23 Transmission designations

Breakdown of BMW designation:

A5S 300J (former designation)		
A	Transmission type	• S = Manual gearbox • A = Automatic transmission
5	Number of forward gears	
S	Type of top gear	• D = Direct gear • S = Overdrive gear
300	Max. input torque (Nm)	
J	Code letter of transmission manufacturer	• G = Getrag • J = Jatco • R = GMPT (General Motors Powertrain) • Z = ZF (Zahnradfabrik Friedrichshafen)
SMG	Notes	SMG = Sequential M gearbox/transmission

GS6-37BZ (new designation according to BMW Group Standard GS 90007)		
G	Transmission	
S	Transmission type	• S = Manual gearbox • A = Automatic transmission
6	Number of forward gears	
-		• - = Standard with manual gearshift • HP = Hydraulic planetary gear • DKG= twin-clutch gearbox
37	Transmission type	• 26 = D-transmission • 31 = C-transmission • 39 = F-transmission • 37 = H-transmission • 53 = G-transmission • 17 = I-transmission • 47= J transmission SMG -7-speed • 45 = K transmission • 36= Transmission DKG
B	Gear set	• B = Petrol gear ratio • D = Diesel gear ratio • S= Sport gear ratio

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Z	Code letter of transmission manufacturer	• G = Getrag • Z = ZF (Zahnradfabrik Friedrichshafen) • A = AISIN

Manual gearbox:

BMW designation	Manufacturer	Manufacturer designation	Remarks
S5D 200G	Getrag	B transmission (220/5)	
S5D 200G	Getrag	B transmission (221/5)	for M41 engine only
S5D 250G	Getrag	B transmission (220/5)	Reinforced version
S5D 260Z	ZF	C-transmission (S5-31 D)	for M51 engine only
S5D 280Z	ZF	C-transmission (S5-31)	
S5D 310Z	ZF	C-transmission (S5-31)	up to 9.95
S5D 320Z	ZF	C-transmission (S5-31)	from 9.95 (reinforced version)
GS5S31BZ (SMG)	ZF	C transmission	SMG
GS5-39DZ	ZF	F transmission	
S6S 420G	Getrag	D-transmission (226/6)	
S6S 420G (SMG)	Getrag	D transmission	SMG
S6S 560G	Getrag	E-transmission (286/6)	
GS6-37BZ	ZF	H-transmission	
GS6S37BZ (SMG)	ZF	H-transmission	
GS6-37DZ	ZF	H-transmission	
GS6-37BG	Getrag	H-transmission	
GS6-53BZ	ZF	G-transmission	
GS6-53DZ	ZF	G-transmission	
GS6-17BG	Getrag	I-transmission	
GS6-17DG	Getrag	I-transmission	
GS7S47BG (SMG)	Getrag	J-transmission (247)	SMG -7-gear
GS7D36SG	Getrag	DKG (436)	DKG -7-gear
GS6- 45BZ	ZF	K transmission	
GS6- 45DZ	ZF	K transmission	
GS6-60DA/BA	AISIN	BG6	

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7DCT300	Getrag	7DCT	DKG -7-gear
GS6-58DG/BG	Getrag		
GS6-59DG/BG	Getrag		

Automatic transmission:

BMW designation	Manufacturer	Manufacturer designation	Remarks
A4S 200R	General Motors Powertrain	GM4	
A4S 270R	General Motors Powertrain	THM-R1w	Transmission wide-stepped
A4S 310R	General Motors Powertrain	THM-R1	
A5S 300J	Jatco	Jatco	
A5S 310Z	ZF	5HP-18	
A5S 325Z	ZF	5HP-19	
A5S 440Z	ZF	5HP-24	
A5S 560Z	ZF	5HP-30	
A5S 360R / 390R	GM	GM5	
GA6F21AW	AISIN	GA6F21AW	
GA6HP19Z	ZF	6HP19	
GA6HP26Z	ZF	6HP26	
GA6HP32Z	ZF	6HP32	
GA6L45R	GM	GM6	
GA6F21AW	AISIN	GA6F21AW	
GA8F22AW	AISIN	GA8F22AW	
GA8G45	AISIN	8G45	
GA8HP45Z	ZF	8HP45	
GA8HP50Z	ZF	8HP50	
GA8HP51Z	ZF	8HP51	
GA8HP70Z	ZF	8HP70	
GA8HP75Z	ZF	8HP75	
GA8HP76Z	ZF	8HP76	
GA8P70H	ZF	8P70	Hybrid
GA8P75H	ZF	8P75	Hybrid
GA8HP90Z	ZF	8HP90	
GA8HP95Z	ZF	8HP95	

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GA7AHSCD	Daimler	AHS-C	Hybrid

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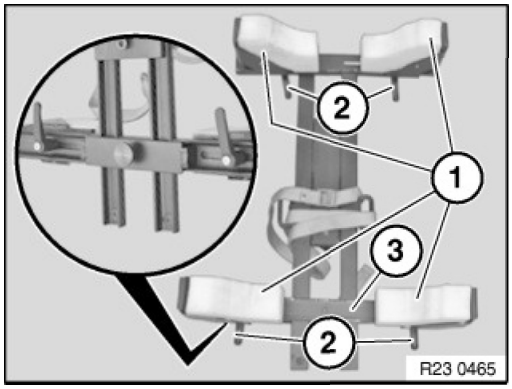
23 ... Universal BMW transmission take-up

Special tools required:

- 00 2 030
- 23 4 050

Note:

- The universal transmission bracket is introduced for the E60 AWD
- Suitable for manual and automatic transmissions

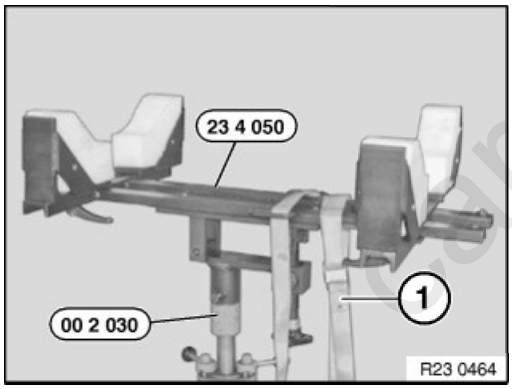


Important!

Front and rear supports (1) can be laterally adjusted by means of screws (2).

Carrier (3) of rear supports (1) can be longitudinally adjusted by means of screw.

Supports must be adapted in length and width to the transmission.



Supporting transmission:

Support transmission with special tools 23 4 050 , 00 2 030 .

Important!

Transmission must be secured with tensioning strap (1).

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23 Universal transmission retaining bridge

Special tools required:

- 0 495 187
- 24 0 200

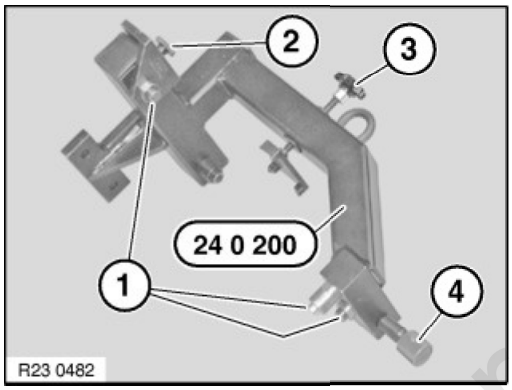
Note:

- Transmission retaining bridge 24 0 200 is suitable for manual and automatic transmissions

Attention!

The adapter and shaft must be adapted to positively lock with the transmission.

(Danger of injury)



Adapt the adapter (1) and spindle with the thrust piece (3) on the transmission.

Adjust the length using the sliding piece (2).

Screw in spindle (4).

Attention!

Before mounting on assembly stand0 495 187 check retraining bridge for tight fit.

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23 Transmission designations

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S6S 420G (SMG)	Getrag	D transmission	SMG
S6S 560G	Getrag	E-transmission (286/6)	
GS6-37BZ	ZF	H-transmission	
GS6S37BZ (SMG)	ZF	H-transmission	
GS6-37DZ	ZF	H-transmission	
GS6-37BG	Getrag	H-transmission	
GS6-53BZ	ZF	G-transmission	
GS6-53DZ	ZF	G-transmission	
GS6-17BG	Getrag	I-transmission	
GS6-17DG	Getrag	I-transmission	
GS7S47BG (SMG)	Getrag	J-transmission (247)	SMG -7-gear
GS7D36SG	Getrag	DKG (436)	DKG -7-gear
GS6- 45BZ	ZF	K transmission	
GS6- 45DZ	ZF	K transmission	
GS6-60DA/BA	AISIN	BG6	

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7DCT300	Getrag	7DCT	DKG -7-gear
GS6-58DG/BG	Getrag		
GS6-59DG/BG	Getrag		

Automatic transmission:

BMW designation	Manufacturer	Manufacturer designation	Remarks
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A5S 310Z	ZF	5HP-18	
A5S 325Z	ZF	5HP-19	
A5S 440Z	ZF	5HP-24	
A5S 560Z	ZF	5HP-30	
A5S 360R / 390R	GM	GM5	
GA6F21AW	AISIN	GA6F21AW	
GA6HP19Z	ZF	6HP19	
GA6HP26Z	ZF	6HP26	
GA6HP32Z	ZF	6HP32	
GA6L45R	GM	GM6	
GA6F21AW	AISIN	GA6F21AW	
GA8F22AW	AISIN	GA8F22AW	
GA8G45	AISIN	8G45	
GA8HP45Z	ZF	8HP45	
GA8HP50Z	ZF	8HP50	
GA8HP51Z	ZF	8HP51	
GA8HP70Z	ZF	8HP70	
GA8HP75Z	ZF	8HP75	
GA8HP76Z	ZF	8HP76	
GA8P70H	ZF	8P70	Hybrid
GA8P75H	ZF	8P75	Hybrid
GA8HP90Z	ZF	8HP90	
GA8HP95Z	ZF	8HP95	

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GA7AHSCD	Daimler	AHS-C	Hybrid

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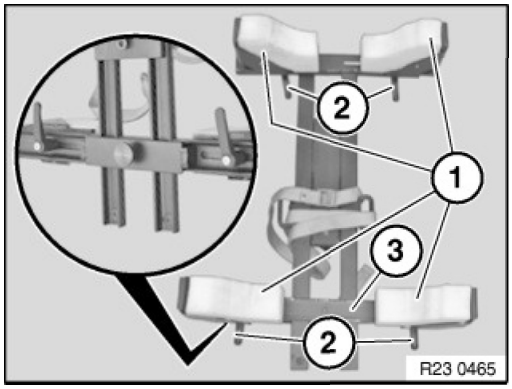
23 ... Universal BMW transmission take-up

Special tools required:

- 00 2 030
- 23 4 050

Note:

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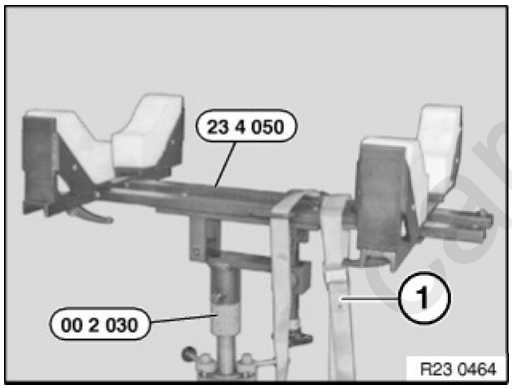


Important!

Front and rear supports (1) can be laterally adjusted by means of screws (2).

Carrier (3) of rear supports (1) can be longitudinally adjusted by means of screw.

Supports must be adapted in length and width to the transmission.



Supporting transmission:

Support transmission with special tools 23 4 050 , 00 2 030 .

Important!

Transmission must be secured with tensioning strap (1).

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23 Universal transmission retaining bridge

Special tools required:

- 0 495 187
- 24 0 200

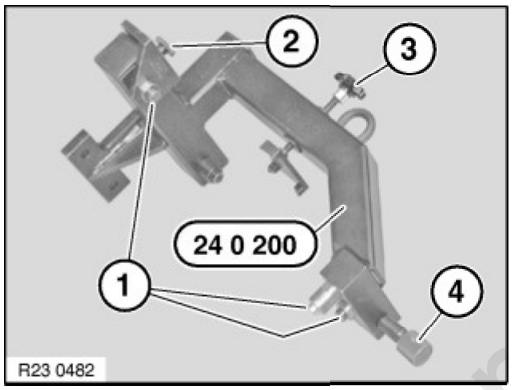
Note:

- Transmission retaining bridge 24 0 200 is suitable for manual and automatic transmissions

Attention!

The adapter and shaft must be adapted to positively lock with the transmission.

(Danger of injury)



Adapt the adapter (1) and spindle with the thrust piece (3) on the transmission.

Adjust the length using the sliding piece (2).

Screw in spindle (4).

Attention!

Before mounting on assembly stand0 495 187 check retraining bridge for tight fit.

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24 00 166 Installing exchange transmission

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.

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.



- Unclip the acoustic cover (1) from the holders in the **marked** areas towards the top.

3 – Removing the clean air pipe with the resonator

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WARNING

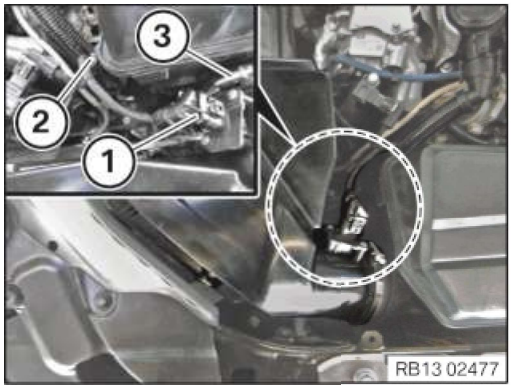
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Risk of burning!

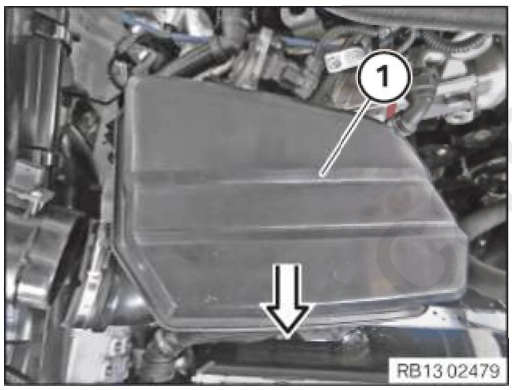
- Perform all work only on components that have cooled down.



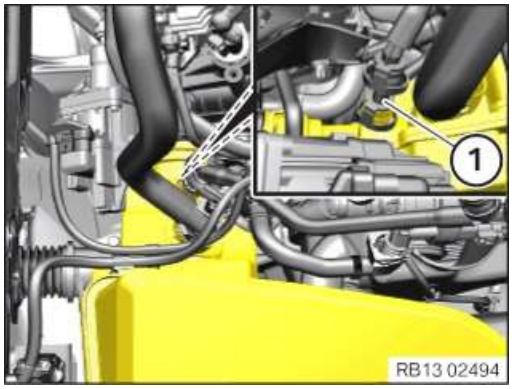
- Unlock the locks (1).
- Feed the engine ventilation line (2) out and set it aside.



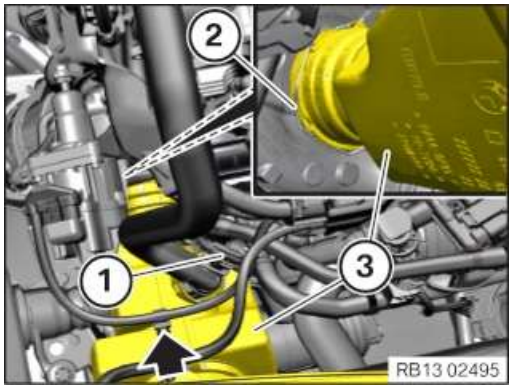
- Unlock plug connection (1) and disconnect.
- Loosen clamp (2).
- Unfasten clamp (3).
- Separate the clean air pipe with resonator from the intake filter housing.



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

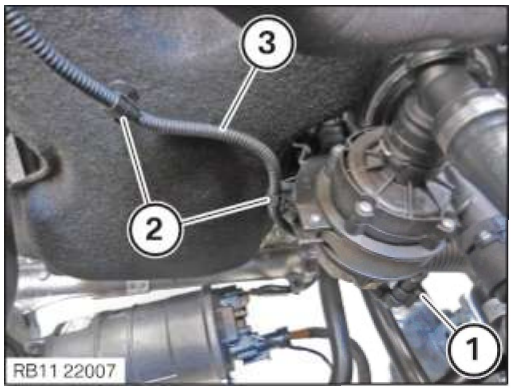


- Unlock and disconnect the tank ventilation line (1).

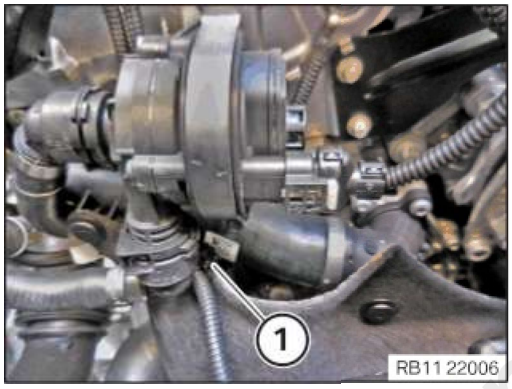


- Loosen the clamp (arrow).
- Unlock plug connection (1) and disconnect.
- Unlock the clamp (2).
- Feed out clean air pipe with resonator (3) and remove.

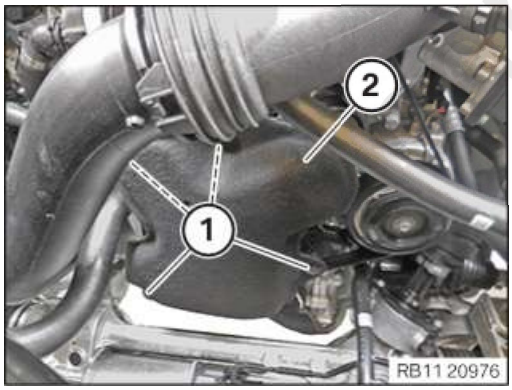
4 – Removing the acoustic cover for the engine at the front



- Unlock plug connection (1) and disconnect.
- Loosen clamps (2).
- Remove the wiring harness section (3) and put to one side.

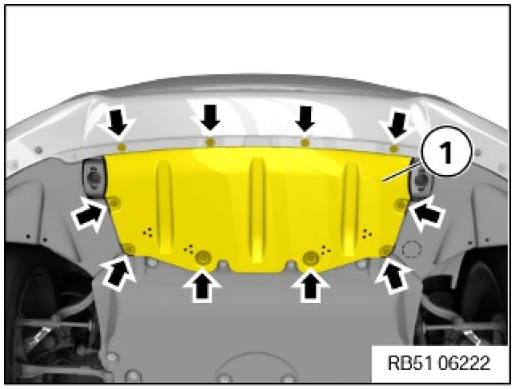


- Loosen clamp (1).



- Detach all expanding rivets (1).
- Guide the acoustic cover (2) out and remove.

5 – Removing the front underbody protection

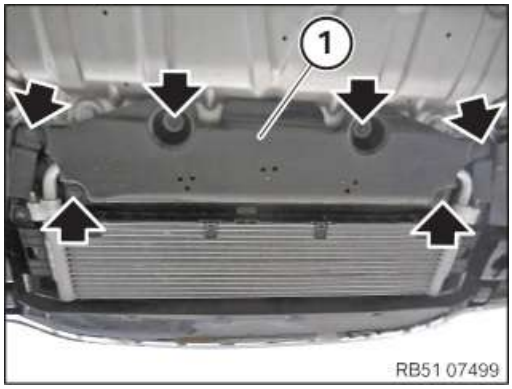


- **Version 1:**

  Remove screws (arrows).

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

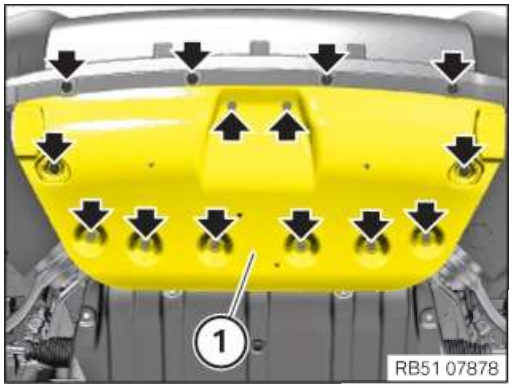
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- **Version 2:**

  Remove screws (arrows).

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

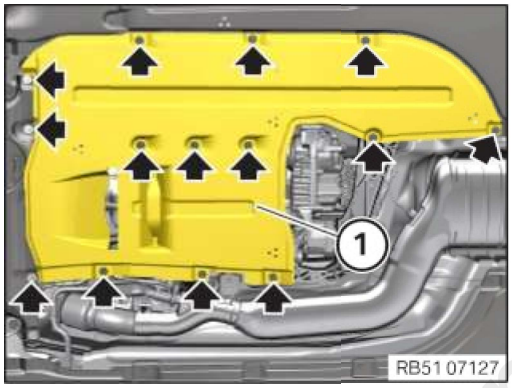


- **Version 3:**

  Remove screws (arrows).

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

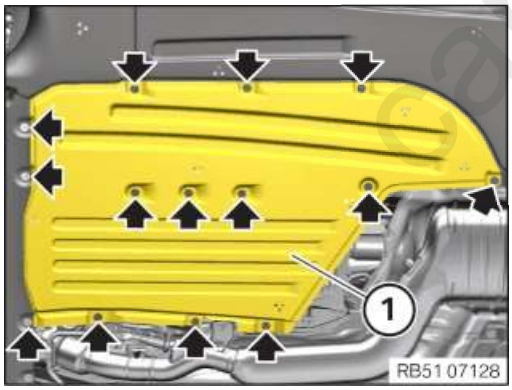
6 – Remove rear underbody protection



- **Version 1:**

  Remove screws (arrows).

  Feed out the rear underbody protection (1).

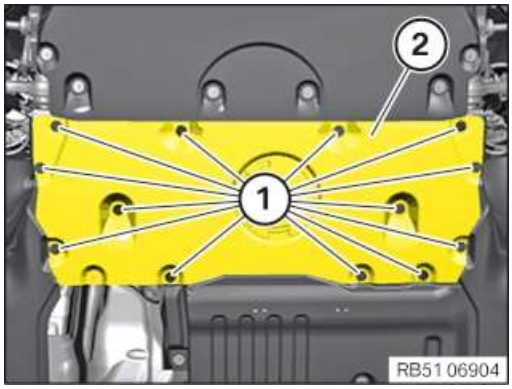


- **Version 2:**

  Remove screws (arrows).

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

7 – Removing the centre underbody protection

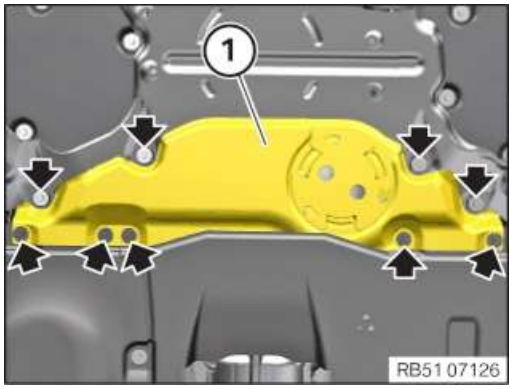


- **Version with rear-wheel drive:**

  Loosen screws (1).

  Remove centre underbody protection (2) .

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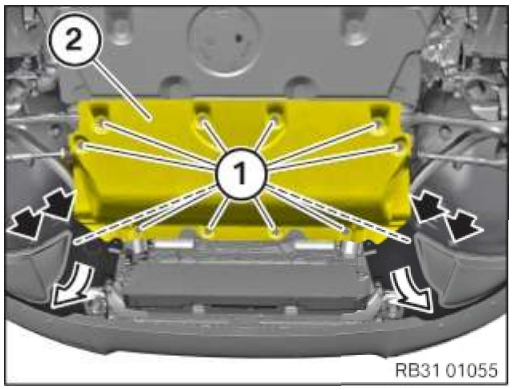


- **Version with all-wheel drive:**

  Remove screws (arrows).

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

8 – Remove the underbody protection of the steering gear



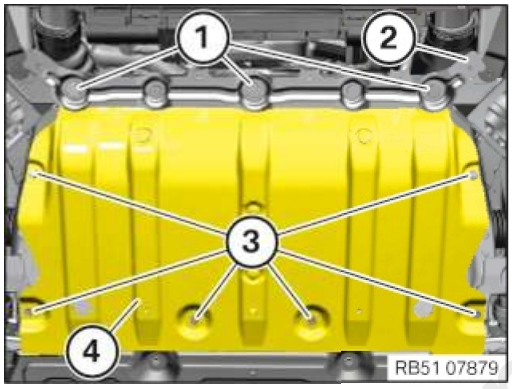
- **Version 1:**

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

  Fold the bottom wheel arch cover to the side.

  Loosen screws (1).

  Remove underbody protection of the steering gear (2).



- **Version 2:**

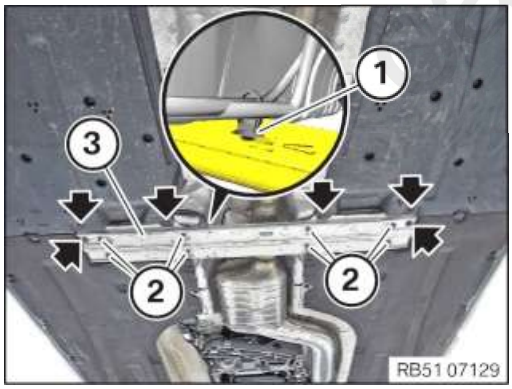
  Loosen screws (1).

  Remove the holder of the underride protection (2).

  Loosen screws (3).

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

9 – 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.

10 – Remove complete exhaust system

WARNING

Hot surfaces.

Risk of burning!

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

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CAUTION

Component with heavy weight.

Danger of injury!

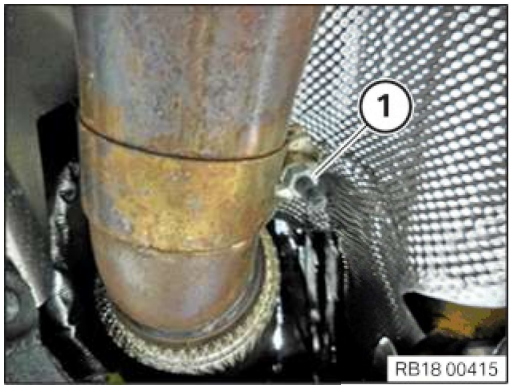
- Note component's centre of gravity.
- Support component using a jack.
- Secure component against falling off the jack.

CAUTION

Heavy component.

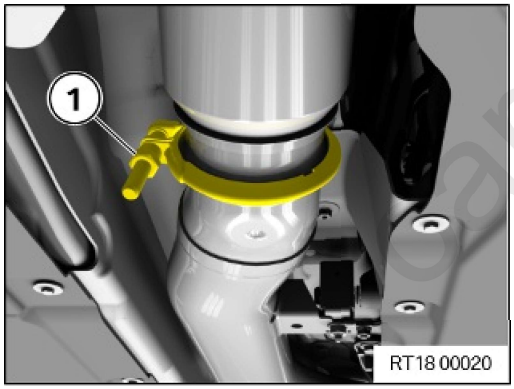
Heavy components can lead to injury or damage.

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



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

  Detach the ribbon clamp (1).



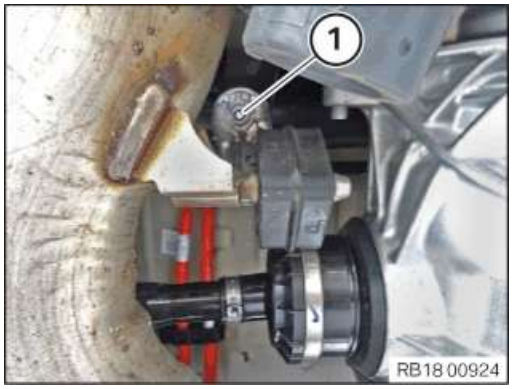
- **Equipment specification 2 (V-clips)**

  Unfasten clamp (1).

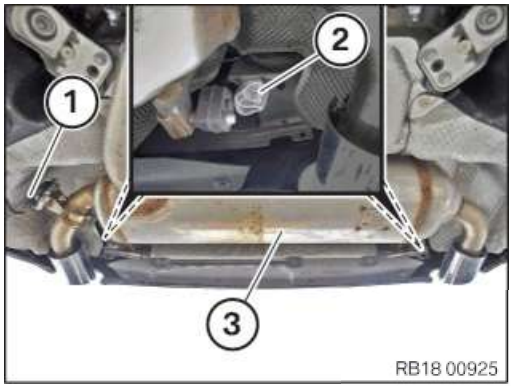


- Loosen nut (1).

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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.

11 – Removing starter motor

Prerequisite

Battery earth leads are disconnected.

WARNING

Hot surfaces.

Risk of burning!

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

WARNING

Working on 12 V vehicle electrical system.

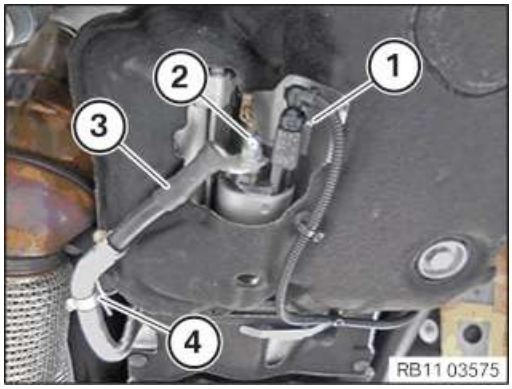
Risk of short circuits! Risk of fire!

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

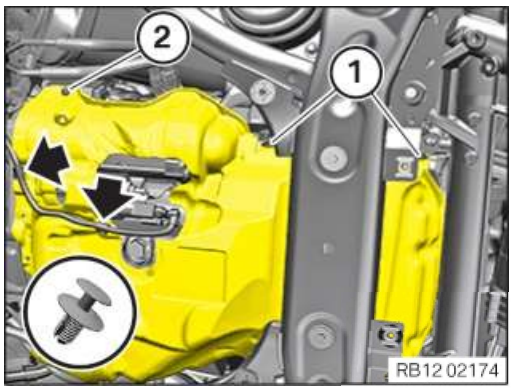
TECHNICAL INFORMATION

Make sure that the acoustic cover is **not** damaged while removing the starter motor.
A damaged lower acoustic cover can only be renewed when the front axle is lowered.

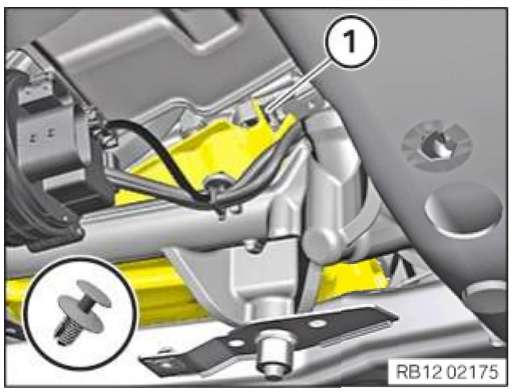
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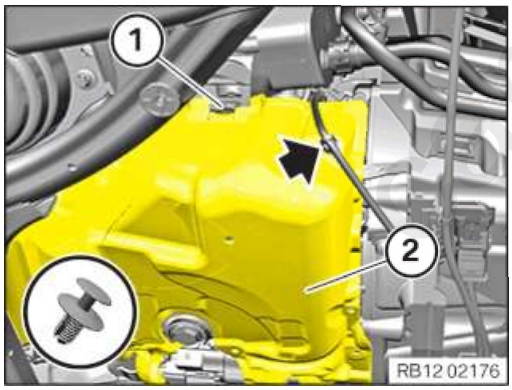
- Unlock plug connection (1) and disconnect.
- Loosen nuts (2).
- Release positive battery cable (3) from holder (4).



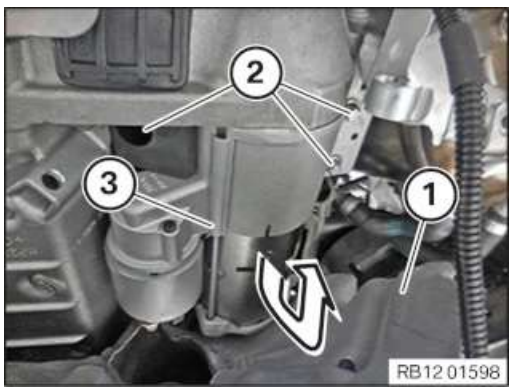
- Loosen the expanding rivet (1).
- Undo fir tree clip (2).
- Release the clamps (arrows).



- Loosen expanding rivet (1).
- Lower the acoustic cover of the oil sump.



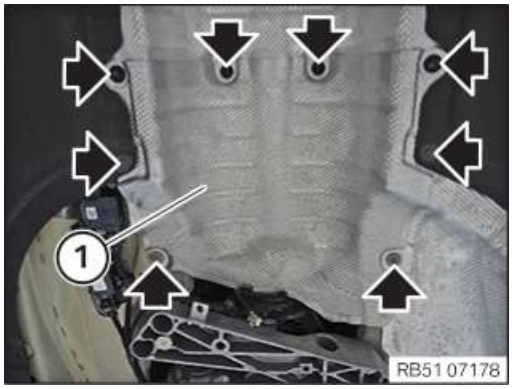
- Loosen expanding rivet (1).
- Loosen the clamp (arrow).
- Lower acoustic cover (2).



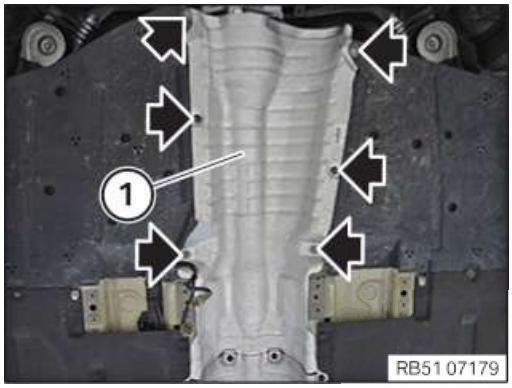
- Make sure that the acoustic cover (1) is not damaged.
- Carefully press the acoustic cover (1) to one side.
- Loosen screws (2).
- Carefully guide out the starter motor (3) in direction of arrow and remove.

12 – Remove heat shields

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



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

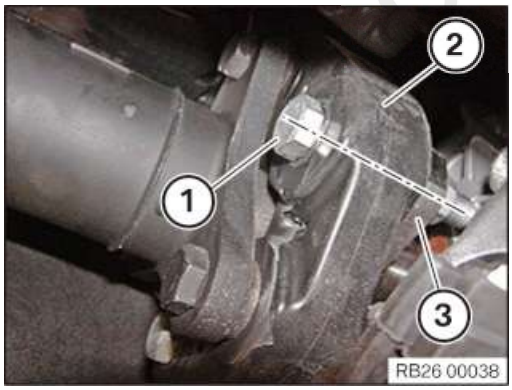
13 – Partially release propeller shaft

RISK OF DAMAGE

Damage to propeller shaft during removal.

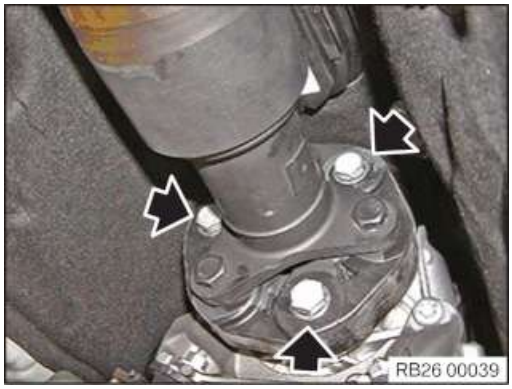
Non-observance of the removal guidelines for the propeller shaft on the rear axle differential may cause severe damage.

- 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.

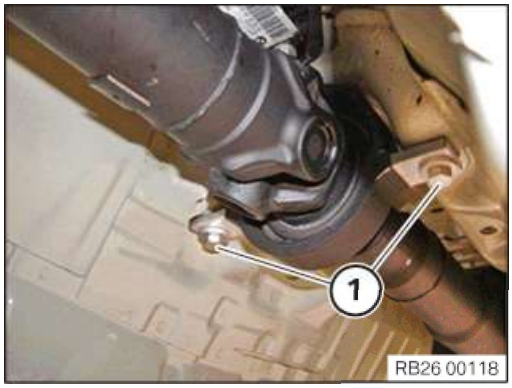


- Mark the installation position of the screw connection (1) of the flexible disc (2) and the three-hole flange (3).

  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.



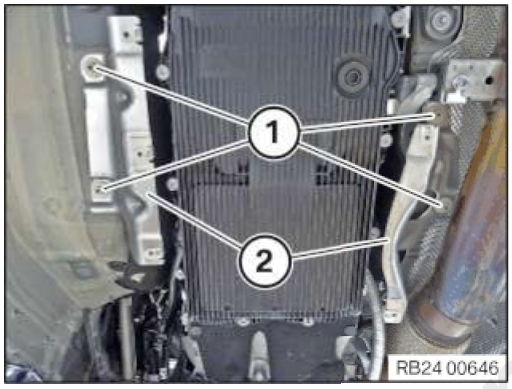
- Remove screws (arrows).



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

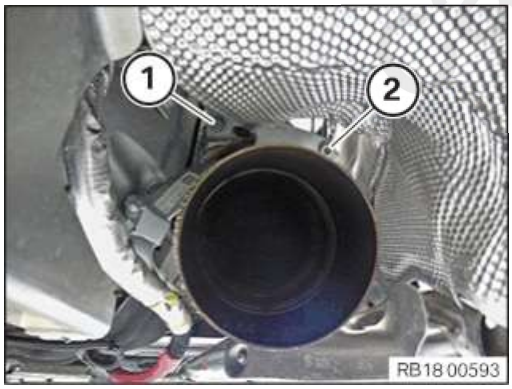
  Major deflection angles of the propeller shaft may damage the propeller shaft and/or the joints.
- Tie up propeller shaft to underbody.

14 – Remove the retaining plates

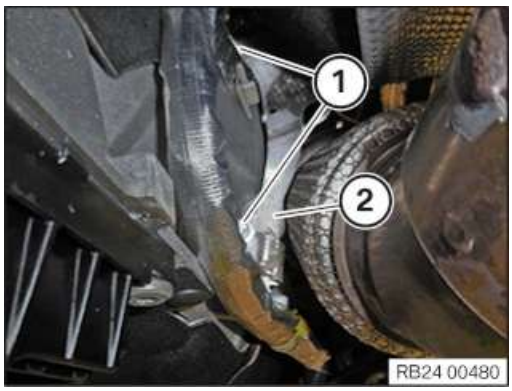


- Loosen nuts (1).
- Feed out retaining plates (2) and remove.

15 – Remove exhaust system holder



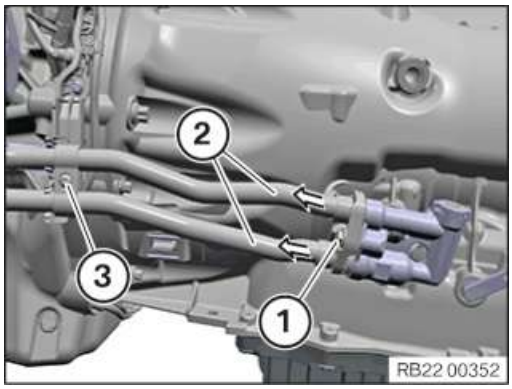
- Loosen screw (1).
- Loosen nut (2).



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

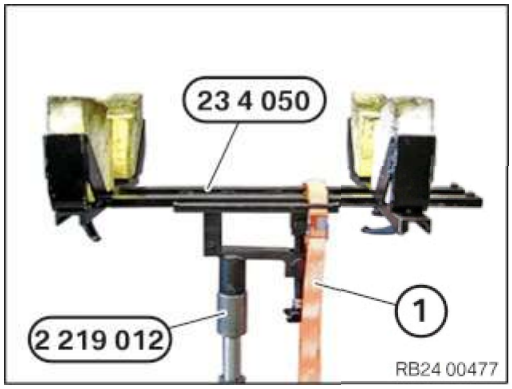
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16 – Disconnect hydraulic lines on the transmission

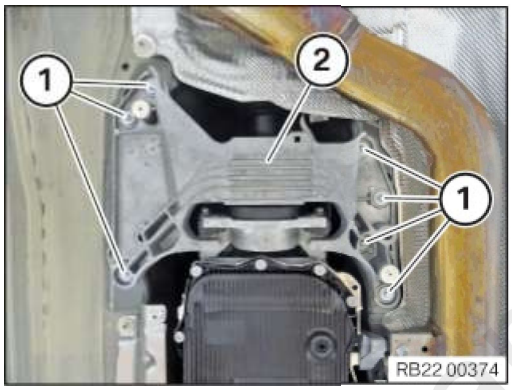


- Loosen screw (1).
- Loosen screw (3).
- Disconnect hydraulic lines (2) to transmission oil cooler.

17 – Detach 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 screws (1).
- Release transmission cross member (2).

18 – Remove automatic transmission (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.

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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.

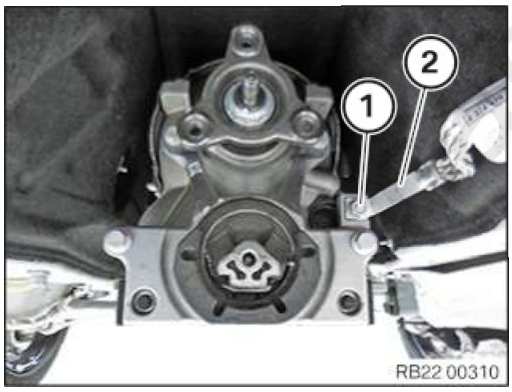
- Before removing the transmission: Support engine.
- Secure the engine against tilt movements.
- Follow the specifications of the repair instructions.

RISK OF DAMAGE

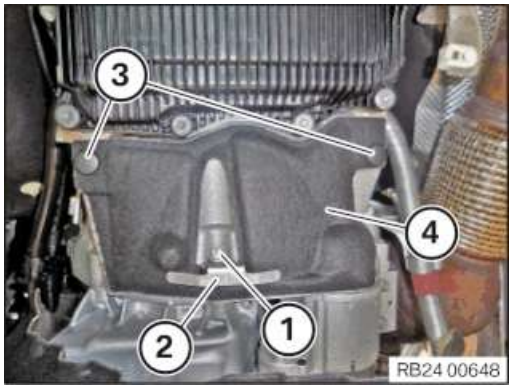
Damage to the transmission.

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).



- Loosen the screw (1) and remove the holder (2).
- Pull the expanding rivet (3) off.
- Remove the acoustic cover (4).

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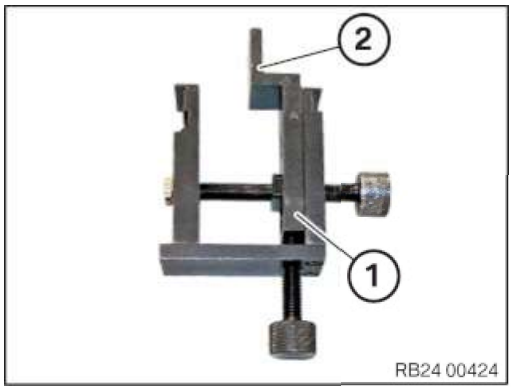
TECHNICAL INFORMATION

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

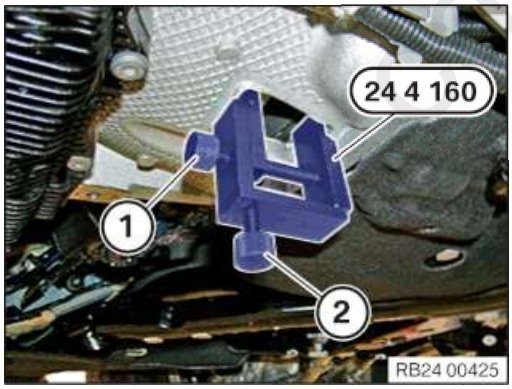
- Turn the engine on the vibration damper with the special tool 0 493 380 (11 6 480) in the direction of rotation until the bolt (1) becomes visible in the recess.
- Undo all 6 screws (1) on the torque converter.



- Prepare special tool 0 494 478 (24 4 161) (1) with the shaped element 0 496 061 (24 4 166) (2) as shown.

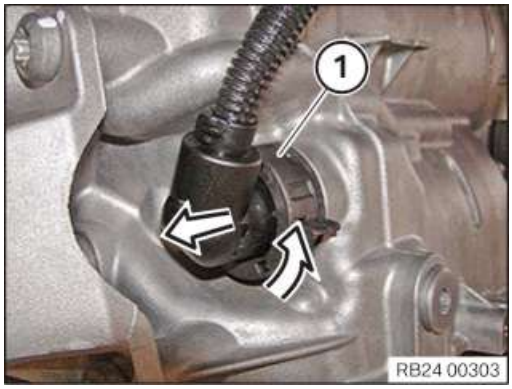


- Remove the sealing cap (1).



- 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).

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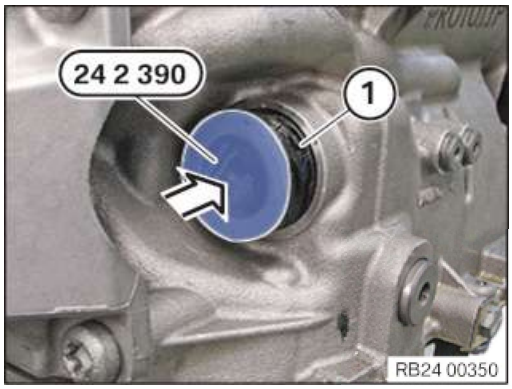


TECHNICAL INFORMATION

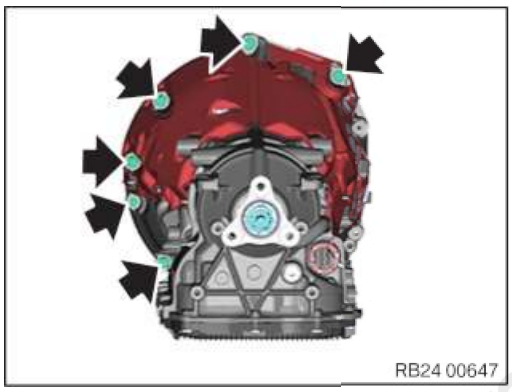
Notes on mechatronics are a fundamental requirement for these repair instructions and must be complied with at all times.

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.



- Support engine.
- Release remaining screws.
- Remove transmission.

MAIN WORK

19 – Preparing the exchange transmission

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.

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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

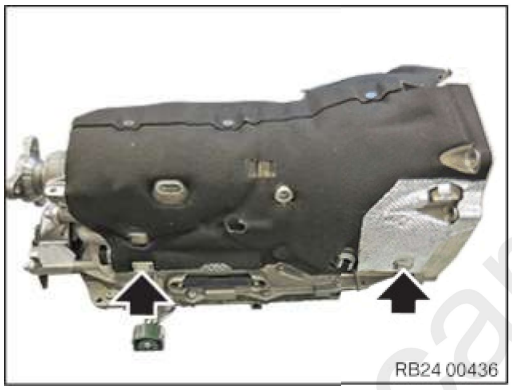
Exchange transmissions come filled with oil

TECHNICAL INFORMATION

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

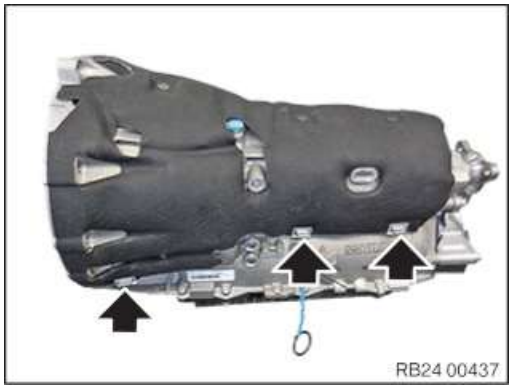
TECHNICAL INFORMATION

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



- Renew the clamps (arrows) of the sound insulation on the right.
  Parts: Clamps
- Remount the sound insulation on the right.

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- Renew the clamps (arrows) of the sound insulation on the left.

  Parts: Clamps
- Remount the sound insulation on the left.

TECHNICAL INFORMATION

After disassembling the transportation retainer, secure the torque converter against slipping out.

- Disassemble transportation retainers.
- Remount all cable clips.
- Remount all seal plugs.
- Remount protective cap on output shaft.
- Remount the exhaust bracket.
- Remount transmission mounting bracket.
- If installed: Remount the transfer box.
- Renew the heat exchanger for heating system for the automatic transmission.
- Make note of transmission identification (see BMW Group Parts and type plate).

POSTPROCESSES

20 – Install automatic transmission (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.

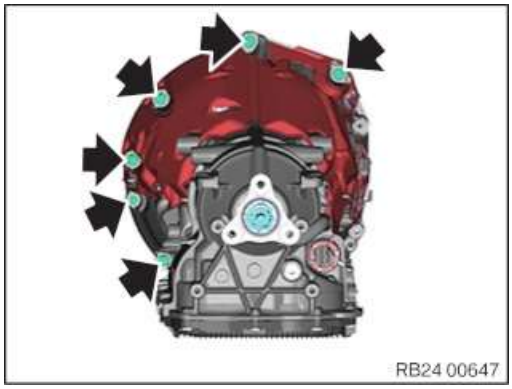
TECHNICAL INFORMATION

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

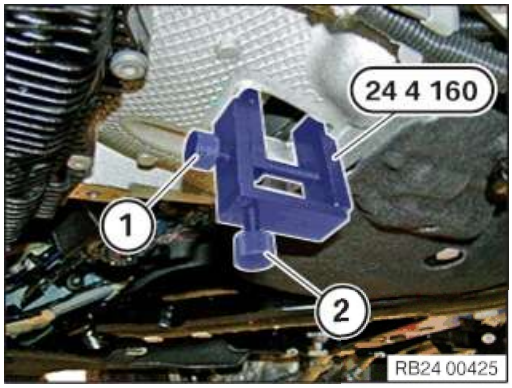


- Check the fitting sleeves (1) for correct fit and damage and renew as needed.

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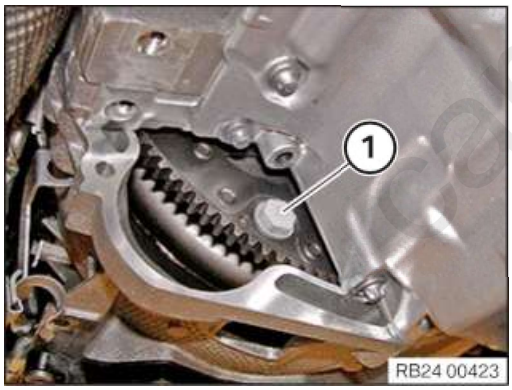
- Transmission flange-mount.
- Rotate the torque converter until the bore hole of the torque converter is flush with bore hole in drive plate.
- Fit the transmission bolts (arrows) and apply lightly.



- 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

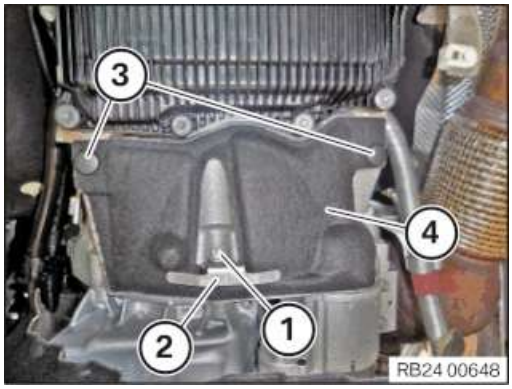
- Renew screws.

  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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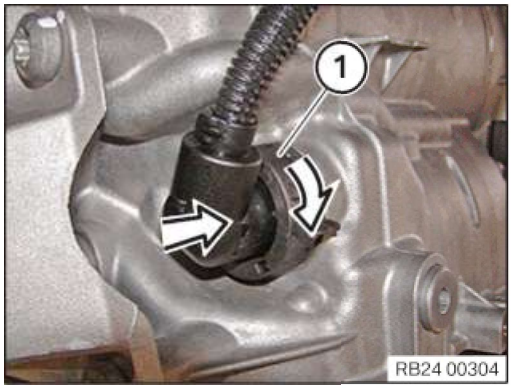
- Install acoustic cover (4).
- Install expanding rivet (3).
- Install the holder (2) and tighten the screw (1).

Transmission to engine

M8		Tightening torque	19 Nm
M12		Tightening torque	66 Nm



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

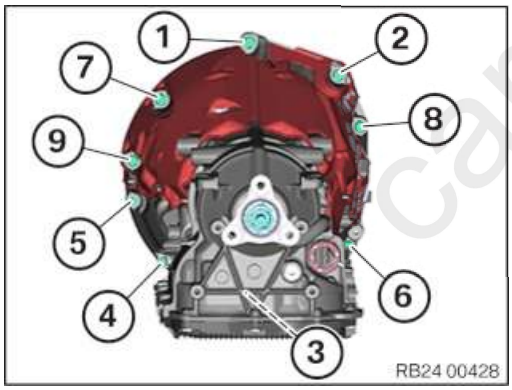


TECHNICAL INFORMATION

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



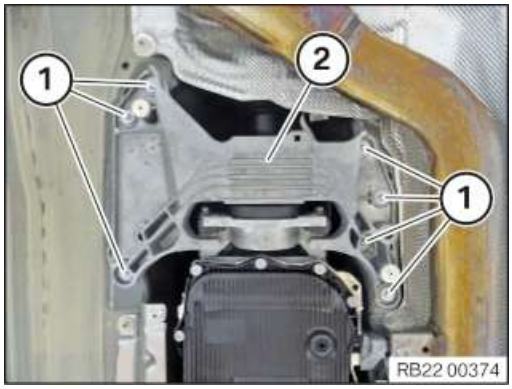
- Install the ground strap (2).
- Tighten down screw (1).

Ground strap to transmission or body

M8		Tightening torque	19 Nm

21 – Install transmission cross member.

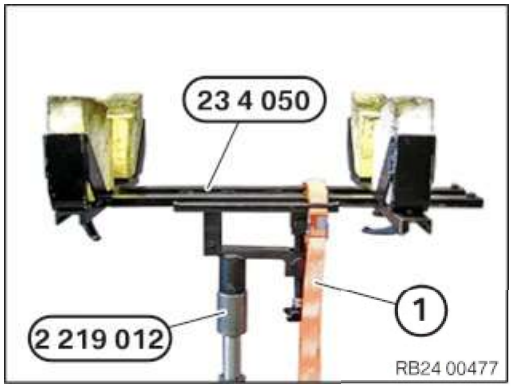
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- Install the transmission cross member (2).
- Tighten the screws (1).

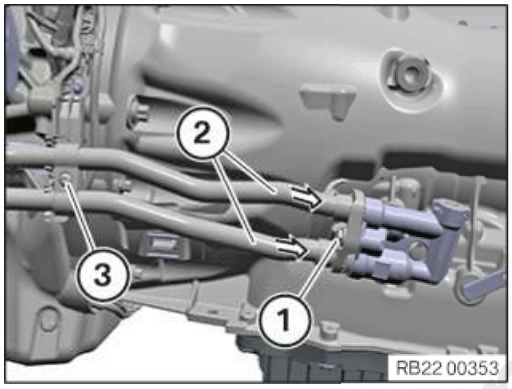
Transmission cross member to body

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.

22 – 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

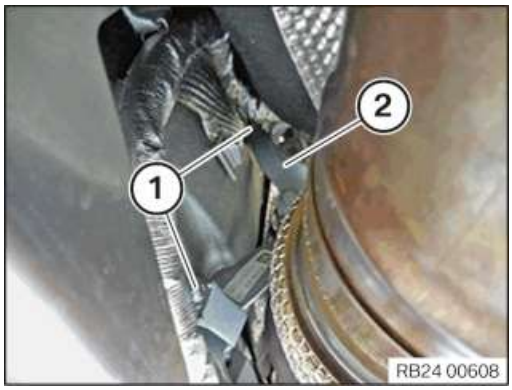
M6x25	Renew the sealing ring.	Tightening torque	8 Nm

- Position and tighten the screw (3).

Transmission oil line on holder

M6		Tightening torque	8 Nm

23 – Install the exhaust bracket

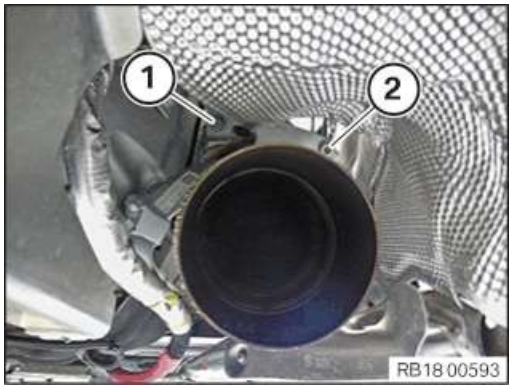


- Install the exhaust bracket (2).
- Tighten the screws (1).

Transmission to engine

M8		Tightening torque	19 Nm
M12		Tightening torque	66 Nm

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- Tighten down screw (1).

Catalytic converter to holder

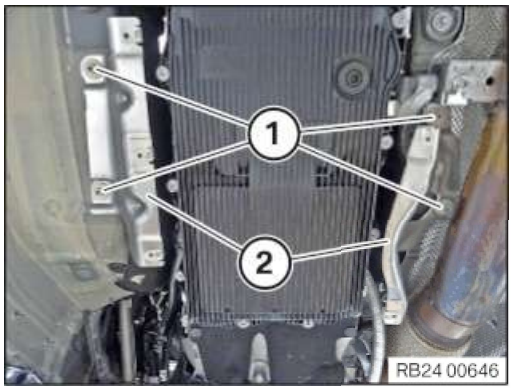
M8	Renew screw.	Tightening torque	19 Nm

- Tighten nut (1).

Catalytic converter to holder

M8	Renew nut.	Tightening torque	19 Nm

24 – Install the retaining plates

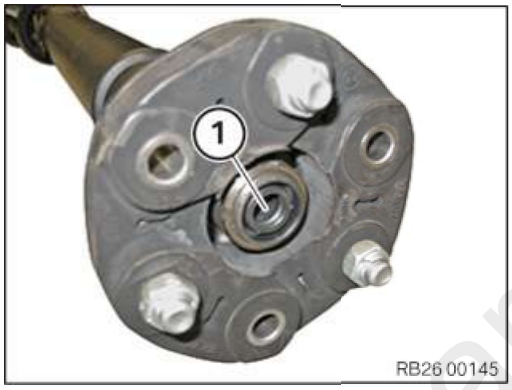


- Feed in retaining plate (2) and install.
- Tighten nuts (1).

Retaining plates for vehicle underbody cover

Sheet metal nut	Replace nuts.	Tightening torque	3 Nm

25 – Partially installing the propeller shaft



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

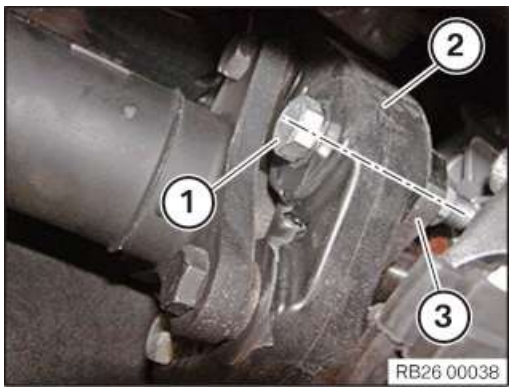


- Apply a thin coat of grease to the soft centring (1), if necessary.

  Do not grease the hard centring (2).

Expendable materials

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

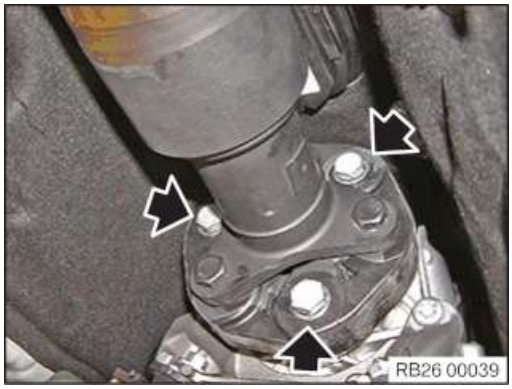


- Renew screws and the self-locking nuts.

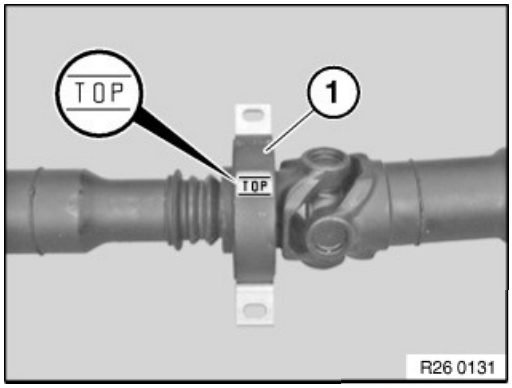
  Parts: Screws, self-locking nuts
- Assemble the screw connections (1) of the flexible disc (2) and the three-hole flange (3) according to the self-affixed identification.

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

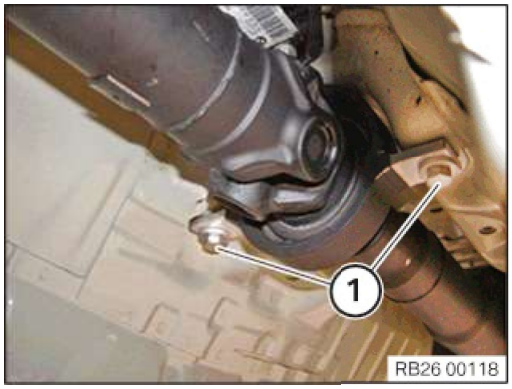
mrdiagn.com



- 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.



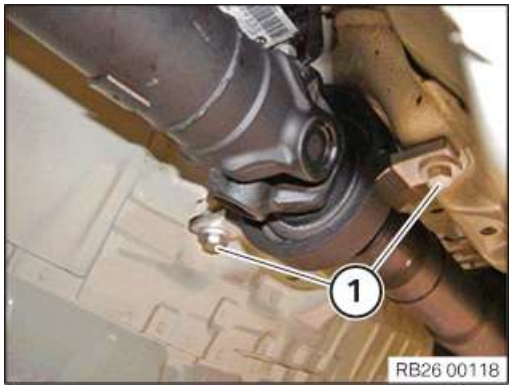
- Renew screws.

  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.



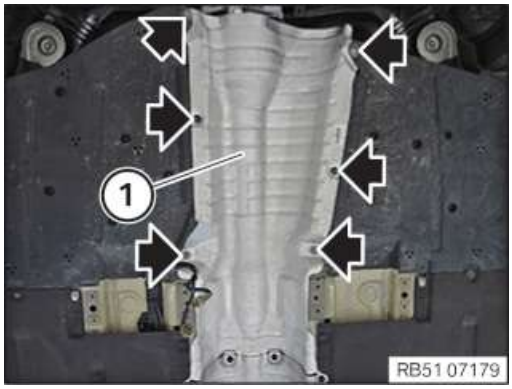
- Tighten the screws (1).

Centre mount to body

M8		Tightening torque	19 Nm

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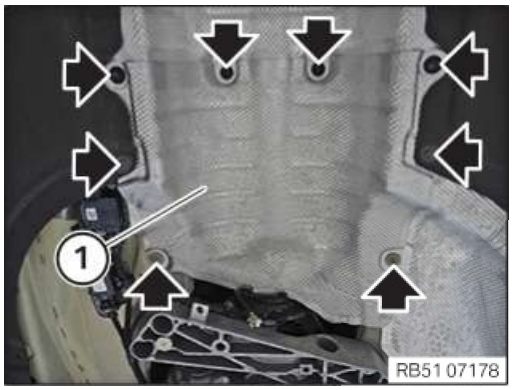
26 – Install the heat shields



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

Heat shield to vehicle underbody

Screws and nuts		Tightening torque	3 Nm

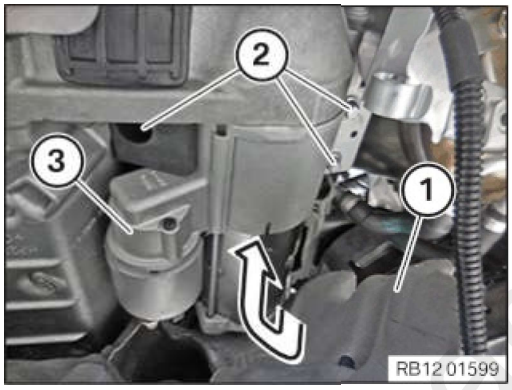


- Install heat shield (1).
- Tighten the nuts and bolts (arrows).

Heat shield to vehicle underbody

Screws and nuts		Tightening torque	3 Nm

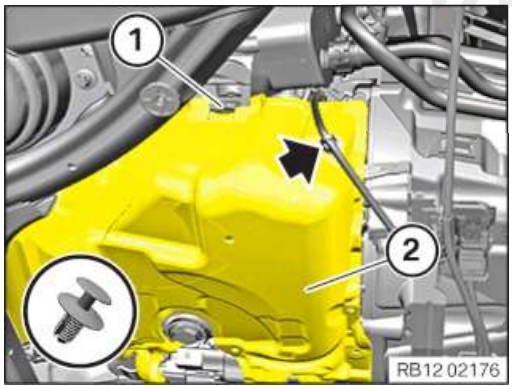
27 – Installing starter motor



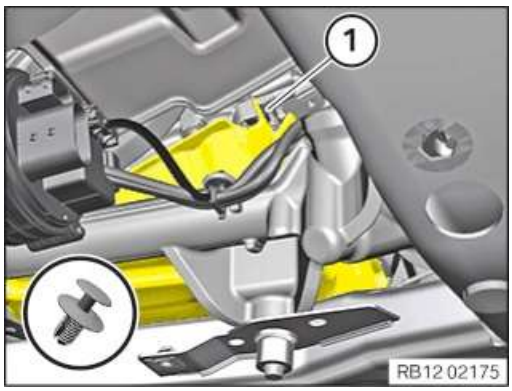
- Make sure that the acoustic cover (1) is not damaged.
- Carefully press the acoustic cover (1) to one side.
- Feed in and install the starter motor (3) in the direction of the arrow.
- Tighten the screws (2).

Starter motor to engine

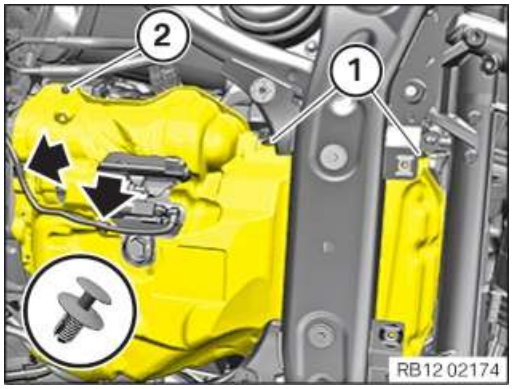
M8X60		Tightening torque	19 Nm



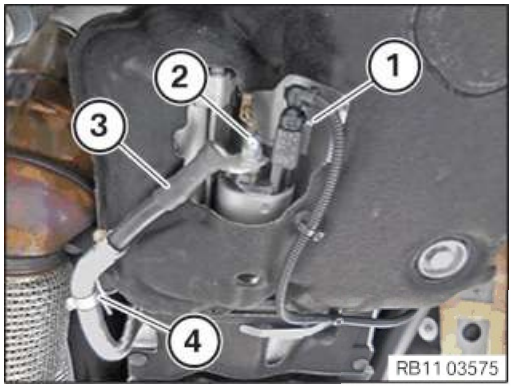
- Position the acoustic cover (2).
- Fasten expanding rivet (1).
- Secure clamp (arrow).



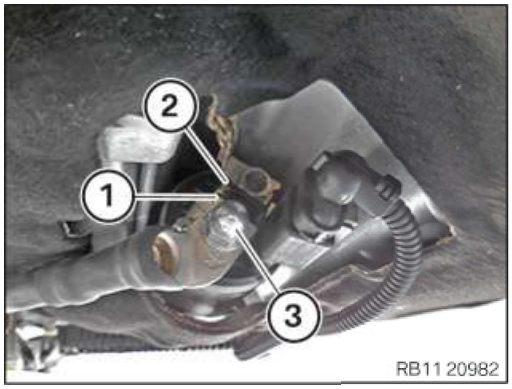
- Fasten expanding rivet (1).



- Secure fir tree clip (2).
- Secure expanding rivet (1).
- Secure the clamps (arrows).



- Secure the positive battery cable (3) in the holder (4) and position it at the starter motor.
- Tighten the nut (2) hand-tight.
- Connect the connector (1) and audibly lock it.



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

28 – 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.

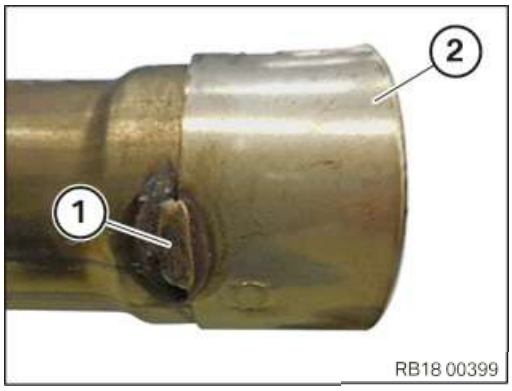
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CAUTION

Heavy component.

Heavy components can lead to injury or damage.

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



CAUTION

Swarf resulting from sawing or grinding components.

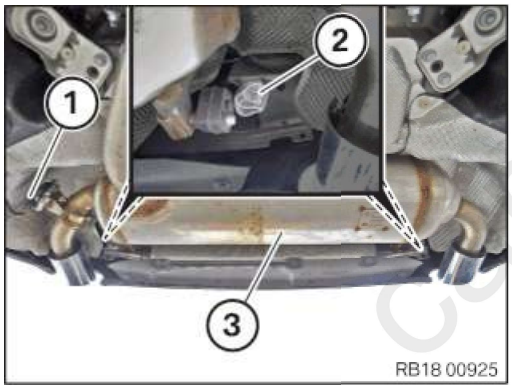
Danger of injury!

- 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).

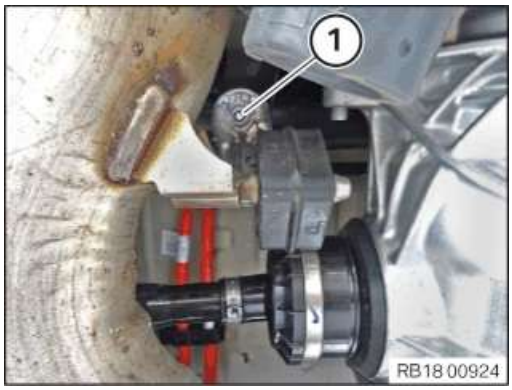
  Parts: Nuts
- Tighten nuts (2).

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

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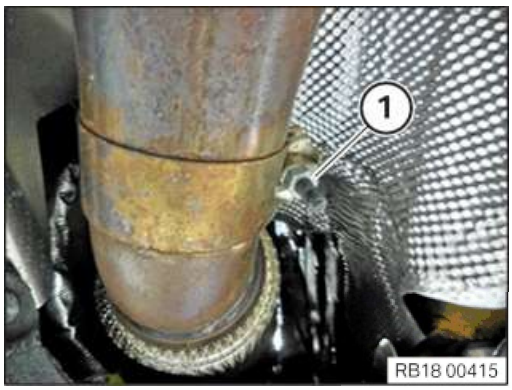
- Renew nut (1).

  Parts: Nut

- Tighten nut (1).

Front silencer / petrol particulate filter on transmission bracket

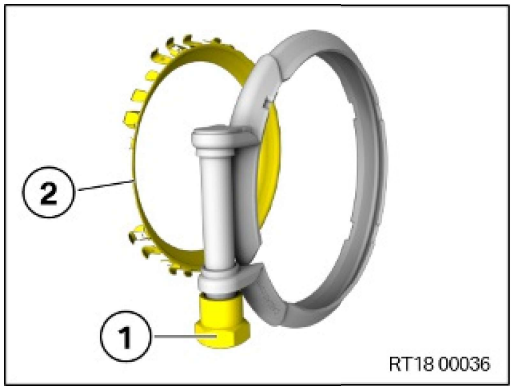
M8	Renew nut.	Tightening torque	19 Nm



- Tighten the ribbon clamp (1).

Exhaust system to catalytic converter

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

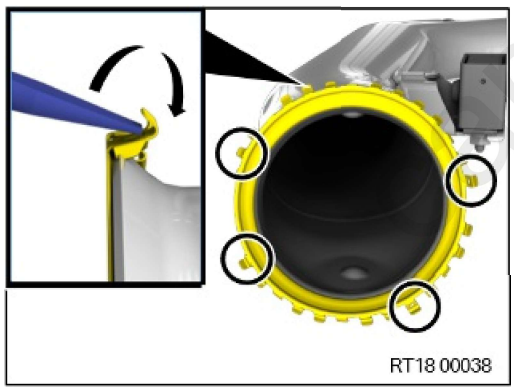


- **Equipment specification 2 (V-clips)**

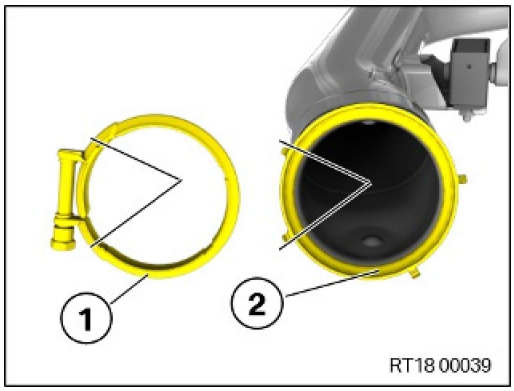
  Renew V-band clamp.

  Parts: V-band clamp

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

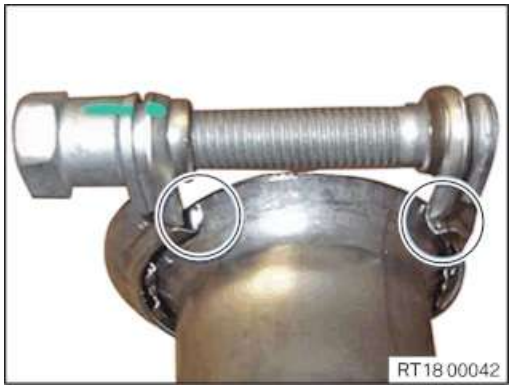


- Bend all sheet metal tabs over with a suitable tool, except those in the marked areas.

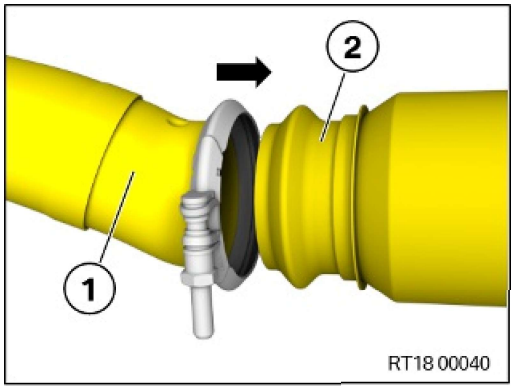


- Mount the V-clip (1) on the sealing ring (2).
- Make sure that the V-clip (1) is positioned correctly on the sealing ring (2).

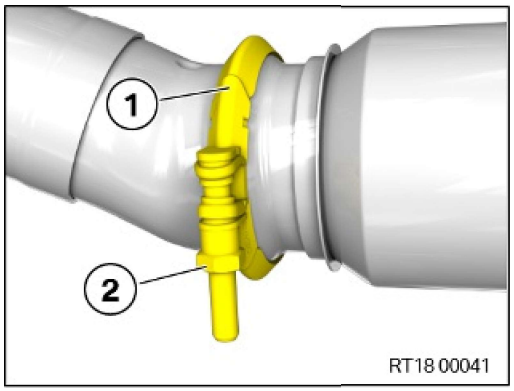
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- Ensure that the V-clip rests against the sheet metal tabs in the marked areas after mounting.



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

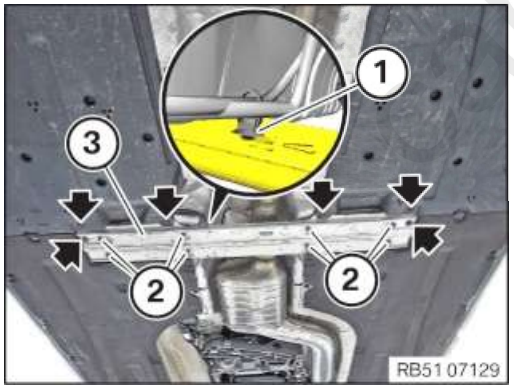


- Make sure that V-clip (1) is fitted correctly.
- Tighten down screw (2).

V-clip to catalytic converter

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

29 – 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).

30 – Disconnecting all battery earth leads

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- See additional information.

31 – 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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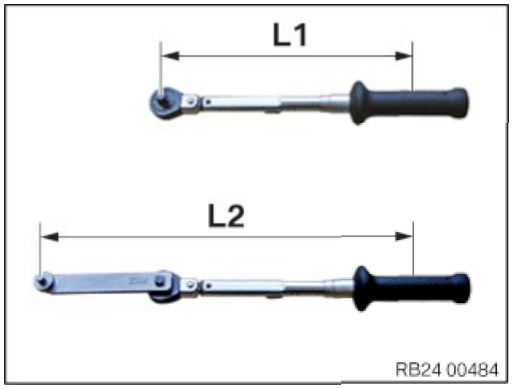
- **Top up the automatic transmission fluid:**
- Loosen the oil filler plug (1) using the special tool 2 405 614.
- Top up automatic transmission fluid according to the instructions in the diagnosis system.

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

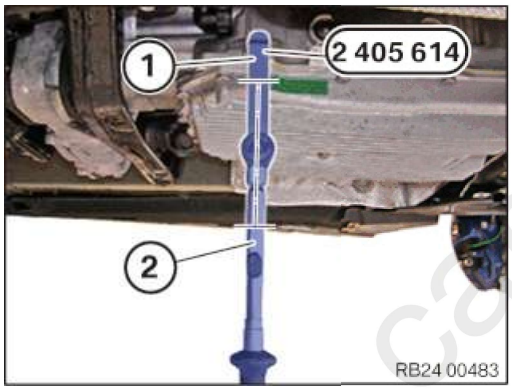
The setpoint torque deviates from the torque to be set when using special tool 2 405 614.

- **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.

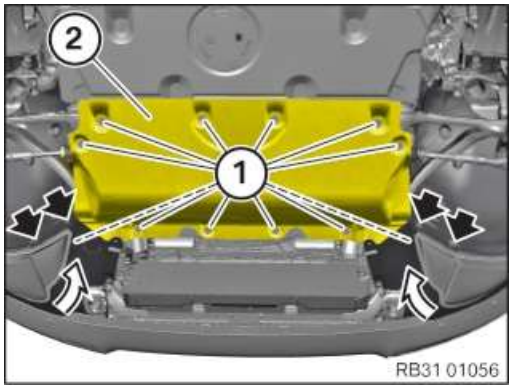
  Parts: Oil filler plug, sealing ring
- Make sure that the special tool 2 405 614 and the torque wrench (2) align while tightening the oil filler plug (1).
- Tighten the oil filler plug (1) with the special tool 2 405 614 and the torque wrench (2).

Oil filler plug

M18x1.5		Tightening torque	35 Nm

32 – Install the underbody protection of the steering gear

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- **Version 1:**
- Position the underbody protection of the steering gear (2).
- Tighten the screws (1).

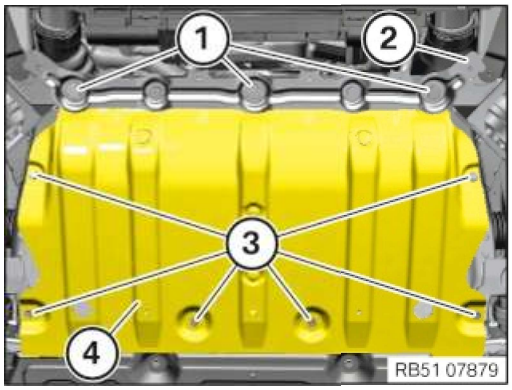
Underbody protection of the steering gear

Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

- Position the bottom wheel arch cover.
- Tighten the screws (arrows) of the bottom wheel arch cover on the wheel arch cover.

Wheel arch cover (screws)

Thermoplastic hexagon screw		Tightening torque	3 Nm



- **Version 2:**
- Guide in the steering gear underbody protection (4) and install.
- Tighten the screws (3).

Underbody protection of the steering gear

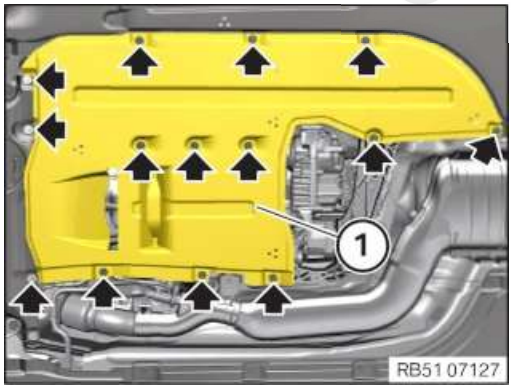
Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

- Position holder of underride protection (2).
- Tighten the screws (1).

Holder underride guard to front axle support

M10		Tightening torque	56 Nm

33 – Installing underbody protection at rear



- **Version 1:**

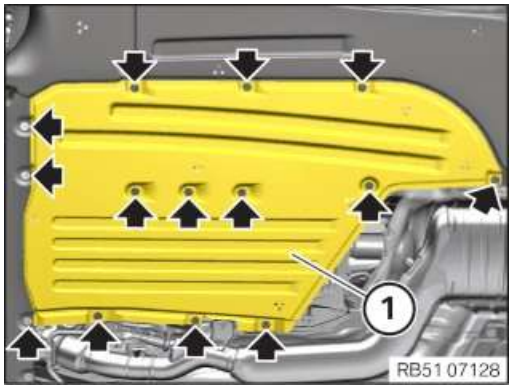
  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

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- **Version 2:**

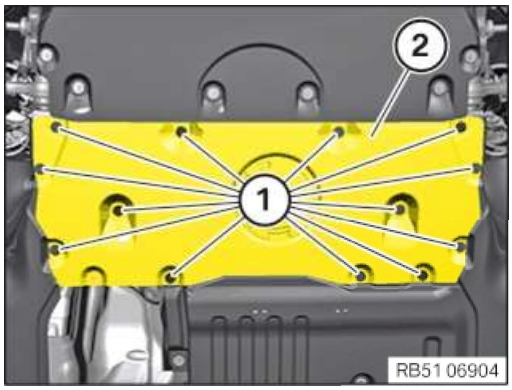
  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

34 – Installing the centre underbody protection



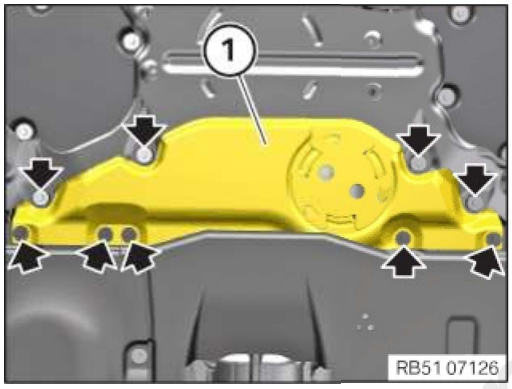
- **Version with rear-wheel drive:**

  Position central underbody protection (2).

  Tighten the screws (1).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



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

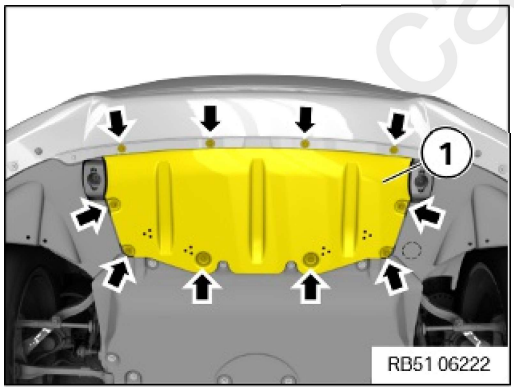
  Guide in and install the centre of underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

35 – Installing the front underbody protection



- **Version 1:**

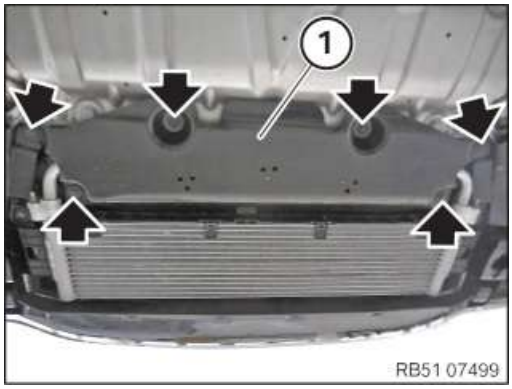
  Feed in the front underbody protection (1) towards the front under the bumper panel and position.

  Tighten screws (arrows).

Underbody protection front

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

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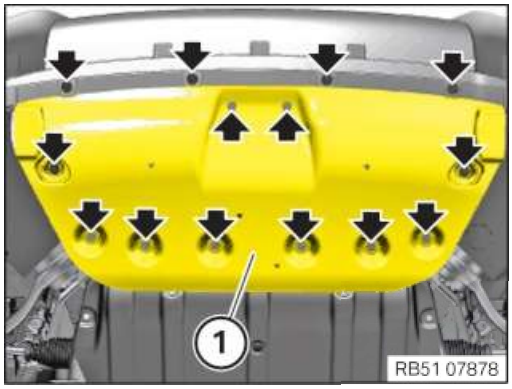
- **Version 2:**

  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:**

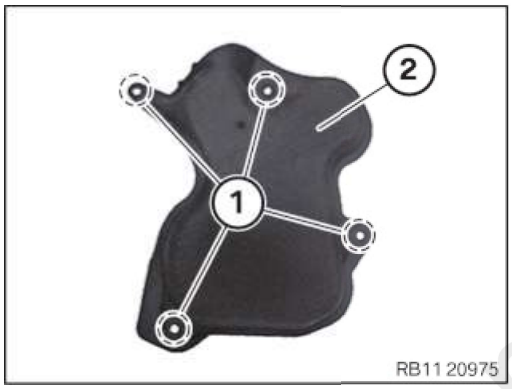
  Feed in and install front underbody protection (1).

  Tighten screws (arrows).

Underbody protection front

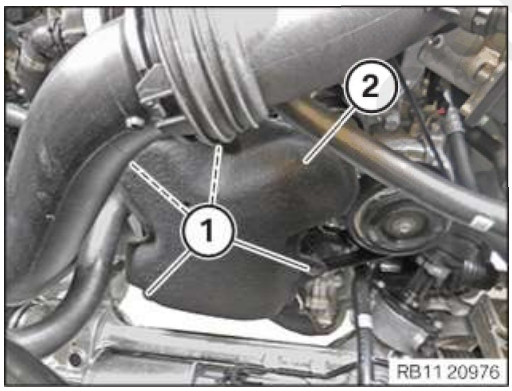
Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

36 – Install the acoustic cover for the engine at the front

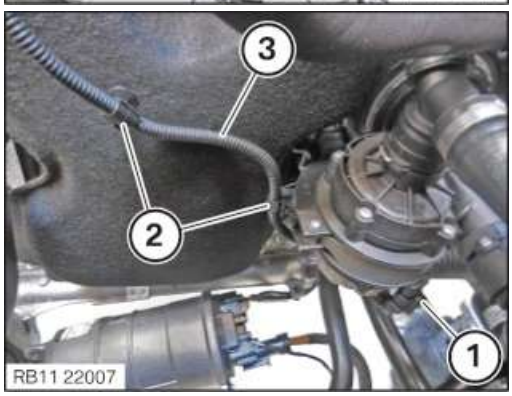


- Check if acoustic cover (2) in marked area (1) is damaged and replace acoustic cover (2) if necessary.

  Parts: Acoustic cover



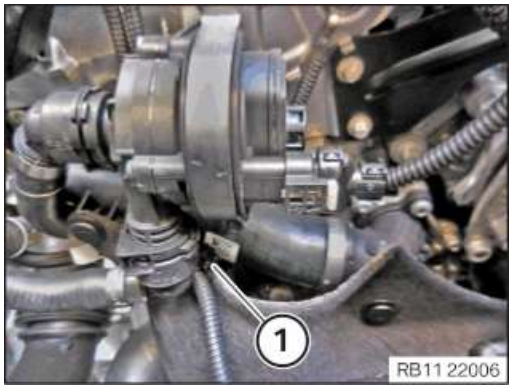
- Thread in and position the acoustic cover (2).
- Mount all expanding rivets (1).



- Feed in and position wiring harness section (3).
- Secure clamps (2).
- Connect connectors (1) and lock.

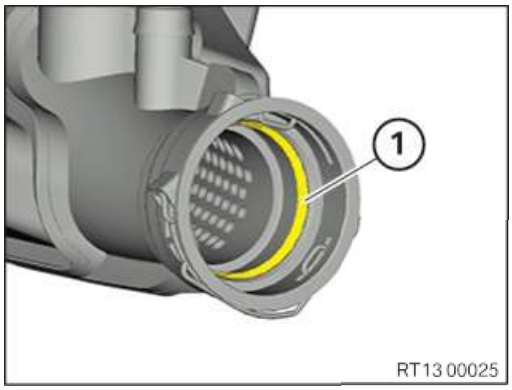
  The connector (1) must engage audibly.

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- Secure clamps (1).

37 – Installing the clean air pipe with resonator

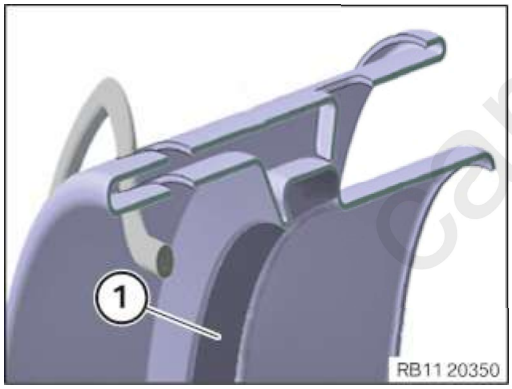


- Check the seal (1) for damages, replace if necessary.

▸ **Replace damaged gasket**

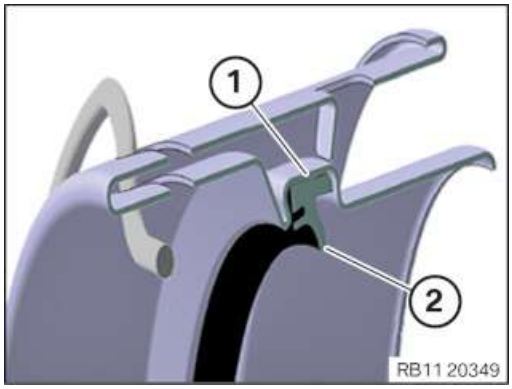
TECHNICAL INFORMATION

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



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

  The gasket groove (1) must be clean.



- Renew gasket.

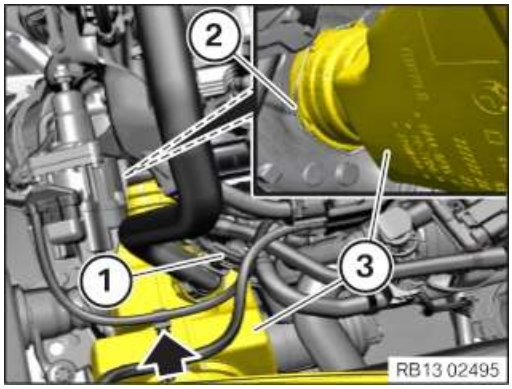
  Parts: Gasket
- Install seal dry without lubricant or mounting agent.

TECHNICAL INFORMATION

Incorrect assembly is possible. Ensure correct installation position.

- Feed in and install the seal.
- Make sure the seal is correctly installed in the gasket groove (1).
- Make sure that the sealing lip (2) is pointing downwards (see figure).

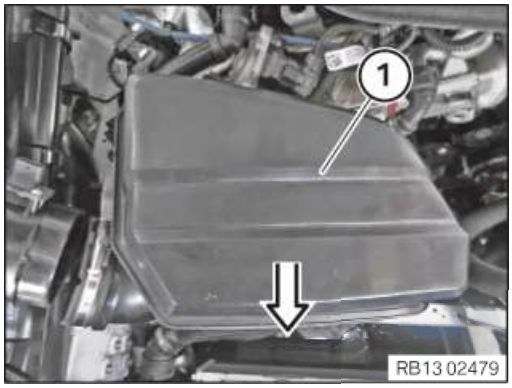
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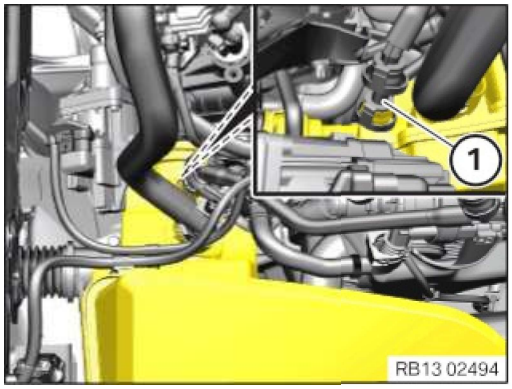
- Guide in and install the clean air pipe with resonator (3).
- Lock clamp (2).

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

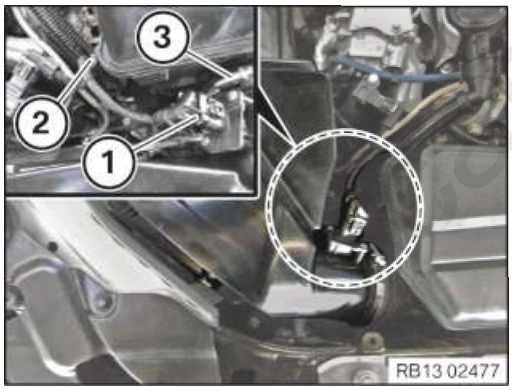
  The connector (1) must engage audibly.
- Secure clamp (arrow).



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



- Connect and lock the tank ventilation line (1).



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

Clean air pipe to upper section of intake filter housing

Clamp		Tightening torque	3 Nm

- Secure the clamp (2).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.



- Insert and install the engine ventilation line (2).
- Ensure that the locks (1) engage audibly.

38 – Install acoustic cover

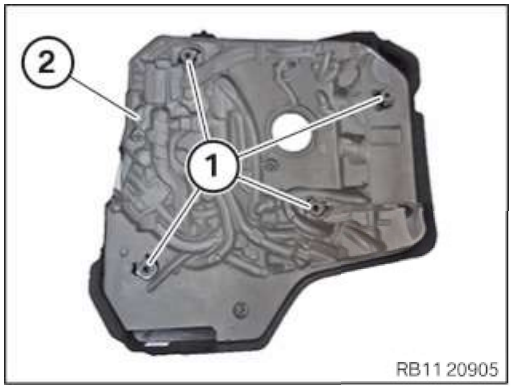
cardiagn.com

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 all rubber mounts (1) of acoustic cover (2) for correct seating.



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

  The acoustic cover (1) must audibly engage into place.

Additional Information

Overview of Tightening Torques

Torque converter to flywheel — Used in step 20

M10	Renew screws.	Tightening torque	56 Nm

Transmission to engine — Used in step 2023

M8		Tightening torque	19 Nm
M12		Tightening torque	66 Nm

Ground strap to transmission or body — Used in step 20

M8		Tightening torque	19 Nm

Transmission cross member to body — Used in step 21

M8	Renew screws.	Tightening torque	19 Nm

Transmission oil line to transmission — Used in step 22

M6x25	Renew the sealing ring.	Tightening torque	8 Nm

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Transmission oil line on holder — Used in step 22

M6		Tightening torque	8 Nm

Catalytic converter to holder — Used in step 23

M8	Renew screw.	Tightening torque	19 Nm

Catalytic converter to holder — Used in step 23

M8	Renew nut.	Tightening torque	19 Nm

Retaining plates for vehicle underbody cover — Used in step 24

Sheet metal nut	Replace nuts.	Tightening torque	3 Nm

Front flexible disc to propeller shaft — Used in step 25

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 25

M8		Tightening torque	19 Nm

Heat shield to vehicle underbody — Used in step 26

Screws and nuts		Tightening torque	3 Nm

Starter motor to engine — Used in step 27

M8X60		Tightening torque	19 Nm

Battery positive lead to starter — Used in step 27

M8		Tightening torque	13,5 Nm

Rear silencer to body / bumper support — Used in step 28

M8	Replace nuts.	Tightening torque	19 Nm

Exhaust system to rear axle carrier — Used in step 28

Nut M8	Renew nut.	Tightening torque	19 Nm

Front silencer / petrol particulate filter on transmission bracket — Used in step 28

M8	Renew nut.	Tightening torque	19 Nm

Exhaust system to catalytic converter — Used in step 28

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

V-clip to catalytic converter — Used in step 28

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

Connecting support to tunnel — Used in step 29

M8x25 screw		Tightening torque	20 Nm
Screw		Tightening torque	3 Nm

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Oil filler plug Used in step 31

M18x1.5		Tightening torque	35 Nm

Underbody protection of the steering gear Used in step 32

Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Wheel arch cover (screws) Used in step 32

Thermoplastic hexagon screw		Tightening torque	3 Nm

Holder underride guard to front axle support Used in step 32

M10		Tightening torque	56 Nm

Underbody protection Used in step 3334

Hexagon screw		Tightening torque	3 Nm

Underbody protection front Used in step 35

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

Clean air pipe to upper section of intake filter housing Used in step 37

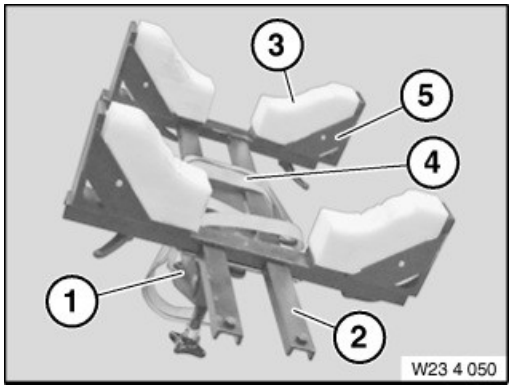
Clamp		Tightening torque	3 Nm

Overview of Special Tools

0 495 498 (23 4 050) Support

Used in step 1721

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Common

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.	

2 219 012 Hydraulic lifter

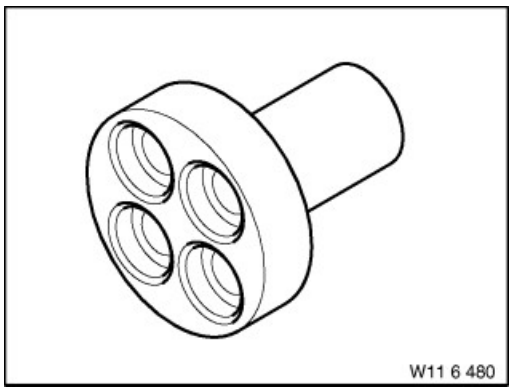


Common Used in step 1721

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)

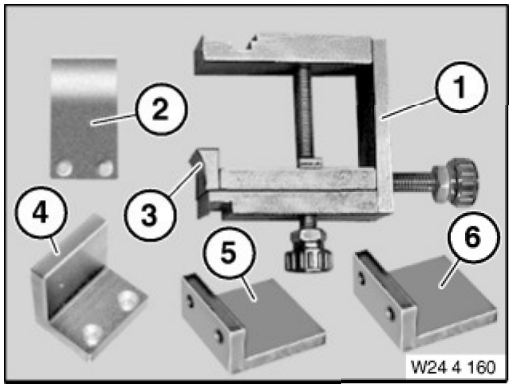
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0 493 380 (11 6 480) Connector



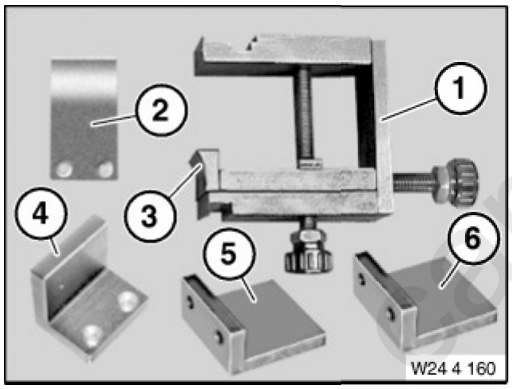
Common	Used in step 1820
Usage	For turning over engine at crankshaft hub (vibration absorber) when adjusting valve timing
Included in the tool or work	
Storage location	B2
Replaced by	
In connection with	
SI-Number	01 11 98 (338)

0 494 478 (24 4 161) Basic body



Common	Used in step 18
Usage	
Included in the tool or work	0 494 451
Storage location	C46
Replaced by	
In connection with	
SI-Number	

0 496 061 (24 4 166) Shaped element

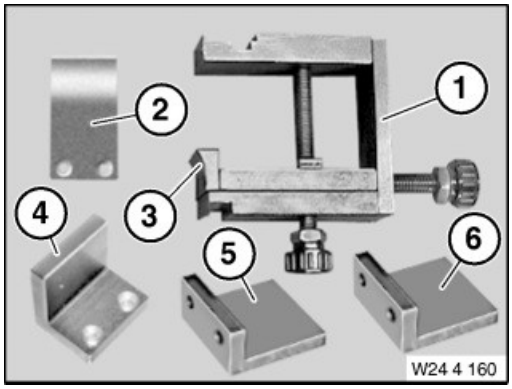


Common	Used in step 18
Usage	Transmission: GA6L45R (GM6) in E83 / N52K Deletion, only available via tool set
Included in the tool or work	0 494 451
Storage location	C46
Replaced by	
In connection with	
SI-Number	01 02 07 (334)

0 494 451 (24 4 160) Holder

Used in step 1820

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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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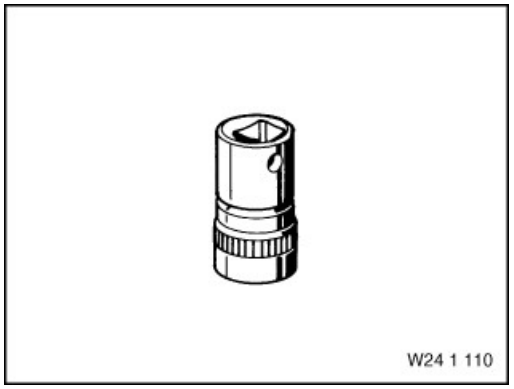
0 494 213 (24 2 390) Cap



Common Used in step 1820

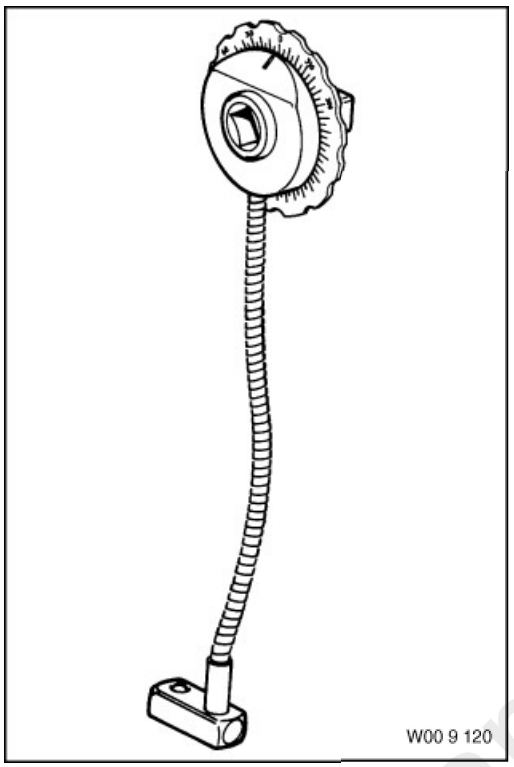
Usage	(protective cap) For sealing off the guide sleeve of the transmission connector
Included in the tool or work	
Storage location	C49
Replaced by	
In connection with	
SI-Number	01 14 01 (766)

0 491 667 (24 1 110) Socket wrench insert



Common	Used in step 20
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)

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



Common	Used in step 25
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 31
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 31

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	min. 9,28 l

Transmission oil: Automatic transmission fluid ATF 3+

GA8HP76Z transmission capacity Used in step 31

	min. 9,35 l

Transmission oil: Automatic transmission fluid ATF 3+

Links

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	130
61 20 900 Disconnecting and connecting battery earth lead	130
61 20 900 Disconnecting and connecting battery earth lead	130
61 20 900 Disconnecting and connecting battery earth lead	130
61 20 900 Disconnecting and connecting battery earth lead	130
61 20 900 Disconnecting and connecting battery earth lead	130
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	130
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	130
61 20 900 Disconnecting and connecting battery earth lead	130
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	130
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	130
61 20 900 Disconnecting and connecting battery earth lead	130
61 20 900 Disconnecting and connecting battery earth lead	130
61 20 900 Disconnecting and connecting battery earth lead	130
61 20 900 Disconnecting and connecting battery earth lead	130
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61 20 900 Disconnecting and connecting battery earth lead	130
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	130
61 20 900 Disconnecting and connecting battery earth lead	130
61 20 900 Disconnecting and connecting battery earth lead	130
61 20 900 Disconnecting and connecting battery earth lead	130
61 20 900 Disconnecting and connecting battery earth lead	130
61 20 900 Disconnecting and connecting battery earth lead	130
61 20 900 Disconnecting and connecting battery earth lead	130
17 11 035 Removing and installing/replacing fan cowl with electric fan	18

Operating materials	Used in step
14.0 Automatic transmission fluid for ZF-transmission GA8HP45Z / GA8HP50Z / GA8HP70Z / GA8HP90Z / GA8P70H / GA8P75H / GA8HP75Z	31

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24 00 116 Remove and install automatic transmission

PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

2 – Removing the acoustic cover

WARNING

Hot surfaces.

Risk of burning!

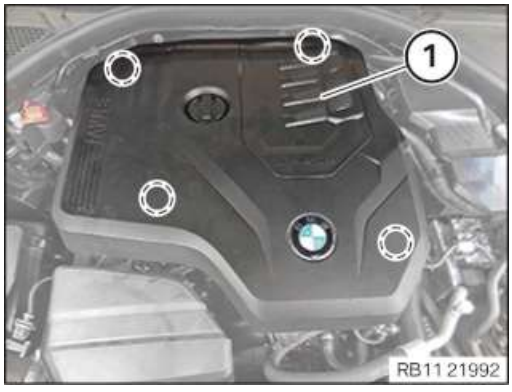
- Perform all work only on components that have cooled down.

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.



- Unclip the acoustic cover (1) from the holders in the **marked** areas towards the top.

3 – Removing the clean air pipe with the resonator

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WARNING

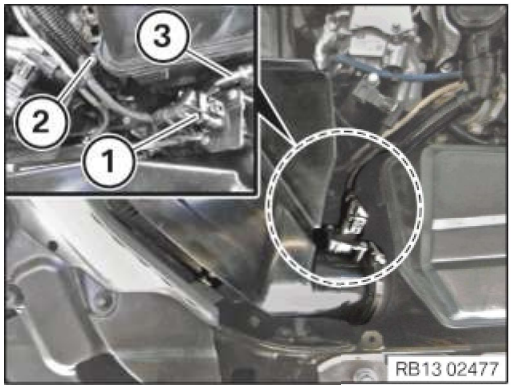
Hot surfaces.

Risk of burning!

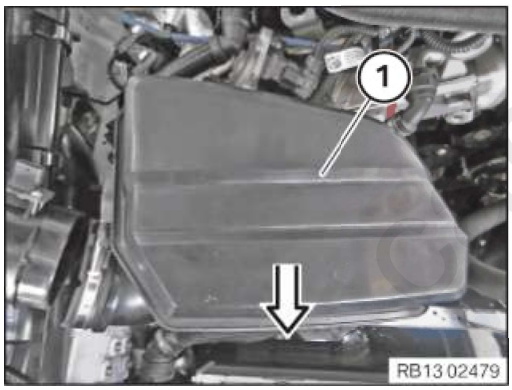
- Perform all work only on components that have cooled down.



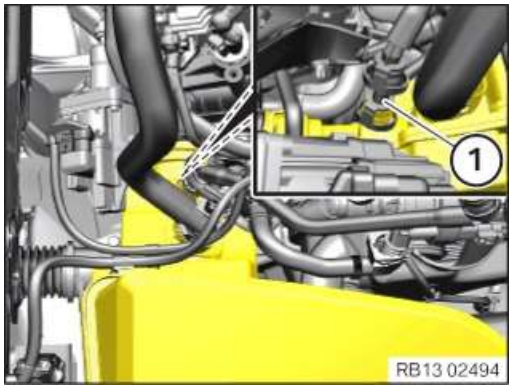
- Unlock the locks (1).
- Feed the engine ventilation line (2) out and set it aside.



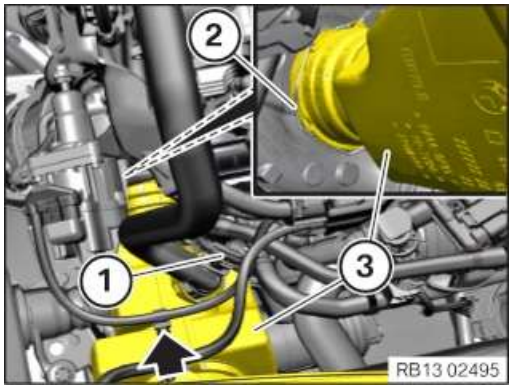
- Unlock plug connection (1) and disconnect.
- Loosen clamp (2).
- Unfasten clamp (3).
- Separate the clean air pipe with resonator from the intake filter housing.



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

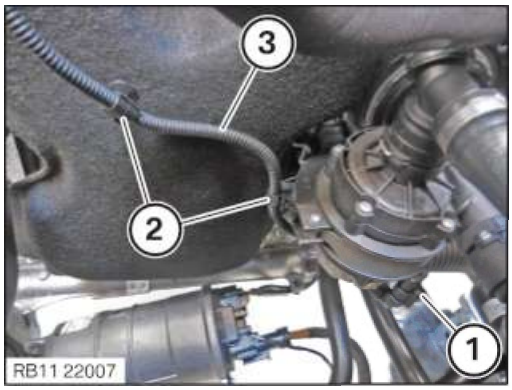


- Unlock and disconnect the tank ventilation line (1).

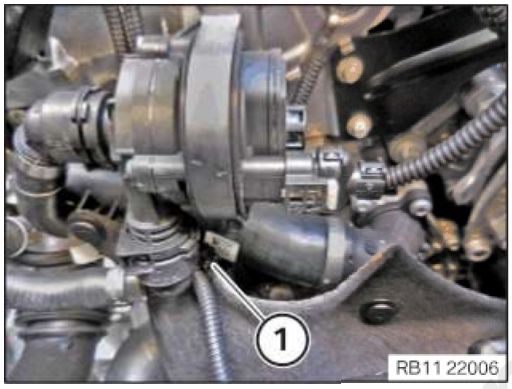


- Loosen the clamp (arrow).
- Unlock plug connection (1) and disconnect.
- Unlock the clamp (2).
- Feed out clean air pipe with resonator (3) and remove.

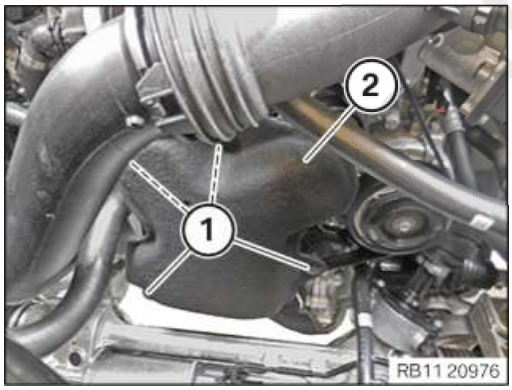
4 – Removing the acoustic cover for the engine at the front



- Unlock plug connection (1) and disconnect.
- Loosen clamps (2).
- Remove the wiring harness section (3) and put to one side.

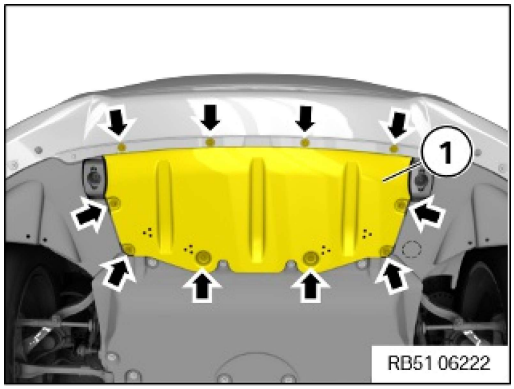


- Loosen clamp (1).



- Detach all expanding rivets (1).
- Guide the acoustic cover (2) out and remove.

5 – Removing the front underbody protection

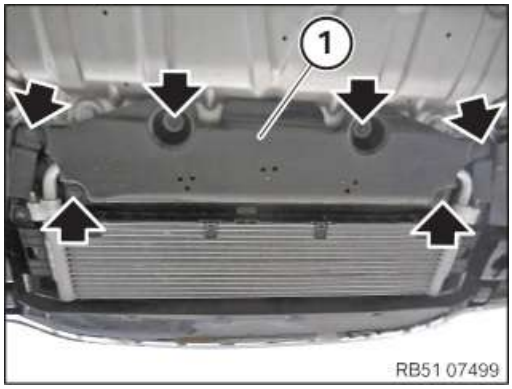


- **Version 1:**

  Remove screws (arrows).

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

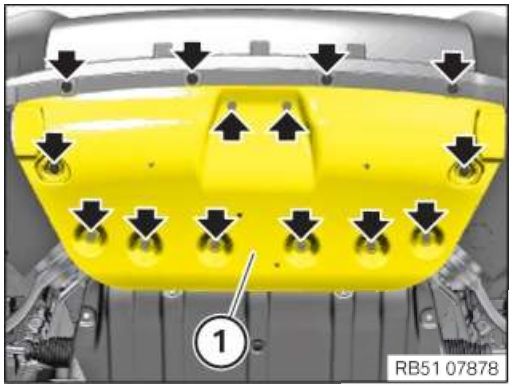
rdiagn.com



- **Version 2:**

  Remove screws (arrows).

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

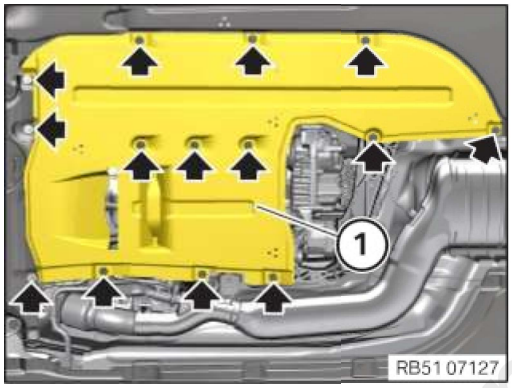


- **Version 3:**

  Remove screws (arrows).

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

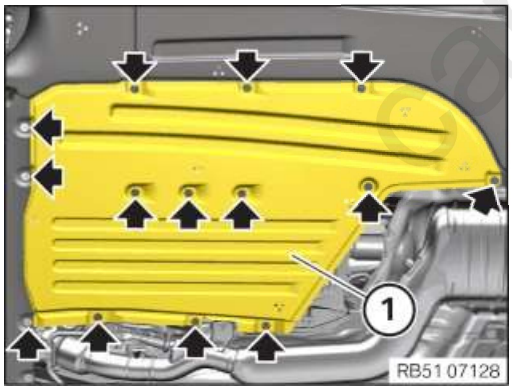
6 – Remove rear underbody protection



- **Version 1:**

  Remove screws (arrows).

  Feed out the rear underbody protection (1).

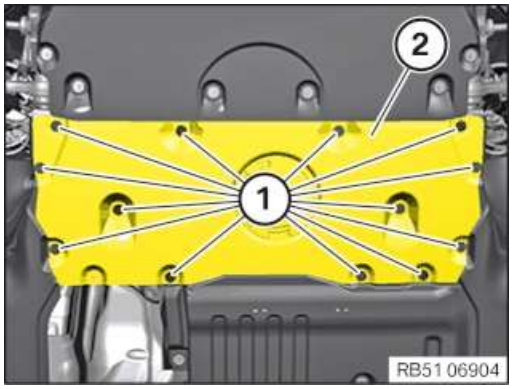


- **Version 2:**

  Remove screws (arrows).

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

7 – Removing the centre underbody protection

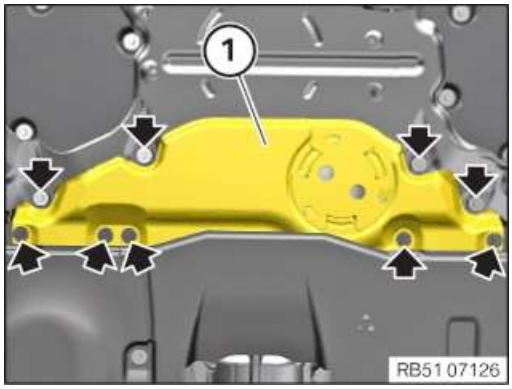


- **Version with rear-wheel drive:**

  Loosen screws (1).

  Remove centre underbody protection (2) .

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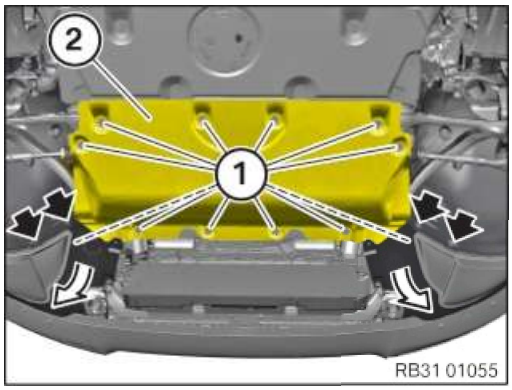


- **Version with all-wheel drive:**

  Remove screws (arrows).

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

8 – Remove the underbody protection of the steering gear



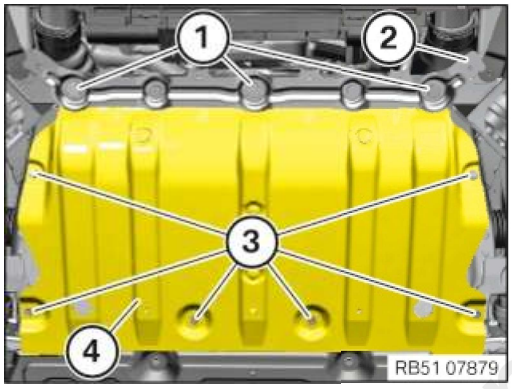
- **Version 1:**

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

  Fold the bottom wheel arch cover to the side.

  Loosen screws (1).

  Remove underbody protection of the steering gear (2).



- **Version 2:**

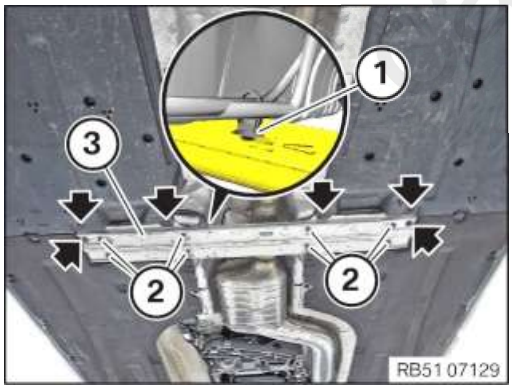
  Loosen screws (1).

  Remove the holder of the underride protection (2).

  Loosen screws (3).

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

9 – 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.

10 – Remove complete exhaust system

WARNING

Hot surfaces.

Risk of burning!

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

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CAUTION

Component with heavy weight.

Danger of injury!

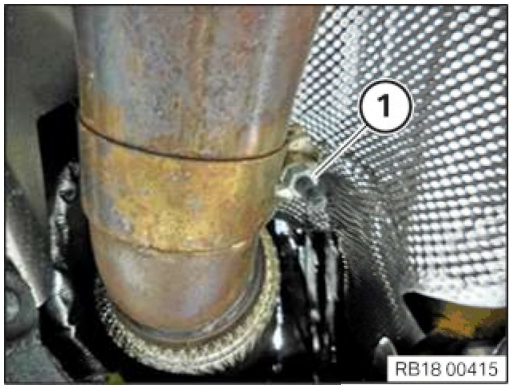
- Note component's centre of gravity.
- Support component using a jack.
- Secure component against falling off the jack.

CAUTION

Heavy component.

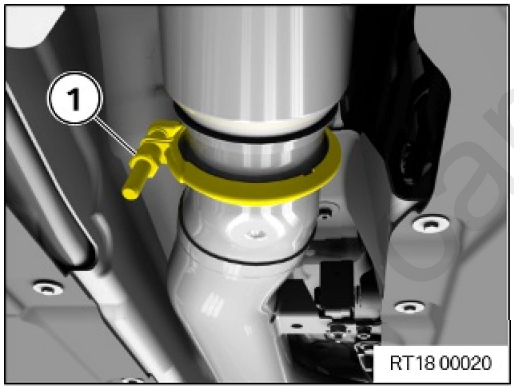
Heavy components can lead to injury or damage.

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



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

  Detach the ribbon clamp (1).



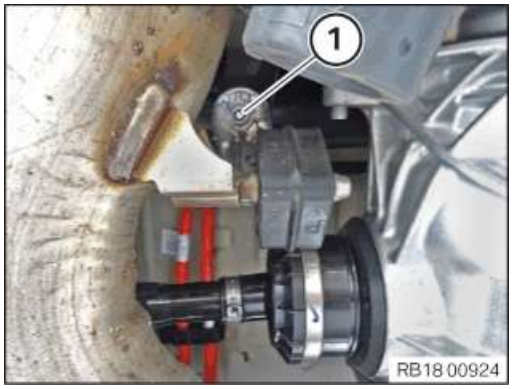
- **Equipment specification 2 (V-clips)**

  Unfasten clamp (1).

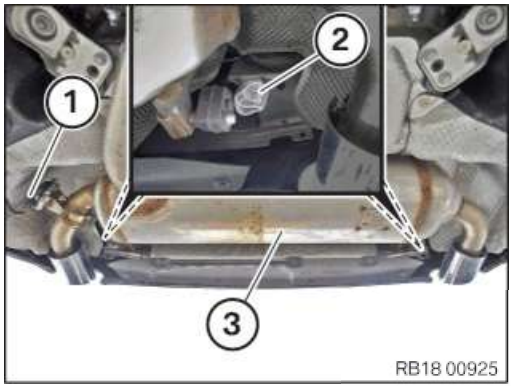


- Loosen nut (1).

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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.

11 – Removing starter motor

Prerequisite

Battery earth leads are disconnected.

WARNING

Hot surfaces.

Risk of burning!

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

WARNING

Working on 12 V vehicle electrical system.

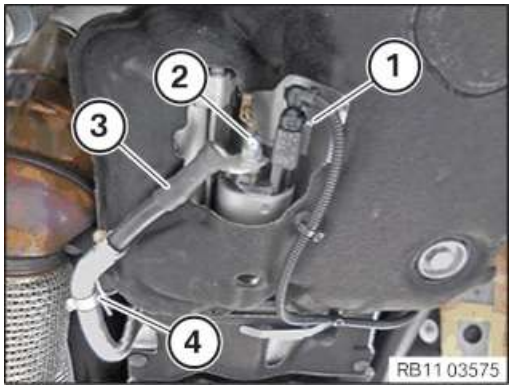
Risk of short circuits! Risk of fire!

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

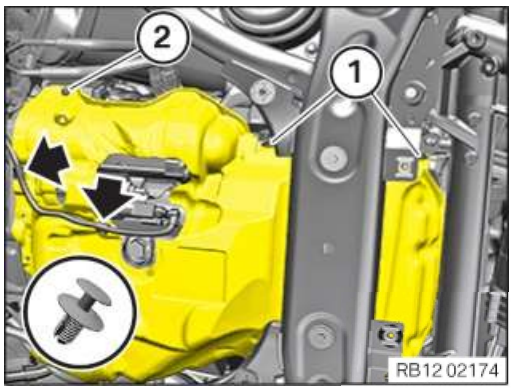
TECHNICAL INFORMATION

Make sure that the acoustic cover is **not** damaged while removing the starter motor.
A damaged lower acoustic cover can only be renewed when the front axle is lowered.

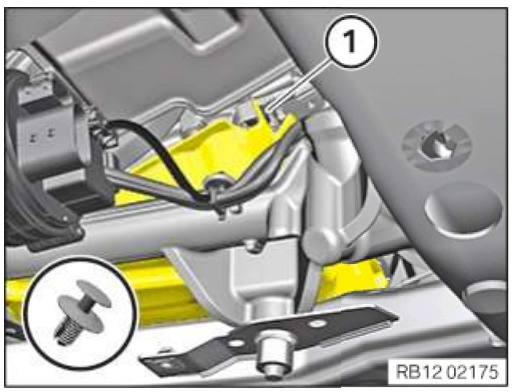
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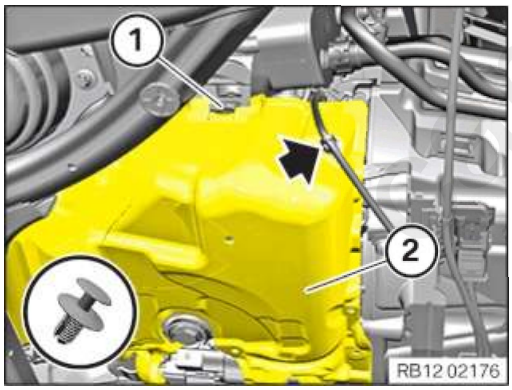
- Unlock plug connection (1) and disconnect.
- Loosen nuts (2).
- Release positive battery cable (3) from holder (4).



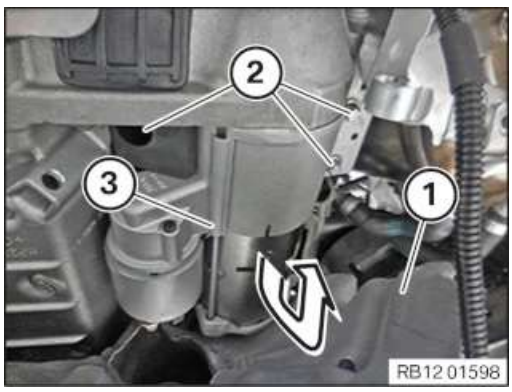
- Loosen the expanding rivet (1).
- Undo fir tree clip (2).
- Release the clamps (arrows).



- Loosen expanding rivet (1).
- Lower the acoustic cover of the oil sump.



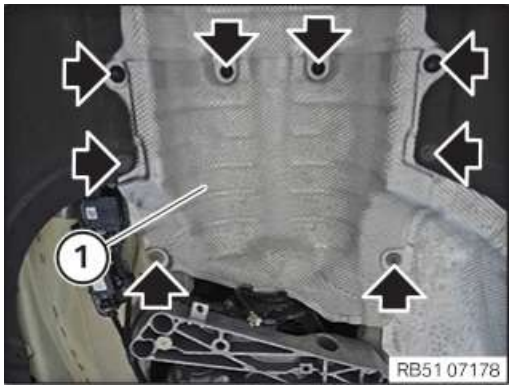
- Loosen expanding rivet (1).
- Loosen the clamp (arrow).
- Lower acoustic cover (2).



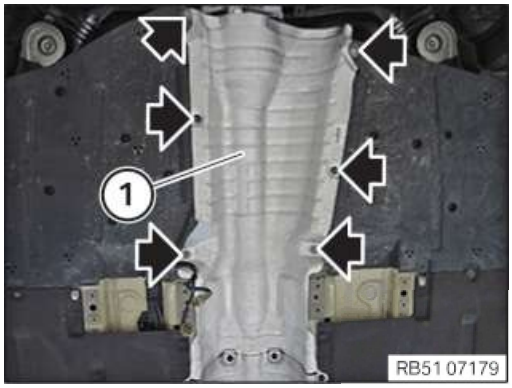
- Make sure that the acoustic cover (1) is not damaged.
- Carefully press the acoustic cover (1) to one side.
- Loosen screws (2).
- Carefully guide out the starter motor (3) in direction of arrow and remove.

12 – Remove heat shields

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



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

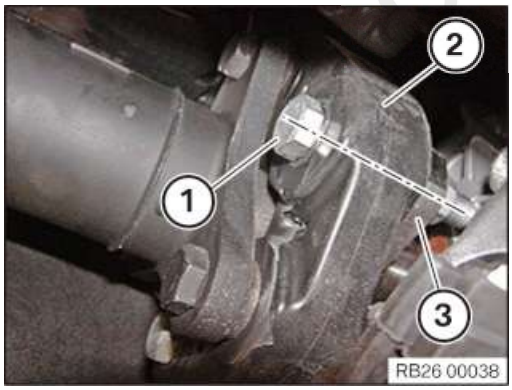
13 – Partially release propeller shaft

RISK OF DAMAGE

Damage to propeller shaft during removal.

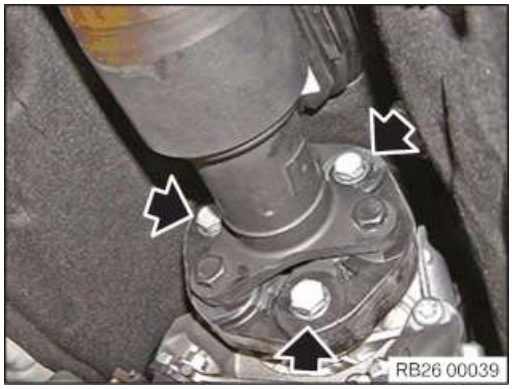
Non-observance of the removal guidelines for the propeller shaft on the rear axle differential may cause severe damage.

- 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.

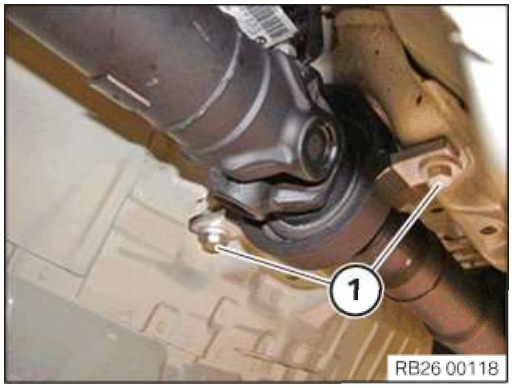


- Mark the installation position of the screw connection (1) of the flexible disc (2) and the three-hole flange (3).

  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.



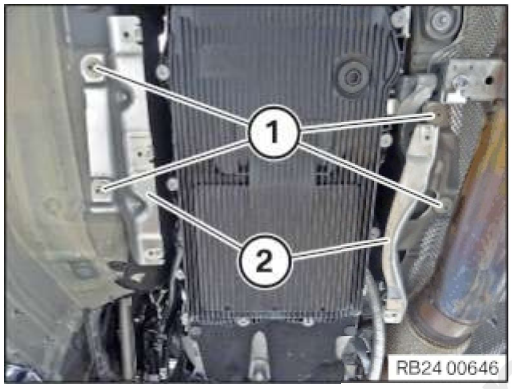
- Remove screws (arrows).



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

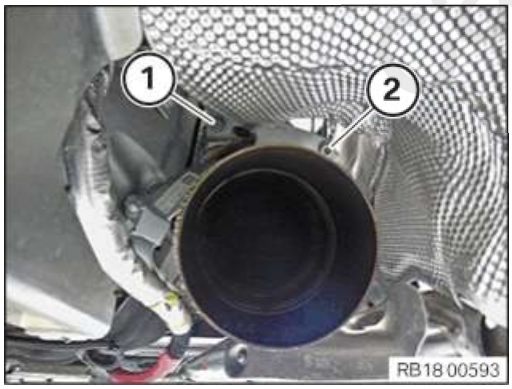
  Major deflection angles of the propeller shaft may damage the propeller shaft and/or the joints.
- Tie up propeller shaft to underbody.

14 – Remove the retaining plates

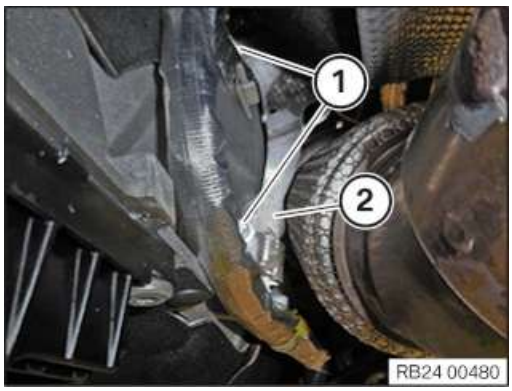


- Loosen nuts (1).
- Feed out retaining plates (2) and remove.

15 – Remove exhaust system holder



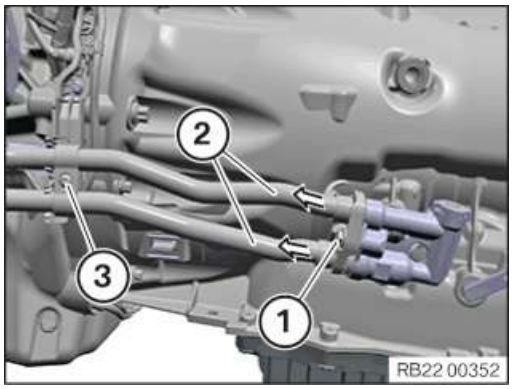
- Loosen screw (1).
- Loosen nut (2).



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

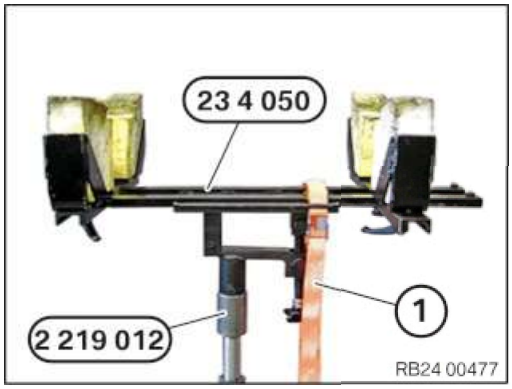
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16 – Disconnect hydraulic lines on the transmission

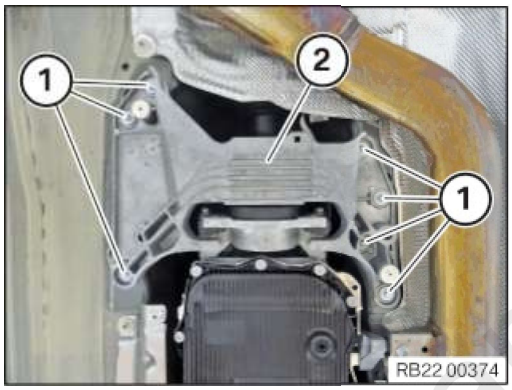


- Loosen screw (1).
- Loosen screw (3).
- Disconnect hydraulic lines (2) to transmission oil cooler.

17 – Detach 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 screws (1).
- Release transmission cross member (2).

MAIN WORK

18 – Remove automatic transmission (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.

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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.

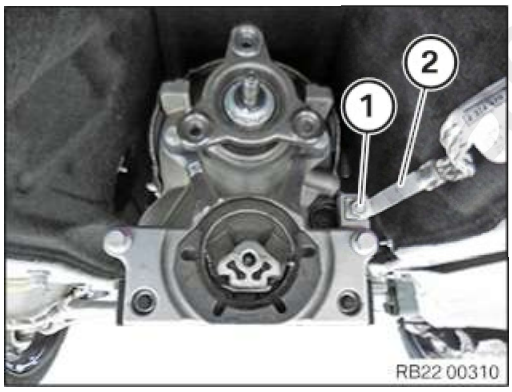
- Before removing the transmission: Support engine.
- Secure the engine against tilt movements.
- Follow the specifications of the repair instructions.

RISK OF DAMAGE

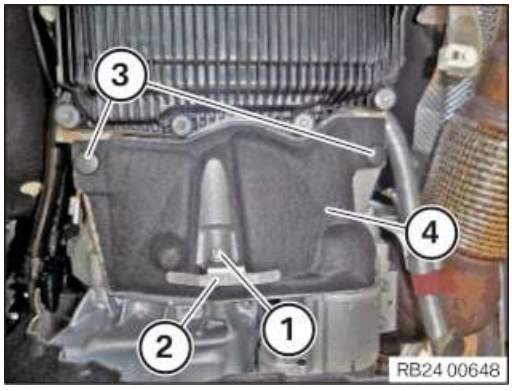
Damage to the transmission.

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).



- Loosen the screw (1) and remove the holder (2).
- Pull the expanding rivet (3) off.
- Remove the acoustic cover (4).

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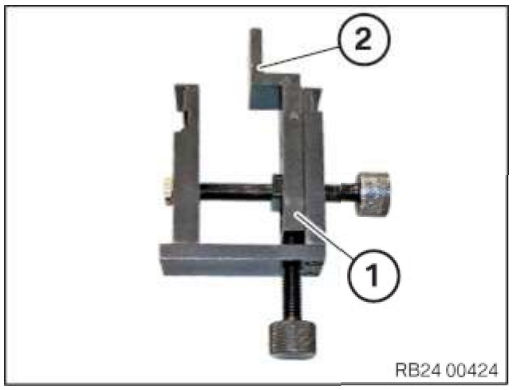
TECHNICAL INFORMATION

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

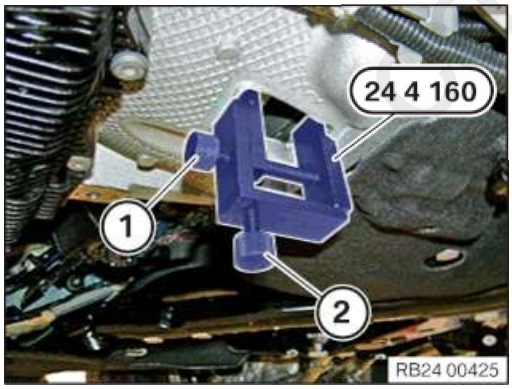
- Turn the engine on the vibration damper with the special tool 0 493 380 (11 6 480) in the direction of rotation until the bolt (1) becomes visible in the recess.
- Undo all 6 screws (1) on the torque converter.



- Prepare special tool 0 494 478 (24 4 161) (1) with the shaped element 0 496 061 (24 4 166) (2) as shown.

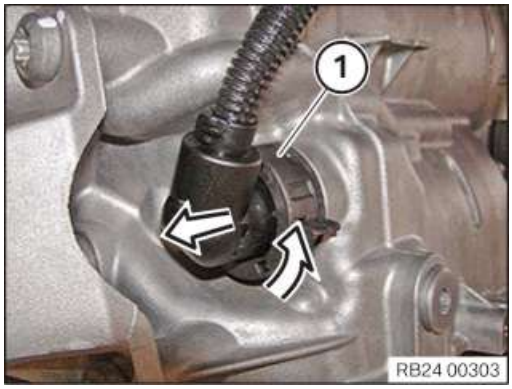


- Remove the sealing cap (1).



- 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).

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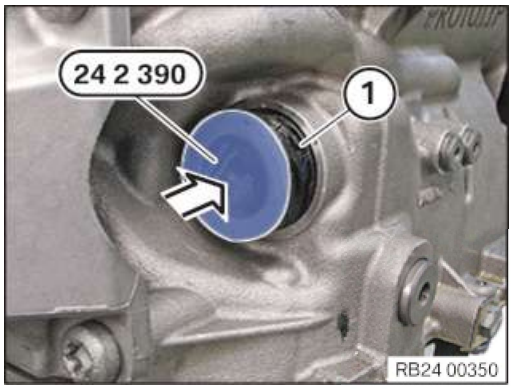


TECHNICAL INFORMATION

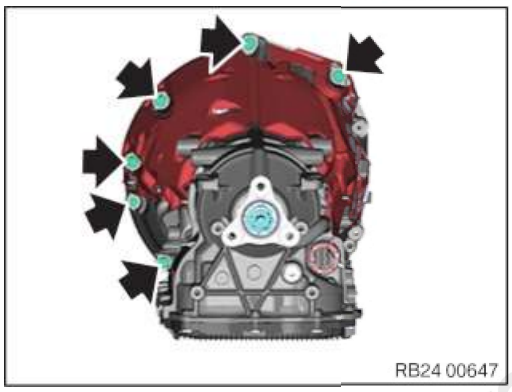
Notes on mechatronics are a fundamental requirement for these repair instructions and must be complied with at all times.

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.



- Support engine.
- Release remaining screws.
- Remove transmission.

19 – Install automatic transmission (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.

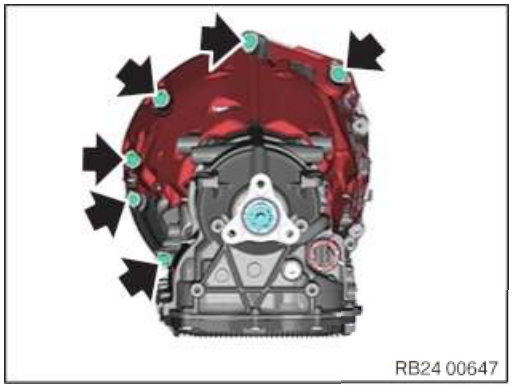
TECHNICAL INFORMATION

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

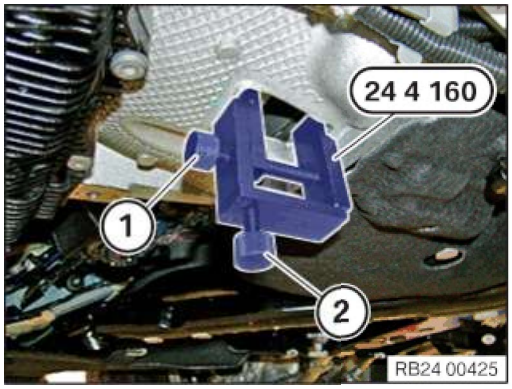
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- Check the fitting sleeves (1) for correct fit and damage and renew as needed.



- Transmission flange-mount.
- 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).

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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

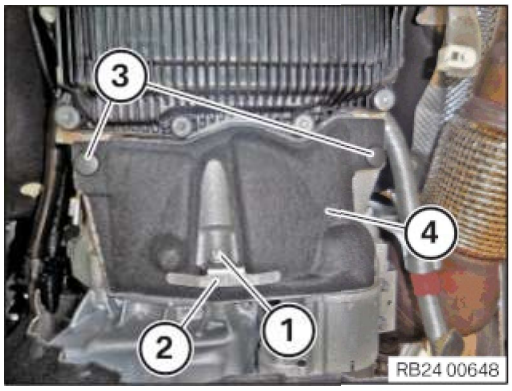
- Renew screws.

  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



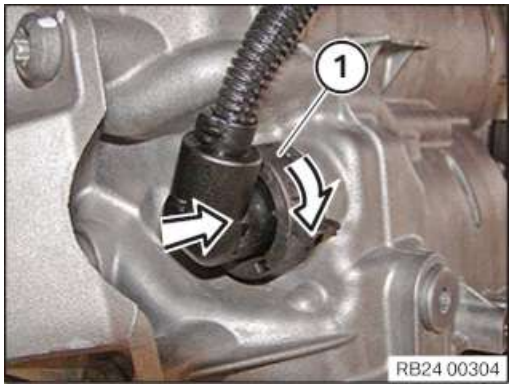
- Install acoustic cover (4).
- Install expanding rivet (3).
- Install the holder (2) and tighten the screw (1).

Transmission to engine

M8		Tightening torque	19 Nm
M12		Tightening torque	66 Nm



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



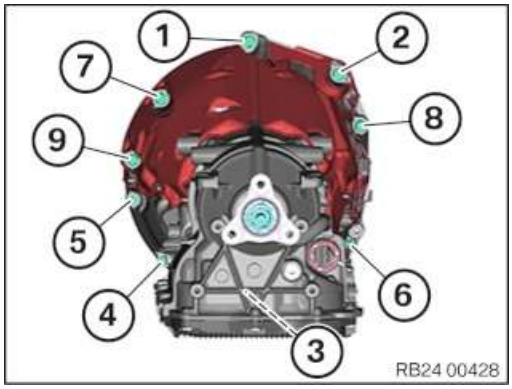
TECHNICAL INFORMATION

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.

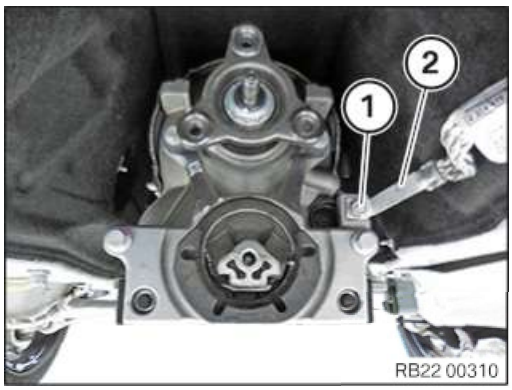
.com



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

Transmission to engine

M8		Tightening torque	19 Nm
M12		Tightening torque	66 Nm



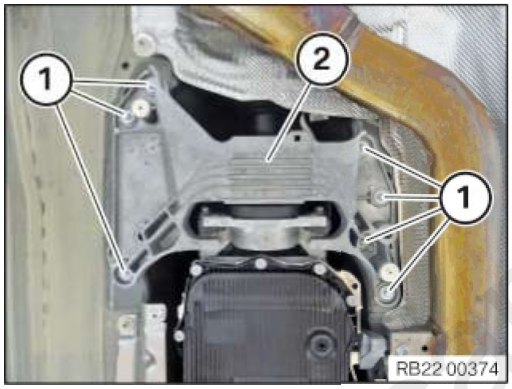
- Install the ground strap (2).
- Tighten down screw (1).

Ground strap to transmission or body

M8		Tightening torque	19 Nm

POSTPROCESSES

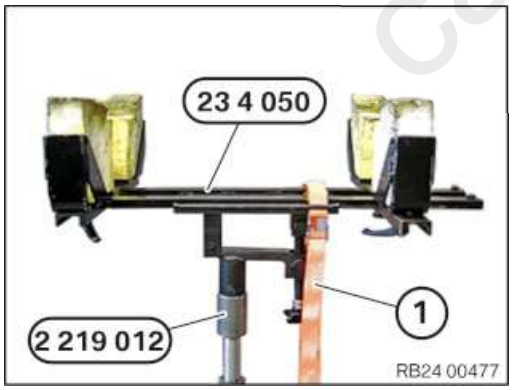
20 – Install transmission cross member.



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

Transmission cross member to body

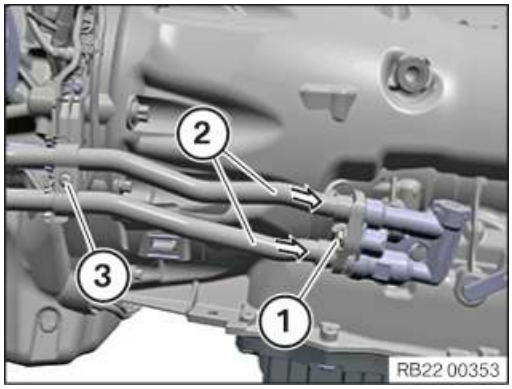
M8	Renew screws.	Tightening torque	19 Nm



- 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.

21 – Fix hydraulic lines

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- Renew sealing rings.

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

Transmission oil line to transmission

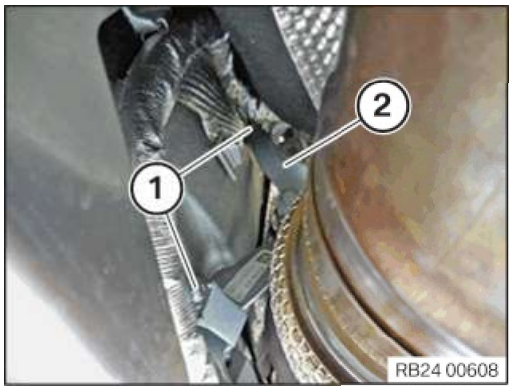
M6x25	Renew the sealing ring.	Tightening torque	8 Nm

- Position and tighten the screw (3).

Transmission oil line on holder

M6		Tightening torque	8 Nm

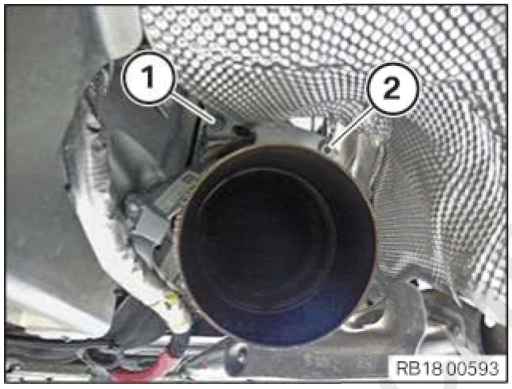
22 – Install the exhaust bracket



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

Transmission to engine

M8		Tightening torque	19 Nm
M12		Tightening torque	66 Nm



- Tighten down screw (1).

Catalytic converter to holder

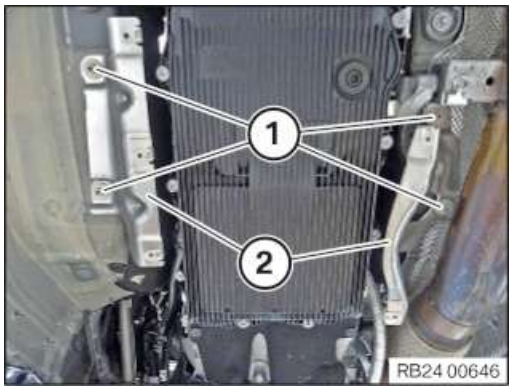
M8	Renew screw.	Tightening torque	19 Nm

- Tighten nut (1).

Catalytic converter to holder

M8	Renew nut.	Tightening torque	19 Nm

23 – 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

24 – Partially installing the propeller shaft

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

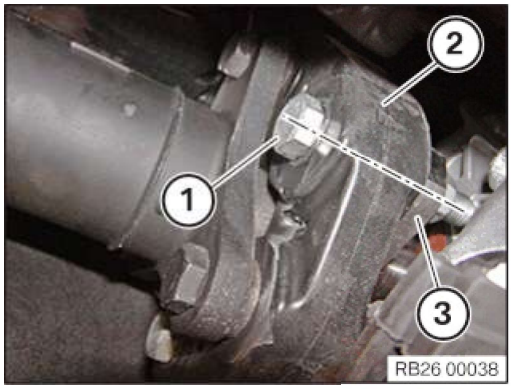


- Apply a thin coat of grease to the soft centring (1), if necessary.

  Do not grease the hard centring (2).

Expendable materials

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

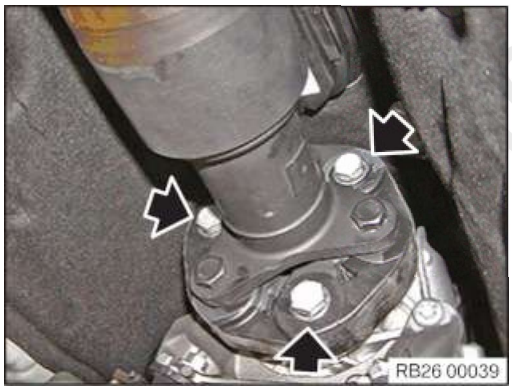


- Renew screws and the self-locking nuts.

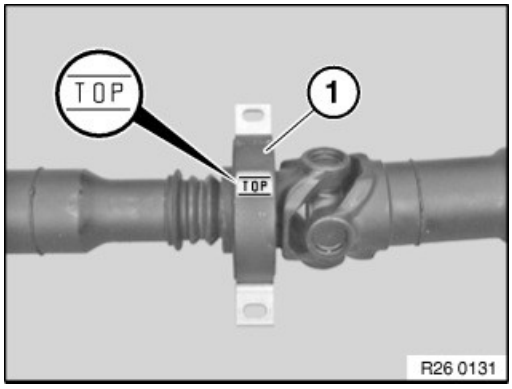
  Parts: Screws, self-locking nuts

- 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.

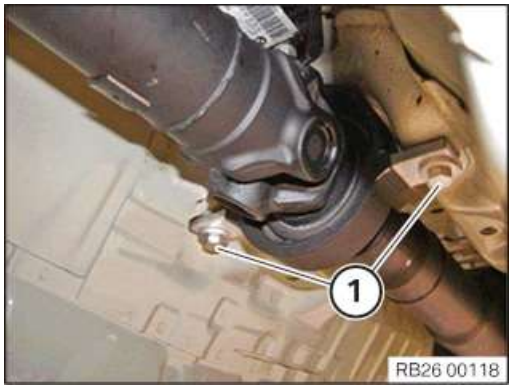


- Hand-tighten the screws and nuts (arrows), but do not tighten fully.



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

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



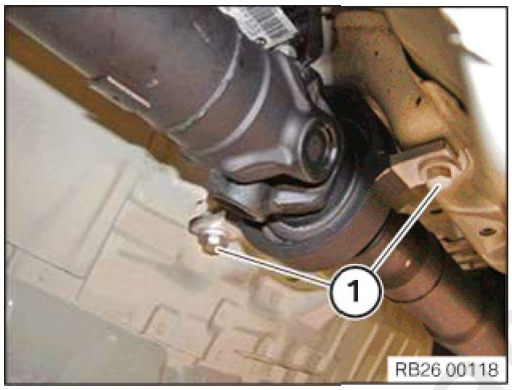
- Renew screws.

  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.

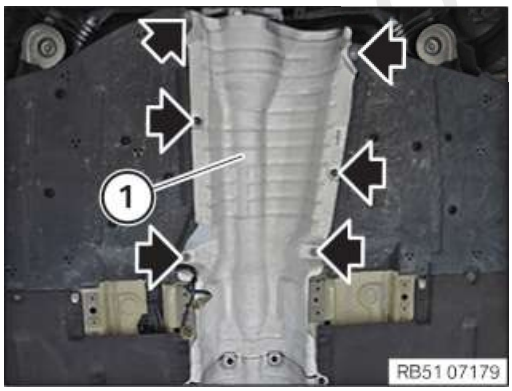


- Tighten the screws (1).

Centre mount to body

M8		Tightening torque	19 Nm

25 – Install the heat shields

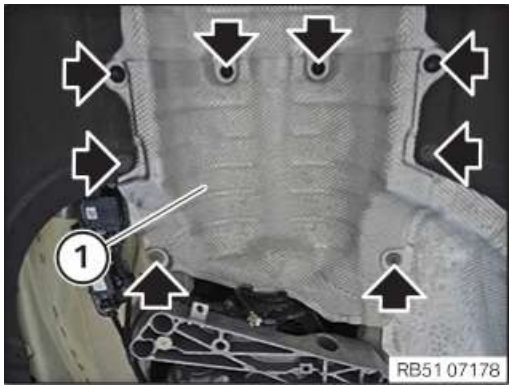


- Install heat shield (1).
- Tighten the nuts and bolts (arrows).

Heat shield to vehicle underbody

Screws and nuts		Tightening torque	3 Nm

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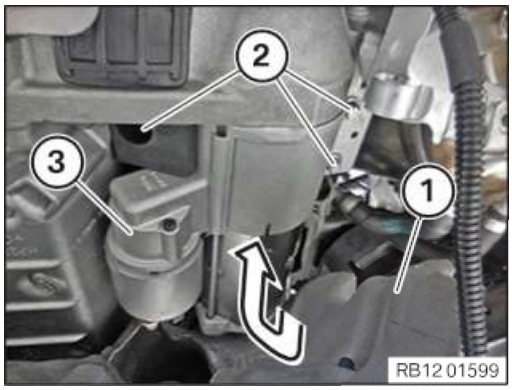


- Install heat shield (1).
- Tighten the nuts and bolts (arrows).

Heat shield to vehicle underbody

Screws and nuts		Tightening torque	3 Nm

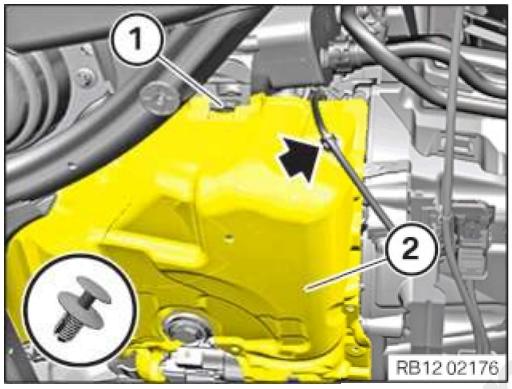
26 – Installing starter motor



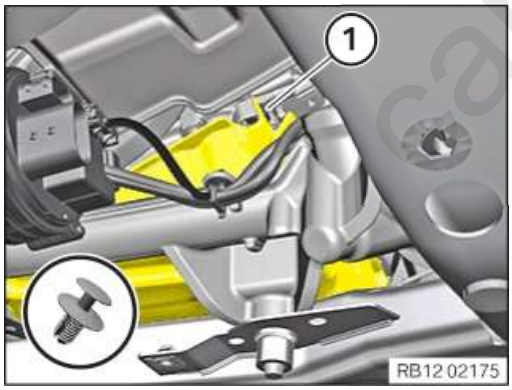
- Make sure that the acoustic cover (1) is not damaged.
- Carefully press the acoustic cover (1) to one side.
- Feed in and install the starter motor (3) in the direction of the arrow.
- Tighten the screws (2).

Starter motor to engine

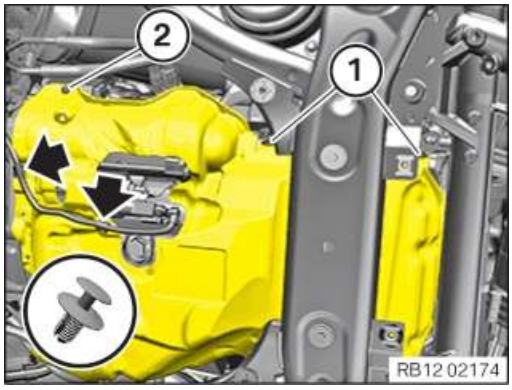
M8X60		Tightening torque	19 Nm



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

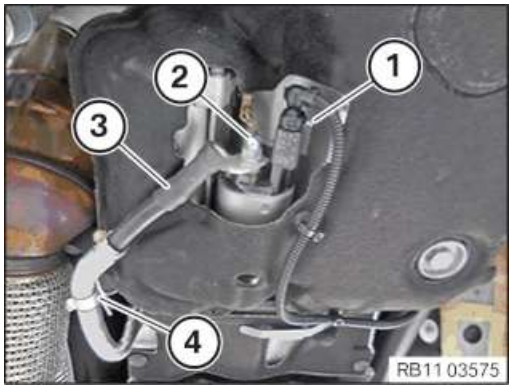


- Fasten expanding rivet (1).

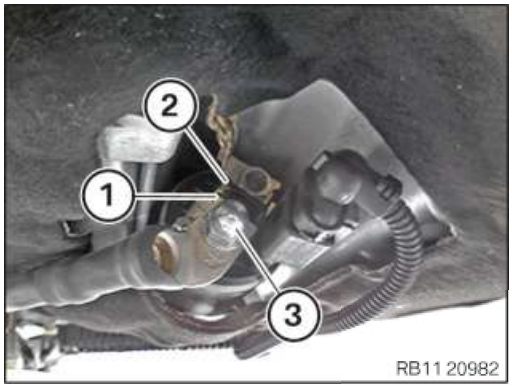


- Secure fir tree clip (2).
- Secure expanding rivet (1).
- Secure the clamps (arrows).

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- Secure the positive battery cable (3) in the holder (4) and position it at the starter motor.
- Tighten the nut (2) hand-tight.
- Connect the connector (1) and audibly lock it.



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

27 – 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.

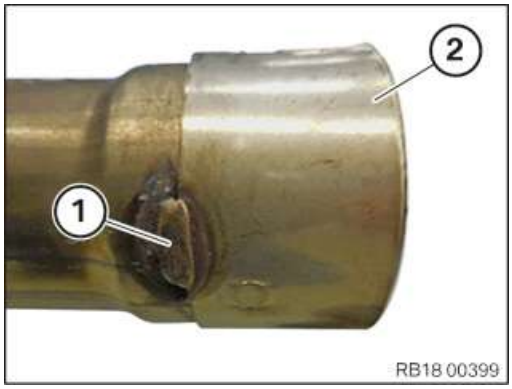
CAUTION

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.

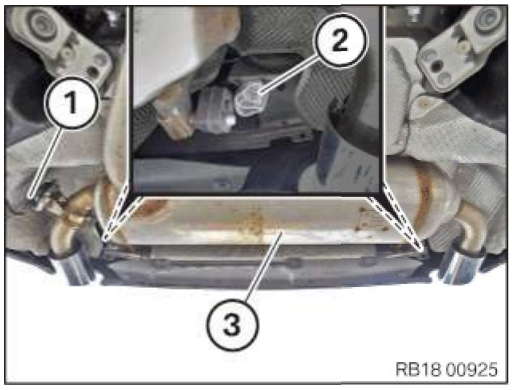
Danger of injury!

- 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).

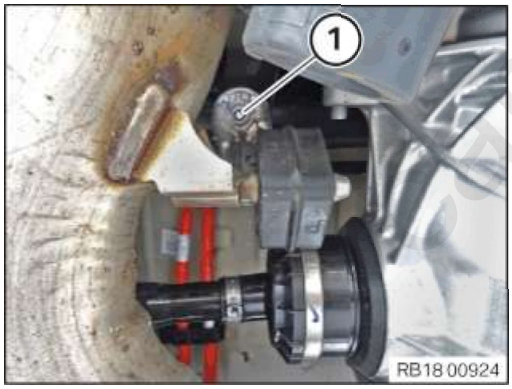
  Parts: Nuts
- Tighten nuts (2).

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 silencer / petrol particulate filter on transmission bracket

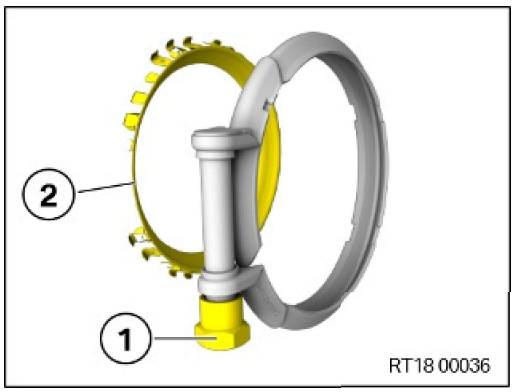
M8	Renew nut.	Tightening torque	19 Nm



- Tighten the ribbon clamp (1).

Exhaust system to catalytic converter

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

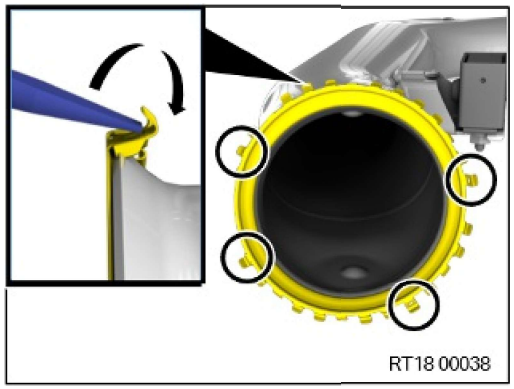


- **Equipment specification 2 (V-clips)**

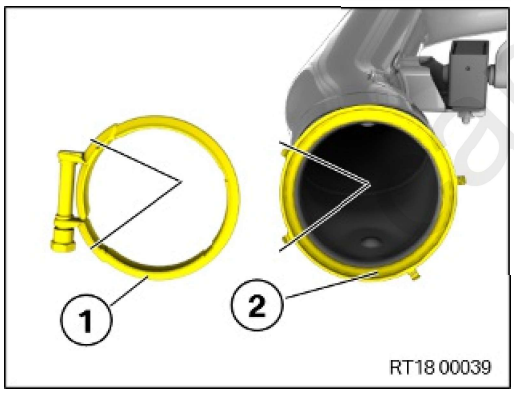
  Renew V-band clamp.

  Parts: V-band clamp

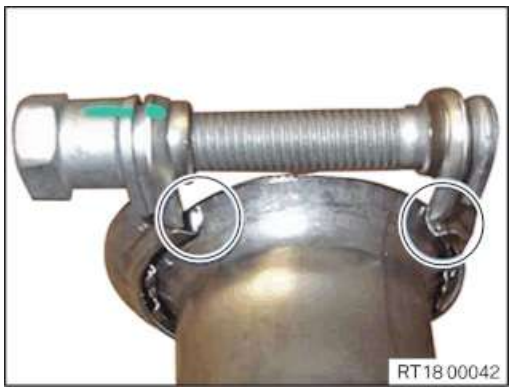
  Unscrew the nut (1) and remove the sealing ring (2).



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

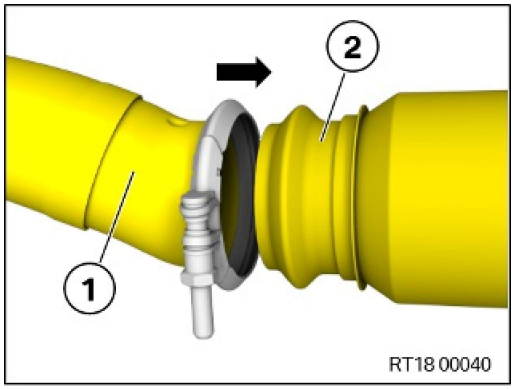


- Mount the V-clip (1) on the sealing ring (2).
- Make sure that the V-clip (1) is positioned correctly on the sealing ring (2).

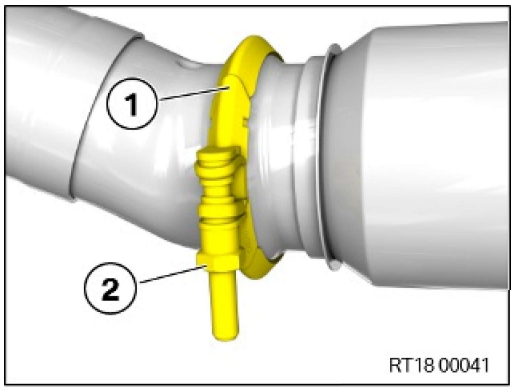


- Ensure that the V-clip rests against the sheet metal tabs in the marked areas after mounting.

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

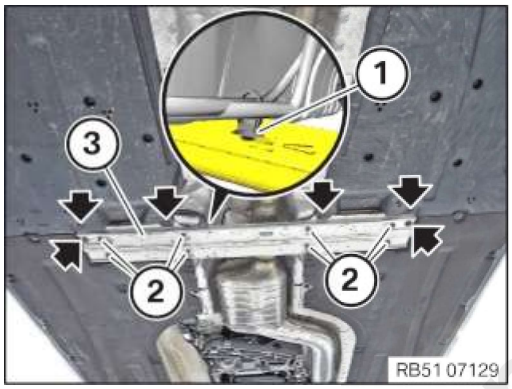


- Make sure that V-clip (1) is fitted correctly.
- Tighten down screw (2).

V-clip to catalytic converter

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

28 – 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).

29 – Disconnecting all battery earth leads



- See additional information.

30 – Checking/topping up oil level in automatic transmission

Prerequisite

Vehicle in horizontal position.

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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.



- **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.

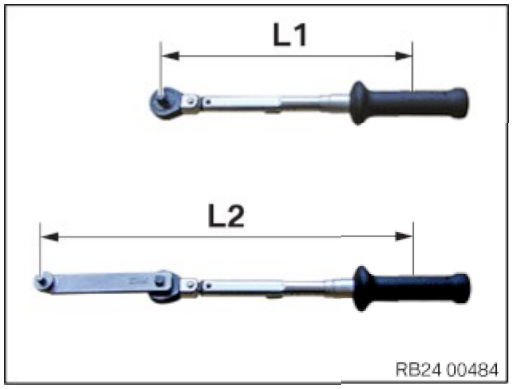
GA8HP51Z transmission capacity

	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+	

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TECHNICAL INFORMATION

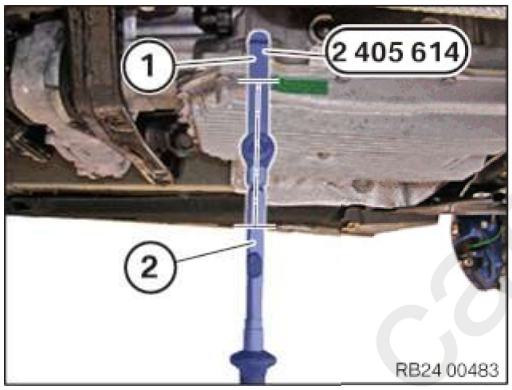
The setpoint torque deviates from the torque to be set when using special tool 2 405 614.

- **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

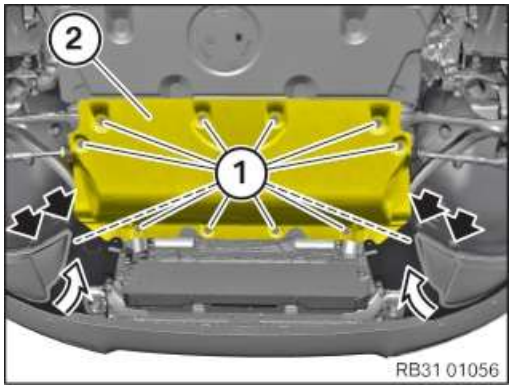
- Make sure that the special tool 2 405 614 and the torque wrench (2) align while tightening the oil filler plug (1).
- Tighten the oil filler plug (1) with the special tool 2 405 614 and the torque wrench (2).

Oil filler plug

M18x1.5		Tightening torque	35 Nm

31 – Install the underbody protection of the steering gear

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- **Version 1:**
- Position the underbody protection of the steering gear (2).
- Tighten the screws (1).

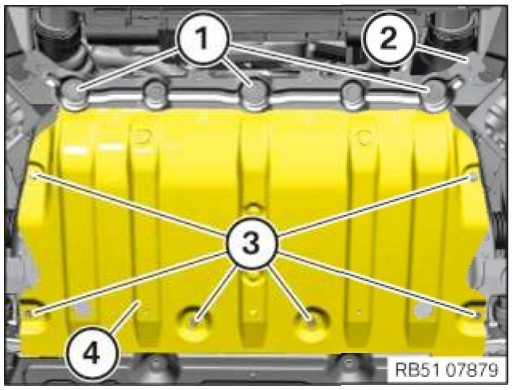
Underbody protection of the steering gear

Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

- Position the bottom wheel arch cover.
- Tighten the screws (arrows) of the bottom wheel arch cover on the wheel arch cover.

Wheel arch cover (screws)

Thermoplastic hexagon screw		Tightening torque	3 Nm



- **Version 2:**
- Guide in the steering gear underbody protection (4) and install.
- Tighten the screws (3).

Underbody protection of the steering gear

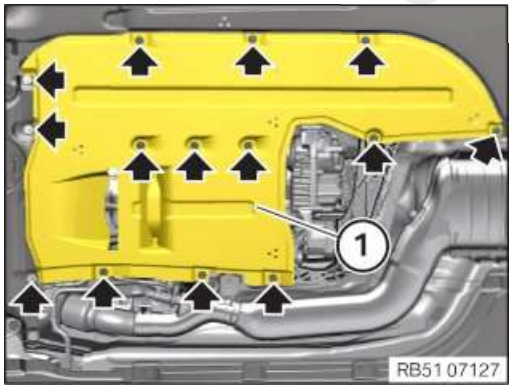
Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

- Position holder of underride protection (2).
- Tighten the screws (1).

Holder underride guard to front axle support

M10		Tightening torque	56 Nm

32 – Installing underbody protection at rear



- **Version 1:**

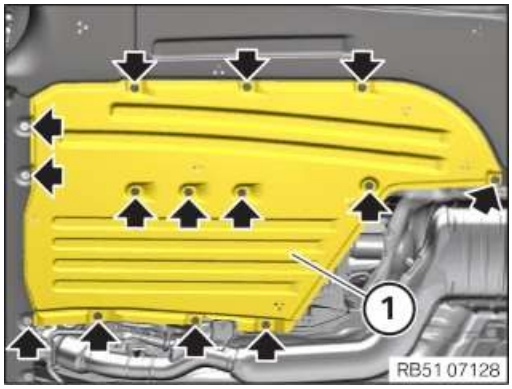
  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

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- **Version 2:**

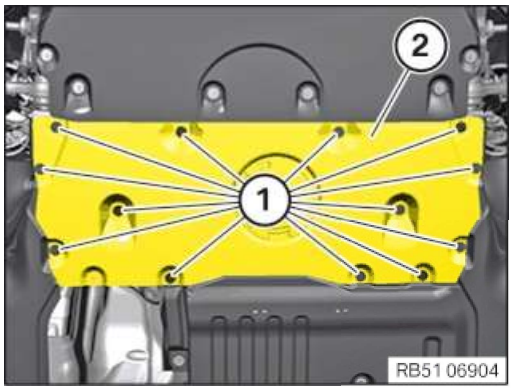
  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

33 – Installing the centre underbody protection



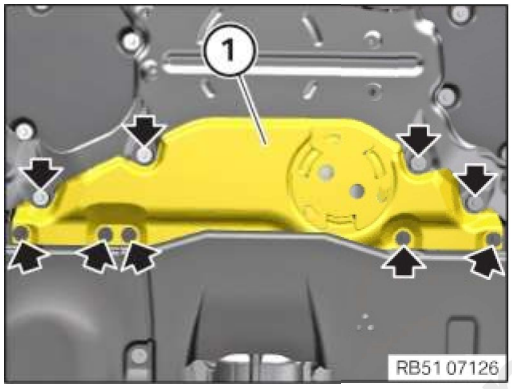
- **Version with rear-wheel drive:**

  Position central underbody protection (2).

  Tighten the screws (1).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



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

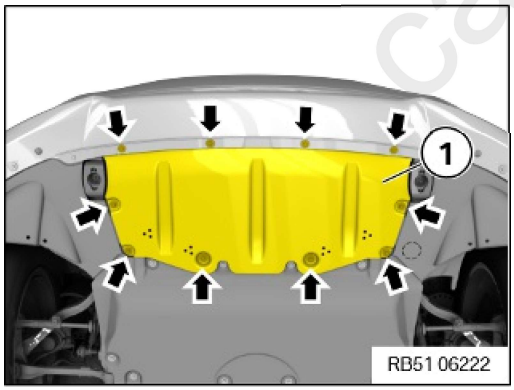
  Guide in and install the centre of underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

34 – Installing the front underbody protection



- **Version 1:**

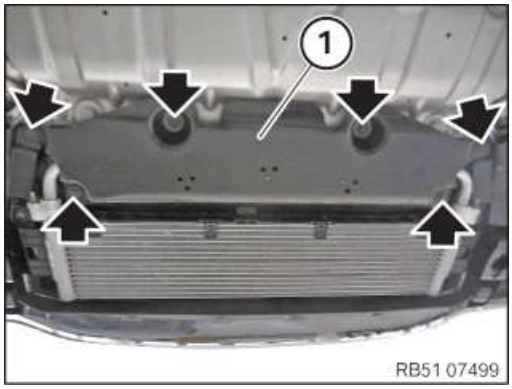
  Feed in the front underbody protection (1) towards the front under the bumper panel and position.

  Tighten screws (arrows).

Underbody protection front

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

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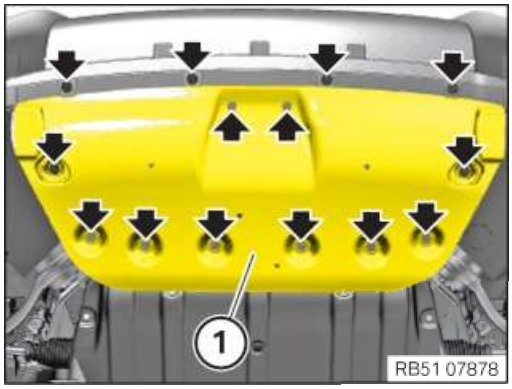
- **Version 2:**

  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:**

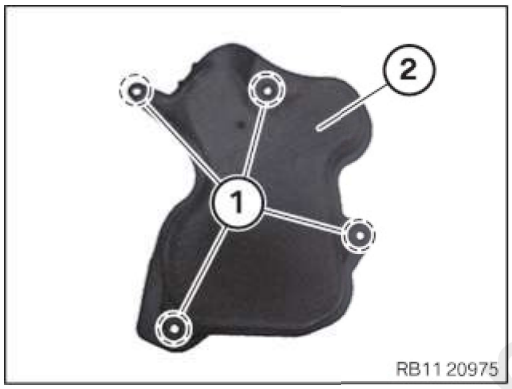
  Feed in and install front underbody protection (1).

  Tighten screws (arrows).

Underbody protection front

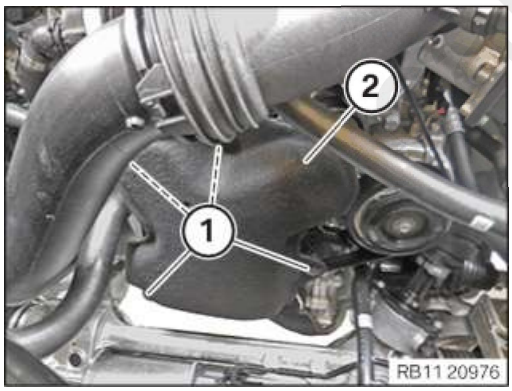
Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

35 – Install the acoustic cover for the engine at the front

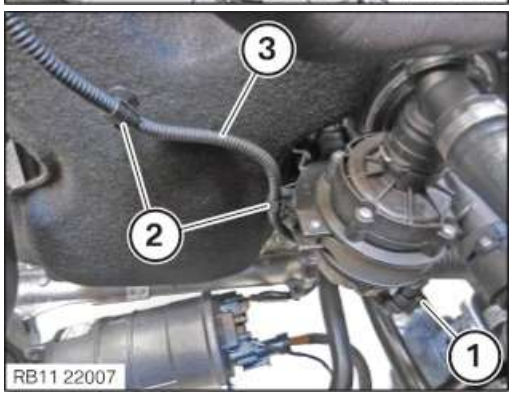


- Check if acoustic cover (2) in marked area (1) is damaged and replace acoustic cover (2) if necessary.

  Parts: Acoustic cover



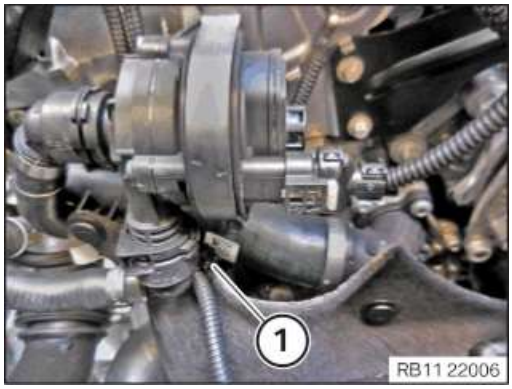
- Thread in and position the acoustic cover (2).
- Mount all expanding rivets (1).



- Feed in and position wiring harness section (3).
- Secure clamps (2).
- Connect connectors (1) and lock.

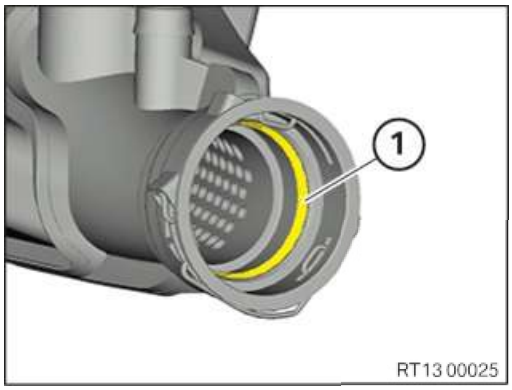
  The connector (1) must engage audibly.

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- Secure clamps (1).

36 – Installing the clean air pipe with resonator

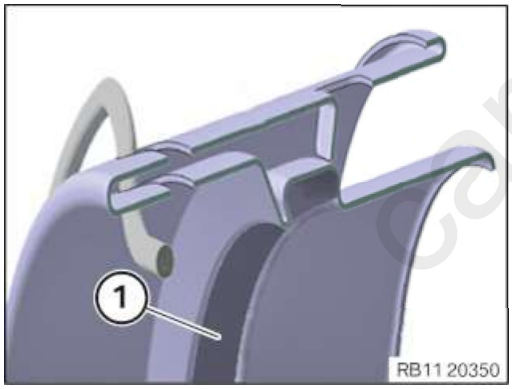


- Check the seal (1) for damages, replace if necessary.

▸ **Replace damaged gasket**

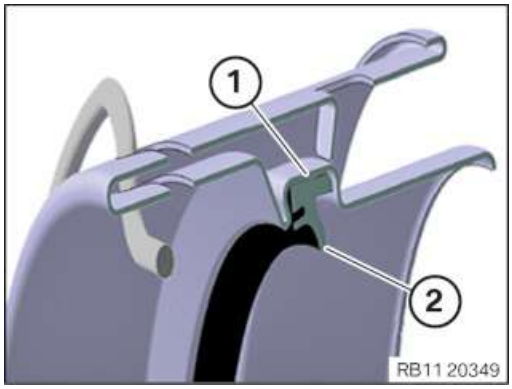
TECHNICAL INFORMATION

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



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

  The gasket groove (1) must be clean.



- Renew gasket.

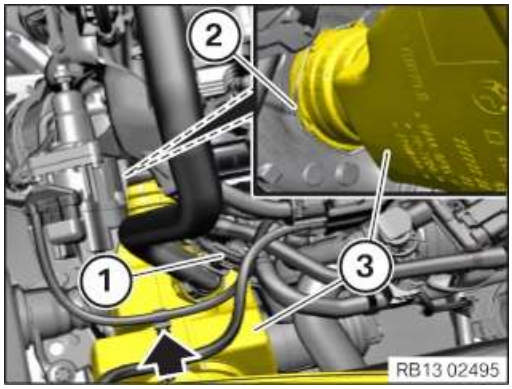
  Parts: Gasket
- Install seal dry without lubricant or mounting agent.

TECHNICAL INFORMATION

Incorrect assembly is possible. Ensure correct installation position.

- Feed in and install the seal.
- Make sure the seal is correctly installed in the gasket groove (1).
- Make sure that the sealing lip (2) is pointing downwards (see figure).

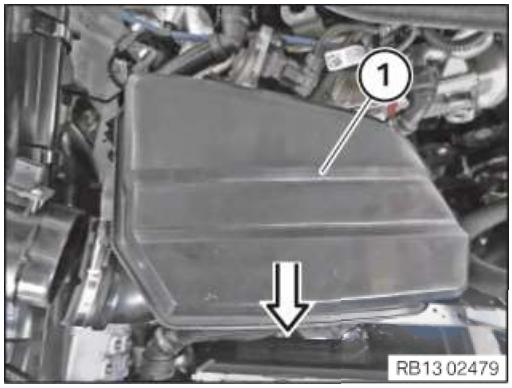
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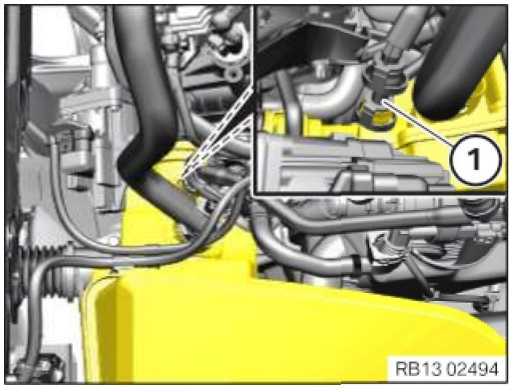
- Guide in and install the clean air pipe with resonator (3).
- Lock clamp (2).

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

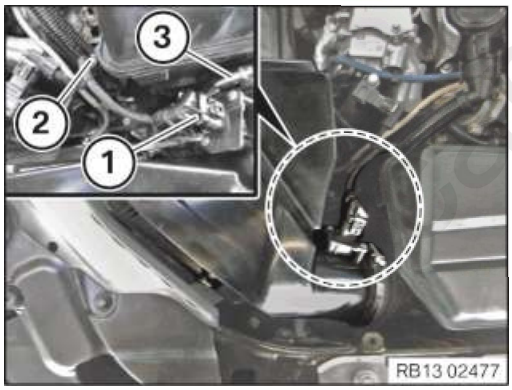
  The connector (1) must engage audibly.
- Secure clamp (arrow).



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



- Connect and lock the tank ventilation line (1).



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

Clean air pipe to upper section of intake filter housing

Clamp		Tightening torque	3 Nm

- Secure the clamp (2).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.



- Insert and install the engine ventilation line (2).
- Ensure that the locks (1) engage audibly.

37 – Install acoustic cover

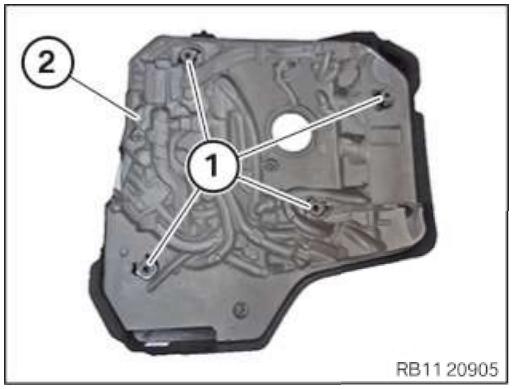
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RISK OF DAMAGE

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.



- Check all rubber mounts (1) of acoustic cover (2) for correct seating.



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

  The acoustic cover (1) must audibly engage into place.

Additional Information

Overview of Tightening Torques

Torque converter to flywheel — Used in step 19

M10	Renew screws.	Tightening torque	56 Nm

Transmission to engine — Used in step 1922

M8		Tightening torque	19 Nm
M12		Tightening torque	66 Nm

Ground strap to transmission or body — Used in step 19

M8		Tightening torque	19 Nm

Transmission cross member to body — Used in step 20

M8	Renew screws.	Tightening torque	19 Nm

Transmission oil line to transmission — Used in step 21

M6x25	Renew the sealing ring.	Tightening torque	8 Nm

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Transmission oil line on holder — Used in step 21

M6		Tightening torque	8 Nm

Catalytic converter to holder — Used in step 22

M8	Renew screw.	Tightening torque	19 Nm

Catalytic converter to holder — Used in step 22

M8	Renew nut.	Tightening torque	19 Nm

Retaining plates for vehicle underbody cover — Used in step 23

Sheet metal nut	Replace nuts.	Tightening torque	3 Nm

Front flexible disc to propeller shaft — Used in step 24

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 24

M8		Tightening torque	19 Nm

Heat shield to vehicle underbody — Used in step 25

Screws and nuts		Tightening torque	3 Nm

Starter motor to engine — Used in step 26

M8X60		Tightening torque	19 Nm

Battery positive lead to starter — Used in step 26

M8		Tightening torque	13,5 Nm

Rear silencer to body / bumper support — Used in step 27

M8	Replace nuts.	Tightening torque	19 Nm

Exhaust system to rear axle carrier — Used in step 27

Nut M8	Renew nut.	Tightening torque	19 Nm

Front silencer / petrol particulate filter on transmission bracket — Used in step 27

M8	Renew nut.	Tightening torque	19 Nm

Exhaust system to catalytic converter — Used in step 27

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

V-clip to catalytic converter — Used in step 27

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

Connecting support to tunnel — Used in step 28

M8x25 screw		Tightening torque	20 Nm
Screw		Tightening torque	3 Nm

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Oil filler plug Used in step 30

M18x1.5		Tightening torque	35 Nm

Underbody protection of the steering gear Used in step 31

Hexagon screw for thermoplastic		Tightening torque	3 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Wheel arch cover (screws) Used in step 31

Thermoplastic hexagon screw		Tightening torque	3 Nm

Holder underride guard to front axle support Used in step 31

M10		Tightening torque	56 Nm

Underbody protection Used in step 3233

Hexagon screw		Tightening torque	3 Nm

Underbody protection front Used in step 34

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

Clean air pipe to upper section of intake filter housing Used in step 36

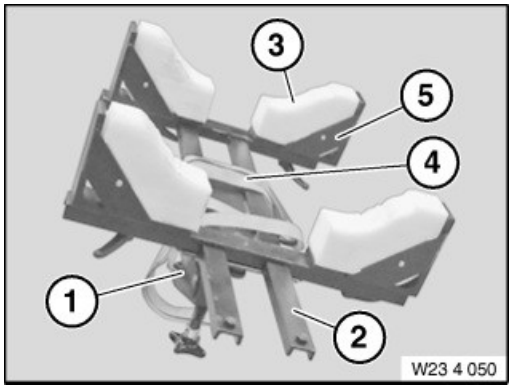
Clamp		Tightening torque	3 Nm

Overview of Special Tools

0 495 498 (23 4 050) Support

Used in step 1720

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Common

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.	

2 219 012 Hydraulic lifter

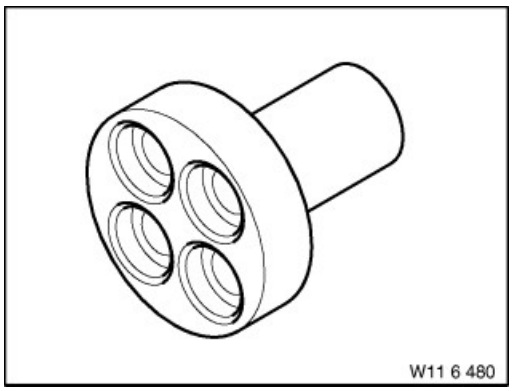


Common Used in step 1720

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)

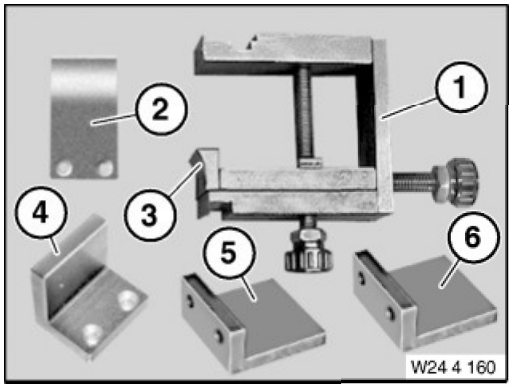
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0 493 380 (11 6 480) Connector



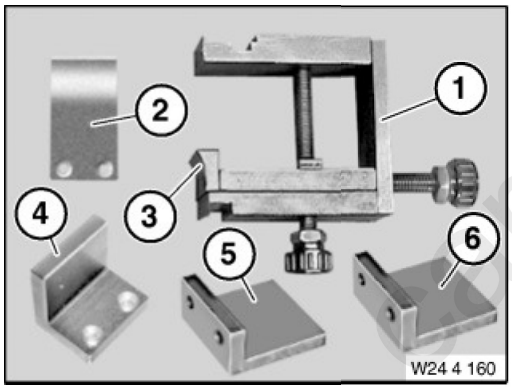
Common	Used in step 1819
Usage	For turning over engine at crankshaft hub (vibration absorber) when adjusting valve timing
Included in the tool or work	
Storage location	B2
Replaced by	
In connection with	
SI-Number	01 11 98 (338)

0 494 478 (24 4 161) Basic body



Common	Used in step 18
Usage	
Included in the tool or work	0 494 451
Storage location	C46
Replaced by	
In connection with	
SI-Number	

0 496 061 (24 4 166) Shaped element

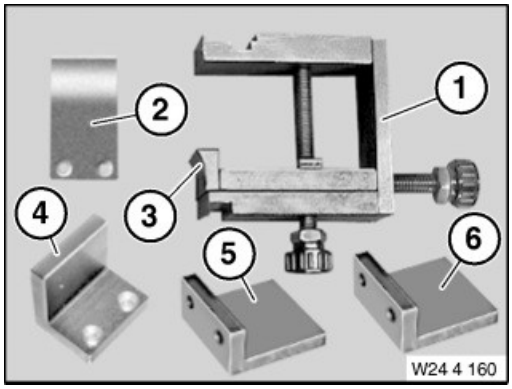


Common	Used in step 18
Usage	Transmission: GA6L45R (GM6) in E83 / N52K Deletion, only available via tool set
Included in the tool or work	0 494 451
Storage location	C46
Replaced by	
In connection with	
SI-Number	01 02 07 (334)

0 494 451 (24 4 160) Holder

Used in step 1819

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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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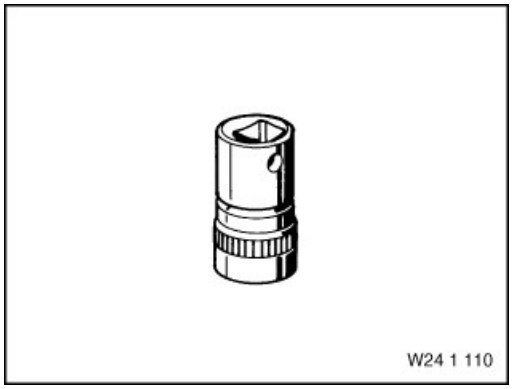
0 494 213 (24 2 390) Cap



Common Used in step 1819

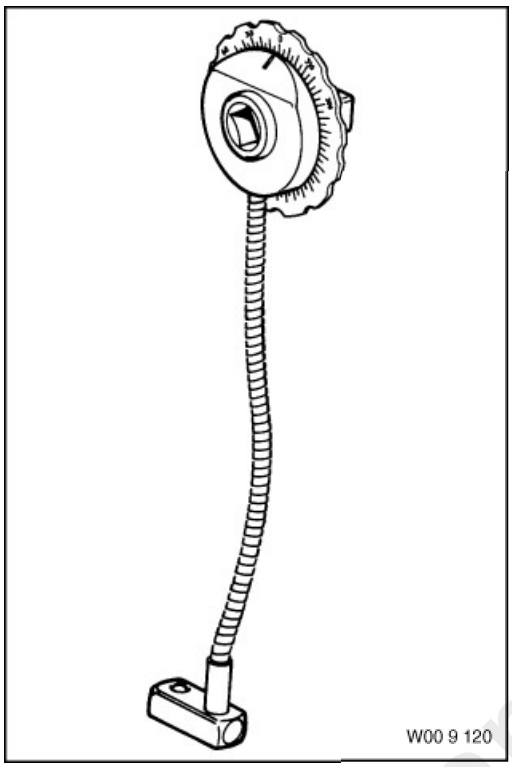
Usage	(protective cap) For sealing off the guide sleeve of the transmission connector
Included in the tool or work	
Storage location	C49
Replaced by	
In connection with	
SI-Number	01 14 01 (766)

0 491 667 (24 1 110) Socket wrench insert



Common	Used in step 19
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)

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



Common	Used in step 24
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 30
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 30

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	min. 9,28 l

Transmission oil: Automatic transmission fluid ATF 3+

GA8HP76Z transmission capacity Used in step 30

	min. 9,35 l

Transmission oil: Automatic transmission fluid ATF 3+

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
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
61 20 900 Disconnecting and connecting battery earth lead	129
61 20 900 Disconnecting and connecting battery earth lead	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 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 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
17 11 035 Removing and installing/replacing fan cowl with electric fan	18

Operating materials	Used in step
14.0 Automatic transmission fluid for ZF-transmission GA8HP45Z / GA8HP50Z / GA8HP70Z / GA8HP90Z / GA8P70H / GA8P75H / GA8HP75Z	30

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23 Transmission designations

Breakdown of BMW designation:

A5S 300J (former designation)		
A	Transmission type	• S = Manual gearbox • A = Automatic transmission
5	Number of forward gears	
S	Type of top gear	• D = Direct gear • S = Overdrive gear
300	Max. input torque (Nm)	
J	Code letter of transmission manufacturer	• G = Getrag • J = Jatco • R = GMPT (General Motors Powertrain) • Z = ZF (Zahnradfabrik Friedrichshafen)
SMG	Notes	SMG = Sequential M gearbox/transmission

GS6-37BZ (new designation according to BMW Group Standard GS 90007)		
G	Transmission	
S	Transmission type	• S = Manual gearbox • A = Automatic transmission
6	Number of forward gears	
-		• - = Standard with manual gearshift • HP = Hydraulic planetary gear • DKG= twin-clutch gearbox
37	Transmission type	• 26 = D-transmission • 31 = C-transmission • 39 = F-transmission • 37 = H-transmission • 53 = G-transmission • 17 = I-transmission • 47= J transmission SMG -7-speed • 45 = K transmission • 36= Transmission DKG
B	Gear set	• B = Petrol gear ratio • D = Diesel gear ratio • S= Sport gear ratio

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Z	Code letter of transmission manufacturer	• G = Getrag • Z = ZF (Zahnradfabrik Friedrichshafen) • A = AISIN

Manual gearbox:

BMW designation	Manufacturer	Manufacturer designation	Remarks
S5D 200G	Getrag	B transmission (220/5)	
S5D 200G	Getrag	B transmission (221/5)	for M41 engine only
S5D 250G	Getrag	B transmission (220/5)	Reinforced version
S5D 260Z	ZF	C-transmission (S5-31 D)	for M51 engine only
S5D 280Z	ZF	C-transmission (S5-31)	
S5D 310Z	ZF	C-transmission (S5-31)	up to 9.95
S5D 320Z	ZF	C-transmission (S5-31)	from 9.95 (reinforced version)
GS5S31BZ (SMG)	ZF	C transmission	SMG
GS5-39DZ	ZF	F transmission	
S6S 420G	Getrag	D-transmission (226/6)	
S6S 420G (SMG)	Getrag	D transmission	SMG
S6S 560G	Getrag	E-transmission (286/6)	
GS6-37BZ	ZF	H-transmission	
GS6S37BZ (SMG)	ZF	H-transmission	
GS6-37DZ	ZF	H-transmission	
GS6-37BG	Getrag	H-transmission	
GS6-53BZ	ZF	G-transmission	
GS6-53DZ	ZF	G-transmission	
GS6-17BG	Getrag	I-transmission	
GS6-17DG	Getrag	I-transmission	
GS7S47BG (SMG)	Getrag	J-transmission (247)	SMG -7-gear
GS7D36SG	Getrag	DKG (436)	DKG -7-gear
GS6- 45BZ	ZF	K transmission	
GS6- 45DZ	ZF	K transmission	
GS6-60DA/BA	AISIN	BG6	

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7DCT300	Getrag	7DCT	DKG -7-gear
GS6-58DG/BG	Getrag		
GS6-59DG/BG	Getrag		

Automatic transmission:

BMW designation	Manufacturer	Manufacturer designation	Remarks
A4S 200R	General Motors Powertrain	GM4	
A4S 270R	General Motors Powertrain	THM-R1w	Transmission wide-stepped
A4S 310R	General Motors Powertrain	THM-R1	
A5S 300J	Jatco	Jatco	
A5S 310Z	ZF	5HP-18	
A5S 325Z	ZF	5HP-19	
A5S 440Z	ZF	5HP-24	
A5S 560Z	ZF	5HP-30	
A5S 360R / 390R	GM	GM5	
GA6F21AW	AISIN	GA6F21AW	
GA6HP19Z	ZF	6HP19	
GA6HP26Z	ZF	6HP26	
GA6HP32Z	ZF	6HP32	
GA6L45R	GM	GM6	
GA6F21AW	AISIN	GA6F21AW	
GA8F22AW	AISIN	GA8F22AW	
GA8G45	AISIN	8G45	
GA8HP45Z	ZF	8HP45	
GA8HP50Z	ZF	8HP50	
GA8HP51Z	ZF	8HP51	
GA8HP70Z	ZF	8HP70	
GA8HP75Z	ZF	8HP75	
GA8HP76Z	ZF	8HP76	
GA8P70H	ZF	8P70	Hybrid
GA8P75H	ZF	8P75	Hybrid
GA8HP90Z	ZF	8HP90	
GA8HP95Z	ZF	8HP95	

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GA7AHSCD	Daimler	AHS-C	Hybrid

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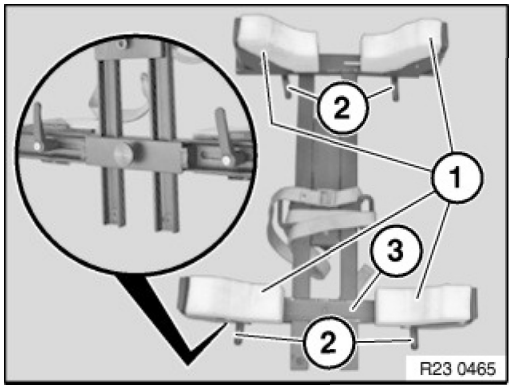
23 ... Universal BMW transmission take-up

Special tools required:

- 00 2 030
- 23 4 050

Note:

- The universal transmission bracket is introduced for the E60 AWD
- Suitable for manual and automatic transmissions

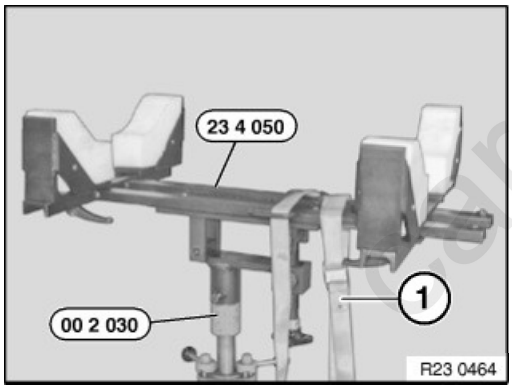


Important!

Front and rear supports (1) can be laterally adjusted by means of screws (2).

Carrier (3) of rear supports (1) can be longitudinally adjusted by means of screw.

Supports must be adapted in length and width to the transmission.



Supporting transmission:

Support transmission with special tools 23 4 050 , 00 2 030 .

Important!

Transmission must be secured with tensioning strap (1).

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23 Universal transmission retaining bridge

Special tools required:

- 0 495 187
- 24 0 200

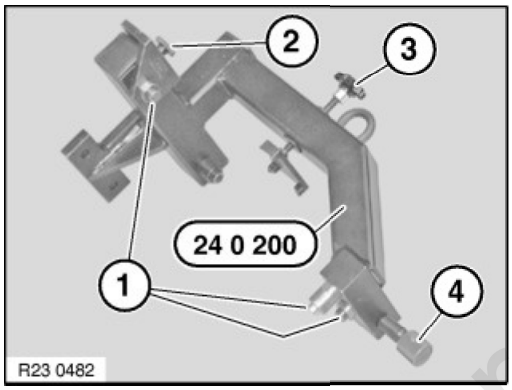
Note:

- Transmission retaining bridge 24 0 200 is suitable for manual and automatic transmissions

Attention!

The adapter and shaft must be adapted to positively lock with the transmission.

(Danger of injury)



Adapt the adapter (1) and spindle with the thrust piece (3) on the transmission.

Adjust the length using the sliding piece (2).

Screw in spindle (4).

Attention!

Before mounting on assembly stand0 495 187 check retraining bridge for tight fit.

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24 11 104 Removing and installing/sealing or replacing transmission oil sump

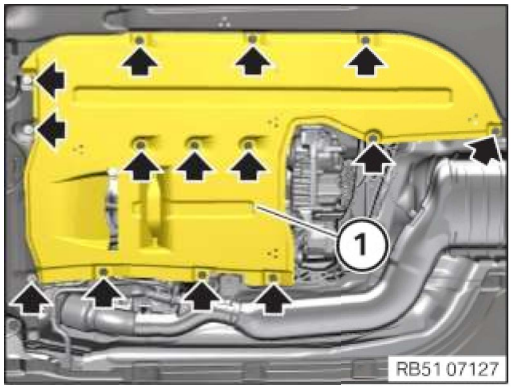
PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

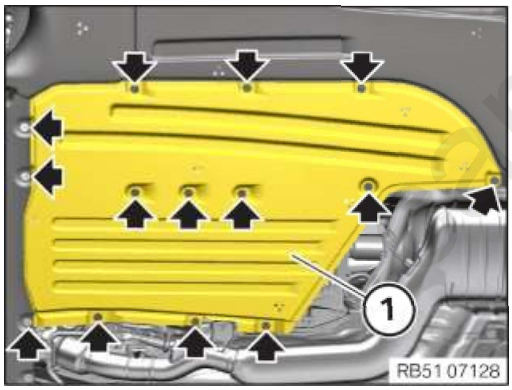
2 – Remove rear underbody protection



- **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.

MAIN WORK

3 – Removing the transmission oil sump (GA8HP50Z, GA8HP51Z, GA8HP75Z, GA8HP76Z)

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 transmission oil sump.

Non-observance of the transmission oil specifications may lead to severe damage to the automatic transmission.

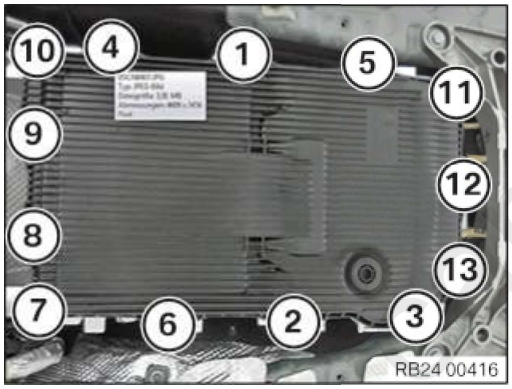
- Remove transmission oil sump only after it has cooled down.
- Use only the approved transmission oil.
- After completion of repair work, check transmission oil level.

TECHNICAL INFORMATION

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



- Release oil drain plug (1).
- Drain automatic transmission oil.



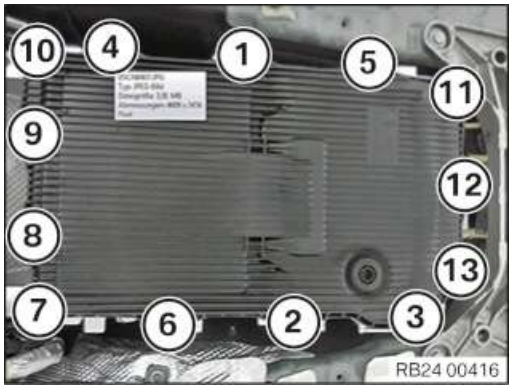
- Loosen screws (1) to (13).
- Remove transmission oil sump.

4 – Installing the transmission oil sump (GA8HP50Z, GA8HP51Z, GA8HP75Z, GA8HP76Z)

TECHNICAL INFORMATION

The transmission oil sump must be renewed each time it is released.

- Clean the contact surface of the transmission oil sump on the transmission.



- Renew screws (1) to (13).

  Parts: Bolts
- Position the transmission oil sump.
- Insert screws until screw heads make contact.
- Tighten screws in the order (1) to (13).

Transmission oil sump

M6	Renew screws.	Tightening torque	10 Nm



- If necessary, tighten the oil drain plug (1).

Oil drain plug

M18	Renew screw.	Tightening torque	8 Nm

POSTPROCESSES

5 – Disconnecting all battery earth leads



- See additional information.

6 – 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.

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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:

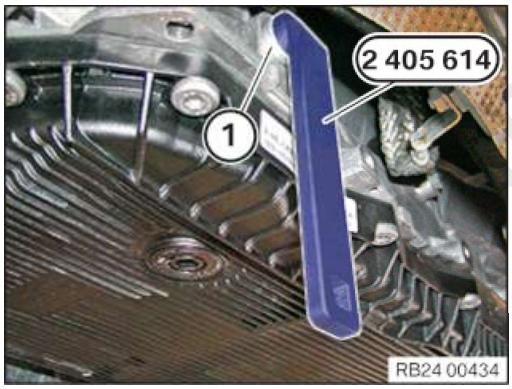
Certain fault memory entries may require an oil-level adjustment in the automatic transmission and after repairs have been completed (e.g. exchange of mechatronics, exchange of the converter, exchange of the transmission, servicing of automatic transmission oil).

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.



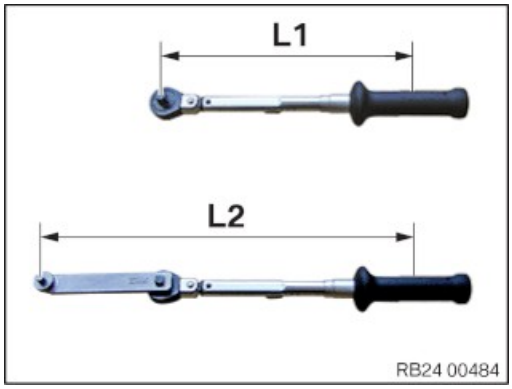
- **Top up the automatic transmission fluid:**
- Loosen the oil filler plug (1) using the special tool 2 405 614.
- Top up automatic transmission fluid according to the instructions in the diagnosis system.

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

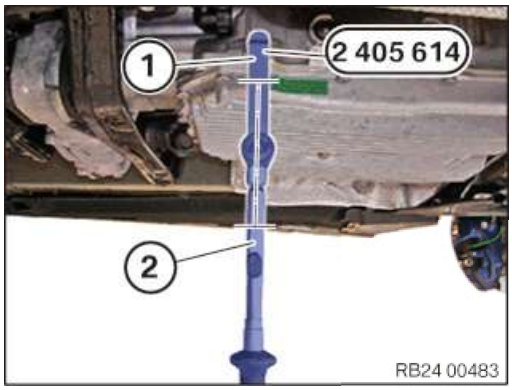
The setpoint torque deviates from the torque to be set when using special tool 2 405 614.

- **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.

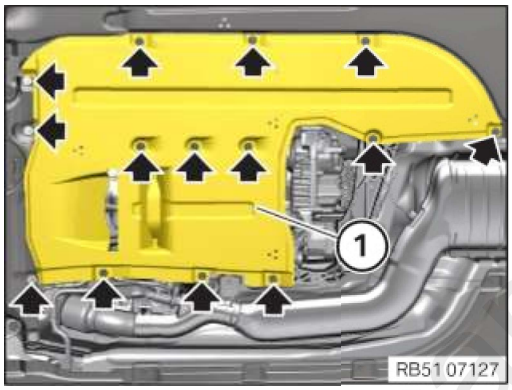
  Parts: Oil filler plug, sealing ring

- 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

7 – Installing underbody protection at rear



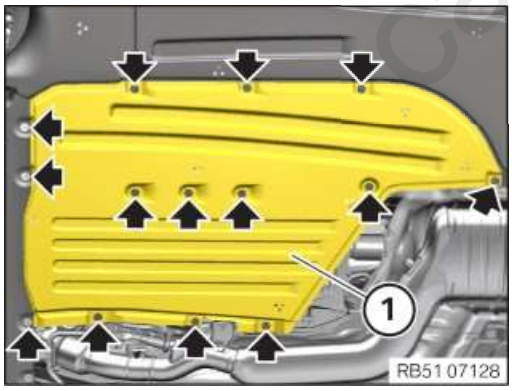
- **Version 1:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



- **Version 2:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

Additional Information

Overview of Tightening Torques

Transmission oil sump Used in step 4

M6	Renew screws.	Tightening torque	10 Nm

Oil drain plug			Used in step 4
M18	Renew screw.	Tightening torque	8 Nm

Oil filler plug			Used in step 6
M18x1.5		Tightening torque	35 Nm

Underbody protection			Used in step 7
Hexagon screw		Tightening torque	3 Nm

Overview of Special Tools

2 405 614 Socket wrench



Common	Used in step 6
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 6
	min. 9,28 l

Transmission oil: Automatic transmission fluid ATF 3+

GA8HP76Z transmission capacity	Used in step 6
	min. 9,35 l

Transmission oil: Automatic transmission fluid ATF 3+

Links

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	15
61 20 900 Disconnecting and connecting battery earth lead	15
61 20 900 Disconnecting and connecting battery earth lead	15
61 20 900 Disconnecting and connecting battery earth lead	15
61 20 900 Disconnecting and connecting battery earth lead	15
61 20 900 Disconnecting and connecting battery earth lead	15
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	15
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	15
61 20 900 Disconnecting and connecting battery earth lead	15
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	15

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61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	15
61 20 900 Disconnecting and connecting battery earth lead	15
61 20 900 Disconnecting and connecting battery earth lead	15
61 20 900 Disconnecting and connecting battery earth lead	15
61 20 900 Disconnecting and connecting battery earth lead	15
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61 20 900 Disconnecting and connecting battery earth lead	15
61 20 900 Disconnecting and connecting battery earth lead	15

Operating materials	**Used in step**
14.0 Automatic transmission fluid for ZF-transmission GA8HP45Z / GA8HP50Z / GA8HP70Z / GA8HP90Z / GA8P70H / GA8P75H / GA8HP75Z	6

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24 13 026 Replacing radial shaft seal for output flange

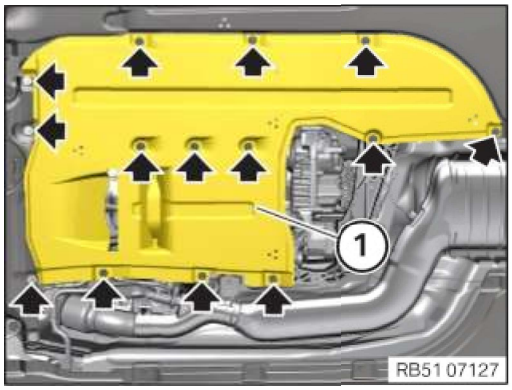
PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

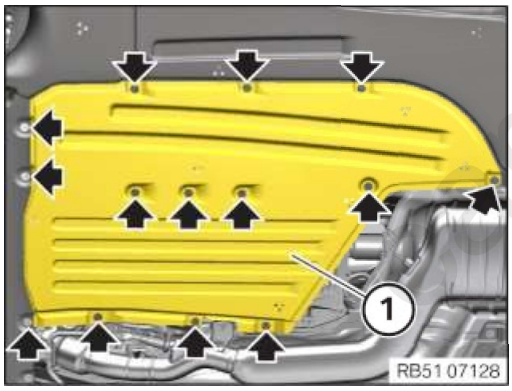
2 – Remove rear underbody protection



- **Version 1:**

  Remove screws (arrows).

  Feed out the rear underbody protection (1).

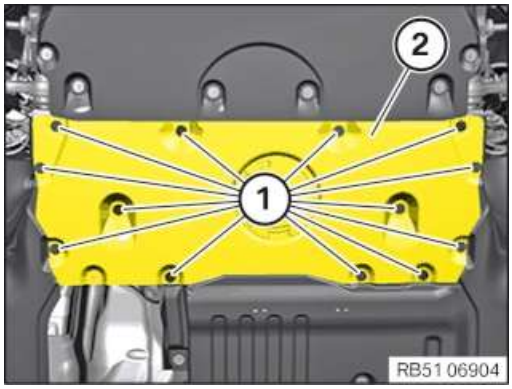


- **Version 2:**

  Remove screws (arrows).

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

3 – Removing the centre underbody protection

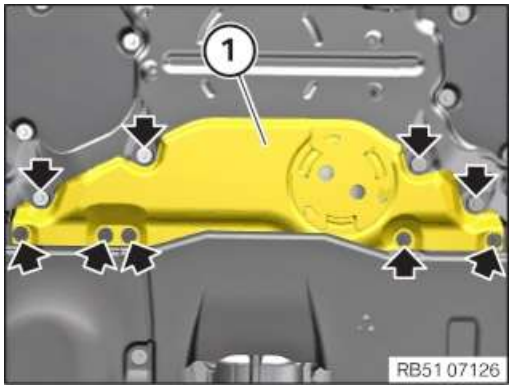


- **Version with rear-wheel drive:**

  Loosen screws (1).

  Remove centre underbody protection (2) .

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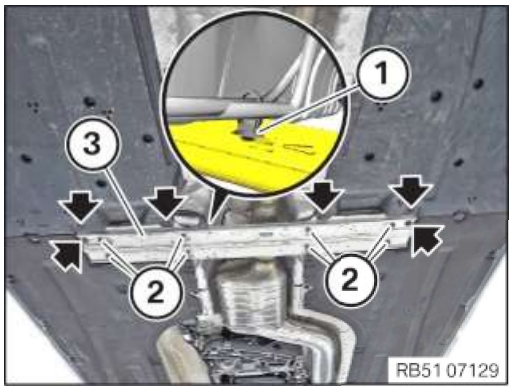


- **Version with all-wheel drive:**

  Remove screws (arrows).

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

4 – 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.

5 – Remove complete exhaust system

WARNING

Hot surfaces.

Risk of burning!

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

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.

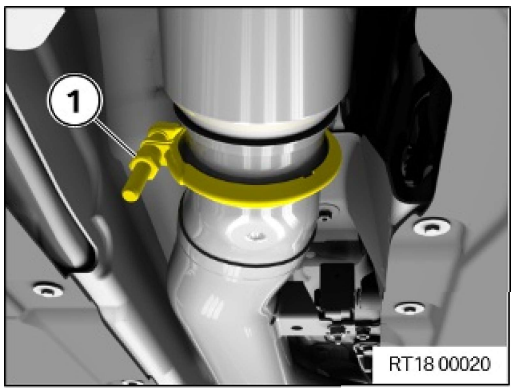
- Remove and install heavy components with the aid of another person/other persons.

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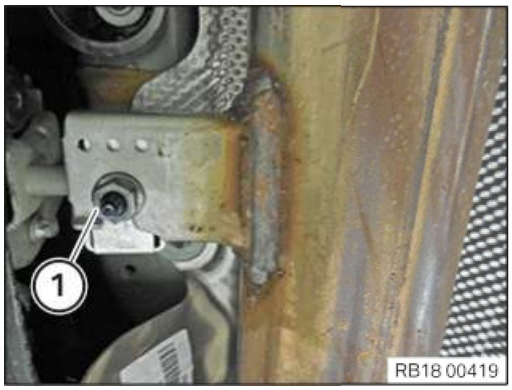
- **Equipment specification 1 (ribbon clamp)**

  Detach the ribbon clamp (1).

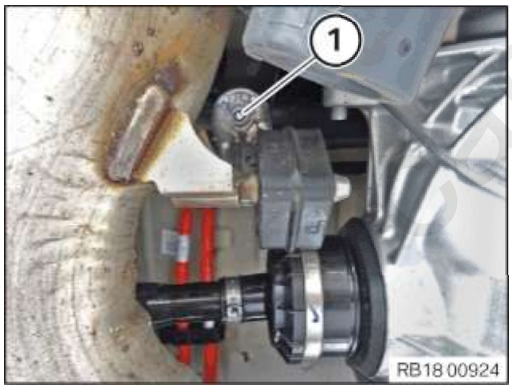


- **Equipment specification 2 (V-clips)**

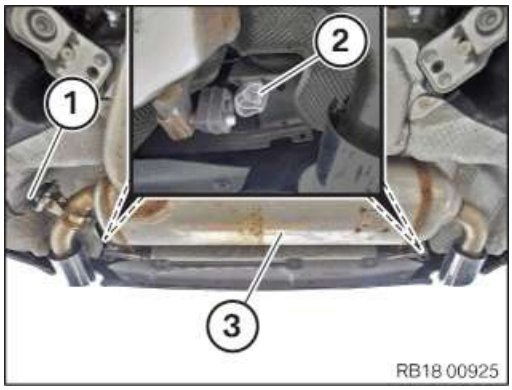
  Unfasten clamp (1).



- Loosen nut (1).



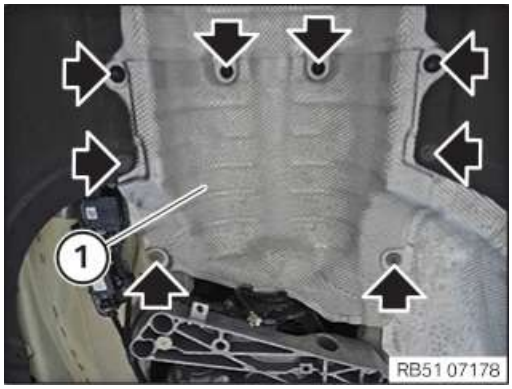
- Release nut (1) on the rear axle support.



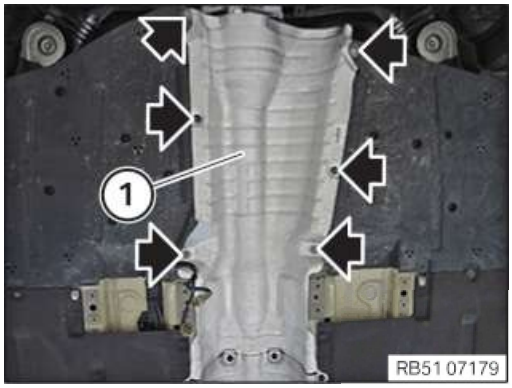
- Unlock plug connection (1) and disconnect.
- Loosen nuts (2).
- Lower and remove the exhaust system (3) with the assistance of a second person.

6 – Remove heat shields

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



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

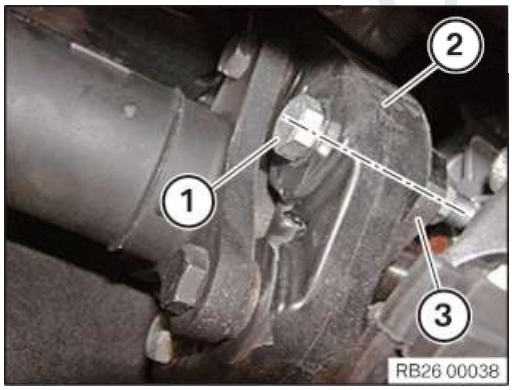
7 – Partially release propeller shaft

RISK OF DAMAGE

Damage to propeller shaft during removal.

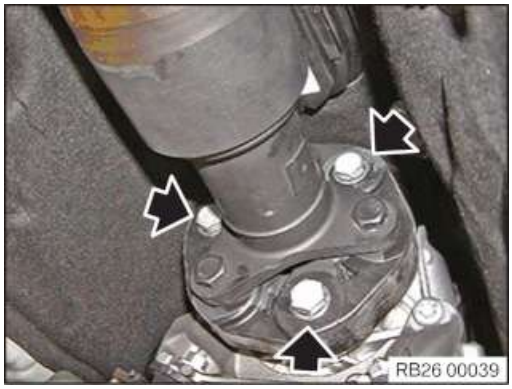
Non-observance of the removal guidelines for the propeller shaft on the rear axle differential may cause severe damage.

- 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.

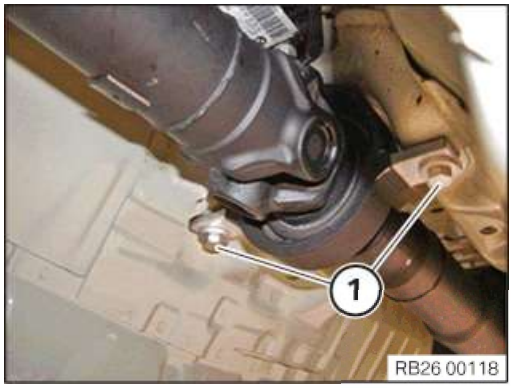


- Mark the installation position of the screw connection (1) of the flexible disc (2) and the three-hole flange (3).

  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.



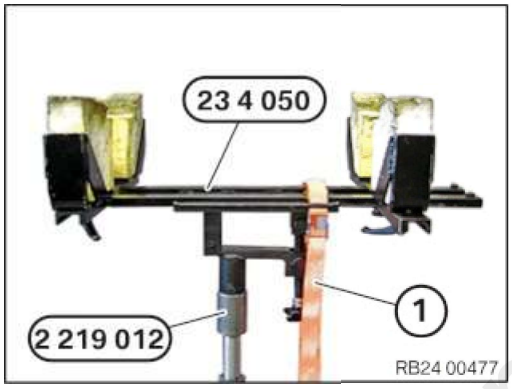
- Remove screws (arrows).



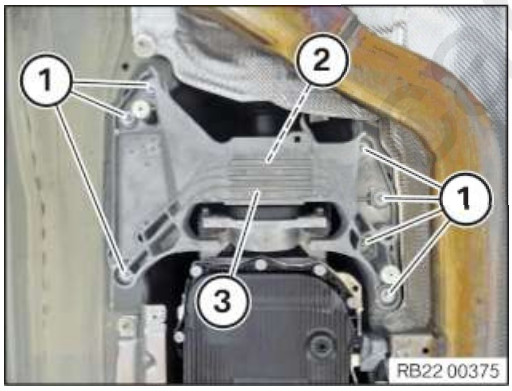
- Unscrew the bolts (1) on the centre mount and hold down the propeller shaft.

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

8 – 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 screws (1).
- Loosen screw (2).
- Remove transmission cross member (3) and lower the transmission slightly.

MAIN WORK

9 – Removing radial shaft seal for the output flange (GA8HP50Z, GA8HP51Z, GA8HP75Z, GA8HP76Z, GA8HP75HZ)

CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

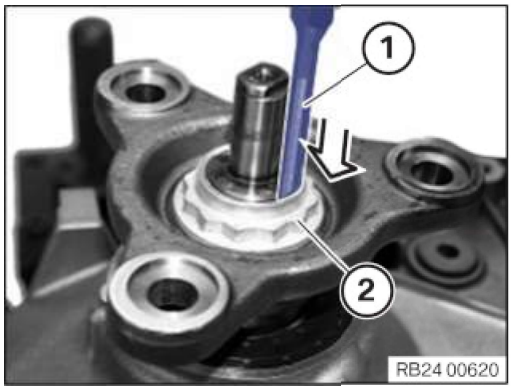
- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.

RISK OF DAMAGE

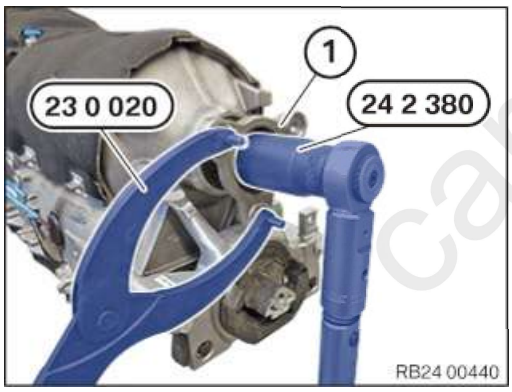
Damage to the transmission.

Damage to the transmission through unapproved transmission oil.

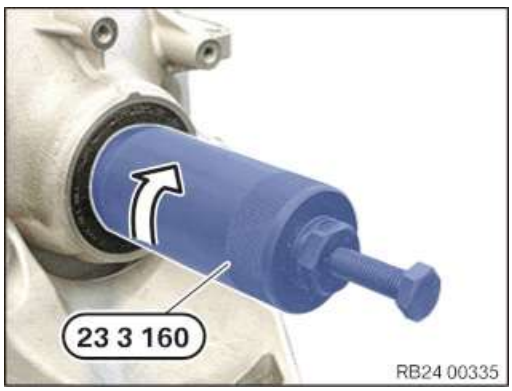
- Use only the approved transmission oil.
- After completion of repair work, check transmission oil level.



- Pry out nut (2) using a suitable tool (2).

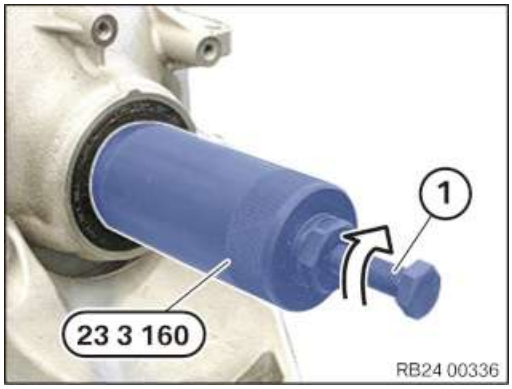


- Brace the output flange (1) with the special tool 0 491 440 (23 0 020).
- Release nut with special tool 0 494 212 (24 2 380).
- Pull off the output flange (1) from the output shaft.



- Slide the special tool 0 494 416 (23 3 160) over the output shaft.
- Screw the special tool 0 494 416 (23 3 160) into the radial shaft seal in the direction of arrow until the special tool is securely connected to the radial shaft seal.

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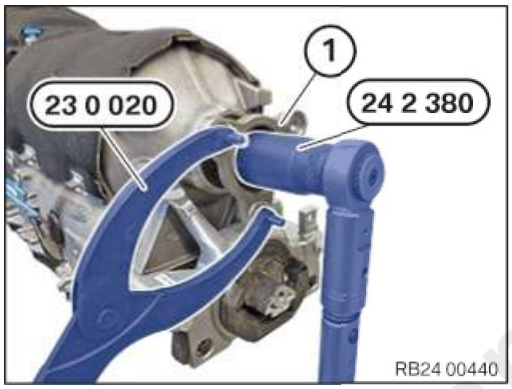


- Turn the screw (1) into the special tool 0 494 416 (23 3 160) in the direction of arrow until the radial shaft seal is pulled out of the transmission housing.

10 – Installing the radial shaft seal for the output flange (GA8HP50Z, GA8HP51Z, GA8HP75Z, GA8HP76Z, GA8HP75HZ)



- Oil the sealing lip of the radial shaft seal.
- Strike in the radial shaft seal with the special tool 0 496 596 (33 0 150) up to the limit position.



- Renew nut.

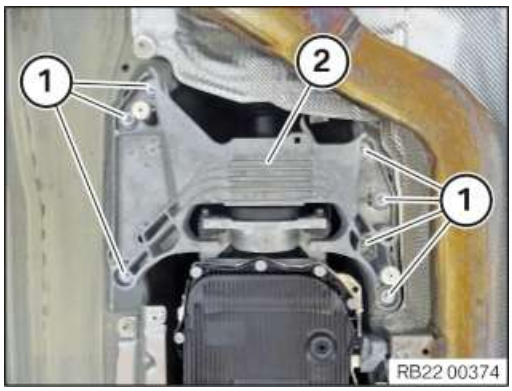
  Parts: Nut
- Brace the output flange (1) with the special tool 0 491 440 (23 0 020).
- Tighten the nut with the special tool 0 494 212 (24 2 380).
- Secure nut with a mandrel (8 mm) by caulking.

Double hexagon nut/output flange

with sealing ring in output flange		Replace nut	60 Nm

POSTPROCESSES

11 – Install transmission cross member.

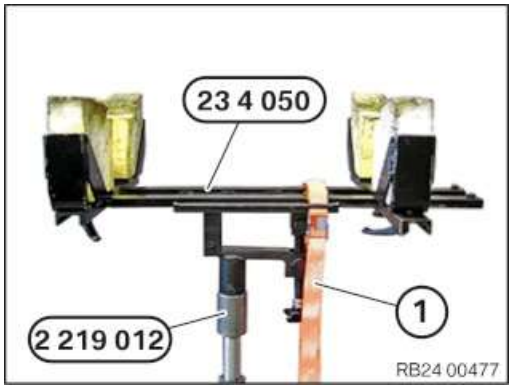


- Install the transmission cross member (2).
- Tighten the screws (1).

Transmission cross member to body

M8	Renew screws.	Tightening torque	19 Nm

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- 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.

12 – Partially installing the propeller shaft



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

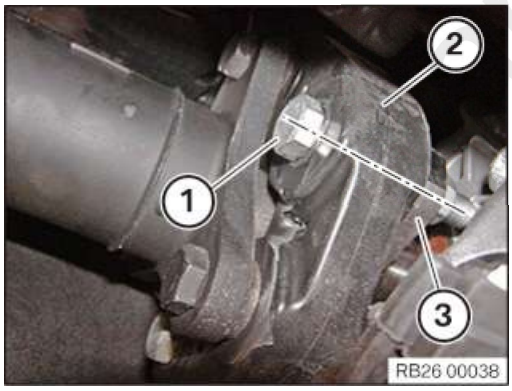


- Apply a thin coat of grease to the soft centring (1), if necessary.

  Do not grease the hard centring (2).

Expendable materials

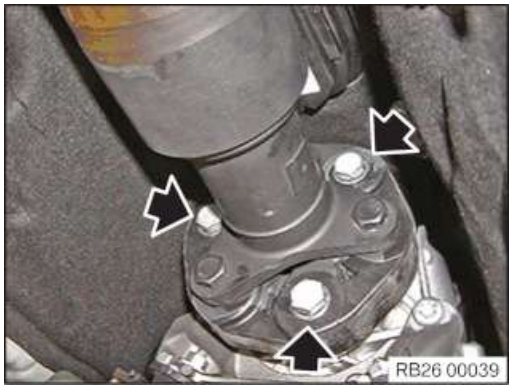
Lubricating grease Olistamoly 2 LN 584 LO	100 g, Tube	83 19 0 447 919



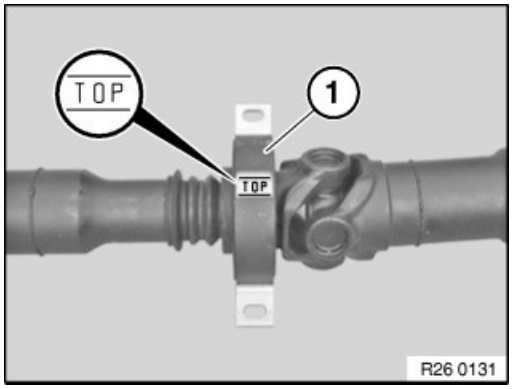
- Renew screws and the self-locking nuts.

  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.

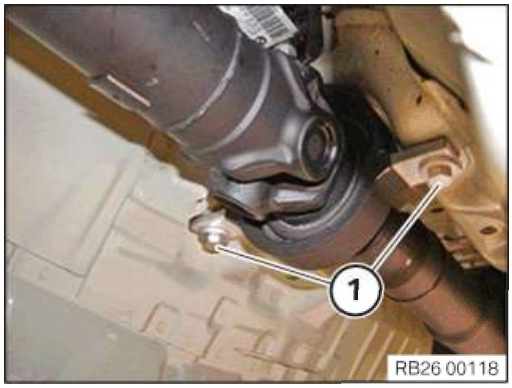
  This should prevent a humming noise from the drive train during driving.



- 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.



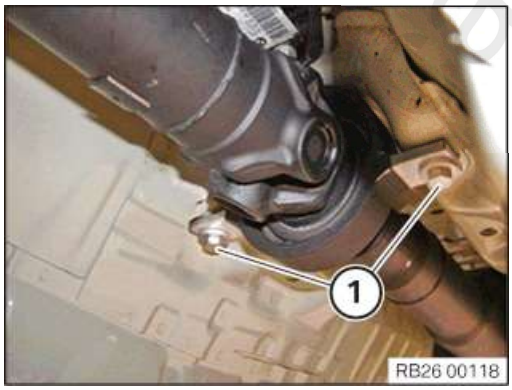
- Renew screws.

  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.

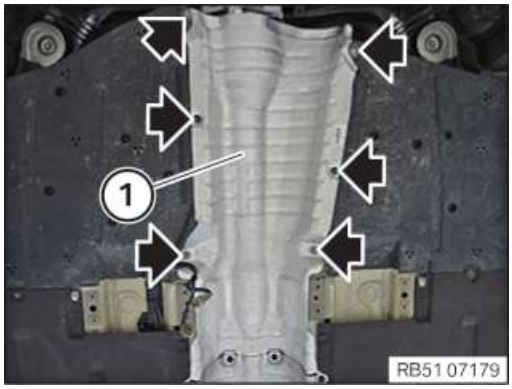


- Tighten the screws (1).

Centre mount to body

M8		Tightening torque	19 Nm

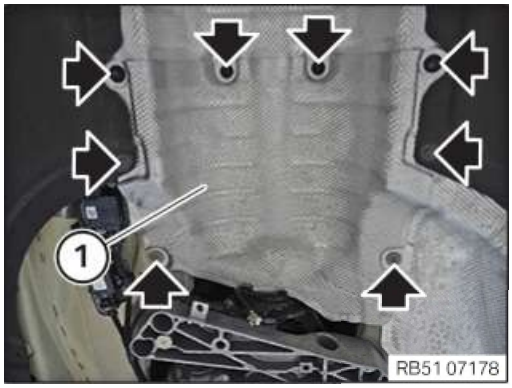
13 – Install the heat shields



- 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

14 – 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.

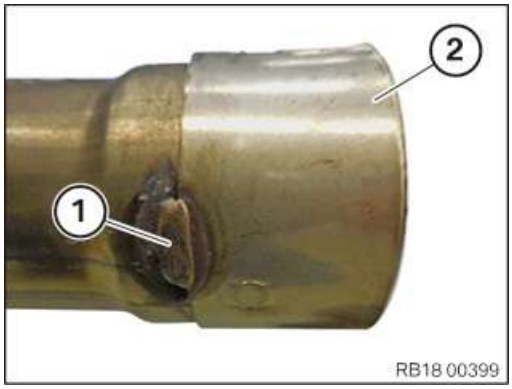
CAUTION

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.

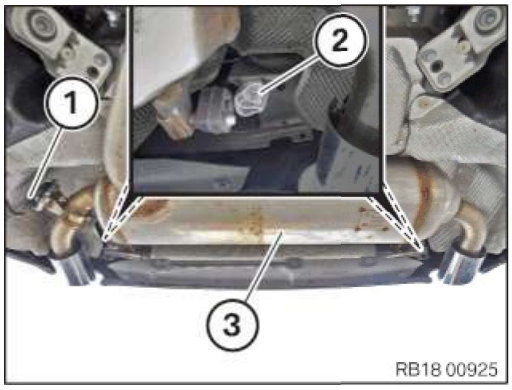
Danger of injury!

- 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).

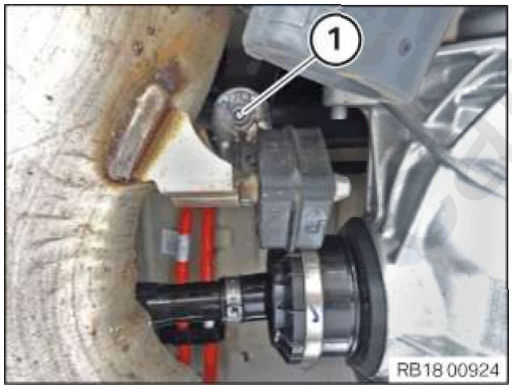
  Parts: Nuts
- Tighten nuts (2).

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 silencer / petrol particulate filter on transmission bracket

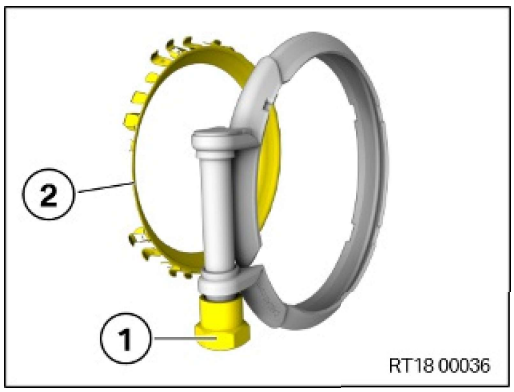
M8	Renew nut.	Tightening torque	19 Nm



- Tighten the ribbon clamp (1).

Exhaust system to catalytic converter

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

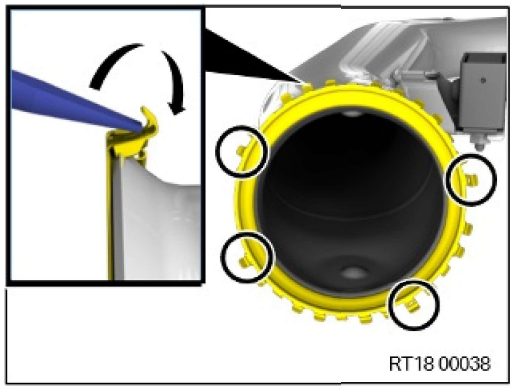


- **Equipment specification 2 (V-clips)**

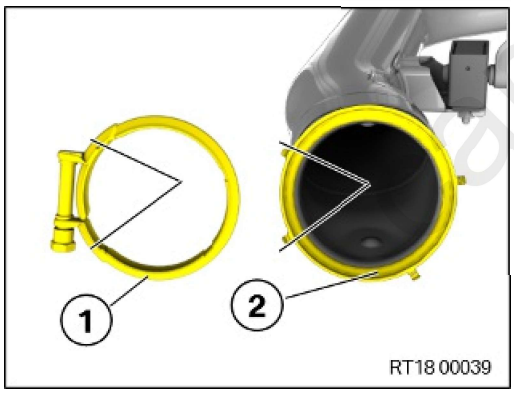
  Renew V-band clamp.

  Parts: V-band clamp

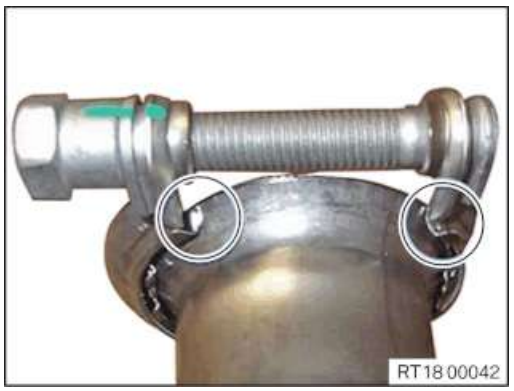
  Unscrew the nut (1) and remove the sealing ring (2).



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

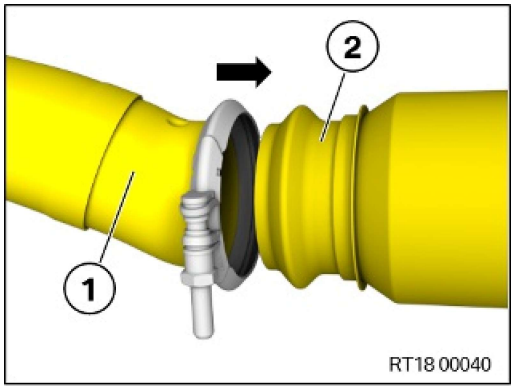


- Mount the V-clip (1) on the sealing ring (2).
- Make sure that the V-clip (1) is positioned correctly on the sealing ring (2).

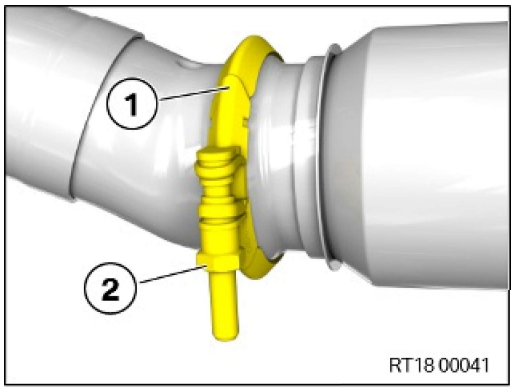


- Ensure that the V-clip rests against the sheet metal tabs in the marked areas after mounting.

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

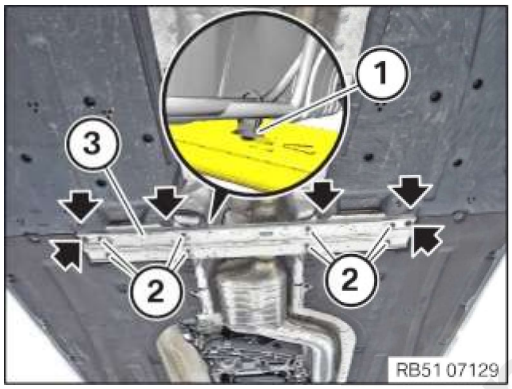


- Make sure that V-clip (1) is fitted correctly.
- Tighten down screw (2).

V-clip to catalytic converter

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

15 – 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).

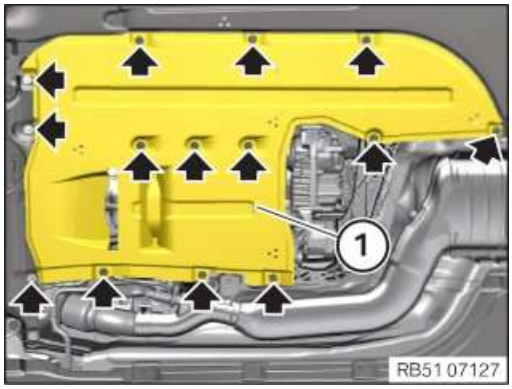
16 – Disconnecting all battery earth leads



- See additional information.

17 – Installing underbody protection at rear

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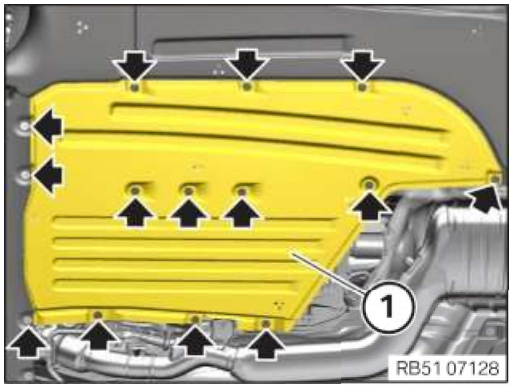
- **Version 1:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



- **Version 2:**

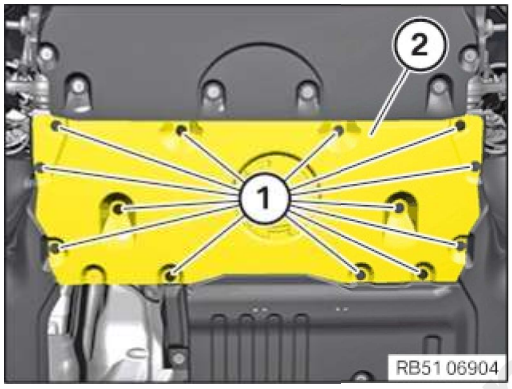
  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

18 – Installing the centre underbody protection



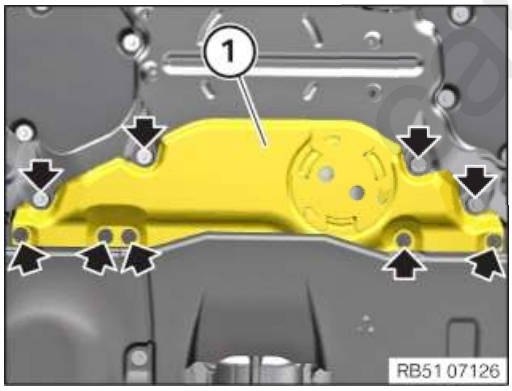
- **Version with rear-wheel drive:**

  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

Additional Information

Overview of Tightening Torques

Double hexagon nut/output flange — Used in step 10

with sealing ring in output flange		Replace nut	60 Nm

Transmission cross member to body — Used in step 11

M8	Renew screws.	Tightening torque	19 Nm

Front flexible disc to propeller shaft — Used in step 12

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 12

M8		Tightening torque	19 Nm

Heat shield to vehicle underbody — Used in step 13

Screws and nuts		Tightening torque	3 Nm

Rear silencer to body / bumper support — Used in step 14

M8	Replace nuts.	Tightening torque	19 Nm

Exhaust system to rear axle carrier — Used in step 14

Nut M8	Renew nut.	Tightening torque	19 Nm

Front silencer / petrol particulate filter on transmission bracket — Used in step 14

M8	Renew nut.	Tightening torque	19 Nm

Exhaust system to catalytic converter — Used in step 14

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

V-clip to catalytic converter — Used in step 14

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

Connecting support to tunnel — Used in step 15

M8x25 screw		Tightening torque	20 Nm
Screw		Tightening torque	3 Nm

Underbody protection — Used in step 1718

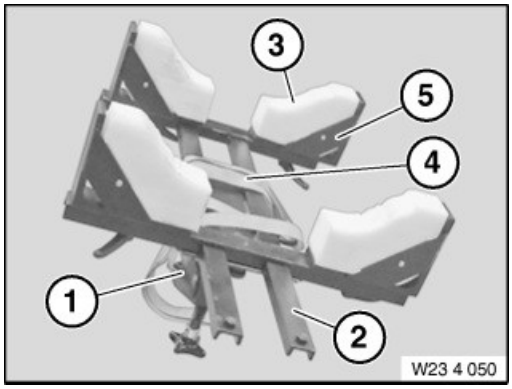
Hexagon screw		Tightening torque	3 Nm

Overview of Special Tools

0 495 498 (23 4 050) Support

Used in step 811

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Common

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.	

2 219 012 Hydraulic lifter

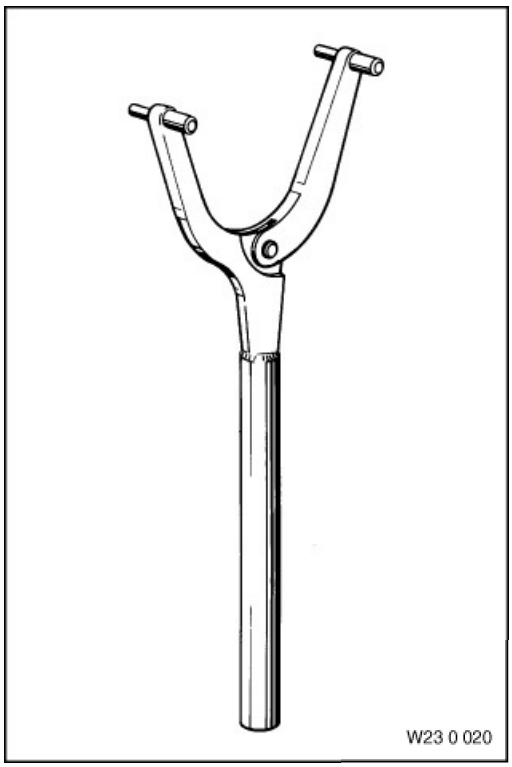


Common Used in step 811

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)

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0 491 440 (23 0 020) Holder



Common	Used in step 910
Usage	(counter support) For all three- and four-hole flanges when releasing and tightening down
Included in the tool or work	
Storage location	B4
Replaced by	
In connection with	
SI-Number	

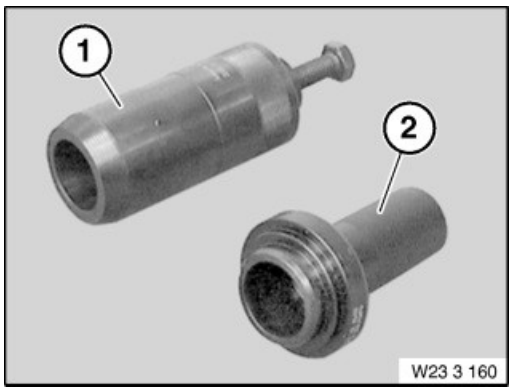
0 494 212 (24 2 380) Socket



Common	Used in step 910
Usage	(Socket AF 34) Double hex head for releasing and tightening the nuts on the output flange.
Included in the tool or work	
Storage location	C42
Replaced by	
In connection with	
SI-Number	01 14 01 (766)

carmagnet.com

0 494 416 (23 3 160) Tool



Common Used in step 9

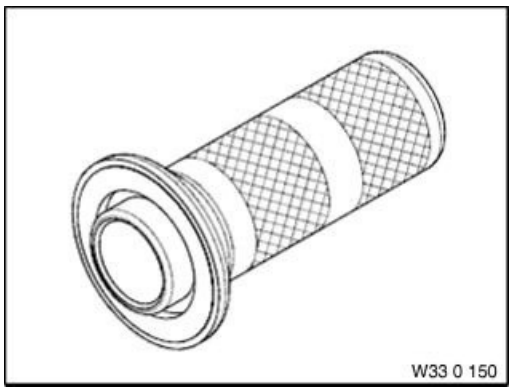
Usage	(Tool set) For removing and installing the radial shaft seal of the output shaft. Transmission: GS6-37BZ / DZ (H transmission)
Included in the tool or work	
Storage location	C43
Replaced by	
In connection with	
SI-Number	01 10 02 (907)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
2	0 494 415 (23 3 162)		**Mandrel** (Drift) Not available individually, only available in set 23 3 160.	
1	0 494 414 (23 3 161)		**Puller** Not available individually, only available in set 23 3 160.	

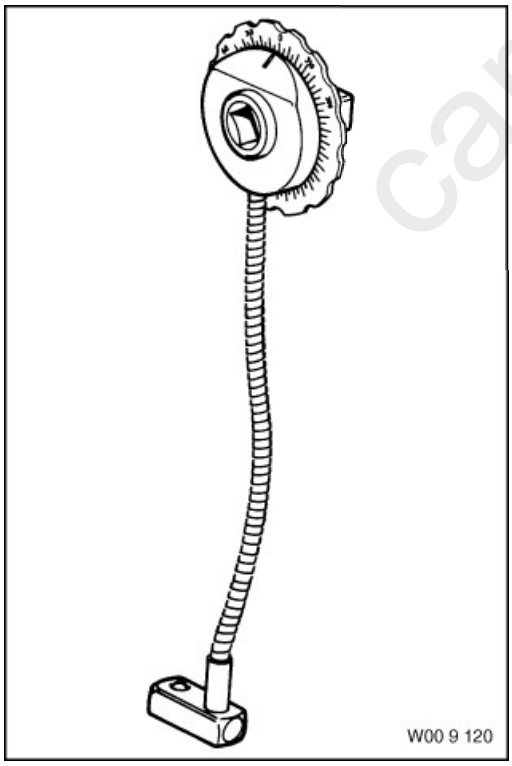
cardiagn.com

0 496 596 (33 0 150) Mandrel



Common	Used in step 10
Usage	(Drift) For driving radial shaft seal onto drive flange. Replaces 33 3 470 / 0 492 343
Included in the tool or work	
Storage location	B25
Replaced by	
In connection with	
SI-Number	01 09 09 (532)

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



Common	Used in step 12
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	

Links

Repair instructions **Used in step**

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61 20 900 Disconnecting and connecting battery earth lead	116
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61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	116
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	116
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61 20 900 Disconnecting and connecting battery earth lead	116
61 20 900 Disconnecting and connecting battery earth lead	116

carsign.com

24 30 108 Removing and installing/replacing the hydraulic impulse storage

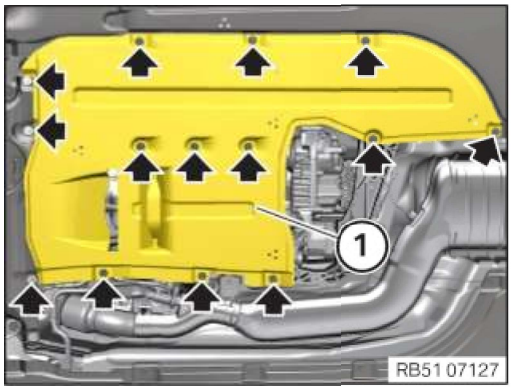
PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

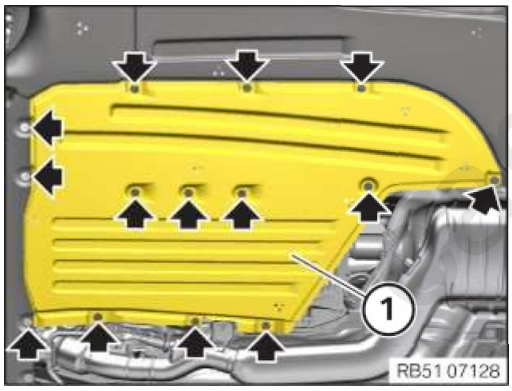
2 – Remove rear underbody protection



- **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.

3 – Removing the transmission oil sump (GA8HP50Z, GA8HP51Z, GA8HP75Z, GA8HP76Z)

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.

.com

RISK OF DAMAGE

Damage to the transmission oil sump.

Non-observance of the transmission oil specifications may lead to severe damage to the automatic transmission.

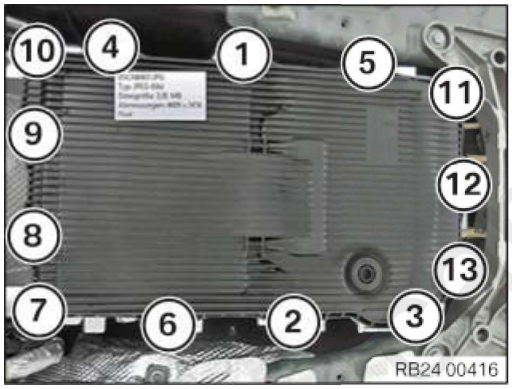
- Remove transmission oil sump only after it has cooled down.
- Use only the approved transmission oil.
- After completion of repair work, check transmission oil level.

TECHNICAL INFORMATION

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



- Release oil drain plug (1).
- Drain automatic transmission oil.



- Loosen screws (1) to (13).
- Remove transmission oil sump.

autodiagn.com

MAIN WORK

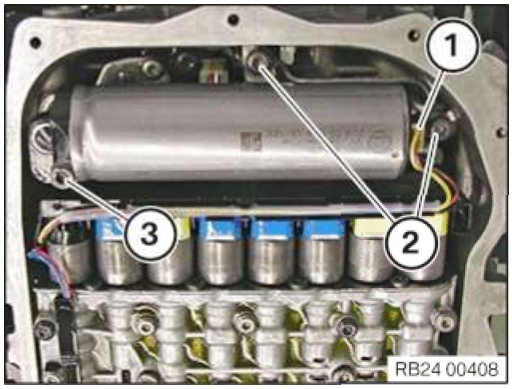
4 – Removing oil volume reservoir (GA8HP50Z, GA8HP51Z, GA8HP75Z, GA8HP76Z, GA8HP95Z)

CAUTION

Materials harmful to health.

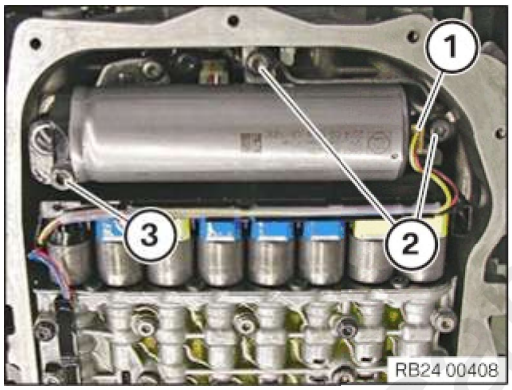
Contact with fluids harmful to health!

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



- Unlock connector (1).
- Loosen screws (M6x20) (2).
- Loosen screw (M6x59) (3).
- Remove hydraulic impulse storage.

5 – Installing the oil volume reservoir (GA8HP50Z, GA8HP51Z, GA8HP75Z, GA8HP76Z, GA8HP95Z)



- Renew screws (M6x20, M6x59).

  Parts: Screws (M6x20, M6x59)
- Tighten screws (M6x20) (2).
- Tighten screws (M6x59) (3).

Mechatronics to transmission

M6x59, M6x20	Renew screws.	Tightening torque	8 Nm

- Lock connector (1).

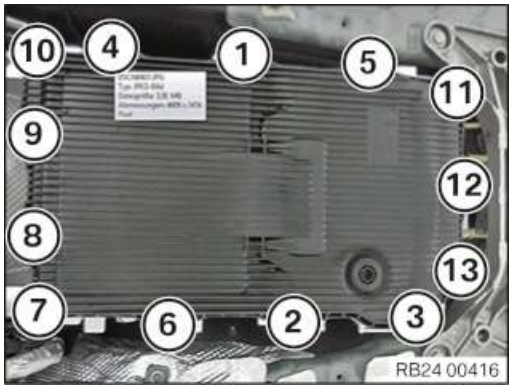
POSTPROCESSES

6 – Installing the transmission oil sump (GA8HP50Z, GA8HP51Z, GA8HP75Z, GA8HP76Z)

TECHNICAL INFORMATION

The transmission oil sump must be renewed each time it is released.

- Clean the contact surface of the transmission oil sump on the transmission.



- Renew screws (1) to (13).

  Parts: Bolts
- Position the transmission oil sump.
- Insert screws until screw heads make contact.
- Tighten screws in the order (1) to (13).

Transmission oil sump

M6	Renew screws.	Tightening torque	10 Nm



- If necessary, tighten the oil drain plug (1).

Oil drain plug

M18	Renew screw.	Tightening torque	8 Nm

7 – Disconnecting all battery earth leads



- See additional information.

8 – 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.

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TECHNICAL INFORMATION

Performing oil-level adjustment:

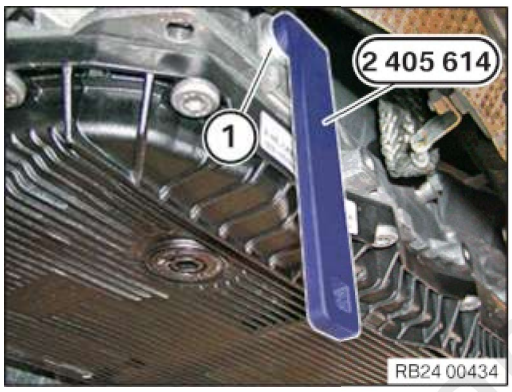
Certain fault memory entries may require an oil-level adjustment in the automatic transmission and after repairs have been completed (e.g. exchange of mechatronics, exchange of the converter, exchange of the transmission, servicing of automatic transmission oil).

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.



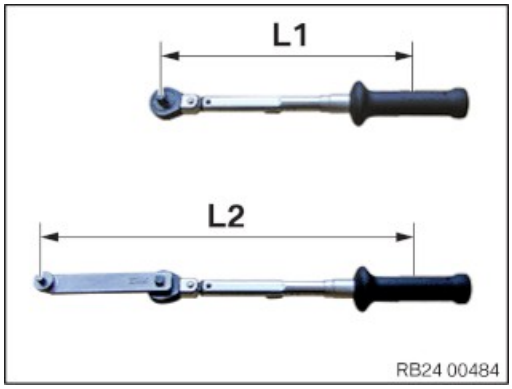
- **Top up the automatic transmission fluid:**
- Loosen the oil filler plug (1) using the special tool 2 405 614.
- Top up automatic transmission fluid according to the instructions in the diagnosis system.

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.

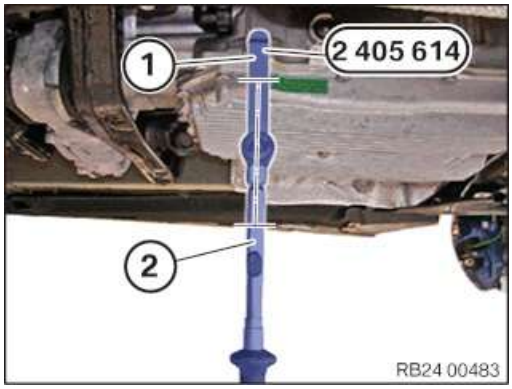
- **Converting the setpoint torque into the torque to be set:**

  (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.

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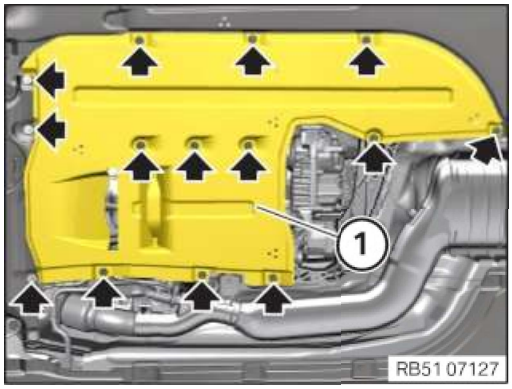
- Renew the oil filler plug (1) and the sealing ring.

  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

9 – Installing underbody protection at rear



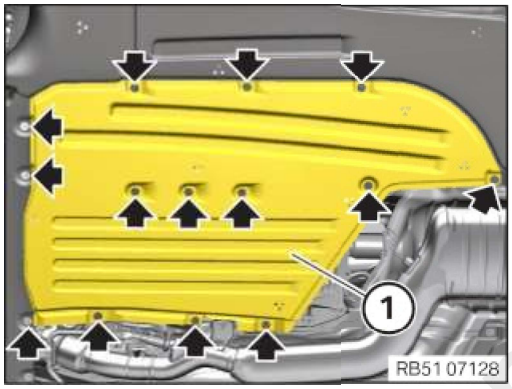
- **Version 1:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



- **Version 2:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

Additional Information

Overview of Tightening Torques

Mechatronics to transmission Used in step 5

M6x59, M6x20	Renew screws.	Tightening torque	8 Nm

Transmission oil sump Used in step 6

M6	Renew screws.	Tightening torque	10 Nm

Oil drain plug Used in step 6

M18	Renew screw.	Tightening torque	8 Nm

Oil filler plug Used in step 8

M18x1.5		Tightening torque	35 Nm

Underbody protection Used in step 9

Hexagon screw		Tightening torque	3 Nm

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Overview of Special Tools

2 405 614 Socket wrench



Common	Used in step 8
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 8

	min. 9,28 l

Transmission oil: Automatic transmission fluid ATF 3+

GA8HP76Z transmission capacity

Used in step 8

	min. 9,35 l

Transmission oil: Automatic transmission fluid ATF 3+

Links

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	17
61 20 900 Disconnecting and connecting battery earth lead	17
61 20 900 Disconnecting and connecting battery earth lead	17
61 20 900 Disconnecting and connecting battery earth lead	17
61 20 900 Disconnecting and connecting battery earth lead	17
61 20 900 Disconnecting and connecting battery earth lead	17
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	17
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	17
61 20 900 Disconnecting and connecting battery earth lead	17
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	17
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	17
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61 20 900 Disconnecting and connecting battery earth lead	17
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	17
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61 20 900 Disconnecting and connecting battery earth lead	17
61 20 900 Disconnecting and connecting battery earth lead	17
61 20 900 Disconnecting and connecting battery earth lead	17
61 20 900 Disconnecting and connecting battery earth lead	17

Operating materials	**Used in step**
14.0 Automatic transmission fluid for ZF-transmission GA8HP45Z / GA8HP50Z / GA8HP70Z / GA8HP90Z / GA8P70H / GA8P75H / GA8HP75Z	8

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24 31 019 Replacing the radial shaft seal for the torque converter

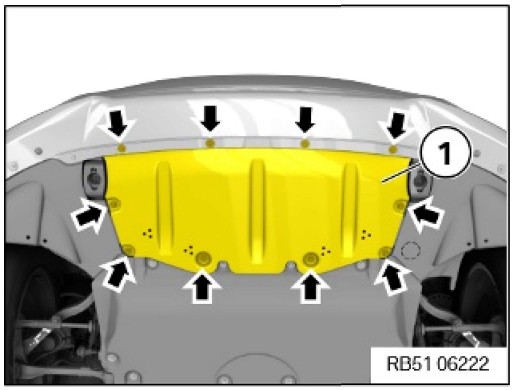
PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

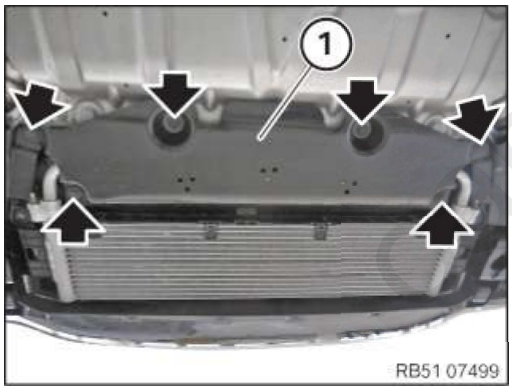
2 – Removing the front underbody protection



- **Version 1:**

  Remove screws (arrows).

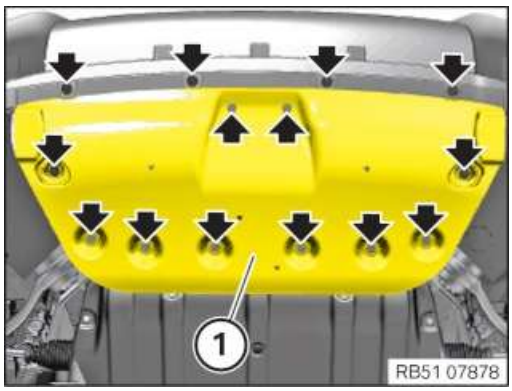
  Feed front underbody protection (1) backwards out of the bumper panel.



- **Version 2:**

  Remove screws (arrows).

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

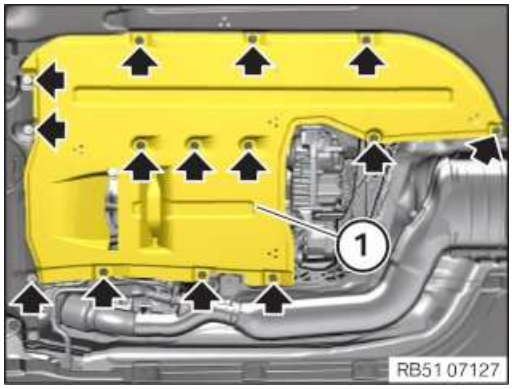


- **Version 3:**

  Remove screws (arrows).

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

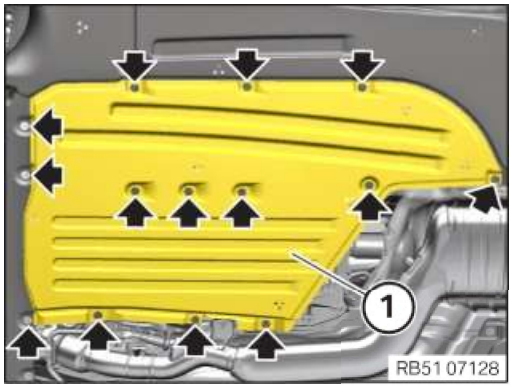
3 – Remove rear underbody protection



- **Version 1:**

  Remove screws (arrows).

  Feed out the rear underbody protection (1).

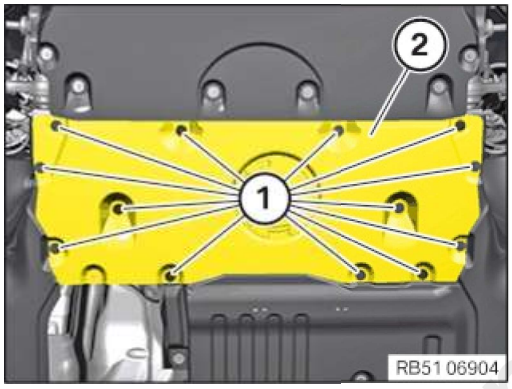


- **Version 2:**

  Remove screws (arrows).

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

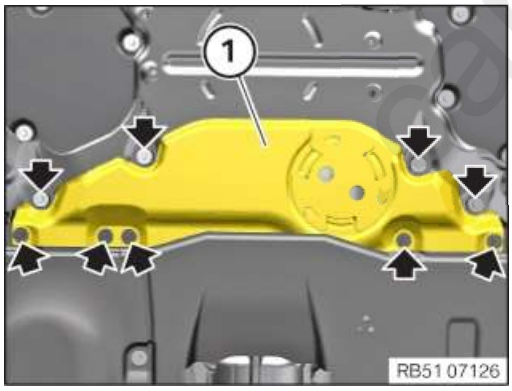
4 – Removing the centre underbody protection



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

  Loosen screws (1).

  Remove centre underbody protection (2) .

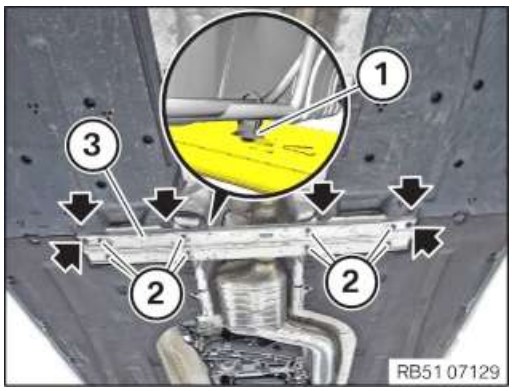


- **Version with all-wheel drive:**

  Remove screws (arrows).

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

5 – 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.

6 – Remove complete exhaust system

WARNING

Hot surfaces.

Risk of burning!

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

CAUTION

Component with heavy weight.

Danger of injury!

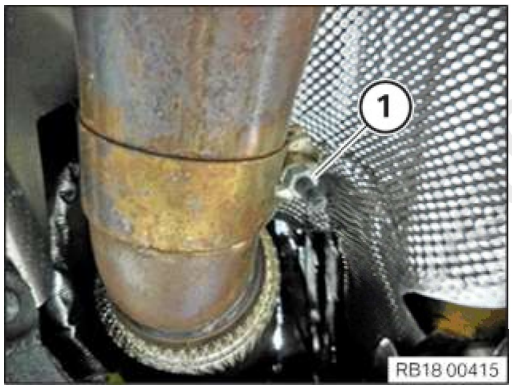
- Note component's centre of gravity.
- Support component using a jack.
- Secure component against falling off the jack.

CAUTION

Heavy component.

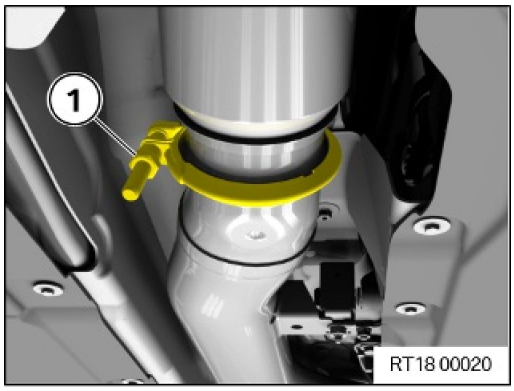
Heavy components can lead to injury or damage.

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



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

  Detach the ribbon clamp (1).

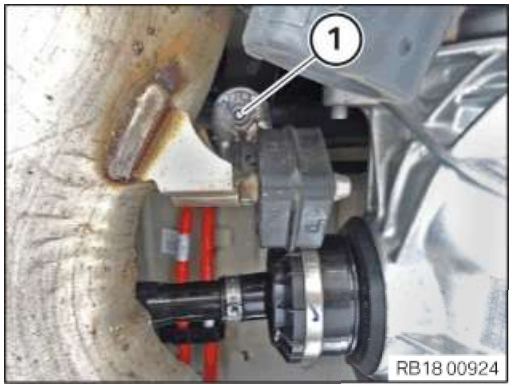


- **Equipment specification 2 (V-clips)**

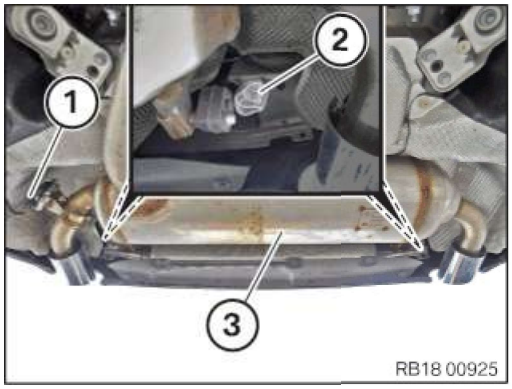
  Unfasten clamp (1).



- Loosen nut (1).



- 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.

7 – Removing starter motor

Prerequisite

Battery earth leads are disconnected.

WARNING

Hot surfaces.

Risk of burning!

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

WARNING

Working on 12 V vehicle electrical system.

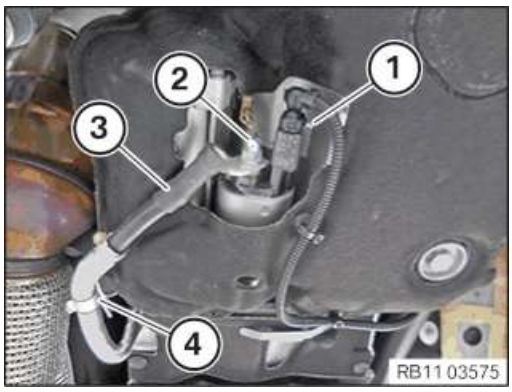
Risk of short circuits! Risk of fire!

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

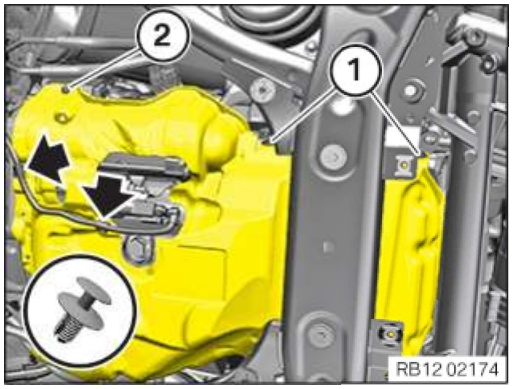
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TECHNICAL INFORMATION

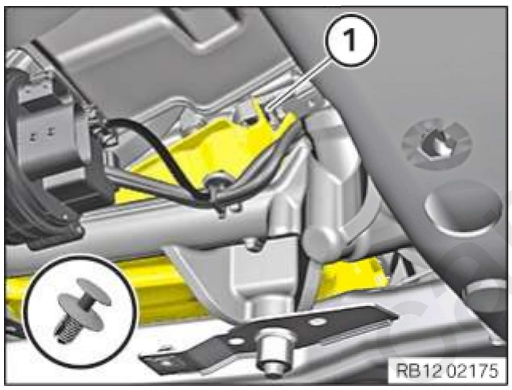
Make sure that the acoustic cover is **not** damaged while removing the starter motor.
A damaged lower acoustic cover can only be renewed when the front axle is lowered.



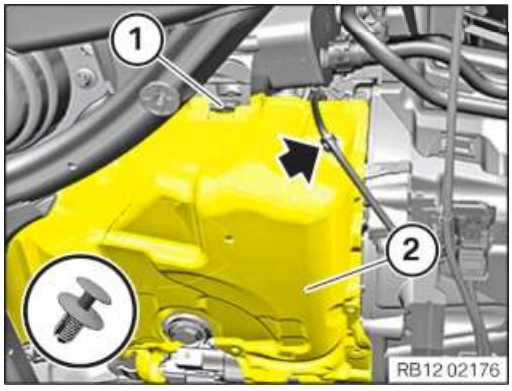
- Unlock plug connection (1) and disconnect.
- Loosen nuts (2).
- Release positive battery cable (3) from holder (4).



- Loosen the expanding rivet (1).
- Undo fir tree clip (2).
- Release the clamps (arrows).

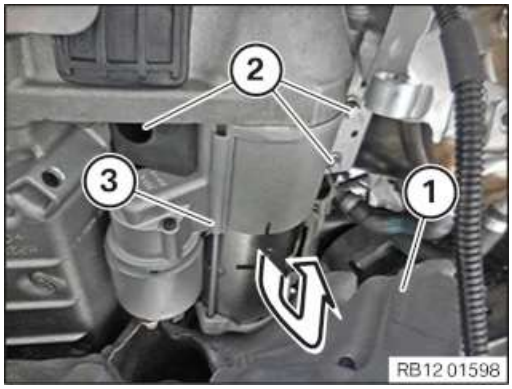


- Loosen expanding rivet (1).
- Lower the acoustic cover of the oil sump.



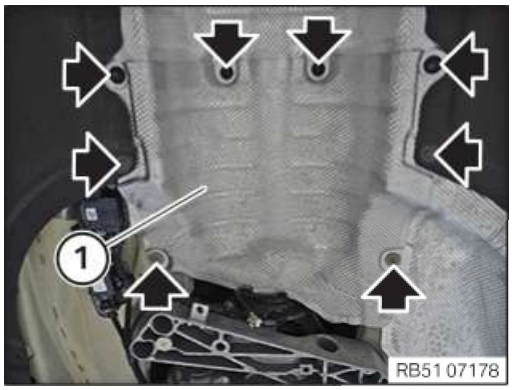
- Loosen expanding rivet (1).
- Loosen the clamp (arrow).
- Lower acoustic cover (2).

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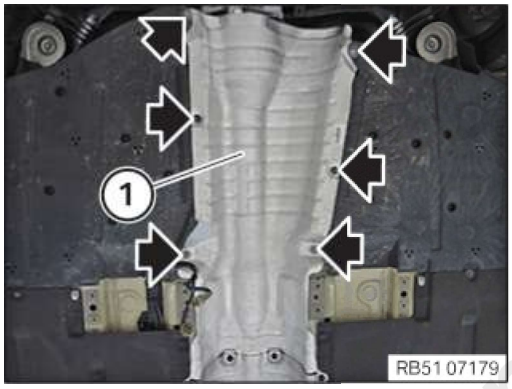


- Make sure that the acoustic cover (1) is not damaged.
- Carefully press the acoustic cover (1) to one side.
- Loosen screws (2).
- Carefully guide out the starter motor (3) in direction of arrow and remove.

8 – Remove heat shields



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



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

9 – Partially release propeller shaft

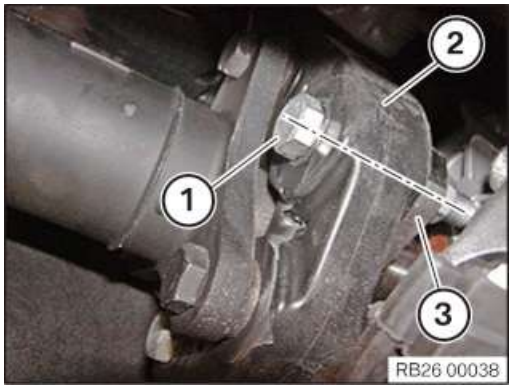
RISK OF DAMAGE

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.

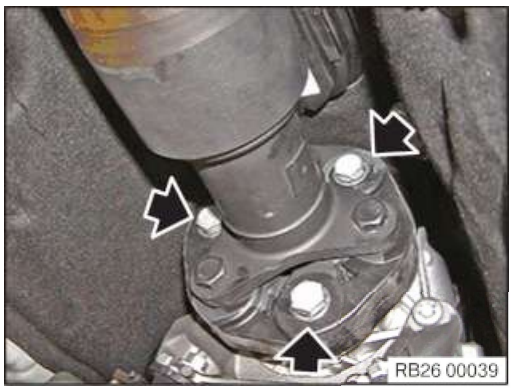
- Do not disassemble the three-hole flange, flexible disc and propeller shaft. The three-hole flange to the rear axle differential is balanced with the flexible disc and propeller shaft.
- Loosen the recessed nut against the direction of travel in clockwise direction. The propeller shaft must be loosened 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.

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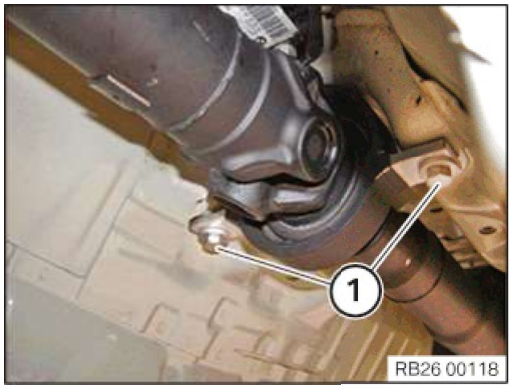


- Mark the installation position of the screw connection (1) of the flexible disc (2) and the three-hole flange (3).

  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).

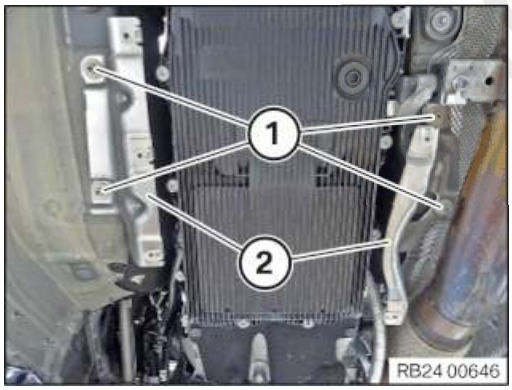


- Unscrew the bolts (1) on the centre mount and hold down the propeller shaft.

  Major deflection angles of the propeller shaft may damage the propeller shaft and/or the joints.

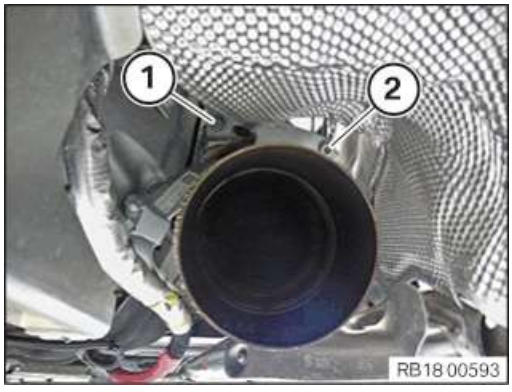
- Tie up propeller shaft to underbody.

10 – Remove the retaining plates

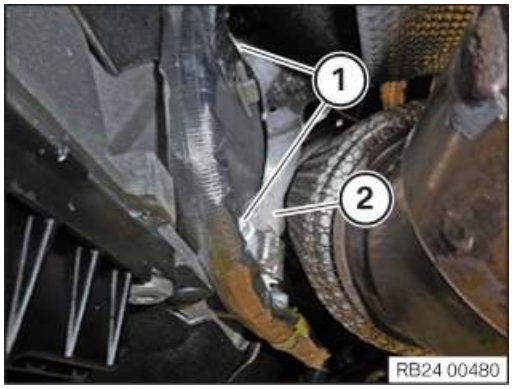


- Loosen nuts (1).
- Feed out retaining plates (2) and remove.

11 – Remove exhaust system holder

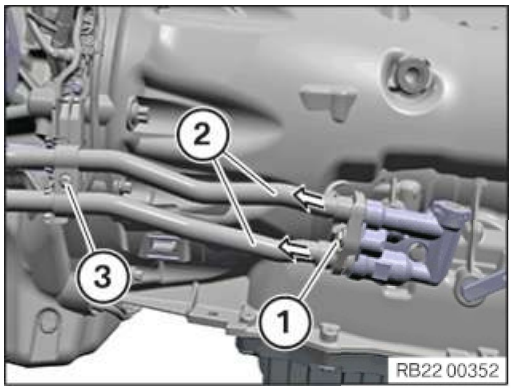


- Loosen screw (1).
- Loosen nut (2).



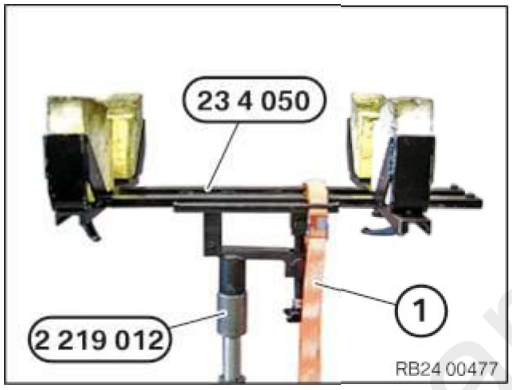
- Loosen screws (1).
- Remove the exhaust bracket (2).

12 – Disconnect hydraulic lines on the transmission

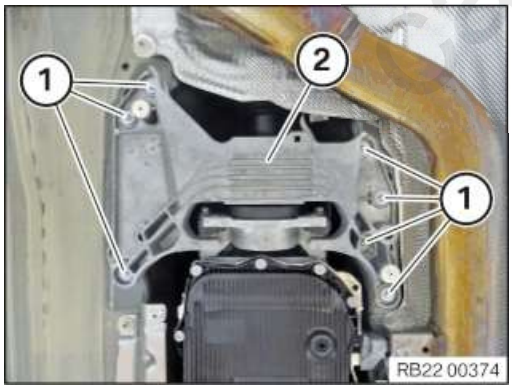


- Loosen screw (1).
- Loosen screw (3).
- Disconnect hydraulic lines (2) to transmission oil cooler.

13 – Detach 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 screws (1).
- Release transmission cross member (2).

14 – Remove automatic transmission (GA8HP51Z)

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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.

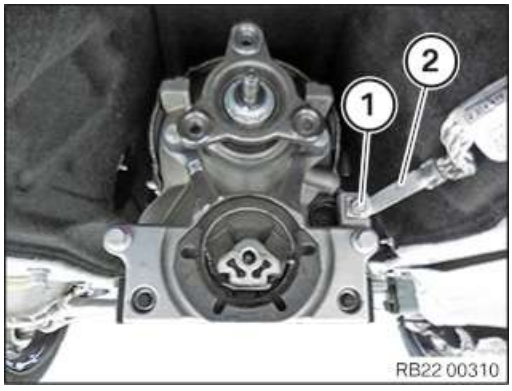
- Before removing the transmission: Support engine.
- Secure the engine against tilt movements.
- Follow the specifications of the repair instructions.

RISK OF DAMAGE

Damage to the transmission.

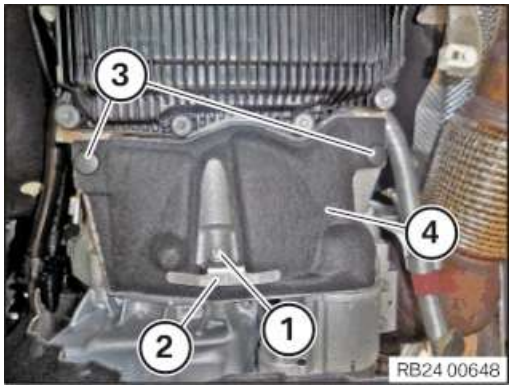
Damage to the transmission through unapproved transmission oil.

- 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).

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- Loosen the screw (1) and remove the holder (2).
- Pull the expanding rivet (3) off.
- Remove the acoustic cover (4).



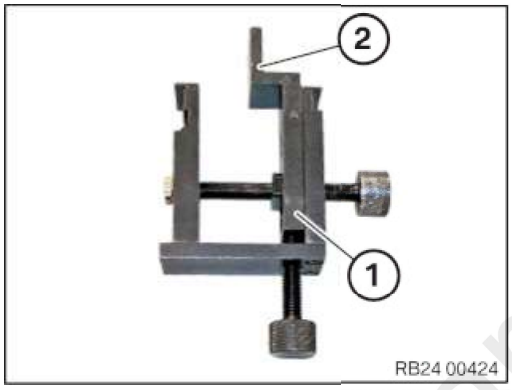
TECHNICAL INFORMATION

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

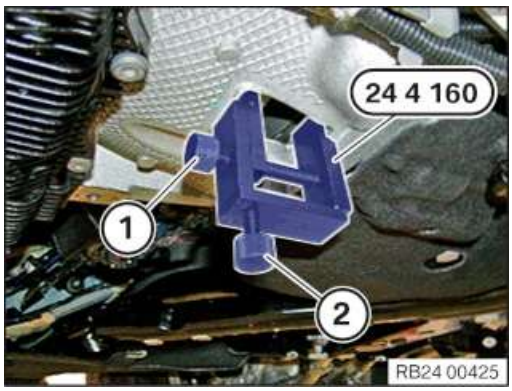
- Turn the engine on the vibration damper with the special tool 0 493 380 (11 6 480) in the direction of rotation until the bolt (1) becomes visible in the recess.
- Undo all 6 screws (1) on the torque converter.



- Prepare special tool 0 494 478 (24 4 161) (1) with the shaped element 0 496 061 (24 4 166) (2) as shown.

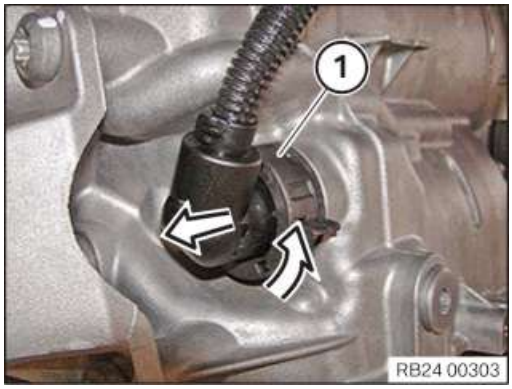


- Remove the sealing cap (1).



- 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).

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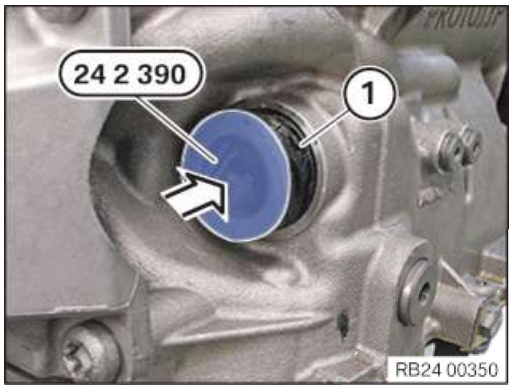


TECHNICAL INFORMATION

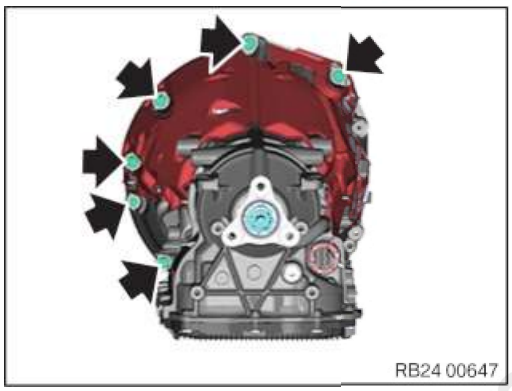
Notes on mechatronics are a fundamental requirement for these repair instructions and must be complied with at all times.

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.



- Support engine.
- Release remaining screws.
- Remove transmission.

15 – Remove torque converter

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.



- Screw the special tool 0 496 717 (24 1 440) into the torque converter.
- Remove torque converter and set down vertically.
- Catch and dispose of escaping transmission oil.

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16 – Remove the radial shaft seal for the torque converter (GA8HP50Z, GA8HP51Z)

CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

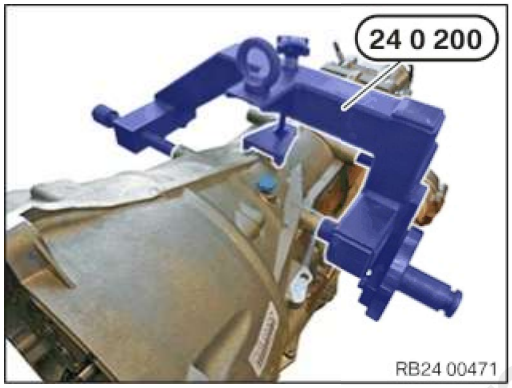
- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.

RISK OF DAMAGE

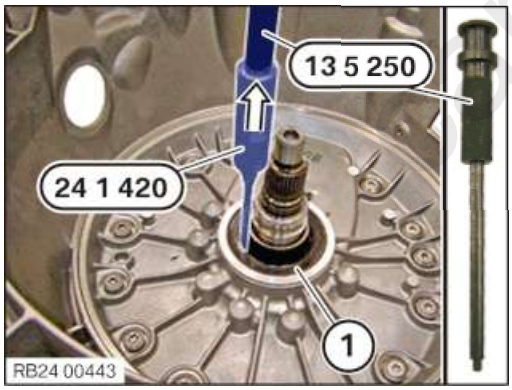
Damage to the transmission.

Damage to the transmission through unapproved transmission oil.

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



- Using special tool 0 495 446 (24 0 200), secure transmission to assembly stand 0 495 187 (00 2 300).



- Pull out the radial shaft seal (1) with the special tools 0 496 716 (24 1 420) and 0 493 321 (13 5 250).

17 – Install the radial shaft seal for the torque converter (GA8HP50Z, GA8HP51Z)



- Renew screws.

  Parts: Bolts

  To do so, it is essential to use the new parts from the drive repair kit.

  The 13 Torx screws in the drive repair kit are equipped with a sealing ring.
- Replace and hand-tighten the screws (1) along the dotted line.

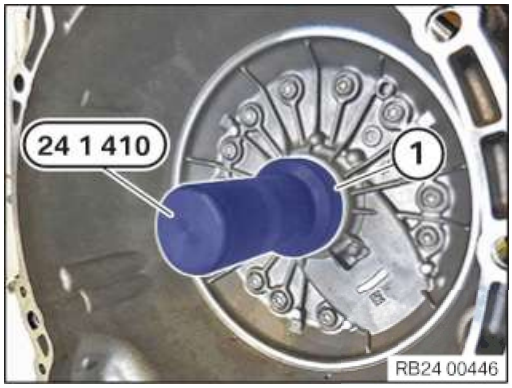
  The screws (1) must be replaced one by one. Only ever replace a screw (1) one at a time.



- Tighten screws in the order (1) to (13).

Centring plate on transmission housing

M8x74	Replace screws	Jointing torque	10 Nm
		Angle of rotation	90 °



- Install the O-ring on the drive shaft.
- Oil the sealing lip of the radial shaft seal with transmission oil.
- Strike the radial shaft seal (1) with the special tool 0 496 719 (24 1 410) until it reaches the limit position.

POSTPROCESSES

18 – Install torque converter

RISK OF DAMAGE

Damage to the driver of the impeller.

Failure to observe the installation instructions may lead to damage on the impeller driver.

- During installation, do not damage the radial shaft seal or ball bearing.
- Lock the torque converter correctly. Otherwise, the driver of the impeller may be damaged when the transmission is flange-mounted on the engine.



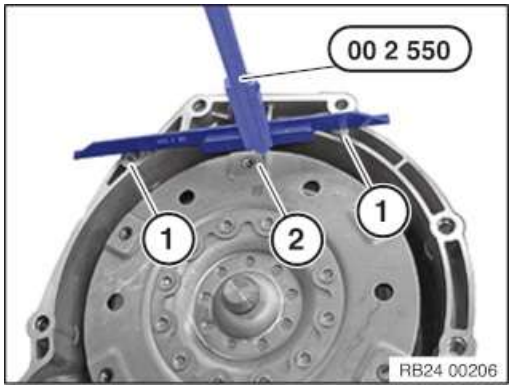
- When replacing the torque converter: Renew the O-ring (1) on the drive shaft.

  Parts: O-ring
- Push the torque converter onto the transmission shaft up to the limit position.
- Press torque converter by hand into converter housing.

  At the same time, turn the torque converter until the recesses at the hub of the torque converter engage in the driver of the impeller.

  You can feel the torque converter slipping inward.

Check



- Determine the dimension between the contact surface (1) and the outer edge (2) of the torque converter threaded hole using special tool 0 490 189 (00 2 550).

desired state

- Measured value is greater than 15 mm.

Result

» Measured value is less than or equal to 15 mm.

Measure

- Position the torque converter correctly in the converter housing.

19 – Install automatic transmission (GA8HP51Z)

RISK OF DAMAGE

Damage to the transmission.

Damage to the transmission through unapproved transmission oil.

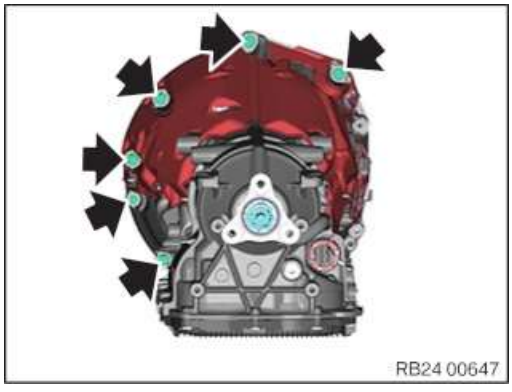
- Use only the approved transmission oil.
- After completion of repair work, check transmission oil level.

TECHNICAL INFORMATION

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

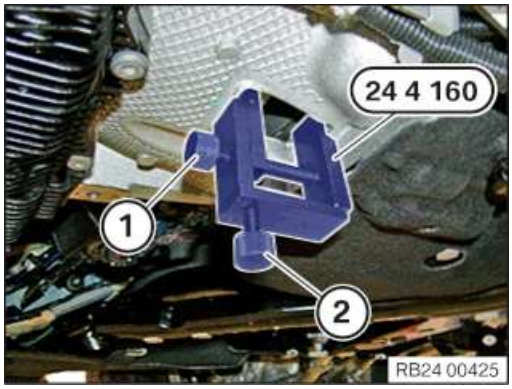


- Check the fitting sleeves (1) for correct fit and damage and renew as needed.



- Transmission flange-mount.
- 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.

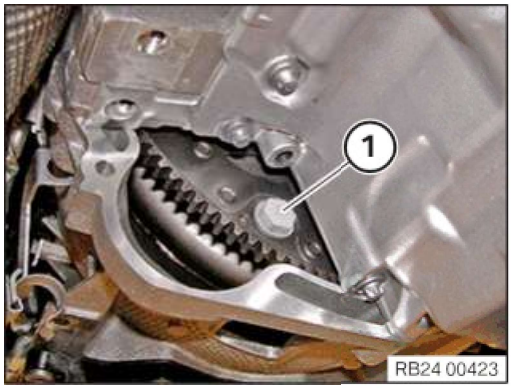
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- Release screw (1) and screw (2).
- Remove special tool 0 494 451 (24 4 160).



- 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.

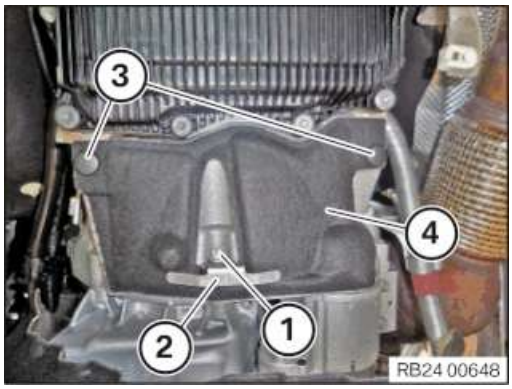
For additional information see: 17 11 035 Removing and installing/replacing the fan cowl including electric fan

- 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



- Install acoustic cover (4).
- Install expanding rivet (3).
- Install the holder (2) and tighten the screw (1).

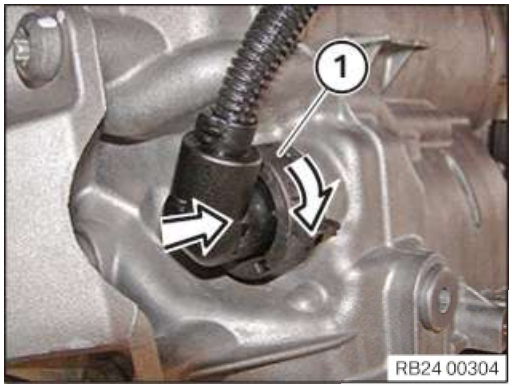
Transmission to engine

M8		Tightening torque	19 Nm
M12		Tightening torque	66 Nm

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

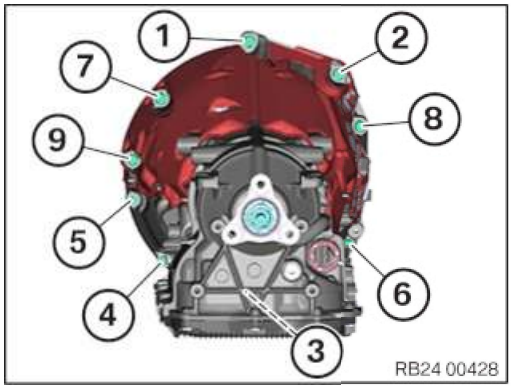


TECHNICAL INFORMATION

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)

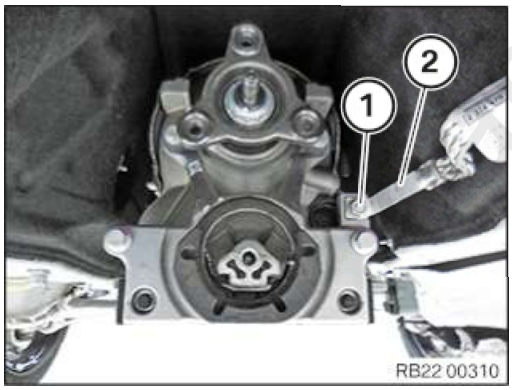
- Slide the connector (1) on and turn it to lock.



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

Transmission to engine

M8		Tightening torque	19 Nm
M12		Tightening torque	66 Nm

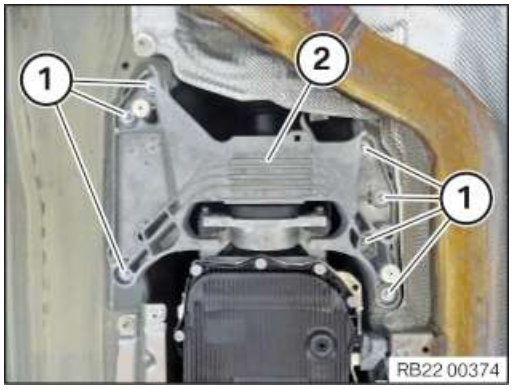


- Install the ground strap (2).
- Tighten down screw (1).

Ground strap to transmission or body

M8		Tightening torque	19 Nm

20 – Install transmission cross member.

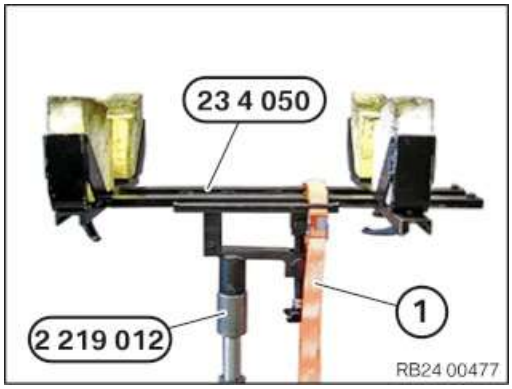


- Install the transmission cross member (2).
- Tighten the screws (1).

Transmission cross member to body

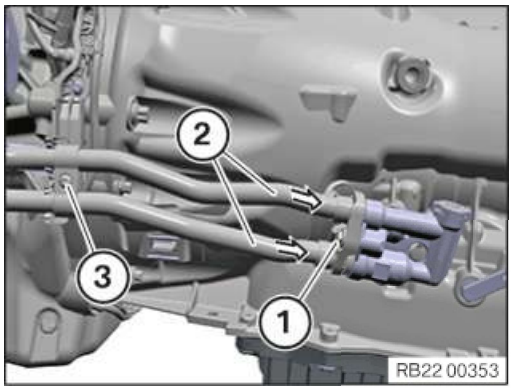
M8	Renew screws.	Tightening torque	19 Nm

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- 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.

21 – 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

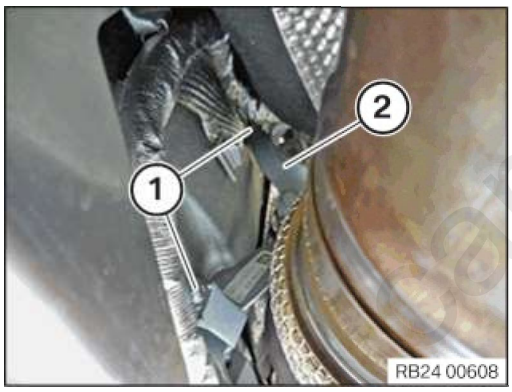
M6x25	Renew the sealing ring.	Tightening torque	8 Nm

- Position and tighten the screw (3).

Transmission oil line on holder

M6		Tightening torque	8 Nm

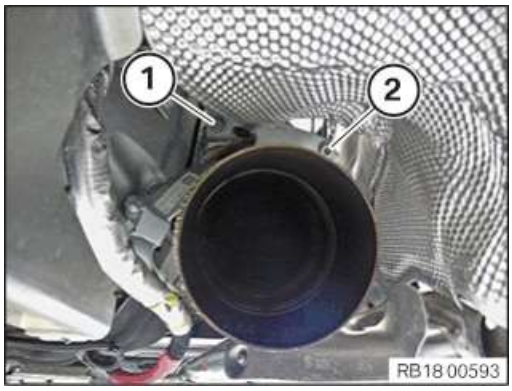
22 – Install the exhaust bracket



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

Transmission to engine

M8		Tightening torque	19 Nm
M12		Tightening torque	66 Nm



- Tighten down screw (1).

Catalytic converter to holder

M8	Renew screw.	Tightening torque	19 Nm

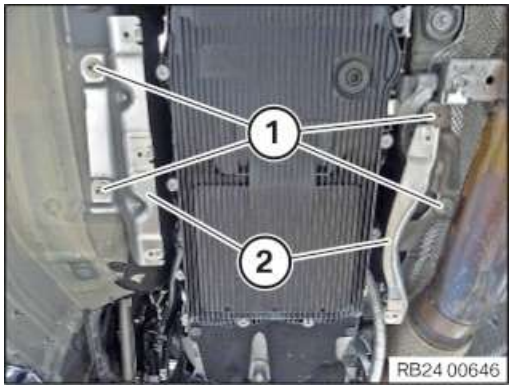
- Tighten nut (1).

Catalytic converter to holder

M8	Renew nut.	Tightening torque	19 Nm

23 – Install the retaining plates

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- 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

24 – Partially installing the propeller shaft



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

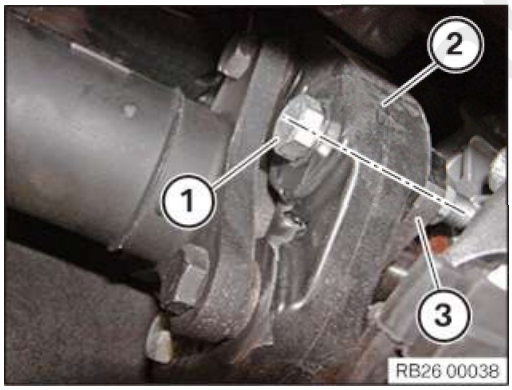


- Apply a thin coat of grease to the soft centring (1), if necessary.

  Do not grease the hard centring (2).

Expendable materials

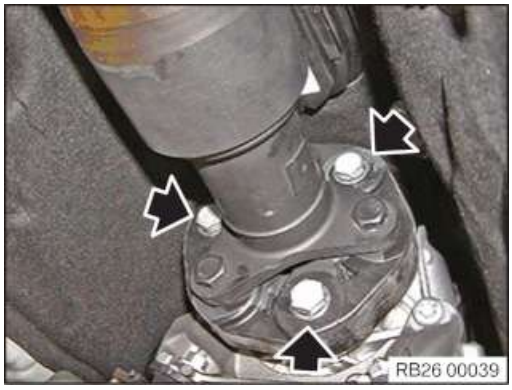
Lubricating grease Olistamoly 2 LN 584 LO	100 g, Tube	83 19 0 447 919



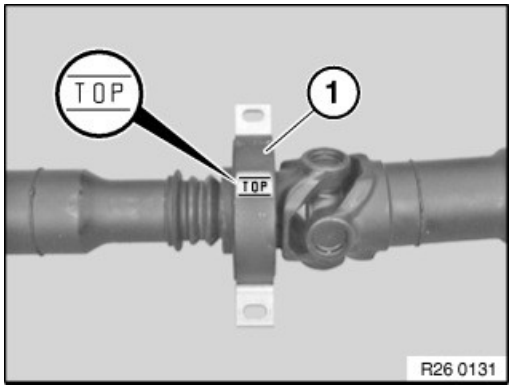
- Renew screws and the self-locking nuts.

  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.

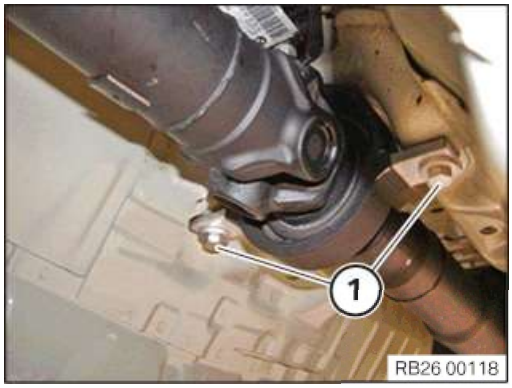
  This should prevent a humming noise from the drive train during driving.



- 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.



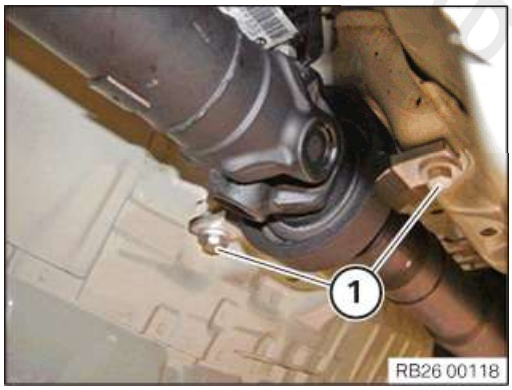
- Renew screws.

  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.

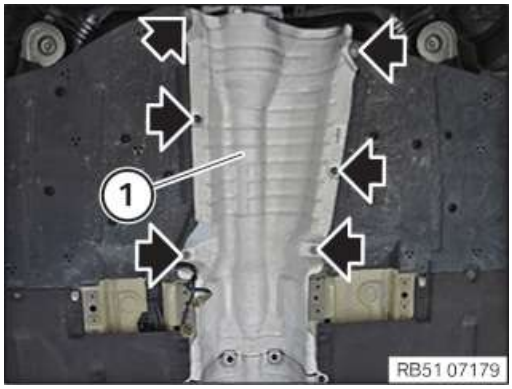


- Tighten the screws (1).

Centre mount to body

M8		Tightening torque	19 Nm

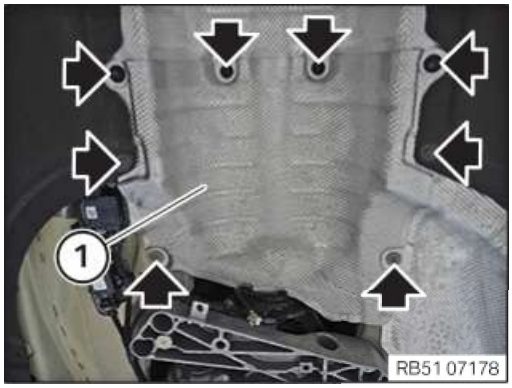
25 – Install the heat shields



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

Heat shield to vehicle underbody

Screws and nuts		Tightening torque	3 Nm

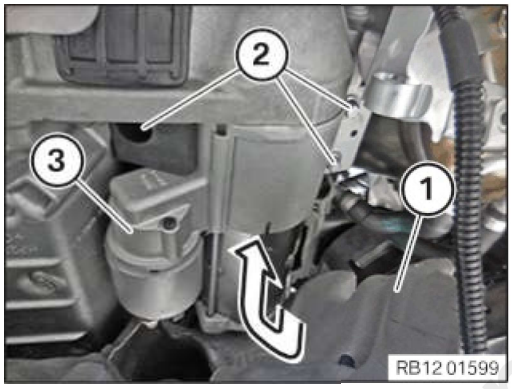


- Install heat shield (1).
- Tighten the nuts and bolts (arrows).

Heat shield to vehicle underbody

Screws and nuts		Tightening torque	3 Nm

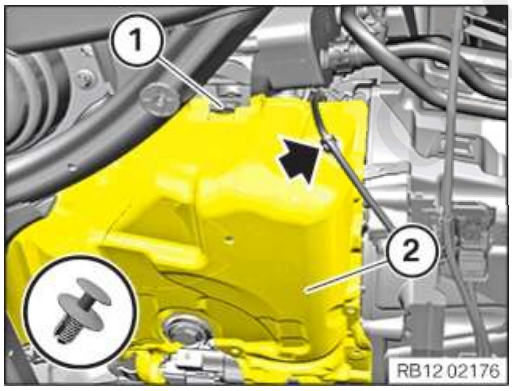
26 – Installing starter motor



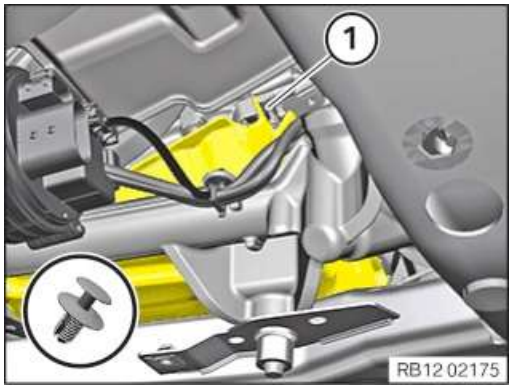
- Make sure that the acoustic cover (1) is not damaged.
- Carefully press the acoustic cover (1) to one side.
- Feed in and install the starter motor (3) in the direction of the arrow.
- Tighten the screws (2).

Starter motor to engine

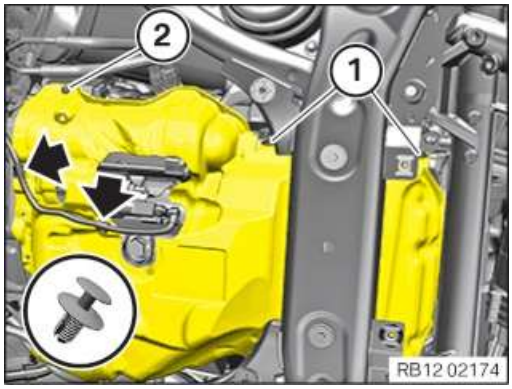
M8X60		Tightening torque	19 Nm



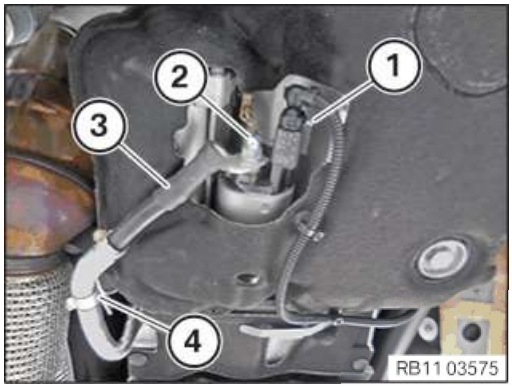
- Position the acoustic cover (2).
- Fasten expanding rivet (1).
- Secure clamp (arrow).



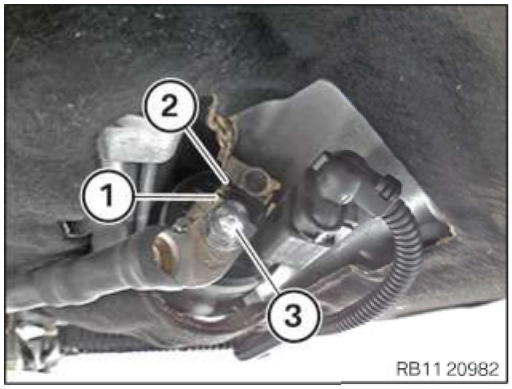
- Fasten expanding rivet (1).



- Secure fir tree clip (2).
- Secure expanding rivet (1).
- Secure the clamps (arrows).



- Secure the positive battery cable (3) in the holder (4) and position it at the starter motor.
- Tighten the nut (2) hand-tight.
- Connect the connector (1) and audibly lock it.



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

27 – 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.

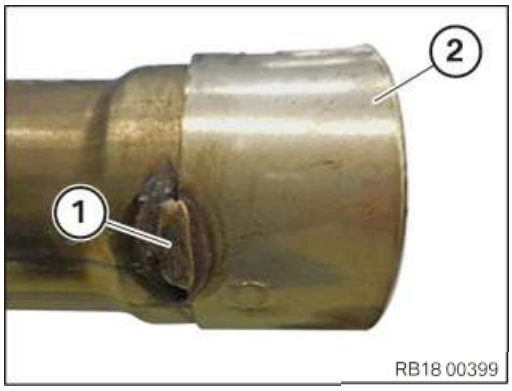
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CAUTION

Heavy component.

Heavy components can lead to injury or damage.

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



CAUTION

Swarf resulting from sawing or grinding components.

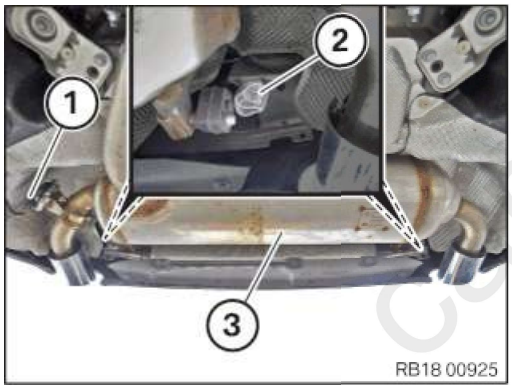
Danger of injury!

- 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).

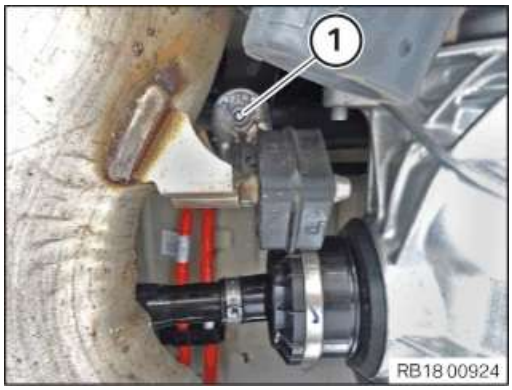
  Parts: Nuts
- Tighten nuts (2).

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

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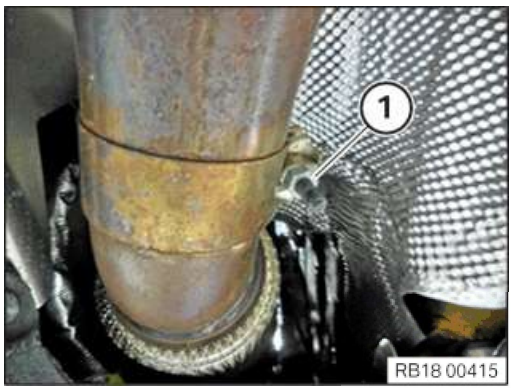
- Renew nut (1).

  Parts: Nut

- Tighten nut (1).

Front silencer / petrol particulate filter on transmission bracket

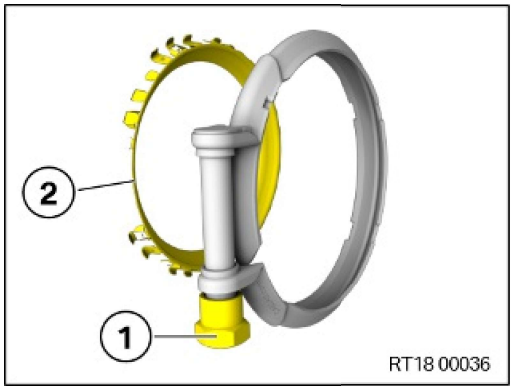
M8	Renew nut.	Tightening torque	19 Nm



- Tighten the ribbon clamp (1).

Exhaust system to catalytic converter

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

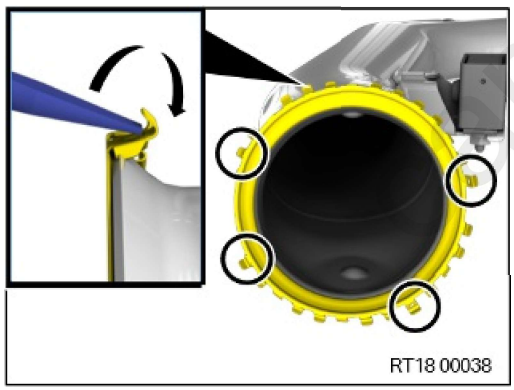


- **Equipment specification 2 (V-clips)**

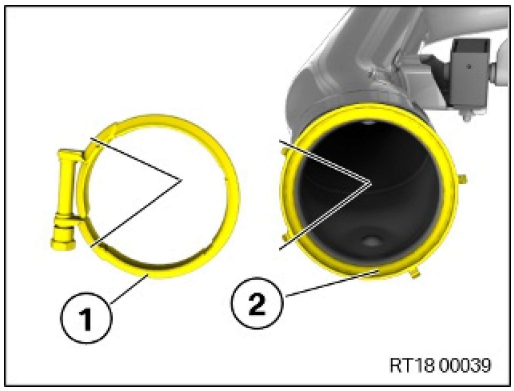
  Renew V-band clamp.

  Parts: V-band clamp

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

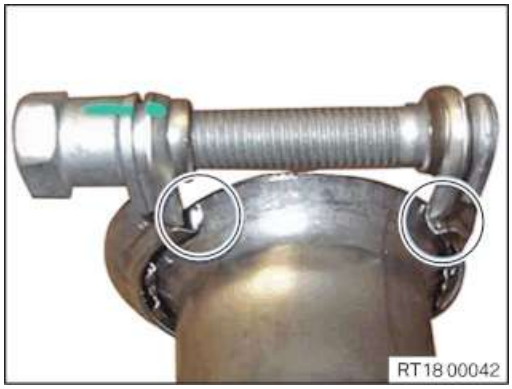


- Bend all sheet metal tabs over with a suitable tool, except those in the marked areas.

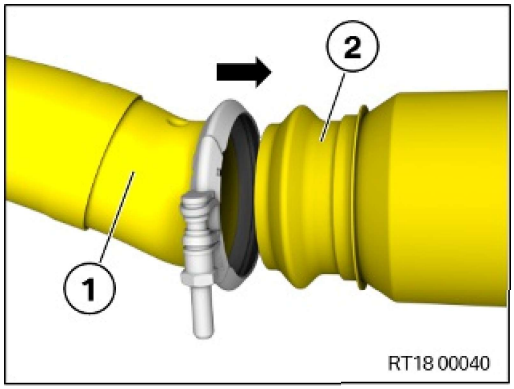


- Mount the V-clip (1) on the sealing ring (2).
- Make sure that the V-clip (1) is positioned correctly on the sealing ring (2).

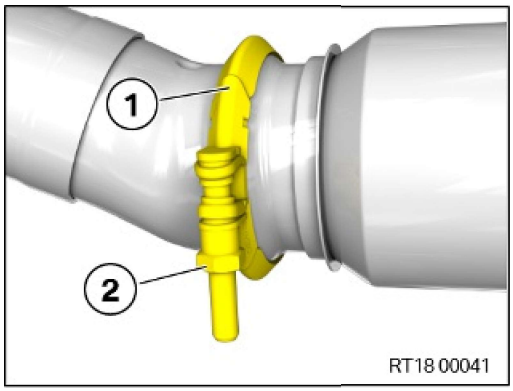
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- Ensure that the V-clip rests against the sheet metal tabs in the marked areas after mounting.



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

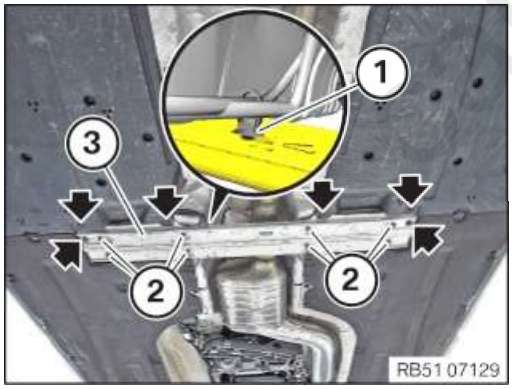


- Make sure that V-clip (1) is fitted correctly.
- Tighten down screw (2).

V-clip to catalytic converter

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

28 – 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).

29 – Disconnecting all battery earth leads

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- See additional information.

30 – 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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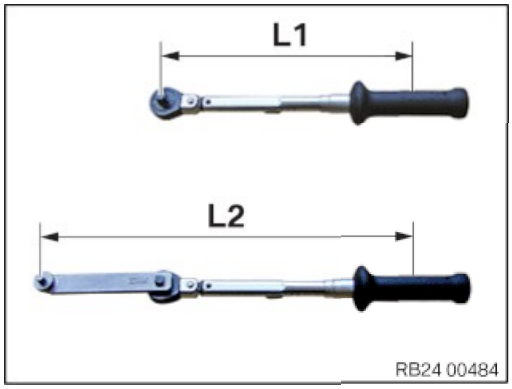
- **Top up the automatic transmission fluid:**
- Loosen the oil filler plug (1) using the special tool 2 405 614.
- Top up automatic transmission fluid according to the instructions in the diagnosis system.

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

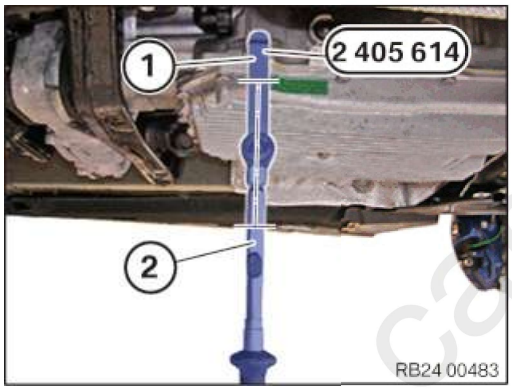
The setpoint torque deviates from the torque to be set when using special tool 2 405 614.

- **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.



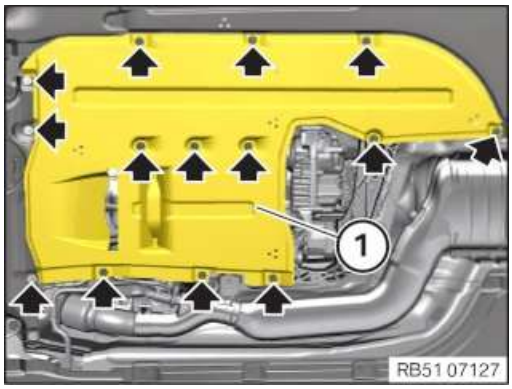
- Renew the oil filler plug (1) and the sealing ring.

  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

31 – Installing underbody protection at rear



- **Version 1:**

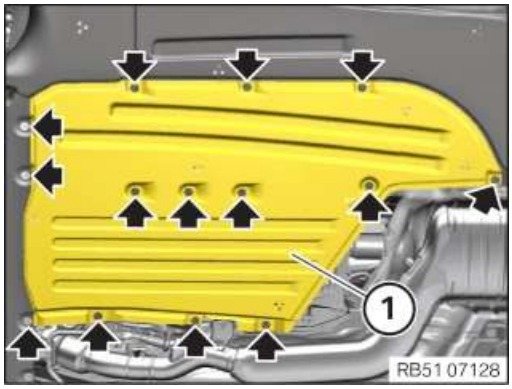
  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

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- **Version 2:**

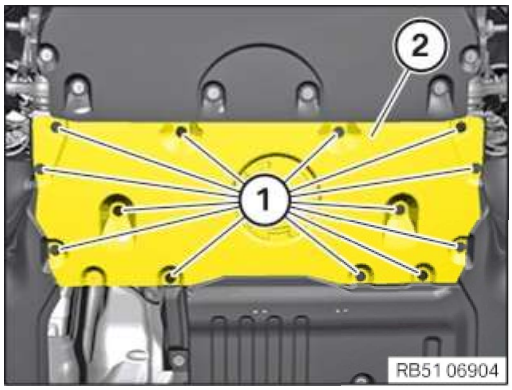
  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

32 – Installing the centre underbody protection



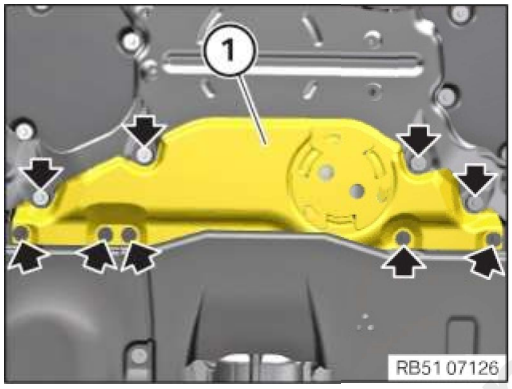
- **Version with rear-wheel drive:**

  Position central underbody protection (2).

  Tighten the screws (1).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



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

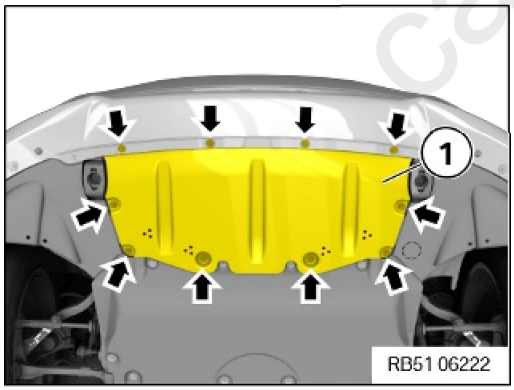
  Guide in and install the centre of underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

33 – Installing the front underbody protection



- **Version 1:**

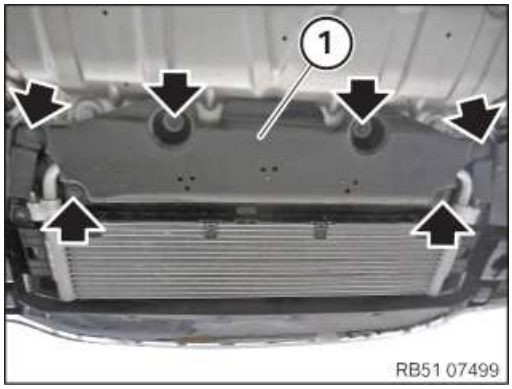
  Feed in the front underbody protection (1) towards the front under the bumper panel and position.

  Tighten screws (arrows).

Underbody protection front

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

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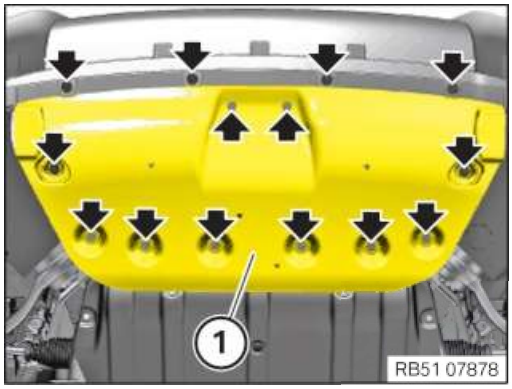
- **Version 2:**

  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

Centring plate on transmission housing — Used in step 17

M8x74	Replace screws	Jointing torque	10 Nm
		Angle of rotation	90 °

Torque converter to flywheel — Used in step 19

M10	Renew screws.	Tightening torque	56 Nm

Transmission to engine — Used in step 1922

M8		Tightening torque	19 Nm
M12		Tightening torque	66 Nm

Ground strap to transmission or body — Used in step 19

M8		Tightening torque	19 Nm

Transmission cross member to body — Used in step 20

M8	Renew screws.	Tightening torque	19 Nm

Transmission oil line to transmission — Used in step 21

M6x25	Renew the sealing ring.	Tightening torque	8 Nm

Transmission oil line on holder — Used in step 21

M6		Tightening torque	8 Nm

Catalytic converter to holder — Used in step 22

M8	Renew screw.	Tightening torque	19 Nm

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Catalytic converter to holder — Used in step 22

M8	Renew nut.	Tightening torque	19 Nm

Retaining plates for vehicle underbody cover — Used in step 23

Sheet metal nut	Replace nuts.	Tightening torque	3 Nm

Front flexible disc to propeller shaft — Used in step 24

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 24

M8		Tightening torque	19 Nm

Heat shield to vehicle underbody — Used in step 25

Screws and nuts		Tightening torque	3 Nm

Starter motor to engine — Used in step 26

M8X60		Tightening torque	19 Nm

Battery positive lead to starter — Used in step 26

M8		Tightening torque	13,5 Nm

Rear silencer to body / bumper support — Used in step 27

M8	Replace nuts.	Tightening torque	19 Nm

Exhaust system to rear axle carrier — Used in step 27

Nut M8	Renew nut.	Tightening torque	19 Nm

Front silencer / petrol particulate filter on transmission bracket — Used in step 27

M8	Renew nut.	Tightening torque	19 Nm

Exhaust system to catalytic converter — Used in step 27

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

V-clip to catalytic converter — Used in step 27

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

Connecting support to tunnel — Used in step 28

M8x25 screw		Tightening torque	20 Nm
Screw		Tightening torque	3 Nm

Oil filler plug — Used in step 30

M18x1.5		Tightening torque	35 Nm

Underbody protection — Used in step 3132

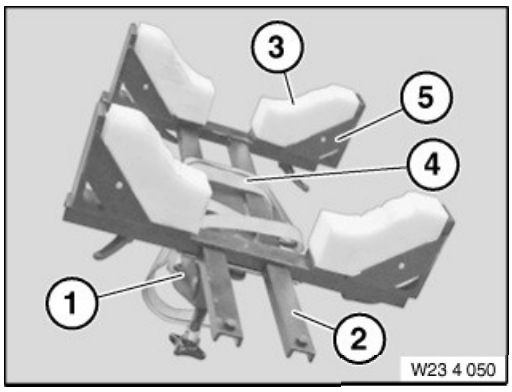
Hexagon screw		Tightening torque	3 Nm

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

Overview of Special Tools

0 495 498 (23 4 050) Support



Common Used in step 1320

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.	

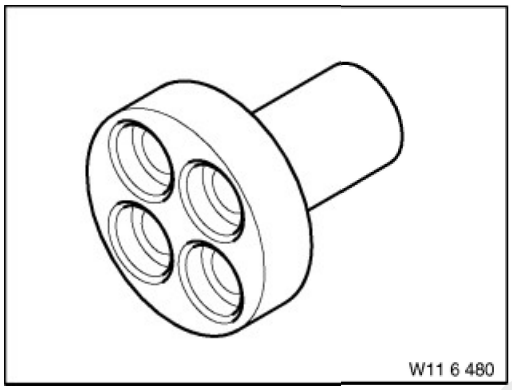
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2 219 012 Hydraulic lifter



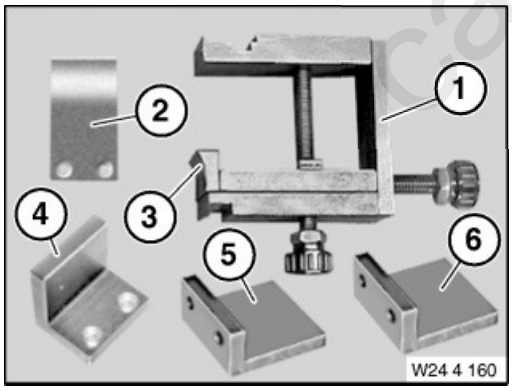
Common	Used in step 1320
Usage	For raising and lowering various vehicle components.
Included in the tool or work	
Storage location	
Replaced by	
In connection with	
SI-Number	01 05 90 (207)

0 493 380 (11 6 480) Connector



Common	Used in step 1419
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)

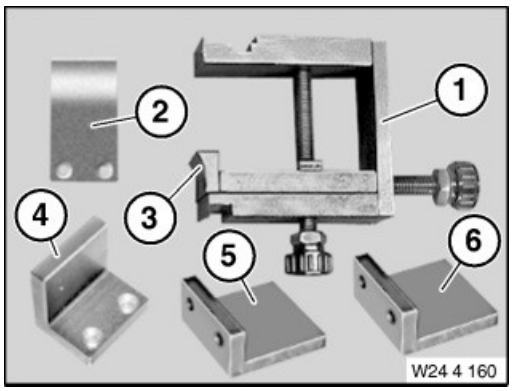
0 494 478 (24 4 161) Basic body



Common	Used in step 14
Usage	
Included in the tool or work	0 494 451
Storage location	C46
Replaced by	
In connection with	
SI-Number	

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0 496 061 (24 4 166) Shaped element



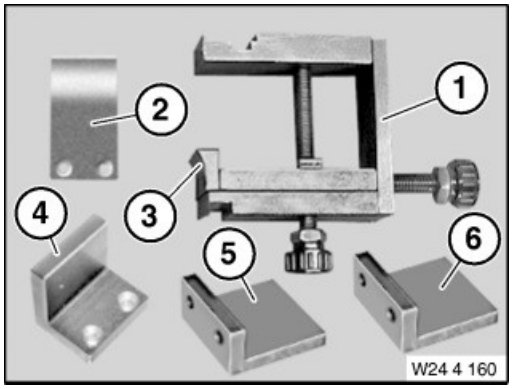
Common Used in step 14

Usage	Transmission: GA6L45R (GM6) in E83 / N52K 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	01 02 07 (334)

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0 494 451 (24 4 160) Holder

Used in step 1419



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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0 494 213 (24 2 390) Cap



Common	Used in step 1419
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)

0 496 717 (24 1 440) Handle

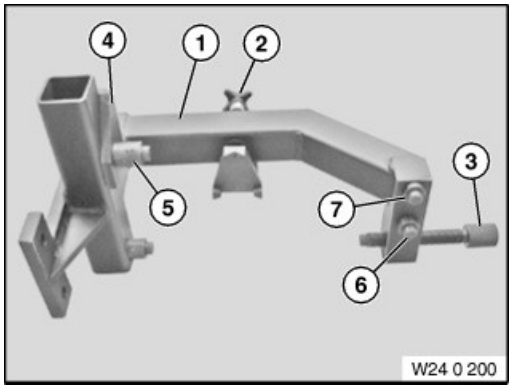


Common	Used in step 15
Usage	For installing and removing the torque converter. 8HPxx
Included in the tool or work	
Storage location	C50
Replaced by	
In connection with	
SI-Number	01 17 09 (577)

0 495 446 (24 0 200) Support

Used in step 16

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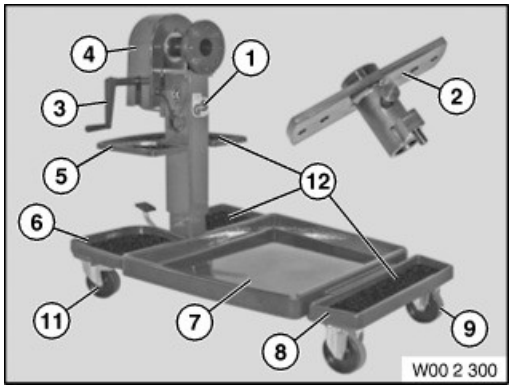
Common

Usage	For mounting gearbox on assembly stand.
Included in the tool or work	
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 27 06 (328)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
2	0 495 489 (24 0 202)		**Spindle** (Spindle with thrust piece) Discontinued, only available via tool set	
7	0 495 494 (24 0 207)		**Adapter** (Adapter (short)) Deletion, only available via tool set	
1	0 495 488 (24 0 201)		**Basic body** Discontinued, only available via complete tool	
3	0 495 490 (24 0 203)		**Spindle** (Spindle with screw) Deletion, only available via tool set	
4	0 495 491 (24 0 204)		**Shaped part** (shaped part)	
5	0 495 492 (24 0 205)		**Adapter** (Adapter (long)) Deletion, only available via tool set	
6	0 495 493 (24 0 206)		**Adapter** (Adapter (medium)) Deletion, only available via tool set	

0 495 187 (00 2 300) Assembly stand



Common Used in step 16

Usage	Assembly stand with universal flange for mounting engines from S85
Included in the tool or work	
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 25 04 (155)

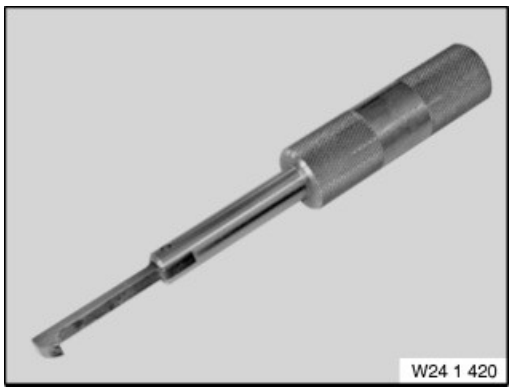
Consisting of

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Pos	BMW Order number	Replaced by	Designation	In Connection with
1	0 495 188 (00 2 301)		**Assembly stand** available only as complete assembly stand 83 30 0 495 187.	
2	0 495 189 (00 2 302)	2 299 563	**Tool** (Universal flange). Do not use any more!!! Technically locked. Replaced with a new flange with material number 83 30 2 299 563. All flanges delivered until the end of 2011 will be replaced at no charge. From 2012, only the new flange will be supplied. Also applies to the complete engine mounting stand 00 2 300.	
3	0 495 200 (00 2 303)		**Crank**	
4	0 495 201 (00 2 304)		**Cover** (Protective hood)	
5	0 495 202 (00 2 305)		**oddments tray** (Oddments tray for small parts)	
6	0 495 203 (00 2 306)		**Shaped element** (Rear shaped pan)	
7	0 495 204 (00 2 307)		**Collection pan** (Oil collection pan)	
8	0 495 205 (00 2 308)		**Shaped element** (Front shaped pan)	
9	0 495 206 (00 2 309)		**Wheel** (Front wheel (without stop))	
10	0 495 207 (00 2 311)		**Wheel** (Rear wheel (with stop))	
11	0 495 208 (00 2 312)		**Mat** (Checker mat set)	
2	2 299 563		**Adapter** New adapter for the engine assembly stand. Replacement for 83 30 0 495 189 - 00 2 302.	

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0 496 716 (24 1 420) Puller



Common Used in step 16

Usage	Removing radial shaft seal from torque converter.
Included in the tool or work	
Storage location	B54
Replaced by	
In connection with	13 5 250 = 0493321
SI-Number	01 17 09 (577)

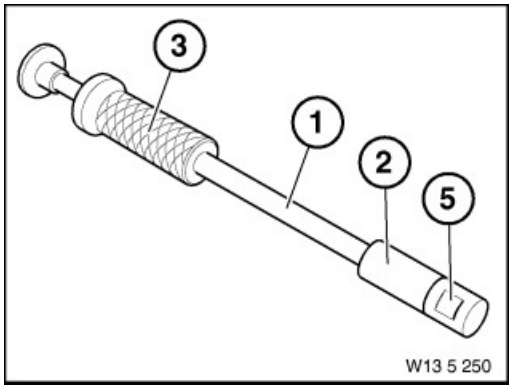
Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
1	2 209 493 (24 1 421)		**Blade** Replacement blades for 24 1 420 Only available as part of complete tool set 24 1 420 (83 30 0 496 716).	

0 493 321 (13 5 250) Puller

Used in step 16

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Common

Usage	For removing injector nozzles or injectors from cylinder head
Included in the tool or work	
Storage location	A16
Replaced by	
In connection with	
SI-Number	01 06 98 (306)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
1	0 493 338 (13 5 251)		**Rod** (guide rod)	
2	0 493 339 (13 5 252)		**Bush** (Threaded bush)	
3	0 493 340 (13 5 253)		**Weight** (Weight)	
4	0 493 379 (13 5 254)		**Claw** (Clamping claw) For removal of injector nozzles / engine: M57	
5	0 495 579 (13 5 255)		**Adapter** For removing steering shaft on E85. Refer to SI 01 11 06 (265)	

0 496 719 (24 1 410) Mandrel

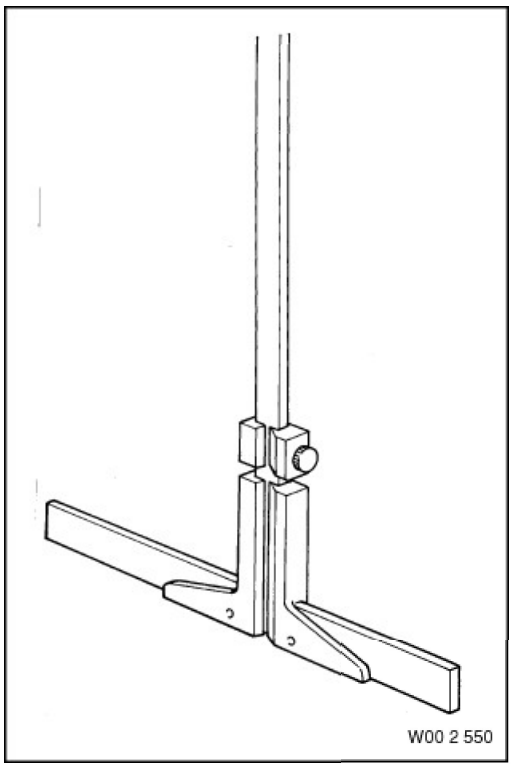


Common Used in step 17

Usage	For driving in shaft seal on gearbox drive shaft.
Included in the tool or work	
Storage location	B49
Replaced by	
In connection with	
SI-Number	01 17 09 (577)

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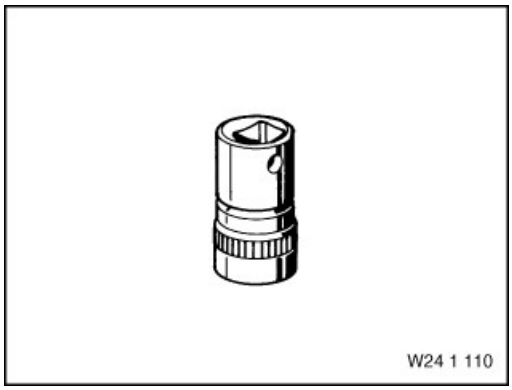
0 490 189 (00 2 550) Measurement aid



Common	Used in step 18
Usage	(Depth gauge) E.g. for determining side clearance of transmission shaft and basic adjustment dimension for installing bevel pinion in rear axle final drives
Included in the tool or work	
Storage location	A4
Replaced by	
In connection with	
SI-Number	

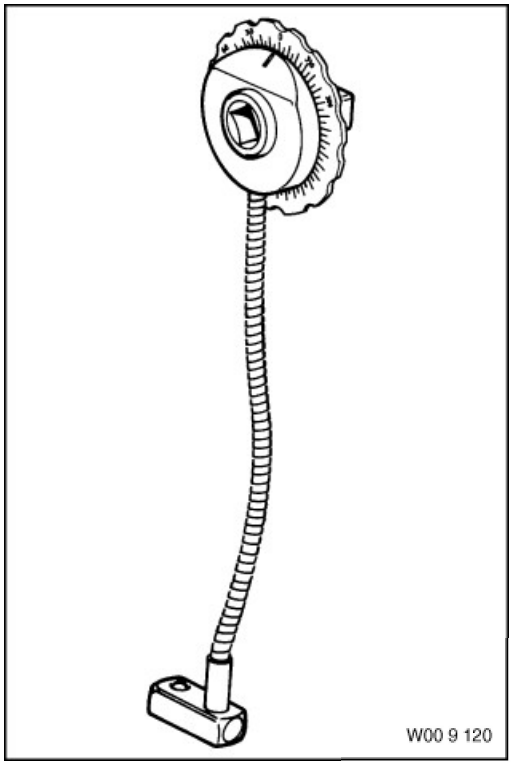
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0 491 667 (24 1 110) Socket wrench insert



Common	Used in step 19
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)

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



Common	Used in step 24
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 30
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)

Replacement tools:

2 299 563 Adapter



Common	Used in step 16
Usage	New adapter for the engine assembly stand. Replacement for 83 30 0 495 189 - 00 2 302.
Included in the tool or work	0 495 187
Storage location	
Replaced by	
In connection with	
SI-Number	

Overview Technical Data

GA8HP51Z transmission capacity Used in step 30

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	min. 9,28 l

Transmission oil: Automatic transmission fluid ATF 3+

GA8HP76Z transmission capacity Used in step 30

	min. 9,35 l

Transmission oil: Automatic transmission fluid ATF 3+

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
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
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
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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 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 battery earth lead	129
17 11 035 Removing and installing/replacing fan cowl with electric fan	14

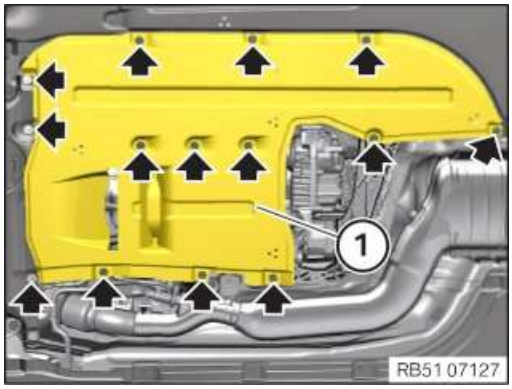
Operating materials	Used in step
14.0 Automatic transmission fluid for ZF-transmission GA8HP45Z / GA8HP50Z / GA8HP70Z / GA8HP90Z / GA8P70H / GA8P75H / GA8HP75Z	30

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24 34 000 Removing and installing/replacing the parking lock

PRELIMINARY WORK

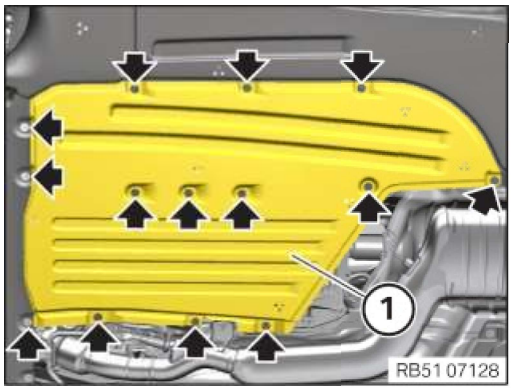
1 – Remove rear underbody protection



- **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.

MAIN WORK

2 – Unlock the parking lock electronically (GA8HP50Z, GA8HP51Z, GA8HP75Z, GA8HP76Z, GA8HP75HZ, GA8HP95Z)

TECHNICAL INFORMATION

Conditions in which an electronic emergency gearbox release is impaired or unavailable:

The vehicle is positioned on an incline (tensions in the drivetrain).

At very high or low transmission oil temperature (modified viscosity).

TECHNICAL INFORMATION

Electronic emergency gearbox release: Service personnel

Only specially trained service personnel are permitted to operate both the mechanical as well as the electronic emergency gearbox release.

The vehicle must be raised and the underbody panelling disassembled in order to operate the mechanical emergency gearbox release.

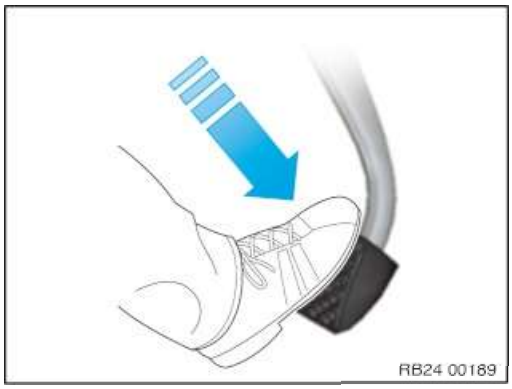
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TECHNICAL INFORMATION

Electronic emergency gearbox release: Fault code entry

To operate the electronic emergency gearbox release the vehicle must **not** be towed away but rather only manoeuvred.

In the case of misuse, a corresponding fault is entered in the fault memory.



- **Electronically release the parking lock.**
- Switch the ignition on.
- Press the brake pedal and keep it pressed down during the entire process.



- Press start/stop button and keep it pressed down during the entire process.



- Press the release button on the electronic gear selector switch.

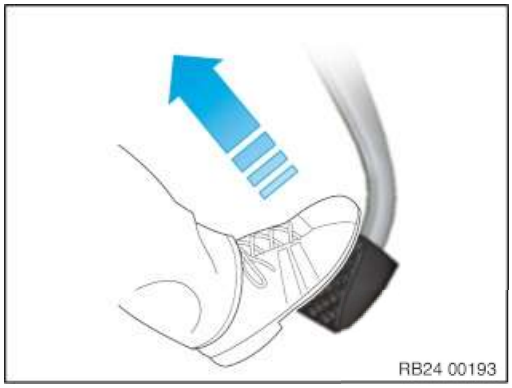


- Press and hold release button, move gear selector switch into position N and hold there until position N lights up.

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- As soon as the Neutral N gear has been engaged in the transmission, a Check Control message will be displayed in the KOMBI.
- The parking lock is now electronically unlocked.



- After the parking lock has been unlocked successfully, release the brake pedal, start/stop button, gear selector switch and release button.

3 – Unlocking the parking lock manually from the undercarriage (GA8HP50Z, GA8HP51Z, GA8HP75Z, GA8HP76Z, GA8HP75HZ, GA8HP95Z)

CAUTION

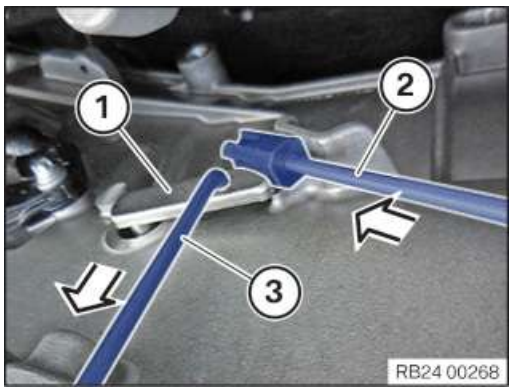
Vehicle rolls away.

Danger of injury! Risk of damage!

- Secure the vehicle against rolling away before unlocking the parking lock.

TECHNICAL INFORMATION

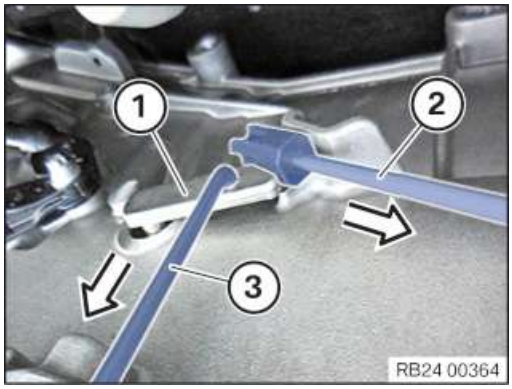
In the event of an open circuit, e.g. discharged battery or electrical fault, the parking lock must be unlocked manually, otherwise the wheels will be blocked and the vehicle cannot be moved.



- Raise vehicle.
- Remove underbody protection.
- Pull selector shaft journal (1) downwards using special tool 2 355 850 (3).
- Install special tool 2 355 850 (2) between selector shaft journal (1) and transmission housing.

  The parking lock is unlocked.

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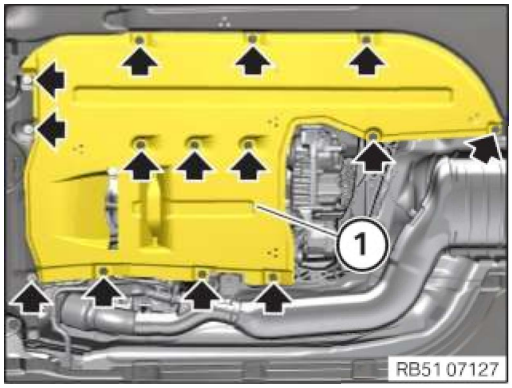


- Pull selector shaft journal (1) downwards using special tool 2 355 850 (3).
- Remove special tool 2 355 850 (2).

  The parking lock is locked.

POSTPROCESSES

4 – Installing underbody protection at rear



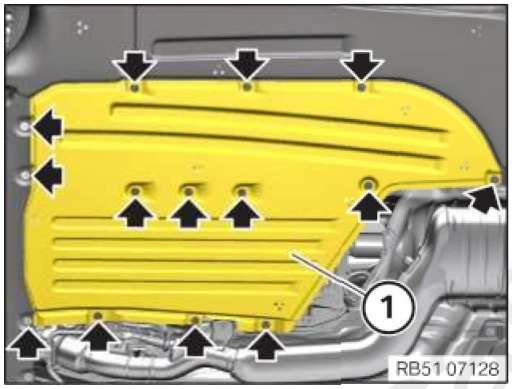
- **Version 1:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



- **Version 2:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

Additional Information

Overview of Tightening Torques

Underbody protection Used in step 4

Hexagon screw		Tightening torque	3 Nm

Overview of Special Tools

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2 355 850 Release tool



Common	Used in step 3
Usage	For parking lock emergency release. 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).
Included in the tool or work	
Storage location	A73
Replaced by	
In connection with	
SI-Number	01 54 13 (058)

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24 34 613 Replace mechatronics

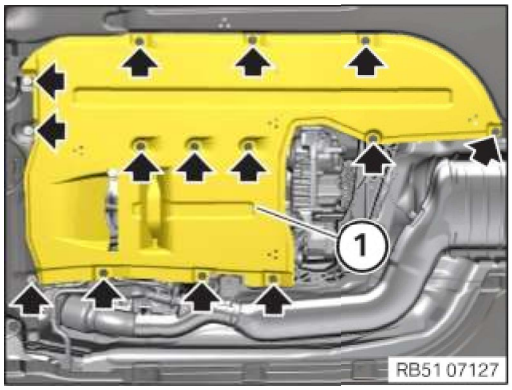
PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

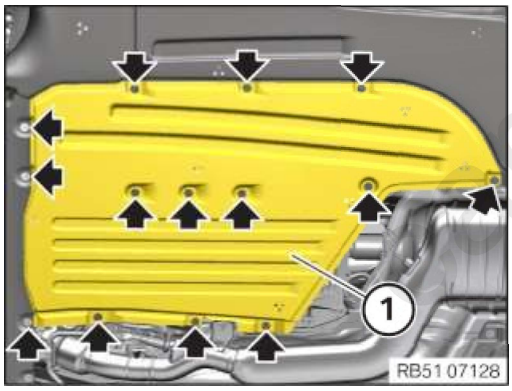
2 – Remove rear underbody protection



- **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.

3 – Removing the transmission oil sump (GA8HP50Z, GA8HP51Z, GA8HP75Z, GA8HP76Z)

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.

.com

RISK OF DAMAGE

Damage to the transmission oil sump.

Non-observance of the transmission oil specifications may lead to severe damage to the automatic transmission.

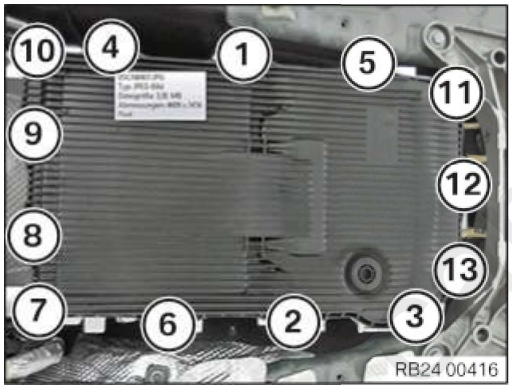
- Remove transmission oil sump only after it has cooled down.
- Use only the approved transmission oil.
- After completion of repair work, check transmission oil level.

TECHNICAL INFORMATION

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



- Release oil drain plug (1).
- Drain automatic transmission oil.



- Loosen screws (1) to (13).
- Remove transmission oil sump.

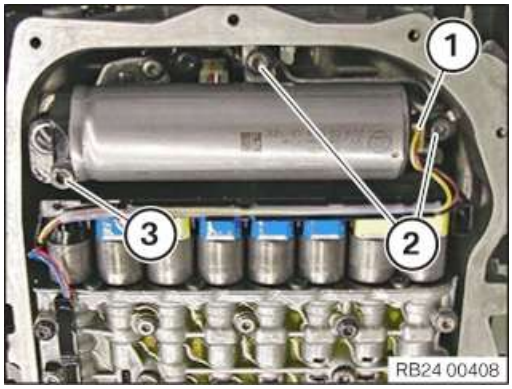
4 – Removing oil volume reservoir (GA8HP50Z, GA8HP51Z, GA8HP75Z, GA8HP76Z, GA8HP95Z)

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.



- Unlock connector (1).
- Loosen screws (M6x20) (2).
- Loosen screw (M6x59) (3).
- Remove hydraulic impulse storage.

MAIN WORK

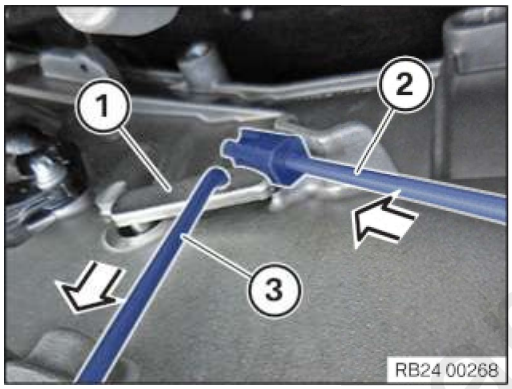
5 – Remove mechatronics

CAUTION

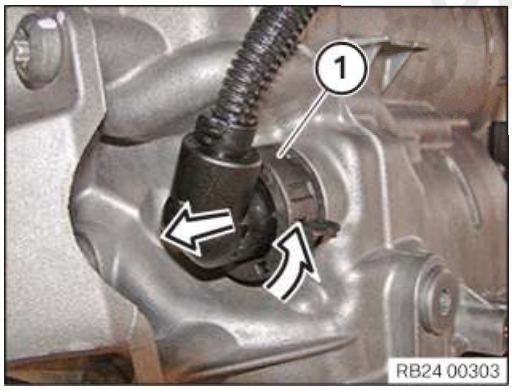
Materials harmful to health.

Contact with fluids harmful to health!

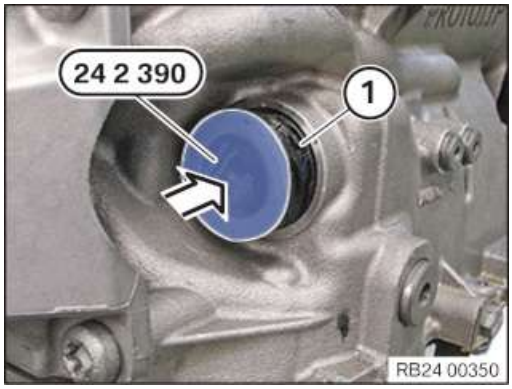
- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.



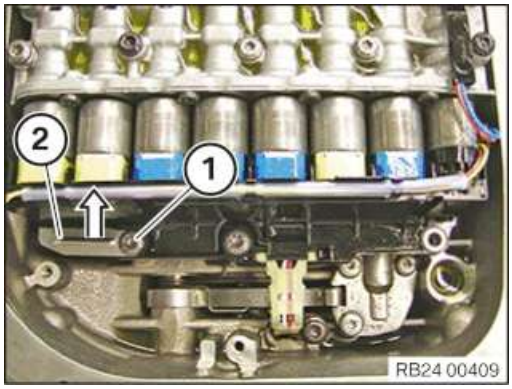
- Pull the selector shaft journal (1) downward with the special tool 2 355 850 (3) in the direction of the arrow.
- Install the special tool 2 355 850 (2) between the selector shaft journal (1) and transmission housing in direction of arrow.



- Turn the connector (1) in the direction of the arrow and pull it off.



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

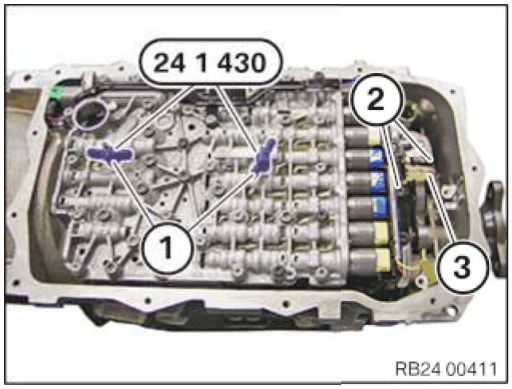


- Release the screw (1) and unlock the sealing sleeve with the slide (2) in direction of arrow.



- Observe the installation position of the sealing sleeve (1).

  The sealing sleeve (1) must be installed in the same mounting orientation.
- Pull out the sealing sleeve (1) in direction of the arrow.



- Release screws in marked area (1) from mechatronics.
- Install special tool 0 496 715 (24 1 430) in marked area (1).
- Tighten the wing nuts (1).
- Loosen screws (2).

TECHNICAL INFORMATION

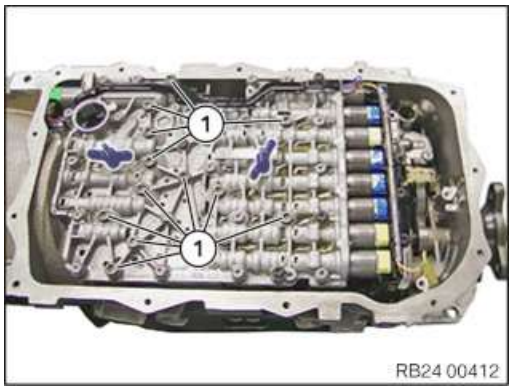
The journal on the output speed sensor may break off during removal or installation.

TECHNICAL INFORMATION

Note the original mounting orientation of the output speed sensor.

Observe the correct mounting orientation when installing the output speed sensor.

- Carefully pull the output speed sensor (3) out of the housing and insert it in the recess on the module.



- Loosen screws (1).
- Release the wing nuts on the special tool 0 496 715 (24 1 430).

TECHNICAL INFORMATION

Carefully remove mechatronics.

- Remove mechatronics.

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- Remove pressure pipe (1).

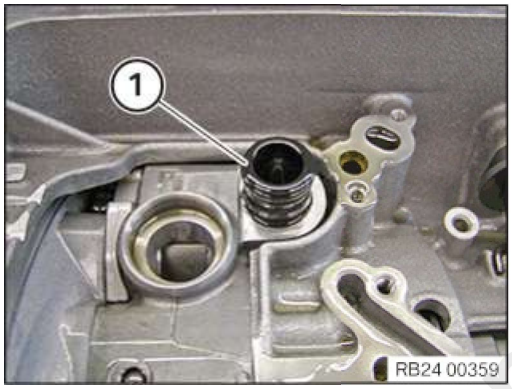
6 – Install mechatronics.

RISK OF DAMAGE

Damage on the automatic transmission after removing the mechatronics.

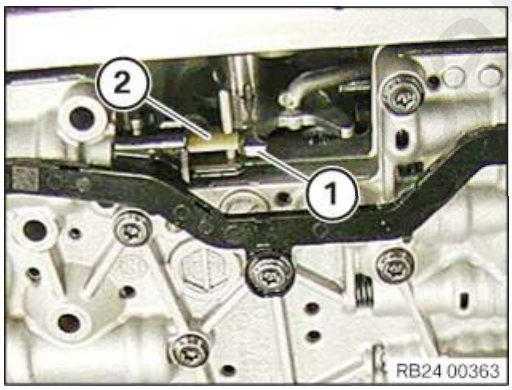
Non-observance of the following work may cause severe damage to the automatic transmission.

- Load specific data status with the diagnosis system.
- Use only the approved transmission oil.
- After completion of repair work, check the transmission oil level.

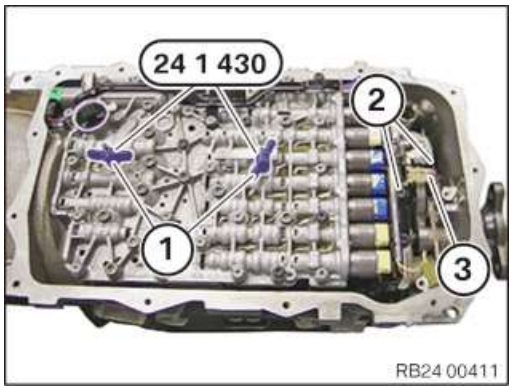


- Renew pressure pipe.

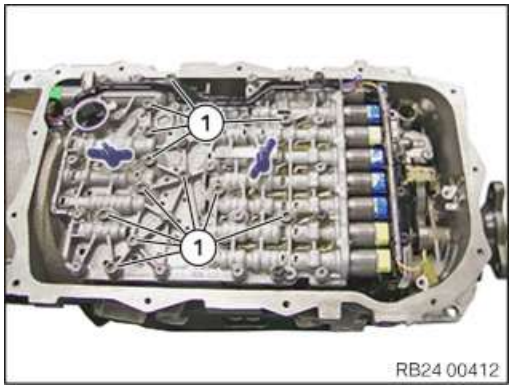
  Parts: Pressure pipe
- Install pressure pipe (1).



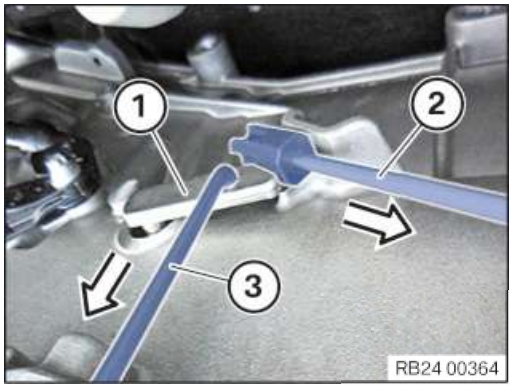
- Fit mechatronics unit.
- Feed shifting claw (1) into gearshift shaft (2).



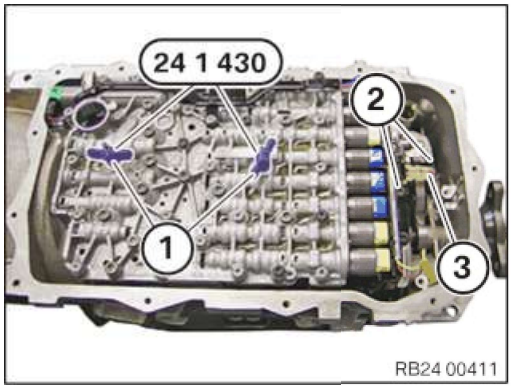
- Install mechatronics.
- Alternately tighten the wing nuts (1) of special tool 0 496 715 (24 1 430) until the mechatronics are in contact with the transmission.



- Insert screws (1) and tighten lightly.



- Pull the selector shaft journal (1) downward with the special tool 2 355 850 (3) in the direction of the arrow.
- Remove the special tool 2 355 850 (2) in the direction of the arrow.



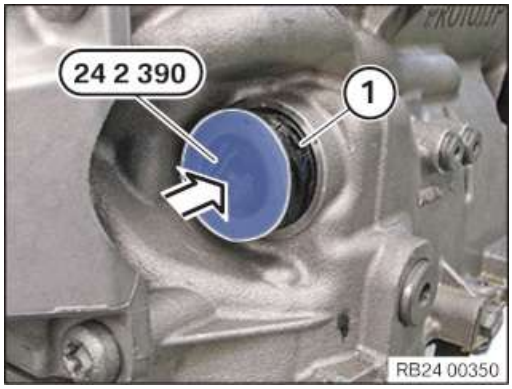
TECHNICAL INFORMATION

Note the original mounting orientation of the output speed sensor.
Observe the correct mounting orientation when installing the output speed sensor.

TECHNICAL INFORMATION

The journal on the output speed sensor may break off during removal or installation.

- Carefully position the output speed sensor (3) and push it in up to the limit position.
- Insert screws (2) and tighten lightly.
- Loosen wing nuts.
- Remove special tool 0 496 715 (24 1 430).
- Insert screws (1) and tighten lightly.



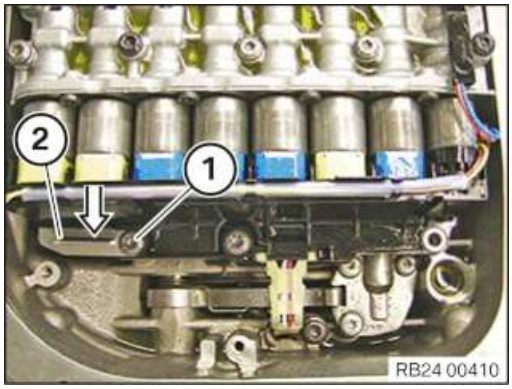
- Renew the sealing sleeve (1).

  Parts: Sealing sleeve
- Carefully position the sealing sleeve (1).

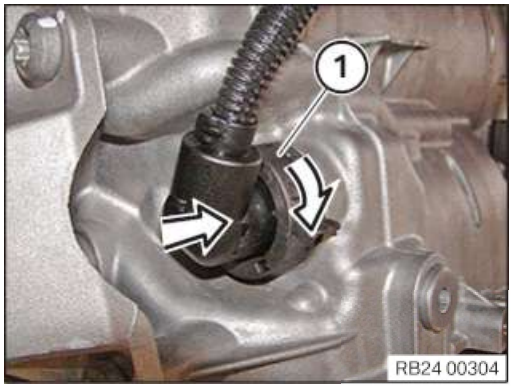
  Lug must be in inner surface.
- Twist the sealing sleeve (1) until the lug has been inserted into the groove of the gear.
- Slide in the sealing sleeve (1) up to the limit position.

  The lug on the sealing sleeve must not be damaged!
- Remove special tool 0 494 213 (24 2 390).

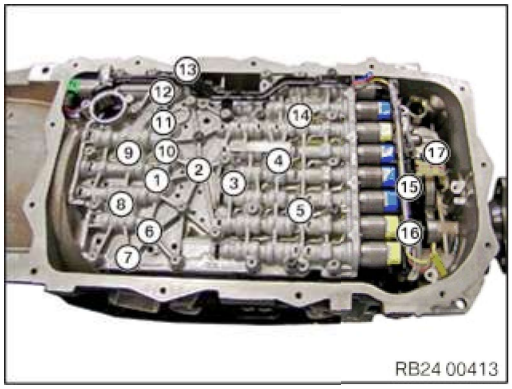
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- Lock the sealing sleeve with the slide (2).
- Insert screw (1) and tighten lightly.



- Insert the connector (1) in the direction of the arrow.
- Lock the connector (1) by turning it in the direction of the arrow.



- Renew screws.

  Parts: Bolts

TECHNICAL INFORMATION

When assembling, it is essential to observe screwing sequences and tightening torques.

Non-compliance with the regulations can lead to damage.

- Tighten screws in the order (1) to (17).

Mechatronics to transmission

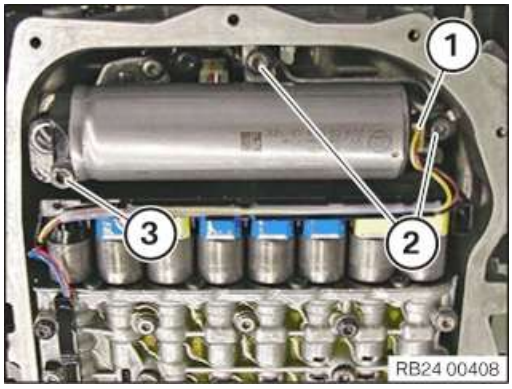
M6x59, M6x20	Renew screws.	Tightening torque	8 Nm

Output speed sensor to transmission (position 17)

M6x20	Renew screw.	Jointing torque	4 Nm
		Angle of rotation	12 °

POSTPROCESSES

7 – Installing the oil volume reservoir (GA8HP50Z, GA8HP51Z, GA8HP75Z, GA8HP76Z, GA8HP95Z)



- Renew screws (M6x20, M6x59).

  Parts: Screws (M6x20, M6x59)
- Tighten screws (M6x20) (2).
- Tighten screws (M6x59) (3).

Mechatronics to transmission

M6x59, M6x20	Renew screws.	Tightening torque	8 Nm

- Lock connector (1).

° – Installing the transmission oil sump (GA8HP50Z, GA8HP51Z, GA8HP75Z, GA8HP76Z)

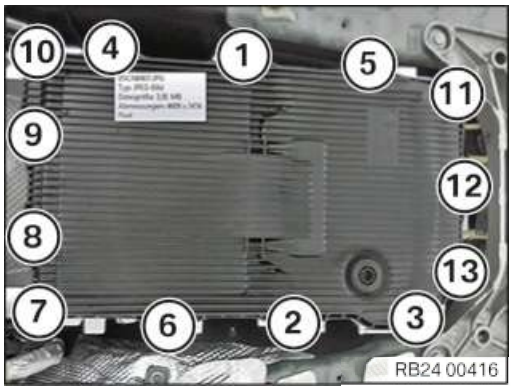
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8 – Installing the transmission oil sump (GA8HP50Z, GA8HP51Z, GA8HP75Z, GA8HP76Z)

TECHNICAL INFORMATION

The transmission oil sump must be renewed each time it is released.

- Clean the contact surface of the transmission oil sump on the transmission.



- Renew screws (1) to (13).

  Parts: Bolts
- Position the transmission oil sump.
- Insert screws until screw heads make contact.
- Tighten screws in the order (1) to (13).

Transmission oil sump

M6	Renew screws.	Tightening torque	10 Nm



- If necessary, tighten the oil drain plug (1).

Oil drain plug

M18	Renew screw.	Tightening torque	8 Nm

9 – Disconnecting all battery earth leads



- See additional information.

10 – Checking/topping up oil level in automatic transmission

Prerequisite

Vehicle in horizontal position.

The vehicle is secured against rolling away.

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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.



- **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.

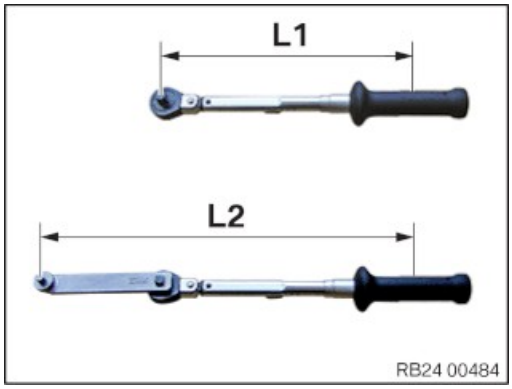
GA8HP51Z transmission capacity

	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+	

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TECHNICAL INFORMATION

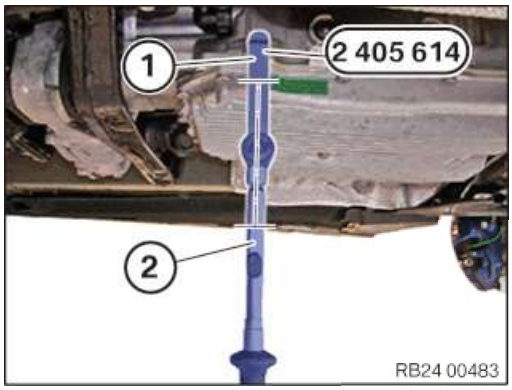
The setpoint torque deviates from the torque to be set when using special tool 2 405 614.

- **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.

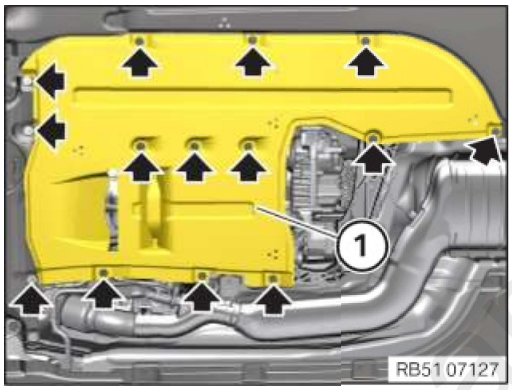
  Parts: Oil filler plug, sealing ring

- 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

11 – Installing underbody protection at rear



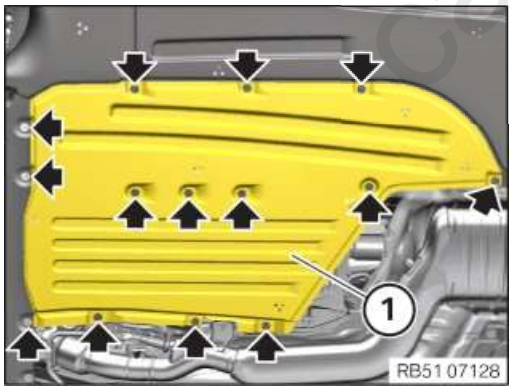
- **Version 1:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



- **Version 2:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

Additional Information

Overview of Tightening Torques

Mechatronics to transmission Used in step 67

M6x59, M6x20	Renew screws.	Tightening torque	8 Nm

Output speed sensor to transmission (position 17) Used in step 6

M6x20	Renew screw.	Jointing torque	4 Nm
		Angle of rotation	12 °

Transmission oil sump Used in step 8

M6	Renew screws.	Tightening torque	10 Nm

Oil drain plug Used in step 8

M18	Renew screw.	Tightening torque	8 Nm

Oil filler plug Used in step 10

M18x1.5		Tightening torque	35 Nm

Underbody protection Used in step 11

Hexagon screw		Tightening torque	3 Nm

Overview of Special Tools

2 355 850 Release tool



Common	Used in step 56
Usage	For parking lock emergency release. 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).
Included in the tool or work	
Storage location	A73
Replaced by	
In connection with	
SI-Number	01 54 13 (058)

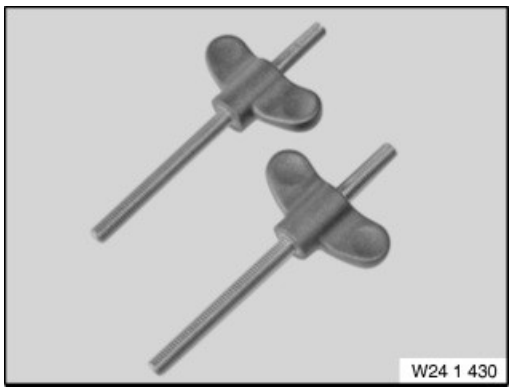
0 494 213 (24 2 390) Cap



Common	Used in step 56
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)

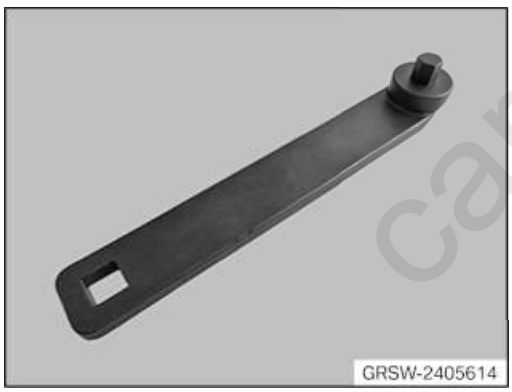
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0 496 715 (24 1 430) Pin



Common	Used in step 56
Usage	For fixing the mechatronics in position during installation.
Included in the tool or work	
Storage location	C53
Replaced by	
In connection with	
SI-Number	01 17 09 (577)

2 405 614 Socket wrench



Common	Used in step 10
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 10

	min. 9,28 l

Transmission oil: Automatic transmission fluid ATF 3+

GA8HP76Z transmission capacity Used in step 10

	min. 9,35 l

Transmission oil: Automatic transmission fluid ATF 3+

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Links

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	19
61 20 900 Disconnecting and connecting battery earth lead	19
61 20 900 Disconnecting and connecting battery earth lead	19
61 20 900 Disconnecting and connecting battery earth lead	19
61 20 900 Disconnecting and connecting battery earth lead	19
61 20 900 Disconnecting and connecting battery earth lead	19
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	19
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	19
61 20 900 Disconnecting and connecting battery earth lead	19
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	19
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	19
61 20 900 Disconnecting and connecting battery earth lead	19
61 20 900 Disconnecting and connecting battery earth lead	19
61 20 900 Disconnecting and connecting battery earth lead	19
61 20 900 Disconnecting and connecting battery earth lead	19
61 20 900 Disconnecting and connecting battery earth lead	19
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61 20 900 Disconnecting and connecting battery earth lead	19
61 20 900 Disconnecting and connecting battery earth lead	19
61 20 900 Disconnecting and connecting battery earth lead	19
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	19
61 20 900 Disconnecting and connecting battery earth lead	19
61 20 900 Disconnecting and connecting battery earth lead	19
61 20 900 Disconnecting and connecting battery earth lead	19
61 20 900 Disconnecting and connecting battery earth lead	19
61 20 900 Disconnecting and connecting battery earth lead	19
61 20 900 Disconnecting and connecting battery earth lead	19

Operating materials	Used in step
14.0 Automatic transmission fluid for ZF-transmission GA8HP45Z / GA8HP50Z / GA8HP70Z / GA8HP90Z / GA8P70H / GA8P75H / GA8HP75Z	10

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24 34 033 Replacing the sealing sleeve for the transmission housing

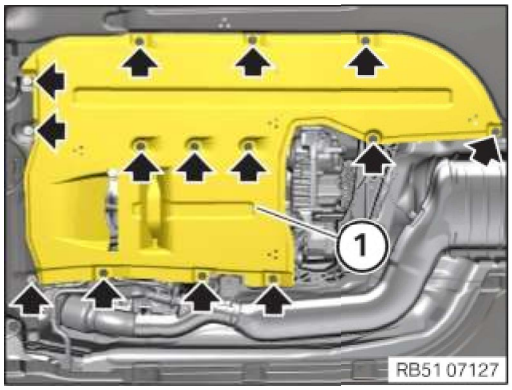
PRELIMINARY WORK

1 – Disconnecting all battery earth leads



- See additional information.

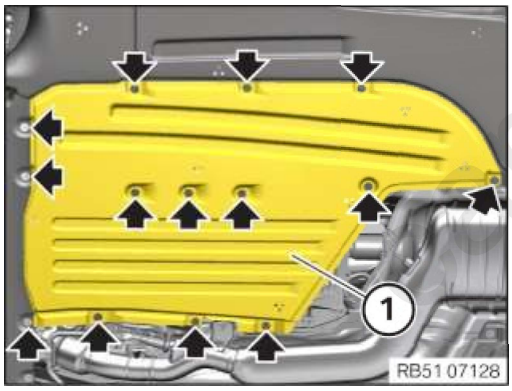
2 – Remove rear underbody protection



- **Version 1:**

  Remove screws (arrows).

  Feed out the rear underbody protection (1).

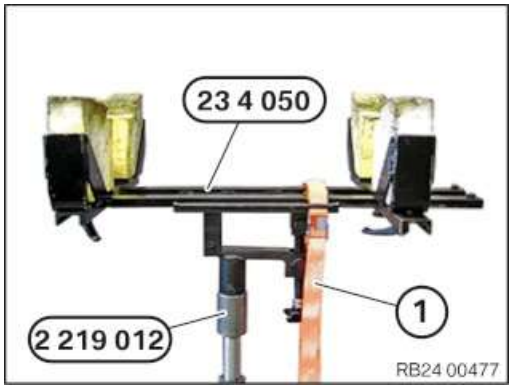


- **Version 2:**

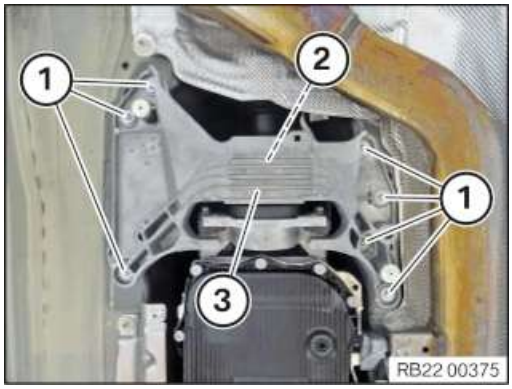
  Remove screws (arrows).

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

3 – 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 screws (1).
- Loosen screw (2).
- Remove transmission cross member (3) and lower the transmission slightly.

4 – Removing the transmission oil sump (GA8HP50Z, GA8HP51Z, GA8HP75Z, GA8HP76Z)

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 transmission oil sump.

Non-observance of the transmission oil specifications may lead to severe damage to the automatic transmission.

- Remove transmission oil sump only after it has cooled down.
- Use only the approved transmission oil.
- After completion of repair work, check transmission oil level.

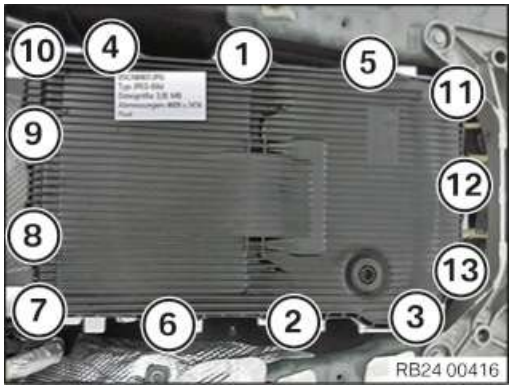
TECHNICAL INFORMATION

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



- Release oil drain plug (1).
- Drain automatic transmission oil.

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- Loosen screws (1) to (13).
- Remove transmission oil sump.

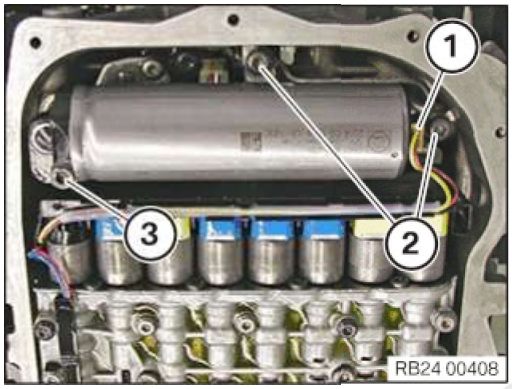
5 – Removing oil volume reservoir (GA8HP50Z, GA8HP51Z, GA8HP75Z, GA8HP76Z, GA8HP95Z)

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.



- Unlock connector (1).
- Loosen screws (M6x20) (2).
- Loosen screw (M6x59) (3).
- Remove hydraulic impulse storage.

MAIN WORK

6 – Removing the sealing sleeve for the transmission housing

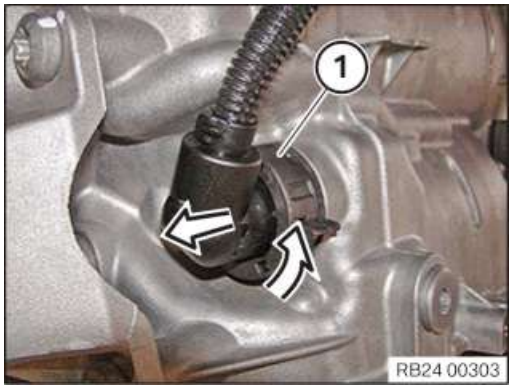
CAUTION

Materials harmful to health.

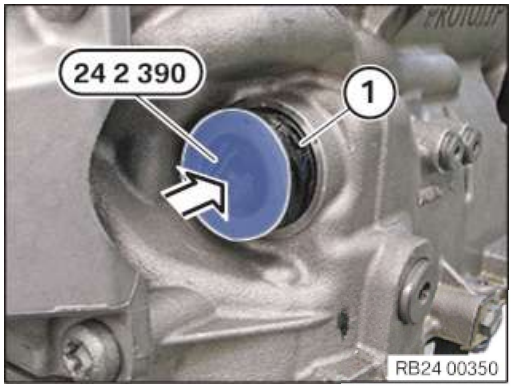
Contact with fluids harmful to health!

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

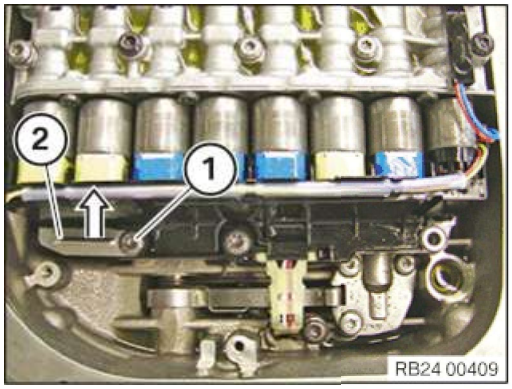
cardiagn.com



- Turn and pull off the connector (1).
- Do not touch pins.
- Release cable from brackets.



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



- Loosen the screw (1) and unlock the sealing sleeve with the slide (2).



- Observe the installation position of the sealing sleeve (1).
- Pull out the sealing sleeve (1).

7 – Installing the sealing sleeve for the transmission housing



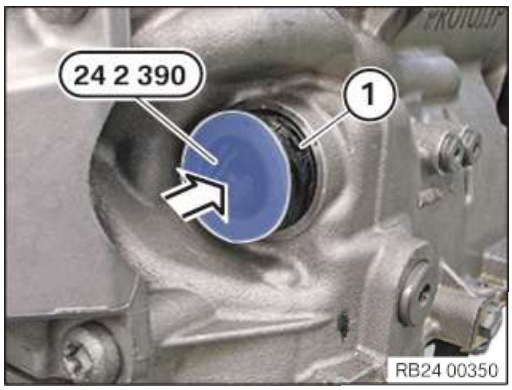
- Make sure that the lug (1) of the sealing sleeve is not damaged when reinstalling.

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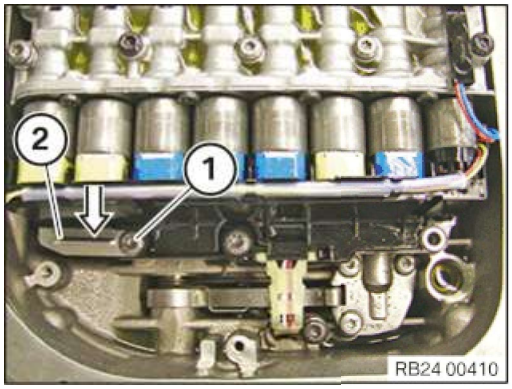
- When reinstalling the sealing sleeve, renew the sealing rings (1).

  Parts: Sealing ring



- Loosely position the sealing sleeve (1) (lug on inner surface).
- Twist the sealing sleeve (1) until the lug has been inserted into the groove of the gear.
- Slide in the sealing sleeve (1) up to the limit position.

  The lug on the sealing sleeve(1) **must not be damaged!**
- Remove special tool 0 494 213 (24 2 390).

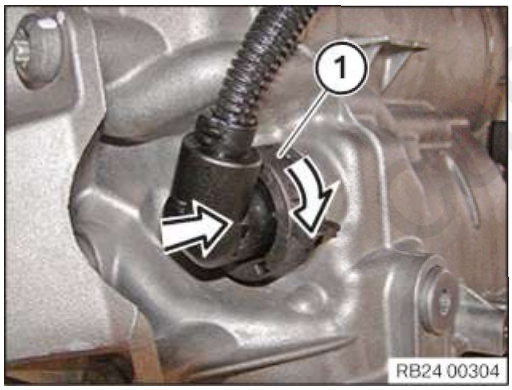


- Lock the slide (2).
- Position and tighten the screw (1).
- Renew screw.

  Parts: Screw

Mechatronics to transmission

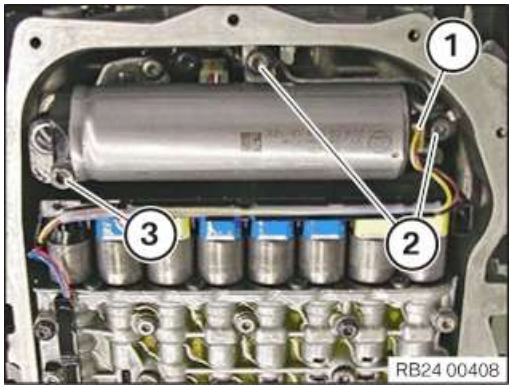
M6x59, M6x20	Renew screws.	Tightening torque	8 Nm



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

POSTPROCESSES

8 – Installing the oil volume reservoir (GA8HP50Z, GA8HP51Z, GA8HP75Z, GA8HP76Z, GA8HP95Z)



- Renew screws (M6x20, M6x59).

  Parts: Screws (M6x20, M6x59)
- Tighten screws (M6x20) (2).
- Tighten screws (M6x59) (3).

Mechatronics to transmission

M6x59, M6x20	Renew screws.	Tightening torque	8 Nm

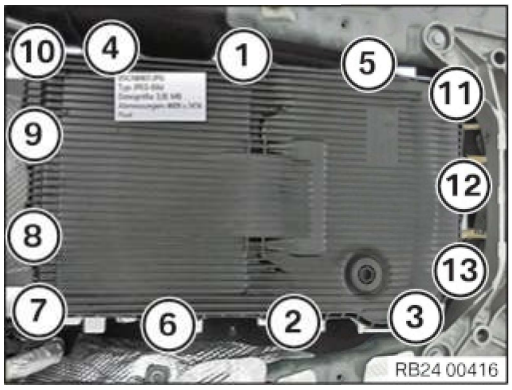
- Lock connector (1).

9 – Installing the transmission oil sump (GA8HP50Z, GA8HP51Z, GA8HP75Z, GA8HP76Z)

TECHNICAL INFORMATION

The transmission oil sump must be renewed each time it is released.

- Clean the contact surface of the transmission oil sump on the transmission.



- Renew screws (1) to (13).

  Parts: Bolts
- Position the transmission oil sump.
- Insert screws until screw heads make contact.
- Tighten screws in the order (1) to (13).

Transmission oil sump

M6	Renew screws.	Tightening torque	10 Nm



- If necessary, tighten the oil drain plug (1).

Oil drain plug

M18	Renew screw.	Tightening torque	8 Nm

10 – Disconnecting all battery earth leads



- See additional information.

11 – Checking/topping up oil level in automatic transmission

Prerequisite

carmanualsdiagram.com

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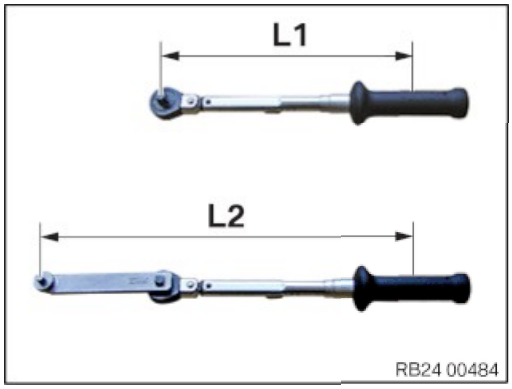
- **Top up the automatic transmission fluid:**
- Loosen the oil filler plug (1) using the special tool 2 405 614.
- Top up automatic transmission fluid according to the instructions in the diagnosis system.

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

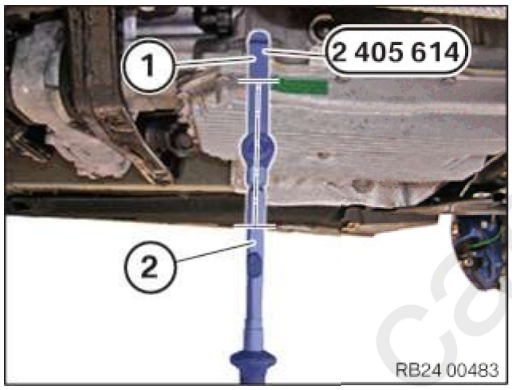
The setpoint torque deviates from the torque to be set when using special tool 2 405 614.

- **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.



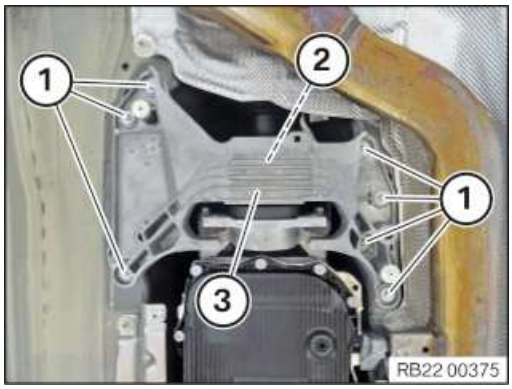
- Renew the oil filler plug (1) and the sealing ring.

  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

12 – Install transmission cross member.



- Install the transmission cross member (3).
- Insert screw (2) and tighten until hand-tight.
- Tighten the screws (1).

Transmission cross member to body

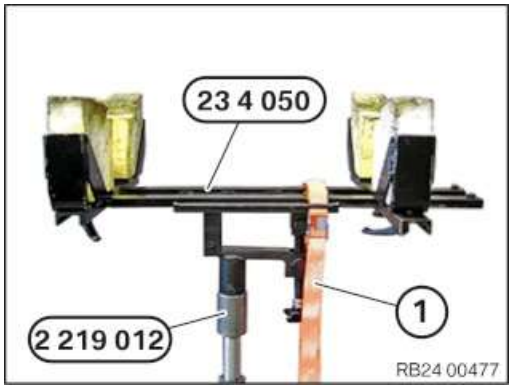
M8	Renew screws.	Tightening torque	19 Nm

- Tighten down screw (2).

Transmission cross member to rubber mounts

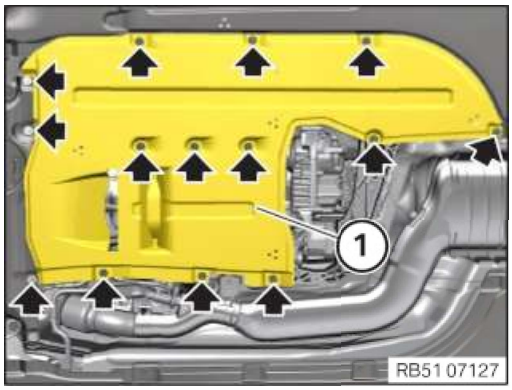
M12		Tightening torque	100 Nm

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- 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.

13 – Installing underbody protection at rear



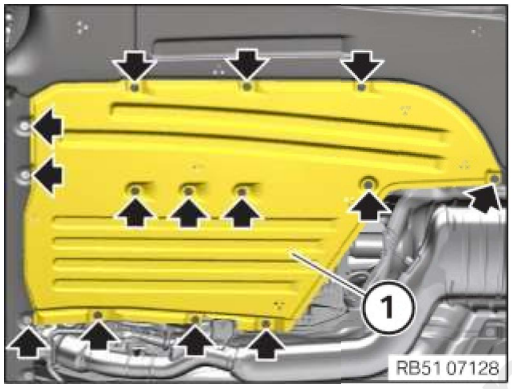
- **Version 1:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



- **Version 2:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

Additional Information

Overview of Tightening Torques

Mechatronics to transmission Used in step 78

M6x59, M6x20	Renew screws.	Tightening torque	8 Nm

Transmission oil sump Used in step 9

M6	Renew screws.	Tightening torque	10 Nm

Oil drain plug Used in step 9

M18	Renew screw.	Tightening torque	8 Nm

Oil filler plug Used in step 11

M18x1.5		Tightening torque	35 Nm

Transmission cross member to body Used in step 12

M8	Renew screws.	Tightening torque	19 Nm

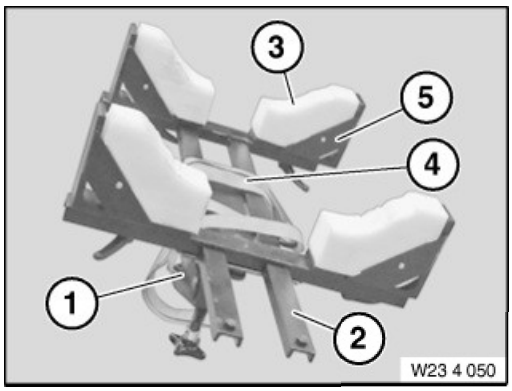
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Transmission cross member to rubber mounts			Used in step 12
M12		Tightening torque	100 Nm

Underbody protection			Used in step 13
Hexagon screw		Tightening torque	3 Nm

Overview of Special Tools

0 495 498 (23 4 050) Support



Common		Used in step 312
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



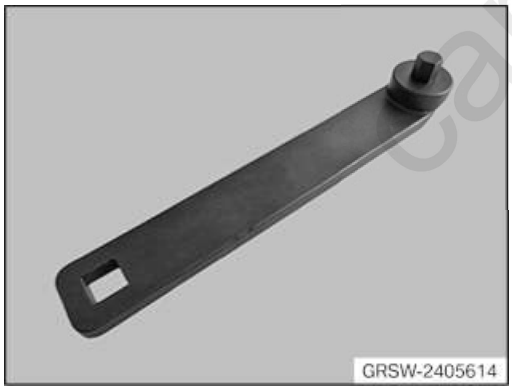
Common	Used in step 312
Usage	For raising and lowering various vehicle components.
Included in the tool or work	
Storage location	
Replaced by	
In connection with	
SI-Number	01 05 90 (207)

0 494 213 (24 2 390) Cap



Common	Used in step 67
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)

2 405 614 Socket wrench



Common	Used in step 11
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 11

	min. 9,28 l

Transmission oil: Automatic transmission fluid ATF 3+

GA8HP76Z transmission capacity Used in step 11

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

Links

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	110
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	110
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	110
61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110
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61 20 900 Disconnecting and connecting battery earth lead	110
61 20 900 Disconnecting and connecting battery earth lead	110

Operating materials	Used in step
14.0 Automatic transmission fluid for ZF-transmission GA8HP45Z / GA8HP50Z / GA8HP70Z / GA8HP90Z / GA8P70H / GA8P75H / GA8HP75Z	11

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24 40 021 Remove and install/replace torque converter ()

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.

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.



- Unclip the acoustic cover (1) from the holders in the **marked** areas towards the top.

3 – Removing the clean air pipe with the resonator

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WARNING

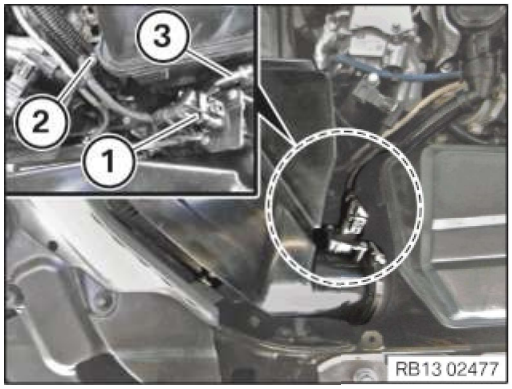
Hot surfaces.

Risk of burning!

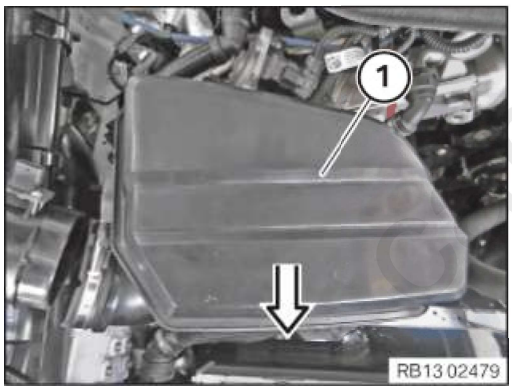
- Perform all work only on components that have cooled down.



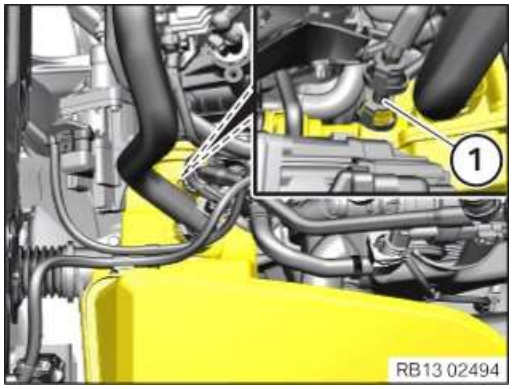
- Unlock the locks (1).
- Feed the engine ventilation line (2) out and set it aside.



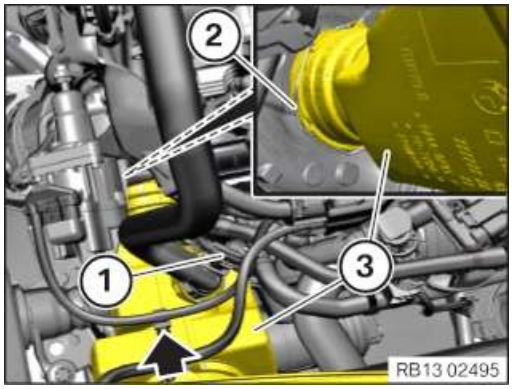
- Unlock plug connection (1) and disconnect.
- Loosen clamp (2).
- Unfasten clamp (3).
- Separate the clean air pipe with resonator from the intake filter housing.



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

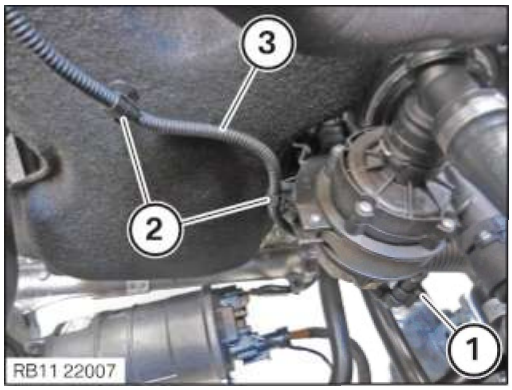


- Unlock and disconnect the tank ventilation line (1).

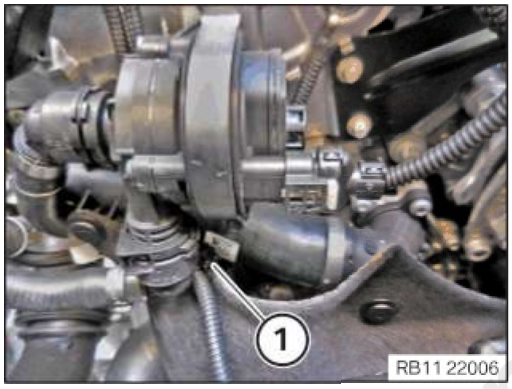


- Loosen the clamp (arrow).
- Unlock plug connection (1) and disconnect.
- Unlock the clamp (2).
- Feed out clean air pipe with resonator (3) and remove.

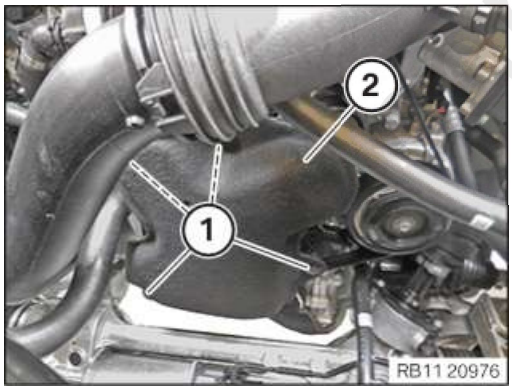
4 – Removing the acoustic cover for the engine at the front



- Unlock plug connection (1) and disconnect.
- Loosen clamps (2).
- Remove the wiring harness section (3) and put to one side.

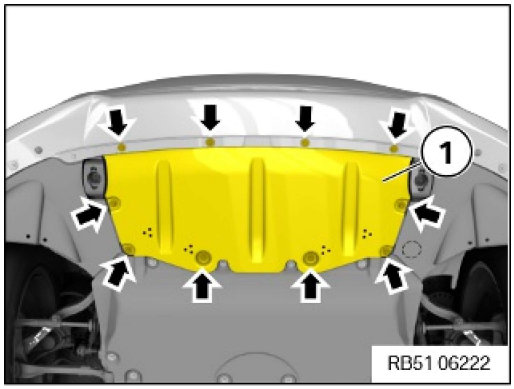


- Loosen clamp (1).



- Detach all expanding rivets (1).
- Guide the acoustic cover (2) out and remove.

5 – Removing the front underbody protection

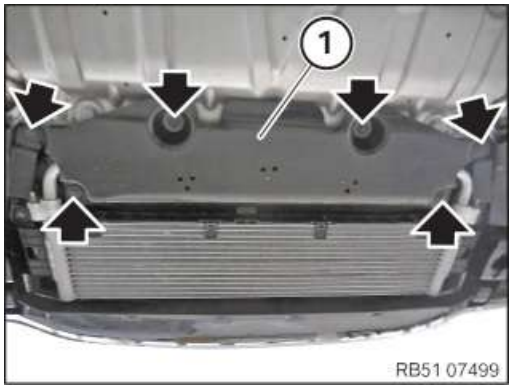


- **Version 1:**

  Remove screws (arrows).

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

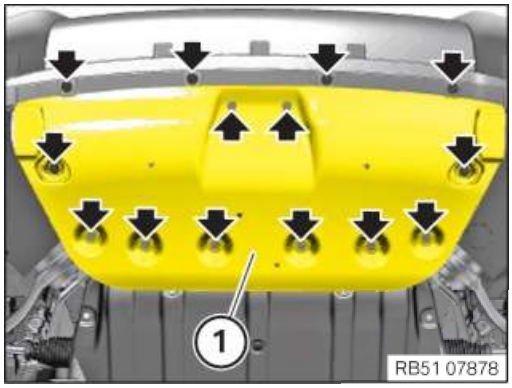
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- **Version 2:**

  Remove screws (arrows).

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

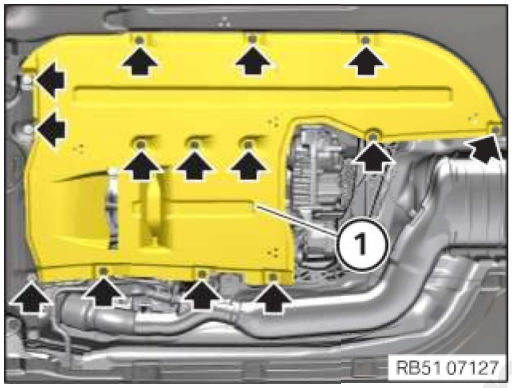


- **Version 3:**

  Remove screws (arrows).

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

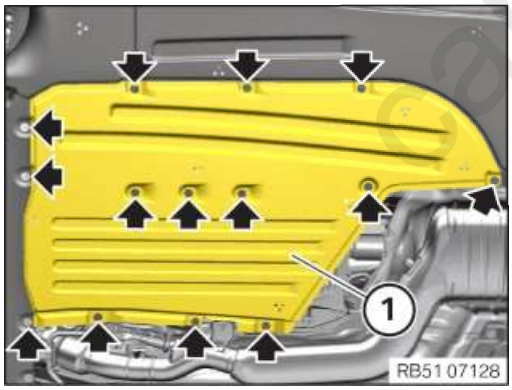
6 – Remove rear underbody protection



- **Version 1:**

  Remove screws (arrows).

  Feed out the rear underbody protection (1).

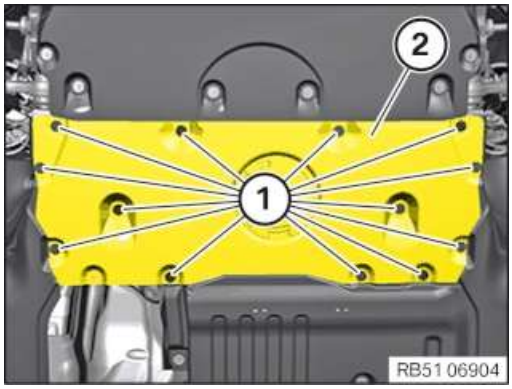


- **Version 2:**

  Remove screws (arrows).

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

7 – Removing the centre underbody protection

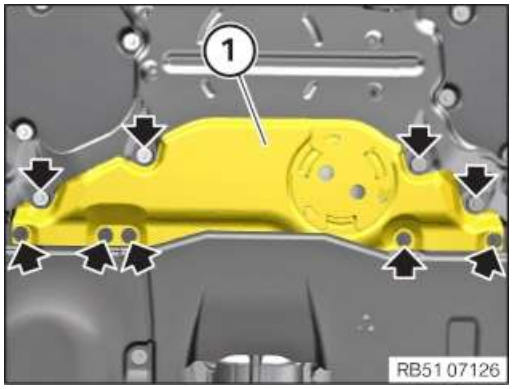


- **Version with rear-wheel drive:**

  Loosen screws (1).

  Remove centre underbody protection (2) .

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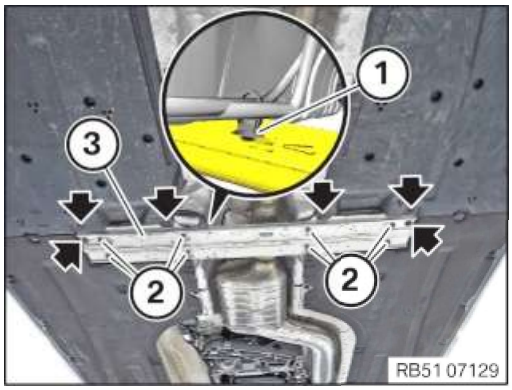


- **Version with all-wheel drive:**

  Remove screws (arrows).

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

8 – 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.

9 – Remove complete exhaust system

WARNING

Hot surfaces.

Risk of burning!

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

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.

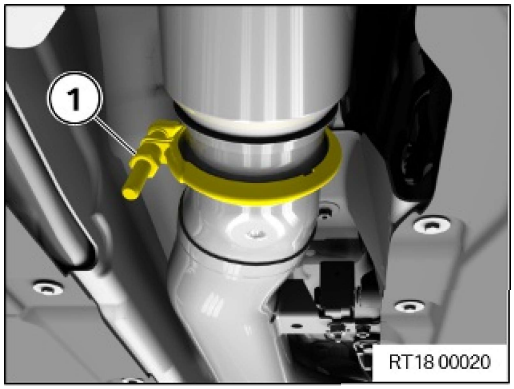
- Remove and install heavy components with the aid of another person/other persons.

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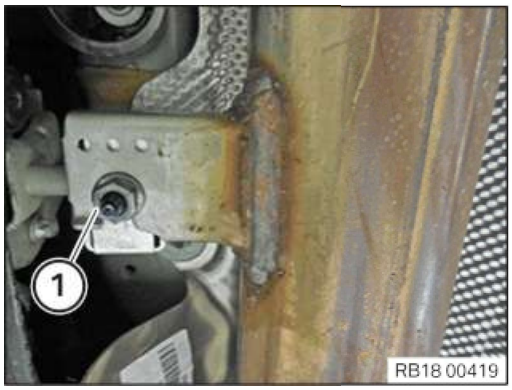
- **Equipment specification 1 (ribbon clamp)**

  Detach the ribbon clamp (1).

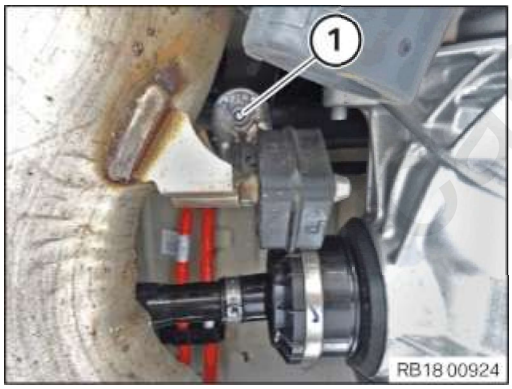


- **Equipment specification 2 (V-clips)**

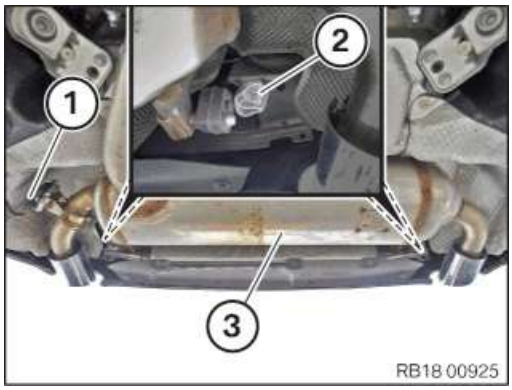
  Unfasten clamp (1).



- Loosen nut (1).



- 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.

10 – Removing starter motor

Prerequisite

Battery earth leads are disconnected.

partdiagn.com

WARNING

Hot surfaces.

Risk of burning!

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

WARNING

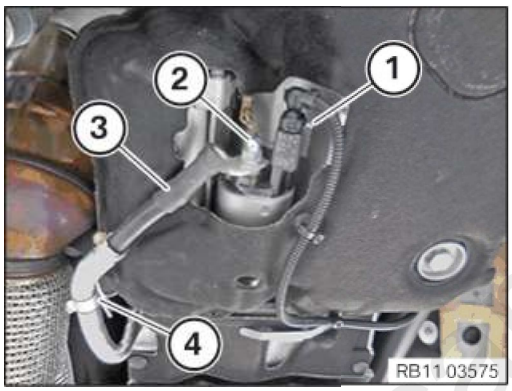
Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

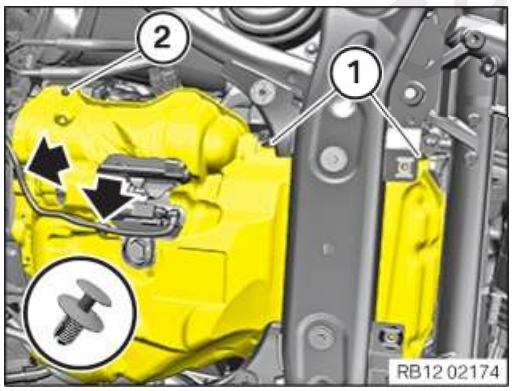
- Detach battery earth lead from battery.
- For additional batteries: Detach all battery earth leads from additional batteries.

TECHNICAL INFORMATION

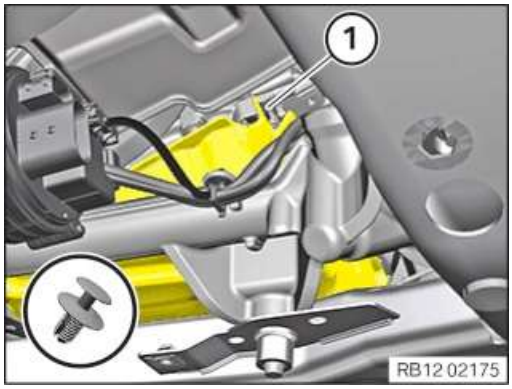
Make sure that the acoustic cover is **not** damaged while removing the starter motor.
A damaged lower acoustic cover can only be renewed when the front axle is lowered.



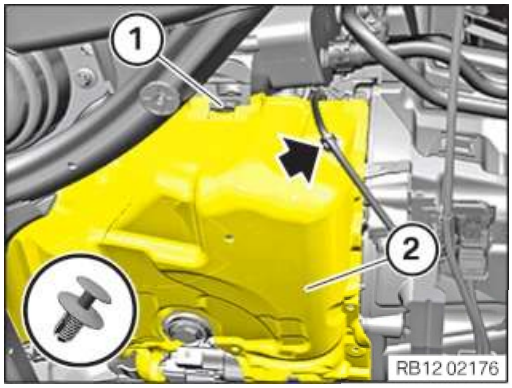
- Unlock plug connection (1) and disconnect.
- Loosen nuts (2).
- Release positive battery cable (3) from holder (4).



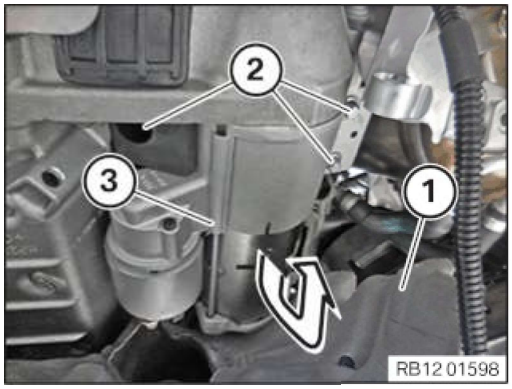
- Loosen the expanding rivet (1).
- Undo fir tree clip (2).
- Release the clamps (*arrows*).



- Loosen expanding rivet (1).
- Lower the acoustic cover of the oil sump.

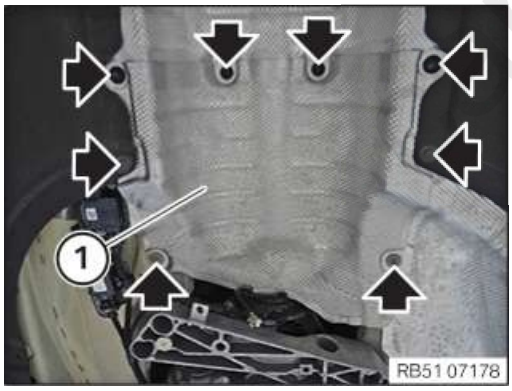


- Loosen expanding rivet (1).
- Loosen the clamp (arrow).
- Lower acoustic cover (2).

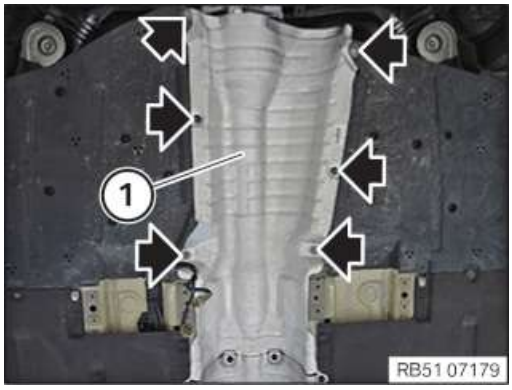


- Make sure that the acoustic cover (1) is not damaged.
- Carefully press the acoustic cover (1) to one side.
- Loosen screws (2).
- Carefully guide out the starter motor (3) in direction of arrow and remove.

11 – Remove heat shields



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



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

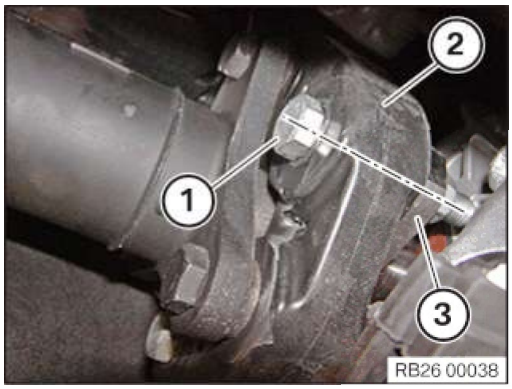
12 – Partially release propeller shaft

RISK OF DAMAGE

Damage to propeller shaft during removal.

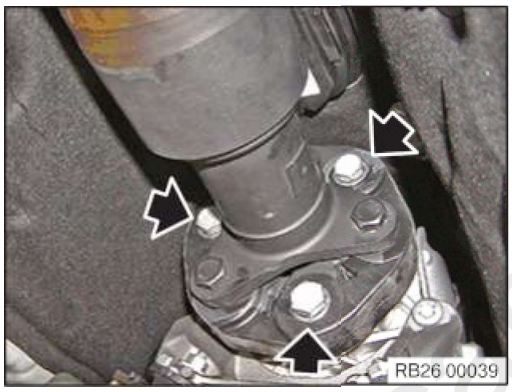
Non-observance of the removal guidelines for the propeller shaft on the rear axle differential may cause severe damage.

- 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.

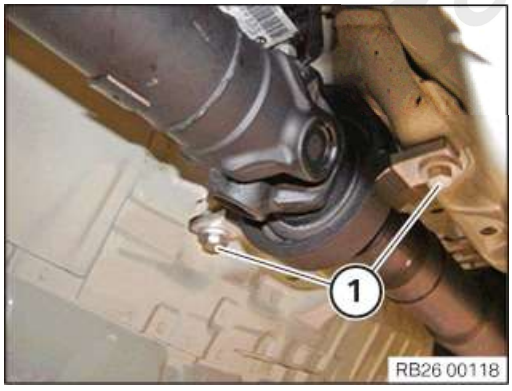


- Mark the installation position of the screw connection (1) of the flexible disc (2) and the three-hole flange (3).

  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).



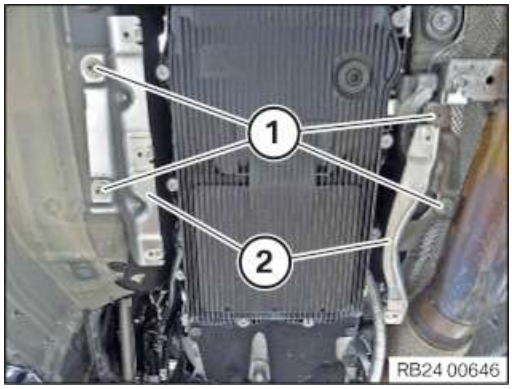
- Unscrew the bolts (1) on the centre mount and hold down the propeller shaft.

  Major deflection angles of the propeller shaft may damage the propeller shaft and/or the joints.

- Tie up propeller shaft to underbody.

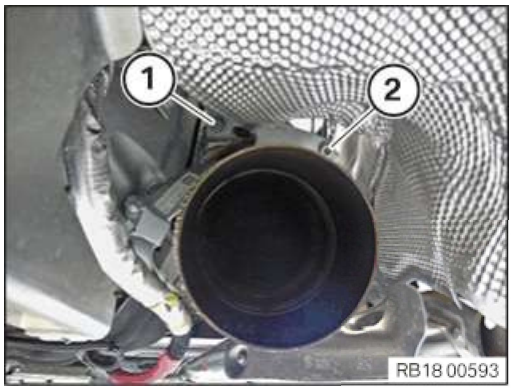
13 – Remove the retaining plates

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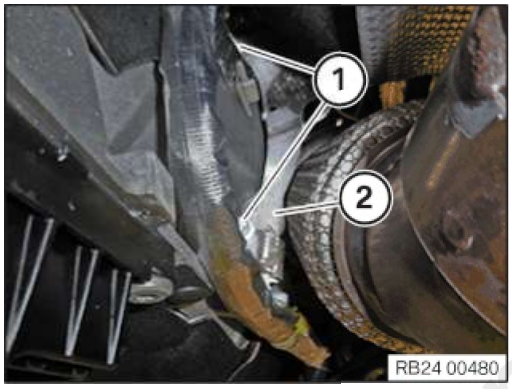


- Loosen nuts (1).
- Feed out retaining plates (2) and remove.

14 – Remove exhaust system holder

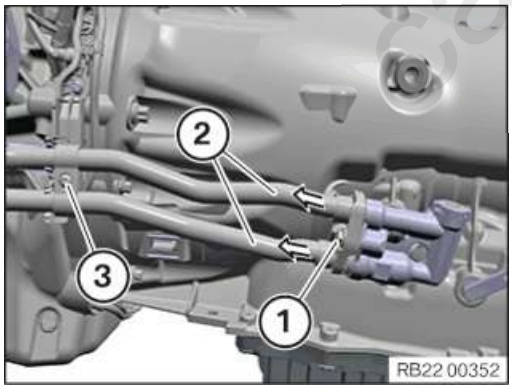


- Loosen screw (1).
- Loosen nut (2).



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

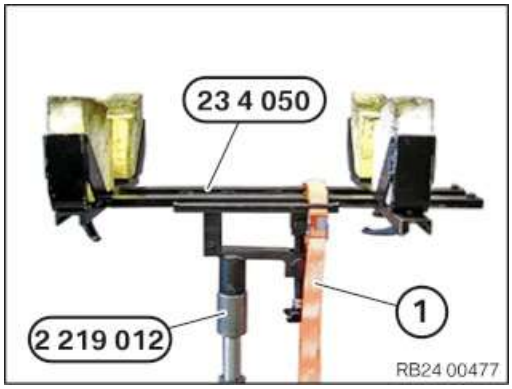
15 – Disconnect hydraulic lines on the transmission



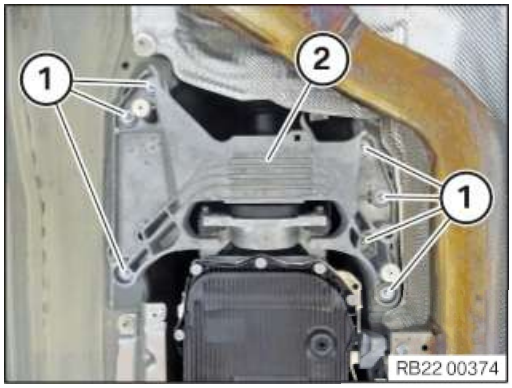
- Loosen screw (1).
- Loosen screw (3).
- Disconnect hydraulic lines (2) to transmission oil cooler.

16 – Detach transmission cross member

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- 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 screws (1).
- Release transmission cross member (2).

17 – Remove automatic transmission (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.

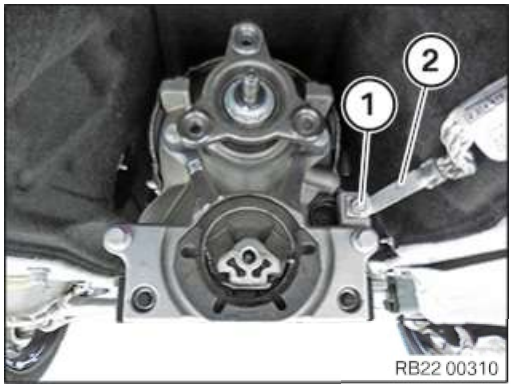
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RISK OF DAMAGE

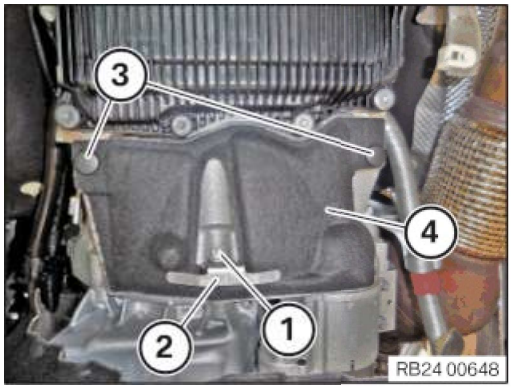
Damage to the transmission.

Damage to the transmission through unapproved transmission oil.

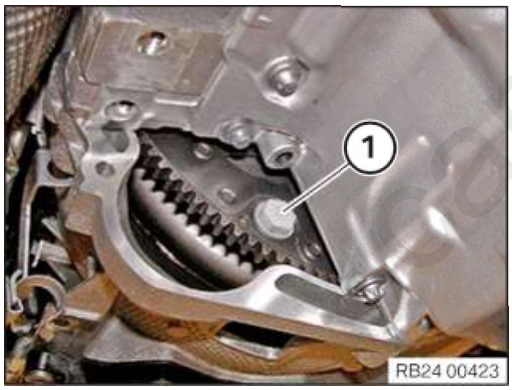
- Use only the approved transmission oil.
- After completion of repair work, check transmission oil level.



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



- Loosen the screw (1) and remove the holder (2).
- Pull the expanding rivet (3) off.
- Remove the acoustic cover (4).



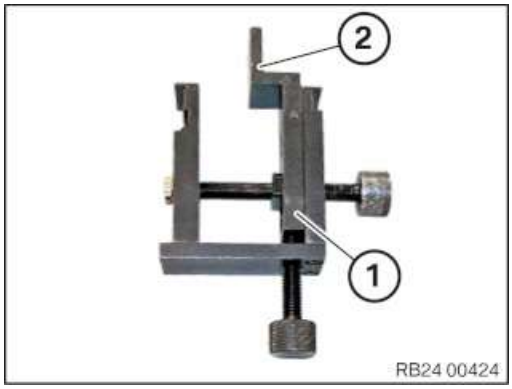
TECHNICAL INFORMATION

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.

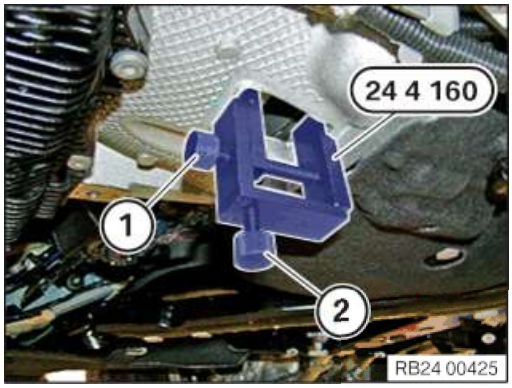


- Prepare special tool 0 494 478 (24 4 161) (1) with the shaped element 0 496 061 (24 4 166) (2) as shown.

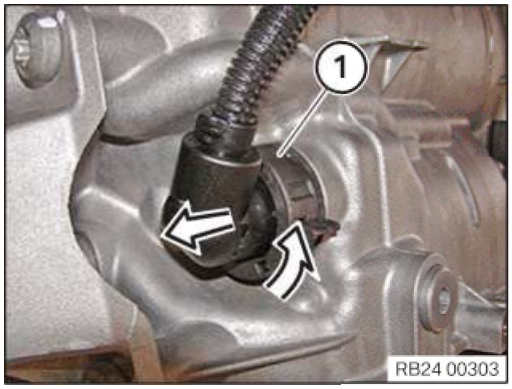
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- Remove the sealing cap (1).



- 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).

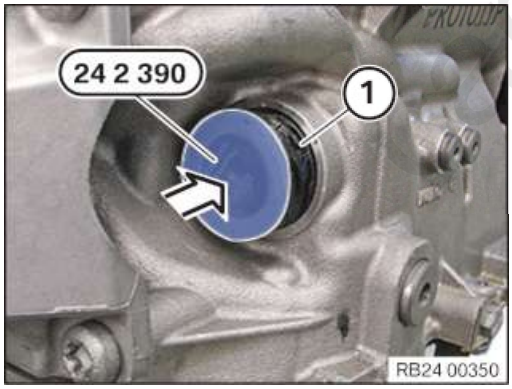


TECHNICAL INFORMATION

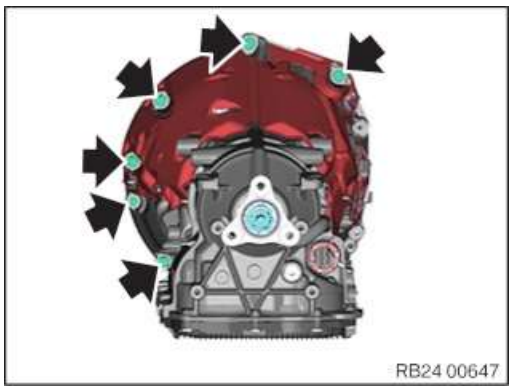
Notes on mechatronics are a fundamental requirement for these repair instructions and must be complied with at all times.

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.



- Support engine.
- Release remaining screws.
- Remove transmission.

18 – Remove torque converter

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.



- Screw the special tool 0 496 717 (24 1 440) into the torque converter.
- Remove torque converter and set down vertically.
- Catch and dispose of escaping transmission oil.

19 – Install torque converter

RISK OF DAMAGE

Damage to the driver of the impeller.

Failure to observe the installation instructions may lead to damage on the impeller driver.

- During installation, do not damage the radial shaft seal or ball bearing.
- Lock the torque converter correctly. Otherwise, the driver of the impeller may be damaged when the transmission is flange-mounted on the engine.



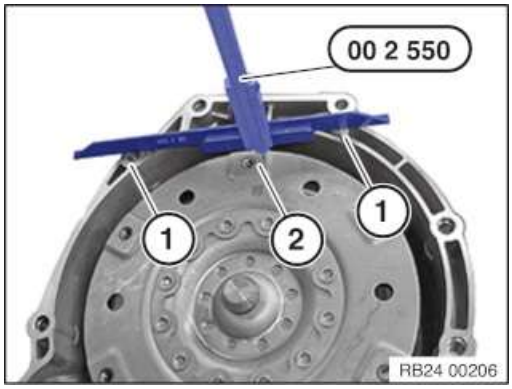
- When replacing the torque converter: Renew the O-ring (1) on the drive shaft.

  Parts: O-ring
- Push the torque converter onto the transmission shaft up to the limit position.
- Press torque converter by hand into converter housing.

  At the same time, turn the torque converter until the recesses at the hub of the torque converter engage in the driver of the impeller.

  You can feel the torque converter slipping inward.

Check



- Determine the dimension between the contact surface (1) and the outer edge (2) of the torque converter threaded hole using special tool 0 490 189 (00 2 550).

desired state

- Measured value is greater than 15 mm.

Result

» Measured value is less than or equal to 15 mm.

Measure

- Position the torque converter correctly in the converter housing.

POSTPROCESSES

20 – Install automatic transmission (GA8HP51Z)

RISK OF DAMAGE

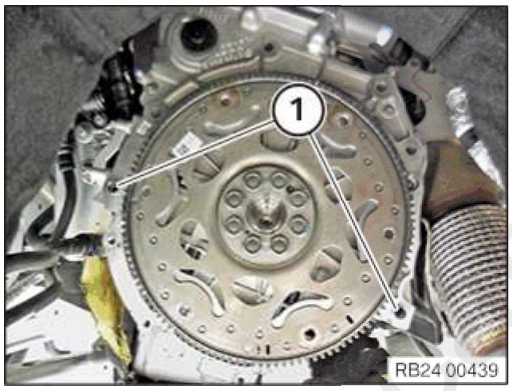
Damage to the transmission.

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).

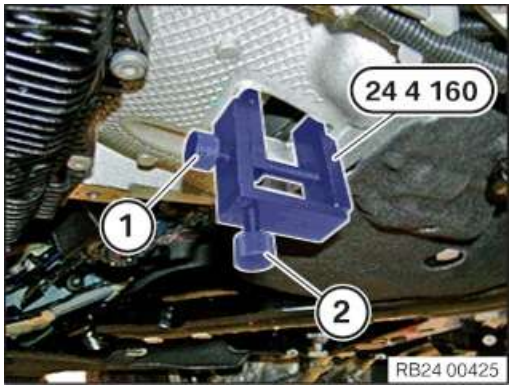


- Check the fitting sleeves (1) for correct fit and damage and renew as needed.



- Transmission flange-mount.
- 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.

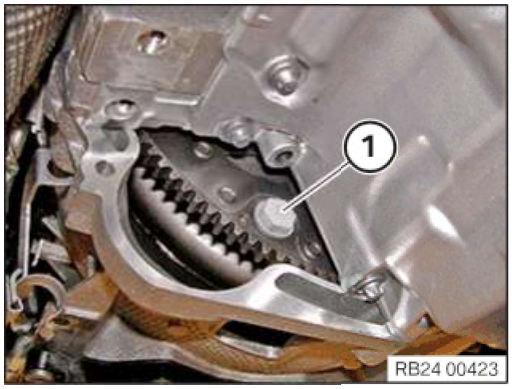
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- Release screw (1) and screw (2).
- Remove special tool 0 494 451 (24 4 160).



- 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.

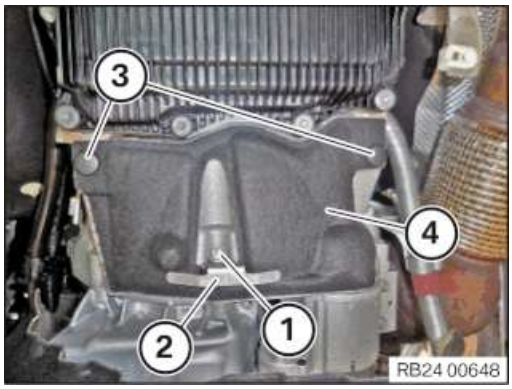
For additional information see: 17 11 035 Removing and installing/replacing the fan cowl including electric fan

- 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



- Install acoustic cover (4).
- Install expanding rivet (3).
- Install the holder (2) and tighten the screw (1).

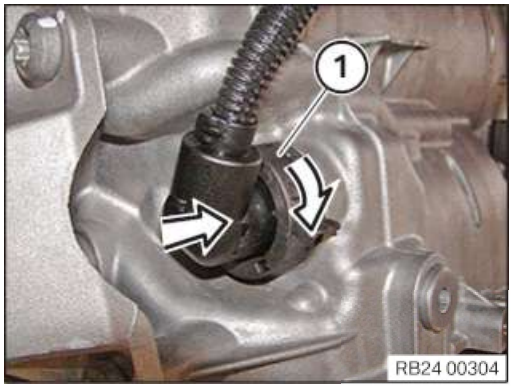
Transmission to engine

M8		Tightening torque	19 Nm
M12		Tightening torque	66 Nm

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

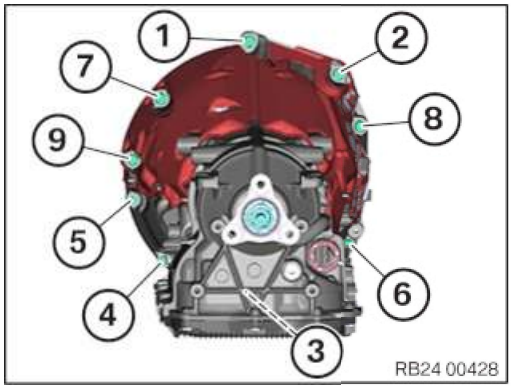


TECHNICAL INFORMATION

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)

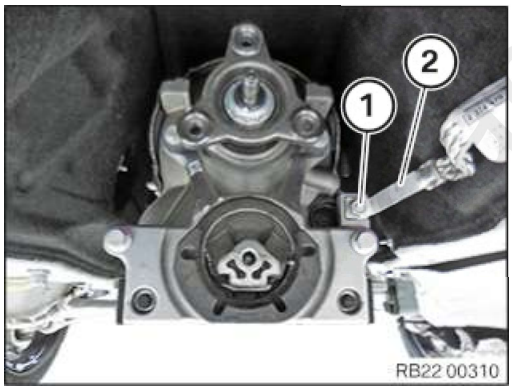
- Slide the connector (1) on and turn it to lock.



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

Transmission to engine

M8		Tightening torque	19 Nm
M12		Tightening torque	66 Nm

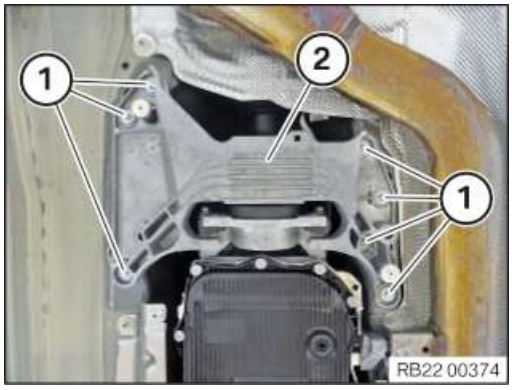


- Install the ground strap (2).
- Tighten down screw (1).

Ground strap to transmission or body

M8		Tightening torque	19 Nm

21 – Install transmission cross member.

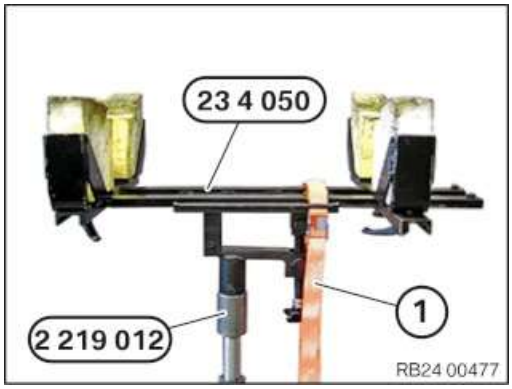


- Install the transmission cross member (2).
- Tighten the screws (1).

Transmission cross member to body

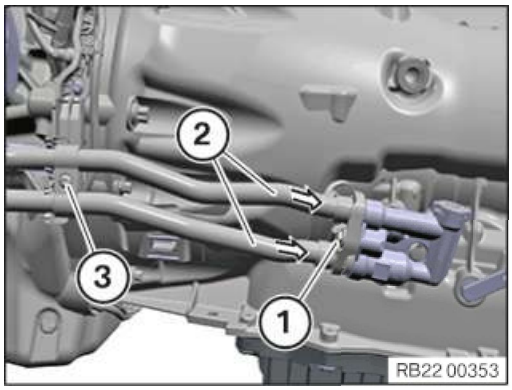
M8	Renew screws.	Tightening torque	19 Nm

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- 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.

22 – 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

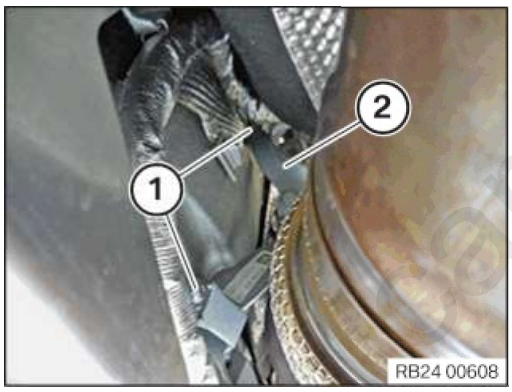
M6x25	Renew the sealing ring.	Tightening torque	8 Nm

- Position and tighten the screw (3).

Transmission oil line on holder

M6		Tightening torque	8 Nm

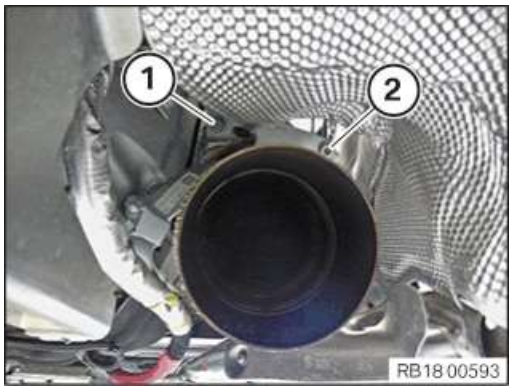
23 – Install the exhaust bracket



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

Transmission to engine

M8		Tightening torque	19 Nm
M12		Tightening torque	66 Nm



- Tighten down screw (1).

Catalytic converter to holder

M8	Renew screw.	Tightening torque	19 Nm

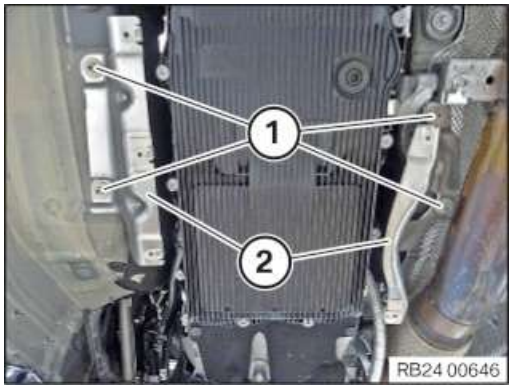
- Tighten nut (1).

Catalytic converter to holder

M8	Renew nut.	Tightening torque	19 Nm

24 – Install the retaining plates

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- 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

25 – Partially installing the propeller shaft



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

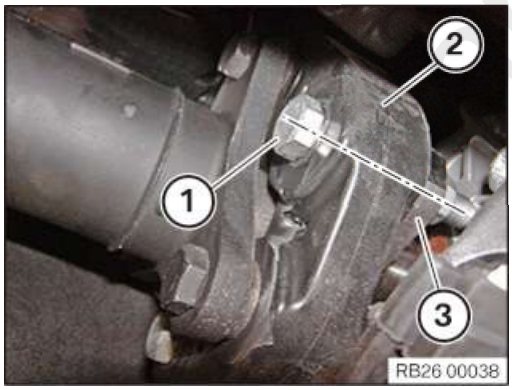


- Apply a thin coat of grease to the soft centring (1), if necessary.

  Do not grease the hard centring (2).

Expendable materials

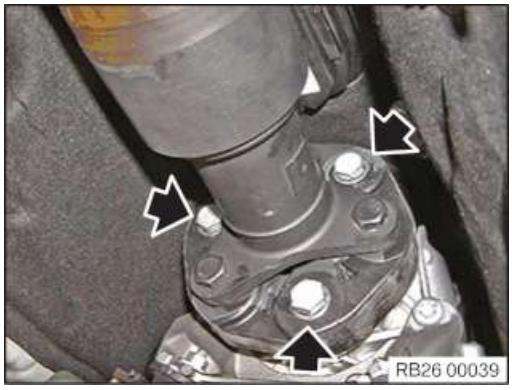
Lubricating grease Olistamoly 2 LN 584 LO	100 g, Tube	83 19 0 447 919



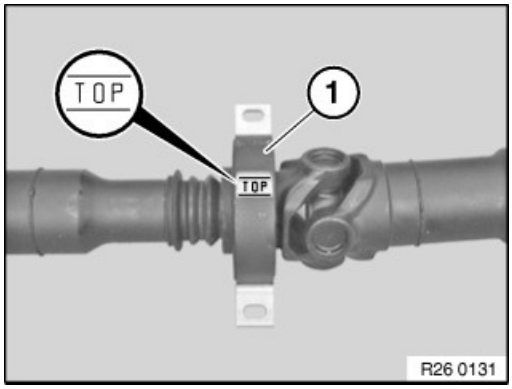
- Renew screws and the self-locking nuts.

  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.

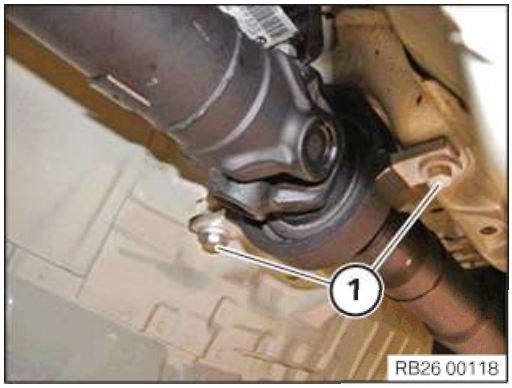
  This should prevent a humming noise from the drive train during driving.



- 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.



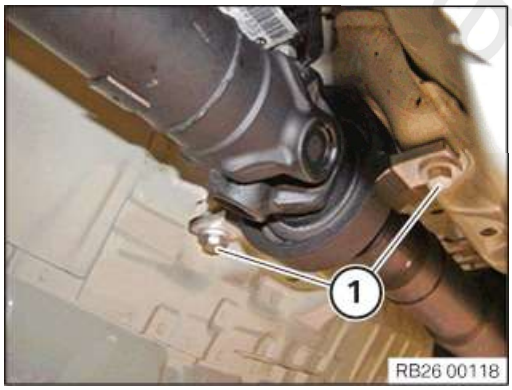
- Renew screws.

  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.

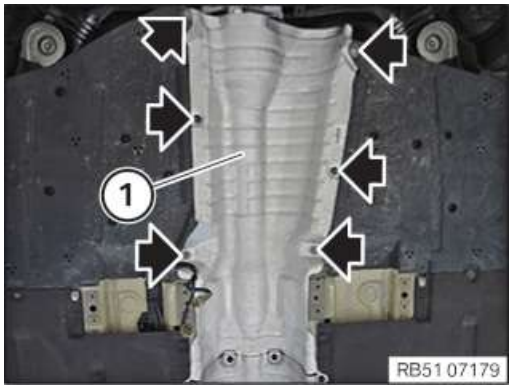


- Tighten the screws (1).

Centre mount to body

M8		Tightening torque	19 Nm

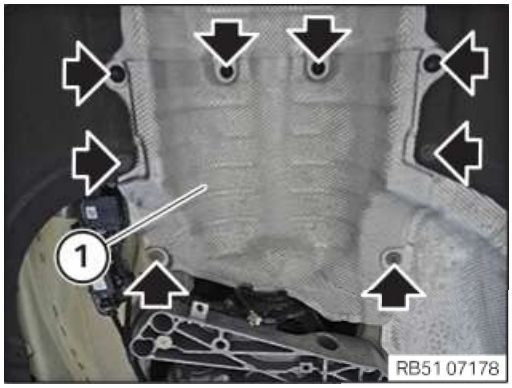
26 – Install the heat shields



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

Heat shield to vehicle underbody

Screws and nuts		Tightening torque	3 Nm

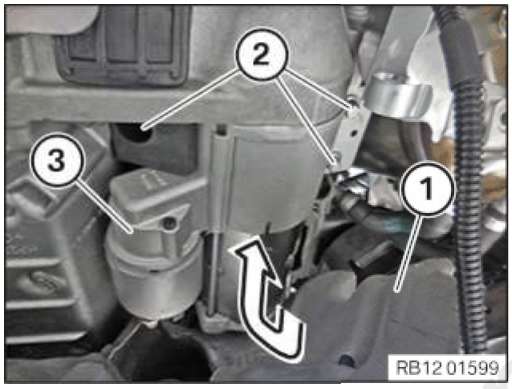


- Install heat shield (1).
- Tighten the nuts and bolts (arrows).

Heat shield to vehicle underbody

Screws and nuts		Tightening torque	3 Nm

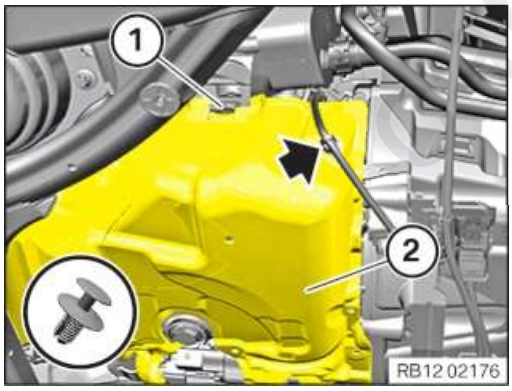
27 – Installing starter motor



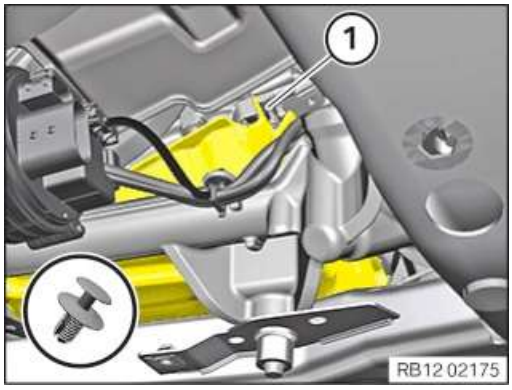
- Make sure that the acoustic cover (1) is not damaged.
- Carefully press the acoustic cover (1) to one side.
- Feed in and install the starter motor (3) in the direction of the arrow.
- Tighten the screws (2).

Starter motor to engine

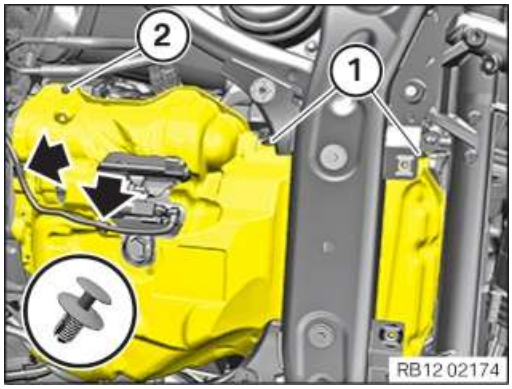
M8X60		Tightening torque	19 Nm



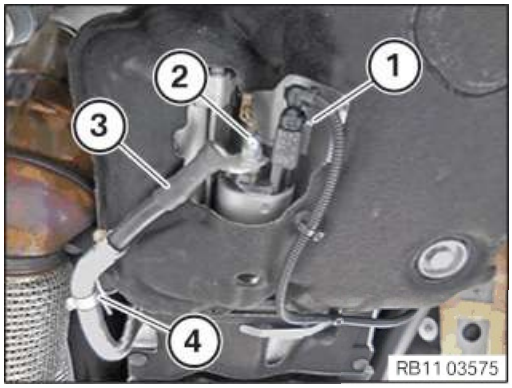
- Position the acoustic cover (2).
- Fasten expanding rivet (1).
- Secure clamp (arrow).



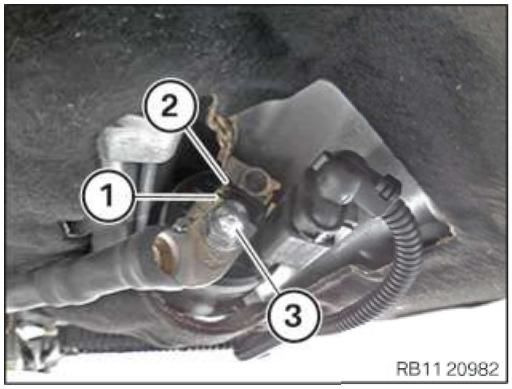
- Fasten expanding rivet (1).



- Secure fir tree clip (2).
- Secure expanding rivet (1).
- Secure the clamps (arrows).



- Secure the positive battery cable (3) in the holder (4) and position it at the starter motor.
- Tighten the nut (2) hand-tight.
- Connect the connector (1) and audibly lock it.



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

28 – 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.

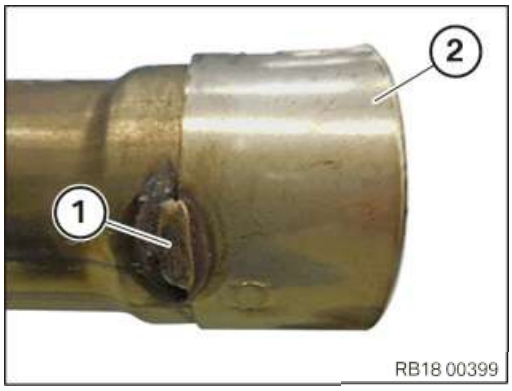
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CAUTION

Heavy component.

Heavy components can lead to injury or damage.

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



CAUTION

Swarf resulting from sawing or grinding components.

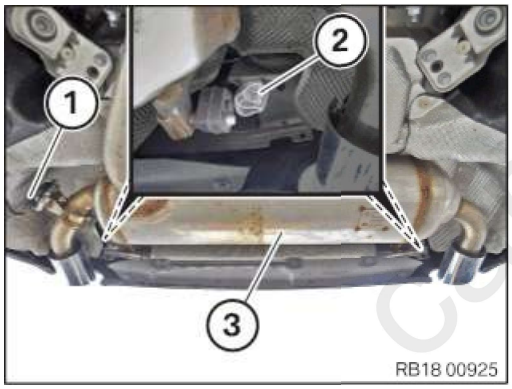
Danger of injury!

- 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).

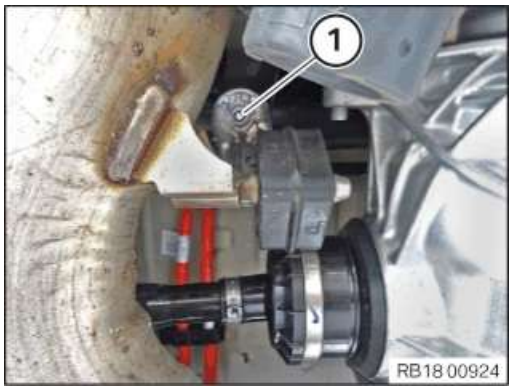
  Parts: Nuts
- Tighten nuts (2).

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

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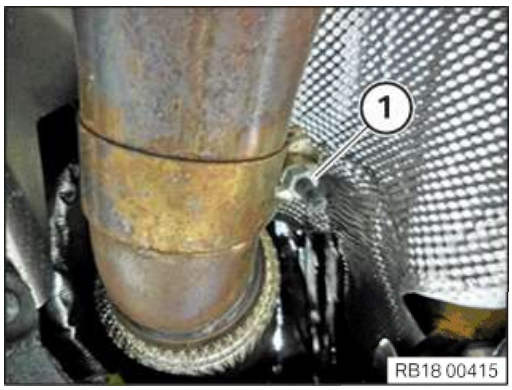
- Renew nut (1).

  Parts: Nut

- Tighten nut (1).

Front silencer / petrol particulate filter on transmission bracket

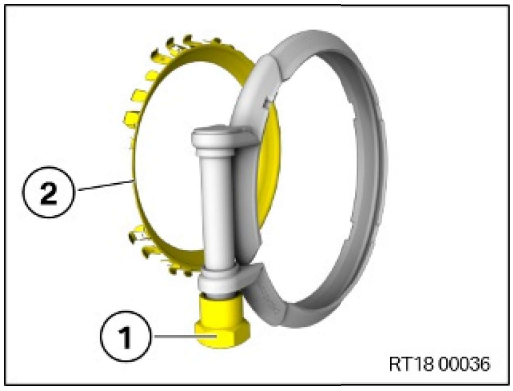
M8	Renew nut.	Tightening torque	19 Nm



- Tighten the ribbon clamp (1).

Exhaust system to catalytic converter

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

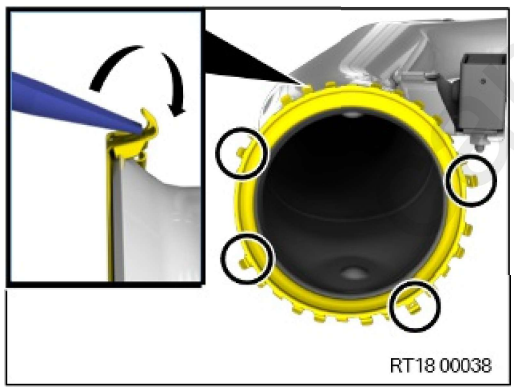


- **Equipment specification 2 (V-clips)**

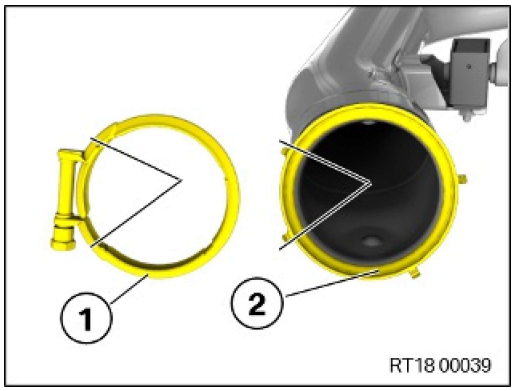
  Renew V-band clamp.

  Parts: V-band clamp

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

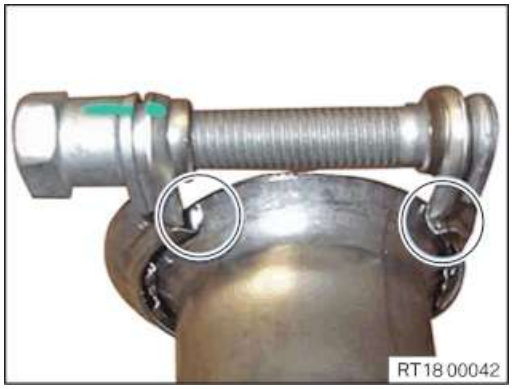


- Bend all sheet metal tabs over with a suitable tool, except those in the marked areas.

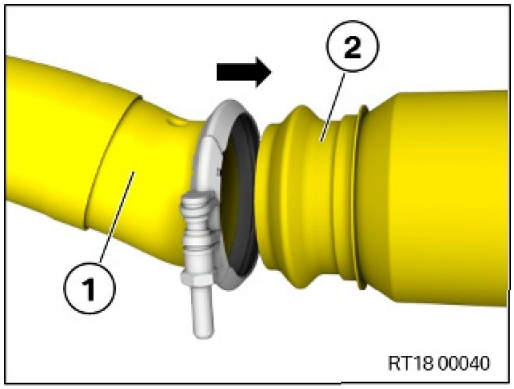


- Mount the V-clip (1) on the sealing ring (2).
- Make sure that the V-clip (1) is positioned correctly on the sealing ring (2).

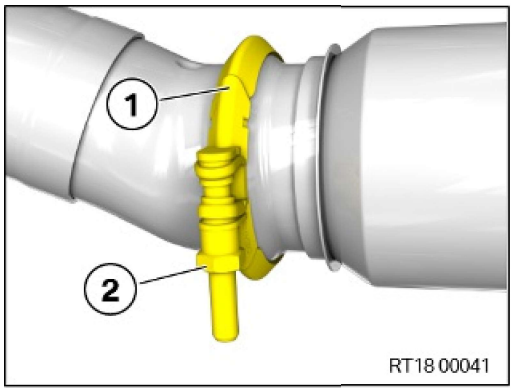
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- Ensure that the V-clip rests against the sheet metal tabs in the marked areas after mounting.



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

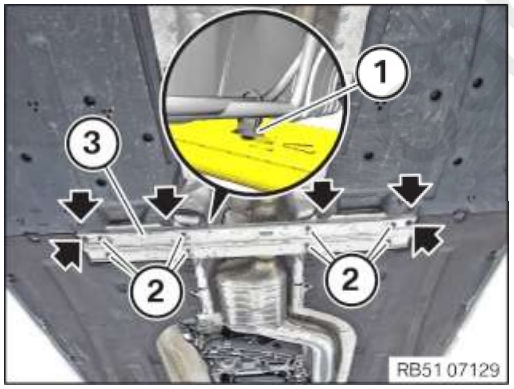


- Make sure that V-clip (1) is fitted correctly.
- Tighten down screw (2).

V-clip to catalytic converter

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

29 – 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).

30 – Disconnecting all battery earth leads

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- See additional information.

31 – 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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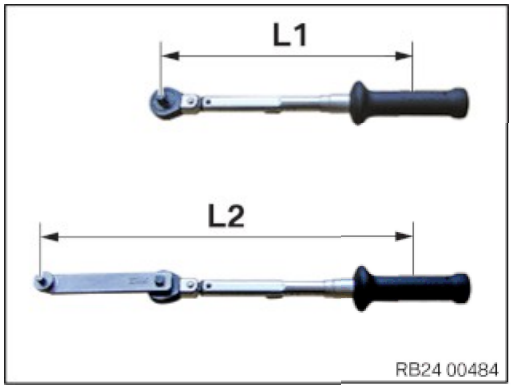
- **Top up the automatic transmission fluid:**
- Loosen the oil filler plug (1) using the special tool 2 405 614.
- Top up automatic transmission fluid according to the instructions in the diagnosis system.

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

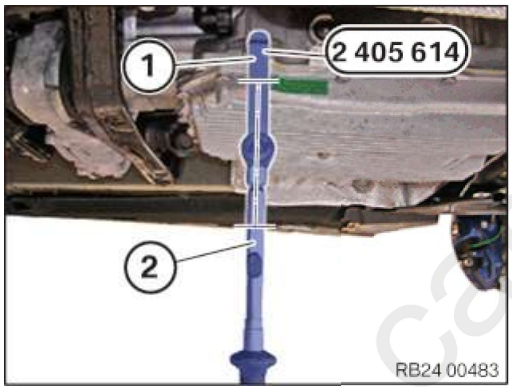
The setpoint torque deviates from the torque to be set when using special tool 2 405 614.

- **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.



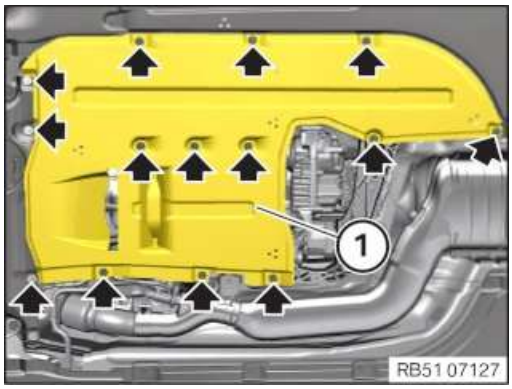
- Renew the oil filler plug (1) and the sealing ring.

  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

32 – Installing underbody protection at rear



- **Version 1:**

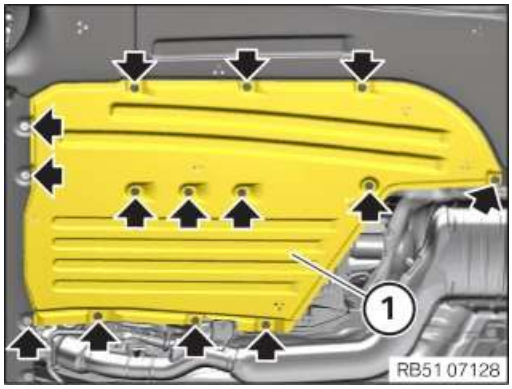
  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

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- **Version 2:**

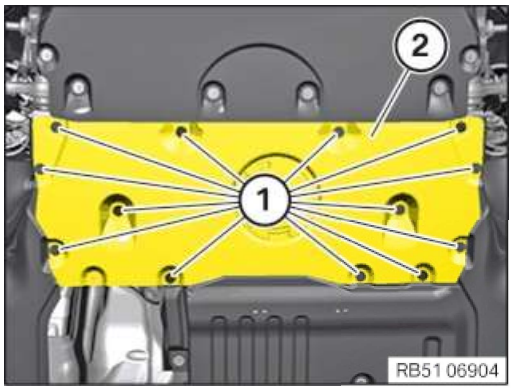
  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

33 – Installing the centre underbody protection



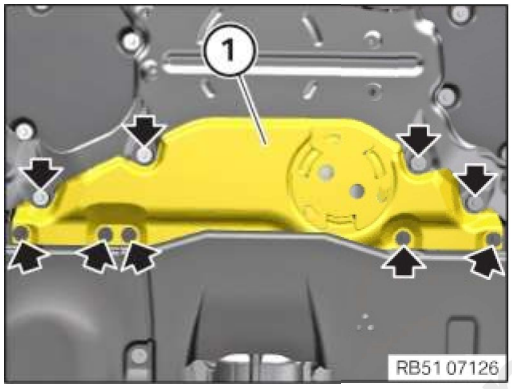
- **Version with rear-wheel drive:**

  Position central underbody protection (2).

  Tighten the screws (1).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



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

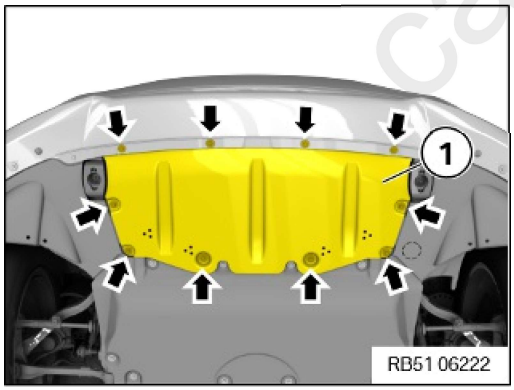
  Guide in and install the centre of underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

34 – Installing the front underbody protection



- **Version 1:**

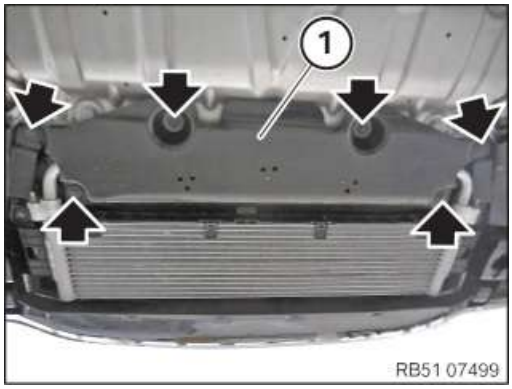
  Feed in the front underbody protection (1) towards the front under the bumper panel and position.

  Tighten screws (arrows).

Underbody protection front

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

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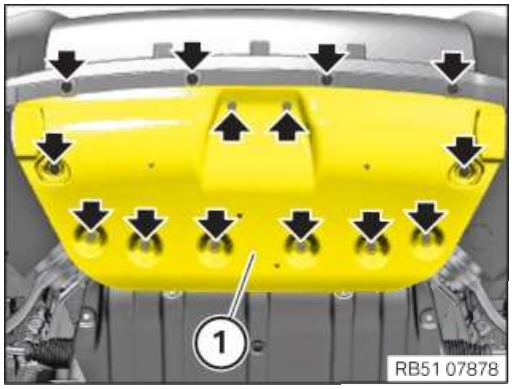
- **Version 2:**

  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:**

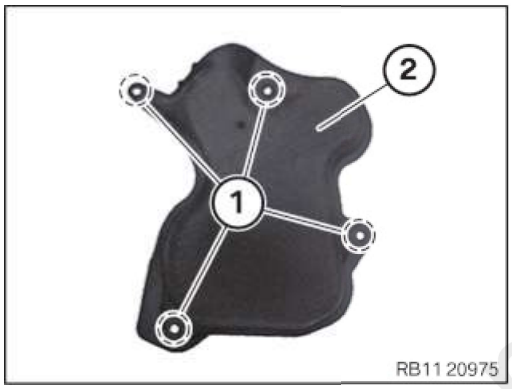
  Feed in and install front underbody protection (1).

  Tighten screws (arrows).

Underbody protection front

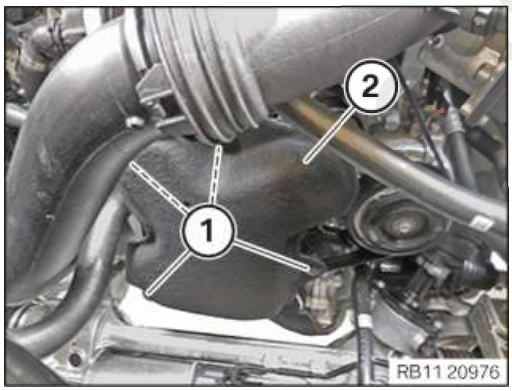
Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

35 – Install the acoustic cover for the engine at the front

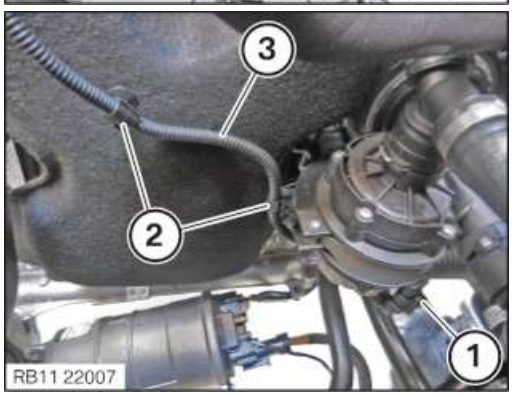


- Check if acoustic cover (2) in marked area (1) is damaged and replace acoustic cover (2) if necessary.

  Parts: Acoustic cover



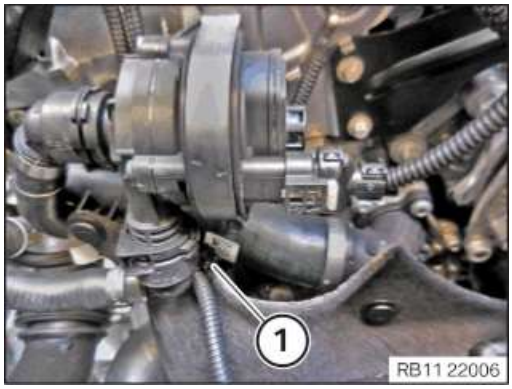
- Thread in and position the acoustic cover (2).
- Mount all expanding rivets (1).



- Feed in and position wiring harness section (3).
- Secure clamps (2).
- Connect connectors (1) and lock.

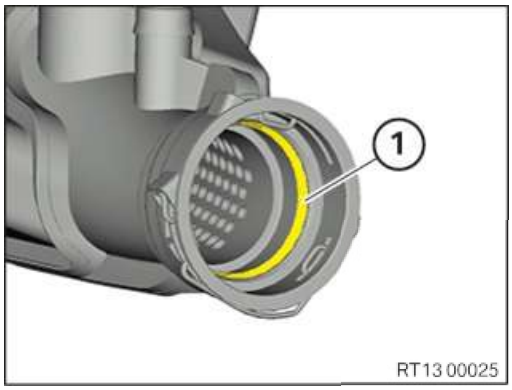
  The connector (1) must engage audibly.

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- Secure clamps (1).

36 – Installing the clean air pipe with resonator

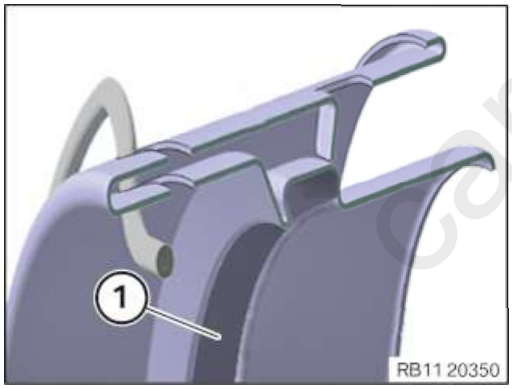


- Check the seal (1) for damages, replace if necessary.

▸ **Replace damaged gasket**

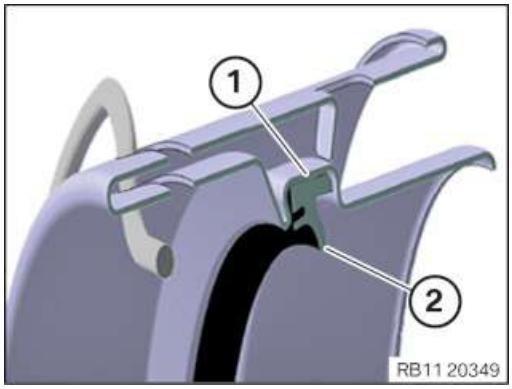
TECHNICAL INFORMATION

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



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

  The gasket groove (1) must be clean.



- Renew gasket.

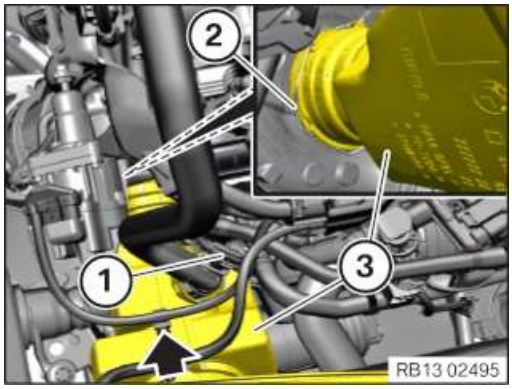
  Parts: Gasket
- Install seal dry without lubricant or mounting agent.

TECHNICAL INFORMATION

Incorrect assembly is possible. Ensure correct installation position.

- Feed in and install the seal.
- Make sure the seal is correctly installed in the gasket groove (1).
- Make sure that the sealing lip (2) is pointing downwards (see figure).

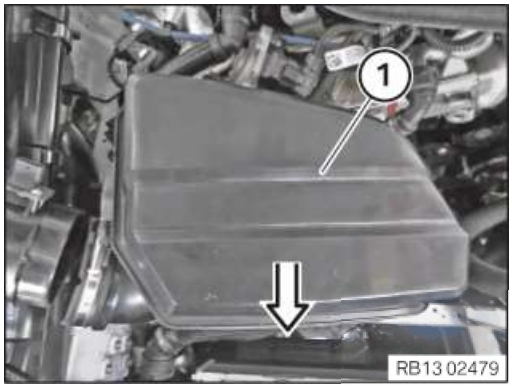
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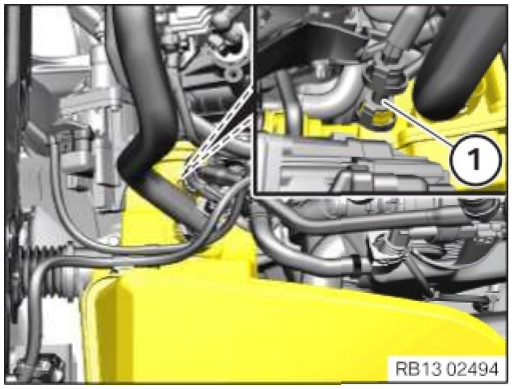
- Guide in and install the clean air pipe with resonator (3).
- Lock clamp (2).

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

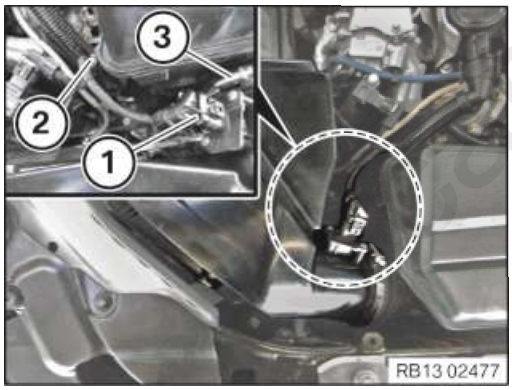
  The connector (1) must engage audibly.
- Secure clamp (arrow).



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



- Connect and lock the tank ventilation line (1).



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

Clean air pipe to upper section of intake filter housing

Clamp		Tightening torque	3 Nm

- Secure the clamp (2).
- Connect connectors (1) and lock.

  The connector (1) must engage audibly.



- Insert and install the engine ventilation line (2).
- Ensure that the locks (1) engage audibly.

37 – Install acoustic cover

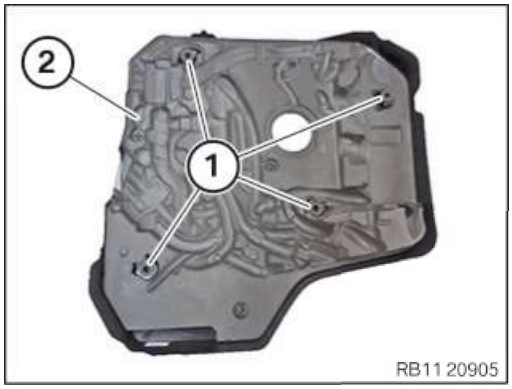
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RISK OF DAMAGE

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.



- Check all rubber mounts (1) of acoustic cover (2) for correct seating.



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

  The acoustic cover (1) must audibly engage into place.

Additional Information

Overview of Tightening Torques

Torque converter to flywheel — Used in step 20

M10	Renew screws.	Tightening torque	56 Nm

Transmission to engine — Used in step 2023

M8		Tightening torque	19 Nm
M12		Tightening torque	66 Nm

Ground strap to transmission or body — Used in step 20

M8		Tightening torque	19 Nm

Transmission cross member to body — Used in step 21

M8	Renew screws.	Tightening torque	19 Nm

Transmission oil line to transmission — Used in step 22

M6x25	Renew the sealing ring.	Tightening torque	8 Nm

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Transmission oil line on holder — Used in step 22

M6		Tightening torque	8 Nm

Catalytic converter to holder — Used in step 23

M8	Renew screw.	Tightening torque	19 Nm

Catalytic converter to holder — Used in step 23

M8	Renew nut.	Tightening torque	19 Nm

Retaining plates for vehicle underbody cover — Used in step 24

Sheet metal nut	Replace nuts.	Tightening torque	3 Nm

Front flexible disc to propeller shaft — Used in step 25

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 25

M8		Tightening torque	19 Nm

Heat shield to vehicle underbody — Used in step 26

Screws and nuts		Tightening torque	3 Nm

Starter motor to engine — Used in step 27

M8X60		Tightening torque	19 Nm

Battery positive lead to starter — Used in step 27

M8		Tightening torque	13,5 Nm

Rear silencer to body / bumper support — Used in step 28

M8	Replace nuts.	Tightening torque	19 Nm

Exhaust system to rear axle carrier — Used in step 28

Nut M8	Renew nut.	Tightening torque	19 Nm

Front silencer / petrol particulate filter on transmission bracket — Used in step 28

M8	Renew nut.	Tightening torque	19 Nm

Exhaust system to catalytic converter — Used in step 28

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

V-clip to catalytic converter — Used in step 28

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

Connecting support to tunnel — Used in step 29

M8x25 screw		Tightening torque	20 Nm
Screw		Tightening torque	3 Nm

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Oil filler plug Used in step 31

M18x1.5		Tightening torque	35 Nm

Underbody protection Used in step 3233

Hexagon screw		Tightening torque	3 Nm

Underbody protection front Used in step 34

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

Clean air pipe to upper section of intake filter housing Used in step 36

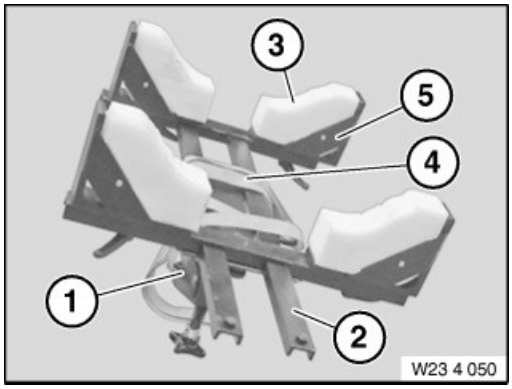
Clamp		Tightening torque	3 Nm

Overview of Special Tools

0 495 498 (23 4 050) Support

Used in step 1621

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Common

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.	

2 219 012 Hydraulic lifter

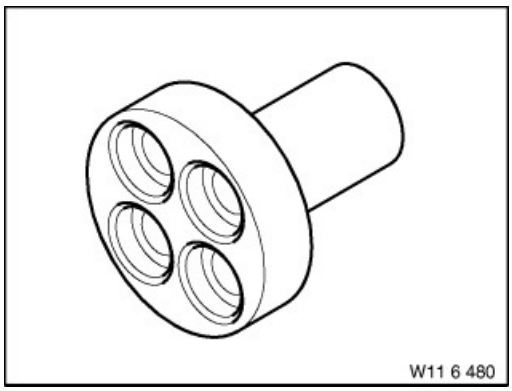


Common Used in step 1621

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)

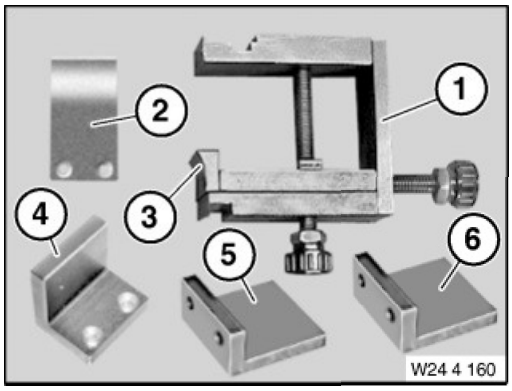
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0 493 380 (11 6 480) Connector



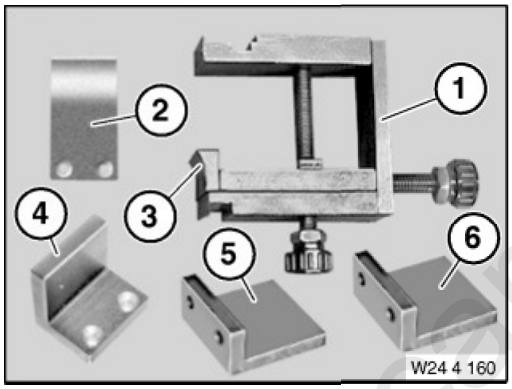
Common	Used in step 1720
Usage	For turning over engine at crankshaft hub (vibration absorber) when adjusting valve timing
Included in the tool or work	
Storage location	B2
Replaced by	
In connection with	
SI-Number	01 11 98 (338)

0 494 478 (24 4 161) Basic body



Common	Used in step 17
Usage	
Included in the tool or work	0 494 451
Storage location	C46
Replaced by	
In connection with	
SI-Number	

0 496 061 (24 4 166) Shaped element

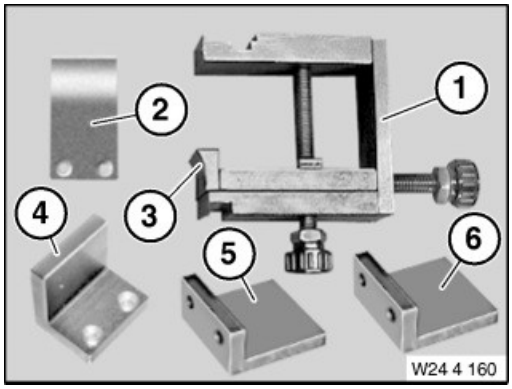


Common	Used in step 17
Usage	Transmission: GA6L45R (GM6) in E83 / N52K Deletion, only available via tool set
Included in the tool or work	0 494 451
Storage location	C46
Replaced by	
In connection with	
SI-Number	01 02 07 (334)

0 494 451 (24 4 160) Holder

Used in step 1720

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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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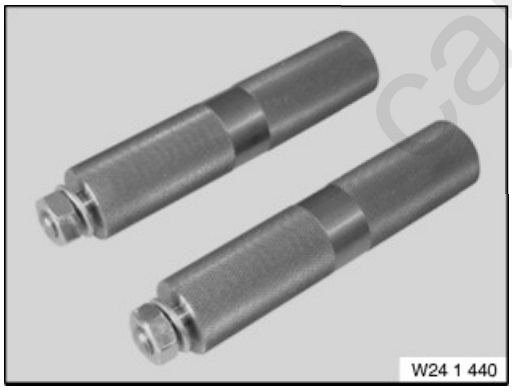
0 494 213 (24 2 390) Cap



Common	Used in step 1720
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)

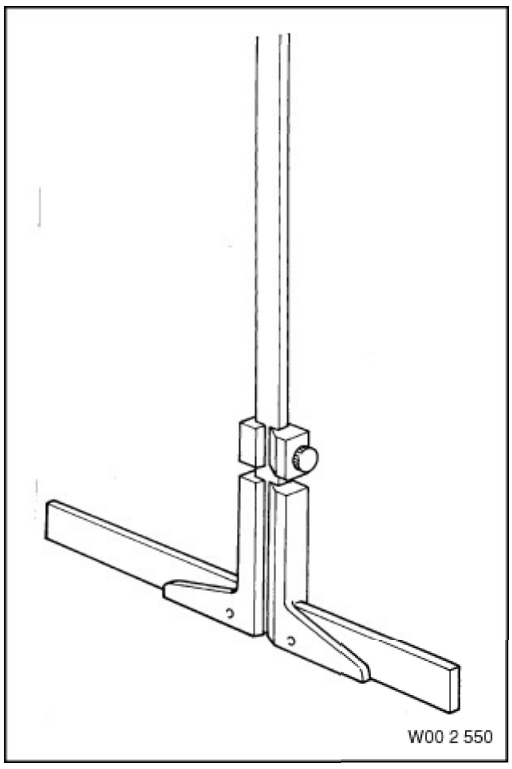
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0 496 717 (24 1 440) Handle



Common	Used in step 18
Usage	For installing and removing the torque converter. 8HPxx
Included in the tool or work	
Storage location	C50
Replaced by	
In connection with	
SI-Number	01 17 09 (577)

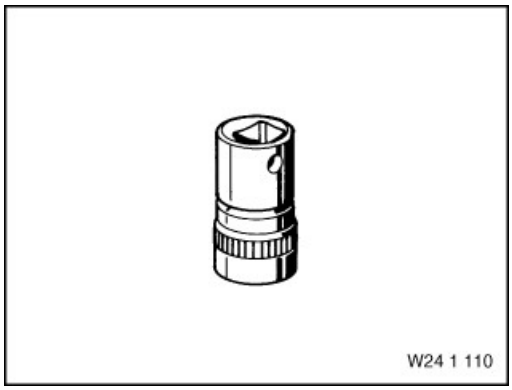
0 490 189 (00 2 550) Measurement aid



Common	Used in step 19
Usage	(Depth gauge) E.g. for determining side clearance of transmission shaft and basic adjustment dimension for installing bevel pinion in rear axle final drives
Included in the tool or work	
Storage location	A4
Replaced by	
In connection with	
SI-Number	

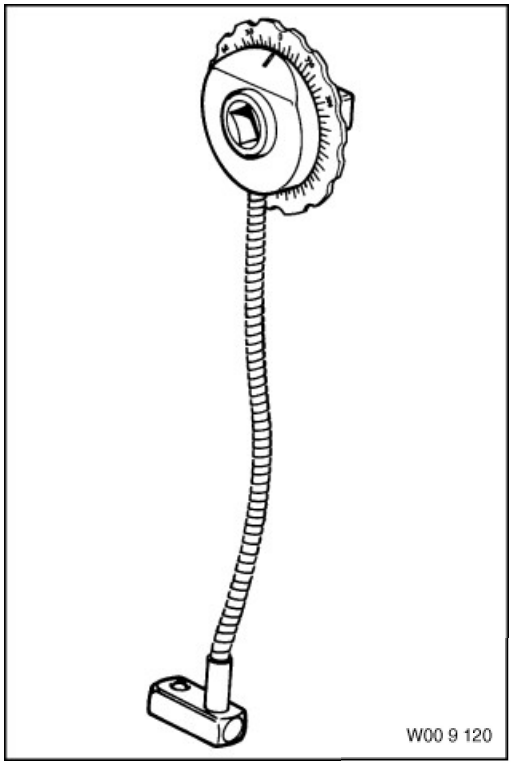
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0 491 667 (24 1 110) Socket wrench insert



Common	Used in step 20
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)

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



Common	Used in step 25
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 31
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)

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Overview Technical Data

GA8HP51Z transmission capacity Used in step 31

	min. 9,28 l

Transmission oil: Automatic transmission fluid ATF 3+

GA8HP76Z transmission capacity Used in step 31

	min. 9,35 l

Transmission oil: Automatic transmission fluid ATF 3+

Links

Repair instructions	Used in step
61 20 900 Disconnecting and connecting battery earth lead	130
61 20 900 Disconnecting and connecting battery earth lead	130

61 20 900 Disconnecting and connecting battery earth lead	130
61 20 900 Disconnecting and connecting battery earth lead	130
61 20 900 Disconnecting and connecting battery earth lead	130
61 20 900 Disconnecting and connecting battery earth lead	130
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	130
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	130
61 20 900 Disconnecting and connecting battery earth lead	130
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	130
61 20 900 Disconnect and connect battery earth lead (Plug-in Hybrid Electric Vehicle)	130
61 20 900 Disconnecting and connecting battery earth lead	130
61 20 900 Disconnecting and connecting battery earth lead	130
61 20 900 Disconnecting and connecting battery earth lead	130
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61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	130
61 20 900 Disconnecting and connecting battery earth lead	130
61 20 900 Disconnecting and connecting battery earth lead	130
61 20 900 Disconnecting and connecting battery earth lead	130
61 20 900 Disconnecting and connecting battery earth lead	130
61 20 900 Disconnecting and connecting battery earth lead	130
61 20 900 Disconnecting and connecting battery earth lead	130
61 20 900 Disconnecting and connecting battery earth lead	130
17 11 035 Removing and installing/replacing fan cowl with electric fan	17

Operating materials	**Used in step**
14.0 Automatic transmission fluid for ZF-transmission GA8HP45Z / GA8HP50Z / GA8HP70Z / GA8HP90Z / GA8P70H / GA8P75H / GA8HP75Z	31

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