

11 Engine M60

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For additional work, refer to "Repair Instructions for 7 Series E38"

General information

M60

Cylinder configuration:

Cylinders 1 ... 4, viewed in direction of travel, are located on the right side of the vehicle, with cylinder 1 at the front.

Cylinders 5 ... 8, viewed in the direction of travel, are located on the left side of the vehicle, with cylinder 5 at the front.

The operations described apply to both cylinder banks: if special explanations are required, the procedures for each cylinder bank are described separately.

General Data for operations on the valve timing system:

If operations on the cylinder head are performed where the camshaft was removed, please note the following:

The hydraulic valve tappets expand without load being applied by the camshaft and, after installation, require some time before they compress back down. This means that, if parts are assembled in rapid sequence, even the "closed" valves may still be open and in direct contact with the piston.

Note the following wait periods between installation of the camshaft and mounting of the cylinder head:

ambient temperature 20° C	4 mins.
10° C - 20° C	11 mins.
0° C - 10° C	30 mins.

After assembly of the camshaft and the timing chain, wait for the following periods before turning the engine crankshaft:

ambient temperature 20° C	after 10 mins.
10° C - 20° C	after 30 mins.
0° C - 10° C	after 75 mins.

General instructions for work involving the gaskets:

Apply a bead of cement to all contact points and a thin, even coat of Hylomar SQ 32M** to determine the location of the gaskets.

** Refer to BMW Parts Service

11 00 039 Checking compression of all cylinders

M60

**Caution!**

High voltage – danger of death!
Interrupt power supply to ignition coils.
Follow instructions on compression testing,
refer to General Data MG12
Repair Instructions for 7 Series E38

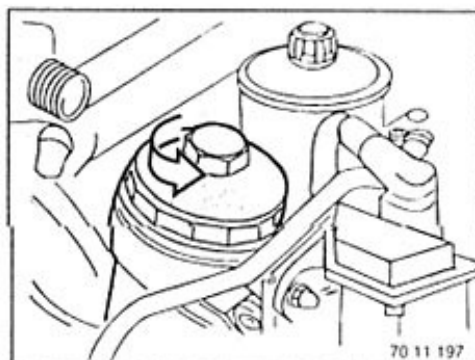
Disconnect fuel pump relay and DME master relay (installation: electronics box),
refer to Electrical Troubleshooting Manual
(schematics) 8 Series E31
Directory of components 7000.0

After checking interrogate fault memory and if necessary rectify faults. Cancel fault memory.
Subsequent procedure,
refer to 11 00 039
Repair Instructions Series 7 E38

00 00 249 BMW engine oil service

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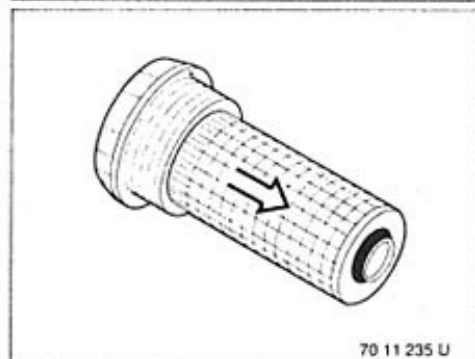
Change engine oil and oil filter



Unscrew and remove oil filter cover.

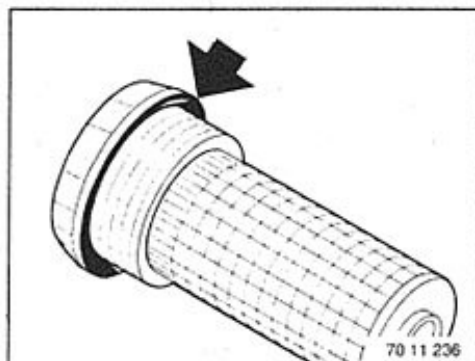
Note:
Oil flows out of the oil filter housing into the oil pan.

Installation:
Tightening torque 11 42 2AZ*



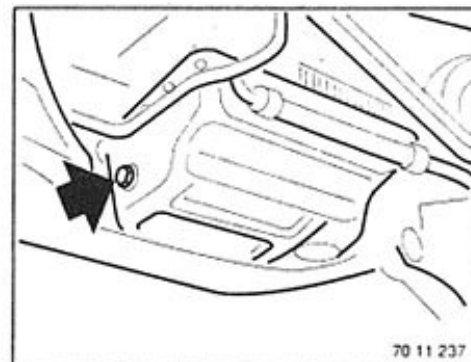
Remove oil filter from the oil filter cover.

Installation:
Note installation direction of the oil filter insert. Oil filter insert must engage in the oil filter cover.



Installation:
Fit new seal.

* Refer to Technical Data



Once the oil has drained out of the oil filter housing, open the oil drain plug or draw off the oil.

Installation:
Replace seal.
Tightening torque 11 13 1AZ*

Top up the engine oil level.

Switch on engine and run at idle speed until the oil display lamp goes out.

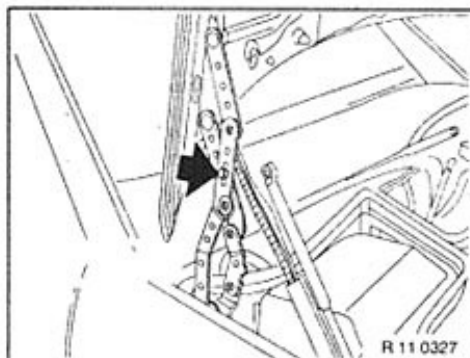
Switch off engine and check the oil level.

Note:
Vehicle on level ground.

Refer to Technical Data

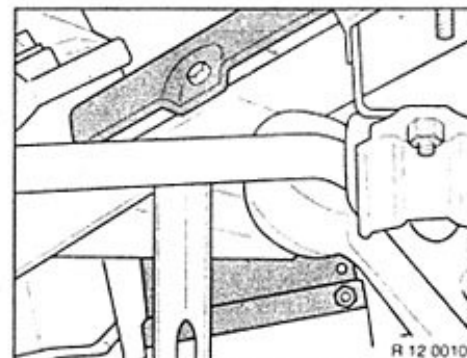
11 00 050 Removing and installing engine (M60)

Interrogate the fault memory in all the control units.
Follow instructions on disconnecting and connecting battery, refer to General Data HG12
Disconnect battery ground lead.
Remove automatic transmission, refer to 24 00 026

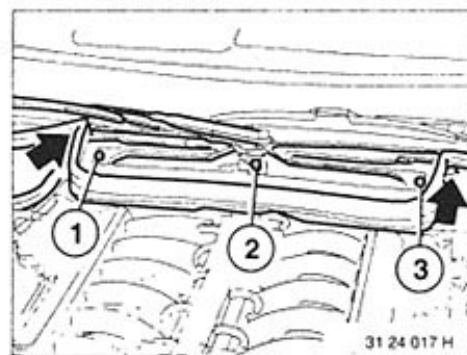


Lift engine hood into assembly position. Fully extend gas strut on engine hood, fully open engine hood and secure with one screw on each side (left and right).

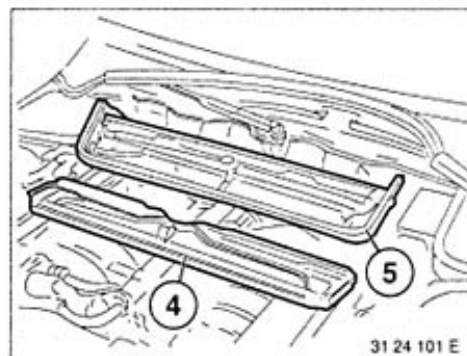
Remove radiator with expansion tank, refer to 17 11 000.



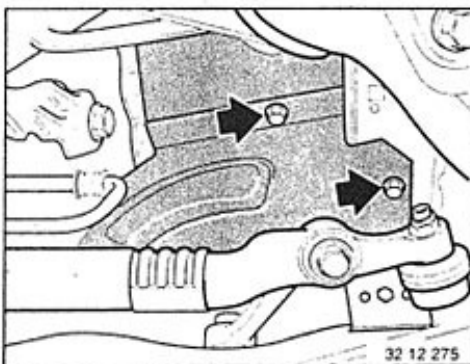
Remove left and right rear heat baffle plates.



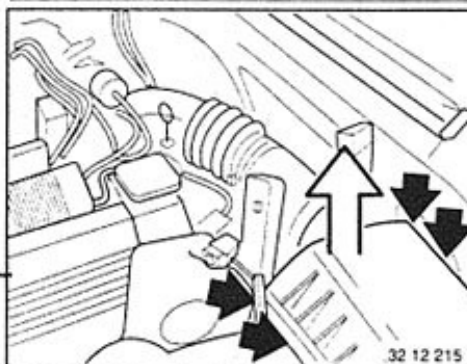
Partially remove rubber seal from air manifold. Twist mounting (1 ... 3). Remove screws on left and right sides.



Lift off trim (4) and microfilter (5).



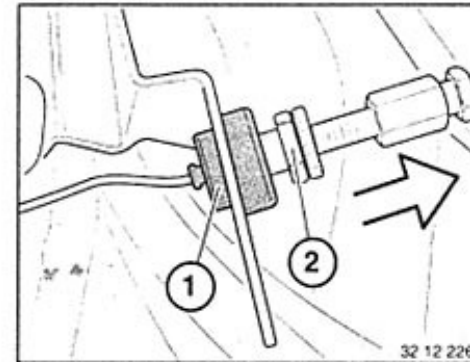
Remove left and right heat baffle plates from front axle carrier.



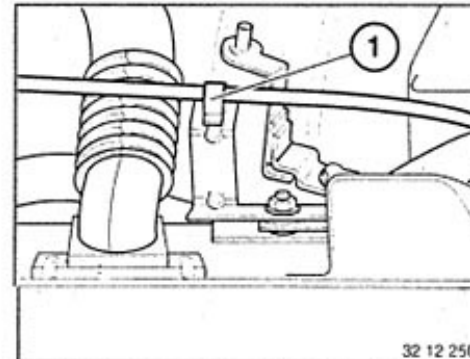
Remove upper section of suction filter with mass air flow sensor.

Remove left and right cable ducts.
These operations are described in the section
on Removing Cylinder Head,
see 11 12 004.

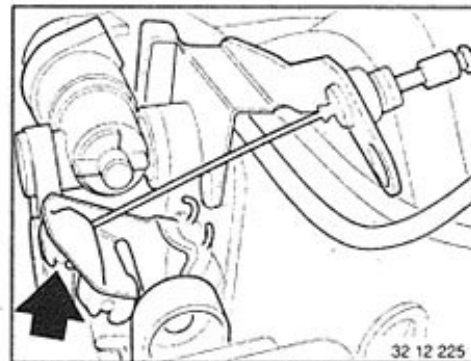
Note:
If necessary, disconnect the connectors
beside the timing cases if this facilitates the
task of lifting out the engine.



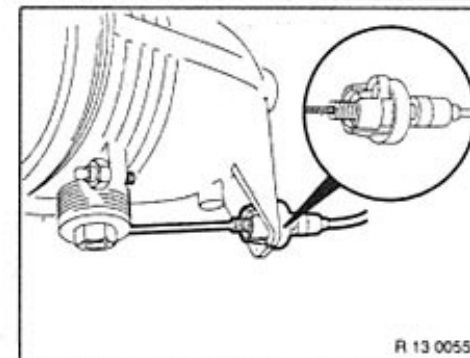
Remove Bowden cable (2) from rubber mount
(1).
Press rubber mount (1) out of bracket.



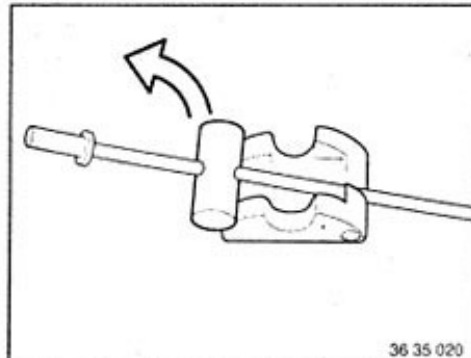
Remove accelerator cable from guide (1) and
place to one side.



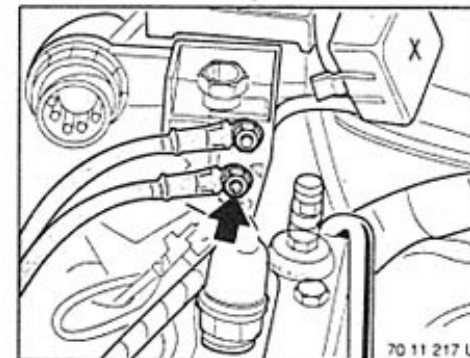
Disconnect accelerator cable.
Press together both lugs on the nipple mount
and press out the actuating lever.



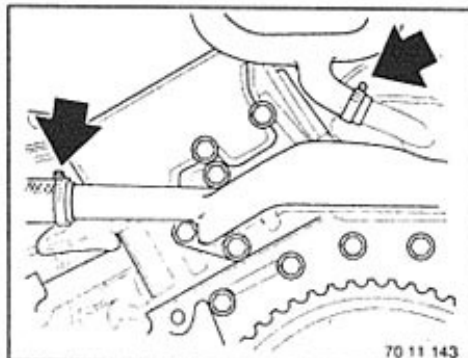
Press plastic locking unit in and remove Bow-
den cable from ASC throttle valve.



Press nipple out of nipple mount.
Remove Bowden cable from nipple mount.



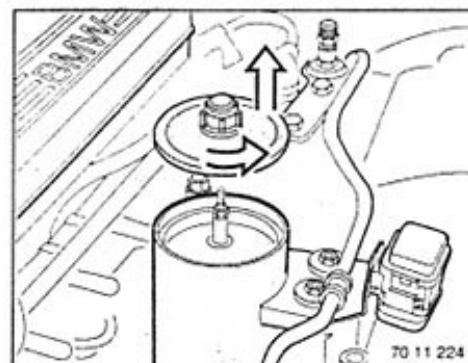
Disconnect cable from positive terminal.



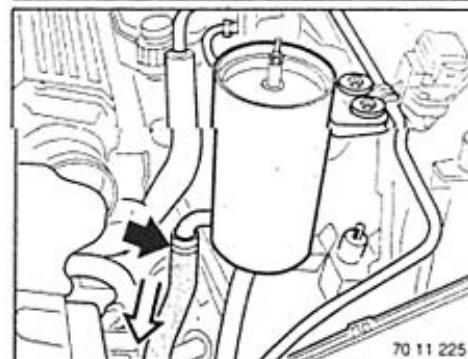
Remove heating hoses from coolant manifold and coolant tube between heating firewall and engine.

Remove 3-phase alternator, see 12 31 020.

Remove complete main flow oil filter, see 11 42 020.



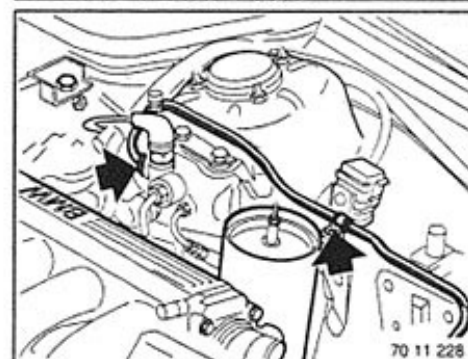
Draw off oil from container for power steering.



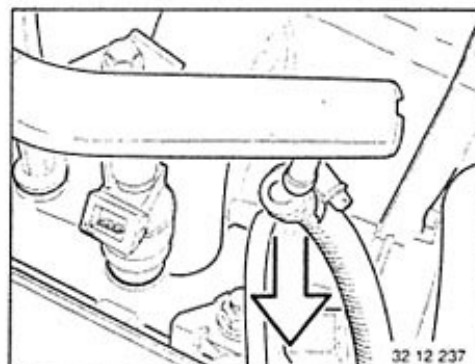
Remove hose from oil container.

Unfasten vane pump from bracket and tie to one side, see 32 41 060 Repair Instructions for 7 Series E32.

Note:
Lines remain connected.

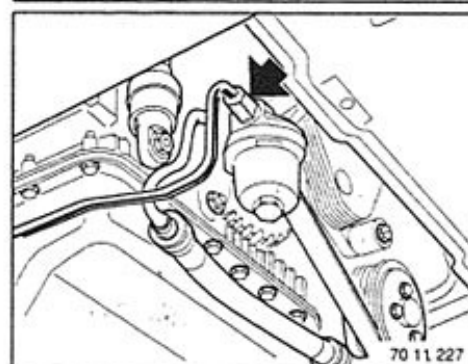


Remove bracket and hydraulic line from 3-phase governor.

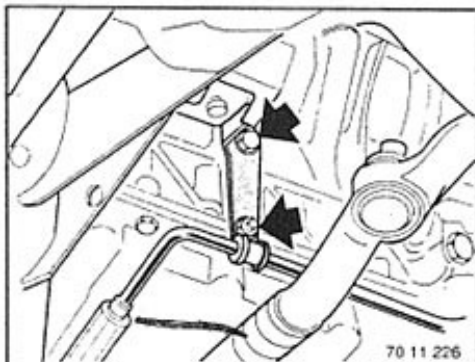


Caution!
Catch fuel as it escapes.

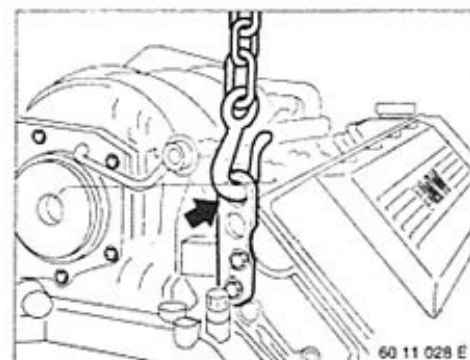
Remove fuel intake and fuel return lines on injection tube.



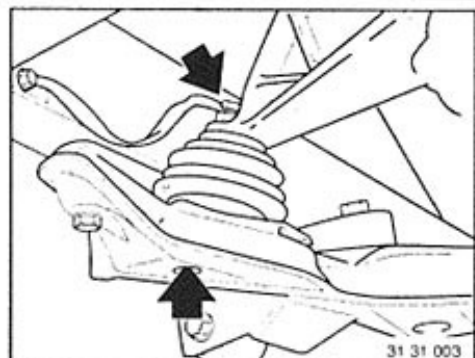
If necessary, remove hydraulic line for ASC+T filter and remove from lower section of oil pan.



Unfasten hydraulic line from back of lower section of oil pan.

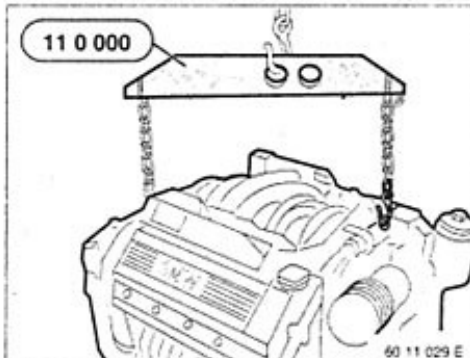


Arrangement of rear engine mounting.



Unfasten left and right engine mounts.
Remove ground tape from engine support arm.

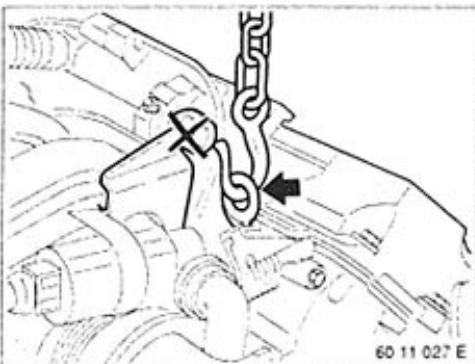
Installation:
Tightening torque 11 81 1AZ / 2AZ*



Lift out engine using special tool 11 0 000.

Unfasten air conditioning compressor from support block, see 64 52 020.

Note:
Lines remain connected.



Caution!
Only lift engine using the mounting lugs provided for this purpose.

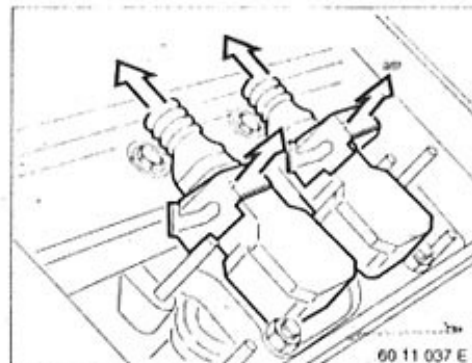
Arrangement of front engine mounting.

* Refer to Technical Data

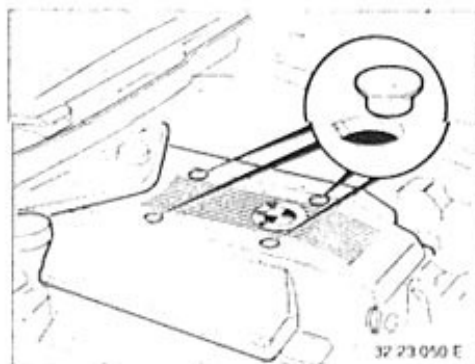
11 12 004 Removing and installing / sealing both cylinder head covers

M60

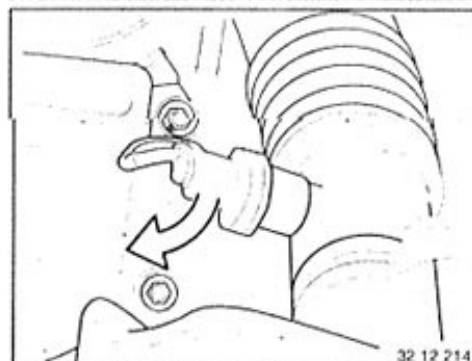
Read out error memories of all control units.
Disconnect battery negative lead.



Remove connectors from ignition coils on both cylinder banks.

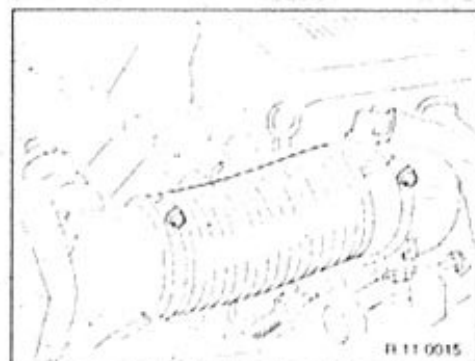


Lever clips off manifold cover.
Unscrew bolts.
Remove cover and insulation material.

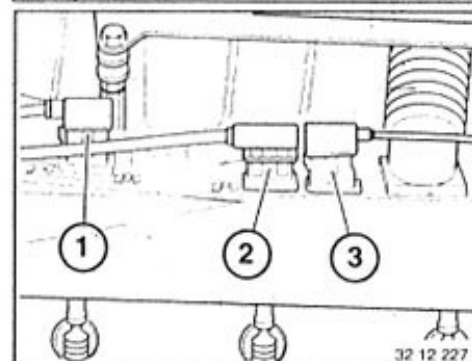


Disconnect plug connection on mass air flow sensor.

Remove tank venting valve from bracket, see 13 90 500.



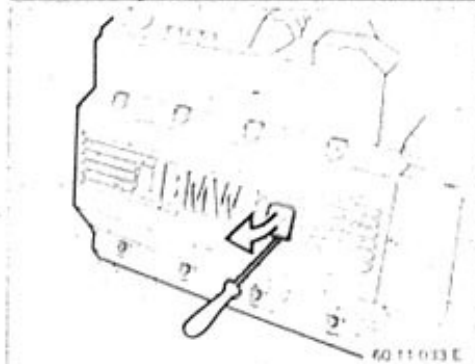
Remove hose to idle speed actuator and remove dust cover between throttle body and mass air flow sensor.



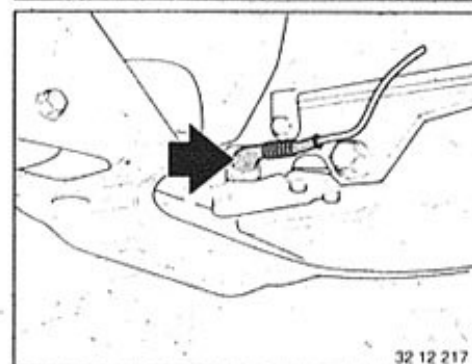
Disconnect all plug connections on left cable duct:

- (1) camshaft sensor
- (2) and (3) knock sensors

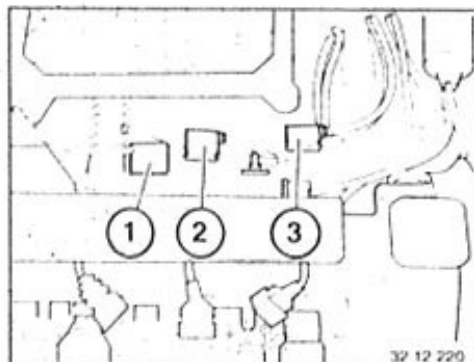
Caution!
Incorrect installation of plug connections (2) and (3) causes engine damage.
Note instructions, see 12 14 610 / 611.



Remove covers from ignition coils.

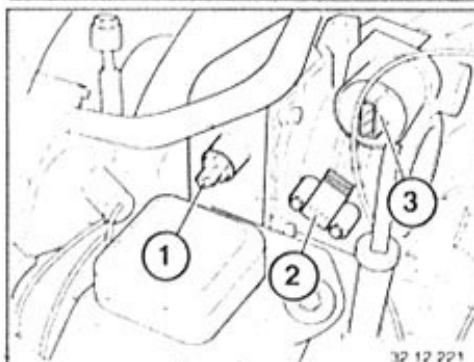


Disconnect plug connection on oil level switch.
Remove cable guide to oil level switch.

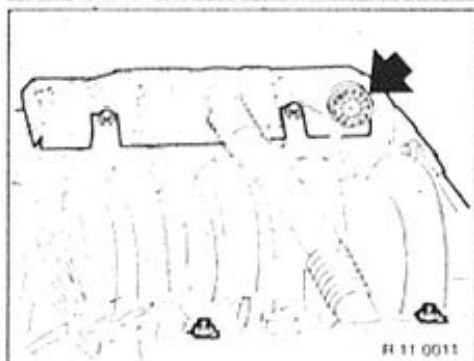


Disconnect all plug connections on right cable duct:
(1) and (2) knock sensors
(3) TDC sensor

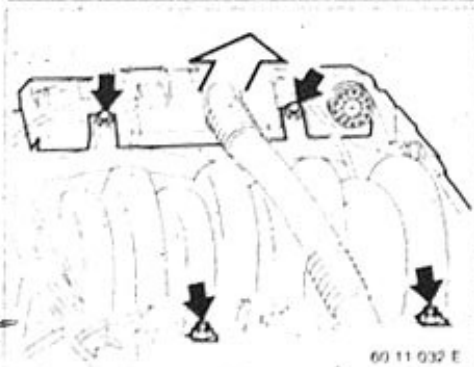
Caution!
Incorrect installation of plug connections (1) and (2) causes engine damage.
Note instructions, see 12 14 610 / 611.



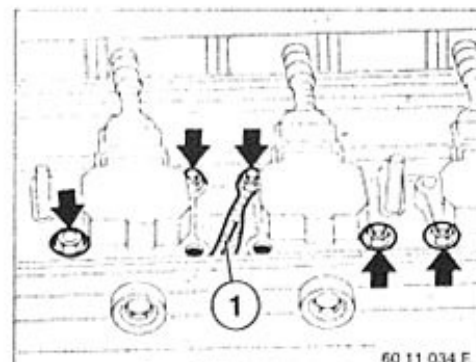
Disconnect plug connections:
(1) temperature sensor for intake air
(2) throttle valve potentiometer
(3) idle speed actuator



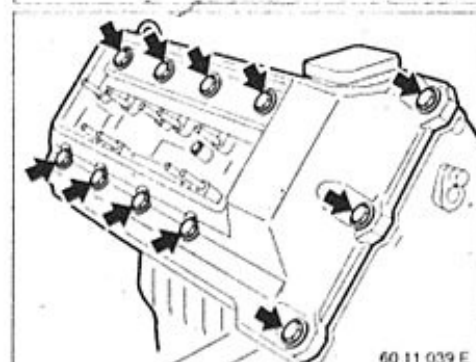
Disconnect engine connector from left and right cable ducts.



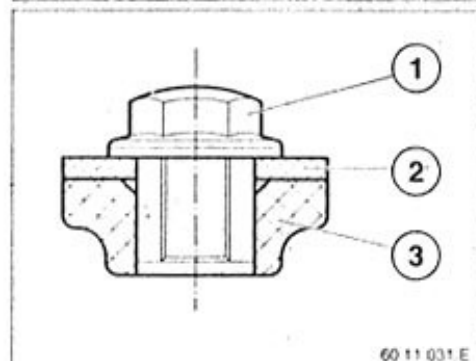
Remove left and right cable ducts from bracket and fold to one side.



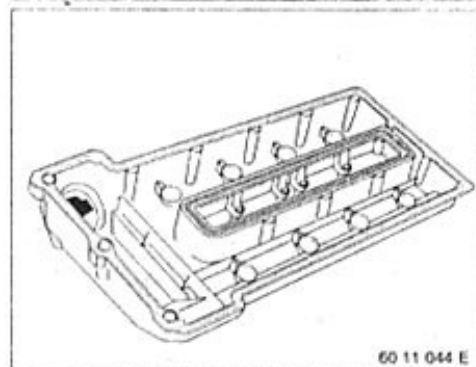
Remove ignition coils from both cylinder banks, see 12 13 011.



Unfasten left and right retainers.



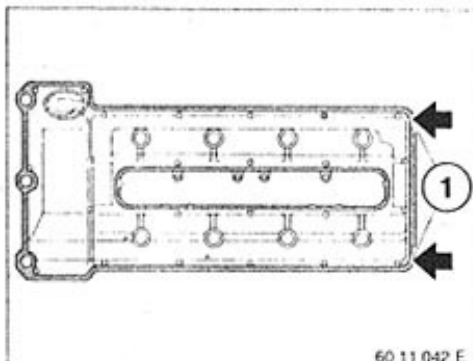
Installation:
Layout of retaining elements:
(1) nut
(2) washer
(3) rubber seal



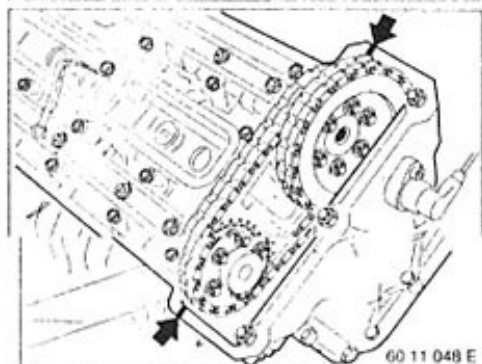
Installation:
Check gasket and replace if necessary.

Coat the entire circumference of the outer and inner groove and the sealing face of the cylinder head cover with rubber anti-friction compound, e.g. glycerine**. Press the inner gasket into the cover groove with no torsional stress, starting at the four corner radii.

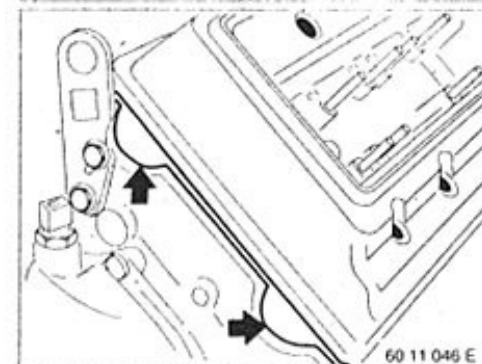
** Source of Supply: BMW Parts Service


Installation:

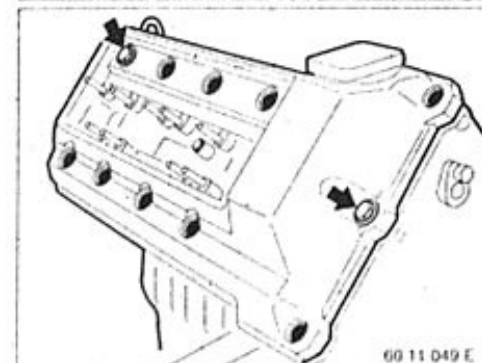
Align outer gasket loosely over the cover groove. Secure gasket in the cover groove, starting at the four reverse corners (1) and press into groove with no torsional stress.


Installation:

Coat the contact faces of the joint with Hy-lomar SQ 32 M** liquid sealing compound.


Installation:

Check for correct seating of gasket on back of cylinder head when installing the cylinder head cover.


Installation:

Attach two retainers to the locating points, without preload at this stage, and align the cover. Install all the other retaining elements and tighten crosswise, radiating out from the center.

11 12 005 Removing and installing / sealing left cylinder head cover

M60

This operation is described in the section on
removing and installing / sealing both cylinder
heads,
see 11 12 004 .

11 12 006 Removing and installing / sealing right cylinder head cover

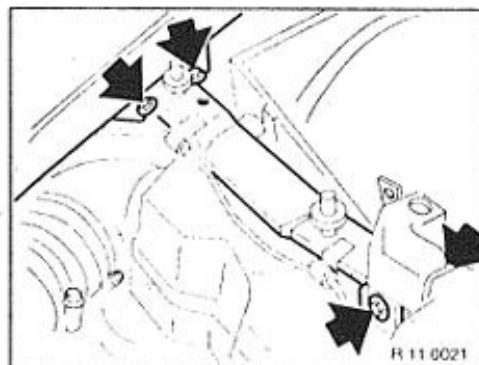
M 60

This operation is described in the section on
removing and installing / sealing both cylinder
heads,
see 11 12 004 .

11 12 105 Removing and installing left cylinder head

M60

Remove right pop-up headlight, refer to 63 12 460



Remove support for pop-up headlights and lower section of intake filter housing.

Remove both cylinder head covers, refer to 11 12 004

Remove intake air manifold, refer to 11 61 050

Remove coolant manifold, refer to 11 53 325

Remove both left exhaust manifolds, refer to 11 62 142

Unfasten air conditioning compressor from mount, refer to 64 52 020

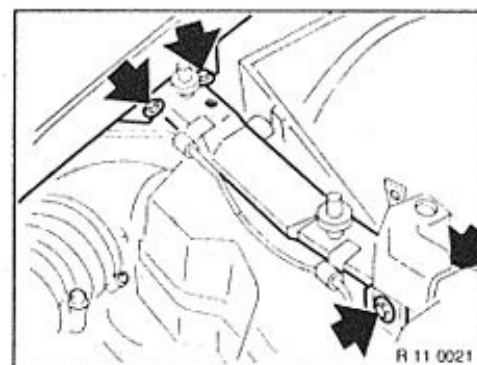
Note:
Lines remain connected.

Subsequent procedure, refer to 11 12 105
Repair Instructions Series 7 E38

11 12 106 Removing and installing right cylinder head

M60

Remove right pop-up headlight, refer to 63 12 460



Remove support for pop-up headlights and lower section of intake filter housing.

Remove both cylinder head covers, refer to 11 12 004

Remove intake air manifold, refer to 11 61 050

Remove coolant manifold, refer to 11 53 325

Remove both right exhaust manifolds, refer to 11 62 143

Unfasten air conditioning compressor from mount, refer to 64 52 020

Note:
Lines remain connected.

Subsequent procedure, refer to 11 12 106
Repair Instructions for 7 Series E38

**11 12 107 Removing and installing
both cylinder heads**

M60

This operation is described in section on removing and installing right / left cylinder heads,
refer to 11 12 105 / 106

**11 12 110 Replacing left cylinder head
gasket**

M60

This operation is described in section on removing and installing right / left cylinder heads,
refer to 11 12 105

**11 12 111 Replacing right cylinder
head gasket**

M60

This operation is described in section on removing and installing right / left cylinder heads,
refer to 11 12 106

**11 12 112 Replacing both cylinder head
gaskets**

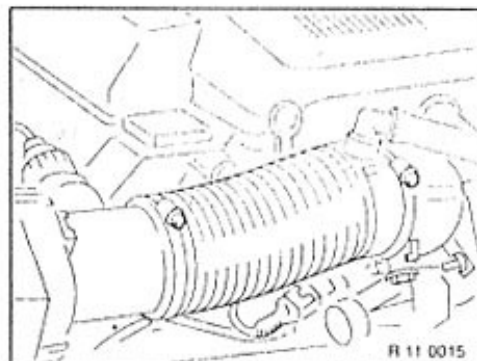
M60

This operation is described in section on removing and installing both cylinder heads,
refer to 11 12 107

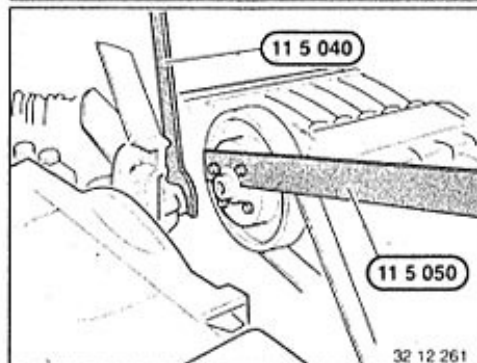
11 13 010 Removing and installing or replacing upper section of oil pan

M 60

Remove exhaust assembly, see 18 00 020.

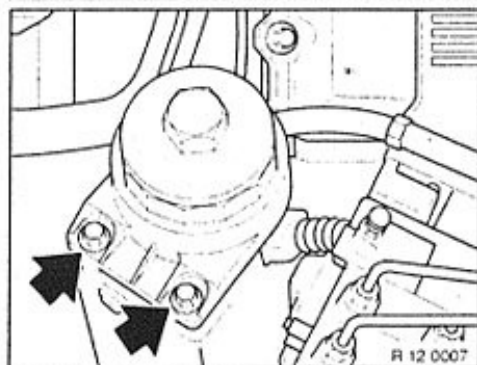


Pull off hose to idle speed actuator and remove dust cover between throttle body and mass air flow sensor.



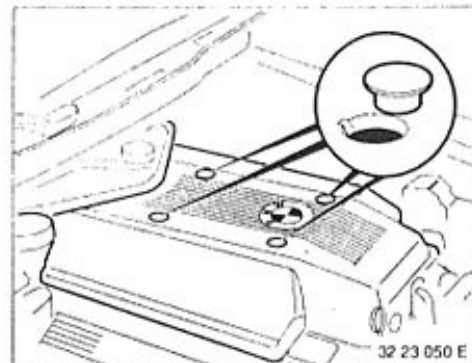
Remove fan. Use special tools 11 5 040 and 11 5 050.

Caution!
Left-hand threads.

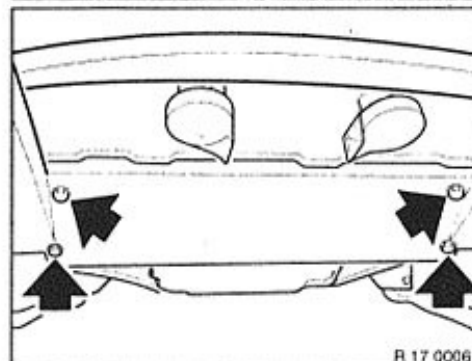


Unfasten full-flow oil filter, lift out of bracket and press forwards.

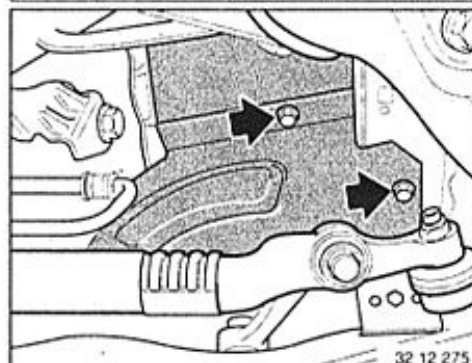
Note:
Hoses remain connected.



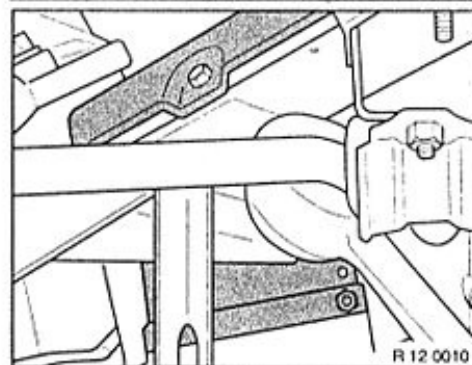
Lever clips out of manifold cover. Unscrew bolts. Remove cover together with noise insulation.



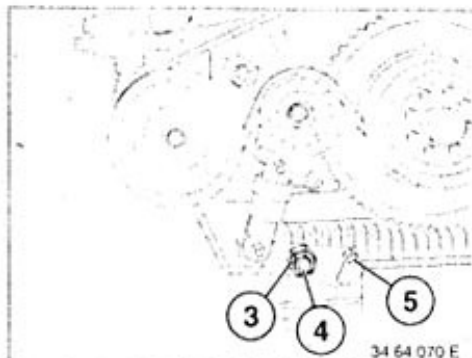
Unscrew and remove splash guard.



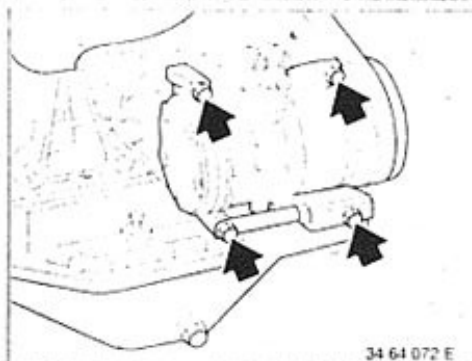
Remove left and right heat baffle plates from front axle carrier.



Remove left and right rear heat baffle plates.

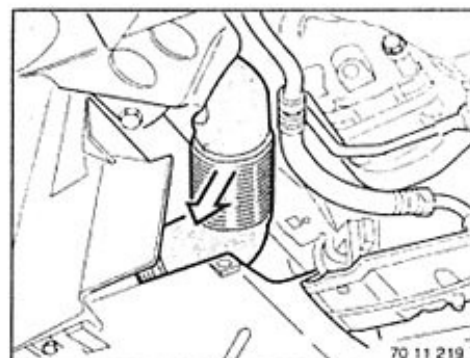


Remove adjustment plate and drive belt from air conditioning compressor, see 64 52 020.

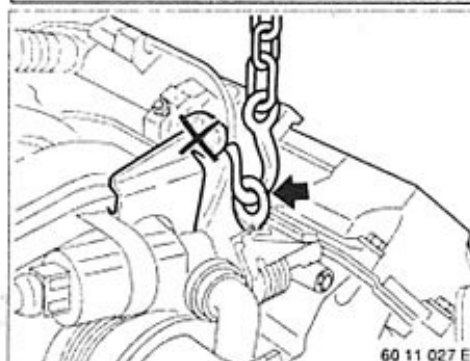


Unfasten air conditioning compressor from mounting bracket, see 64 52 020.

Note:
Lines remain connected.



Remove cooling air guide for 3-phase alternator.



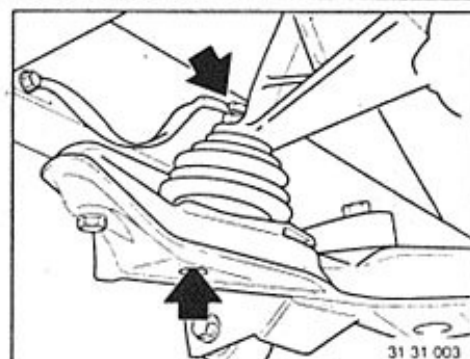
Lift up front of engine with special tool 00 0 200.

Important!
Note  between engine and splash guard.

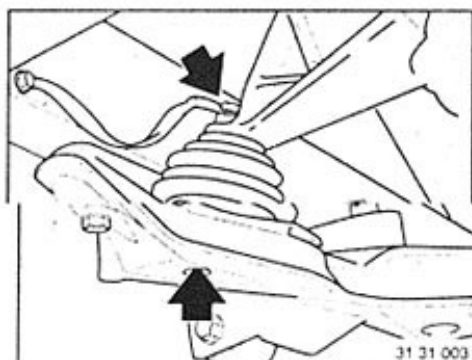
Remove alternator drive belt, see 11 28 010.

Unfasten vane pump from bracket, see 32 41 060 Repair Instructions for the 7 Series E32.

Note:
Lines remain connected.



Remove right engine mount.

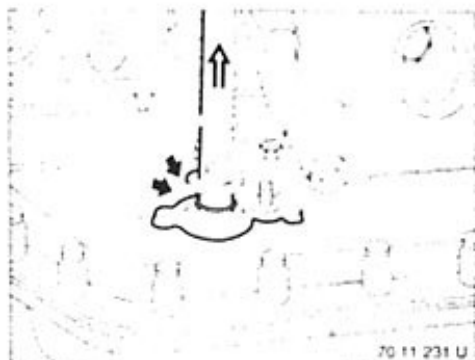


Unscrew left and right engine mounts. Remove ground tape from engine supporting arm.

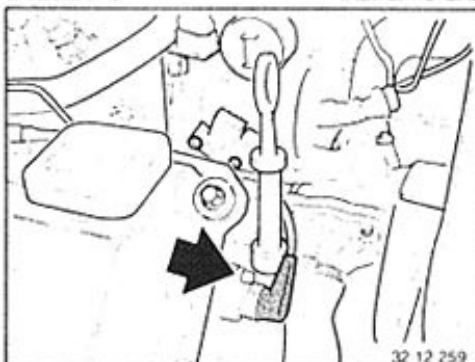
Installation:
Tightening torque 11 81 1AZ / 2AZ*

Unfasten mounting bracket for air conditioning compressor.

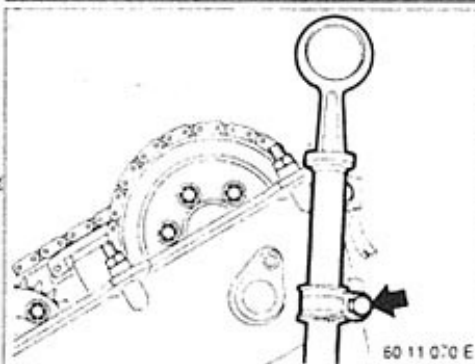
* Refer to Technical Data



Unfasten dip stick guide from oil pan.



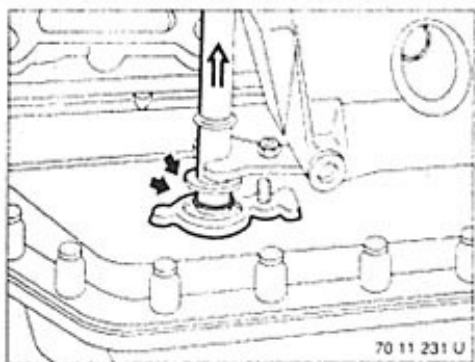
Remove camshaft sensor.



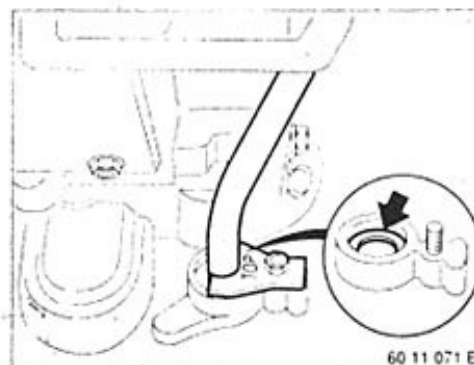
Remove tank venting valve from bracket, see 13 90 500.

Unfasten top of dip stick guide.

Unfasten water hose from bracket between expansion tank and water pump.

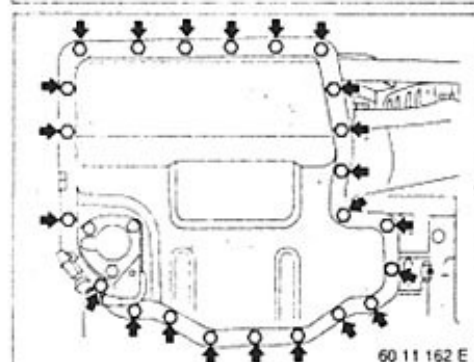


Remove dip stick guide by pulling upwards.



Installation:

Pull water hose to one side.
Place disc and O-ring in oil pan bore.
If necessary, replace O-ring.



Remove complete lower section of oil pan, see 11 13 020.



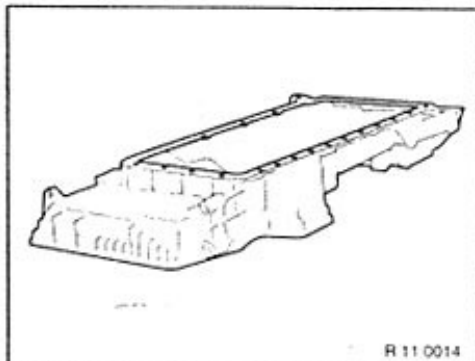
Remove return line between oil filter and oil pan.

Installation:

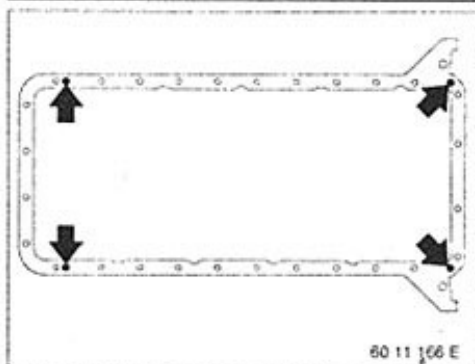
Replace the sealing ring.

Remove oil lines for automatic transmission from vane pump.

Remove oil pump, see 11 41 000.



Unfasten screws in oil pan.
Remove upper section of oil pan by pulling forwards.



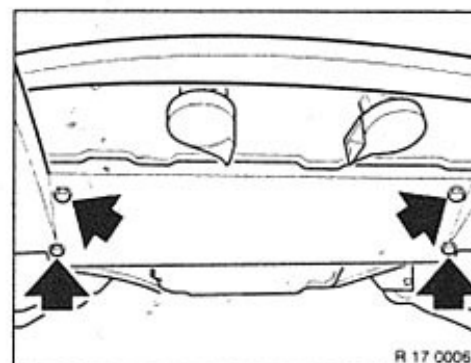
Installation:
Clear sealing faces of gasket residue and clean.
Coat contact edges of sealing face with liquid sealing compound Hylomar SQ 32 M**
Replace seal.

Installation:
Insert all screws in oil pan.
Fit screws on transmission end without preload. Tighten screws on engine end.
Tighten screws on transmission end.

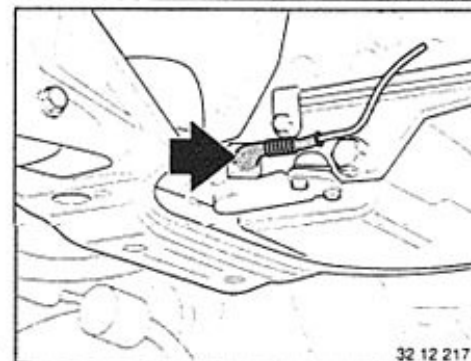
11 13 020 Removing and installing or replacing lower section of oil pan

M 60

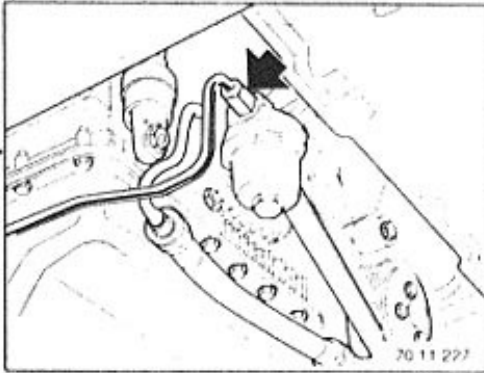
Drain engine oil.
This operation is described in the section on the BMW engine oil service, see 00 00 249.



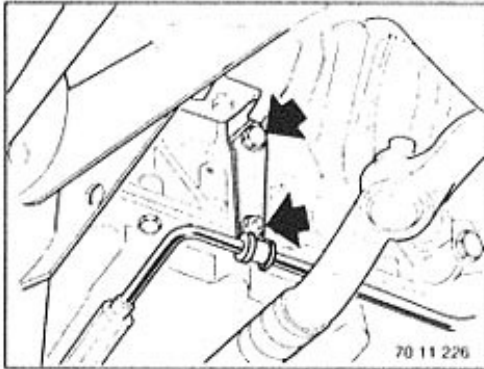
Remove underbody protection from engine.



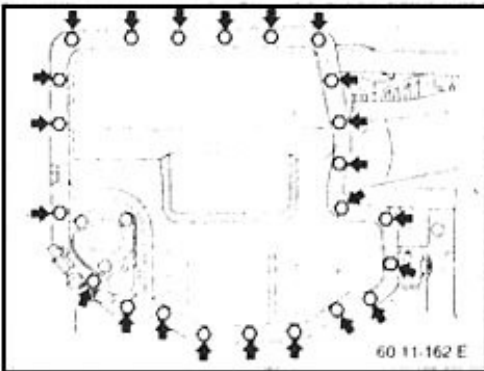
Disconnect plug connection on oil level switch.



If necessary, unfasten hydraulic line for ASC+T from filter.



Unfasten hydraulic line from lower section of oil pan.



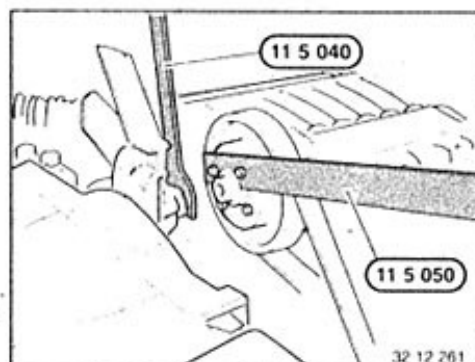
Unfasten screw connection from lower section of oil pan.

Installation:
Clean sealing faces and fit new gasket.

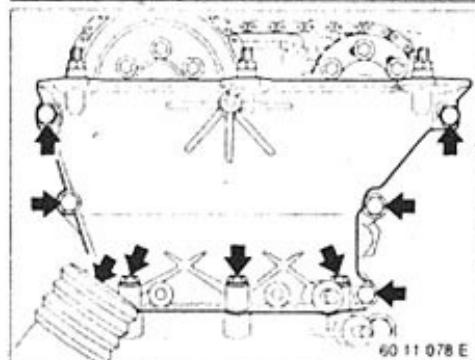
11 14 080 Removing and installing, sealing or replacing top left timing case cover

M60

Remove left cylinder head cover. This operation is described in the section removing and installing / sealing both cylinder head covers, see 11 12 004.

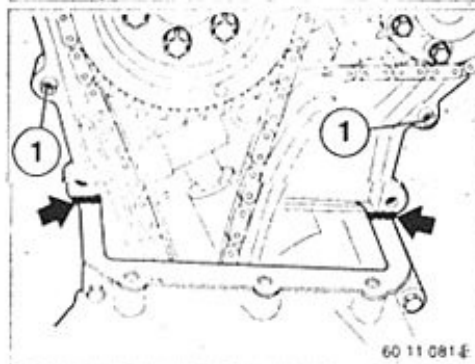


Remove fan cowl.
Use special tool 11 5 040 and 11 5 050.



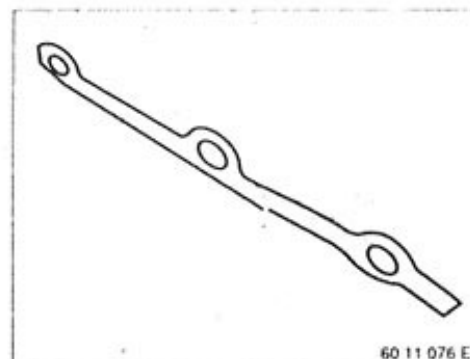
Disconnect positive battery lead from alternator, unfasten retaining screws from protective pipe and place line to one side.

Unscrew bolt connection on timing case cover.



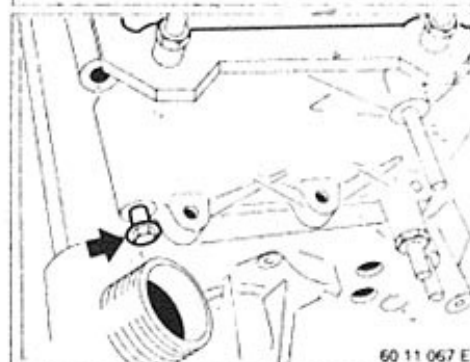
Installation:
Ensure that hollow dowels are correctly located (1).
Coat the edges of the joint between cylinder head and cylinder head gasket with liquid sealing compound Hylomar SQ32 M**.

* Source of Supply: BMW Parts Service



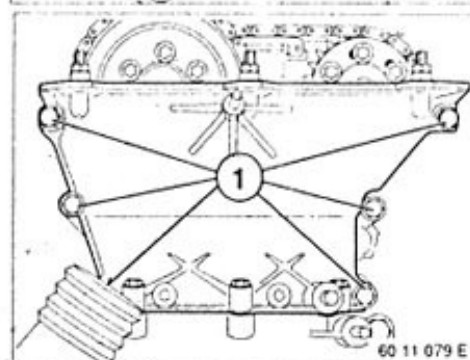
Installation:
Sealing faces clean and free of oil.
Replace gasket.

Caution!
Remove protective film.

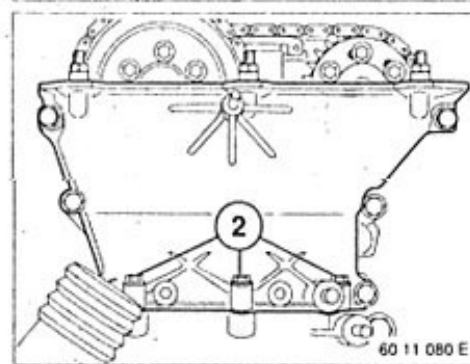


Installation:
Ensure that gaskets are correctly seated, fit timing case cover with screw inserted.

Caution!
It is not possible to install the screw afterwards.



Installation:
Install all screws.
Tighten screw connection (1) until flush with cylinder head.

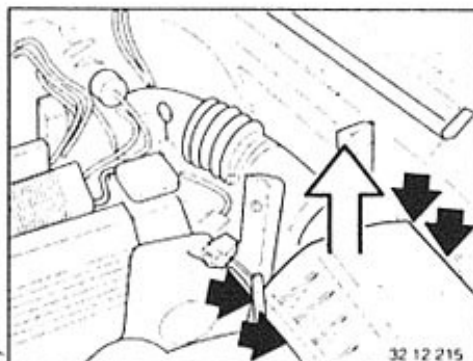


Installation:
Tighten screw connection (2) on timing case cover in two stages.
Then tighten the screw connection to the cylinder head in two stages.

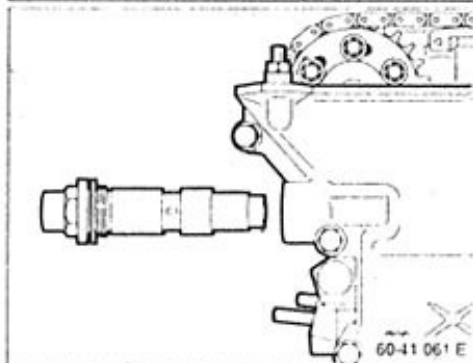
11 14 085 Removing and installing, sealing or replacing top right timing case cover

M60

Remove right cylinder head cover. This operation is described in the section on removing and installing / sealing both cylinder head covers, see 11 12 004 .

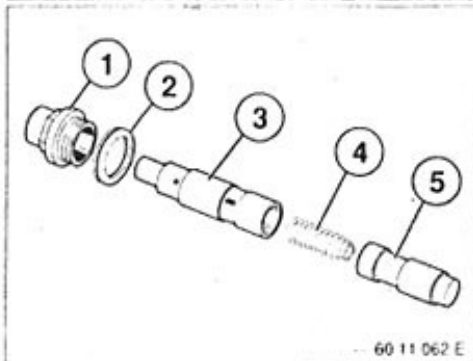


Remove upper section of air intake housing with mass air flow sensor.



Remove chain tensioner.

Installation:
Replace seal.
Tightening torque 11 31 7AZ*

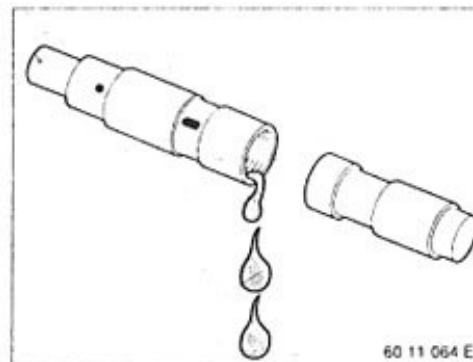


Arrangement of components:

- (1) Screw plug
- (2) Sealing ring
- (3) Sleeve
- (4) Recoil spring
- (5) Hydraulic piston

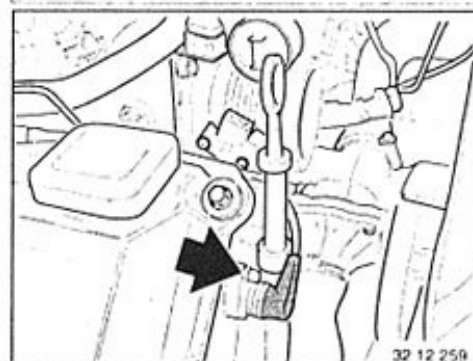
Installation:
Tapered end of recoil spring (4) points towards hydraulic piston (5).

* Refer to Technical Data

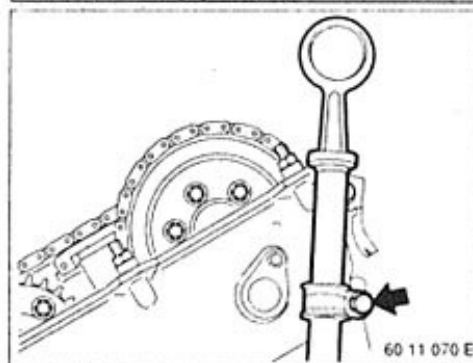


Installation:
To facilitate assembly operation, drain oil chamber between sleeve and hydraulic piston.

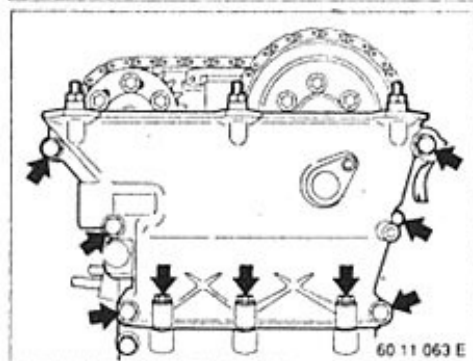
Replace the sealing ring.
Tightening torque 11 31 7AZ*



Remove camshaft sensor.

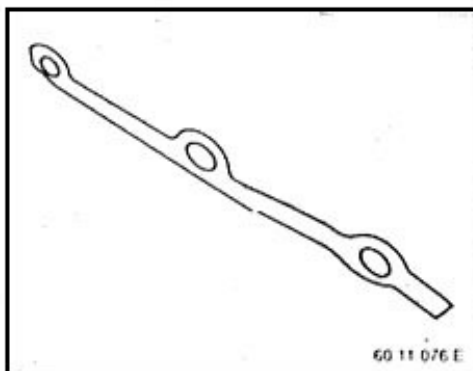


Unfasten upper screw on dipstick guide.



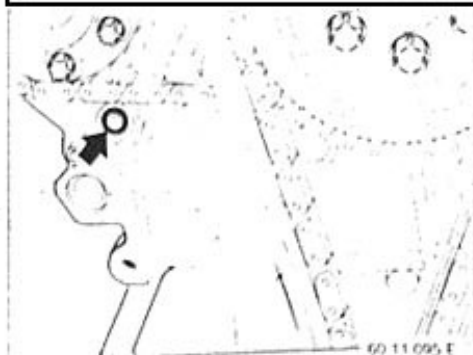
Unfasten screws in timing case cover.

* Refer to Technical Data

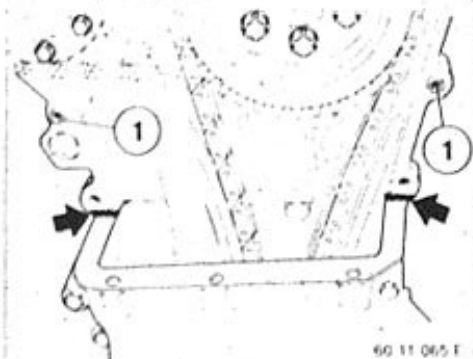


Installation:
Sealing faces clean and free of oil.
Replace gasket.

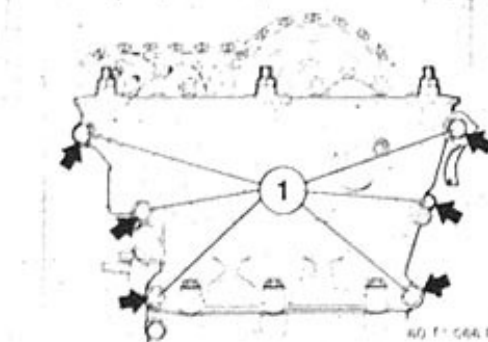
Caution!
Remove protective film.



Caution!
Replace sealing ring in cylinder head for oil supply of chain tensioner.



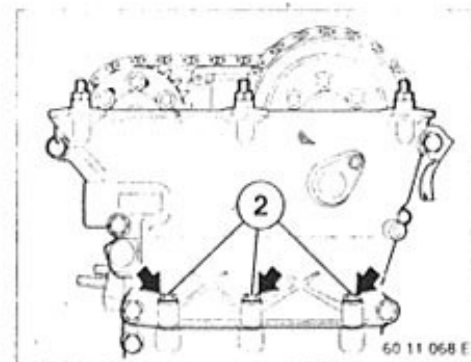
Installation:
Ensure that hollow dowels are correctly located (1).
Coat the edges of the joint between cylinder head and cylinder head gasket with liquid sealing compound Hylomar SQ32 M**.



Installation:
Ensure that gaskets are correctly seated.
Fit timing case cover.
Install all screws.

Fit screw connection flush to cylinder head (1).

** Refer to BMW Parts Service



Installation:
Tighten screws on timing case cover (2) in two stages.
Then tighten the remaining screws (1) in two stages.

11-14 141 Replacing radial seal in
lower timing case cover

M60

Refer to Repair Instructions for the 5 Series
E34.

11 14 151 Replacing radial crankshaft
seal

Transmission side

M60

Refer to Repair Instructions for the 5 Series
E34.

11-22/10

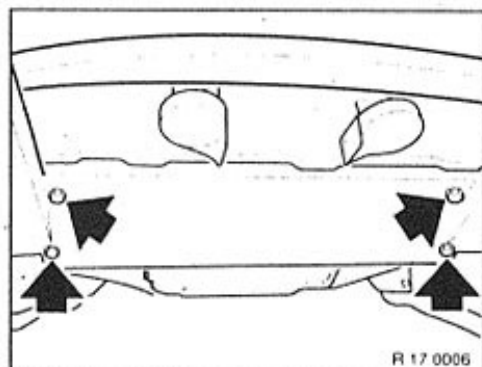
11 22 000 Removing and installing or
replacing the flywheel

M60

Refer to Repair Instructions for 5 Series E34.

11 23 010 Removing and installing or replacing vibration damper

M60



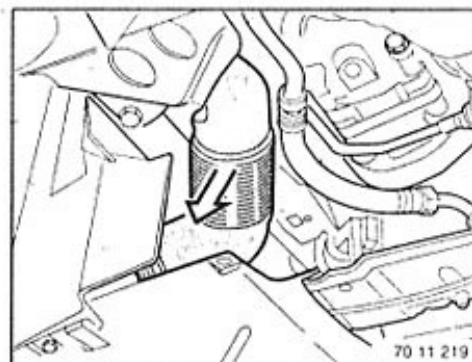
Remove underbody protection from engine.

Subsequent procedure, see Repair Instructions for 5 Series E34.

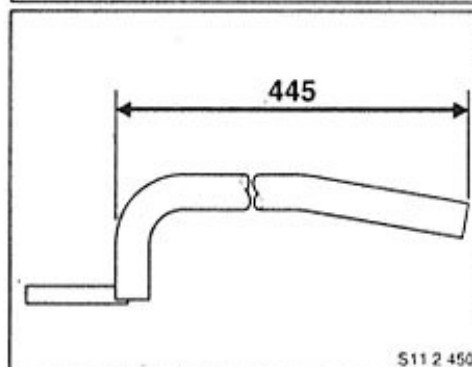
11 23 031 Removing and installing or replacing hub for vibration damper

M60

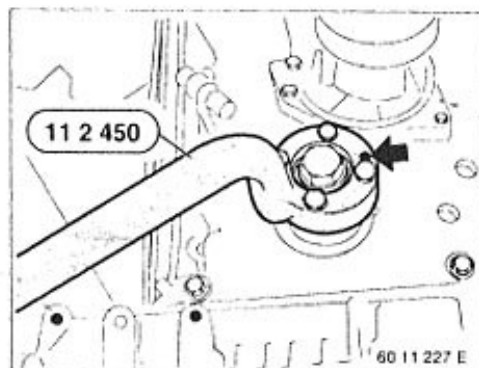
Remove vibration damper, see 11 23 010.



Remove cooling air duct for 3-phase alternator.

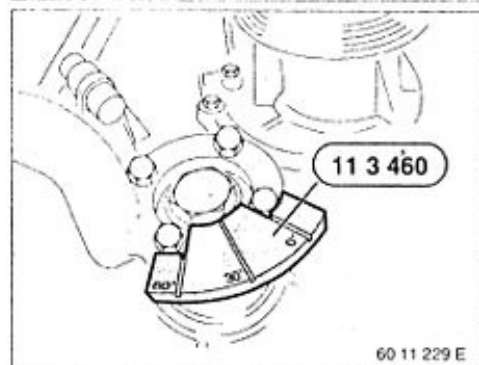


If necessary, shorten end of special tool 11 2 450 to the specified dimension.



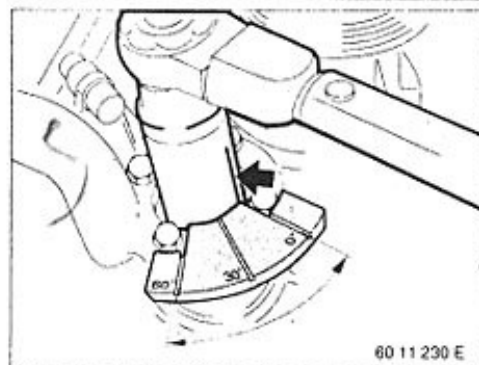
Caution!
Note dowel pin.

Screw special tool 11 2 450 firmly to hub of vibration damper.
Unfasten central screw.



Installation:
Attach special tool 11 3 460 to special tool 11 2 450.

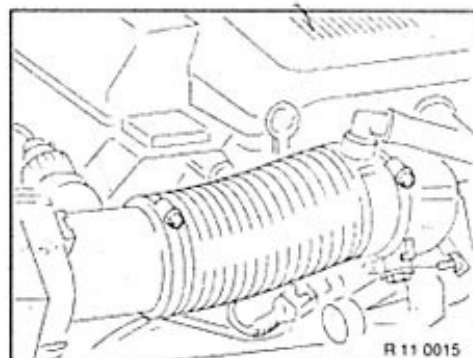
Note:
Special tool 11 3 460 is magnetic.



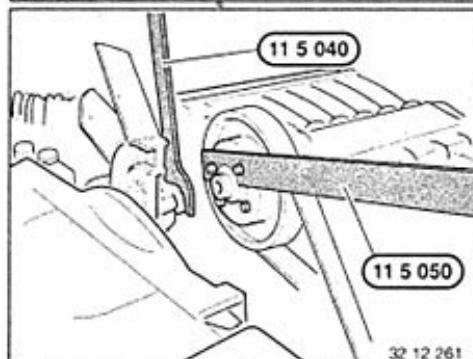
Installation:
Tighten central screw to jointing torque.
Tightening torque 11 23 2AZ*
Select 0° position and mark on the socket head.
Tighten central screw with torsion angle.
Tightening torque 11 23 2AZ*

11 28 010 Replacing drive belt for alternator

M60



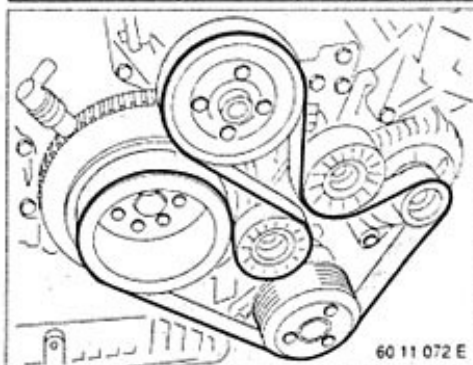
Remove hose from idle speed actuator and remove gaiter between throttle body and mass air flow sensor.



Remove fan.
Use special tools 11 5 040 and 11 5 050.

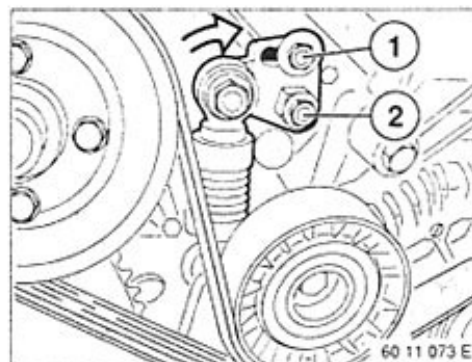
Caution!
Counterclockwise thread

Installation:
Tightening torque 11 52 1AZ*



Arrangement of drive belt guide.

* Refer to Technical Data

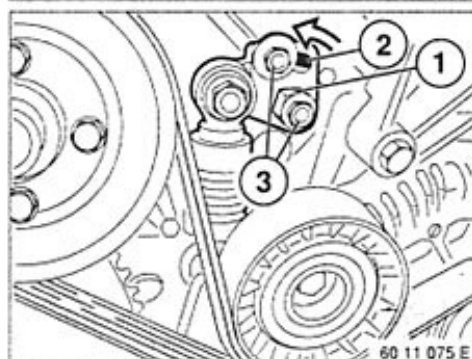


Unfasten nuts (1) and (2) and relieve tension on belt drive.
Remove Vee belt.

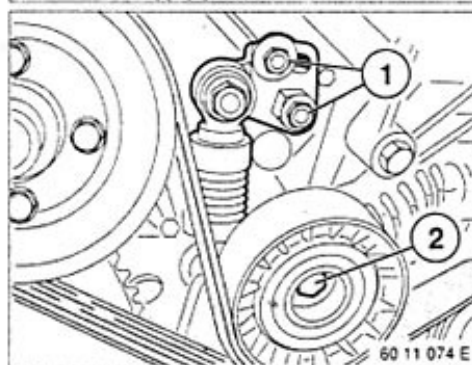
Installation:
Check Vee belt for coolant and oil residue, replacing if necessary.



Caution!
Always replace Vee belt if contaminated with hydraulic oil.



Installation:
Fit Vee belt and check that pulley wheels are correctly located.
Preload adjusting plate on hex head (1) until it contacts the end of the long bore (2) and tighten nuts (3).



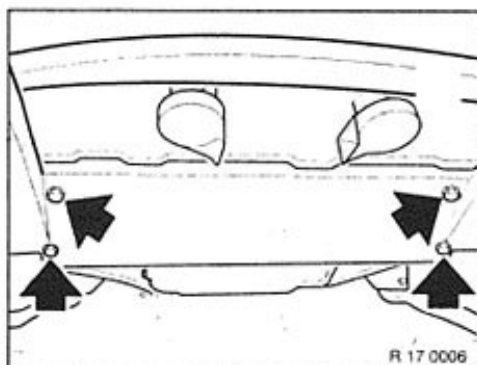
Note:
To remove the complete belt tensioning fixture, unfasten nut (1) and screw (2).

11 31 010 Adjusting timing of camshaft(s)

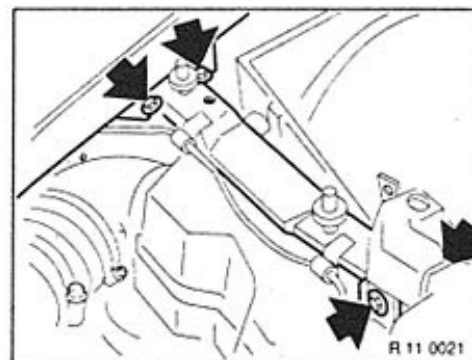
M60

Remove active carbon filter,
refer to 16 12 010

Remove pop-up headlights,
refer to 63 12 460



Remove underbody protection from engine.

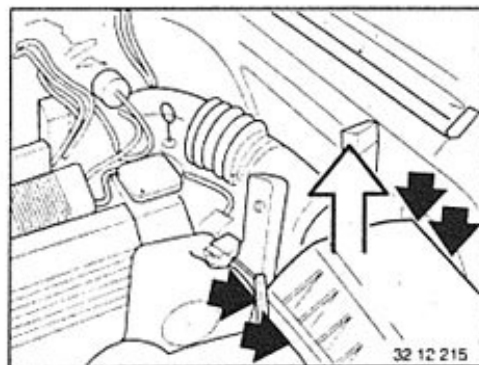


Remove support for pop-up headlights.
Remove complete lower section of air intake
filter housing.

Unfasten air-conditioning compressor from
mounting block,
refer to 64 52 020

Note:
Lines remain connected.

Subsequent procedure,
refer to 11 31 010
Repair Instructions for 7 Series E38



Remove complete upper section of air intake
filter together with mass air flow sensor.

11 31 011 Replacing left camshaft

(Inlet or exhaust side, as applicable)
Cylinder bank 5 - 8

M60

Preliminary work in accordance with "Adjusting timing of camshaft(s)",
refer to 11 31 010

Subsequent procedure,
refer to 11 31 011
Repair Instructions for 7 Series E38

11 31 015 Replacing right camshaft

(Inlet or exhaust side, as applicable)
Cylinder bank 1 - 4

M60

Perform preliminary work in accordance with
"Adjusting timing of camshaft(s)"
refer to 11 31 010

Subsequent procedure,
refer to 11 31 015
Repair Instructions for 7 Series E38

11-41/10

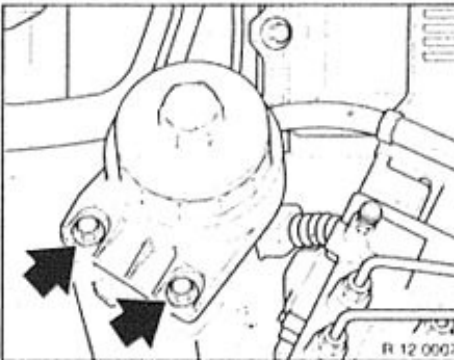
11 41 000 Removing and installing or
replacing oil pump

M60

see Repair Instructions for 5 Series E34.

11 42 020 Removing and installing, sealing or replacing complete full-flow oil filter

M60

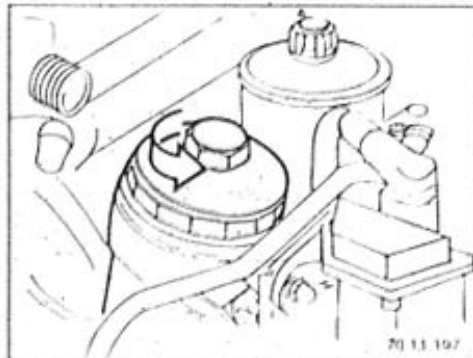


Unfasten full-flow filter housing and lift out of bracket.

Installation:

If necessary, replace oil filter.

Check oil level and top up oil if necessary.



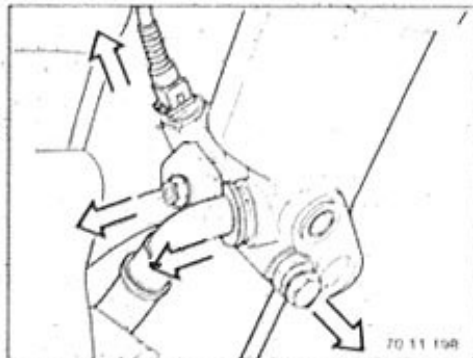
Note:

Do not damage full-flow oil filter cover: only open and tighten using a socket nut. Unfasten full-flow filter cover to enable engine oil to flow back into the oil pan.

Installation:

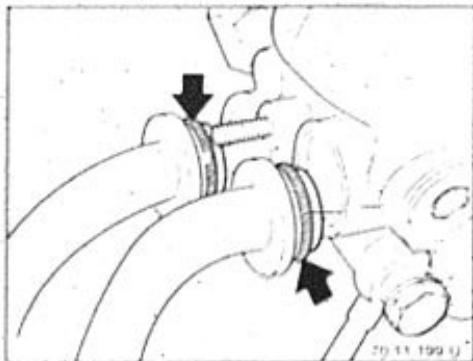
Fit new seal.

Tightening torque 11 42 2AZ*



Disconnect plug connection on oil pressure switch.

Remove oil lines from full-flow filter housing.



Installation:

Fit new seals.

* Refer to Technical Data

**11 51 000 Removing and installing or
replacing water pump**

M60

Remove coolant hose between expansion tank
and water pump.

For subsequent procedure,
see Repair Instructions for 5 Series E34.

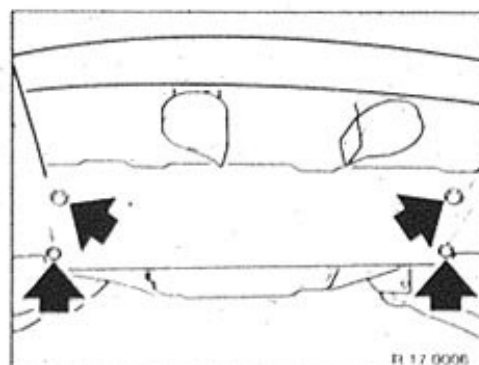
**11 51 011 Replacing pulley wheel on
water pump**

M60

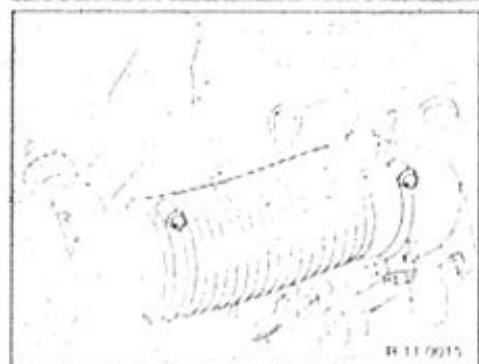
see Repair Instructions for 5 Series E34.

11 53 000 Removing and installing or replacing coolant thermostat

M60



Remove underbody protection from engine.

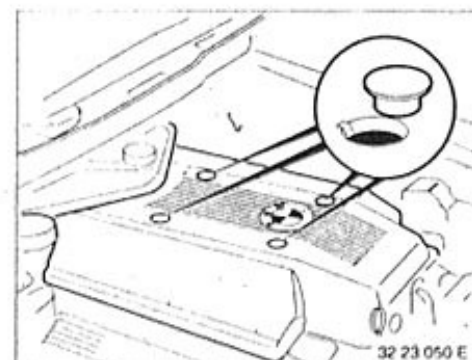


Remove hose to idle speed actuator and remove gaiter between throttle body and mass air flow sensor.

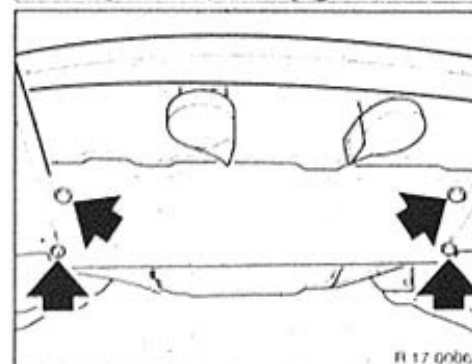
Subsequent procedure, see Repair Instructions, 5 Series E34.

11 53 325 Removing and installing or replacing coolant manifold

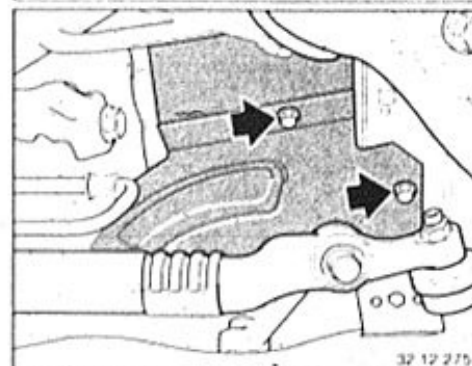
M60



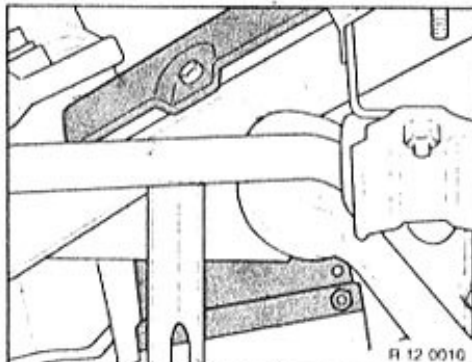
Lever clips off manifold cover. Unfasten screws. Remove cover together with acoustic insulation.



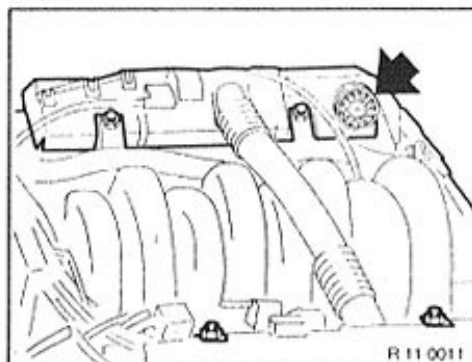
Remove underbody protection from engine.



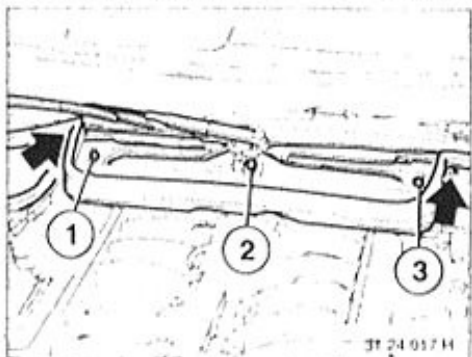
Remove left and right heat baffle plates from front axle carrier.



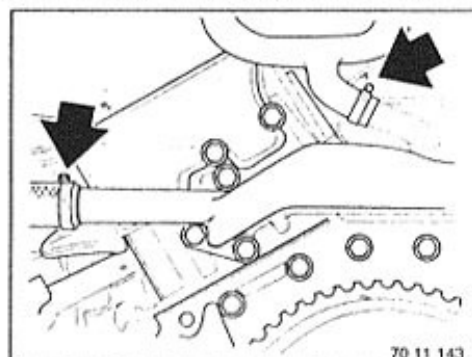
Remove rear left and right heat baffle plates.



Disconnect engine connector from left and right cable ducts.

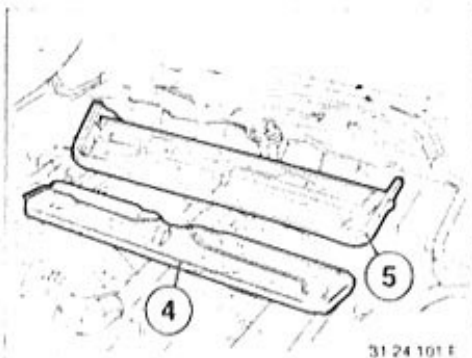


Partially remove rubber seal from air manifold. Twist retainers (1...3). Unscrew and remove screws on left and right sides.

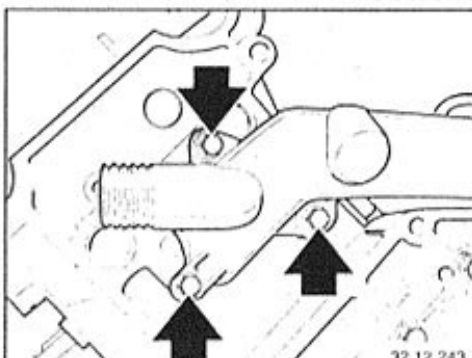


Drain off coolant, see 17 00 039.

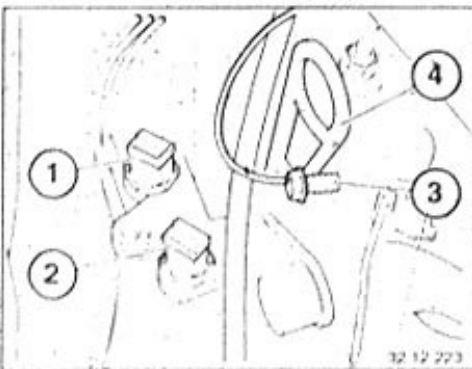
Remove coolant hoses from coolant manifold.



Lift out trim section (4) and microfilter (5).

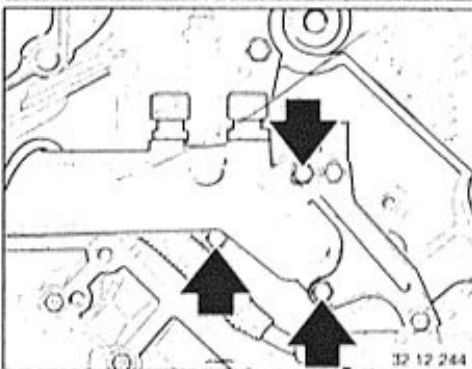


Unfasten screw connection from coolant manifold.



Disconnect plug connections:
(1) Temperature sensor for remote thermometer (black)
(2) Temperature sensor for control unit on Digital Motor Electrics (white)

Unscrew beside engine mount (4) behind shared ground wire for the ignition coils (3).



Unfasten screw connection on coolant manifold.

Installation:
Clean sealing faces and replace gaskets.

Top up coolant.
Bleed cooling system and check for leaks, see 17 00 039.

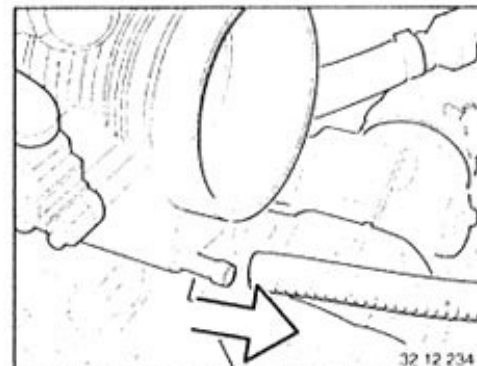
11 61 050 Removing and installing air intake manifold

M60

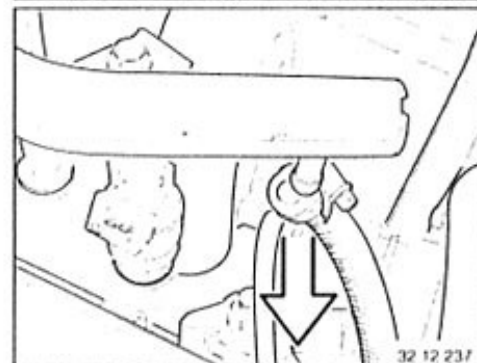
Interrogate fault memory.
Switch off ignition.

Remove left and right cable duct.
These operations are described in the section on Removing Both Cylinder Heads, see 11 12 004.

Disconnect accelerator cable and Bowden cable from ASC throttle valve.
This operation is described in Removing and Installing the Engine, see 11 00 050.

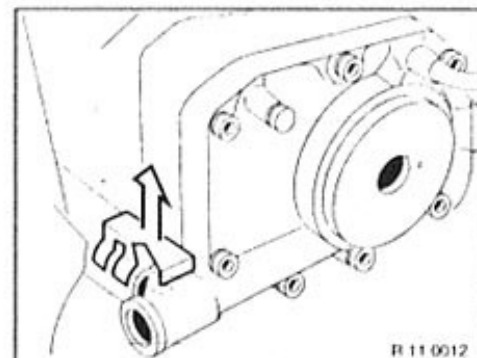


Remove tank vent hose from throttle body.



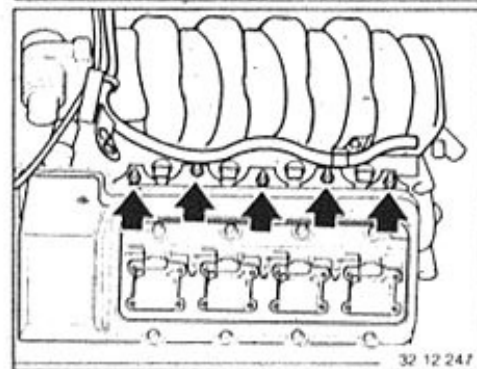
Caution!
Catch escaping fuel.

Remove fuel inlet and return lines from injection tube.

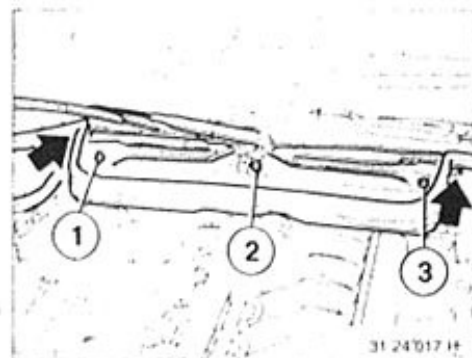


Remove clips and slide tube for engine venting forwards.

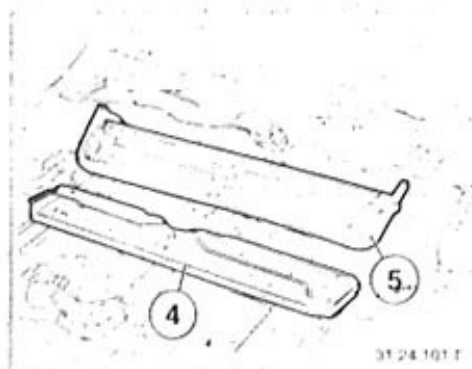
Installation:
Check seal and replace if necessary.



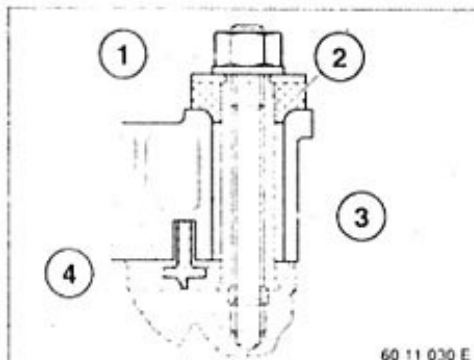
Loosen nuts.
Remove decoupling units, then remove intake air manifold by lifting upwards.



Partially remove rubber seal from air manifold.
Twist retainers (1 ... 3).
Unscrew and remove left and right screws.



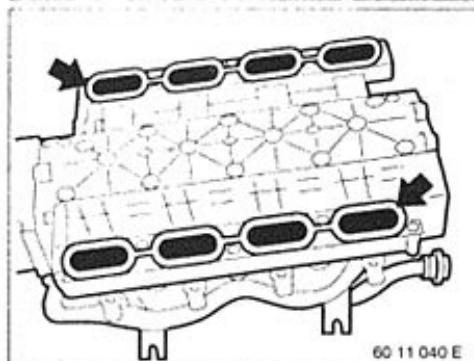
Lift out trim section (4) and microfilter (5).



Note:
The intake air manifold is separated from the cylinder head by decoupling units and gaskets (vibration damping).
(1) Nut
(2) Decoupling unit
(3) Intake air manifold
(4) Gasket



Installation:
Fit two decoupling units on left and right with nut - not under preload - and align the intake air manifold.
Fit all the other decoupling units with nut and tighten crosswise, radiating outwards from the center.
Tightening torque 11 61 1AZ*

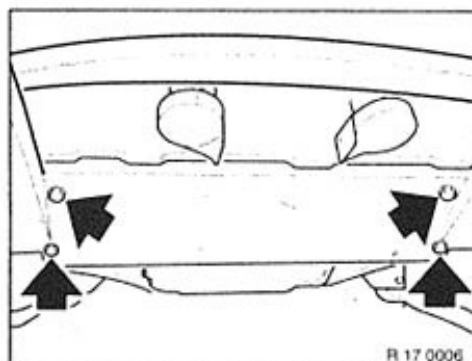


Installation:
Check gaskets and replace if necessary.
Ensure that the gaskets are correctly seated.

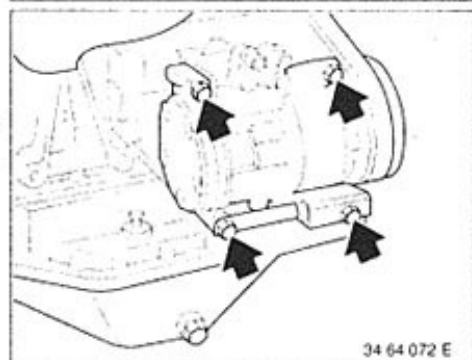
11 62 142 Removing and installing or replacing both left exhaust manifolds

M60

Remove complete exhaust unit, see 18 00 020.



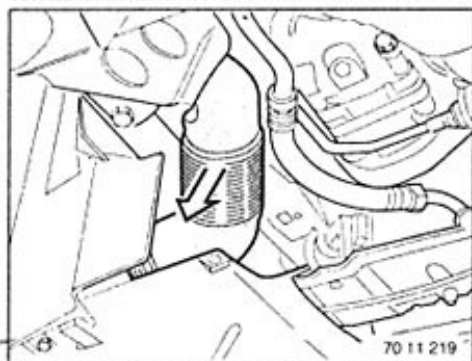
Remove underbody protection from engine.



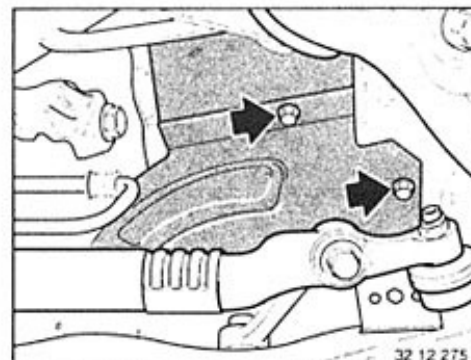
Remove drive belt from air conditioning compressor, see 64 52 020.

Unfasten air conditioning compressor from mount, see 64 52 020.

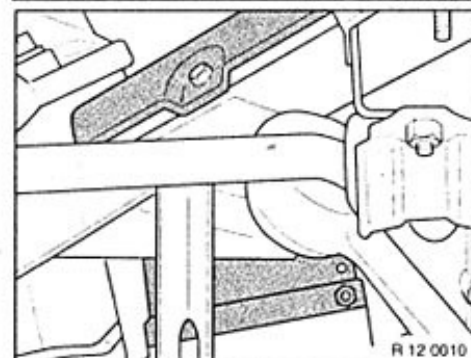
Note:
Lines remain connected.



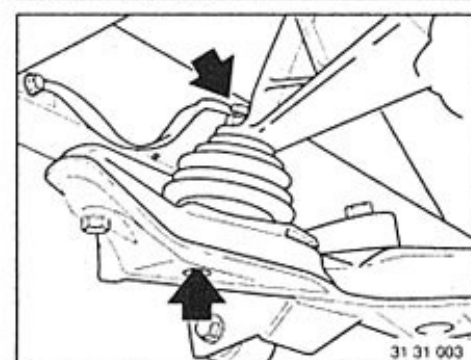
Remove cooling air guide for 3-phase alternator:



Remove left and right heat baffle plates from front axle carrier.

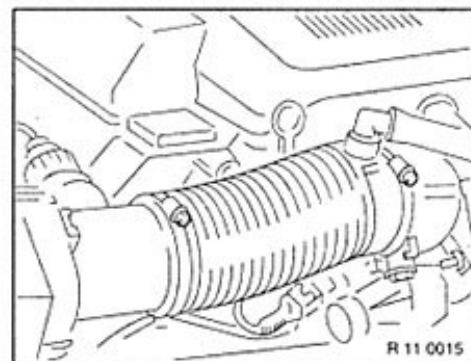


Remove left and right heat baffle plates.



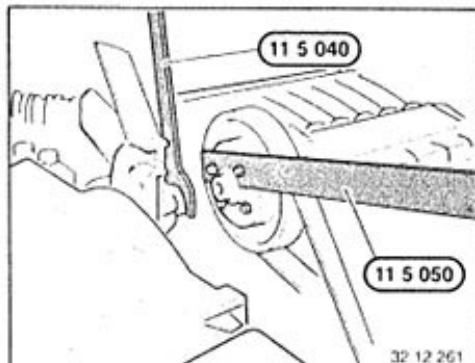
Unfasten left and right engine mount.
Remove ground tape from engine support arm.

Installation:
Tightening torque 11 81 1AZ*



Remove hose to idle speed actuator and remove gaiter between throttle body and mass air flow sensor.

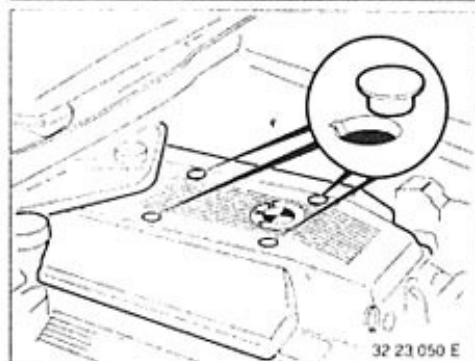
* Refer to Technical Data



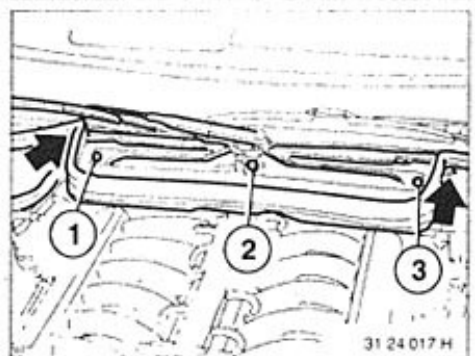
Remove fan wheel.
Use special tool 11 5 040 and 11 5 050.

Caution!
Counterclockwise thread

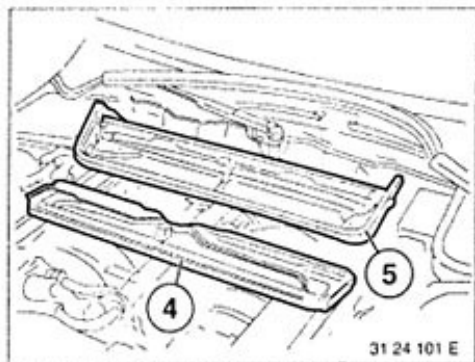
Installation:
Tightening torque 11 52 1AZ*



Lever clips out of manifold cover.
Unfasten screws.
Remove cover and acoustic insulation.

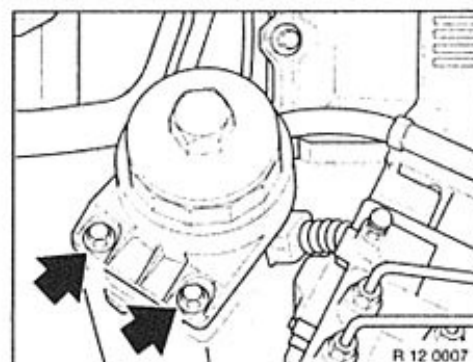


Partially remove rubber seal from air manifold.
Twist retainers (1 ... 3).
Unscrew and remove left and right screws.

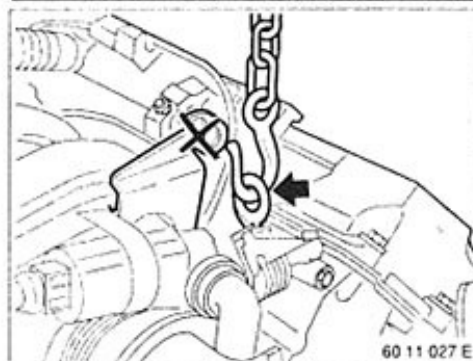


Lift out trim section (4) and microfilter (5).

* Refer to Technical Data

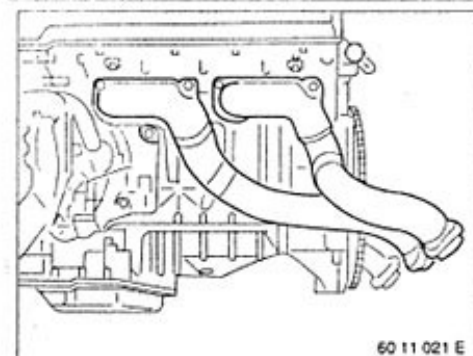


Disconnect full-flow oil filter.



Raise engine at front with special tool 00 0 200.

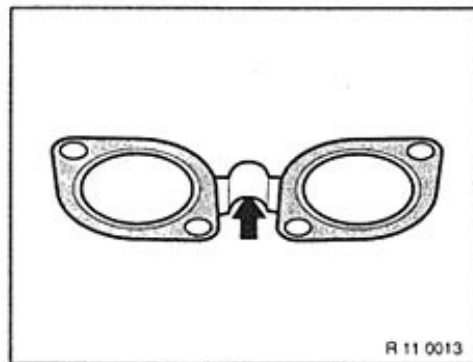
Caution!
Note distance between engine and splash guard.



Completely unfasten screw connections on both exhaust manifolds.
Remove both exhaust manifolds from below.

Note:
Unfasten screw connection on exhaust manifold for cylinders 7/8 from below.

Installation:
Tightening torque 11 62 1AZ*



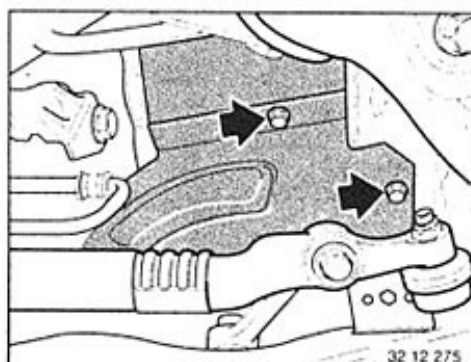
Installation:
Replace gaskets.
Sealing bead faces the exhaust manifold.

* Refer to Technical Data

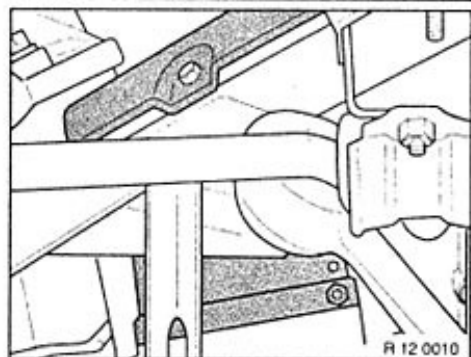
11 62 143 Removing, installing or replacing both exhaust manifolds

M60

Remove complete exhaust system, see 18 00 020.



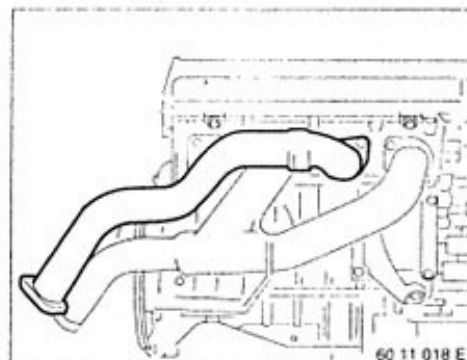
Remove left and right heat baffle plates from front axle carrier.



Remove left and right heat baffle plates from rear.

Remove active carbon filter, see 16 12 010.

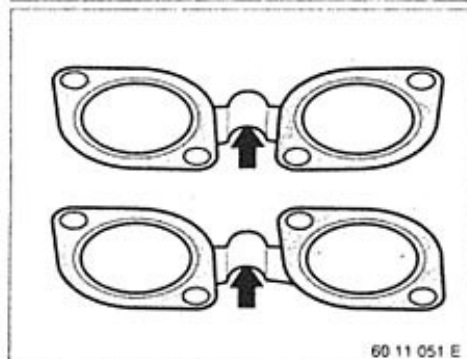
Remove both heat baffle plates from engine support.



Completely unfasten screw connection on both exhaust manifolds. Remove both exhaust manifolds by lifting upwards.

Note:
Unfasten screw connection on exhaust manifold for cylinders 2/4 from below.

Installation:
Tightening torque 11 62 1AZ*



Installation:
Replace gaskets. Sealing bead faces exhaust manifold. Install gaskets from below.