection (2) of the steering gear.



- **Version B:**

  Loosen screws (1).

  Remove the holder (2) for the underride protection.

  Loosen screws (3).

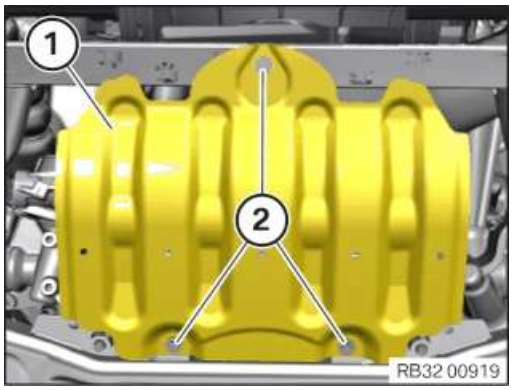
  Feed out and remove the underbody protection (4) of the steering gear.

5 – If installed: Removing the steering underbody protection

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Prerequisite

Front underbody protection has been removed.



- Loosen screws (2).
- Remove underbody protection (1).

6 – Removing the acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover/design cover.

Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover/design cover.

- Disassemble or mount the acoustic cover/design cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover/design cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Unclip the acoustic cover (1) from the holders in the indicated area towards the top.

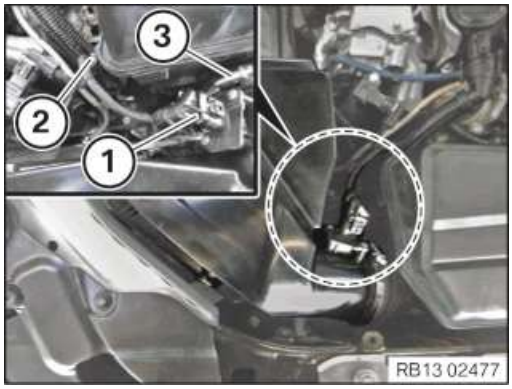
7 – Removing the clean air pipe with the resonator

WARNING

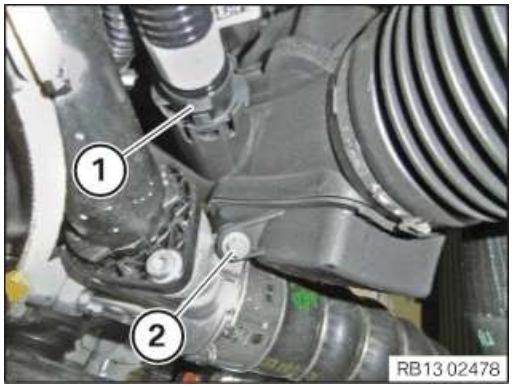
Hot surfaces.

Risk of burning!

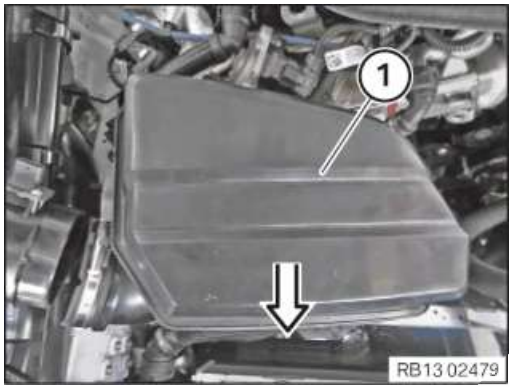
- Perform all work only on components that have cooled down.



- Unlock plug connection (1) and disconnect.
- Loosen clamp (2).
- Unfasten clamp (3).
- Separate the clean air pipe with resonator from the intake filter housing.



- Unlock engine ventilation line (1), disconnect it and place it aside.
- Loosen screw (2).



- Press and hold clean air pipe with resonator (1) in the direction of the arrow.



- Unlock and loosen clamp (1).



- Feed out and remove clean air pipe with resonator (1) in the direction of the arrow.

8 – Draining the coolant from the high-temperature cooling system

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WARNING

Hot fluids.

Risk of scalding!

- Conduct all work in the vehicle wearing appropriate personal protective equipment only.

CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.

TECHNICAL INFORMATION

Life-long fill of coolant!

Do not reuse used coolant.

When replacing and removing components which rely on the corrosion protection effect of the coolant, it is essential to change the coolant. The cooling system must therefore be emptied and refilled.

In the case of other removal work involving the draining of part quantities of coolant, the coolant level must be topped up with new coolant.

TECHNICAL INFORMATION

Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.



- Loosen sealing cap (1).

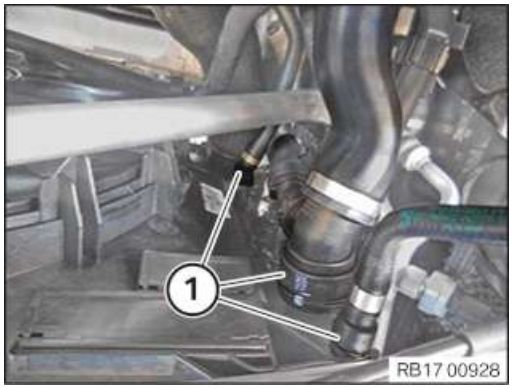
▸ **Avoiding damage to the starter generator due to escaping coolant**

RISK OF DAMAGE

Escaping coolant on the starter generator.

Damage and operating failure of the starter generator.

- Cover the starter generator with suitable, watertight auxiliary materials.
- Close off line connections with seal plugs.
- If necessary: Flush the leaked coolant from the starter generator with at least 1 l water.



NOTICE

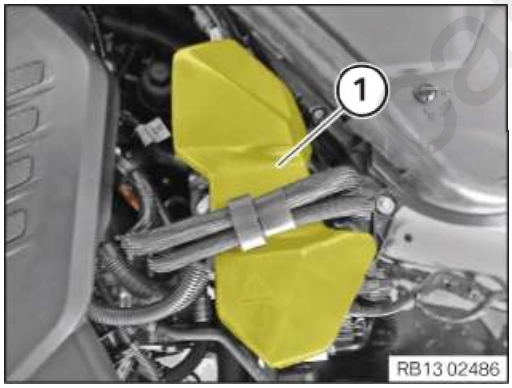
Schematic diagram is for example purposes. Some parts may differ in certain details.

- Unlock all coolant lines (1) and detach.
- Catch and dispose of escaping coolant.



- Unlock and loosen coolant line (1).
- Catch and dispose of escaping coolant.

9 – Remove the cover for the DDE control unit



- Pull off, guide out and remove cover (1) upwards.

10 – Remove DDE control unit

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 ... Notes for ESD protection (electrostatic discharge)

TECHNICAL INFORMATION

In a warranty case, you must always provide a fault memory printout with the defective part, even if the fault memory does not contain an entry.

TECHNICAL INFORMATION

Follow instructions for removing and installing control units.

For additional information see: 12 00 ... Notes on removal and installation of control units

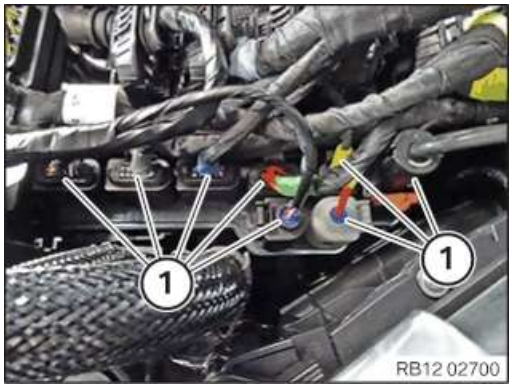
TECHNICAL INFORMATION

Disconnecting control units may cause fault code entries and functional limitations. Fault code entries must be read out and deleted if necessary.

TECHNICAL INFORMATION

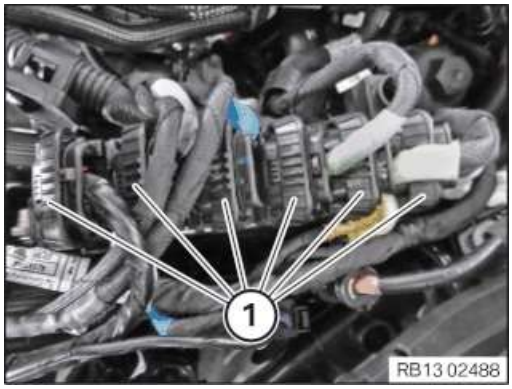
Control unit must be programmed after it is replaced.

For additional information see: 61 00 ... Programming/encoding control unit(s)

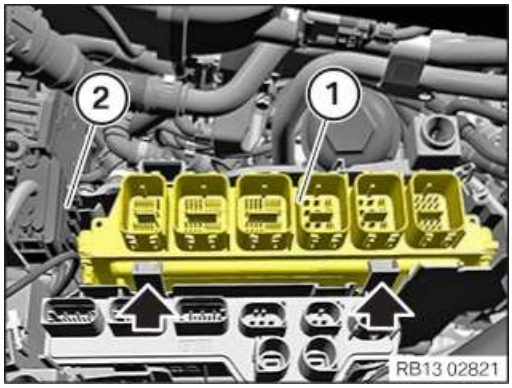


- Unlock plug connections (1) and disconnect.

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- Unlock and disconnect plug connections (1).



- Release the latch mechanisms (arrows).
- Ensure that the plug connection is (2) not damaged.
- Feed out the DDE control unit (1) **carefully** and remove.

11 – Removing the integrated supply module (PDM) partially

Prerequisite

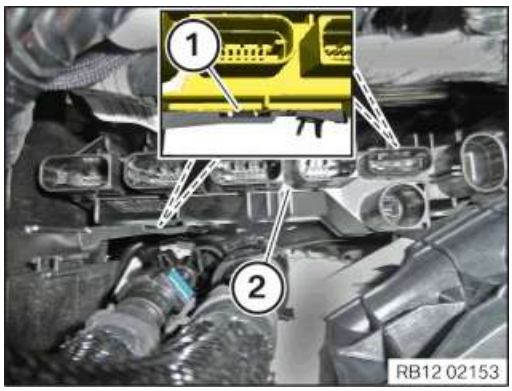
Engine control unit is removed.

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 ... Notes for ESD protection (electrostatic discharge)



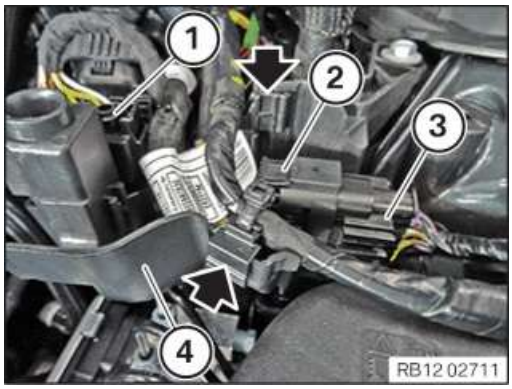
- Loosen the latch mechanisms (1).
- Feed out and remove the integrated supply module (PDM) (2) upwards.

12 – Removing the control unit holder

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TECHNICAL INFORMATION

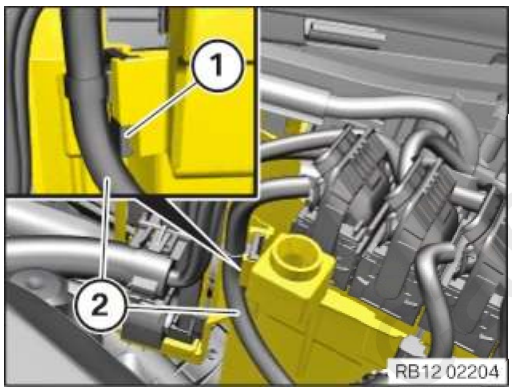
The number of connectors on the described component may vary depending on the equipment specification.
If necessary, unlock all other connectors and disconnect or connect and lock respectively.



- Unlock plug connection (1) and disconnect.
- Unlock plug connection (2) and disconnect.
- Release the connector (3) and disconnect from the control unit holder (4).
- Release the clamps (arrows).



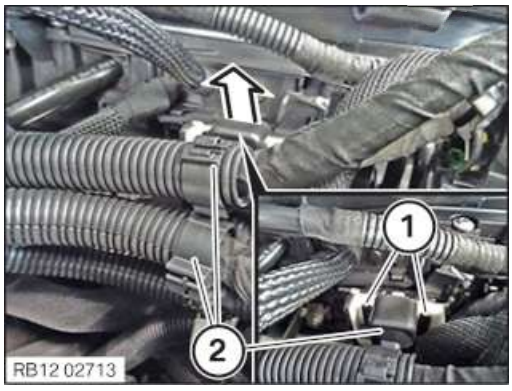
- Unlock plug connection (1) and disconnect.



- Unlock and loosen the cable clip (1).
- Remove the wiring harness section (2) and put to one side.

NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

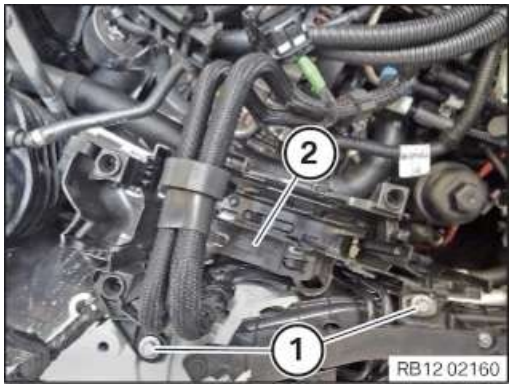


- Unlock the locks (1) .
- Guide out the cable clip (2) in the direction of arrow and set aside.

.com



- Unlock the lock (arrow).
- Feed out the cable clip (1) upwards and set it aside.



- Loosen screws (1).
- Guide out and remove the control unit holder (2).

13 – Releasing the wiring harness section with the starter generator lines partially

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

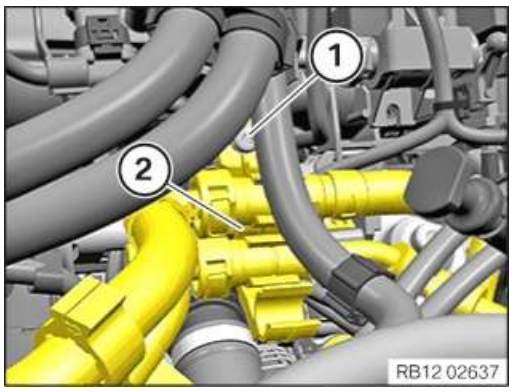
- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 ... Notes for ESD protection (electrostatic discharge)

RISK OF DAMAGE

Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

- Do not pull on the wires when disconnecting connectors and plug connections.

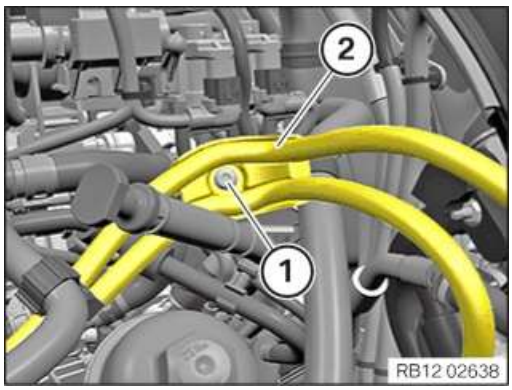


- Release the screw (1).
- Guide out fuel lines (2) and set them aside.

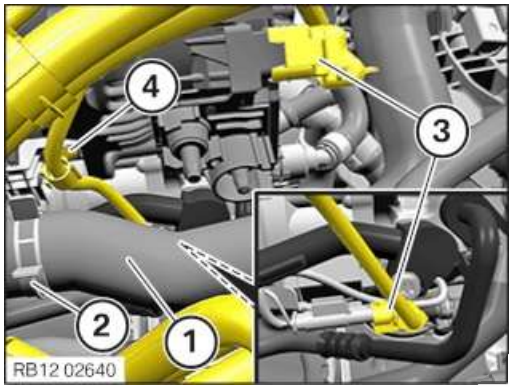
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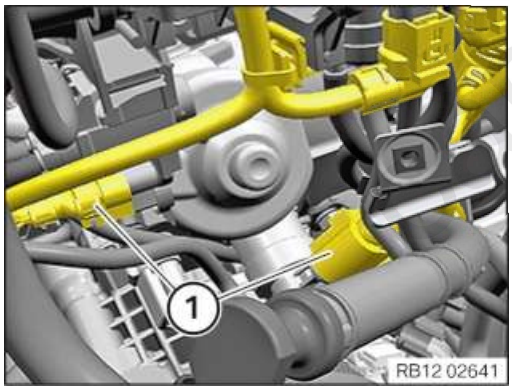
- Guide out and remove the lid (1).
- Release the nuts (2) and (3).
- Feed out positive battery cables (4) and place to one side.
- Loosen clamp (5).
- Thread out holder (2) and set aside.



- Release the screw (1).
- Guide out the positive battery cables (2) and set them aside.



- Release the coolant line (1) from the holder (2) .
- Unlock plug connections (3) and disconnect.
- Loosen clamp (4).



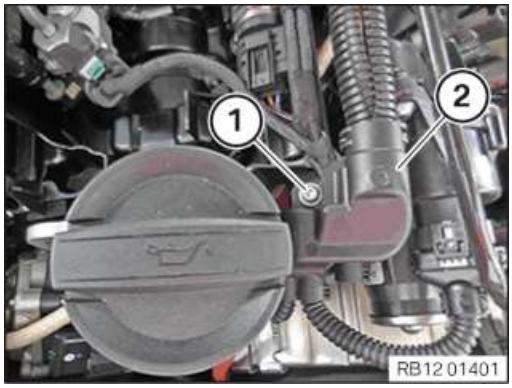
- Unlock and disconnect plug connections (1).



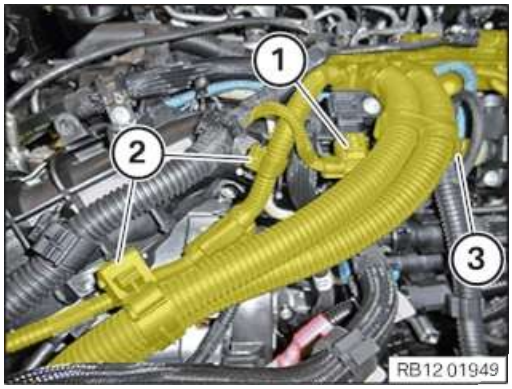
- Unlock and loosen connector (1).



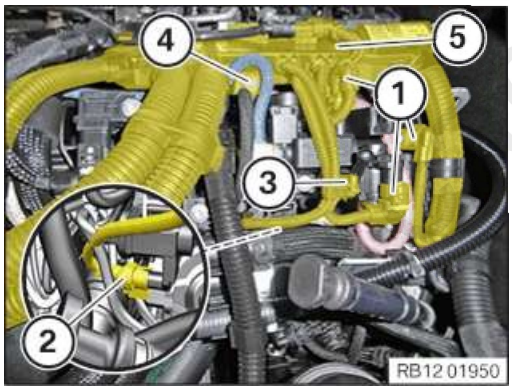
- Unlock plug connection (1) and disconnect.



- Loosen screw (1).
- Remove the wiring harness section (2) and put to one side.



- Unlock plug connection (1) and disconnect.
- Loosen clamps (2).
- Loosen clamp (3).



- Unlock and disconnect the plug connection (1).
- Unlock and disconnect the plug connection (2).
- Loosen clamp (3).
- Loosen screw (4).
- Guide out wiring harness section (5) as far as possible and set it aside.

14 – Removing the throttle body

WARNING

Hot surfaces.

Risk of burning!

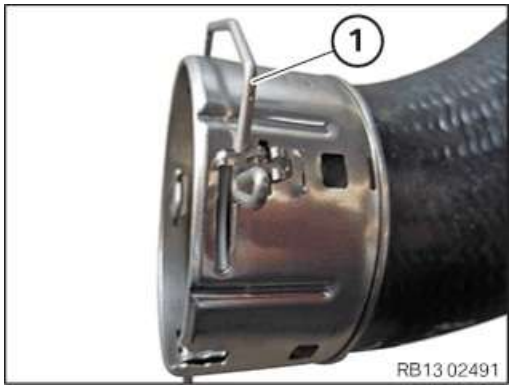
- Perform all work only on components that have cooled down.

RISK OF DAMAGE

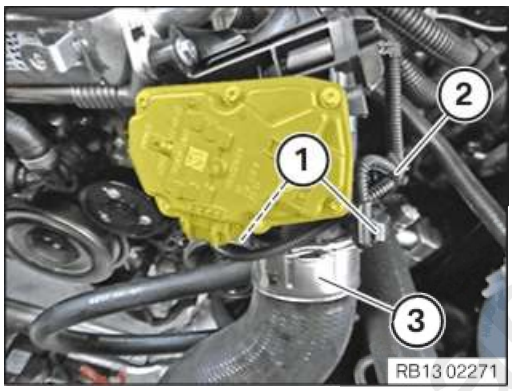
Electrostatic discharge.

Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 ... Notes for ESD protection (electrostatic discharge)



- Unlock clamp (1) and engage in this position.

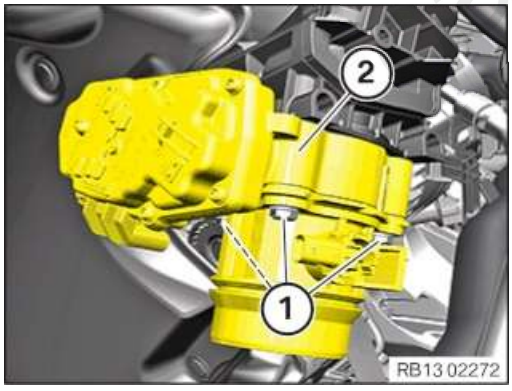


- Unlock and disconnect plug connections (1).

NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- Loosen clamp (2).
- Unlock and disconnect the pressure pipe (3).



- Loosen screws (1).
- Remove throttle body (2).

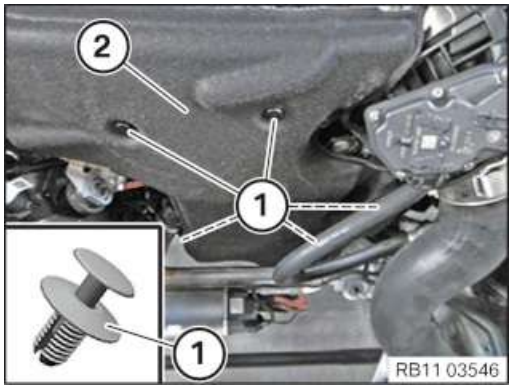
15 – Remove acoustic cover of the front engine

WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.



- Release and remove expanding rivet (1).
- Guide the acoustic cover (2) out and remove.

16 – Removing the drive belt for the starter motor generator

CAUTION

Spring preload.

Danger of injury!

- The use of the specified special tool (tool) is mandatory.
- The described operation must be carried out properly.

CAUTION

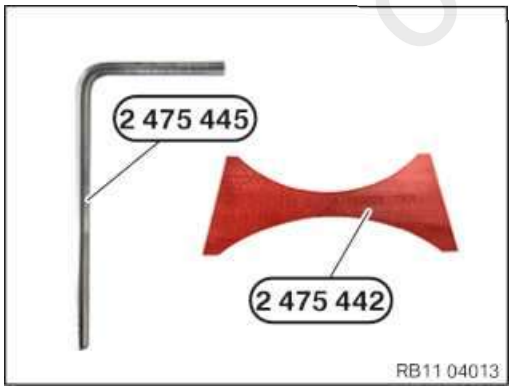
Component with preload.

Danger of injury!

- Reduce preload as far as possible before disassembly. Relieve component.

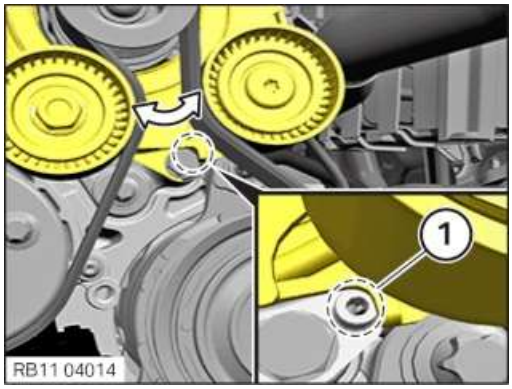
TECHNICAL INFORMATION

The drive belt must be replaced if contaminated with coolant- and oil residues.

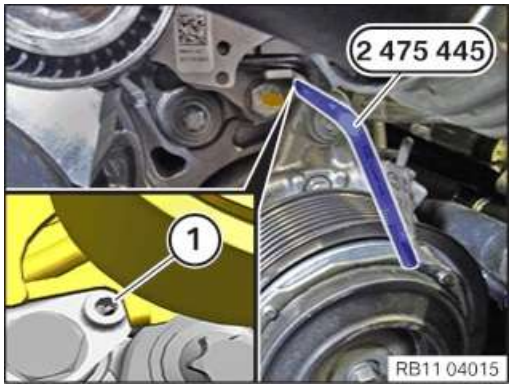


- Prepare the special tool 2 475 442 and the special tool 2 475 445.

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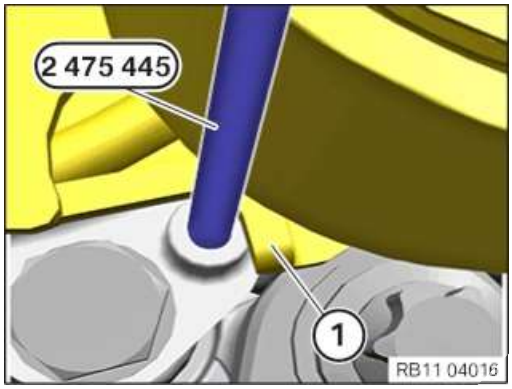


- Position the belt tensioner in the direction of the arrow so that the bore hole is visible in the area (1).

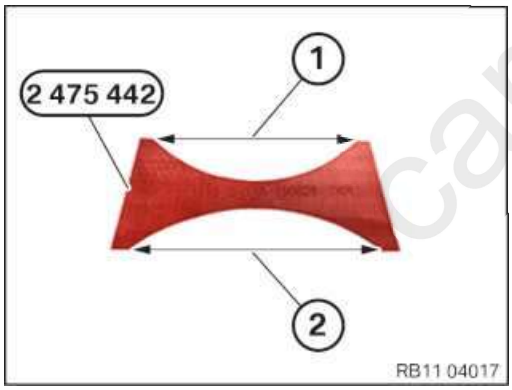


- Guide in the special tool 2 475 445 and install it in the bore hole (1).

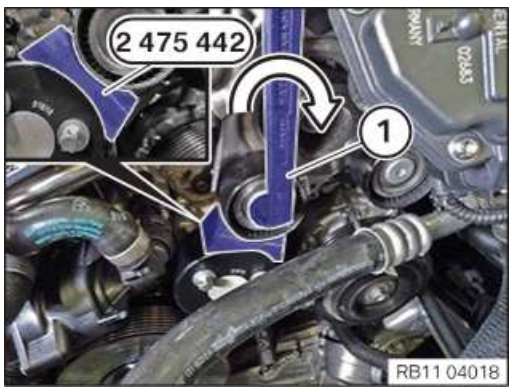
  The special tool 2 475 445 must rest against the starter motor generator.



- Ensure that the belt tensioner (1) is supported on the special tool 2 475 445.



- Ensure that the radius (1) of the special tool 2 475 442 supports the tensioning pulley of the belt tensioner.
- Ensure that the radius (2) of the special tool 2 475 442 is supported on the belt pulley of the coolant pump.

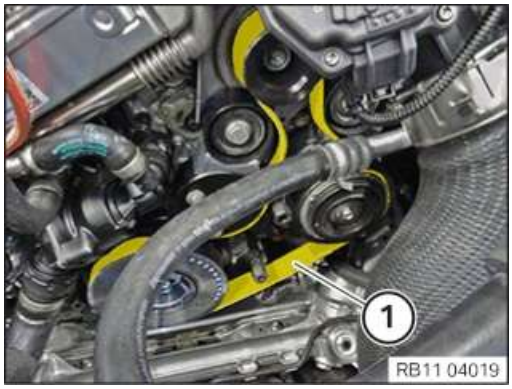


TECHNICAL INFORMATION

Conduct the following operation with the assistance of a second person.

- Twist the tensioning pulley (1) in the direction of the arrow.
- Guide in and install the special tool 2 475 442 between the belt pulley of the coolant pump and the tensioning pulley.

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TECHNICAL INFORMATION

If the drive belt is reused: Mark direction of travel and reinstall drive belt in same direction of travel.

- Guide out and remove the drive belt (1) for the starter motor generator.

17 – Removing the starter motor generator

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.
- Detach battery earth lead from battery.
- With auxiliary batteries: Detach all battery earth leads from additional batteries.

RISK OF DAMAGE

Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

- Do not pull on the wires when disconnecting connectors and plug connections.

RISK OF DAMAGE

Electrostatic discharge.

Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 ... Notes for ESD protection (electrostatic discharge)

▸ **Avoiding damage to the starter generator due to escaping coolant**

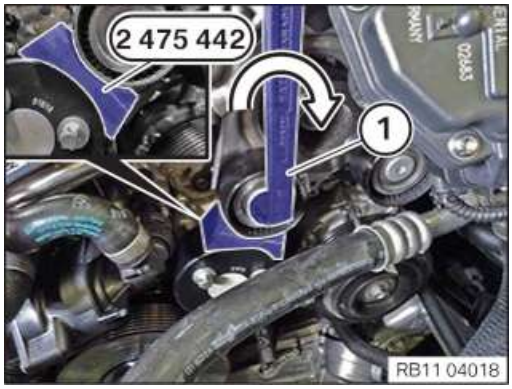
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RISK OF DAMAGE

Escaping coolant on the starter generator.

Damage and operating failure of the starter generator.

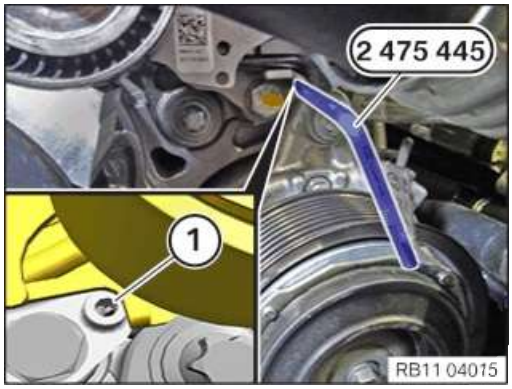
- Cover the starter generator with suitable, watertight auxiliary materials.
- Close off line connections with seal plugs.
- If necessary: Flush the leaked coolant from the starter generator with at least 1 l water.



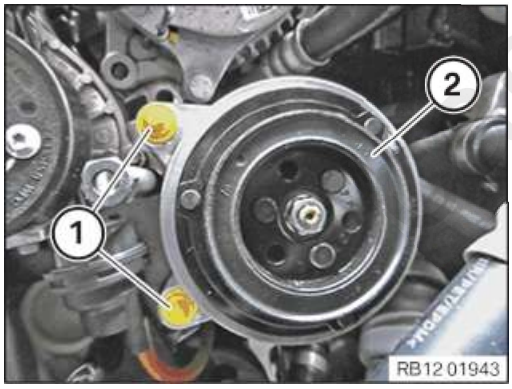
TECHNICAL INFORMATION

Conduct the following operation with the assistance of a second person.

- Twist the tensioning pulley (1) in the direction of the arrow.
- Feed out the special tool 2 475 442 between the belt pulley of the coolant pump and the tensioning pulley and remove it.



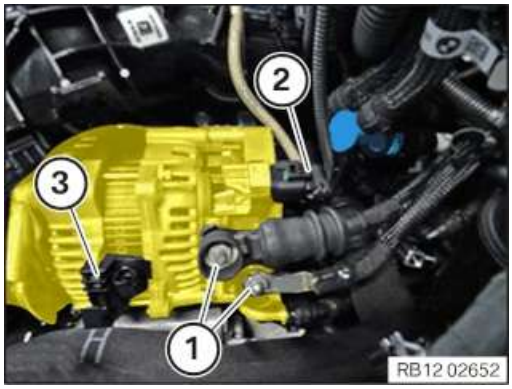
- Feed out the special tool 2 475 445 from the bore hole (1) and remove it.



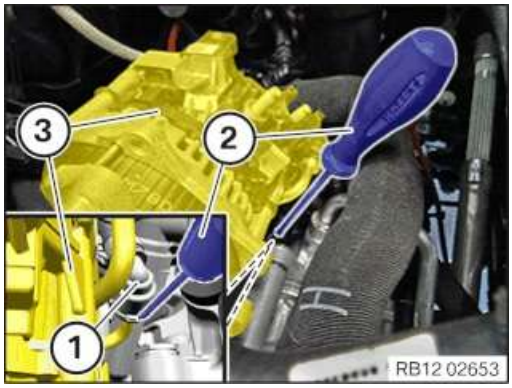
- Loosen screws (1).
- Slide the air conditioning compressor (2) out and set it aside.



- Guide out and remove the lid (1).



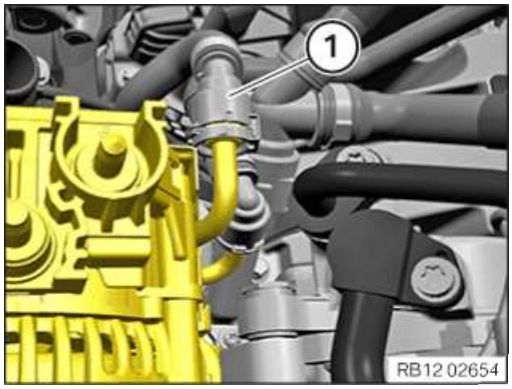
- Release nuts (1).
- Unlock plug connection (2) and disconnect.
- Loosen the holder (3).



TECHNICAL INFORMATION

Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.

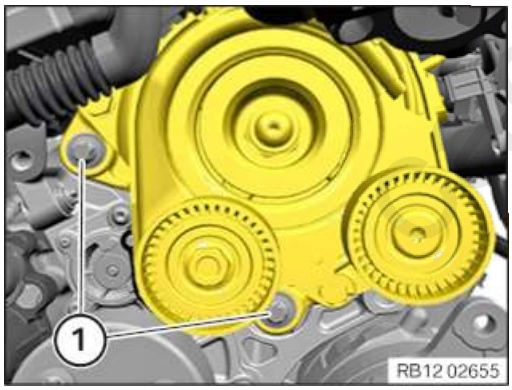
- Unlock and pull off the coolant line (1) with a screwdriver (2).
- Catch and dispose of escaping coolant.



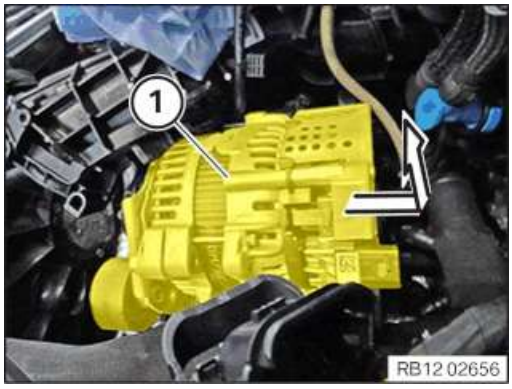
TECHNICAL INFORMATION

Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.

- Unlock and remove the coolant line (1).
- Catch and dispose of escaping coolant.



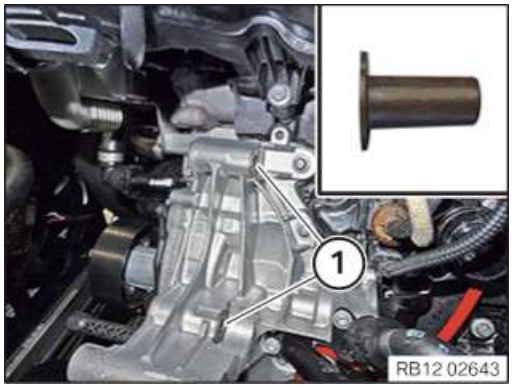
- Loosen screws (1).



- Feed out and remove the starter motor generator (1) in the direction of arrow.



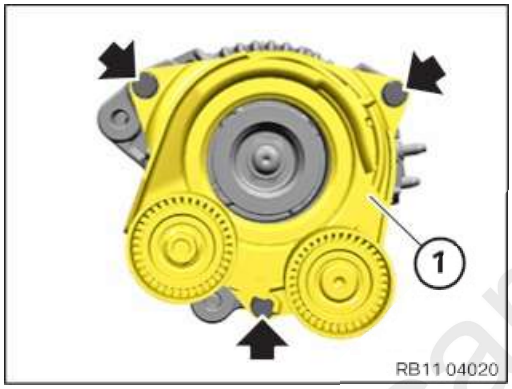
- Feed out and remove the bush (1).



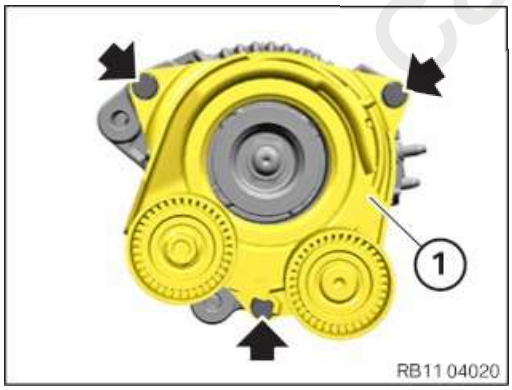
- Feed out and remove the bush (1).

MAIN WORK

18 – Replacing the belt tensioner of the starter generator



- Remove screws (arrows).
- Feed out the belt tensioner (1) at the starter generator and remove.



- Feed in and install the belt tensioner (1) on the starter generator.
- Tighten screws (arrows).

Belt tensioner to alternator/starter generator

M8X30		Tightening torque	28 Nm

POSTPROCESSES

19 – Installing the starter motor generator

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CAUTION

Improper routing of the positive battery cable.

Risk of short circuits!

- Route the positive battery cable without abrasions and do not trap.

RISK OF DAMAGE

Improper routing of cables and wiring harnesses.

Trapped, crushed or damaged cables may cause short circuits and malfunctions.

- Route all cables without abrasions, do not trap and crush.

▸ **Avoiding damage to the starter generator due to escaping coolant**

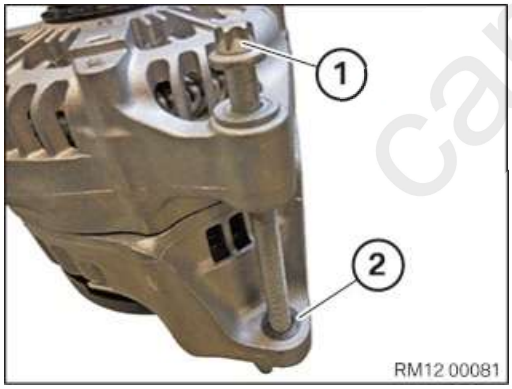
RISK OF DAMAGE

Escaping coolant on the starter generator.

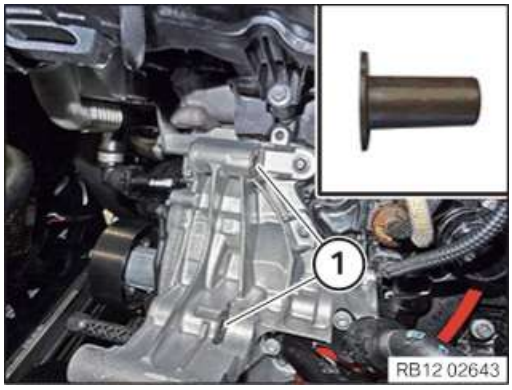
Damage and operating failure of the starter generator.

- Cover the starter generator with suitable, watertight auxiliary materials.
- Close off line connections with seal plugs.
- If necessary: Flush the leaked coolant from the starter generator with at least 1 l water.

▸ **Prepare for the installation of the alternator**



- Screw the screw (1) into the threaded support sleeve (2).
- Slightly press back the threaded support sleeve (2) using the bolt (1).
- Once again unscrew the screw (1) from the threaded support sleeve (2).



- Renew the bushes (1).

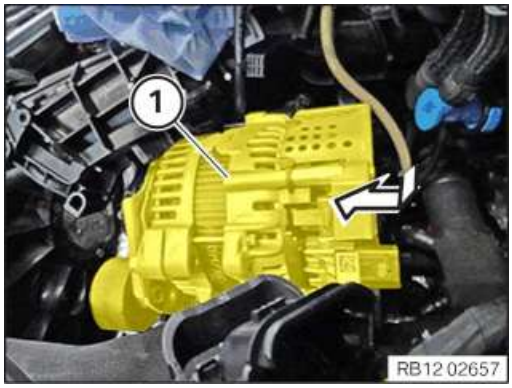
  Parts: Bushes
- Guide in and install the bushes (1).

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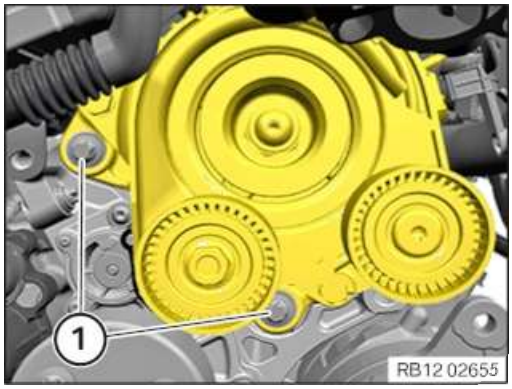


- Renew the bushes (1).

  Parts: Bushes
- Guide in and install the bushes (1).



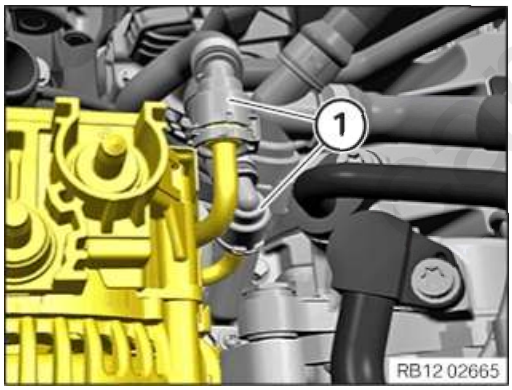
- Guide in and install the starter motor generator (1) in the direction of the arrow.



- Tighten the screws (1).

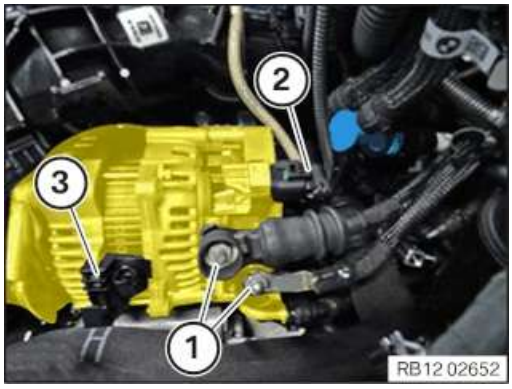
Alternator to component carrier

M10x75		Tightening torque	38 Nm
M10x125		Tightening torque	38 Nm
M10x90		Tightening torque	38 Nm



- Connect and lock the coolant lines (1).

  The coolant lines (1) must engage audibly.



- Fasten the holder (3).
- Connect connectors (2) and lock.

  The connector (2) must engage audibly.
- Renew nuts (1).

  Parts: Nuts
- Tighten nuts (1).

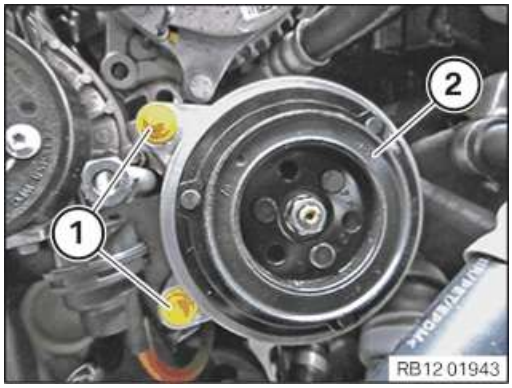
Battery positive lead on the starter motor generator

M8		Tightening torque	19 Nm

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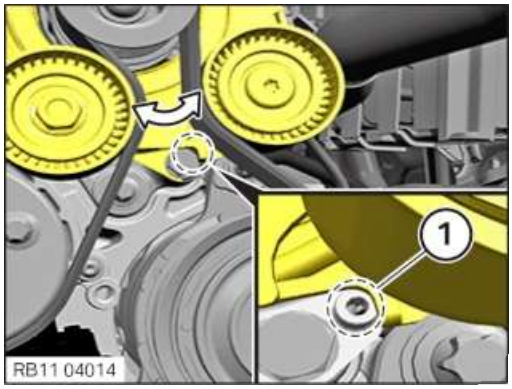
- Guide in and install the lid (1).



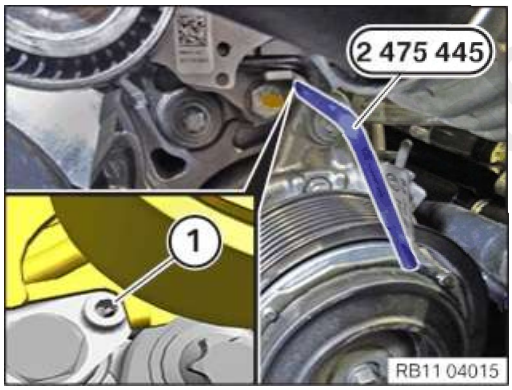
- Insert and install the air conditioning compressor (2).
- Tighten the screws (1).

Air conditioning compressor in component carrier

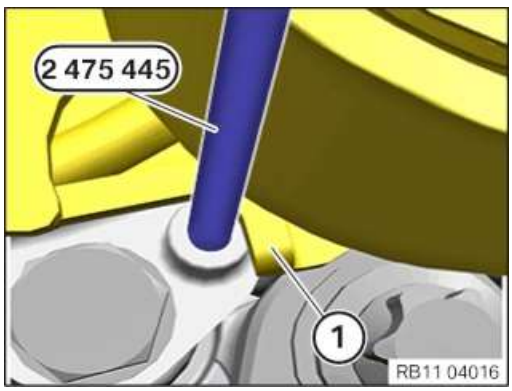
M10		Tightening torque	38 Nm



- Position the belt tensioner so that the bore hole is visible in the area (1).

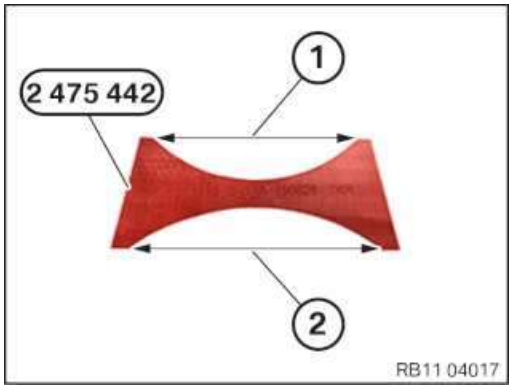


- Guide in the special tool 2 475 445 and install it in the bore hole (1).
  The special tool 2 475 445 must rest against the starter motor generator.

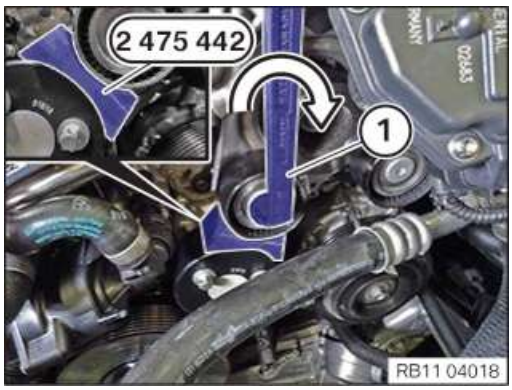


- The belt tensioner (1) must be supported on the special tool 2 475 445.

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- The radius (1) of the special tool 2 475 442 supports the tensioning pulley of the belt tensioner.
- The radius (2) of the special tool 2 475 442 is supported on the belt pulley of the coolant pump.



TECHNICAL INFORMATION

Conduct the following operation with the assistance of a second person.

- Twist the tensioning pulley (1) in the direction of the arrow.
- Guide in and install the special tool 2 475 442 between the belt pulley of the coolant pump and the tensioning pulley.

20 – Installing the drive belt for the starter motor generator

CAUTION

Spring preload.

Danger of injury!

- The use of the specified special tool (tool) is mandatory.
- The described operation must be carried out properly.

CAUTION

Component with preload.

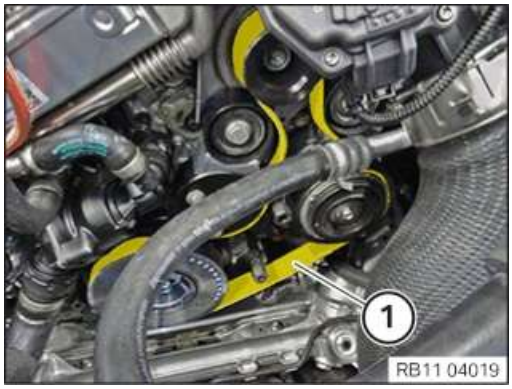
Danger of injury!

- Reduce preload as far as possible before disassembly. Relieve component.

TECHNICAL INFORMATION

The drive belt must be replaced if contaminated with coolant- and oil residues.

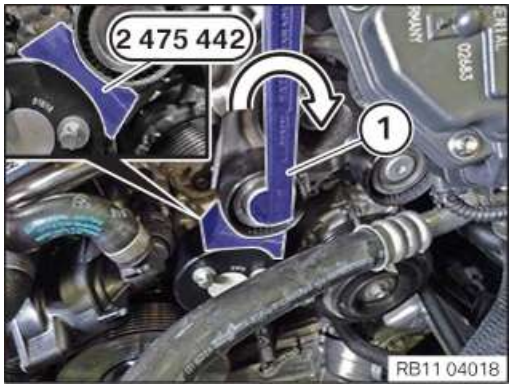
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TECHNICAL INFORMATION

If the drive belt is reused: Mark direction of travel and reinstall drive belt in same direction of travel.

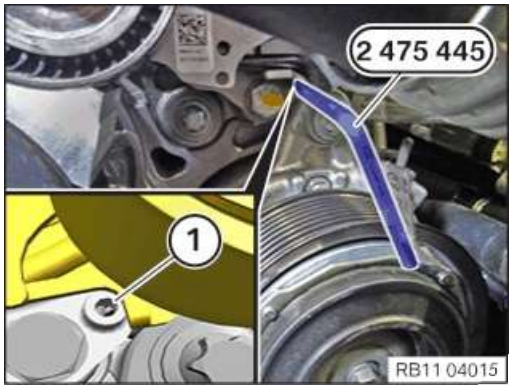
- Feed in and install the drive belt (1) for the starter motor generator.



TECHNICAL INFORMATION

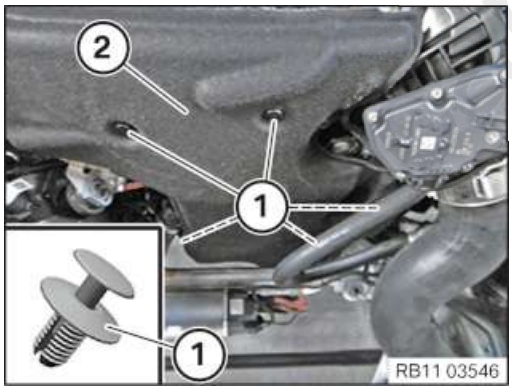
Conduct the following operation with the assistance of a second person.

- Turn the tensioning pulley in (1) in the direction of arrow.
- Feed out the special tool 2 475 442 between the belt pulley of the coolant pump and the tensioning pulley and remove it.



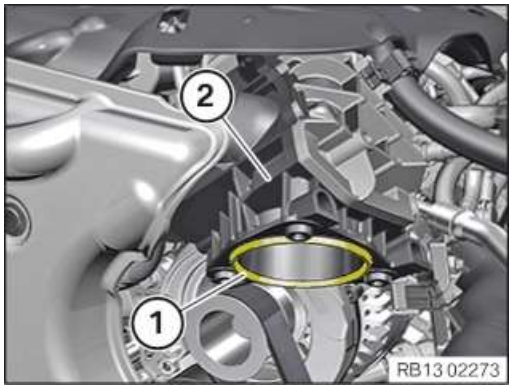
- Feed out the special tool 2 475 445 from the bore hole (1) and remove it.

21 – Install acoustic cover for the engine, front



- Feed the acoustic cover (2) in and install.
- Secure the acoustic cover (2) with the expanding rivets (1).

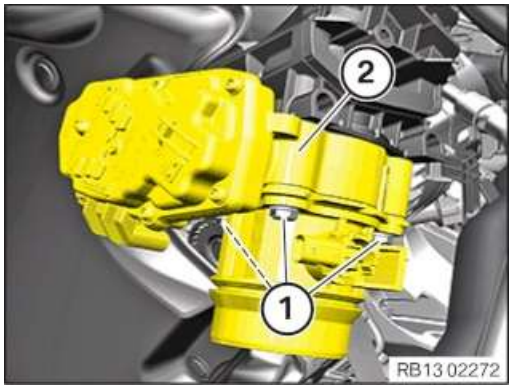
22 – Installing the throttle body



- Renew the sealing ring (1) on the intake plenum .

  Parts: Sealing ring

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- Feed in and install the throttle body (2).
- Tighten the screws (1).

Throttle body to intake plenum

6x50		Tightening torque	8 Nm

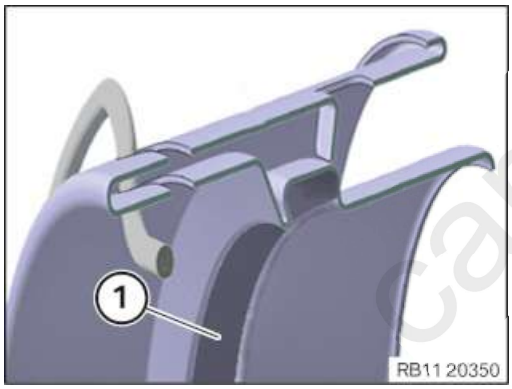


- Check the seal (1) for damage, renew if necessary.

▸ **Replacing damaged seal**

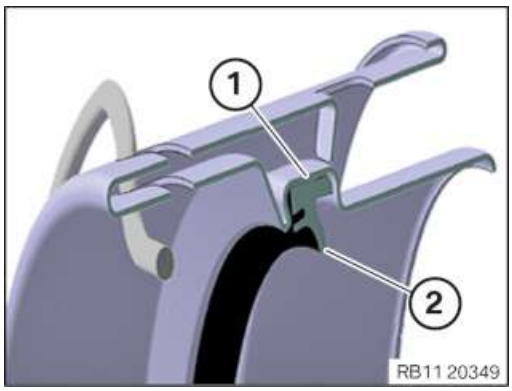
TECHNICAL INFORMATION

Do not use pointed or sharp-edged tools for the installation and/or removal.



- Remove damaged seal.
- Clean gasket groove (1) with a dry towel.

  The gasket groove (1) must be clean.



- Renew gasket.

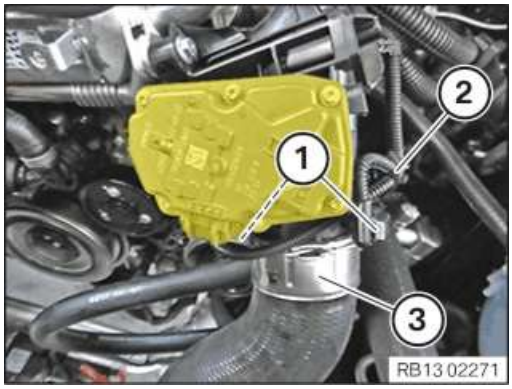
  Parts: Gasket
- Install seal dry without lubricant or mounting agent.

TECHNICAL INFORMATION

Incorrect assembly is possible. Ensure correct installation position.

- Feed in and install the seal.
- Make sure the seal is correctly installed in the gasket groove (1).
- Make sure that the sealing lip (2) is directed inwards as shown.

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- Connect the pressure pipe (3) and lock.

  The pressure pipe (3) must engage audibly.

NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- Secure clamps (2).
- Connect connectors (1) and lock.

  The connectors (1) must engage audibly.



- Lock clamp (1).

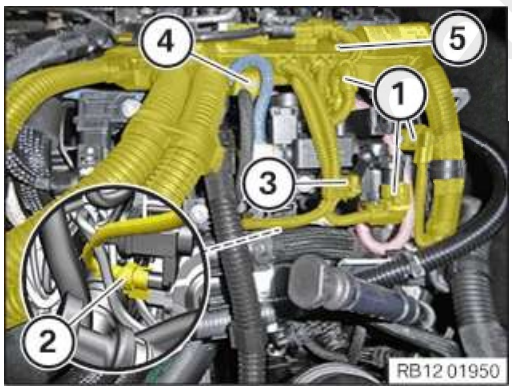
23 – Partially securing the wiring harness section with the starter generator cables

RISK OF DAMAGE

Improper routing of cables and wiring harnesses.

Trapped, crushed or damaged cables may cause short circuits and malfunctions.

- Route all cables without abrasions, do not trap and crush.



- Guide in the wiring harness section (5) and install.
- Tighten down screw (4).

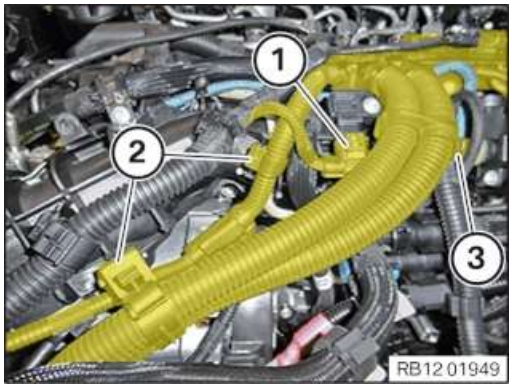
Wiring harness section to manifold

TS5x20		Tightening torque	3,6 Nm

- Secure clamps (3).
- Connect connectors (2) and lock.

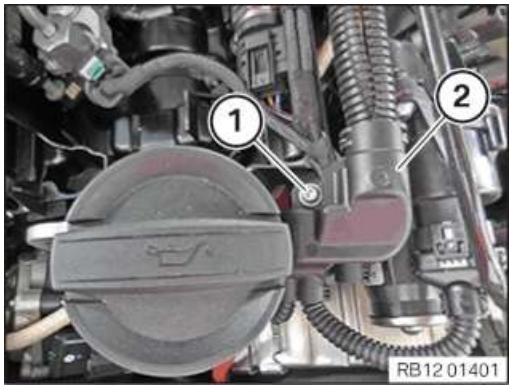
  The connector (2) must engage audibly.
- Connect connectors (1) and lock.

  The connectors (1) must engage audibly.



- Secure clamps (3).
- Secure clamps (2).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.



- Guide in the wiring harness section (2) and install.
- Tighten down screw (1).

Wiring harness section to cylinder head cover

TS5x20		Tightening torque	3,6 Nm



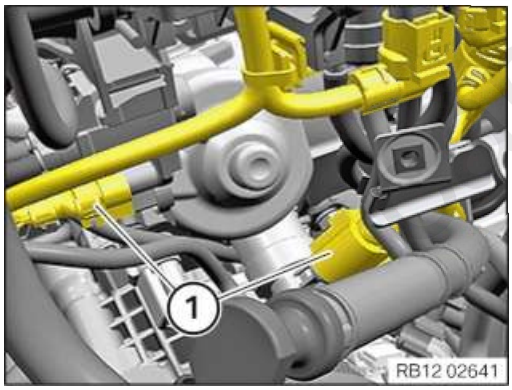
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.



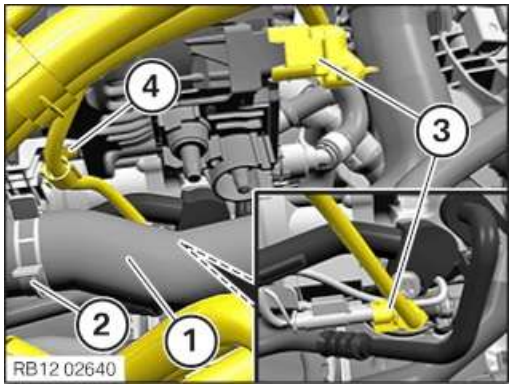
- Connect the connector (1) and lock it.

  The connector (1) must engage audibly.



- Connect connectors (1) and lock.

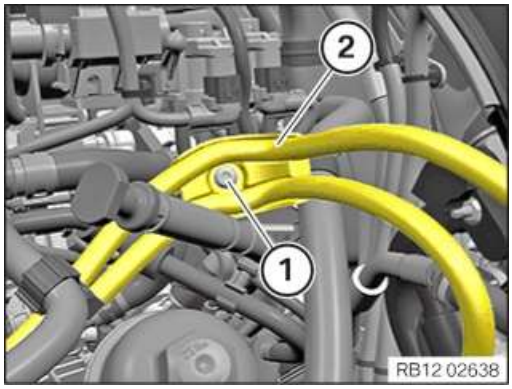
  The connectors (1) must engage audibly.



- Secure the clamp (4).
- Connect connectors (3) and lock.

  The connectors (3) must engage audibly.
- Feed the coolant line (1) into the holder (2) and install it.

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- Feed in and position the positive battery cables (2) .
- Tighten down screw (1).

Standard screw connection M6

M6		Tightening torque	8 Nm



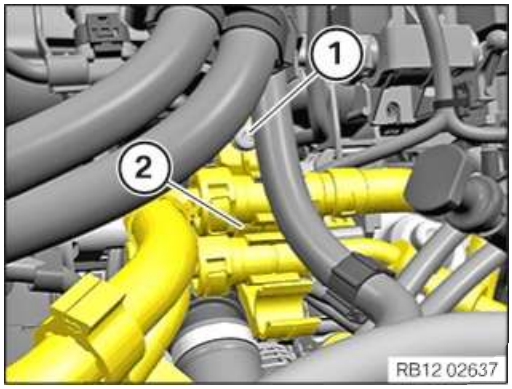
- Feed in and install the positive battery cable (4).
- Feed in and position the positive battery cables (4) .
- Renew the nuts (3) and (2).

  Parts: Nuts
- Tighten nuts (3) and (2).

Battery positive lead on the starter motor generator

M8		Tightening torque	19 Nm

- Guide in and install the lid (1).



- Insert and install the holder (2).
- Tighten down screw (1).

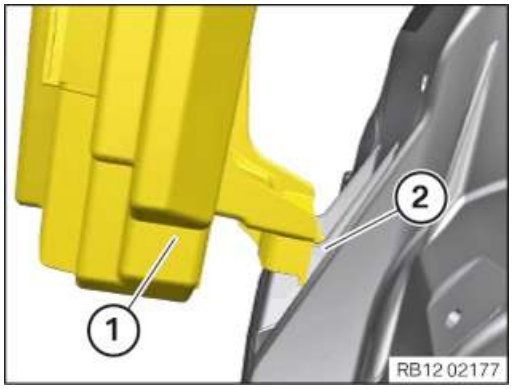
Holder on intake plenum

TS6X20		Tightening torque	5 Nm

24 – Installing the control unit holder

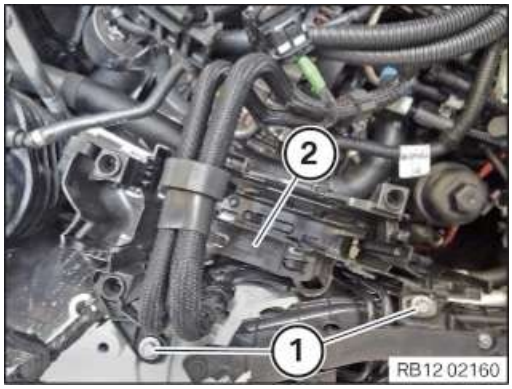
TECHNICAL INFORMATION

The number of connectors on the described component may vary depending on the equipment specification.
If necessary, unlock all other connectors and disconnect or connect and lock respectively.



- Make sure the bottom control unit holder (1) is inserted correctly into the fixture (2).

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- Guide in and install control unit holder (2).
- Tighten the screws (1).

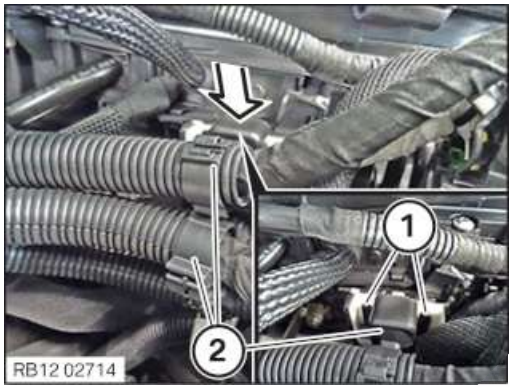
Control unit holder

M6		Tightening torque	8 Nm



- Feed in and install the cable clip (1).

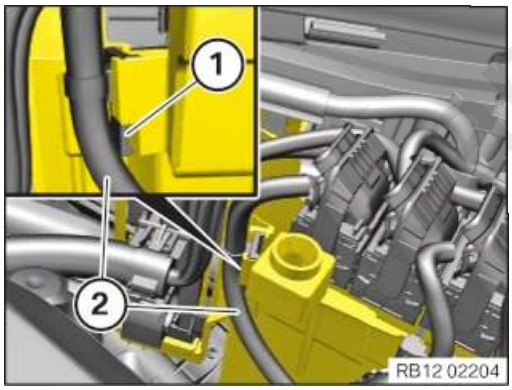
  Lock (arrow) must audibly engage.



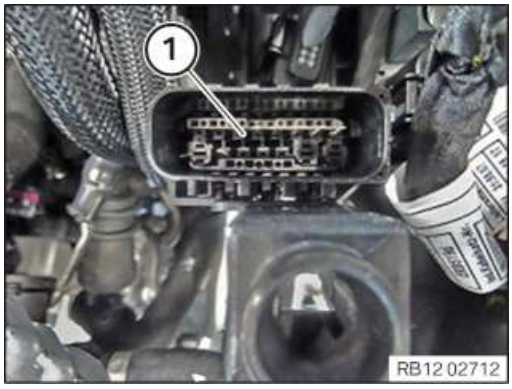
NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- Guide in cable clip (2) in the direction of the arrow and install it.
- Ensure that the locks (1)engage audibly.

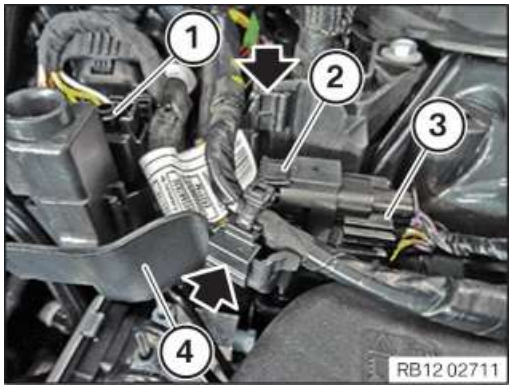


- Guide in the wiring harness section (2) and install.
- Connect and lock the cable clip (1).



- Feed in and install the connector (1).

  The connector (1) must engage audibly.



- Connect connector (3) to control unit holder (4) and lock it.

  The connector (3) must engage audibly.
- Connect connectors (2) and lock.

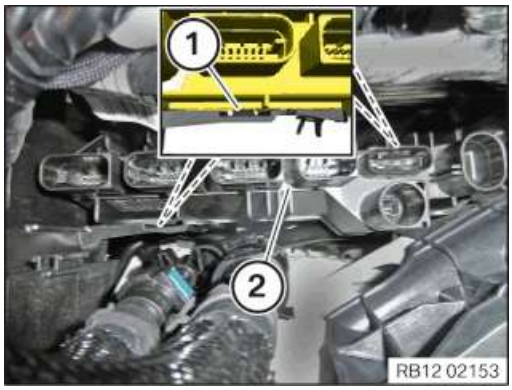
  The connector (2) must engage audibly.
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.
- Secure the clamps (arrows).

25 – Installing the integrated supply module (PDM) partially

Prerequisite

Engine control unit has been removed.



- Insert and install the integrated supply module (PDM) (2).

  The latch mechanisms (1) must engage audibly.

26 – Install DDE control unit

TECHNICAL INFORMATION

If the DDE control unit or an injector has been replaced, it will also be necessary to carry out injection quantity compensation. The adjustment value (7-position letter/number code) is engraved on each injector.

TECHNICAL INFORMATION

Follow instructions for removing and installing control units.

For additional information see: 12 00 ... Notes on removal and installation of control units

TECHNICAL INFORMATION

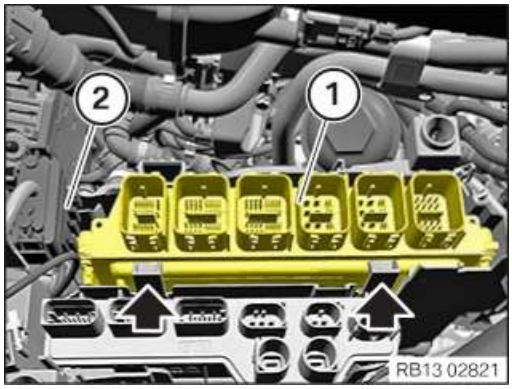
Control unit must be programmed after it is replaced.

For additional information see: 61 00 ... Programming/encoding control unit(s)

TECHNICAL INFORMATION

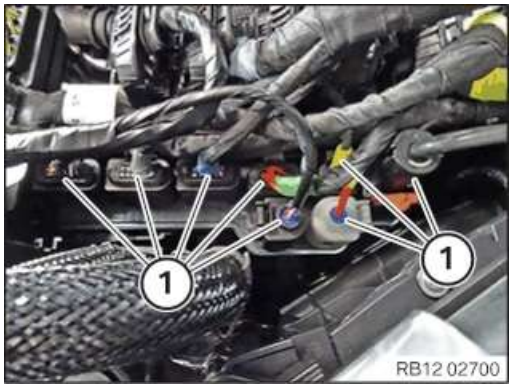
Disconnecting control units may cause fault code entries and functional limitations. Fault code entries must be read out and deleted if necessary.

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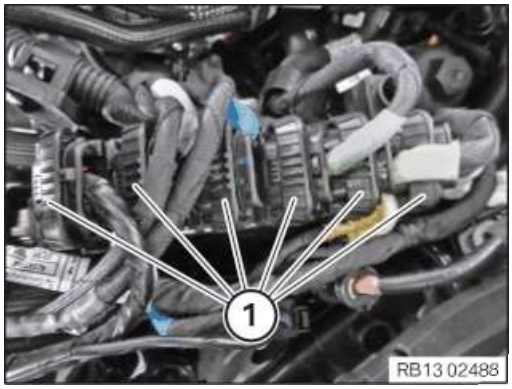
- Make sure that the plug connection (2) does not get damaged.
- Insert the DDE control unit (1) **carefully** and install it.

  The latch mechanisms (arrows) must engage audibly.



- Connect connectors (1) and lock.

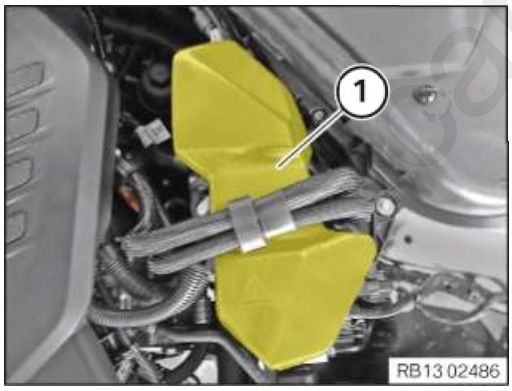
  The connectors (1) must engage audibly.



- Connect connectors (1) and lock.

  The connectors (1) must engage audibly.

27 – Install the cover for the DDE control unit



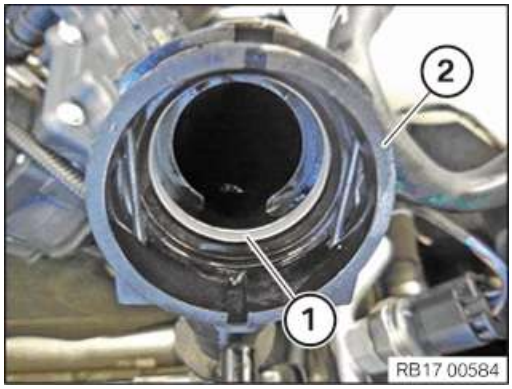
- Insert and install cover (1) into guides.

28 – Connecting the coolant lines

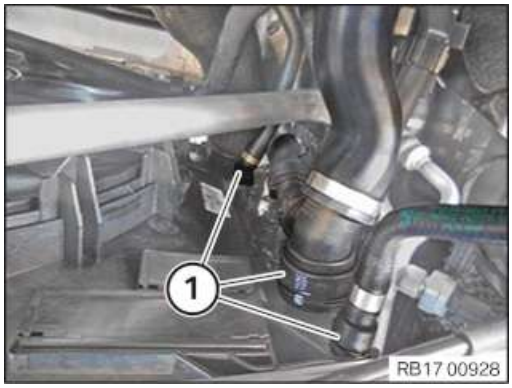
TECHNICAL INFORMATION

Make sure that the connections are locked correctly. The locks must engage audibly.

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- Check the sealing ring (1) of the coolant line (2) for damage and renew where required.



NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.

- Connect and lock the coolant lines (1).

  The coolant lines (1) must engage audibly.



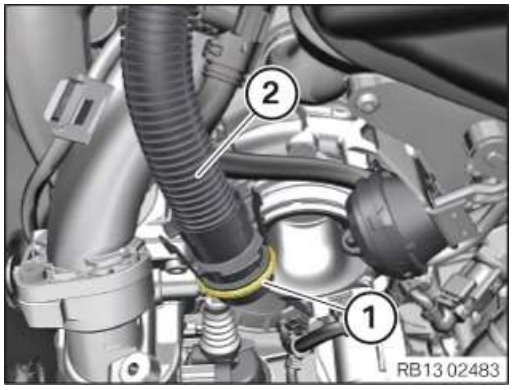
- Connect and lock coolant line (1).

  The coolant line (1) must audibly engage.

29 – Installing the clean air pipe with resonator



- Check the sealing ring (1) on the exhaust turbocharger for damage and renew if necessary.

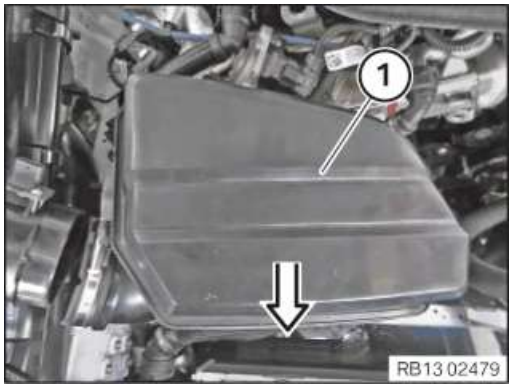


- Check the sealing ring (1) for the engine ventilation line (2) for damage and renew where required.

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- Feed in and install clean air pipe with resonator (1) in the direction of the arrow.

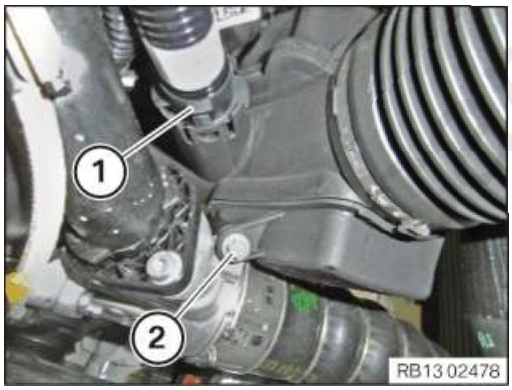


- Press and hold clean air pipe with resonator (1) in the direction of the arrow.



- Attach and lock the clamp (1).

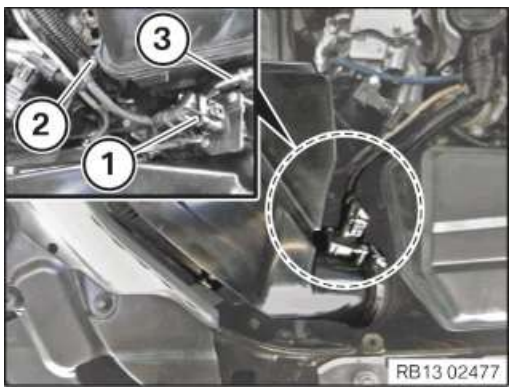
  The clamp (1) must engage audibly.



- Tighten down screw (2).

Clean air pipe to exhaust turbocharger

M6X20		Tightening torque	8 Nm



- Connect the clean air pipe with resonator to the intake filter housing.
- Tighten clamp (3).

Clean air pipe to upper section of intake filter housing

Clamp		Tightening torque	3 Nm

- Secure clamps (2).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

30 – Install acoustic cover

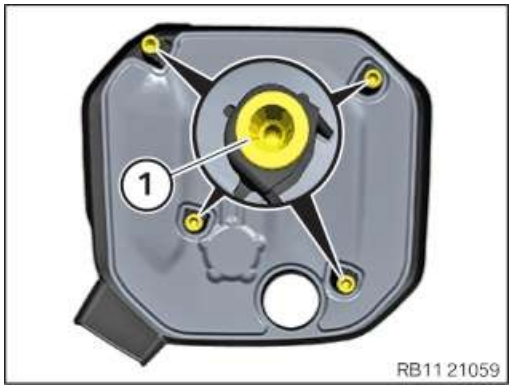
fdiagn.com

RISK OF DAMAGE

Damage to the acoustic cover/design cover.

Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover/design cover.

- Disassemble or mount the acoustic cover/design cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover/design cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Check the acoustic cover for correct fit of the rubber mounts (1).



- Clip in the acoustic cover (1) into the holders in the indicated areas.

31 – Connecting all battery earth leads



- See additional information.

32 – Activating the 48 V electrical system

Prerequisite

Ignition is switched off.

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RISK OF DAMAGE

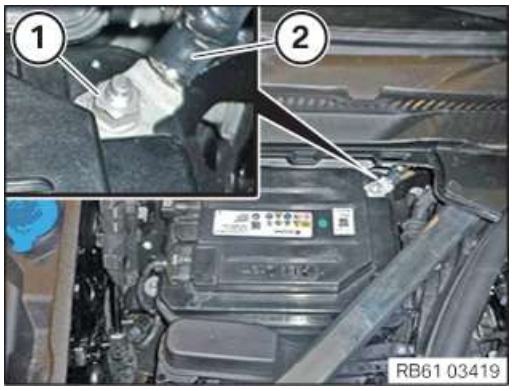
Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.



- Lift battery earth lead (1).
- Remove special tool .



- Release the negative battery cable (2) of the 48-V battery from the mounting.
- Position the negative battery cable (2) of the 48-V battery on the negative battery terminal.
- Tighten nut (1).

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



- Connect the connector (1) of the CAN bus and lock it.
- Clip in clip (2).



- Activate the 48V electrical system by closing the bonnet.

  The activation takes place automatically.

33 – Filling and bleed the high-temperature coolant circuit



TECHNICAL INFORMATION

It is **mandatory** to fill the cooling system before bleeding.

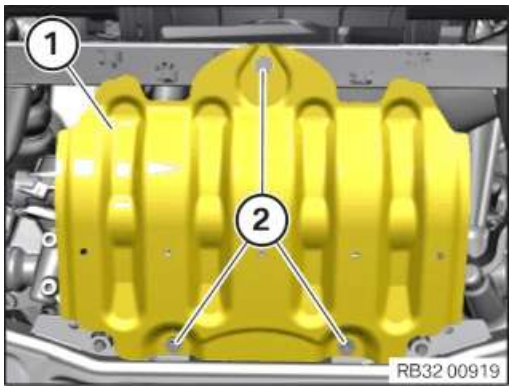
Fill **both** the circuits for high and low-temperature coolant circuits.

- See additional information.

34 – If installed: Install underbody protection of the steering

Prerequisite

Front underbody protection has been removed.



- Position underbody protection (1).
- Tighten the screws (2).

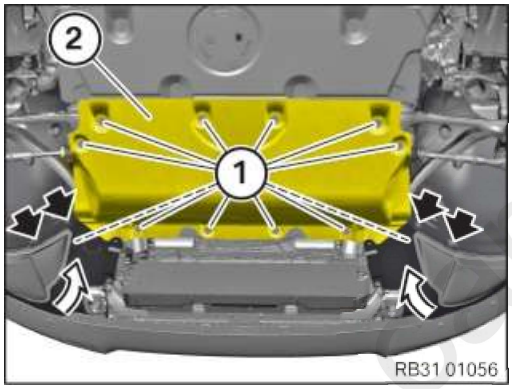
Underbody protection, steering, to front axle support

Multi-purpose boltM10		Tightening torque	56 Nm

Underbody protection, steering, to front axle support

Hexagon bolt M6		Tightening torque	8 Nm

35 – Install the underbody protection of the steering gear



- **Version A:**

  Position the underbody protection (2) of the steering gear.

  Tighten the screws (1).

Underbody protection of the steering gear

Hexagon screw for thermoplastic		Tightening torque	2.6 Nm
Hexagon bolt M6x20		Tightening torque	8 Nm

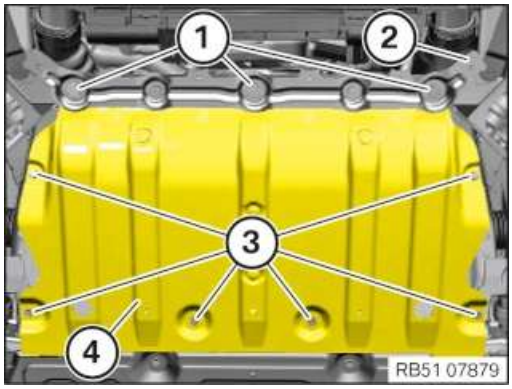
- Position the bottom wheel arch cover.

  Tighten the screws (arrows) of the lower wheel arch cover on the wheel arch cover.

Wheel arch trim panel, front

Thermoplastic hexagon screw		Tightening torque	2,6 Nm

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- **Version B:**

  Feed in the underbody protection (4) of steering gear and install it.

  Tighten the screws (3).

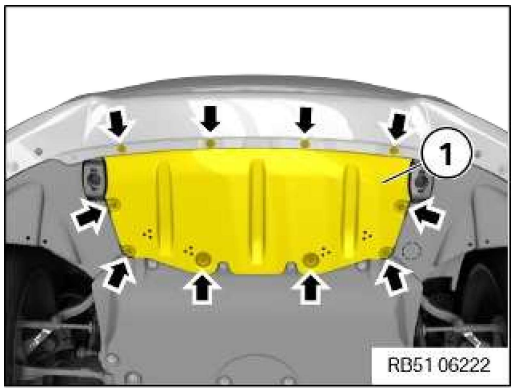
Underbody protection of the steering gear

Hexagon screw for thermoplastic		Tightening torque	2.6 Nm
Hexagon bolt M6x20		Tightening torque	8 Nm

- Position the holder (2) for the underride protection.

  Tighten the screws (1).

36 – Installing the front underbody protection



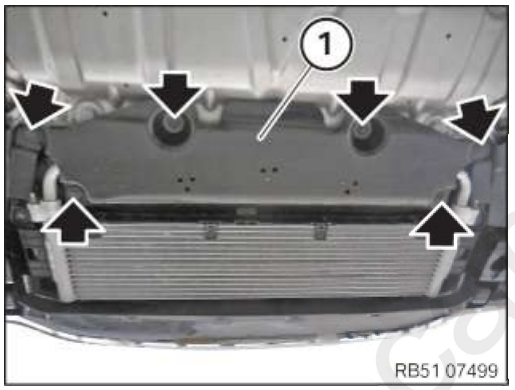
- **Version A:**

  Feed in the front underbody protection (1) towards the front under the bumper panel and position.

  Tighten screws (arrows).

Underbody protection front

Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm



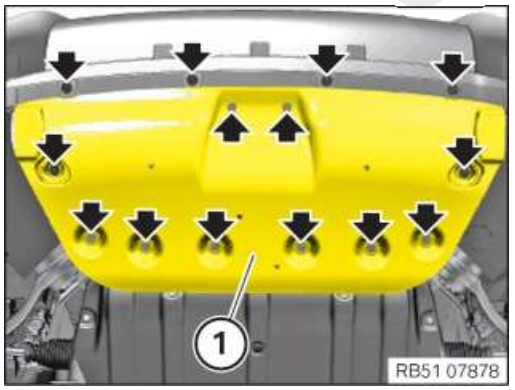
- **Version B:**

  Feed in and position the front underbody protection (1).

  Tighten screws (arrows).

Underbody protection front

Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm



- **Version C:**

  Feed in and install front underbody protection (1).

  Tighten screws (arrows).

Underbody protection front

Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Additional Information

Overview of Tightening Torques

Belt tensioner to alternator/starter generator Used in step 18

M8X30		Tightening torque	28 Nm

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Alternator to component carrier			Used in step 19
M10x75		Tightening torque	38 Nm
M10x125		Tightening torque	38 Nm
M10x90		Tightening torque	38 Nm

Battery positive lead on the starter motor generator			Used in step 1923
M8		Tightening torque	19 Nm

Air conditioning compressor in component carrier			Used in step 19
M10		Tightening torque	38 Nm

Throttle body to intake plenum			Used in step 22
6x50		Tightening torque	8 Nm

Wiring harness section to manifold			Used in step 23
TS5x20		Tightening torque	3,6 Nm

Wiring harness section to cylinder head cover			Used in step 23
TS5x20		Tightening torque	3,6 Nm

Standard screw connection M6			Used in step 23
M6		Tightening torque	8 Nm

Holder on intake plenum			Used in step 23
TS6X20		Tightening torque	5 Nm

Control unit holder			Used in step 24
M6		Tightening torque	8 Nm

Clean air pipe to exhaust turbocharger			Used in step 29
M6X20		Tightening torque	8 Nm

Clean air pipe to upper section of intake filter housing			Used in step 29
Clamp		Tightening torque	3 Nm

Negative battery cable to 48-V battery			Used in step 32
Nut M8		Tightening torque	19 Nm

Underbody protection, steering, to front axle support			Used in step 34
Multi-purpose boltM10		Tightening torque	56 Nm

Underbody protection, steering, to front axle support			Used in step 34
Hexagon bolt M6		Tightening torque	8 Nm

Underbody protection of the steering gear			Used in step 35
Hexagon screw for thermoplastic		Tightening torque	2.6 Nm
Hexagon bolt M6x20		Tightening torque	8 Nm

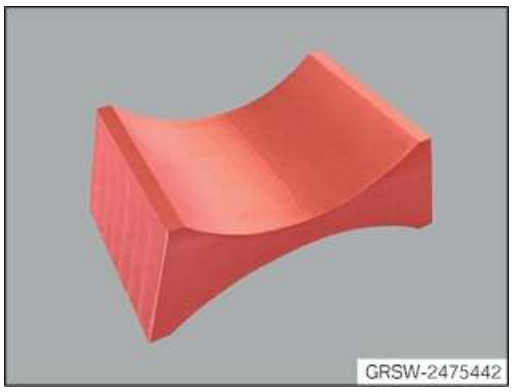
Wheel arch trim panel, front			Used in step 35
Thermoplastic hexagon screw		Tightening torque	2,6 Nm

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Underbody protection front			Used in step 36
Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Overview of Special Tools

2 475 442 Removal and installation tool



Common	Used in step 16171920
Usage	For removing and installing the drive belt of the ancillary components.
Included in the tool or work	
Storage location	A8
Replaced by	
In connection with	83302475445
SI-Number	01 19 19 (668)

2 475 445 Pin



Common	Used in step 16171920
Usage	Tool for drive belt of 48 V ancillary components
Included in the tool or work	
Storage location	A8
Replaced by	
In connection with	83302475442 83302475444
SI-Number	01 19 19 (668)

Links

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General repair instructions	Used in step
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Repair instructions	Used in step
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61 20 900 Disconnecting and connecting battery earth lead	231
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