11 22 000 Removing and installing/replacing the flywheel

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Detach battery earth lead from battery.
- For additional batteries: Detach all battery earth leads from additional batteries.

CAUTION

Heavy component.

Heavy components can lead to injury or damage.

- Remove and install heavy components with the aid of another person/other persons.

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 – Disconnecting all battery earth leads



- See additional information.

2 – Removing the acoustic cover

WARNING

Hot surfaces.

Risk of burning!

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

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RISK OF DAMAGE

Damage to the acoustic cover.

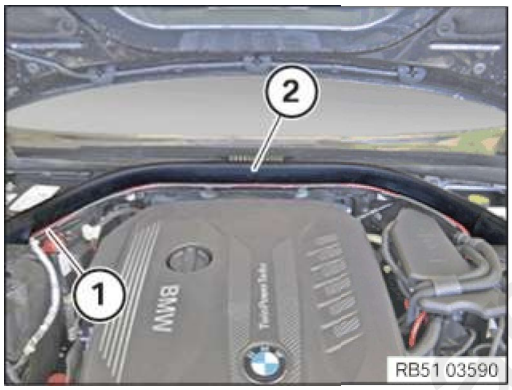
Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

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



- Release the acoustic cover (1) towards the top from the rubber mounts (marks).

3 – Remove the seal for the rear bonnet



- Feed the cable (1) out of the brackets toward the front.
- Remove the rear bonnet seal (2) from the guide toward the inside.

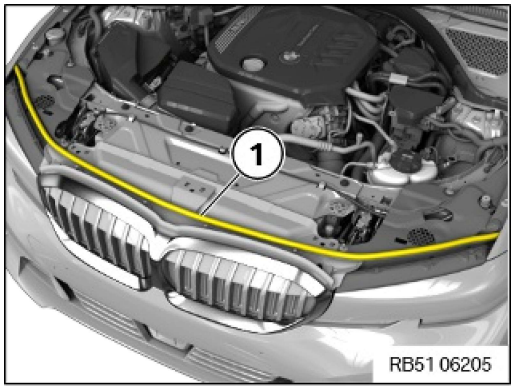
4 – Removing acoustic cover at rear



- Unclip the acoustic cover (1) in the marked areas and remove it to the top.

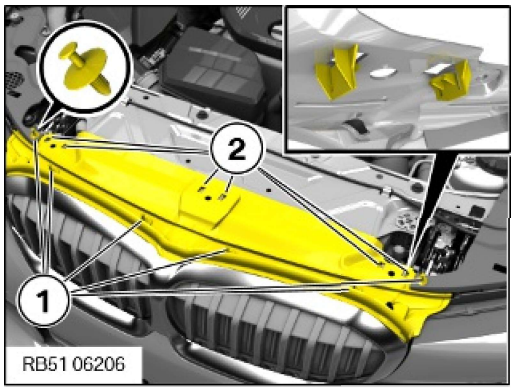
5 – Remove the seal for the bonnet in front

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- Pull off front bonnet seal (1) upwards.

6 – Removing the centre engine compartment cover



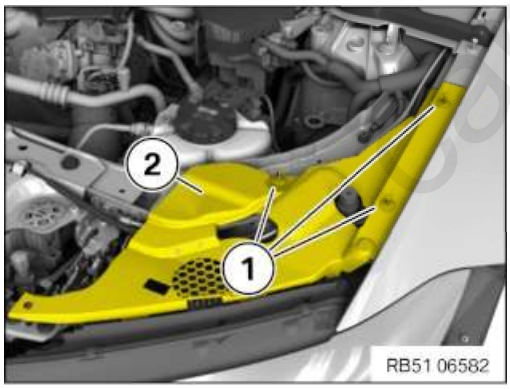
- Detach all expanding rivets (1).
- Release the cover of the centre engine compartment with the latch mechanisms (2) .
- Feed the cover for the centre engine compartment out to the rear.

7 – Partially remove the top left and right cover in the engine compartment

NOTICE

Description is for left component only. Procedure on the right side is identical.

▸ **Removing the cover in the engine compartment on top partially**



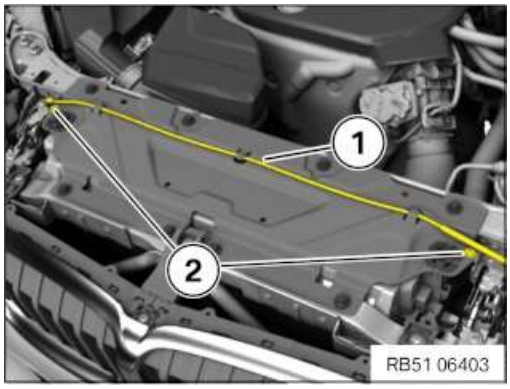
- Loosen the expanding rivet (1).
- Remove the cover in the engine compartment on top (2) partially.

8 – Removing the top cross connection

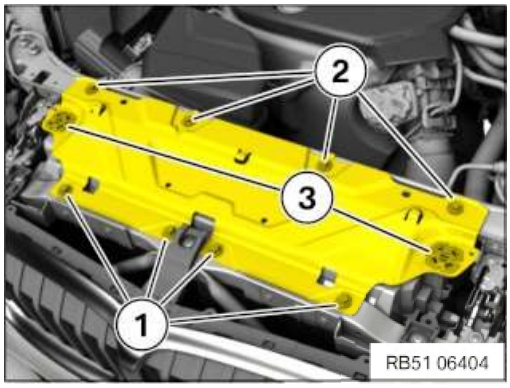


- Release the housing for the coupling of the Bowden cables (1) from the body.

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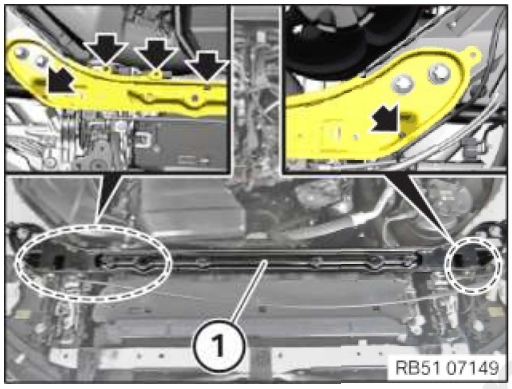


- Detach Bowden cable (1) at the top cross connection.
- Loosen screws (2).

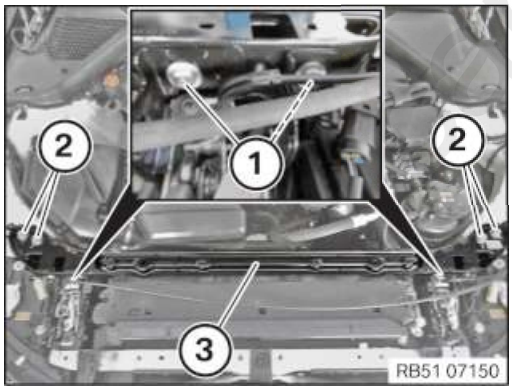


- Loosen screws (1) and (2).
- Remove the top cross connection with the holders(3) towards the top.

9 – Remove the rear top cross connection



- Release the clips (arrows) in the marked areas from the top rear cross connection (1).



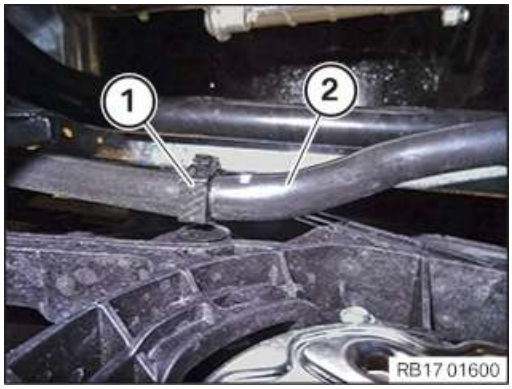
- Loosen screws (1).
- Loosen screws (2).
- Guide out and remove top rear cross connection (3).

10 – Remove fan cowl.

TECHNICAL INFORMATION

- When the engine is stopped after the end of the journey, it may be necessary to run the electric fan. In rare cases, operation of the electric fan can last up to 11 min. This protects the components. In this case, replacing the electric fan will not remedy the problem!

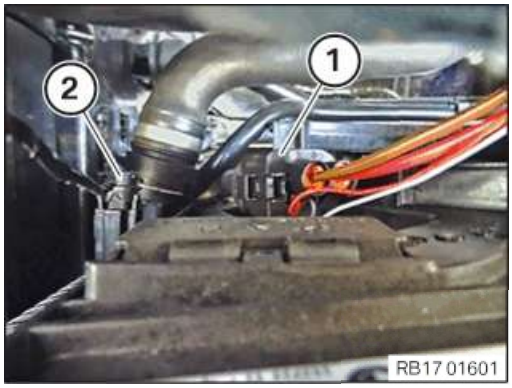
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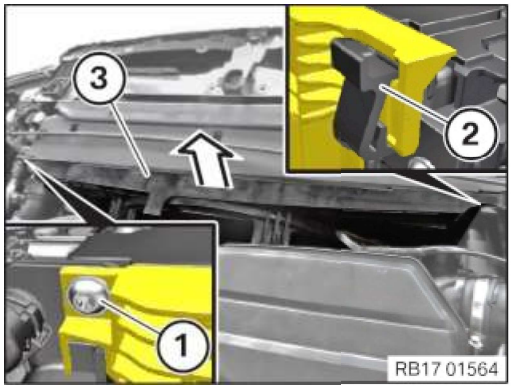
- **If installed:** Release transmission oil line (2).

  Unlock the holder (1).

  Thread out transmission oil line (2) and set aside.

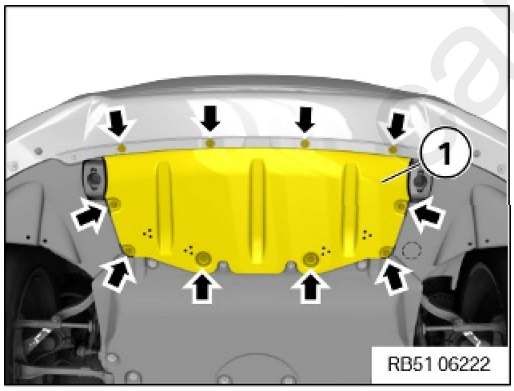


- Unlock plug connection (1) and disconnect.
- Unlock plug connection (2) and disconnect.



- Loosen screw (1).
- Unlock lock (2).
- Guide out and remove fan cowl (3) **carefully** in the direction of the arrow.

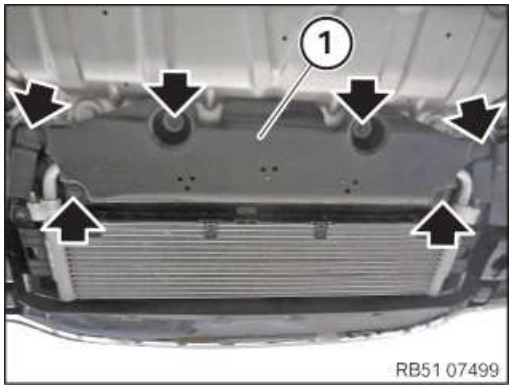
11 – Removing the front underbody protection



- **Version 1:**

  Remove screws (arrows).

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

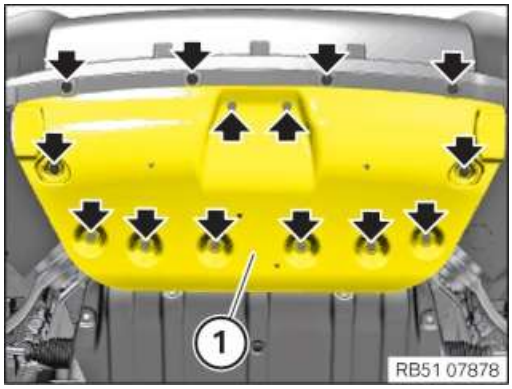


- **Version 2:**

  Remove screws (arrows).

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

obdiagn.com



- **Version 3:**

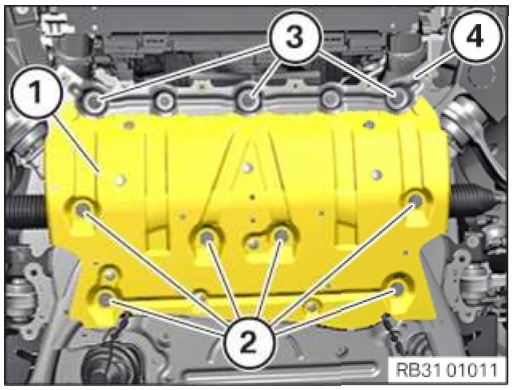
  Remove screws (arrows).

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

12 – Removing the stiffening plate

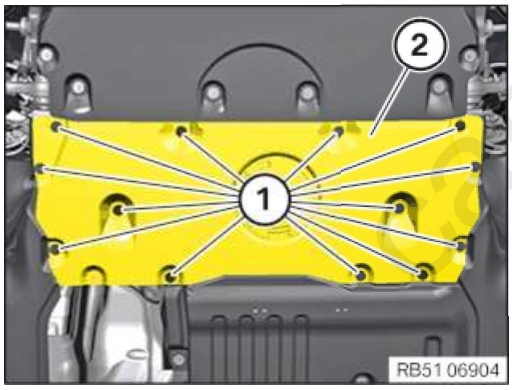
TECHNICAL INFORMATION

Driving without stiffening plate is not permissible.



- Loosen screws (3).
- Remove the holder of the underride protection (4).
- Loosen screws (2).
- Remove stiffening plate (1).

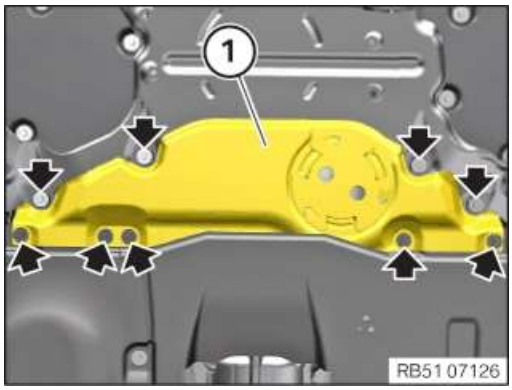
13 – Removing the centre underbody protection



- **Version with rear-wheel drive:**

  Loosen screws (1).

  Remove centre underbody protection (2) .



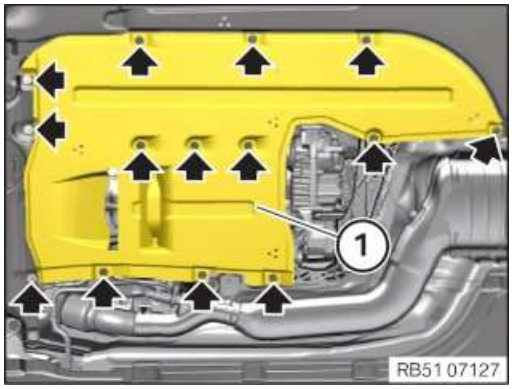
- **Version with all-wheel drive:**

  Remove screws (arrows).

  Feed out and remove the centre underbody protection (1).

14 – Remove rear underbody protection

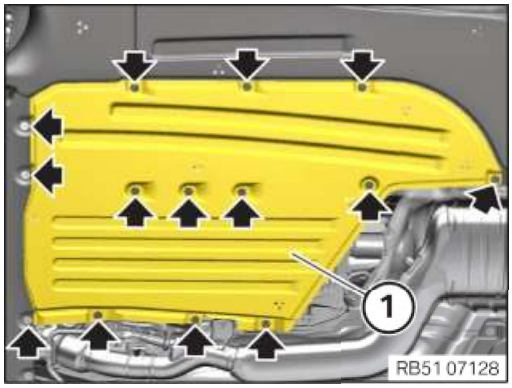
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- **Version 1:**

  Remove screws (arrows).

  Feed out the rear underbody protection (1).



- **Version 2:**

  Remove screws (arrows).

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

15 – If installed: Partially release the engine oil cooler

WARNING

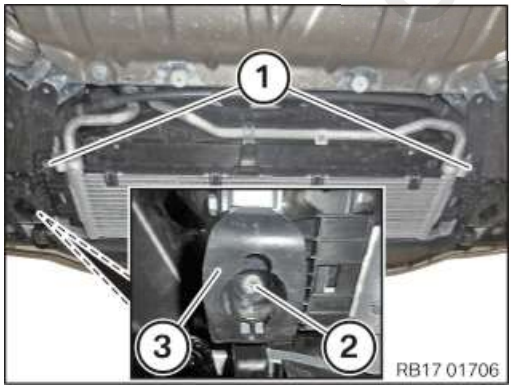
Hot surfaces.

Risk of burning!

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

TECHNICAL INFORMATION

The work must be performed with care to prevent component damage.

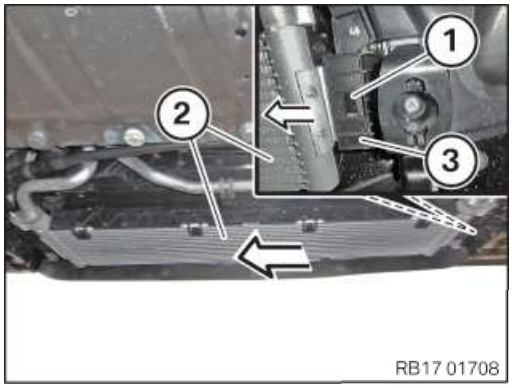


- Loosen screws (1).
- Drill out rivet on the left (2).
- Remove the left-hand damper (3).

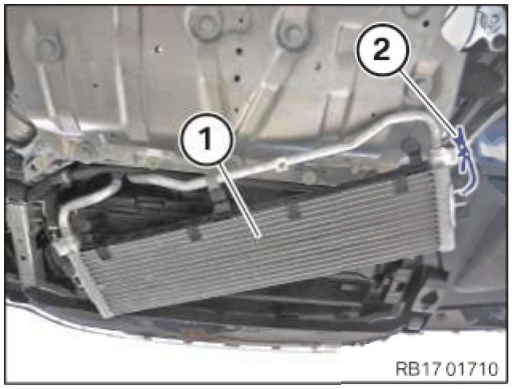
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- Loosen screw (1).

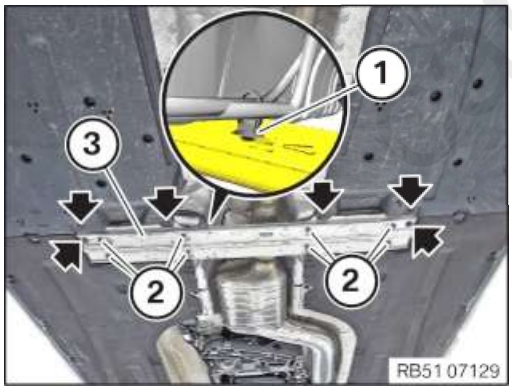


- Unlock lock (1).
- Feed out engine oil cooler (2) from the holder in the direction of arrow (3) and place to one side.



- Affix the engine oil cooler (1) with a cable strap (2) as shown.

16 – Remove the connecting support from the tunnel



- Remove screws (arrows).
- **If installed:** Loosen clamp (1).
- Loosen screws (2).
- Guide out and remove connecting support (3) on the tunnel.

17 – Remove complete exhaust system

WARNING

Hot surfaces.

Risk of burning!

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

mdiagn.com

CAUTION

Component with heavy weight.

Danger of injury!

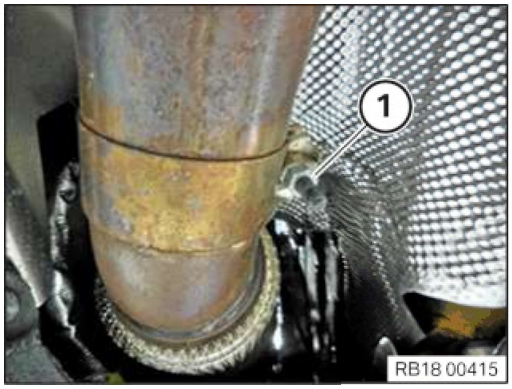
- Note component's centre of gravity.
- Support component using a jack.
- Secure component against falling off the jack.

CAUTION

Heavy component.

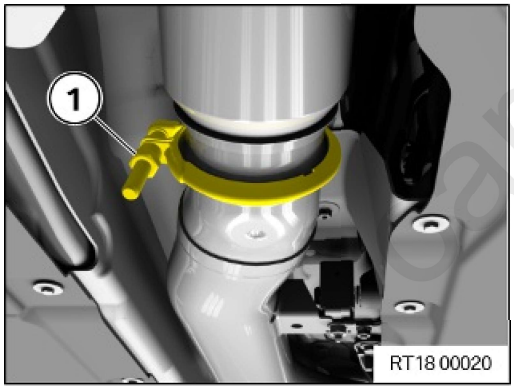
Heavy components can lead to injury or damage.

- Remove and install heavy components with the aid of another person/other persons.



- **Equipment specification 1 (ribbon clamp)**

  Detach the ribbon clamp (1).



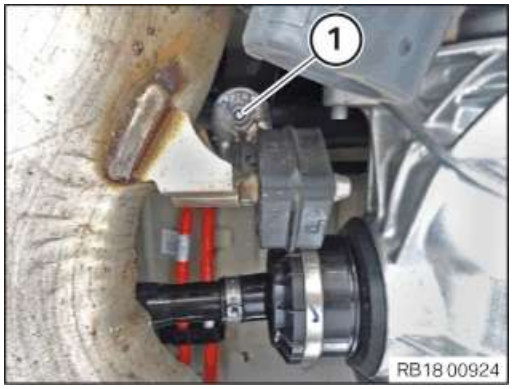
- **Equipment specification 2 (V-clips)**

  Unfasten clamp (1).

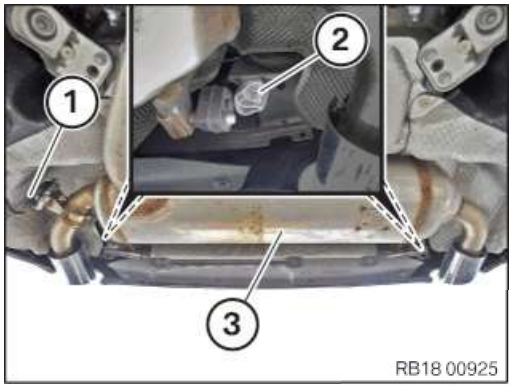


- Loosen nut (1).

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- Release nut (1) on the rear axle support.



- Unlock plug connection (1) and disconnect.
- Loosen nuts (2).
- Lower and remove the exhaust system (3) with the assistance of a second person.

18 – Removing starter motor

WARNING

Hot surfaces.

Risk of burning!

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

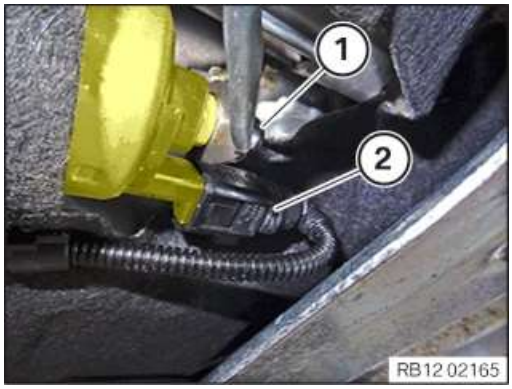
RISK OF DAMAGE

Electrostatic discharge.

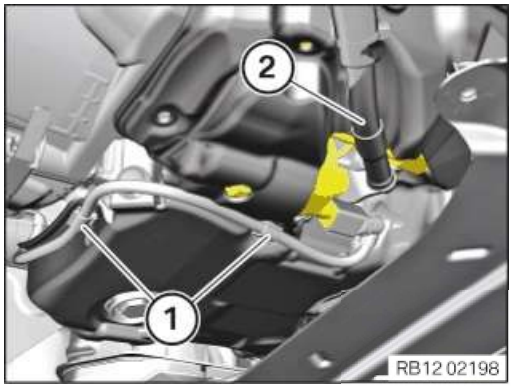
Damage to or destruction of electrical components.

- 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 Information on electrostatic discharge (ESD) protection.

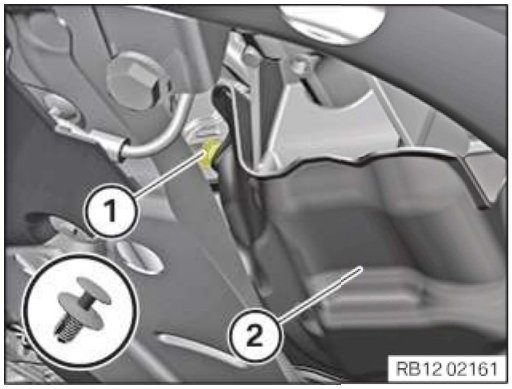
cardiagn.com



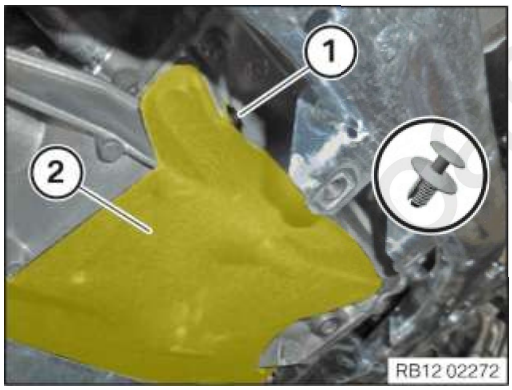
- Loosen nut (1).
- Unlock plug connection (2) and disconnect.



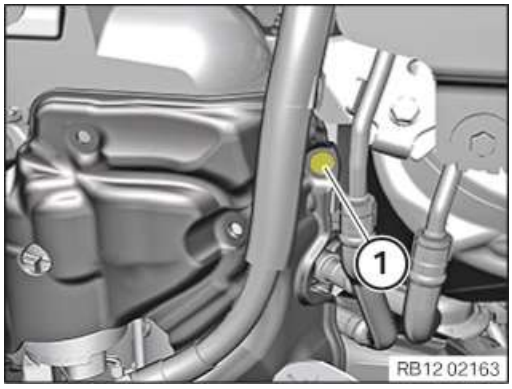
- Loosen clamps (1).
- Feed out positive battery cable (2) and put to one side.



- Release the expanding rivet (1) for the acoustic cover (2) for oil sump.

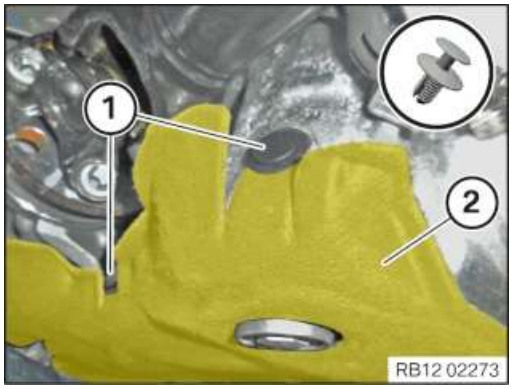


- Loosen expanding rivet (1).



- Undo fir tree clip (1).

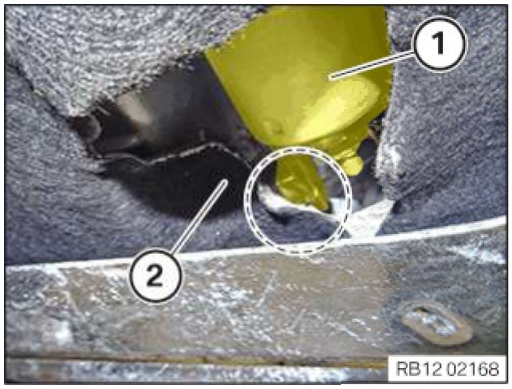
carfdiagn.com



- Loosen the expanding rivet (1).
- Release acoustic cover (2) for the oil sump and store it below.

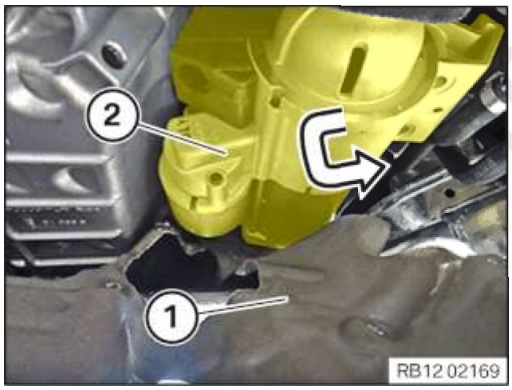


- Loosen screws (1).

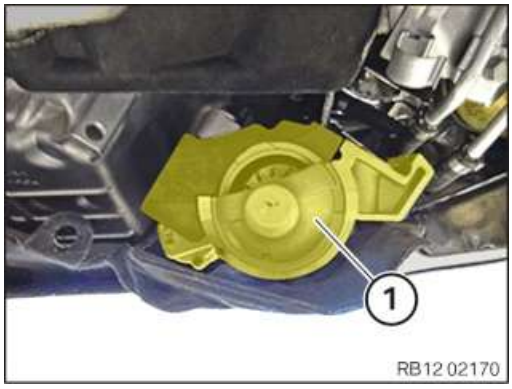


- Position the starter (1) **carefully** in the marked area above the acoustic cover (2) as shown.

  An evaluation cannot be performed without positioning the starter.



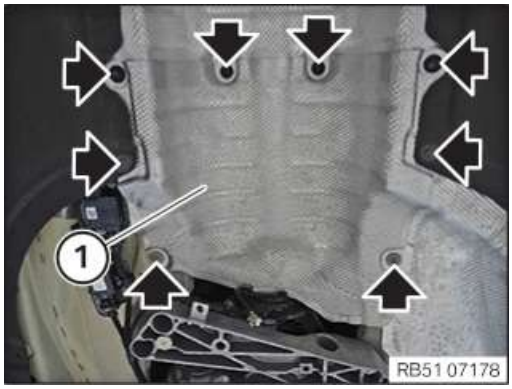
- Make sure that the acoustic cover (1) **is not damaged.**
- Carefully fold the acoustic cover (1) down.
- Feed out the starter (2) **carefully** in the direction of arrow to the rear and below.



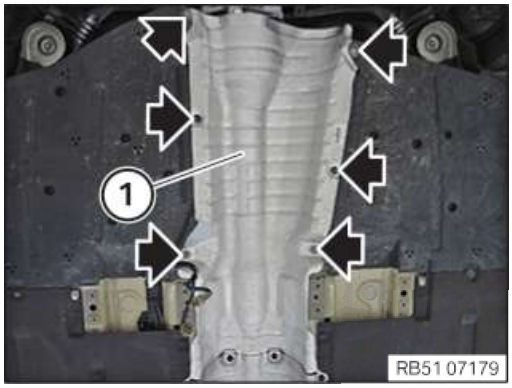
- Remove starter motor (1).

19 – Remove heat shields

rdiagn.com



- Loosen bolts and nuts (arrows).
- Remove heat shield (1).



- Loosen bolts and nuts (arrows).
- Remove heat shield (1).

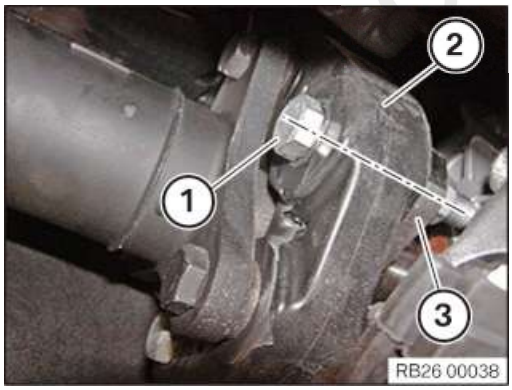
20 – Partially release propeller shaft

RISK OF DAMAGE

Damage to propeller shaft during removal.

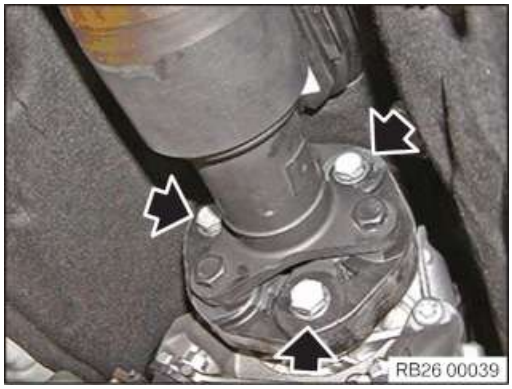
Non-observance of the removal guidelines for the propeller shaft on the rear axle differential may cause severe damage.

- Do not disassemble the three-hole flange, flexible disc and propeller shaft. The three-hole flange to the rear axle differential is balanced with the flexible disc and propeller shaft.
- Loosen the recessed nut against the direction of travel in clockwise direction. The propeller shaft must be loosened on the recessed nut only and exclusively in the direction of rotation otherwise the anti-twist lock of the bi-hexagonal flange nut is damaged.
- In the event of a damaged anti-twist lock on the bi-hexagonal flange nut: Replace the rear axle differential.

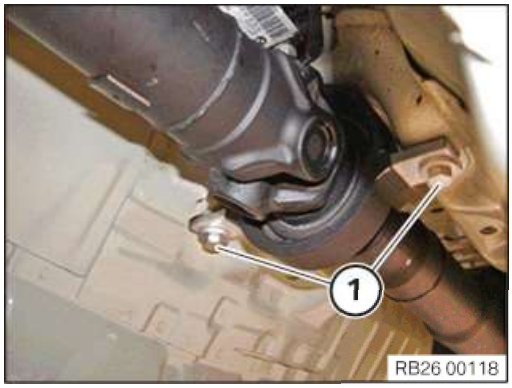


- Mark the installation position of the screw connection (1) of the flexible disc (2) and the three-hole flange (3).

  The mark makes it possible for the propeller shaft to be installed again in the same position. This should prevent a humming noise from the drive train during driving.



- Remove screws (arrows).



- Unscrew the bolts (1) on the centre mount and hold down the propeller shaft.

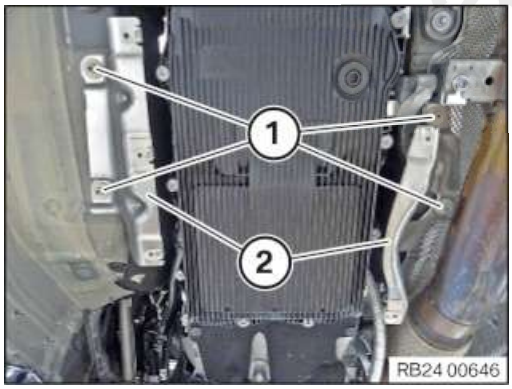
  Major deflection angles of the propeller shaft may damage the propeller shaft and/or the joints.
- Tie up propeller shaft to underbody.

21 – Releasing front propeller shaft on front axle differential



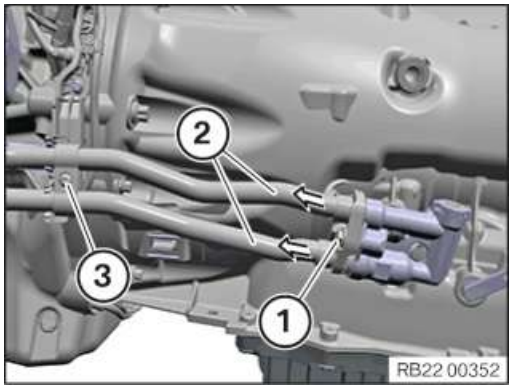
- Remove screws (arrows).
- Secure the propeller shaft on the transmission with a belt.

22 – Remove the retaining plates



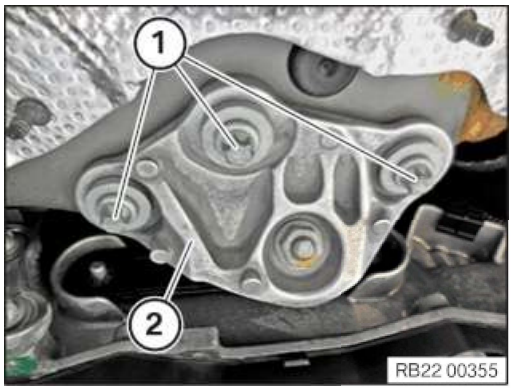
- Loosen nuts (1).
- Feed out retaining plates (2) and remove.

23 – Disconnect hydraulic lines on the transmission



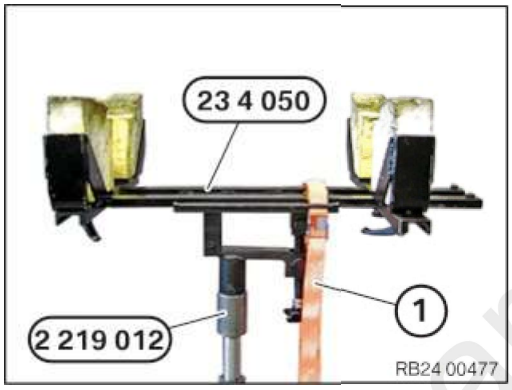
- Loosen screw (1).
- Loosen screw (3).
- Disconnect hydraulic lines (2) to transmission oil cooler.

24 – Removing the transmission bearing support

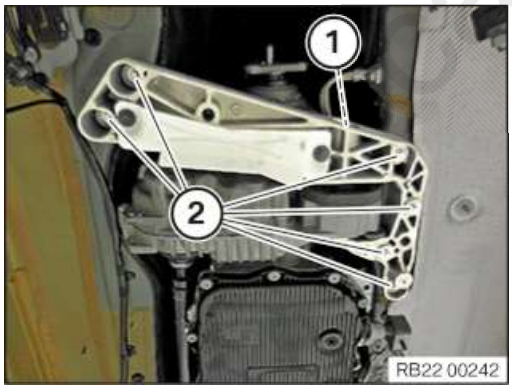


- Unscrew the bolts (1) on the transmission bearing support (2).

25 – Remove transmission cross-member.



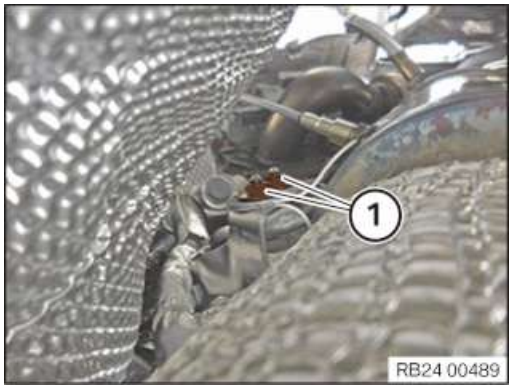
- Support the transmission using special tools 0 495 498 (23 4 050) and 2 219 012.
- Secure the transmission with the tensioning strap (1).



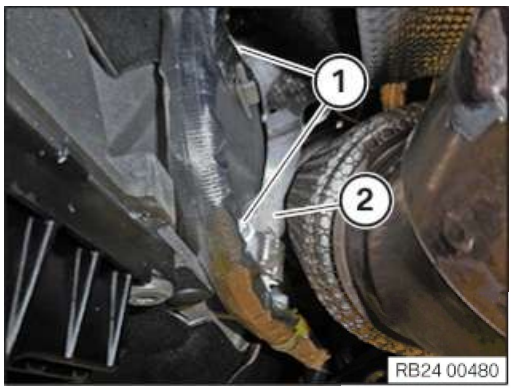
- Loosen screw (1).
- Loosen screws (2).
- Remove transmission cross-member.

26 – Remove exhaust system holder

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- Loosen nuts (1).



- Loosen screws (1).
- Remove the exhaust bracket (2).

27 – Remove automatic transmission (all-wheel drive vehicle) (GA8HP51Z)

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.

RISK OF DAMAGE

Damage to the engine block.

Damaged and corroded bolts will lead to major damage in the engine block and the transmission.

- It is imperative that protruding threads of the transmission bolts are checked for corrosion and damage prior to removal.
- It is imperative that all rust is removed from corroded threads and that they are cleaned prior to removal.
- Renew rusted and damaged bolts.

RISK OF DAMAGE

Damage of components in the engine compartment.

When removing the transmission, tilting of the engine may damage components in the engine compartment.

- Before removing the transmission: Support engine.
- Secure the engine against tilt movements.
- Follow the specifications of the repair instructions.

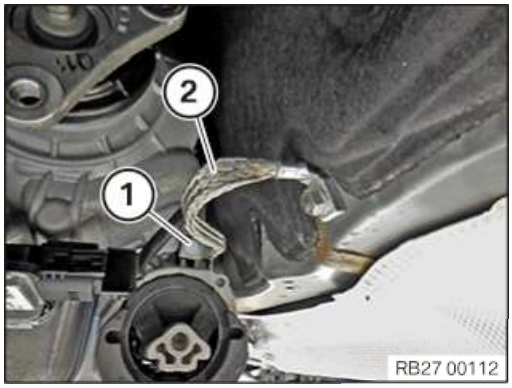
cardiagn.com

RISK OF DAMAGE

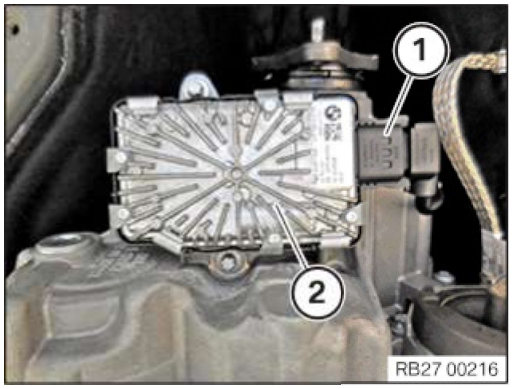
Damage to the transmission.

Damage to the transmission through unapproved transmission oil.

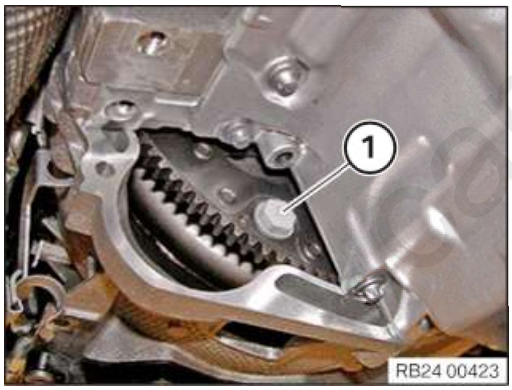
- Use only the approved transmission oil.
- After completion of repair work, check transmission oil level.



- Unscrew the bolt (1) and disconnect the ground strap (2).



- Disconnect connector (1) from transfer box control unit (longitudinal torque distribution) (2).



TECHNICAL INFORMATION

Only G05 and G07

In vehicles with active anti-roll bar (ARS) the fan cowl must be removed in order to spin the engine.

For additional information see: 17 11 035 Removing and installing/replacing the fan cowl including electric fan

- Turn the engine on the vibration damper with the special tool 0 493 380 (11 6 480) in the direction of rotation until the bolt (1) becomes visible in the recess.
- Undo all 6 screws (1) on the torque converter.

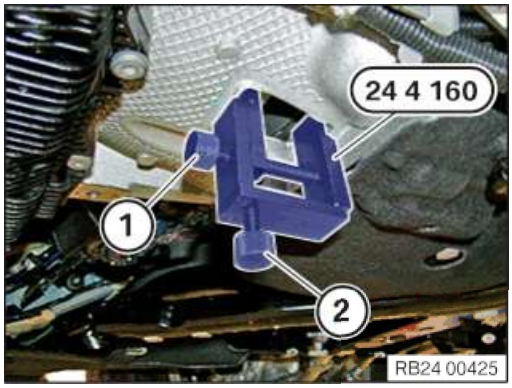


- Prepare special tool 0 494 451 (24 4 160) with the shaped element 0 494 622 (24 4 164) as shown.

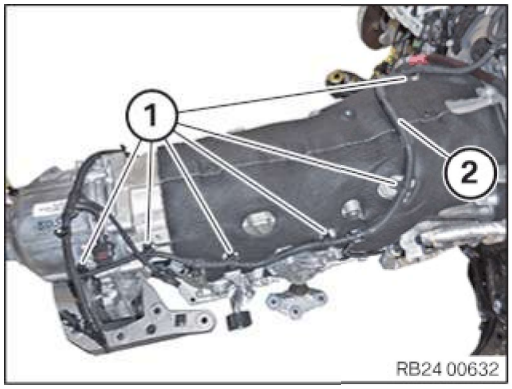
carmagn.com



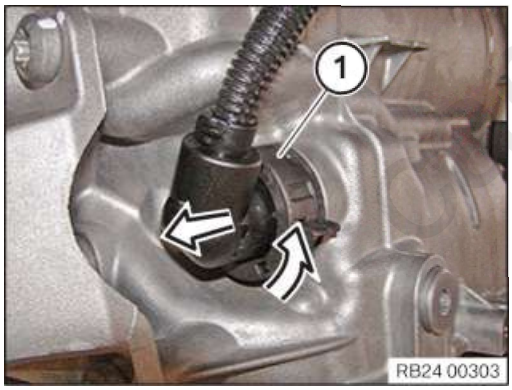
- Remove the sealing cap (1).



- Insert special tool 0 494 451 (24 4 160) into the recess of the transmission housing and apply slight tension using the screw (1).
- Screw the bolt (2) in to the stop.
- Tighten down screw (1).



- Loosen clamps (1).
- Hang line (2) on one side.

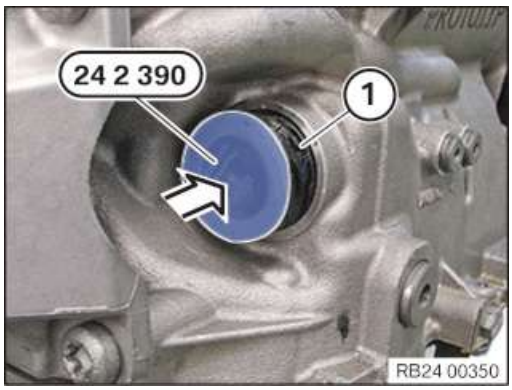


TECHNICAL INFORMATION

Notes on mechatronics are a fundamental requirement for these repair instructions and must be complied with at all times.

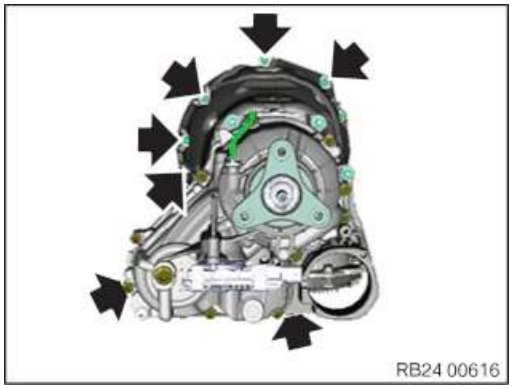
For additional information see: 24 34 ... Notes on mechatronics (GA8HP50Z/GA8HP51Z/GA8HP75Z/GA8HP76Z/GA8HP95Z)

- Unlock connector (1) by turning and pull off.
- Do not touch pins.
- Loosen all cable clips.



- Insert the special tool 0 494 213 (24 2 390) in the sealing sleeve (1) in direction of arrow.

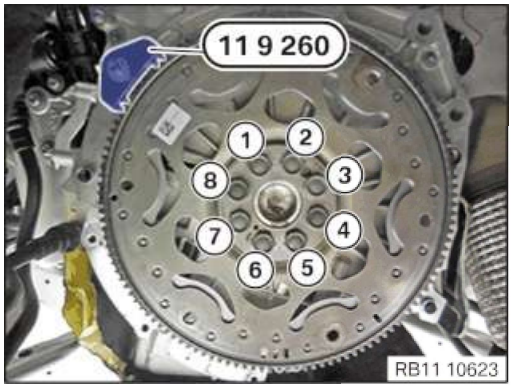
autodiagn.com



- Support engine.
- Release remaining screws.
- Remove the transmission with the transfer box and the front propeller shaft.

MAIN WORK

28 – Removing flywheel



- Fasten the flywheel with the special tool 0 493 938 (11 9 260) and tighten with the special tool 0 494 130 (11 9 264).
- Loosen screws (1-8).

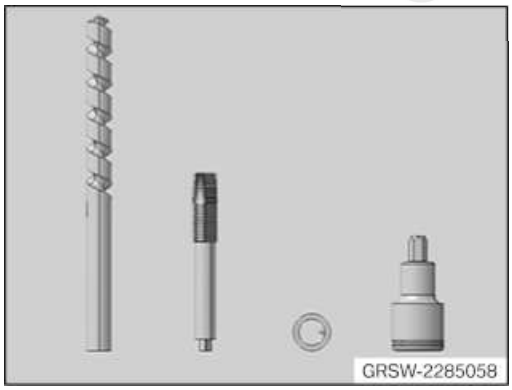
29 – Installing the flywheel



TECHNICAL INFORMATION

Clean all threads with a screw tap.

- Clean all the screw threads (1).



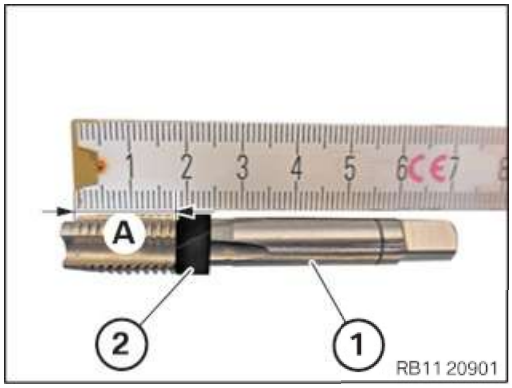
- Use the set of special tools 2 285 058.

Description
Twist drill
Thread cutter M12x1.5
Depth
Insertion tool



- Assemble tool set.

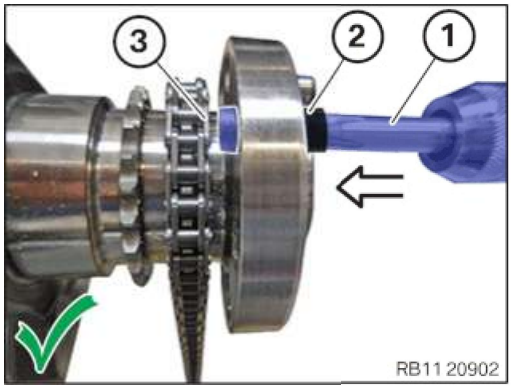
Number	Description
1	Tool holder
2	Thread cutter M12X1,5



- Mark the screw-in depth (A) on thread cutter (1) from the set of special tools 2 285 058 with a standard tool (2).

Screw-in depth of thread cutter

Screw-in depth	18 mm



NOTICE

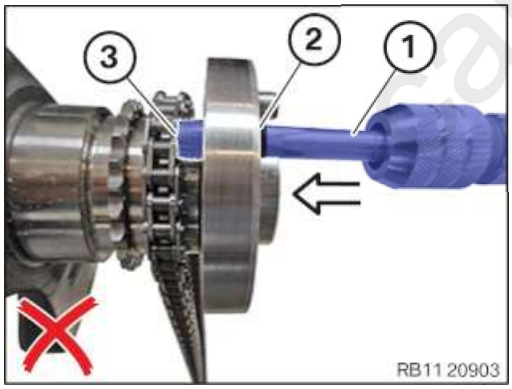
To provide a better overview: Shown with engine removed.

- Screw in the thread cutter (1) from the set of special tools 2 285 058 in direction of arrow up to the screw-in depth (2).

Screw-in depth of thread cutter

Screw-in depth	18 mm

- Make sure that the thread cutter does (1) **not** rest on the timing chain (3).



TECHNICAL INFORMATION

- **Carefully** handle the timing chain, to protect the timing chain and timing chain drive against damage.

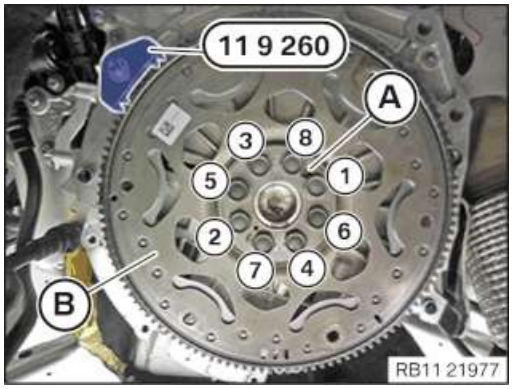
- Make sure that the screw-in depth (2) of the screw tap (1) is not exceeded.

  The thread cutter (1) may not rest on the timing chain (3).



- Make sure the magnet wheel (1) is installed correctly.

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- Renew screws (1) to (8).

  Parts: Bolts
- Position flywheel (B) .
- Screw in flywheel bolt (1) to (8) by hand.
- Fix the flywheel (B) with the special tool 0 494 034 (11 9 261) and screw the special tool 0 494 130 (11 9 264) tightly.
- Make sure the tightening sequence starts at dowel pin (A).
- Tighten flywheel bolts in sequence (1) to (8).

Flywheel to crankshaft

M12x1.5	Renew screws.	Jointing torque	45 Nm
		Angle of rotation	40 °

- Remove special tool 0 493 938 (11 9 260).

POSTPROCESSES

30 – Install automatic transmission (all-wheel drive vehicle) (GA8HP51Z)

RISK OF DAMAGE

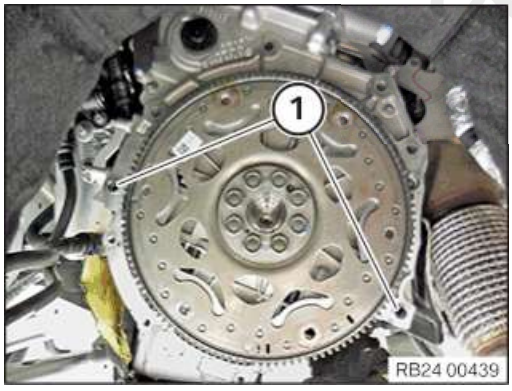
Damage to the transmission.

Damage to the transmission through unapproved transmission oil.

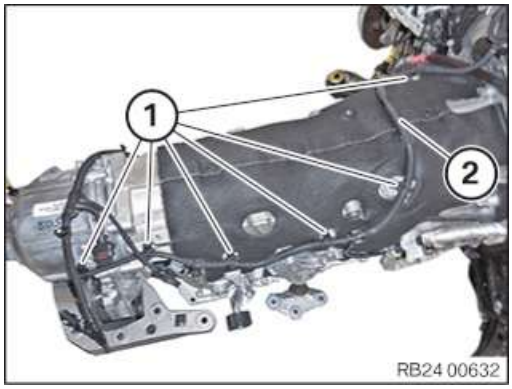
- Use only the approved transmission oil.
- After completion of repair work, check transmission oil level.

TECHNICAL INFORMATION

After completion of the work, program the control unit for the electronic transmission control (EGS).

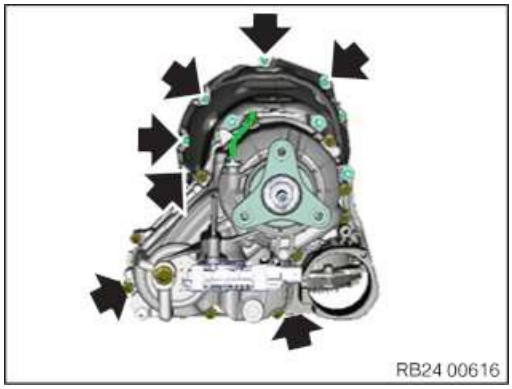


- Check the fitting sleeves (1) for correct fit and damage and renew as needed.

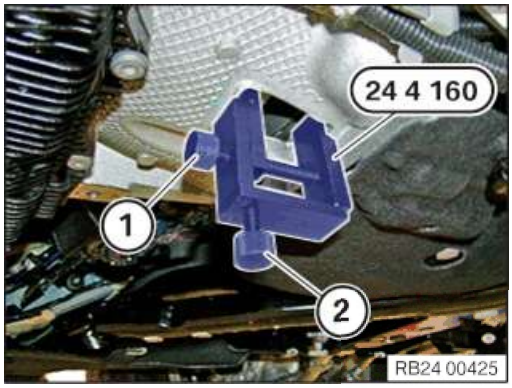


- Install the line (2).
- Secure clamps (1).

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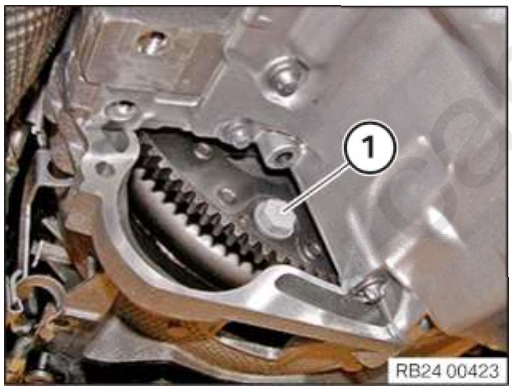
- Flange-mount the transmission on the transfer box (VTG).
- Rotate the torque converter until the bore hole of the torque converter is flush with bore hole in drive plate.
- Fit the transmission bolts (arrows) and apply lightly.



- Release screw (1) and screw (2).
- Remove special tool 0 494 451 (24 4 160).



- Install the sealing cap (1).



TECHNICAL INFORMATION

Only G05 and G07

In vehicles with active anti-roll bar (ARS) the fan cowl must be removed in order to spin the engine.

For additional information see: 17 11 035 Removing and installing/replacing the fan cowl including electric fan

- Renew screws.

  Parts: Bolts
- Crank the engine on the vibration damper in the direction of rotation using special tool 0 493 380 (11 6 480) to tighten all six screws (1).
- Tighten all 6 screws (1) of the torque converter using special tool 0 491 667 (24 1 110) .

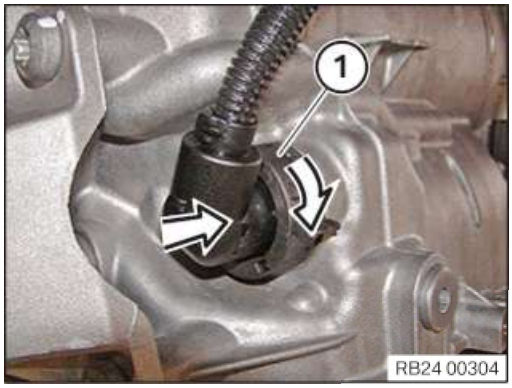
Torque converter to flywheel

M10	Renew screws.	Tightening torque	56 Nm

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- Remove the special tool 0 494 213 (24 2 390) from the sealing sleeve in direction of arrow.

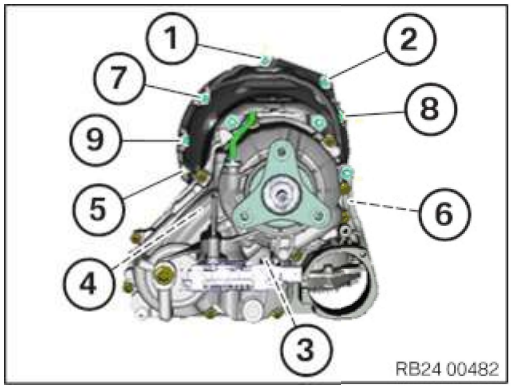


TECHNICAL INFORMATION

Notes on mechatronics are a fundamental requirement for these repair instructions and must be complied with at all times.

For additional information see: 24 34 ... Notes on mechatronics (GA8HP50Z/GA8HP51Z/GA8HP75Z/GA8HP76Z/GA8HP95Z)

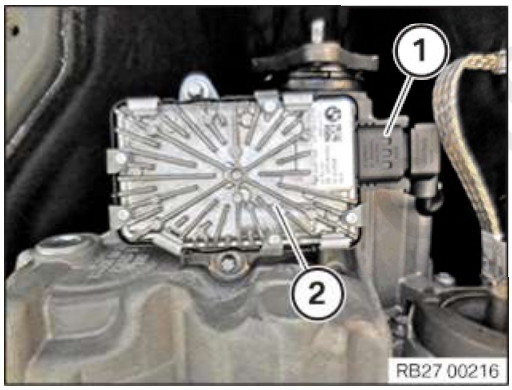
- Slide the connector (1) on and turn it to lock.



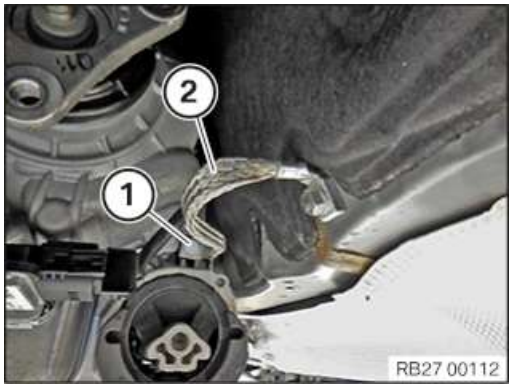
- Tighten the transmission bolts in sequence (1) to (9).

Transmission to engine

M8		Tightening torque	19 Nm
M12		Tightening torque	66 Nm



- Connect the connector (1) to the VTG control unit for the longitudinal torque distribution (2).

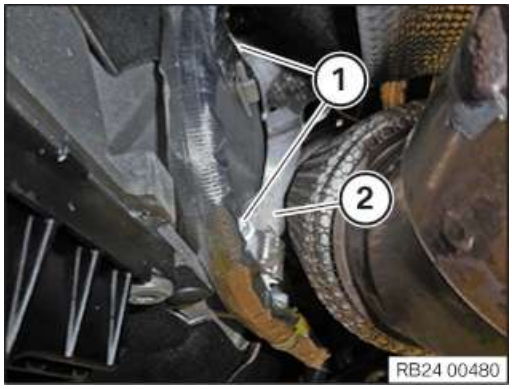


- Install the ground strap (2).
- Tighten down screw (1).

Ground strap to transmission or body

M8		Tightening torque	19 Nm

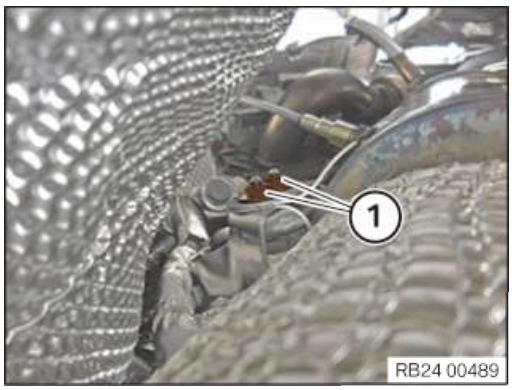
31 – Install the exhaust bracket



- Install the exhaust bracket (2).
- Tighten the screws (1).

Transmission to engine

M8		Tightening torque	19 Nm
M12		Tightening torque	66 Nm

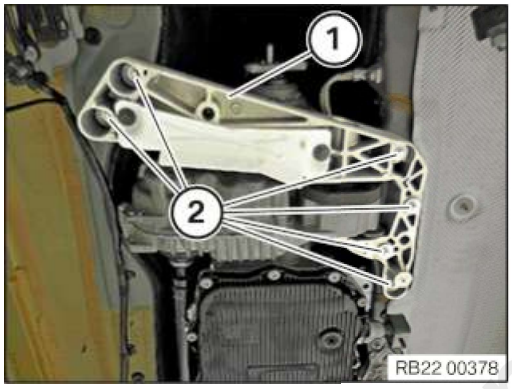


- Tighten nuts (1).

Catalytic converter to holder

M8 nut	Renew nut.	Tightening torque	28 Nm

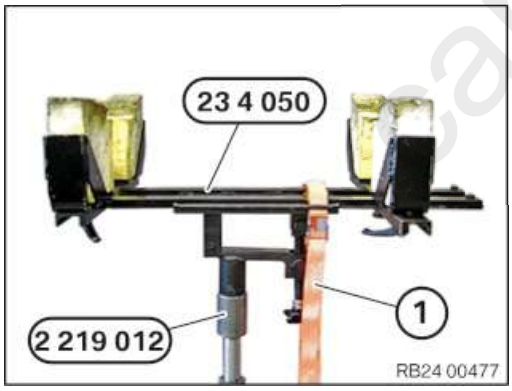
32 – Install transmission cross member.



- Install the transmission cross member (1).
- Tighten the screws (2).

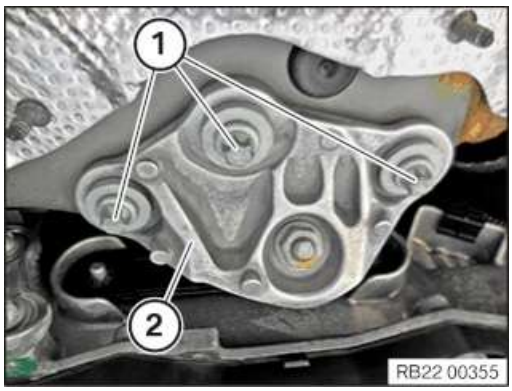
Transmission cross member to body

M8	Renew screws.	Tightening torque	19 Nm



- Loosen the tensioning strap (1) from the transmission.
- Remove the special tools 0 495 498 (23 4 050) and 2 219 012 from the transmission.

33 – Installing the transmission bearing support



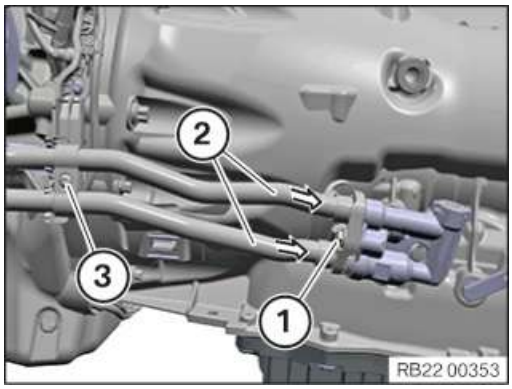
- Position transmission bearing support (2).
- Tighten the screws (1).

Transmission bearing support to body

M8	Renew screws.	Tightening torque	19 Nm

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34 – Fix hydraulic lines



- Renew sealing rings.

  Parts: Sealing ring
- Install hydraulic lines (2) on transmission.
- Position and tighten the screw (1).

Transmission oil line to transmission

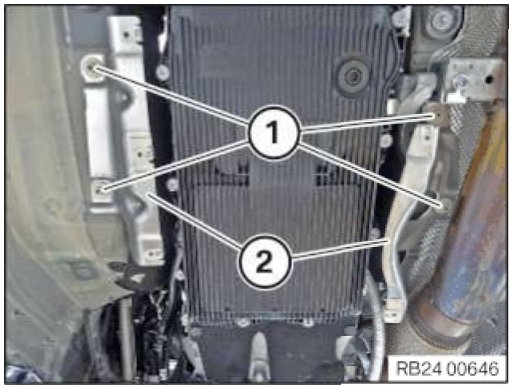
M6x25	Renew the sealing ring.	Tightening torque	8 Nm

- Position and tighten the screw (3).

Transmission oil line on holder

M6		Tightening torque	8 Nm

35 – Install the retaining plates

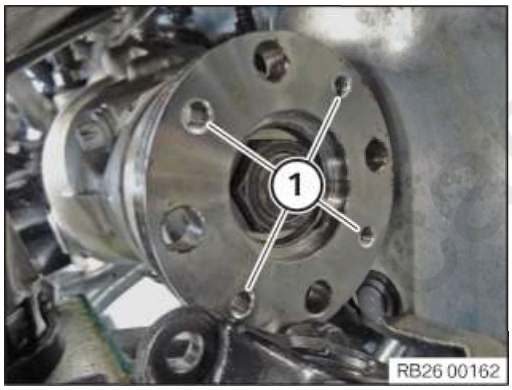


- Feed in retaining plate (2) and install.
- Tighten nuts (1).

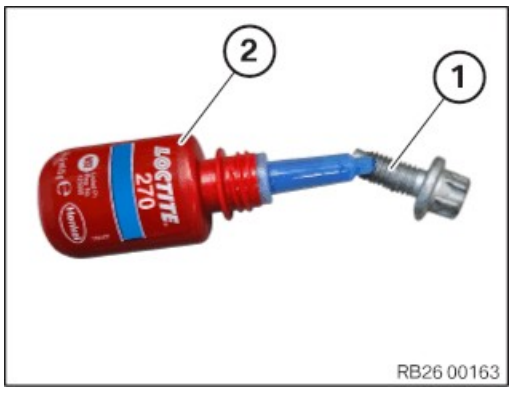
Retaining plates for vehicle underbody cover

Sheet metal nut	Replace nuts.	Tightening torque	3 Nm

36 – Installing front propeller shaft at the front axle transmission



- Before fitting the propeller shaft to the front axle transmission, all the 4 threads (1) must be cleaned and free from possible residues and contaminations in the front axle transmission flange.



- Renew screws.

  Parts: Bolts
- A drop of Loctite 270 (2) must be given before the screw connection on each thread at the end of the respective screw (1).

Expendable materials

High-strength screw lock, Loctite 270	10 ml, Tube	83 19 2 210 337

carfordiagn.com



TECHNICAL INFORMATION

A 30-minute hardening time must be ensured after screwing the front propeller shaft before the vehicle is driven again.

- Tighten screws (arrows).

Propeller shaft before the front axle differential

Renew screws. Jointing torque and angle of rotation must be observed without fail.	Tightening torque Angle of rotation	25 Nm 45 °

37 – Partially installing the propeller shaft



- Check centring (1) for damage; renew if necessary.

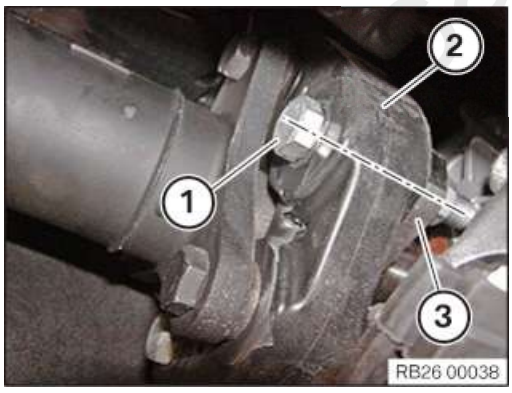


- Apply a thin coat of grease to the soft centring (1), if necessary.

  Do not grease the hard centring (2).

Expendable materials

Lubricating grease Olistamoly 2 LN 584 LO	100 g, Tube	83 19 0 447 919

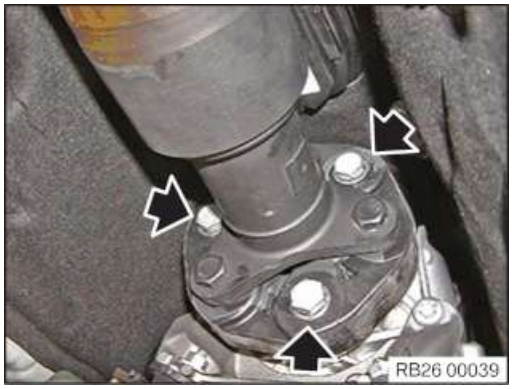


- Renew screws and the self-locking nuts.

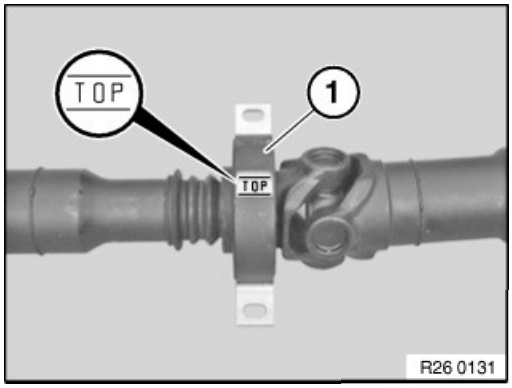
  Parts: Screws, self-locking nuts

- Assemble the screw connections (1) of the flexible disc (2) and the three-hole flange (3) according to the self-affixed identification.

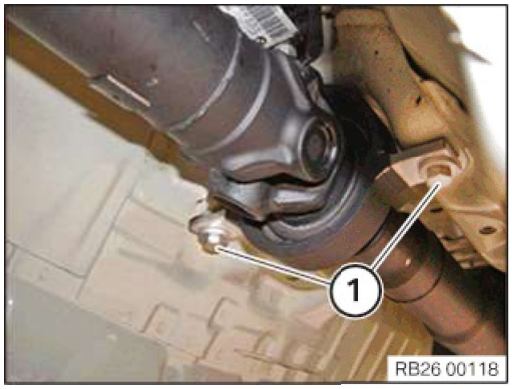
  This should prevent a humming noise from the drive train during driving.



- Hand-tighten the screws and nuts (arrows), but do not tighten fully.



- **Centre mount with TOP marking:**
- The centre mount (1) must be installed with the TOP marking at the top in the gearbox tunnel.



- Position centre mount.
- Hand-tighten the bolts (1), but do not tighten fully.



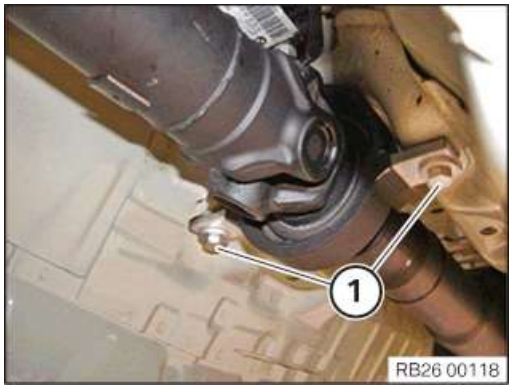
- Renew screws.

  Parts: Bolts
- Provide counter support for the bolts of the flexible disc on the nut and tighten with the bolts.

Front flexible disc to propeller shaft

M12	Renew screws. Comply with jointing torque and angle of rotation. Tightening via screw.	Jointing torque Angle of rotation	55 Nm 90 °

- Secure the special tool 0 490 504 (00 9 120) with the special tool on the vehicle underbody and continue to screw it in according to the angle of rotation.



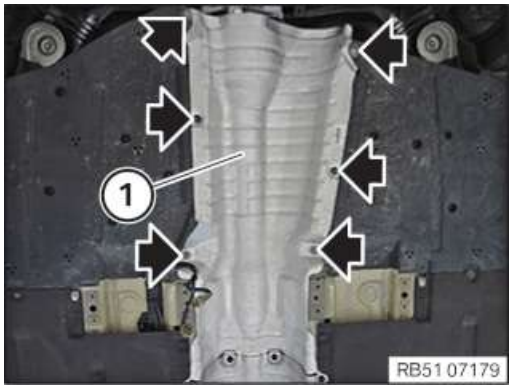
- Tighten the screws (1).

Centre mount to body

M8		Tightening torque	19 Nm

rdiagn.com

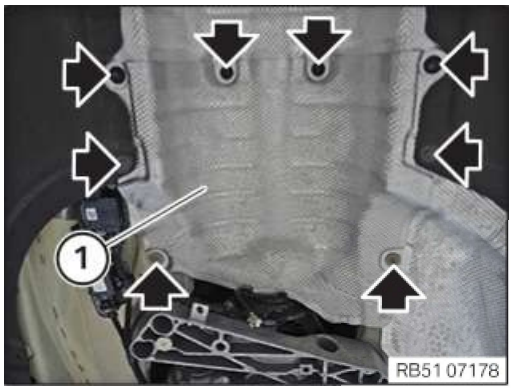
38 – Install the heat shields



- Install heat shield (1).
- Tighten the nuts and bolts (arrows).

Heat shield to vehicle underbody

Screws and nuts		Tightening torque	3 Nm



- Install heat shield (1).
- Tighten the nuts and bolts (arrows).

Heat shield to vehicle underbody

Screws and nuts		Tightening torque	3 Nm

39 – Installing the complete exhaust system

CAUTION

Component with heavy weight.

Danger of injury!

- Note component's centre of gravity.
- Support component using a jack.
- Secure component against falling off the jack.

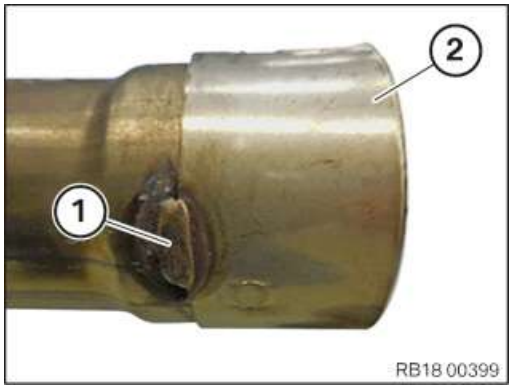
CAUTION

Heavy component.

Heavy components can lead to injury or damage.

- Remove and install heavy components with the aid of another person/other persons.

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CAUTION

Swarf resulting from sawing or grinding components.

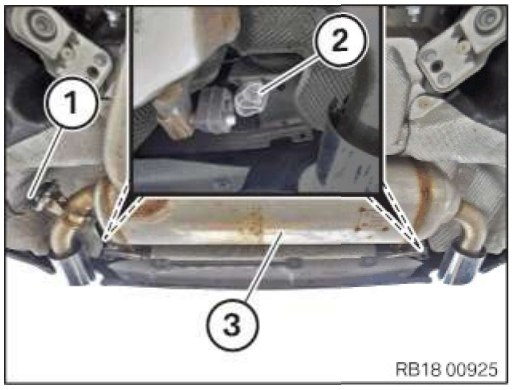
Danger of injury!

- Conduct all work in appropriate personal protective equipment only.
- Wear safety goggles and protective gloves.

- **Equipment specification 1 (ribbon clamp)**

  Open the weld seam (1) with a conventional tool.
- Remove ribbon clamp (2).
- Renew the (2) ribbon clamp.

  Parts: Ribbon cable clamp



- Feed in and install the exhaust system (3) with a second person.
- Renew nuts (2).

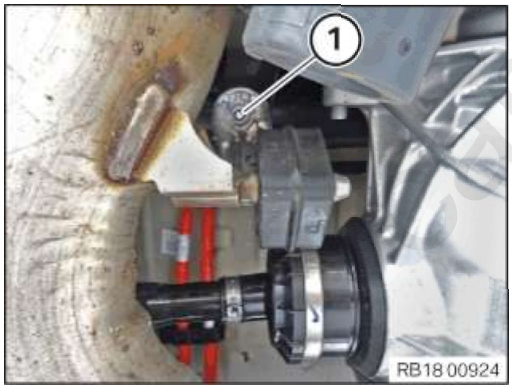
  Parts: Nuts
- Tighten nuts (2).

Rear silencer to body / bumper support

M8	Replace nuts.	Tightening torque	19 Nm

- Connect connectors (1) and lock.

  The connector (1) must engage audibly.



- Renew nut (1).

  Parts: Nut
- Tighten the bolt (1) on the rear axle support.

Exhaust system to rear axle carrier

Nut M8	Renew nut.	Tightening torque	19 Nm



- Renew nut (1).

  Parts: Nut
- Tighten nut (1).

Front pipe / petrol particulate filter on transmission holder

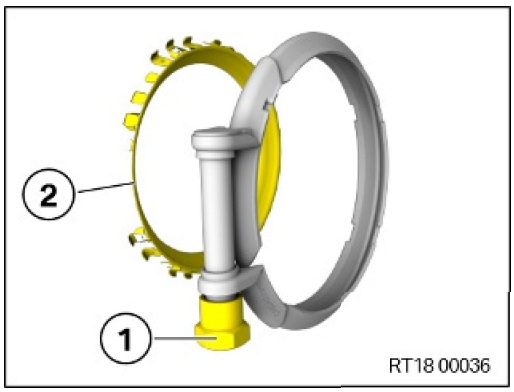
M8	Renew nut.	Tightening torque	19 Nm



- Tighten the ribbon clamp (1).

Exhaust system to catalytic converter

Ribbon cable clamp	Renew flat band clip.	Tightening torque	26 Nm

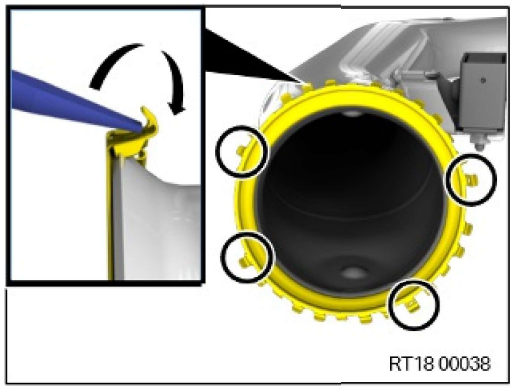


- **Equipment specification 2 (V-clips)**

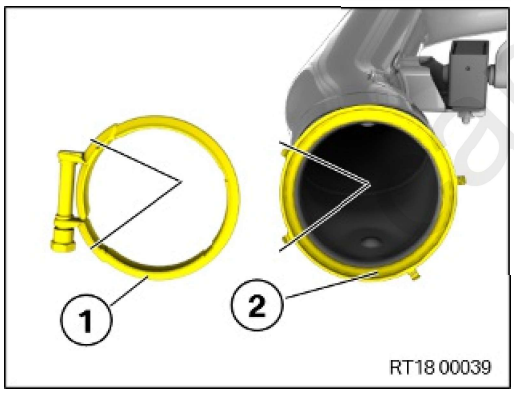
  Renew V-band clamp.

  Parts: V-band clamp

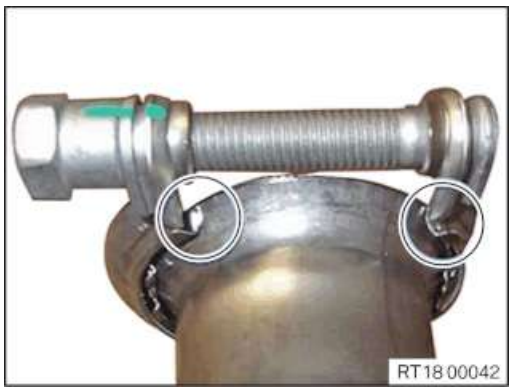
  Unscrew the nut (1) and remove the sealing ring (2).



- Bend all sheet metal tabs over with a suitable tool, except those in the marked areas.

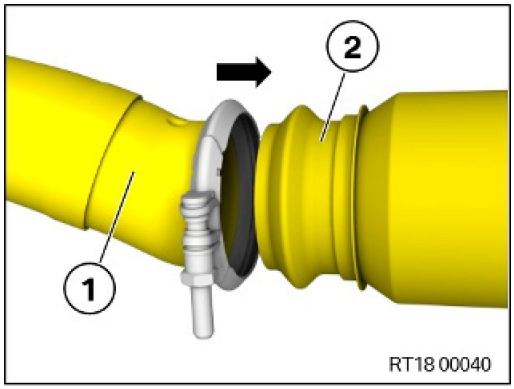


- Mount the V-clip (1) on the sealing ring (2).
- Make sure that the V-clip (1) is positioned correctly on the sealing ring (2).

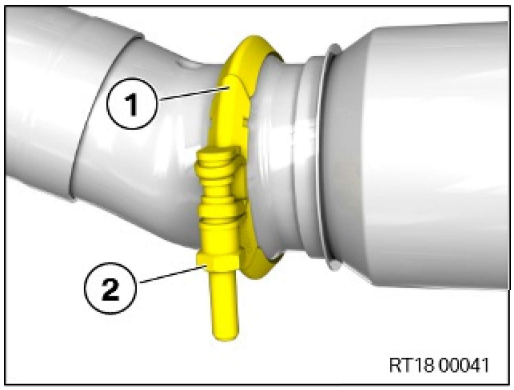


- Ensure that the V-clip rests against the sheet metal tabs in the marked areas after mounting.

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- Connect the exhaust system (1) with the catalytic converter (2) and position it correctly (arrow).

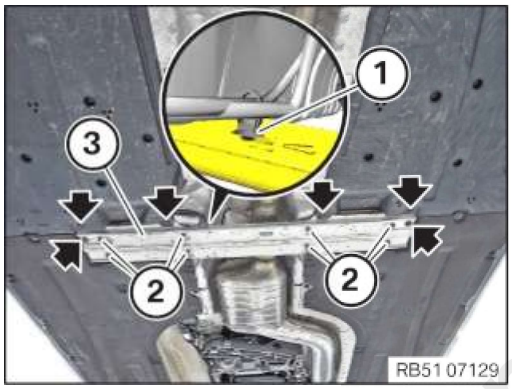


- Make sure that V-clip (1) is fitted correctly.
- Tighten down screw (2).

V-clip to catalytic converter

V-band clamp	Renew V-band clamp.	Tightening torque	22 Nm

40 – Install the connecting supports on the tunnel



- Guide in and install connecting support (3) on the tunnel.
- Tighten the screws (2).

Connecting support to tunnel

M8x25 screw		Tightening torque	20 Nm
Screw		Tightening torque	3 Nm

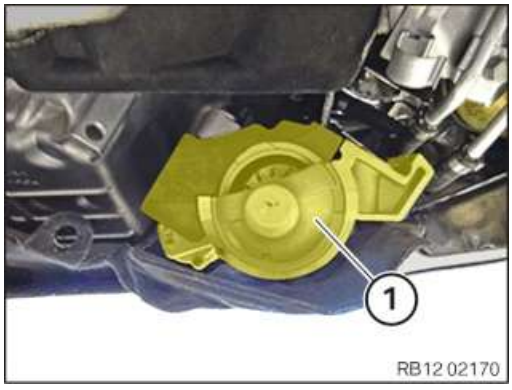
- Tighten screws (arrows).

Connecting support to tunnel

M8x25 screw		Tightening torque	20 Nm
Screw		Tightening torque	3 Nm

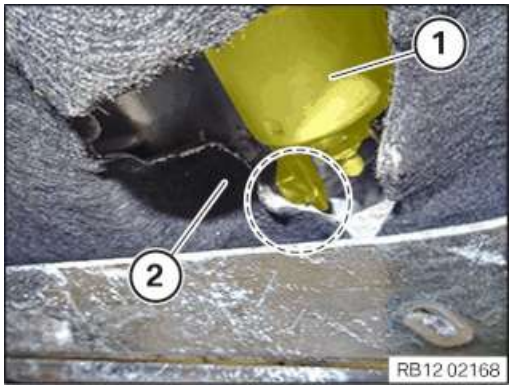
- **If installed:** Secure clamps (1).

41 – Installing starter motor



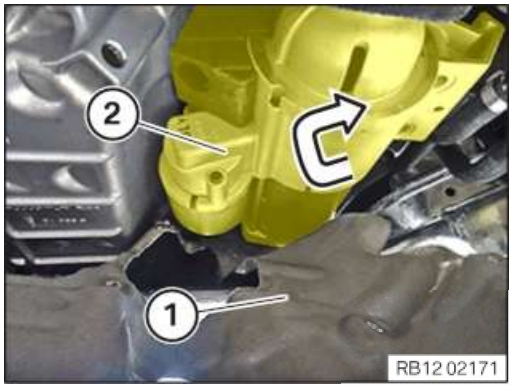
- Guide in the starter motor (1).

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- Position the starter motor (1) carefully in the marked area over the acoustic cover (2) as shown.

  An installation cannot be performed without positioning the starter motor.



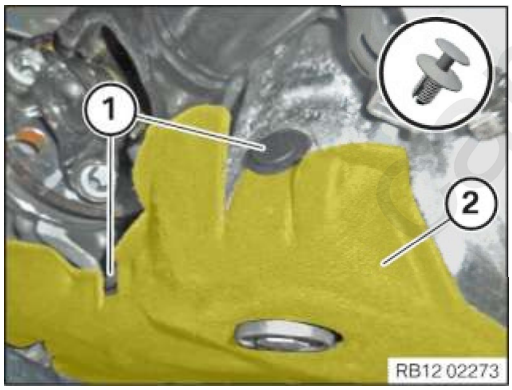
- Make sure that the acoustic cover (1) **is not damaged.**
- Fold the acoustic cover (1) **carefully** downwards.
- Install and position the starter motor (2) in direction of arrow.



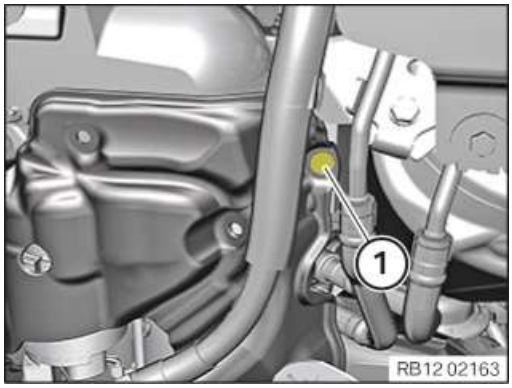
- Tighten the screws (1).

Starter motor to engine

M8X60		Tightening torque	19 Nm

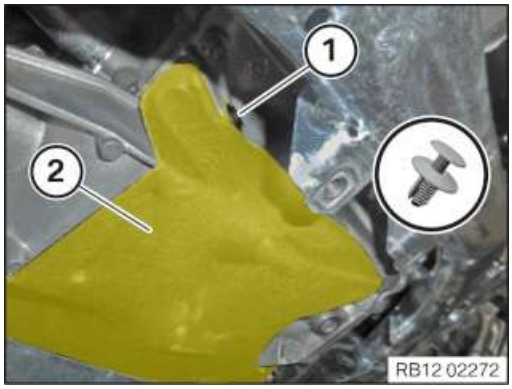


- Position the acoustic cover (2).
- Secure expanding rivet (1).

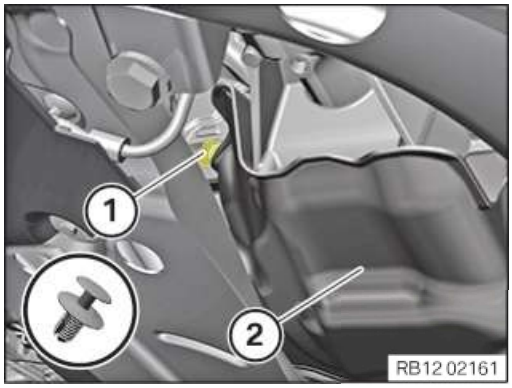


- Secure fir tree clip (1).

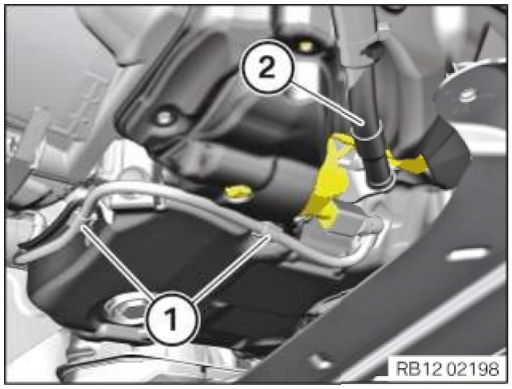
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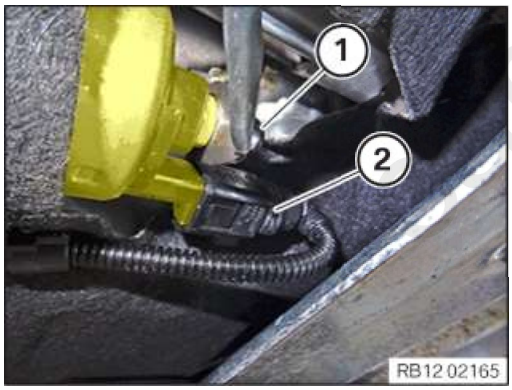
- Fasten expanding rivet (1).



- Fasten expanding rivet (1).



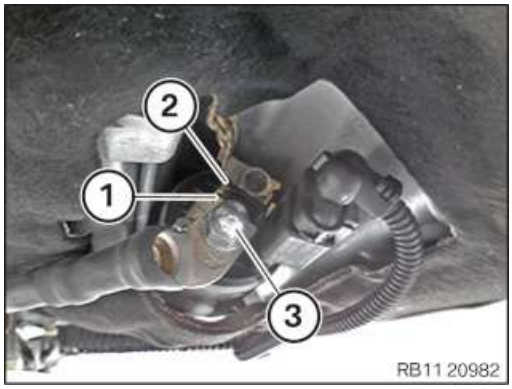
- Insert and position the positive battery cable (2).
- Secure clamps (1).



- Connect connectors (2) and lock.

  The connector (2) must engage audibly.
- Tighten the nut (1) hand-tight.

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CAUTION

Improper routing of the positive battery cable.

Risk of short circuits!

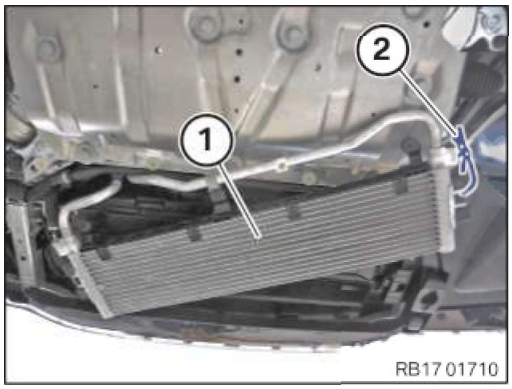
- Route the positive battery cable without abrasions and do not trap.

- Attach positive battery cable (1) **correctly** to anti-twist lock (2).
- Tighten nut (3).

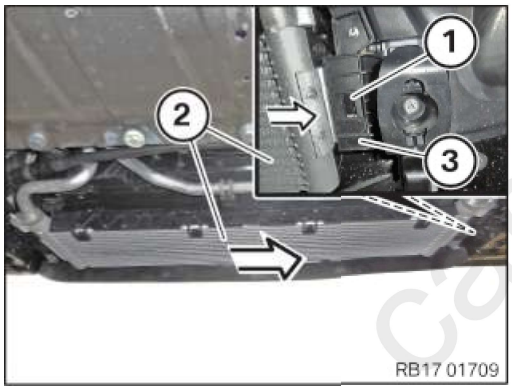
Battery positive lead to starter

M8		Tightening torque	13,5 Nm

42 – If installed: Secure engine oil cooler



- Remove the cable straps (2).
- Position engine oil cooler (1).



- Feed in and install the engine oil cooler (2) on the holder (3) in the direction of the arrow.
- Ensure that the lock (1)engages audibly.

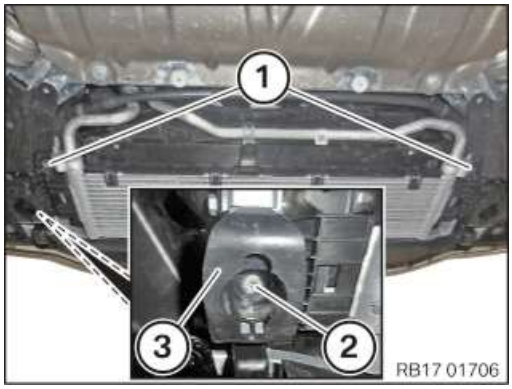


- Tighten down screw (1).

Engine oil cooler to bumper support

M6X25		Tightening torque	8 Nm

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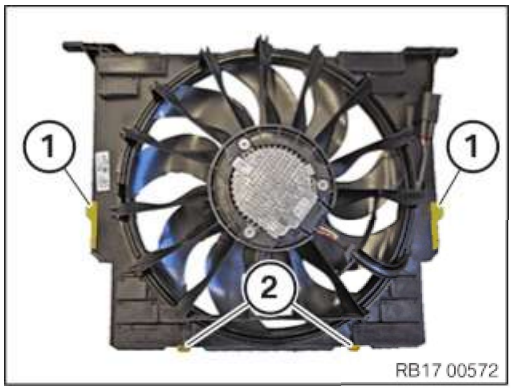
- Renew rivet (2).

  Parts: Rivet
- Install and rivet damper (3).
- Tighten the screws (1).

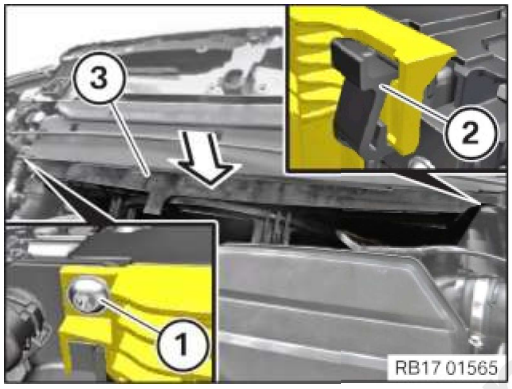
Cover, front bottom on side

Hexagon screw for thermoplastic		Tightening torque	3 Nm

43 – Install fan cowl



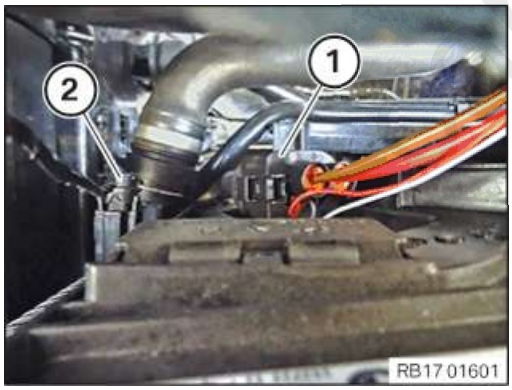
- Feed guides (1) into the radiator.
- Feed guides (2) into the charge air cooler.



- Guide in and install fan cowl (3) **carefully** in the direction of the arrow.
- Ensure that the lock (2)engages audibly.
- Tighten down screw (1).

Fan cowl with electric fan on radiator

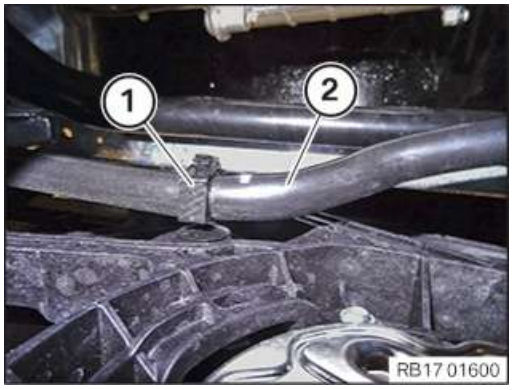
TS6x20		Tightening torque	6,5 Nm



- Connect connectors (2) and lock.

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

  The connector (1) must engage audibly.



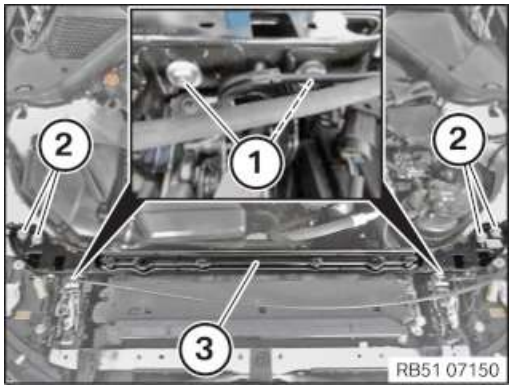
- **If installed:** Secure the transmission oil line (2).

  Insert and install the transmission oil line (2).

  Lock holder (1).

44 – Install the rear top cross connection

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- Guide in and position the top rear cross connection (3).
- Tighten the screws (1).

Top rear cross connection to bonnet catch support

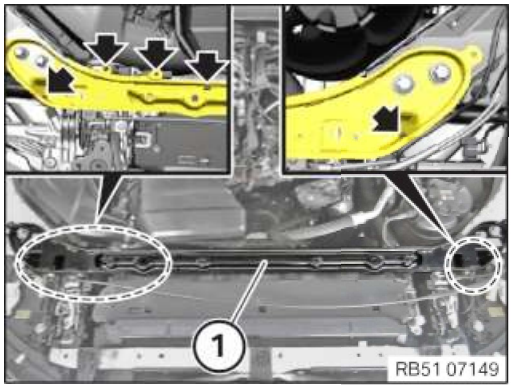
Flat-head screw M6x20		Tightening torque	11,8 Nm

- Renew screws (2).

  Parts: Bolts
- Tighten the screws (2).

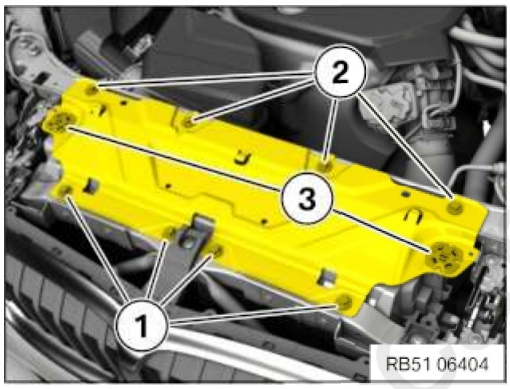
Rear top cross connection to wheel arch carrier support

M10x20 screw	Renew screw.	Jointing torque	56 Nm
		Angle of rotation	90 °



- Secure the clips (arrows) in the marked areas to the top rear cross connection (1).

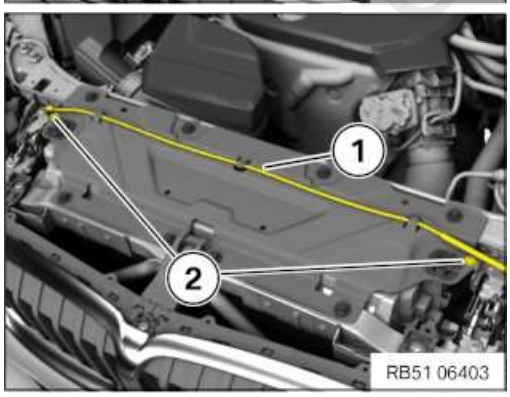
45 – Installing the top cross connection



- Set and position upper cross connection with holders (3) from above.
- Tighten down screws (1) and (2).

Cross connection, top

M8x20		Tightening torque	28 Nm



- Tighten down screws (2).

Cross connection, top

M6x20		Tightening torque	11,8 Nm

- Attach Bowden cable (1) on the upper cross connection.

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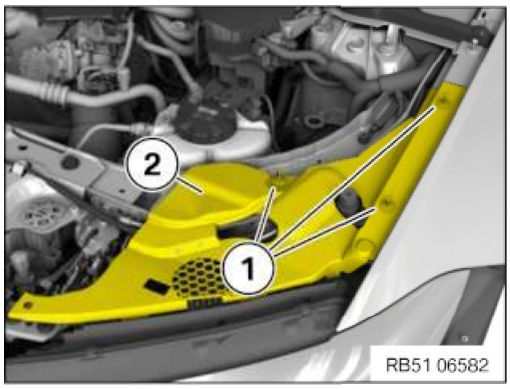
- Clip in the housing for the coupling of the Bowden cables (1).

46 – Install the cover in the engine compartment at top left and right partially

NOTICE

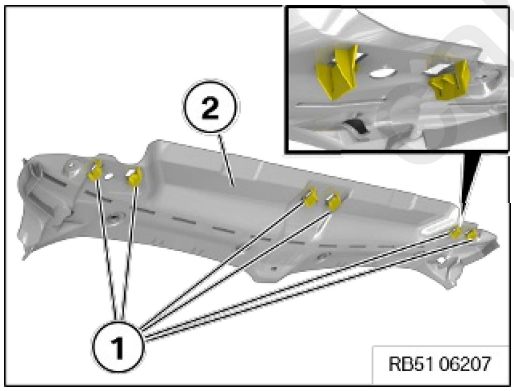
Description is for left component only. Procedure on the right side is identical.

▸ **Installing the cover in the engine compartment on top partially**



- Install the cover in the engine compartment on top (2).
- Secure expanding rivet (1).

47 – Installing cover for engine compartment centre



Check

- Check latch mechanisms (1) of cover for engine compartment centre (2) for damage.

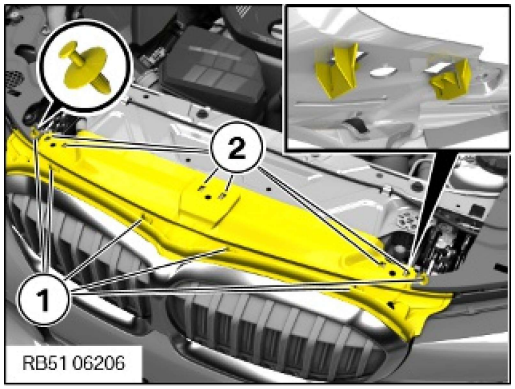
Result

» The latch mechanism (1) is damaged.

Measure

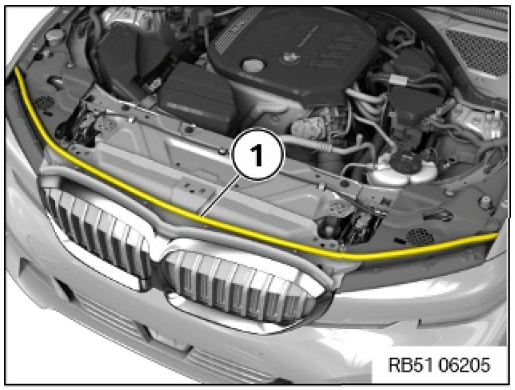
- Renew cover for engine compartment centre (2).

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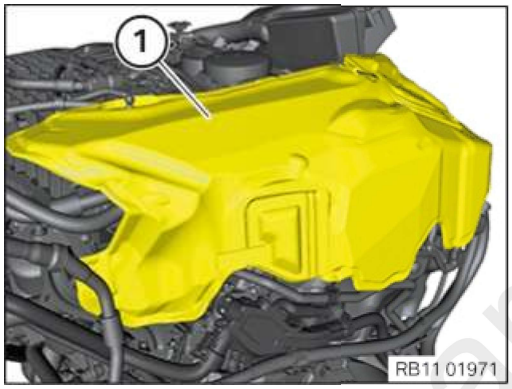
- Guide in the cover for the engine compartment centre from the rear and position it.
- Clip in the cover for the engine compartment centre with latch mechanisms (2).
- Mount all expanding rivets (1).

48 – Install the seal for the front bonnet



- Position the bonnet seal(1) and connect it on the mounting on the bumper and on the headlights.

49 – Installing acoustic cover at rear



- Make sure the acoustic cover (1) is correctly positioned on the rear side of the engine.



- Install the acoustic cover (1) from the top and clip it in into the marked areas.

50 – Install the seal for the bonnet

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- Press the rear bonnet seal (2) into the guide.
- Feed in cable (1) into the brackets.
- Check that the rear bonnet seal (2) and the cable (1) are seated correctly.

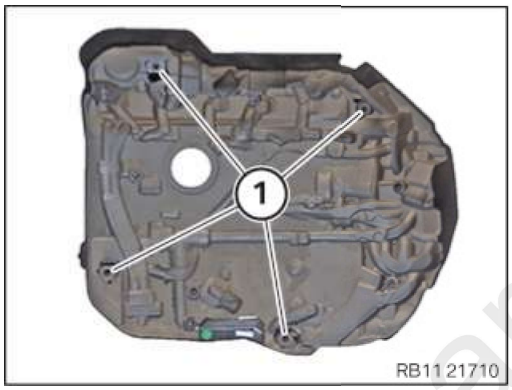
51 – Install acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover.

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

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



- Check the rubber mount (1) for correct fit in the acoustic cover.



- Install acoustic cover (1) and fix in the rubber mounts (marks).

52 – Disconnecting all battery earth leads

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- See additional information.

53 – Checking/topping up oil level in automatic transmission

Prerequisite

Vehicle in horizontal position.

The vehicle is secured against rolling away.

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

To set the correct oil level, it is mandatory that the service function "Transmission control unit: Oil-level adjustment" is carried out with the diagnosis system.

TECHNICAL INFORMATION

Performing oil-level adjustment:

Certain fault memory entries may require an oil-level adjustment in the automatic transmission and after repairs have been completed (e.g. exchange of mechatronics, exchange of the converter, exchange of the transmission, servicing of automatic transmission oil).

TECHNICAL INFORMATION

The automatic transmission fluid specified by BMW must be used for the automatic transmission.

For additional information see: SBS-ANL-SBS1996-240596143_A14 (automatic transmission fluid for ZF transmissions, etc.)

- Connect diagnosis system.
- Observe preconditions for the oil-level adjustment with the diagnosis system:
  - Precondition for beginning: Transmission oil temperature 30°C to 40°C.
  - Precondition for ending: Transmission oil temperature 40°C to 50°C.
- Call up service function (drive).
- Carry out oil-level adjustment in accordance with instructions.

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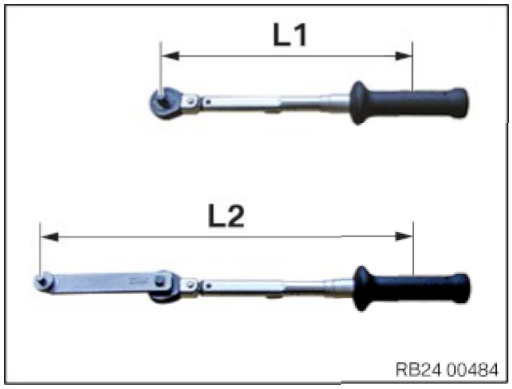
- **Top up the automatic transmission fluid:**
- Loosen the oil filler plug (1) using the special tool 2 405 614.
- Top up automatic transmission fluid according to the instructions in the diagnosis system.

GA8HP51Z transmission capacity

	min. 9,28 l
Transmission oil:	Automatic transmission fluid ATF 3+

GA8HP76Z transmission capacity

	min. 9,35 l
Transmission oil:	Automatic transmission fluid ATF 3+



TECHNICAL INFORMATION

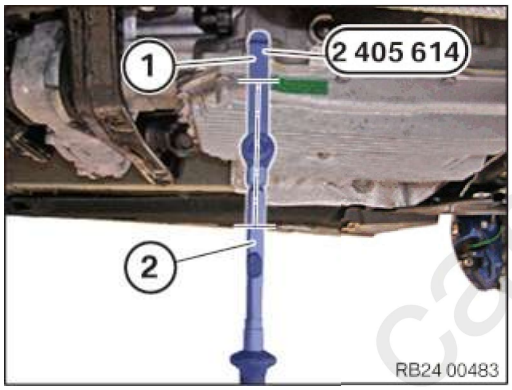
The setpoint torque deviates from the torque to be set when using special tool 2 405 614.

- **Converting the setpoint torque into the torque to be set:**

  (setpoint torque x L1) : L2 =torque to be set.

  L1 = Length from the centre of the handle to the reversible ratchet head

  L2 = Length from the centre of the handle to the engaging of the special tool in the bolt.



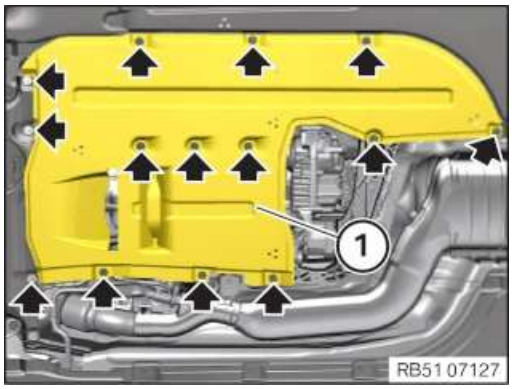
- Renew the oil filler plug (1) and the sealing ring.

  Parts: Oil filler plug, sealing ring
- Make sure that the special tool 2 405 614 and the torque wrench (2) align while tightening the oil filler plug (1).
- Tighten the oil filler plug (1) with the special tool 2 405 614 and the torque wrench (2).

Oil filler plug

M18x1.5		Tightening torque	35 Nm

54 – Installing underbody protection at rear



- **Version 1:**

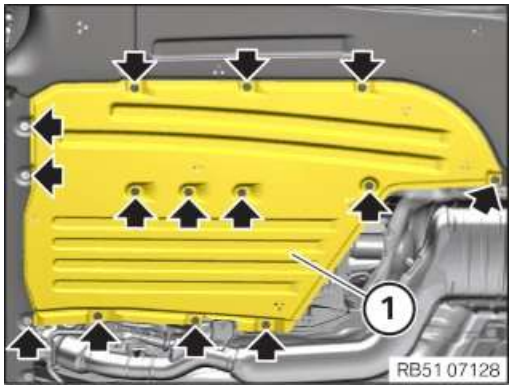
  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

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- **Version 2:**

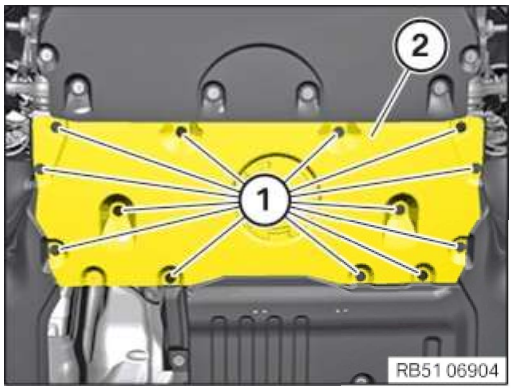
  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

55 – Installing the centre underbody protection



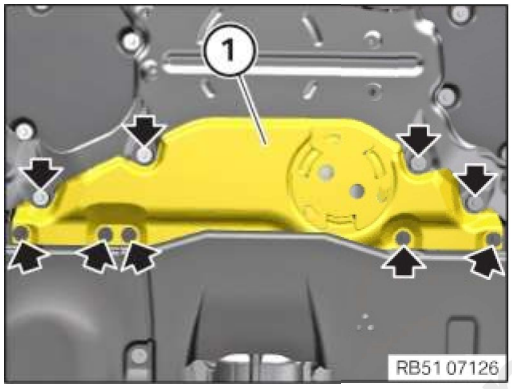
- **Version with rear-wheel drive:**

  Position central underbody protection (2).

  Tighten the screws (1).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



- **Version with all-wheel drive:**

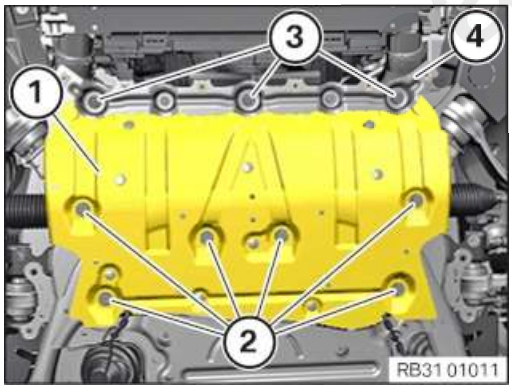
  Guide in and install the centre of underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

56 – Installing the stiffening plate

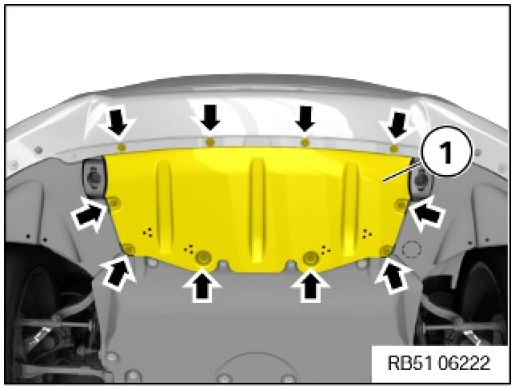


- Position stiffening plate (1).
- Screw screws (2) in.
- Position holder of underride protection (4).
- Screw screws (3) in.
- Tighten down screws (2) and (3).

Stiffening plate to front axle support

M10		Tightening torque	56 Nm

57 – Installing the front underbody protection



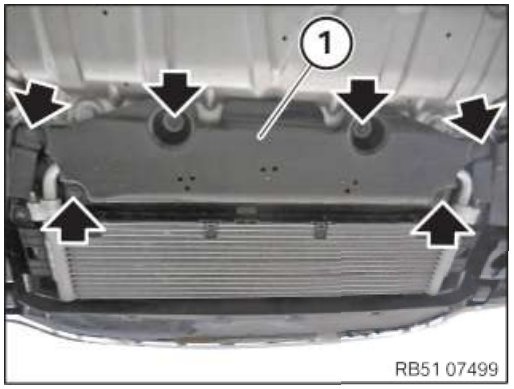
- **Version 1:**

  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



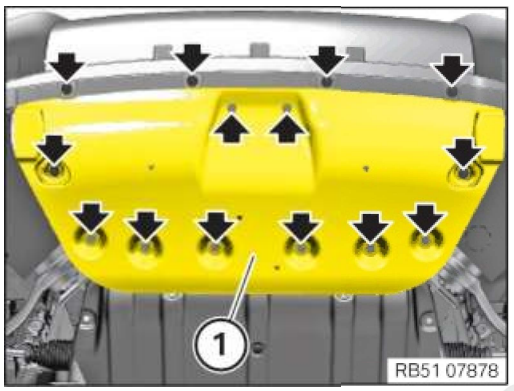
- **Version 2:**

  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 3:**

  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

Flywheel to crankshaft — Used in step 29

M12x1.5	Renew screws.	Jointing torque	45 Nm
		Angle of rotation	40 °

Torque converter to flywheel — Used in step 30

M10	Renew screws.	Tightening torque	56 Nm

Transmission to engine — Used in step 3031

M8		Tightening torque	19 Nm
M12		Tightening torque	66 Nm

Ground strap to transmission or body — Used in step 30

M8		Tightening torque	19 Nm

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Catalytic converter to holder — Used in step 31

M8 nut	Renew nut.	Tightening torque	28 Nm

Transmission cross member to body — Used in step 32

M8	Renew screws.	Tightening torque	19 Nm

Transmission bearing support to body — Used in step 33

M8	Renew screws.	Tightening torque	19 Nm

Transmission oil line to transmission — Used in step 34

M6x25	Renew the sealing ring.	Tightening torque	8 Nm

Transmission oil line on holder — Used in step 34

M6		Tightening torque	8 Nm

Retaining plates for vehicle underbody cover — Used in step 35

Sheet metal nut	Replace nuts.	Tightening torque	3 Nm

Propeller shaft before the front axle differential — Used in step 36

Renew screws. Jointing torque and angle of rotation must be observed without fail.		Tightening torque Angle of rotation	25 Nm 45 °

Front flexible disc to propeller shaft — Used in step 37

M12	Renew screws. Comply with jointing torque and angle of rotation. Tightening via screw.	Jointing torque Angle of rotation	55 Nm 90 °

Centre mount to body — Used in step 37

M8		Tightening torque	19 Nm

Heat shield to vehicle underbody — Used in step 38

Screws and nuts		Tightening torque	3 Nm

Rear silencer to body / bumper support — Used in step 39

M8	Replace nuts.	Tightening torque	19 Nm

Exhaust system to rear axle carrier — Used in step 39

Nut M8	Renew nut.	Tightening torque	19 Nm

Front pipe / petrol particulate filter on transmission holder — Used in step 39

M8	Renew nut.	Tightening torque	19 Nm

Exhaust system to catalytic converter — Used in step 39

Ribbon cable clamp	Renew flat band clip.	Tightening torque	26 Nm

V-clip to catalytic converter — Used in step 39

V-band clamp	Renew V-band clamp.	Tightening torque	22 Nm

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Connecting support to tunnel — Used in step 40

M8x25 screw		Tightening torque	20 Nm
Screw		Tightening torque	3 Nm

Starter motor to engine — Used in step 41

M8X60		Tightening torque	19 Nm

Battery positive lead to starter — Used in step 41

M8		Tightening torque	13,5 Nm

Engine oil cooler to bumper support — Used in step 42

M6X25		Tightening torque	8 Nm

Cover, front bottom on side — Used in step 42

Hexagon screw for thermoplastic		Tightening torque	3 Nm

Fan cowl with electric fan on radiator — Used in step 43

TS6x20		Tightening torque	6,5 Nm

Top rear cross connection to bonnet catch support — Used in step 44

Flat-head screw M6x20		Tightening torque	11,8 Nm

Rear top cross connection to wheel arch carrier support — Used in step 44

M10x20 screw	Renew screw.	Jointing torque	56 Nm
		Angle of rotation	90 °

Cross connection, top — Used in step 45

M8x20		Tightening torque	28 Nm

Cross connection, top — Used in step 45

M6x20		Tightening torque	11,8 Nm

Oil filler plug — Used in step 53

M18x1.5		Tightening torque	35 Nm

Underbody protection — Used in step 5455

Hexagon screw		Tightening torque	3 Nm

Stiffening plate to front axle support — Used in step 56

M10		Tightening torque	56 Nm

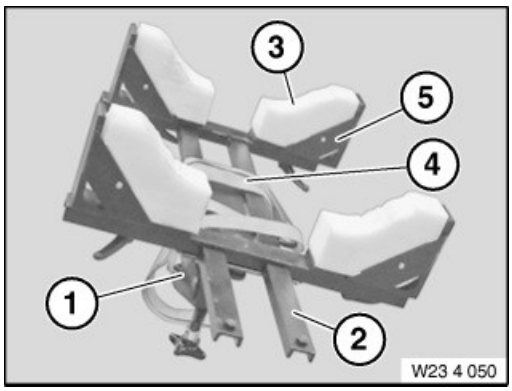
Underbody protection front — Used in step 57

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

Overview of Special Tools

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0 495 498 (23 4 050) Support



Common

Used in step 2532

Usage	(universal gearbox holder) Support for removing and installing manual gearboxes and automatic transmissions for BMW & RR.
Included in the tool or work	
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 07 06 (256)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
3	0 495 549 (23 4 053)		**Insert** (Foam material insert (1 set = 4 pieces)) deleted, can be ordered only via tool set	
1	0 495 547 (23 4 051)		**Joint** Available only as a complete tool set 23 4 050 (83 30 0 495 498) - as of 16.07.12.	
2	0 495 548 (23 4 052)		**Frame** (Basic frame) Available only as a complete tool set 23 4 050 (83 30 0 495 498) - as of 16.07.12.	
4	0 495 550 (23 4 054)		**Belt** (Tensioning strap) Available only as a complete tool set 23 4 050 (83 30 0 495 498) - as of 16.07.12.	
5	0 496 018 (23 4 055)		**Support** (Fixture for foam insert) Available only as a complete tool set 23 4 050 (83 30 0 495 498) - as of 16.07.12.	

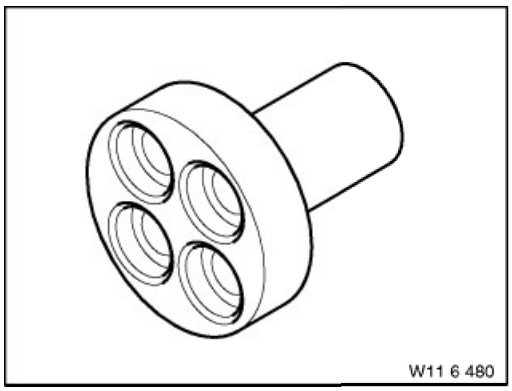
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2 219 012 Hydraulic lifter



Common	Used in step 2532
Usage	For raising and lowering various vehicle components.
Included in the tool or work	
Storage location	
Replaced by	
In connection with	
SI-Number	01 05 90 (207)

0 493 380 (11 6 480) Connector

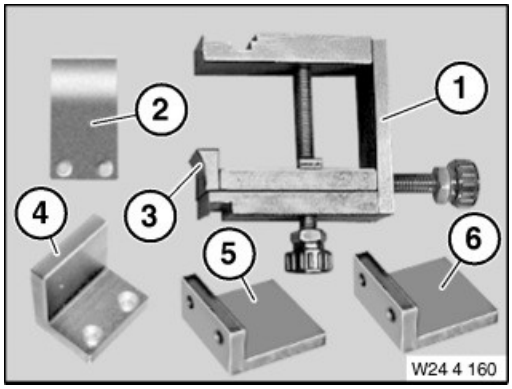


Common	Used in step 2730
Usage	For turning over engine at crankshaft hub (vibration absorber) when adjusting valve timing
Included in the tool or work	
Storage location	B2
Replaced by	
In connection with	
SI-Number	01 11 98 (338)

0 494 451 (24 4 160) Holder

Used in step 2730

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Common

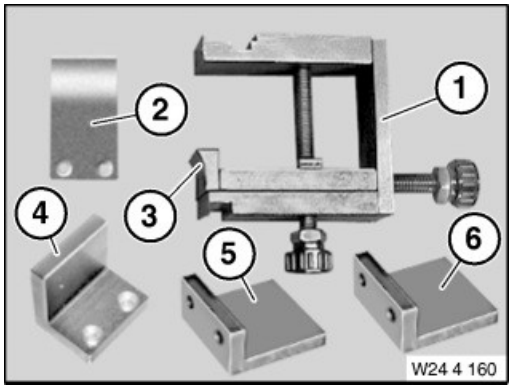
Usage	For securing converter during removal and installation of transmission
Included in the tool or work	
Storage location	B45
Replaced by	
In connection with	
SI-Number	01 11 02 (908)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
2	0 494 479 (24 4 162)		**Shaped element** For converter version N73 discontinued, available as part of set of special tools only	
5	0 494 965 (24 4 165)		**Shaped element** Transmission: GA6 HP19 in E87, E90 Discontinued, available as part of set of special tools only	
3	0 494 477 (24 4 163)		**Shaped element** For converter version M57TU discontinued, available as part of set of special tools only	
1	0 494 478 (24 4 161)		**Basic body**	
4	0 494 622 (24 4 164)		**Shaped element** For converter version M54 discontinued, available as part of set of special tools only	
6	0 496 061 (24 4 166)		**Shaped element** Transmission: GA6L45R (GM6) in E83 / N52K Discontinued, available as part of set of special tools only	

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0 494 622 (24 4 164) Shaped element



Common Used in step 27

Usage	For converter variant M54 Deletion, only available via tool set
Included in the tool or work	0 494 451
Storage location	C46
Replaced by	
In connection with	
SI-Number	

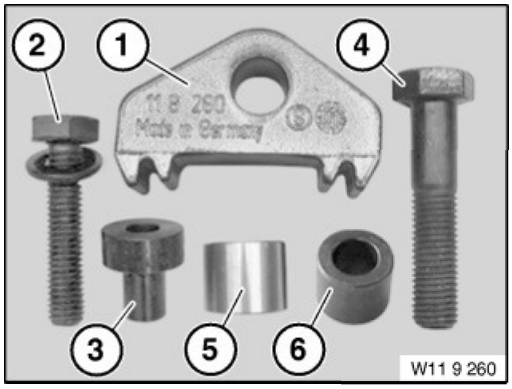
0 494 213 (24 2 390) Cap



Common Used in step 2730

Usage	(protective cap) For sealing off the guide sleeve of the transmission connector
Included in the tool or work	
Storage location	C49
Replaced by	
In connection with	
SI-Number	01 14 01 (766)

0 493 938 (11 9 260) Holder



Common Used in step 2829

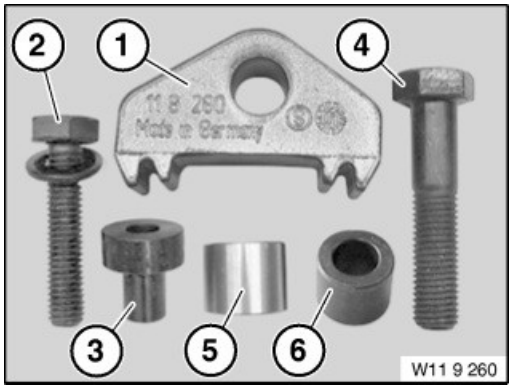
Usage	(Counter support with screw connection) For holding the flywheel when gearbox is removed
Included in the tool or work	
Storage location	A44
Replaced by	
In connection with	
SI-Number	01 01 01 (662)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
1	0 494 034 (11 9 261)		**Holder** (Individual counter support)	
2	0 494 035 (11 9 262)		**Screw** (Bolt (thread M10) with washer) For screwing counter support	
3	0 494 129 (11 9 263)		**Bush** (Bush for counter support) For counter support, for retaining flywheel when gearbox is removed Engine: N62, N73	
6	0 495 216 (11 9 266)		**Bush** For counter support, for retaining flywheel when gearbox is removed Engine: M57TU2	
4	0 494 130 (11 9 264)		**Screw** (Bolt (thread M12)) For counter support for retaining flywheel when gearbox is removed	
5	0 494 793 (11 9 265)		**Bush**	

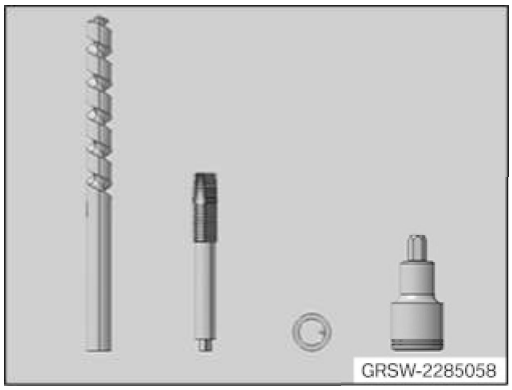
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0 494 130 (11 9 264) Screw



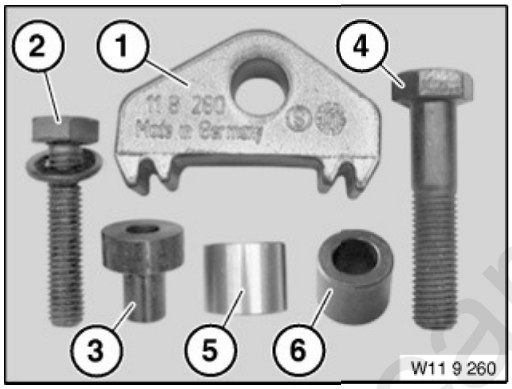
Common	Used in step 2829
Usage	(Bolt (thread M12)) For counter support for retaining flywheel when gearbox is removed
Included in the tool or work	0 493 938
Storage location	A44
Replaced by	
In connection with	
SI-Number	

2 285 058 Tool set



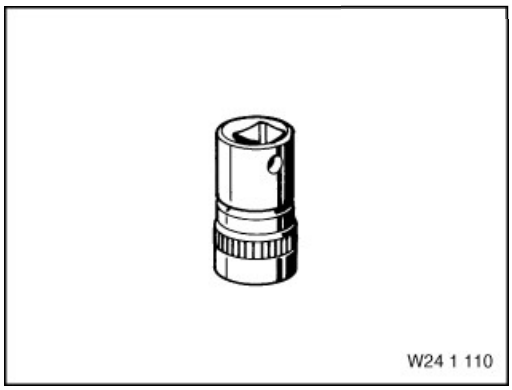
Common	Used in step 29
Usage	
Included in the tool or work	
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 02 14 (069)

0 494 034 (11 9 261) Holder



Common	Used in step 29
Usage	(Individual counter support)
Included in the tool or work	0 493 938
Storage location	
Replaced by	
In connection with	
SI-Number	

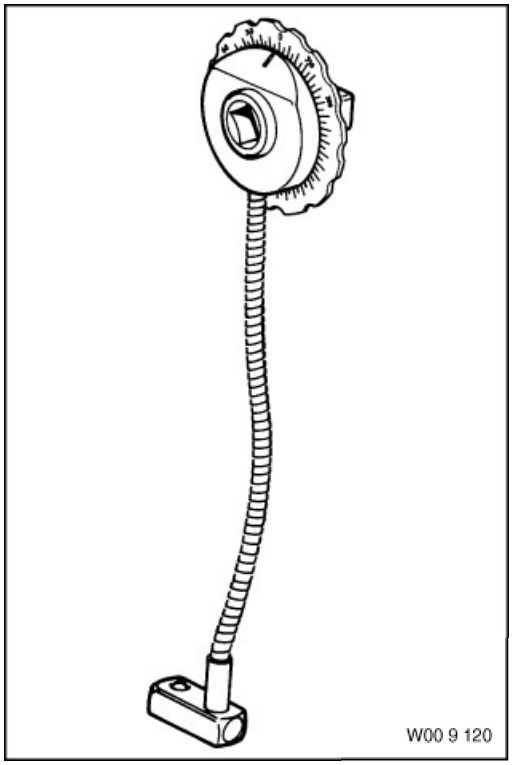
0 491 667 (24 1 110) Socket wrench insert



Common	Used in step 30
Usage	Loosening and fastening the converter fastener
Included in the tool or work	
Storage location	A14
Replaced by	
In connection with	
SI-Number	01 04 86 (566)

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0 490 504 (00 9 120) Torque angle measuring dial



Common	Used in step 37
Usage	For torsion angle adjustment of cylinder head bolts (all engines) And reinforcement plate front axle support E46
Included in the tool or work	
Storage location	A4
Replaced by	
In connection with	
SI-Number	

2 405 614 Socket wrench



Common	Used in step 53
Usage	For opening and closing the oil filler plug. Contour-graphic silhouette foil is included in delivery specification. Further information on the contour-graphic silhouette foil can be found in service information 00 22 13 (969). Replaced by 2455997
Included in the tool or work	
Storage location	
Replaced by	
In connection with	
SI-Number	01 33 15 (305)

Overview Technical Data

GA8HP51Z transmission capacity Used in step 53

	min. 9,28 l

Transmission oil: Automatic transmission fluid ATF 3+

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GA8HP76Z transmission capacity	Used in step 53
	min. 9,35 l

Transmission oil: Automatic transmission fluid ATF 3+

Screw-in depth of thread cutter	Used in step 29
Screw-in depth	18 mm

Links

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	152
61 20 900 Disconnecting and connecting battery earth lead	152
61 20 900 Disconnecting and connecting battery earth lead	152
61 20 900 Disconnecting and connecting battery earth lead	152
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61 20 900 Disconnecting and connecting battery earth lead	152
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	152
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	152
61 20 900 Disconnecting and connecting battery earth lead	152
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	152
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	152
61 20 900 Disconnecting and connecting battery earth lead	152
61 20 900 Disconnecting and connecting battery earth lead	152
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	152
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61 20 900 Disconnecting and connecting battery earth lead	152
61 35 ... Notes on ESD protection (Electro Static Discharge)	18
17 11 035 Removing and installing/replacing fan cowl with electric fan	27

Operating materials	Used in step
14.0 Automatic transmission fluid for ZF-transmission GA8HP45Z / GA8HP50Z / GA8HP70Z / GA8HP90Z / GA8P70H / GA8P75H / GA8HP75Z	53

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11 23 010 Removing and installing/replacing vibration damper

WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Detach battery earth lead from battery.
- For additional 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.

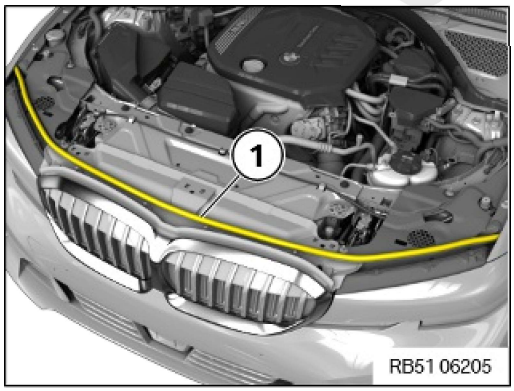
PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

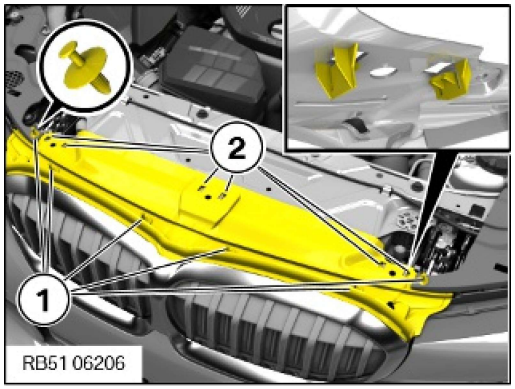
2 – Remove the seal for the bonnet in front



- Pull off front bonnet seal (1) upwards.

3 – Removing the centre engine compartment cover

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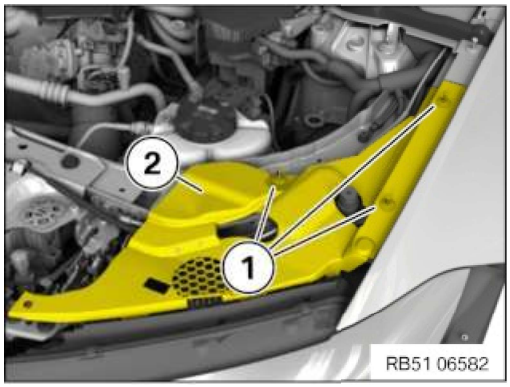
- Detach all expanding rivets (1).
- Release the cover of the centre engine compartment with the latch mechanisms (2) .
- Feed the cover for the centre engine compartment out to the rear.

4 – Partially remove the top left and right cover in the engine compartment

NOTICE

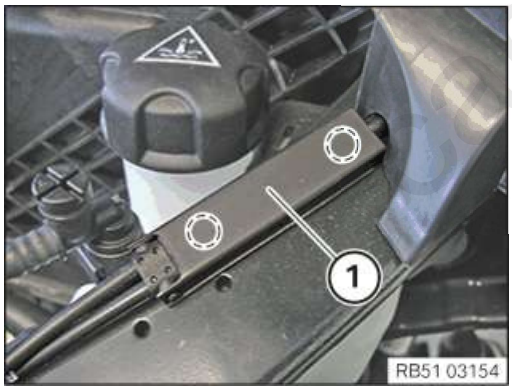
Description is for left component only. Procedure on the right side is identical.

▸ **Removing the cover in the engine compartment on top partially**

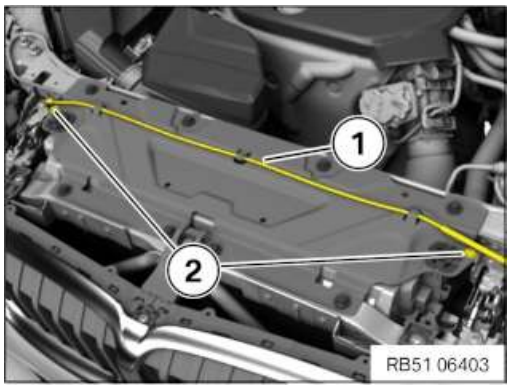


- Loosen the expanding rivet (1).
- Remove the cover in the engine compartment on top (2) partially.

5 – Removing the top cross connection

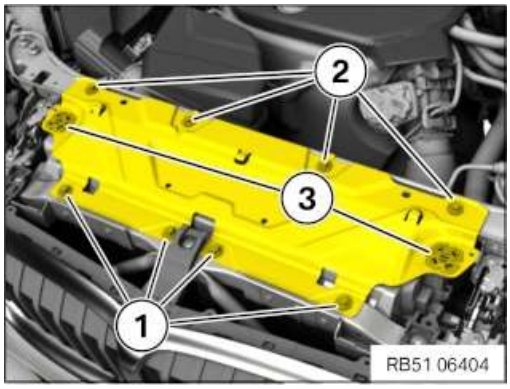


- Release the housing for the coupling of the Bowden cables (1) from the body.



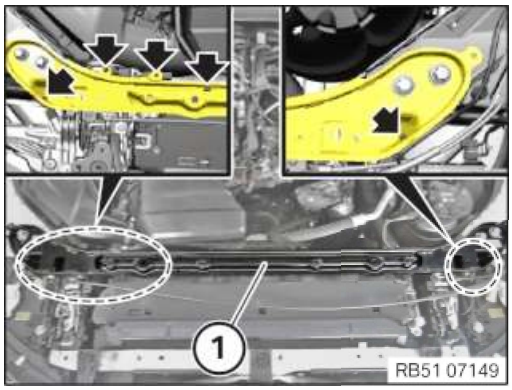
- Detach Bowden cable (1) at the top cross connection.
- Loosen screws (2).

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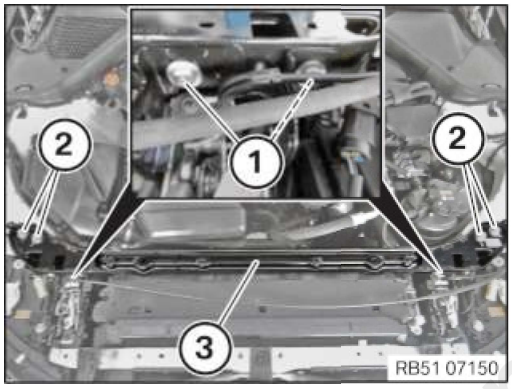


- Loosen screws (1) and (2).
- Remove the top cross connection with the holders(3) towards the top.

6 – Remove the rear top cross connection



- Release the clips (arrows) in the marked areas from the top rear cross connection (1).

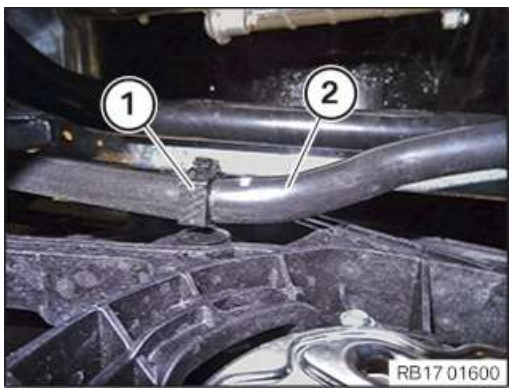


- Loosen screws (1).
- Loosen screws (2).
- Guide out and remove top rear cross connection (3).

7 – Remove fan cowl.

TECHNICAL INFORMATION

- When the engine is stopped after the end of the journey, it may be necessary to run the electric fan. In rare cases, operation of the electric fan can last up to 11 min. This protects the components. In this case, replacing the electric fan will not remedy the problem!

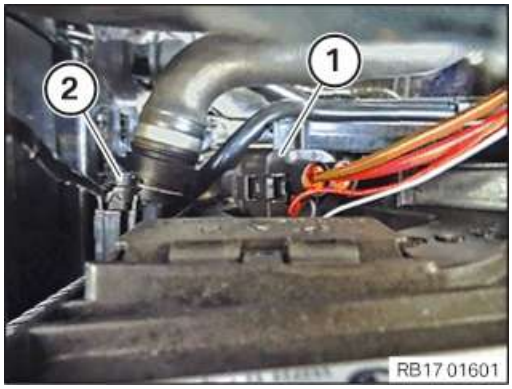


- **If installed:** Release transmission oil line (2).

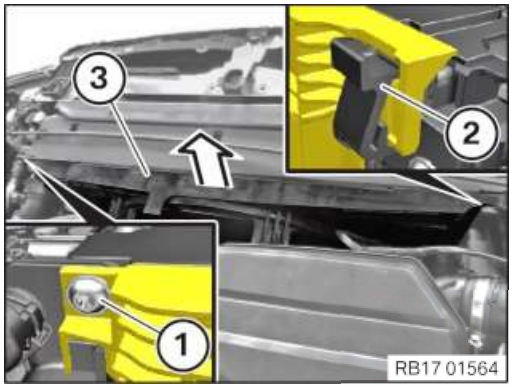
  Unlock the holder (1).

  Thread out transmission oil line (2) and set aside.

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- Unlock plug connection (1) and disconnect.
- Unlock plug connection (2) and disconnect.



- Loosen screw (1).
- Unlock lock (2).
- Guide out and remove fan cowl (3) **carefully** in the direction of the arrow.

8 – 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

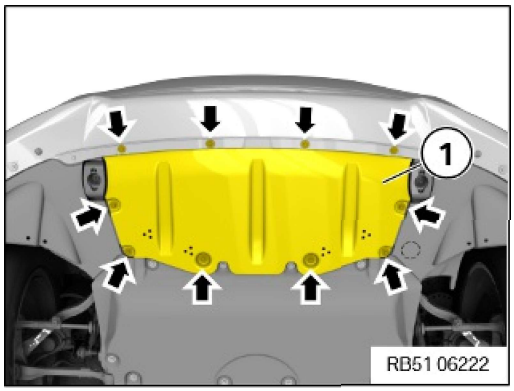
The drive belt must be replaced if contaminated with coolant- and oil residues.

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- Increase the preload on the belt tensioner in **the direction of the arrow** using standard tools (1).
- Secure the belt tensioner with the special tool 0 496 268 (11 0 390).
- Guide out the drive belt for the alternator (2) and remove it.

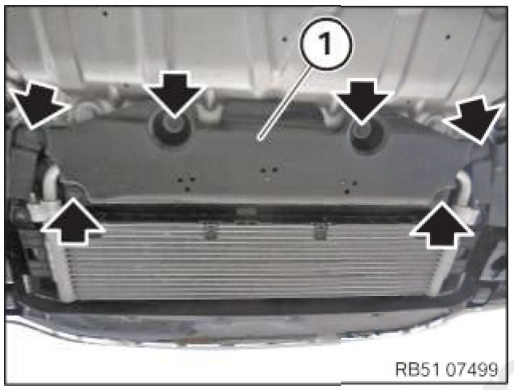
9 – Removing the front underbody protection



- **Version 1:**

  Remove screws (arrows).

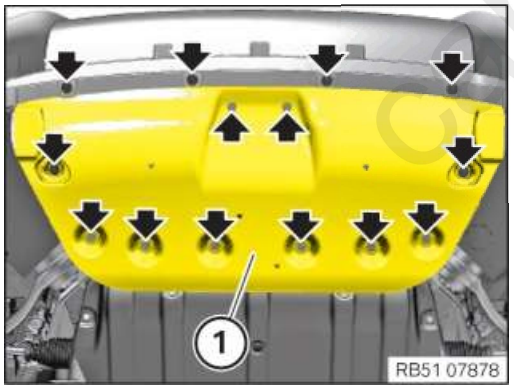
  Feed front underbody protection (1) backwards out of the bumper panel.



- **Version 2:**

  Remove screws (arrows).

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



- **Version 3:**

  Remove screws (arrows).

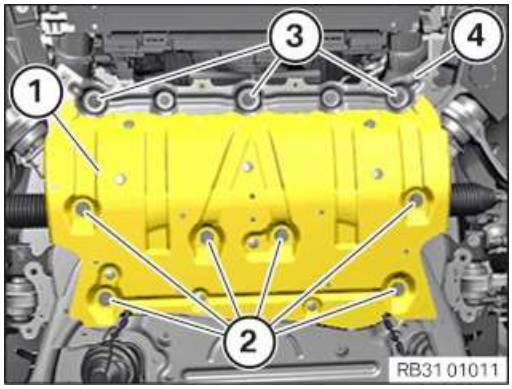
  Guide out front underbody protection (1) and remove it.

10 – Removing the stiffening plate

TECHNICAL INFORMATION

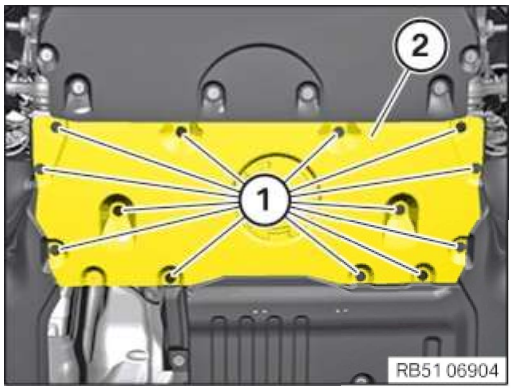
Driving without stiffening plate is not permissible.

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- Loosen screws (3).
- Remove the holder of the underride protection (4).
- Loosen screws (2).
- Remove stiffening plate (1).

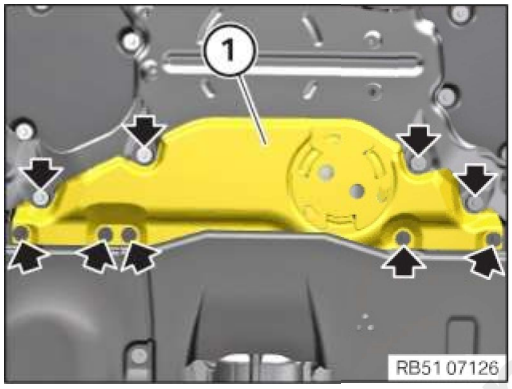
11 – Removing the centre underbody protection



- **Version with rear-wheel drive:**

  Loosen screws (1).

  Remove centre underbody protection (2) .

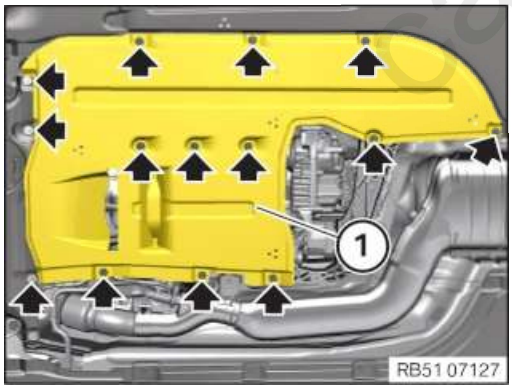


- **Version with all-wheel drive:**

  Remove screws (arrows).

  Feed out and remove the centre underbody protection (1).

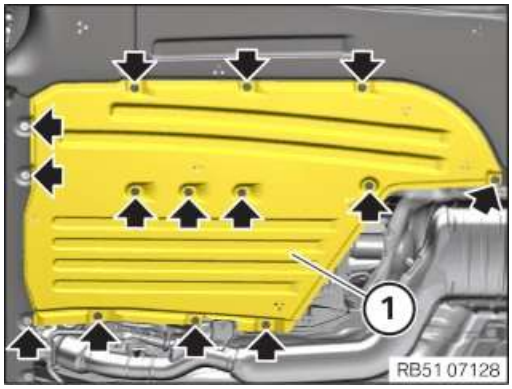
12 – Remove rear underbody protection



- **Version 1:**

  Remove screws (arrows).

  Feed out the rear underbody protection (1).



- **Version 2:**

  Remove screws (arrows).

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

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13 – Removing starter motor

WARNING

Hot surfaces.

Risk of burning!

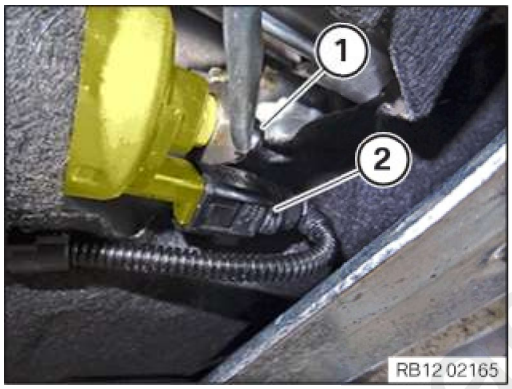
- Perform all work only on components that have cooled down.

RISK OF DAMAGE

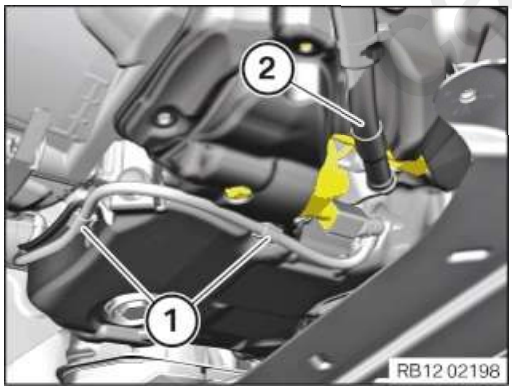
Electrostatic discharge.

Damage to or destruction of electrical components.

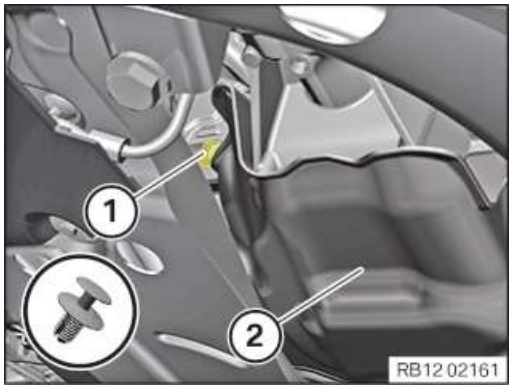
- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the 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 Information on electrostatic discharge (ESD) protection.



- Loosen nut (1).
- Unlock plug connection (2) and disconnect.

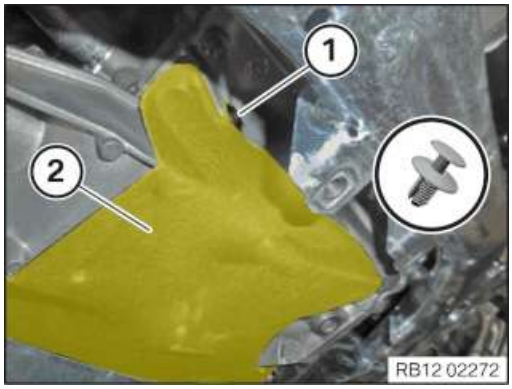


- Loosen clamps (1).
- Feed out positive battery cable (2) and put to one side.

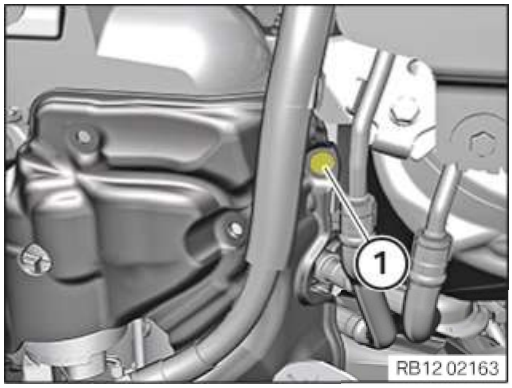


- Release the expanding rivet (1) for the acoustic cover (2) for oil sump.

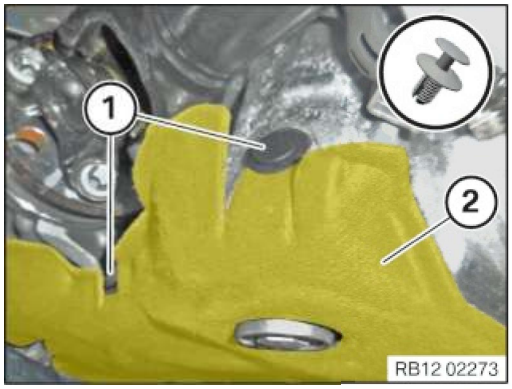
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- Loosen expanding rivet (1).



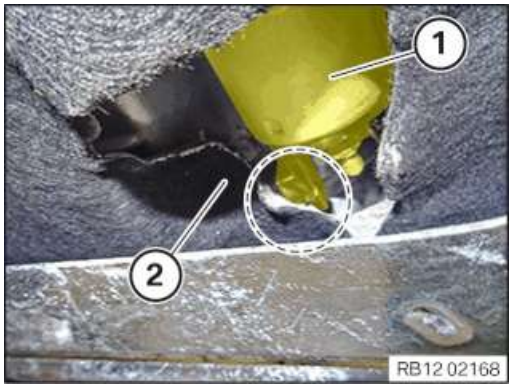
- Undo fir tree clip (1).



- Loosen the expanding rivet (1).
- Release acoustic cover (2) for the oil sump and store it below.



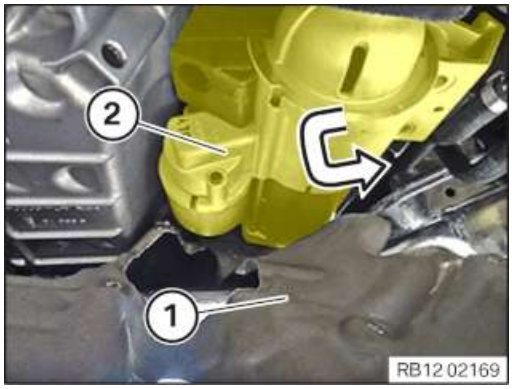
- Loosen screws (1).



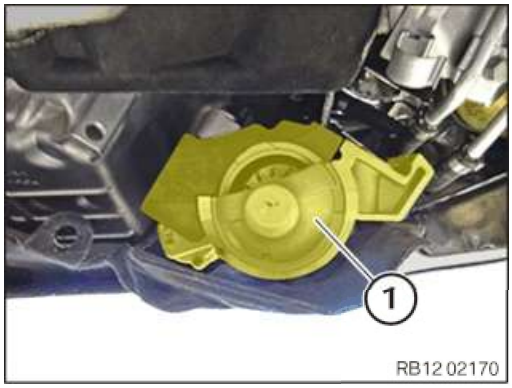
- Position the starter (1) **carefully** in the marked area above the acoustic cover (2) as shown.

  An evaluation cannot be performed without positioning the starter.

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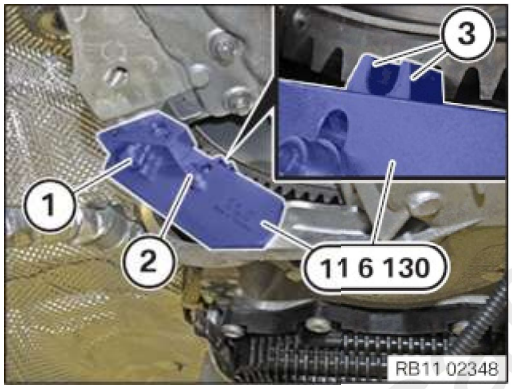
- Make sure that the acoustic cover (1) **is not damaged.**
- Carefully fold the acoustic cover (1) down.
- Feed out the starter (2) **carefully** in the direction of arrow to the rear and below.



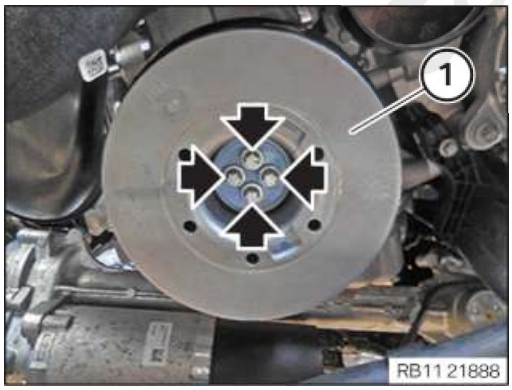
- Remove starter motor (1).

MAIN WORK

14 – Removing the vibration damper



- Position special tool 0 496 595 (11 6 130) and fasten with screw (1).
- Slide counter support on the bolt (2) in direction of flywheel and turn the engine on the vibration damper until the gearing (3) engages in the flywheel.
- Tighten the bolt (2).



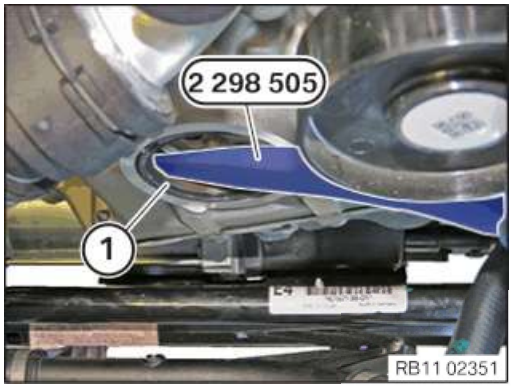
- Remove screws (arrows).
- Pull vibration damper (1) out upwards and remove.

15 – Renewing the front crankshaft seal

▸ **Removing the front crankshaft seal**

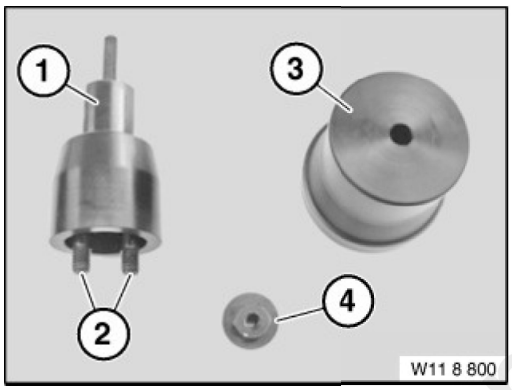


- Drive in the crankshaft seal (1) in the marked area with a punch to approx. 1 cm deep.



- Lever out the crankshaft seal (1) with the special tool 2 298 505.
- Make sure that the sealing surface on the crankcase is **not** scratched.

▸ **Installing the front crankshaft seal**

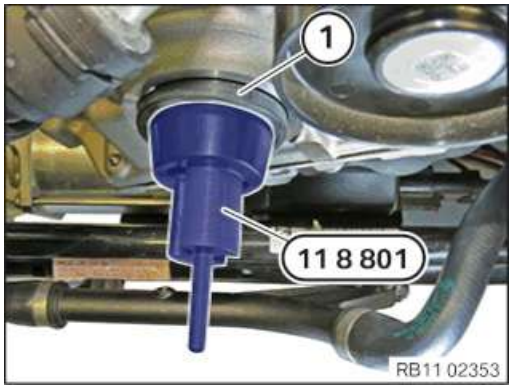


- Prepare special tool 0 496 130 (11 8 803).



- Clean the special tool 0 496 128 (11 8 801) from the set of special tools 0 496 127 (11 8 800) and coat it with fresh engine oil.
- Secure special tool 0 496 128 (11 8 801) using special tool 0 496 129 (11 8 802) from the set of special tools 0 496 127 (11 8 800) to the crankshaft.

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RISK OF DAMAGE

Radial shaft seal damage.

Touching the sealing lip (inner) and applying oil to the radial shaft seal will lead to its destruction.

- Do not touch the sealing lip (inner) of the radial shaft seal.
- Do not apply oil to the radial shaft seal.
- Install the radial shaft seal dry.

- Carefully slide crankshaft sealing ring (1) straight **in a rotational movement** onto special tool 0 496 128 (11 8 801) from the set of special tools 0 496 127 (11 8 800) until the crankshaft sealing ring (1) rests against the crankcase.



- Mount special tool 0 496 130 (11 8 803) on special tool 0 496 128 (11 8 801) from the set of special tools0 496 127 (11 8 800) in the direction of the arrow.



- Screw in special tool (sleeve) 0 496 130 (11 8 803) using special tool 0 496 131 (11 8 804) from the set of special tools 0 496 127 (11 8 800) and a suitable tool until the sleeve rests flush against crankcase (1).



- Release and remove special tool 0 496 131 (11 8 804).

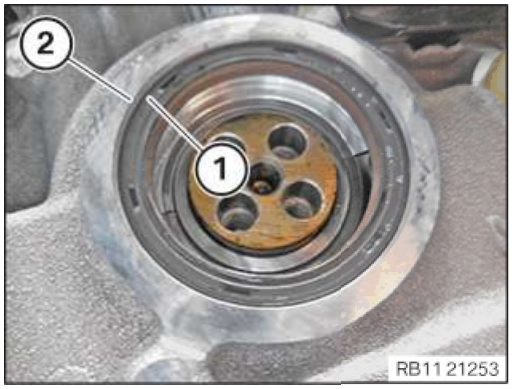
mdiag.com



- Guide out and remove special tool 0 496 130 (11 8 803) in the direction of the arrow from special tool 0 496 128 (11 8 801) from the set of special tools 0 496 127 (11 8 800).



- Release special tool 0 496 129 (11 8 802).
- Guide out and remove special tool 0 496 128 (11 8 801) I 0 496 129 (11 8 802) on the crankshaft.



- Ensure that crankshaft sealing ring (1) is fitted correctly on crankcase (2).

16 – Installing the vibration damper

RISK OF DAMAGE

Radial shaft seal damage.

When installing the vibration damper, the rotary shaft seal can be damaged.

- The special tool must be used to install the vibration damper.

TECHNICAL INFORMATION

When removing and installing or replacing the vibration damper, the rotary shaft seal must be replaced.

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- Clean the sealing surface (1) from oil and contamination.



- Screw special tool 2 466 729 into the crankshaft by hand.

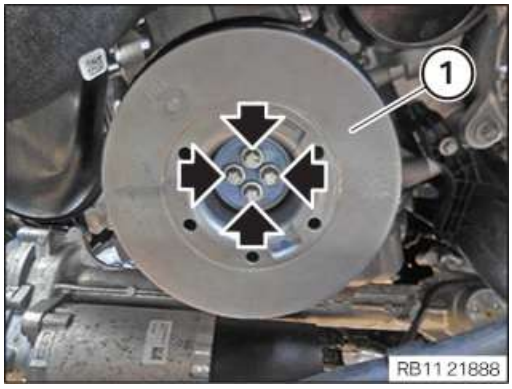


- Insert vibration damper (1) into the special tool 2 466 729 and install.



- Replace screws (arrows).

  Parts: Bolts
- Hand-tighten the bolt (1).
- Guide the special tool 2 466 729 out and remove.

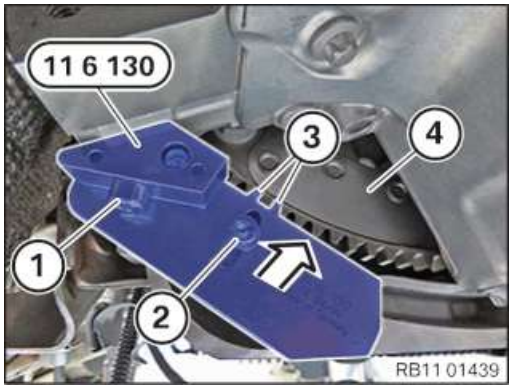


- Tighten screws (arrows).

Vibration damper to crankshaft

M10 x 65	Renew screws.	Jointing torque	40 Nm
		Angle of rotation	120 °

rdiagn.com



- Loosen screw (2).
- Slide the counter support with the bolt (2) down until the teeth (3) are no longer engaged in the gearing of the flywheel (4).
- Release the screw (1) and feed out and remove special tool 0 496 595 (11 6 130).

POSTPROCESSES

17 – Installing the drive belt for alternator

Overview of drive belt for alternator



1. 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.



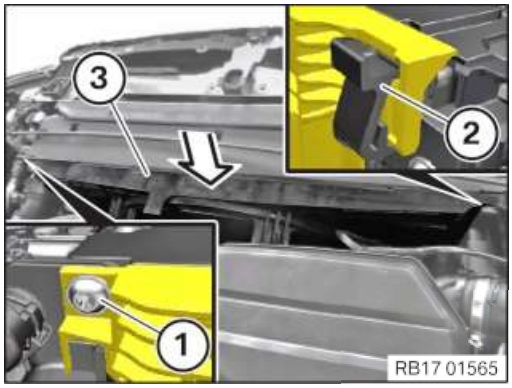
- Position the drive belt for alternator (2) on the ancillary components.
- Increase the preload on the belt tensioner in **the direction of the arrow** using standard tools (1).
- Feed the special tool 0 496 268 (11 0 390) out of the belt tensioner and remove it.

18 – Install fan cowl

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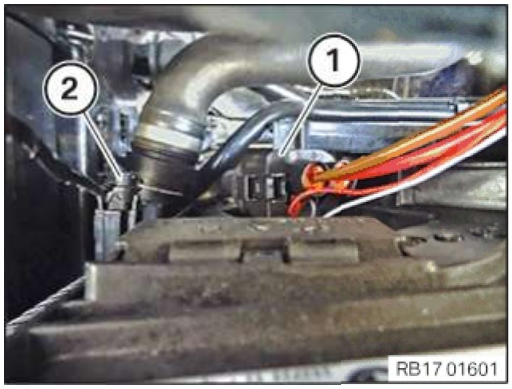
- Feed guides (1) into the radiator.
- Feed guides (2) into the charge air cooler.



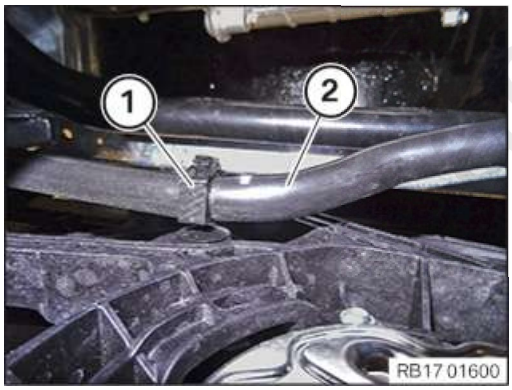
- Guide in and install fan cowl (3) **carefully** in the direction of the arrow.
- Ensure that the lock (2)engages audibly.
- Tighten down screw (1).

Fan cowl with electric fan on radiator

TS6x20		Tightening torque	6,5 Nm



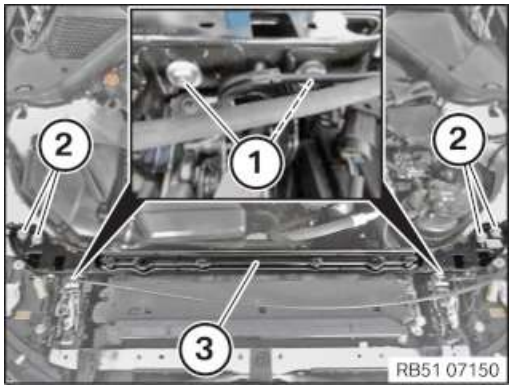
- Connect connectors (2) and lock.
  The connector (2) must engage audibly.
- Connect connectors (1) and lock.
  The connector (1) must engage audibly.



- **If installed:** Secure the transmission oil line (2).
  Insert and install the transmission oil line (2).
  Lock holder (1).

19 – Install the rear top cross connection

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- Guide in and position the top rear cross connection (3).
- Tighten the screws (1).

Top rear cross connection to bonnet catch support

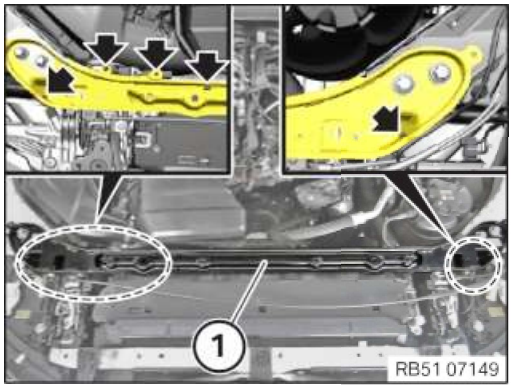
Flat-head screw M6x20		Tightening torque	11,8 Nm

- Renew screws (2).

  Parts: Bolts
- Tighten the screws (2).

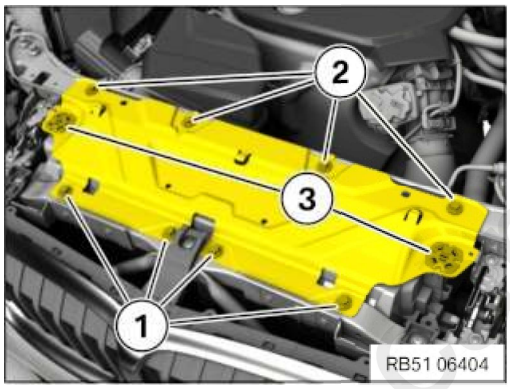
Rear top cross connection to wheel arch carrier support

M10x20 screw	Renew screw.	Jointing torque	56 Nm
		Angle of rotation	90 °



- Secure the clips (arrows) in the marked areas to the top rear cross connection (1).

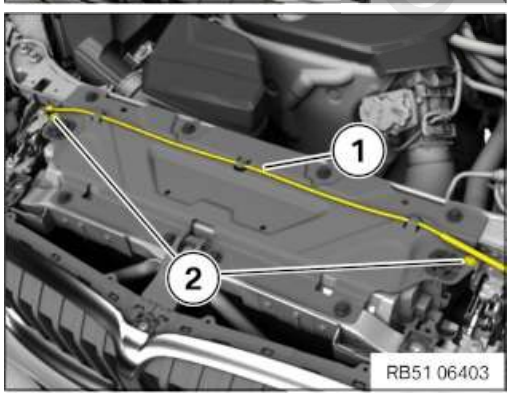
20 – Installing the top cross connection



- Set and position upper cross connection with holders (3) from above.
- Tighten down screws (1) and (2).

Cross connection, top

M8x20		Tightening torque	28 Nm



- Tighten down screws (2).

Cross connection, top

M6x20		Tightening torque	11,8 Nm

- Attach Bowden cable (1) on the upper cross connection.

autodiagn.com



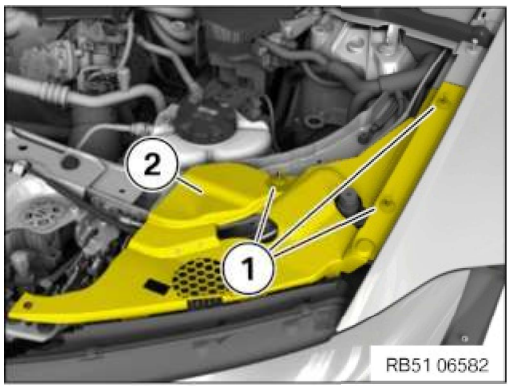
- Clip in the housing for the coupling of the Bowden cables (1).

21 – Install the cover in the engine compartment at top left and right partially

NOTICE

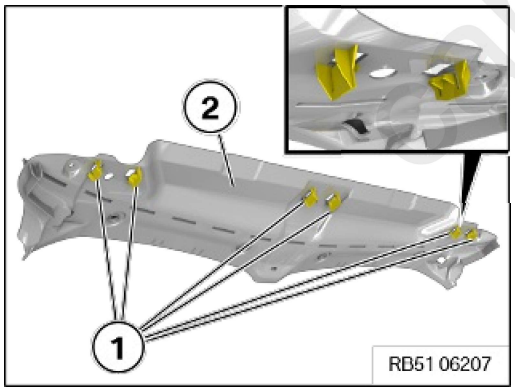
Description is for left component only. Procedure on the right side is identical.

▸ **Installing the cover in the engine compartment on top partially**



- Install the cover in the engine compartment on top (2).
- Secure expanding rivet (1).

22 – Installing cover for engine compartment centre



Check

- Check latch mechanisms (1) of cover for engine compartment centre (2) for damage.

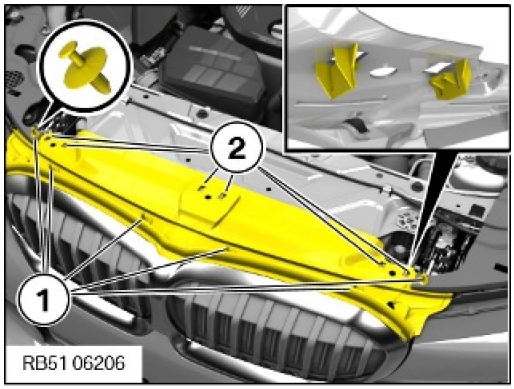
Result

» The latch mechanism (1) is damaged.

Measure

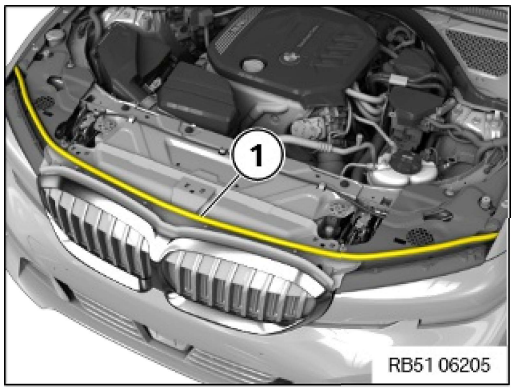
- Renew cover for engine compartment centre (2).

carldiagn.com



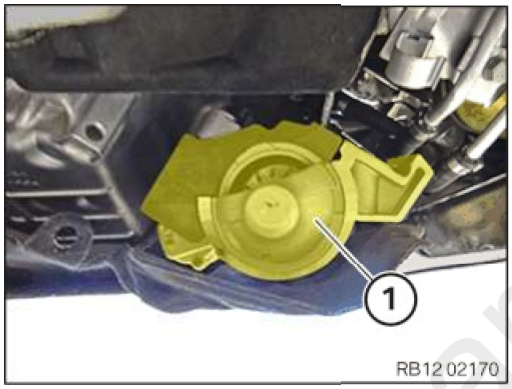
- Guide in the cover for the engine compartment centre from the rear and position it.
- Clip in the cover for the engine compartment centre with latch mechanisms (2).
- Mount all expanding rivets (1).

23 – Install the seal for the front bonnet

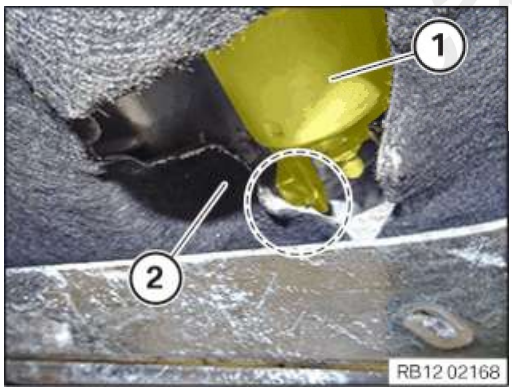


- Position the bonnet seal(1) and connect it on the mounting on the bumper and on the headlights.

24 – Installing starter motor

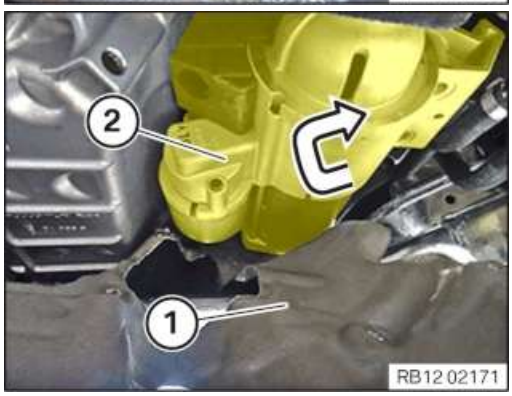


- Guide in the starter motor (1).



- Position the starter motor (1) carefully in the marked area over the acoustic cover (2) as shown.

  An installation cannot be performed without positioning the starter motor.



- Make sure that the acoustic cover (1) **is not damaged.**
- Fold the acoustic cover (1) **carefully** downwards.
- Install and position the starter motor (2) in direction of arrow.

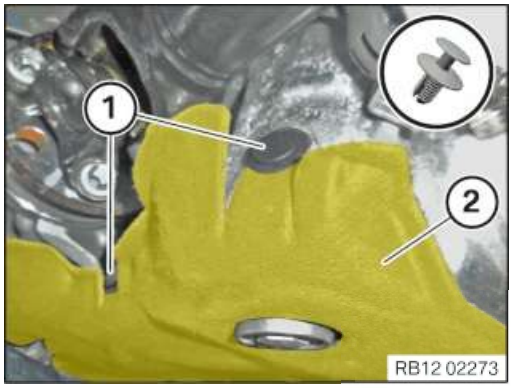
ardiagn.com



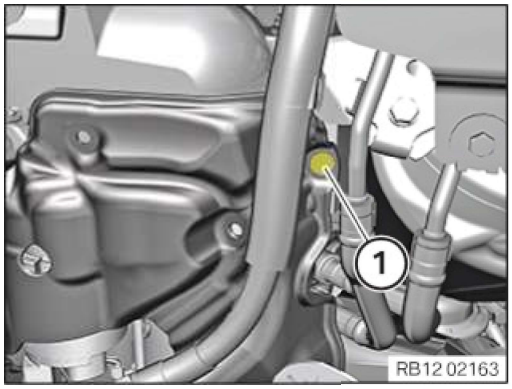
- Tighten the screws (1).

Starter motor to engine

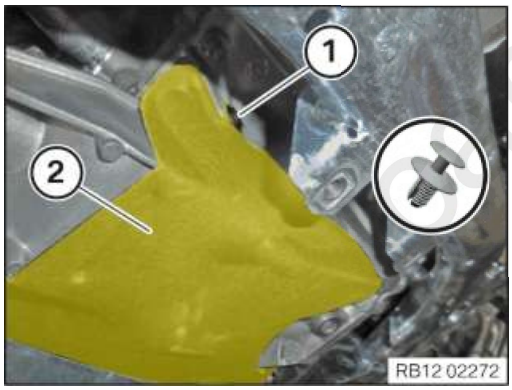
M8X60		Tightening torque	19 Nm



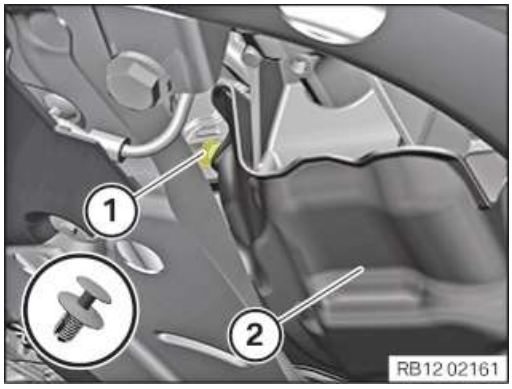
- Position the acoustic cover (2).
- Secure expanding rivet (1).



- Secure fir tree clip (1).

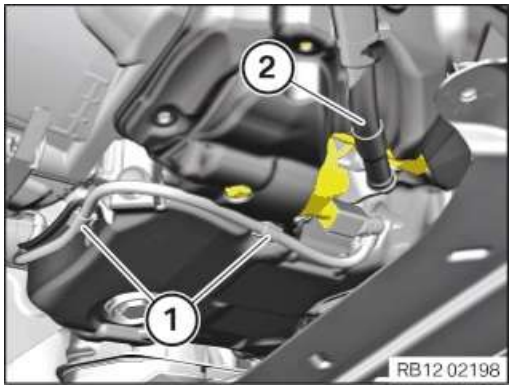


- Fasten expanding rivet (1).

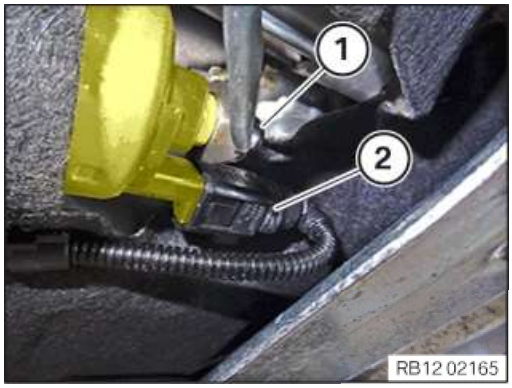


- Fasten expanding rivet (1).

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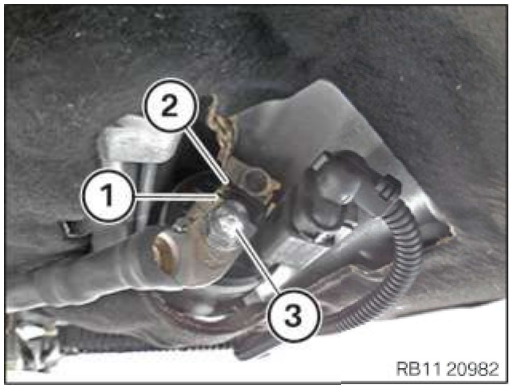


- Insert and position the positive battery cable (2).
- Secure clamps (1).



- Connect connectors (2) and lock.

  The connector (2) must engage audibly.
- Tighten the nut (1) hand-tight.



CAUTION

Improper routing of the positive battery cable.

Risk of short circuits!

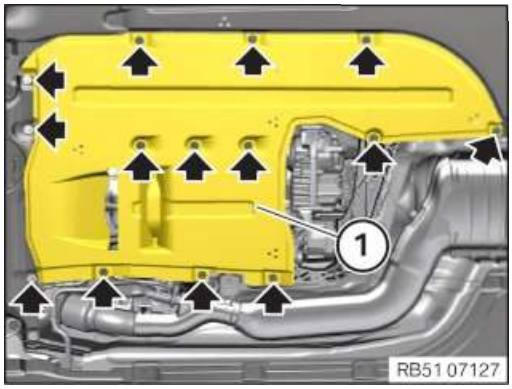
- Route the positive battery cable without abrasions and do not trap.

- Attach positive battery cable (1) **correctly** to anti-twist lock (2).
- Tighten nut (3).

Battery positive lead to starter

M8		Tightening torque	13,5 Nm

25 – Installing underbody protection at rear



- **Version 1:**

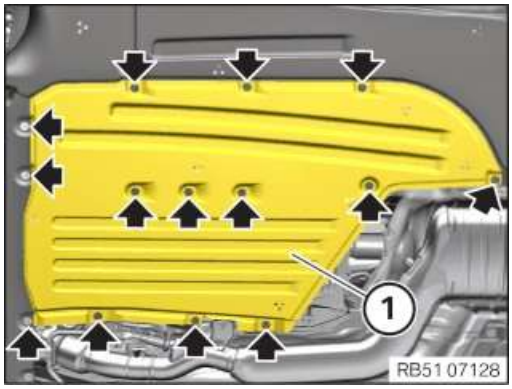
  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

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- **Version 2:**

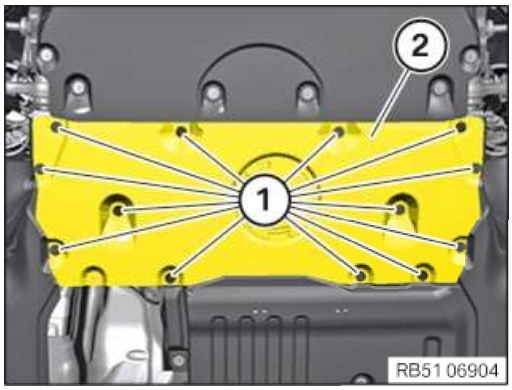
  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

26 – Installing the centre underbody protection



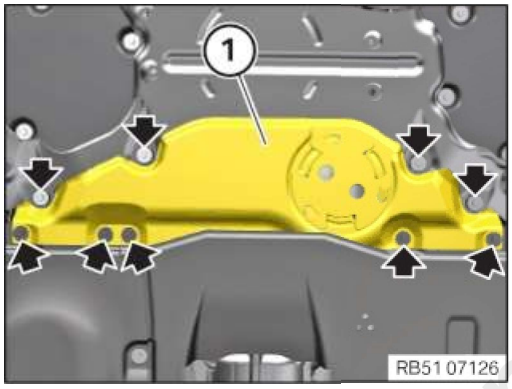
- **Version with rear-wheel drive:**

  Position central underbody protection (2).

  Tighten the screws (1).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



- **Version with all-wheel drive:**

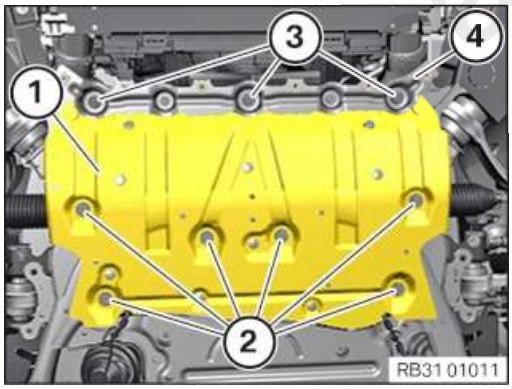
  Guide in and install the centre of underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

27 – Installing the stiffening plate

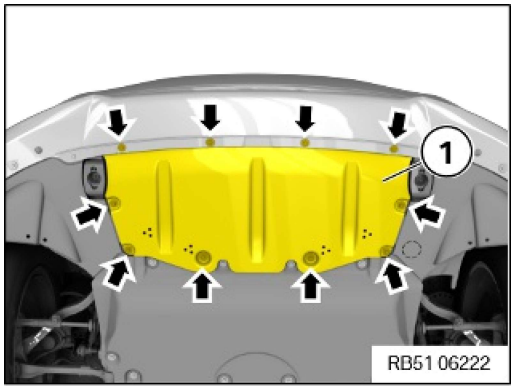


- Position stiffening plate (1).
- Screw screws (2) in.
- Position holder of underride protection (4).
- Screw screws (3) in.
- Tighten down screws (2) and (3).

Stiffening plate to front axle support

M10		Tightening torque	56 Nm

28 – Installing the front underbody protection



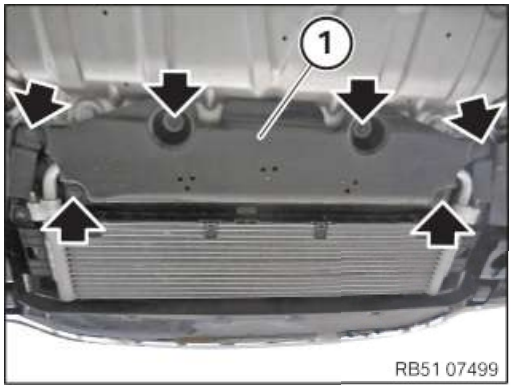
- **Version 1:**

  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



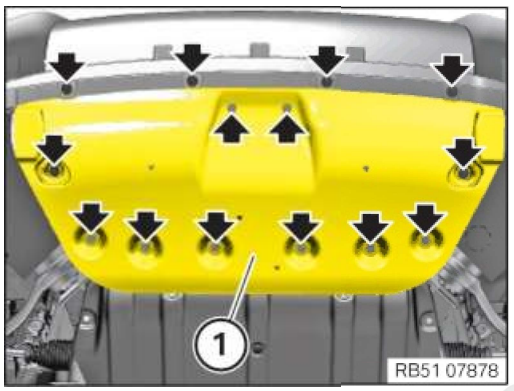
- **Version 2:**

  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 3:**

  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

29 – Disconnecting all battery earth leads



- See additional information.

30 – Check engine oil level

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- Park vehicle on a horizontal surface.
- In the case of automatic transmission, shift to selector lever position N or P.
- Accelerator pedal is not pressed.
- Engine is running and is at operating temperature.
- Read off the engine oil level in the instrument cluster (KOMBI) or on the control display.
- Top up engine oil if necessary.

Additional Information

Overview of Tightening Torques

Vibration damper to crankshaft — Used in step 16

M10 x 65	Renew screws.	Jointing torque	40 Nm
		Angle of rotation	120 °

Fan cowl with electric fan on radiator — Used in step 18

TS6x20		Tightening torque	6,5 Nm

Top rear cross connection to bonnet catch support — Used in step 19

Flat-head screw M6x20		Tightening torque	11,8 Nm

Rear top cross connection to wheel arch carrier support — Used in step 19

M10x20 screw	Renew screw.	Jointing torque	56 Nm
		Angle of rotation	90 °

Cross connection, top — Used in step 20

M8x20		Tightening torque	28 Nm

Cross connection, top — Used in step 20

M6x20		Tightening torque	11,8 Nm

Starter motor to engine — Used in step 24

M8X60		Tightening torque	19 Nm

Battery positive lead to starter — Used in step 24

M8		Tightening torque	13,5 Nm

Underbody protection — Used in step 2526

Hexagon screw		Tightening torque	3 Nm

Stiffening plate to front axle support — Used in step 27

M10		Tightening torque	56 Nm

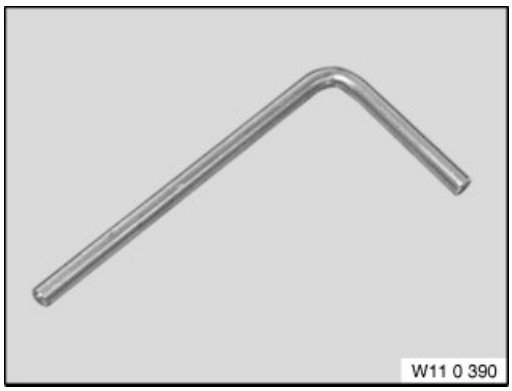
Underbody protection front — Used in step 28

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

Overview of Special Tools

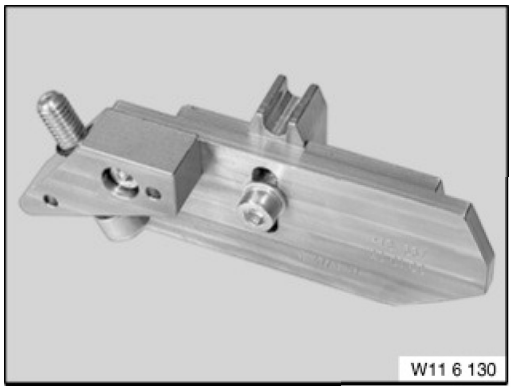
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0 496 268 (11 0 390) Pin



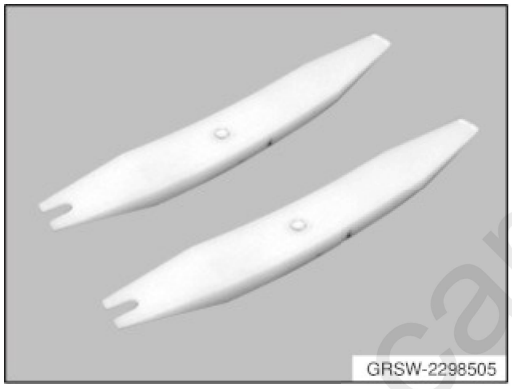
Common	Used in step 817
Usage	(roll pin) For securing new tensioning pulley (poly-V belt)
Included in the tool or work	
Storage location	B24
Replaced by	
In connection with	
SI-Number	01 15 07 (390)

0 496 595 (11 6 130) Holder



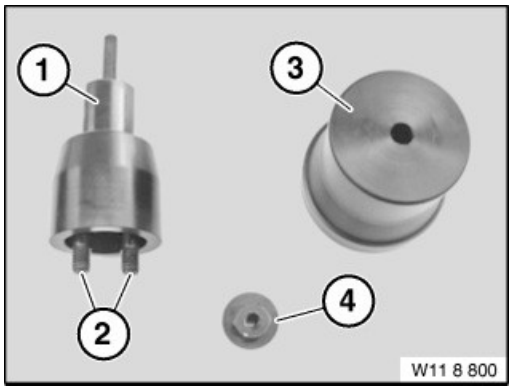
Common	Used in step 1416
Usage	(counter support) For securing flywheel when releasing and tightening down screw connection of vibration absorber. Series: E90, E91, E92 with 4WD.
Included in the tool or work	
Storage location	B26
Replaced by	
In connection with	
SI-Number	01 05 09 (519)

2 298 505 Wedge



Common	Used in step 15
Usage	Set (delivery of 2 pieces)
Included in the tool or work	
Storage location	C34
Replaced by	
In connection with	
SI-Number	01 03 12 (792)

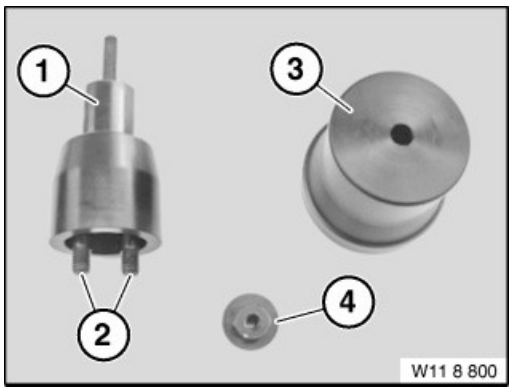
0 496 130 (11 8 803) Holding sleeve



Common	Used in step 15
Usage	(Thrust piece) sale of existing inventory and then available as part of complete tool set 11 8 800 = 83 30 0 496 127 only - as of 30.11.2011
Included in the tool or work	0 496 127
Storage location	
Replaced by	
In connection with	
SI-Number	01 05 07 (353)

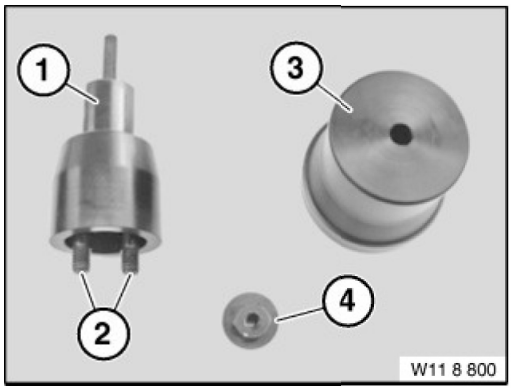
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0 496 128 (11 8 801) Basic body



Common	Used in step 15
Usage	Available only as a complete tool set 11 8 800 = 83 30 0 496 127 - as of 30.11.2011
Included in the tool or work	0 496 127
Storage location	
Replaced by	
In connection with	
SI-Number	01 05 07 (353)

0 496 127 (11 8 800) Device



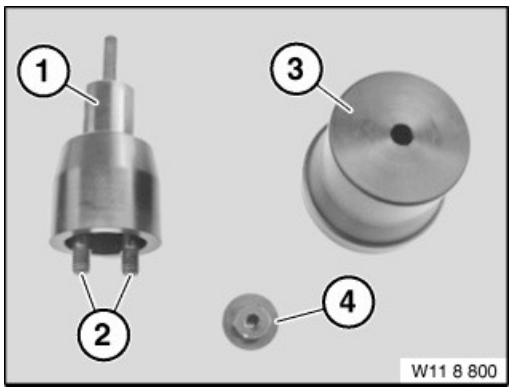
Common	Used in step 15
Usage	(Pulling device) For installing front radial shaft seal.
Included in the tool or work	
Storage location	B23
Replaced by	
In connection with	
SI-Number	01 05 07 (353)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
3	0 496 130 (11 8 803)		**Holding sleeve** (Thrust piece) sale of existing inventory and then available as part of complete tool set 11 8 800 = 83 30 0 496 127 only - as of 30.11.2011	
1	0 496 128 (11 8 801)		**Basic body** Available only as a complete tool set 11 8 800 = 83 30 0 496 127 - as of 30.11.2011	
2	0 496 129 (11 8 802)		**Screw** (Set of screws) Can only be ordered as part of complete tool 11 9 660 = 0495955	
4	0 496 131 (11 8 804)		**Nut** (Nut with collar) available as part of set of tools 11 8 800 = 83 30 0 496 127 only - as of 30.11.2011	

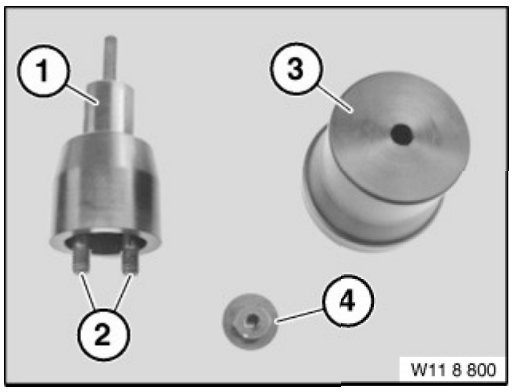
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0 496 129 (11 8 802) Screw



Common	Used in step 15
Usage	(Set of screws) Can only be ordered as part of complete tool 11 9 660 = 0495955
Included in the tool or work	0 496 127
Storage location	
Replaced by	
In connection with	
SI-Number	01 05 07 (353)

0 496 131 (11 8 804) Nut



Common	Used in step 15
Usage	(Nut with collar) available as part of set of tools 11 8 800 = 83 30 0 496 127 only - as of 30.11.2011
Included in the tool or work	0 496 127
Storage location	
Replaced by	
In connection with	
SI-Number	01 05 07 (353)

2 466 729 Fitting aid



Common	Used in step 16
Usage	For the installation of the vibration damper. Engine: B48, B58. Contour-graphic silhouette foil is included in the delivery specification.
Included in the tool or work	
Storage location	B55
Replaced by	
In connection with	
SI-Number	01 07 18 (545)

Overview Technical Data

Links

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	129
61 20 900 Disconnecting and connecting battery earth lead	129
61 20 900 Disconnecting and connecting battery earth lead	129
61 20 900 Disconnecting and connecting battery earth lead	129
61 20 900 Disconnecting and connecting battery earth lead	129
61 20 900 Disconnecting and connecting battery earth lead	129
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	129
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	129
61 20 900 Disconnecting and connecting battery earth lead	129

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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads) 129
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle) 129
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61 20 900 Disconnecting and connecting battery earth lead 129
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61 20 900 Disconnecting and connecting battery earth lead 129
61 20 900 Disconnecting and connecting battery earth lead 129
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads) 129
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61 20 900 Disconnecting and connecting battery earth lead 129
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