

12 Engine Electrical Equipment

	Working instructions for Ignition and DME (Digital Motor Electronics)	12-00/1
	Working instructions for removal/installation of electronic control units	12-00/1
	Synchronization of cylinder banks on M 70 engine	12-00/2
12 11 094	Distributor caps - replace	12-11/1
114	Distributor rotors - replace	12-11/2
12 12 011	Spark plugs - replace	12-12/1
072	Spark plug connector - replace	12-12/2
151	Shielded connector - replace	12-12/2
12 13 009	Ignition coil - check	12-13/1
011	Ignition coil - replace	12-13/2
12 14 ...	Cylinder identifying sender - check	12-14/1
150	Cylinder identifying sender - replace	12-14/1
...	Pulse sender - check	12-14/2
152	Pulse sender for left cylinder bank - replace	12-14/2
153	Pulse sender for right cylinder bank - replace	12-14/4
12 31 009	Alternator and voltage regulator - check	12-31/1
020	Alternator - remove and install	12-31/2
...	Drive belt - tighten	12-31/5
12 32 000	Voltage regulator - replace	12-32/1

12 Engine Electrical Equipment

12 41 020	Starter – replace	12-41/1
12 70 500	External safety path – check	12-70/1
12 71 530	Electronic engine power control unit – replace	12-71/1
12 72 520	Pedal value sender – remove and install or replace	12-72/1
550	Pedal value sender kinematic – check and adjust	12-72/3
	On-board diagnosis	12-73/1
	Fault code example: NTC coolant	12-73/1
	Fault code table	12-73/2

12-00/1

INSTRUCTIONS FOR REMOVING AND INSTALLING ELECTRONIC CONTROL UNITS

Important!

Disconnecting the car's battery will erase the fault memories of control units.

Consequently always interrogate the fault memories and have the faults printed with the printer of a BMW SERVICE TESTER before disconnecting the car battery.

Investigate stored faults.

The Ignition must always be switched off first before disconnecting or connecting control unit plugs.

Faults could be stored in the fault memories of control units with self diagnosis by removing and installing components, relays, fuses and so on.

Consequently always interrogate the fault memories after working on the electrical system. Investigate and erase stored faults.

INSTRUCTIONS FOR WORKING ON IGNITION, DIGITAL MOTOR ELECTRONICS (DME) AND ENGINE ELECTRICAL SYSTEMS

Safety Information:

Always switch off the Ignition first before working on an Ignition system — dangerous high tension voltage!

Always remove the DME master relay for compression tests to prevent activation of Ignition coils by the final Ignition stages of the DME control unit — dangerous high tension voltage!

Always switch off the Ignition before connecting or disconnecting the Service Tester, other testers or adapters as well as replacing components!

- The secondary end (high tension end) of the Ignition system must be loaded with at least 4 k Ω .
- The engine must never be started after removing the distributor cap or disconnecting the lead on Ignition coil terminal 4.
- Never connect a shielded capacitor or test lamp on terminal 1 of the Ignition coil.
- The electric lead from terminal 1 of the Ignition coil must never be connected with ground or B+. Consequently terminal 1 lead must not be used for engine starting interlock when service installing a burglar alarm system.
- The engine must never be started when the secondary circuit is disconnected, i.e. when spark plug connectors are pulled off of spark plugs and ground connection (terminal 4a).
- Never disconnect the battery or leads on the alternator and starter while the engine is running.

12-00/2

SYNCHRONIZATION OF BANKS OF M 70 ENGINE CYLINDERS

The following information is important when replacing Motronic control units or the EML control unit.

Each control unit is programmed with certain basic values, which are only mean values.

A control unit receives various input values depending on engine load conditions and compares them with the stored values.

An adaptive system compares the input values with stored curve family values, after which corresponding orders are put out to the concerned control elements.

If, for example, the EML control unit were without current for a long period of time (more than 1 hour), its adaptive system would lose the stored values.

The adaptive system would have to read in and store the input values of a certain engine after restoring operation of an erased control unit or installing a new control unit.

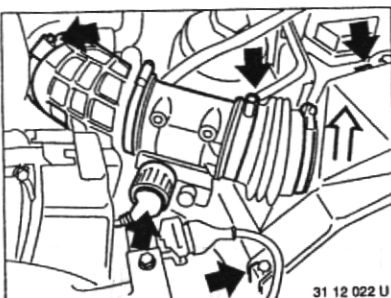
This procedure could lead to erratic idling of the engine after starting and disturbances in overrun.

Consequently there must be conformance with the following procedures before an EML control unit is replaced or after restoring operation of a disconnected control unit.

- Run engine to operating temperature.
Install control unit and drive car. During test drive have the car coast three times from speeds above 5,000 rpm to the idling range in transmission range 1 (approx. 10 seconds).
- Have engine run at idle speed in transmission range P or N at least 5 minutes.

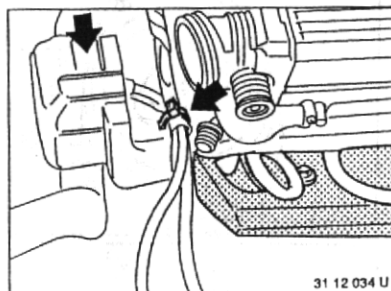
These measures serve immediate and precise synchronization of both banks of cylinders in all operating conditions.

12-11/1



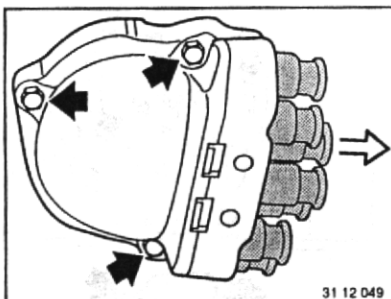
12 11 094 REPLACING BOTH DISTRIBUTOR CAPS

Remove upper air cleaner section complete with air mass sensor.



Loosen wire strap.
Take off cover.

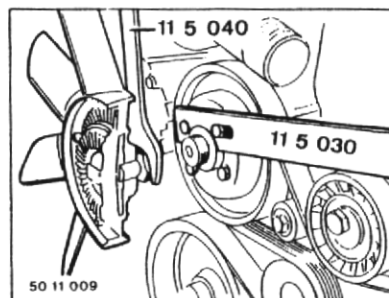
Installation:
Engage cover in holder.



Pull off shielded connector.

Installation:
Numbers on leads and cap (for example 5) must be the same.

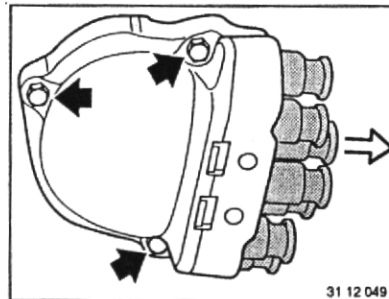
ZS = Ignition coil



Note:
Firing order of M 70 engine is
1-7-5-11-3-9-6-12-2-8-4-10.

Numbers of Ignition leads for bank of
cylinders 7 ... 12 is equal to bank of
cylinders 1 ... 6, i.e.
cylinder 7 = Ignition lead 1,
cylinder 8 = Ignition lead 2
and so on.

Unscrew fan – left-hand threads!
Use Special Tools 11 5 030 / 040.

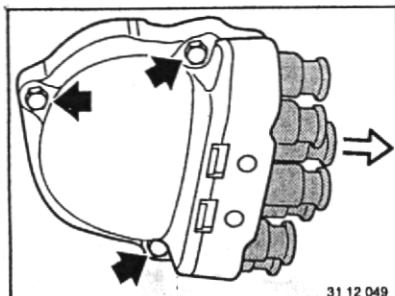


Unscrew screws and take off distributor cap.

Caution!
Danger of cutting hands on radiator fins.

Installation:
Check seal, replacing if necessary.

12-11/2

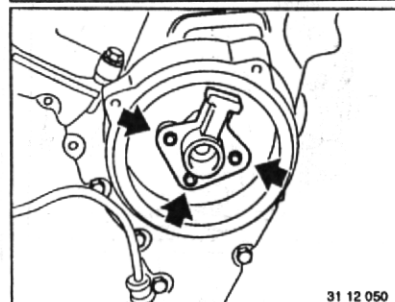


31 12 049

12 11 114 REPLACING BOTH DISTRIBUTOR ROTORS

Remove distributor cap – see 12 11 091.
Remove windshield washing fluid tank when necessary.

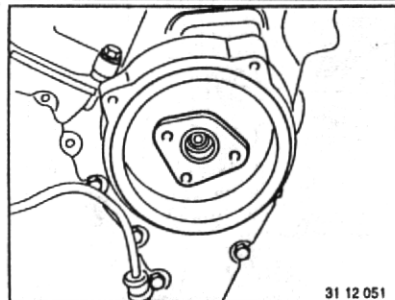
Caution!
Danger of cutting hands on radiator fins.



31 12 050

Unscrew screws with a 3 mm hexagon key.

Installation:
Tightening torque*.



31 12 051

Note:
Measure resistance*.
Check surface and cast compound for cracks and traces of burning.

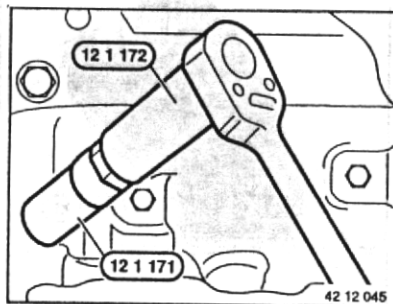
* See Specifications

12-12/1

12 12 011 REPLACING SPARK PLUGS

M 70

Remove windshield washing fluid tank.
Take off spark plug connectors.
Unscrew spark plugs with Special Tool
12 1 170.



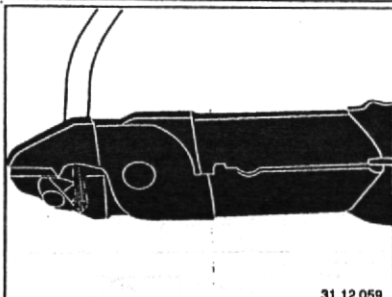
Installation:

Tighten spark plugs with Special Tools
12 1 171 and 12 1 172 = assembled
Special Tool 12 1 170.
Check tightening torque* when work-
ing without Special Tool 12 1 172.

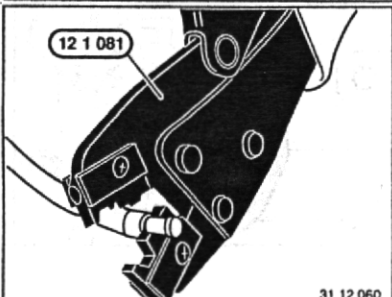
* See Specifications

Diagram showing the connection of a cable to a cable tie. The cable is inserted into the tie, and the tie is secured by a locking mechanism.

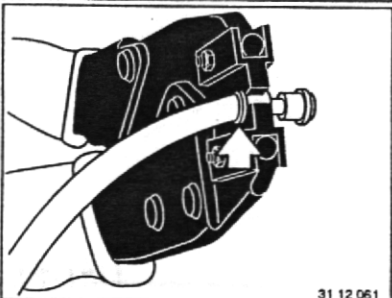
31 12 058



31 12 059



31 12 060



31 12 061

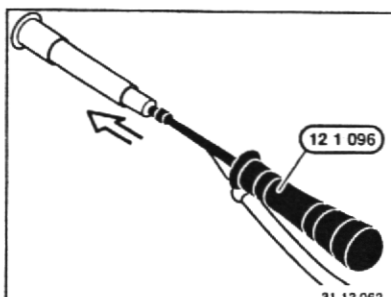
Cut off ignition lead directly behind the connector.
Remove windshield washing fluid tank when necessary.

Strip 6 mm (0.236") of Ignition lead with a stripping pliers^{**}; cross section size of wire = 1.5 mm (0.059").

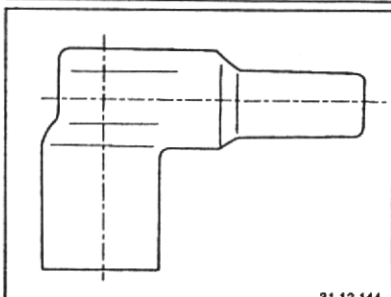
Place connection on Ignition lead and lock on wire end with Special Tool 12 1 081.

Lock connection flush with the insulation.

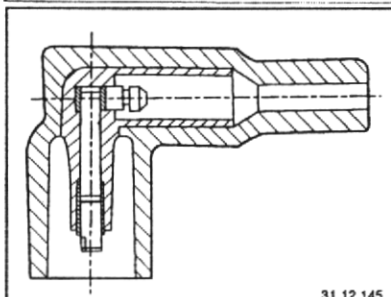
**** Source of Supply: HWB**



31 12 062



31 12 144

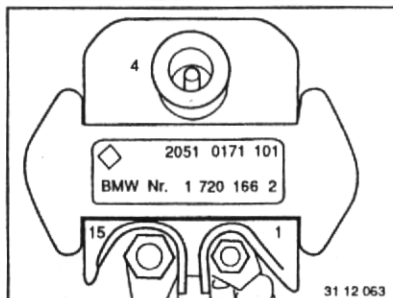
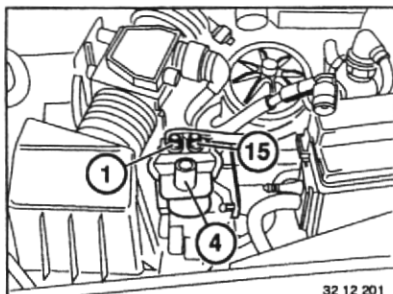


31 12 145

Spray lubricant (Special Tool 12 1 098) on the Ignition lead.
Place connection with Ignition lead in Special Tool 12 1 096.
Guide Ignition lead into spark plug connector until connection is heard to engage in the connector.

See 12 12 072 for procedures.

12-13/1



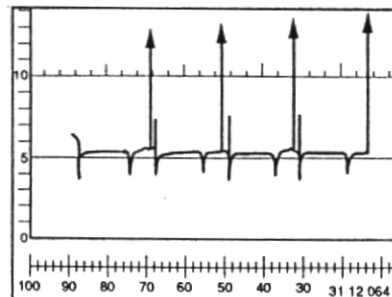
12 13 009 CHECKING IGNITION COIL

Multimeter Test (M 06):
Measure resistance of primary coil terminals 1/15 = $0.5 \text{ k}\Omega \pm 10 \%$ and secondary coil terminals 15/4 = $6 \text{ k}\Omega \pm 10 \%$.

Check cast compound of primary coil plate for hairline cracks.
If a gray material has run out on the edges of the coil plate, this is indication of a faulty final ignition stage in the DME control unit.

M 70:
Use Special Tool 61 2 010 and diagnosis leads to measure the right bank of cylinders 1 ... 6, whereby the oscilloscope receives the triggering signal from DME 1.

Measure the left bank of cylinders 7 ... 12 with Special Tool 61 2 010 and universal diagnosis leads.
Disconnect diagnosis lead from the diagnostic socket to make sure that the oscilloscope does not receive a triggering signal from the wrong bank of cylinders.



Connect BMW SERVICE TESTER in diagnostic socket.
Carry out engine test step 09.
Observe oscillograph: Ignition voltage = 6 ... 14 kV.
Maximum permissible Ignition voltage deviation = 3 kV.

Connection: close to distributor wire plug with high tension clip on lead 4 of ignition coil.
Connect triggering clip (red) on Ignition lead 1 or 7.

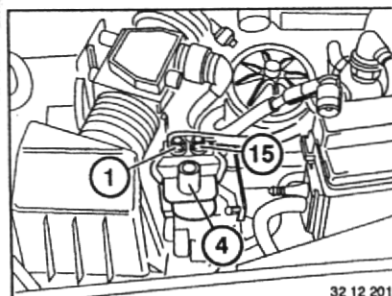
Note:
Numbers of Ignition leads for bank of cylinders 7 ... 12 are equal to bank of cylinders 1 ... 6, i.e. cylinder 7 = Ignition lead 1 and so on.

Bank of Cylinders 7 ... 12:
Connect universal diagnosis leads of tester on the Ignition coil with black clip on terminal 1 and brown clip on vehicle ground.

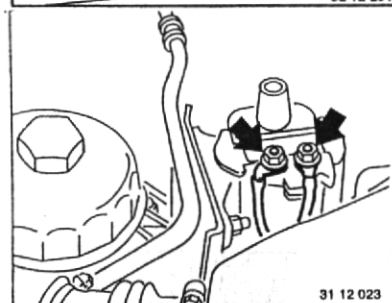
Note:
Mixed up connection of the tester (wrong connection of cylinder bank) could cause very high Ignition voltage deviations, displayed in test step 09.

Note:
Left side cylinder identifying sender on Ignition lead of cylinder 12.
Right side cylinder identifying sender on Ignition lead of cylinder 6.

12-13/2



32 12 201



31 12 023

12 13 011 REPLACING IGNITION COIL

Caution!

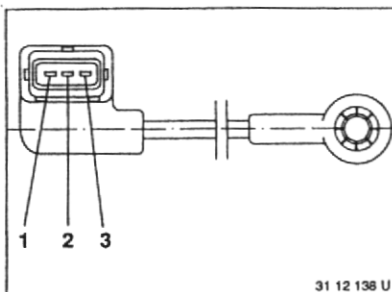
Always switch off the Ignition when working on the Ignition system – dangerous high tension voltage! Refer to Instructions for working on Ignition systems on page 12-0.

Pull off protective cap and Ignition lead (terminal 4).

Unscrew connections (terminals 1 and 15).

Loosen holder and take off Ignition coil.

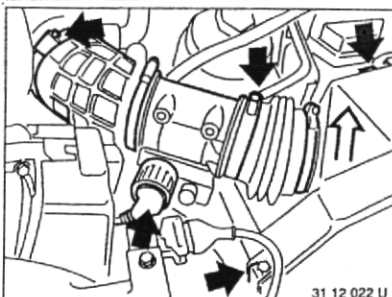
12-14/1



31 12 138 U

12 14 ... CHECKING CYLINDER IDENTIFYING SENDERS

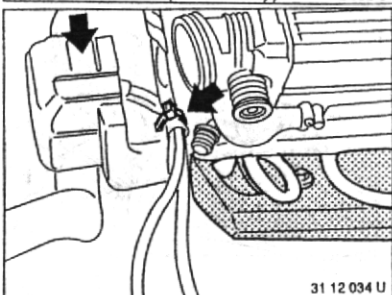
Measure resistance of coil between pins 1 and 2.
Specification: $< 1 \Omega$.
Measure insulation resistance between pins 2 and 3.
Specification: $> 10 M\Omega$.



31 12 022 U

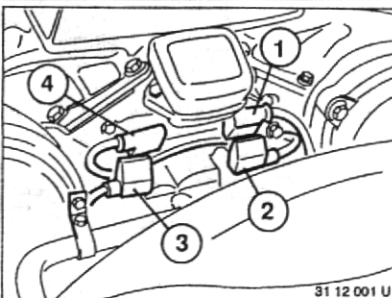
12 14 150 REPLACING CYLINDER IDENTIFYING SENDERS

M 70:
Remove upper air cleaner section complete with air mass sensor.



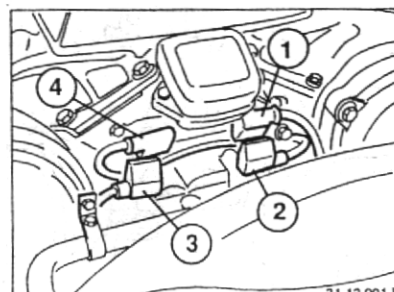
31 12 034 U

Loosen wire strap.
Take cover off of distributor cap.



31 12 001 U

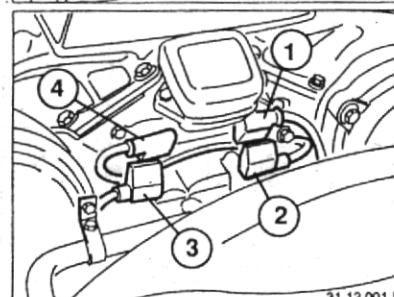
Senders are located on ignition leads for cylinders 6 and 12.
Cut shielded connector off of ignition lead.
Pull sender off of ignition lead.



31 12 001 U

Cylinder Bank 1...6 (Right Cyl. Bank):
Disconnect plug.
Remove wire.
Install new sender.

3 = Cylinder Identifying sender
4 = Inductive pulse sender

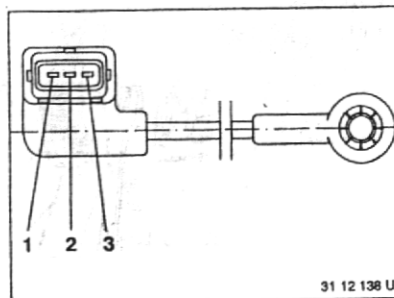


31 12 001 U

Cylinder Bank 7...12 (Left Cyl. Bank):
Disconnect plug.
Remove wire.
Install new sender.

1 = Cylinder Identifying sender
2 = Inductive pulse sender

Installation:
Install shielded connector – see 12 12 072.

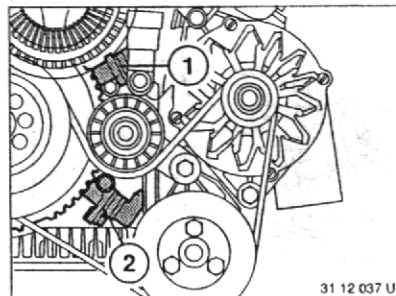


31 12 138 U

Checking Sender:
Measure resistance* of coil between wires 1 and 2.

* See Specifications

12-14/2

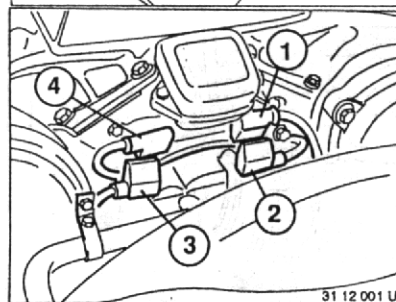


12 14 ... CHECKING PULSE SENDERS

M 70:

Check pulse sender (1) for DME 1 on the upper timing case cover for tight fit and damage.

Check pulse sender (2) for DME 2 on the lower timing case cover for tight fit and damage.



Disconnect plug (4) for pulse sender 1 of right bank of cylinders.
Disconnect plug (2) for pulse sender 2 of left bank of cylinders.

Select Multimeter Test (M 06) on the BMW Service Tester.

Disconnect plug.

Measure resistance between pins 1 and 2.

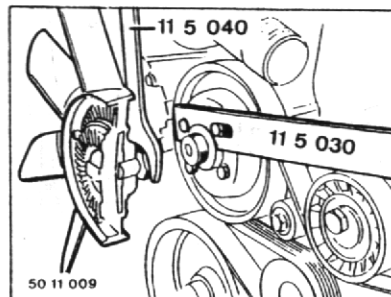
Specification: $520 \Omega \pm 5 \%$.

Check shielding

between pins 1 and 3 $> 100 \text{ k}\Omega$ and

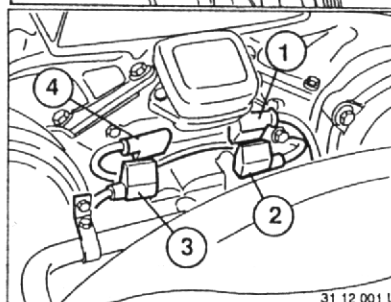
between pins 2 and 3 $> 100 \text{ k}\Omega$.

Connect oscilloscope M 22/23) on connections 1 and 2 of the pulse sender.
Operate engine with the starter.
The shown signal should appear on the monitor.

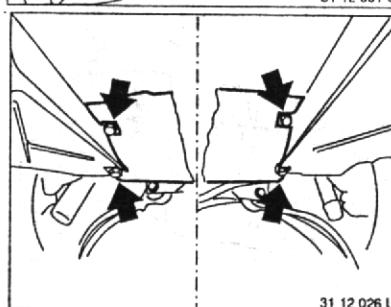


12 14 152 REPLACING PULSE SENDER FOR LEFT CYLINDER BANK

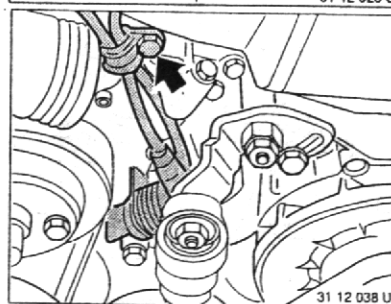
Remove fan.



Disconnect plug (2) in holder on upper timing case cover.

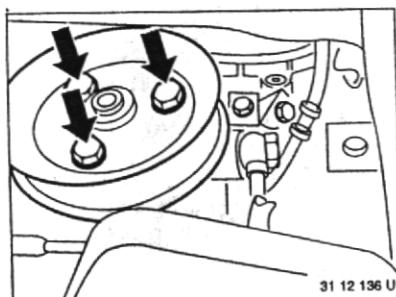


Unscrew splash guard.

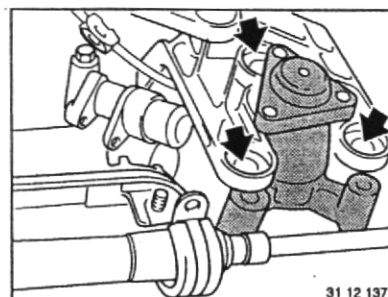


Unscrew holder on upper timing case cover.

12-14/3

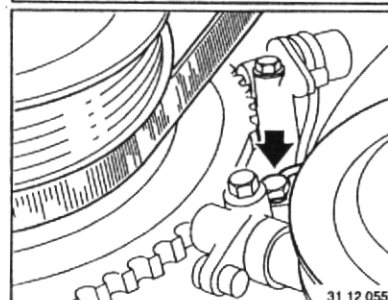


Loosen front power steering pump console bolts.

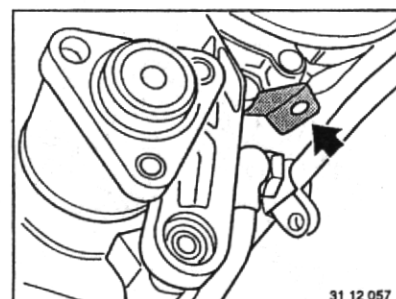


Unscrew pulley on power steering pump.

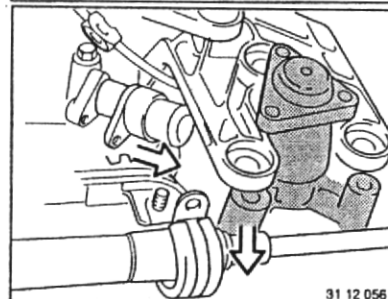
Unscrew pipe holder on lower timing case cover.
Turn increment wheel until bolt head is accessible through a tooth gap.



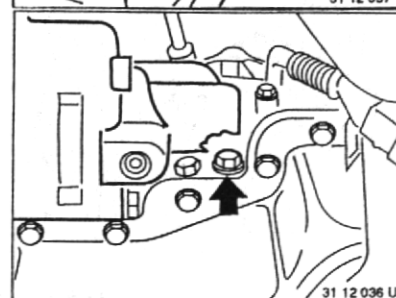
Unscrew cool air guide for alternator.



Unscrew pulse sender.
Press hydraulic fluid pump aside and remove the pulse sender.



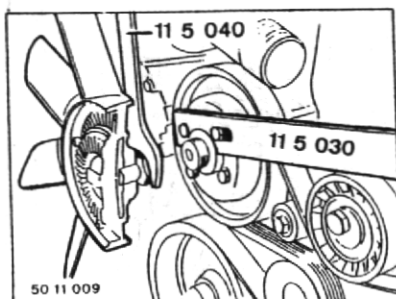
Unscrew both holders for hydraulic fluid pipes.



Checking Increment Wheel:
TDC mark must be at middle of a tooth.
Beginning at the TDC mark and continuing in the engine's direction of rotation there must be a gap after 30 teeth.

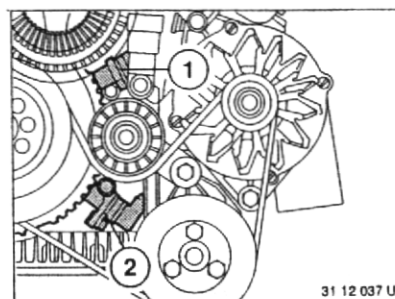
Unscrew holder for hydraulic fluid pump on engine block.

12-14/4

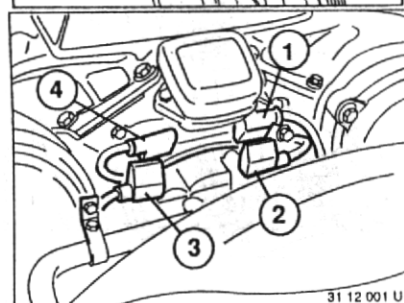


12 14 153 REPLACING PULSE SENDER FOR RIGHT CYLINDER BANK

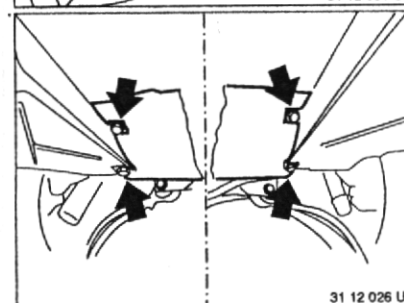
Remove fan.
Remove complete drive belt tensioner.



Unscrew and remove pulse sender (1).



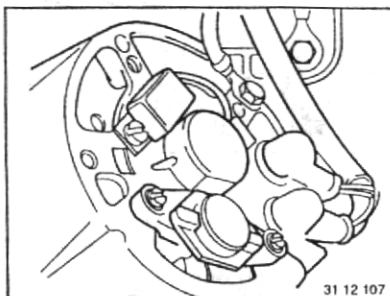
Disconnect plug (4) in holder on upper
timing case cover.



Unscrew splash guard.



Unscrew pipe holder on upper timing
case cover.



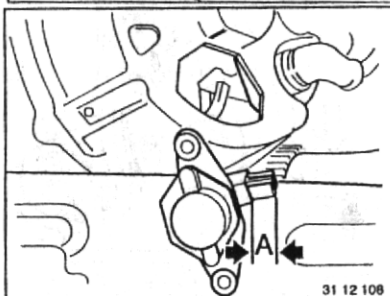
31 12 107

12 31 009 CHECKING ALTERNATOR AND VOLTAGE REGULATOR

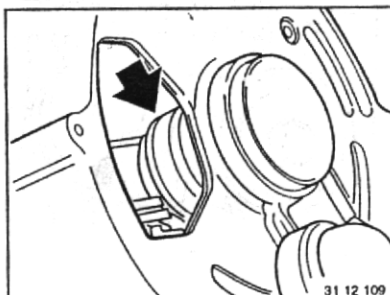
Test Conditions:

- Correct connections on charged battery.
- Correct connections on alternator and starter.
- Good ground connection between engine and body.
- Tensioned drive belt.

Charge Warning Lamp ON Continuously:
Remove voltage regulator and check carbon brushes, replacing if necessary – see 12 31 200.
Length "A" = at least 5 mm (0.197").



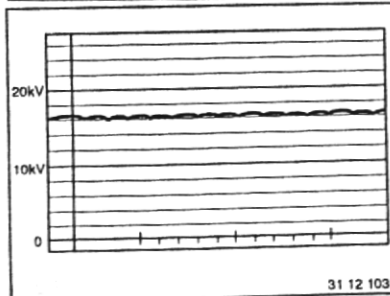
31 12 108



31 12 109

Installation:

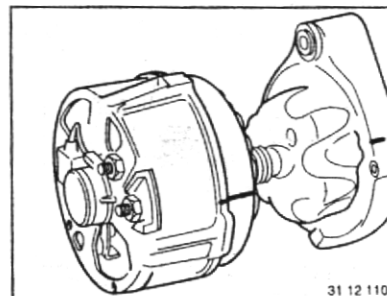
Check slip rings for wear, fine grinding and polishing if necessary.
Connect BMW SERVICE TESTER.
Start engine and compare measured values with the nominal values*.



31 12 103

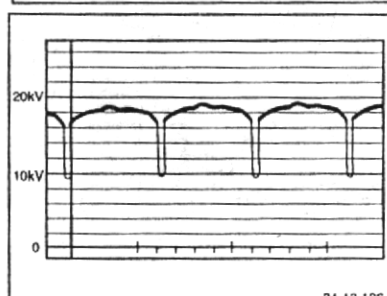
If the charge warning lamp goes out with the engine running, the regulating voltage* is not reached and the oscillograph is okay (as shown), replace the voltage regulator – see 12 32 000.

* See Nominal Value Microfiche



31 12 110

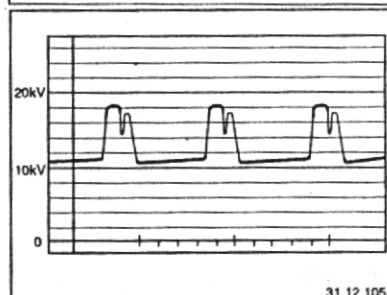
If the specified charging current is not reached, remove and disassemble the alternator and inspect parts – see 12 31 020 and 12 31 513.



31 12 106

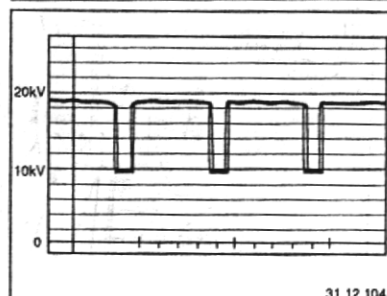
Oscillographs of Fault Alternator:
Faulty power or exciter diode.

Fault between turns of stator coil.



31 12 105

Break in exciter diode.

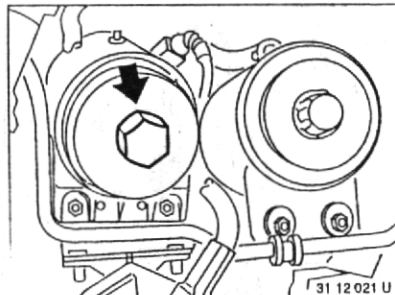


31 12 104

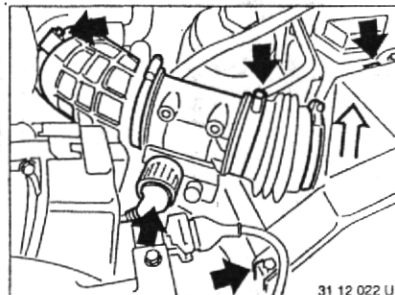
12-31/2

12 31 020 REMOVING AND INSTALLING ALTERNATOR

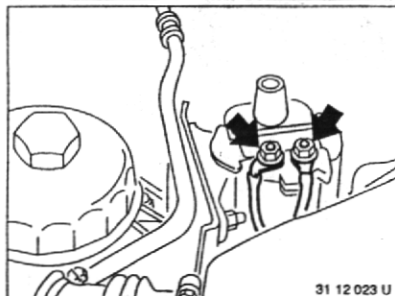
Disconnect ground leads on batteries.



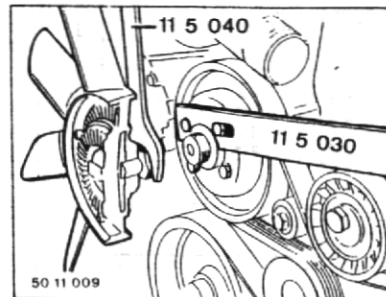
Unscrew cap on oil filter to have engine oil flow back into the oil pan.



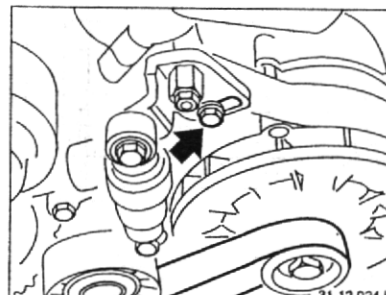
Remove upper air cleaner section complete with air mass sensor. Loosen clips. Loosen hose clamps.



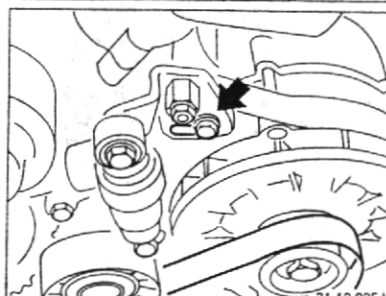
Pull off cap of ignition coil. Unscrew nuts. Take off pipes.



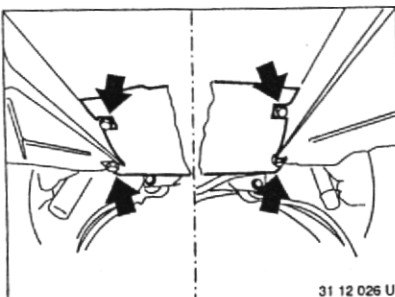
Remove visco fan.



Loosen drive belt tensioner. Unscrew nut of tensioner. Loosen bolt.

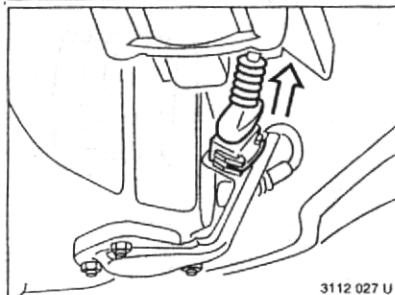


Loosen upper alternator mounting bolt. Remove drive belt.



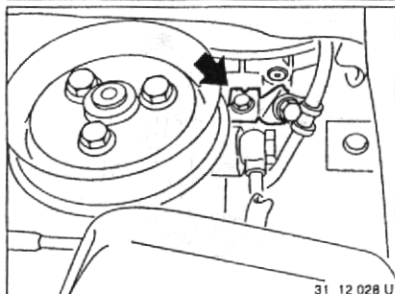
Unscrew splash guard.

31 12 026 U



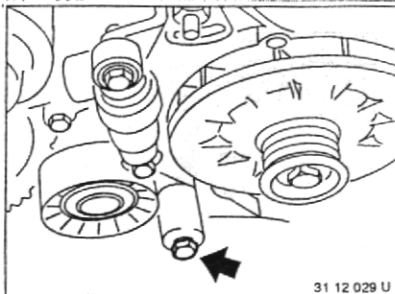
Pull off plug on oil level sender.

31 12 027 U



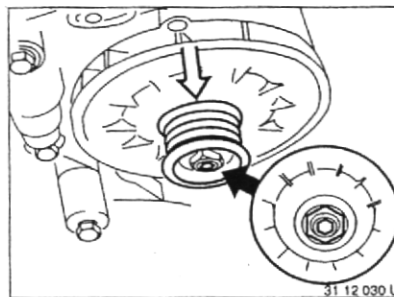
Unscrew hydraulic pipe holder on alternator.

31 12 028 U



Loosen bottom tensioner bolt from underside of car.
Remove tensioner downward.
Unscrew cooling air hose on alternator.

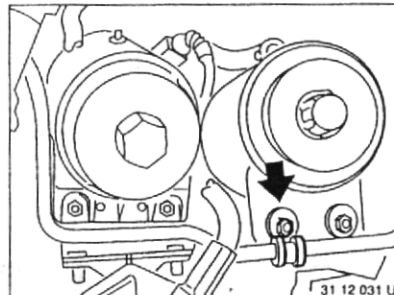
31 12 029 U



Unscrew pulley and fan from underside of car.
Unscrew both bottom bolts of alternator.

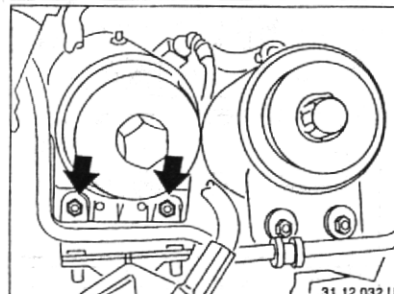
Installation:
Tightening torque*.

31 12 030 U



Unscrew upper hydraulic pipe holder.

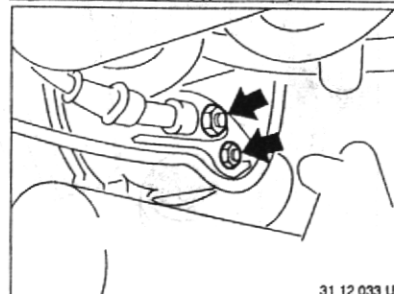
31 12 031 U



Remove complete full flow oil filter.

Installation:
Molded hoses on the oil filter impair removal and installation.
Install molded hoses straight.
Replace gaskets.
Check for correct seating of O-rings.

31 12 032 U

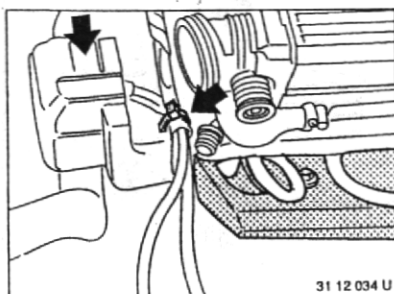


Unscrew pipes of alternator.

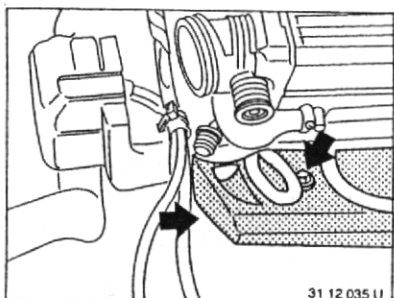
31 12 033 U

* See Specifications

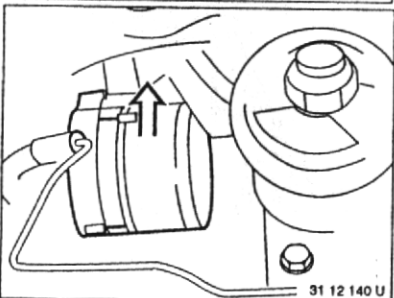
12-31/4



Remove cover of distributor.
Loosen wire strap.



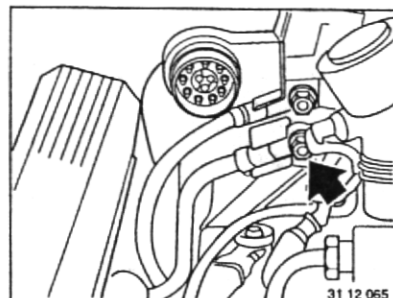
Unscrew screws.
Unscrew heat shield.



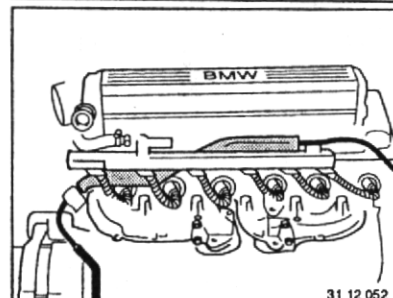
Remove alternator upward approxi-
mately in installed position.
Press the hydraulic fluid pipe aside.

Installation:

Install alternator without pulley from
above approximately in installed posi-
tion.
Install pipes on alternator.
Install upper bolt and then continue in-
stallation from underside of car.
Check engine oil level, adding engine
oil if necessary.

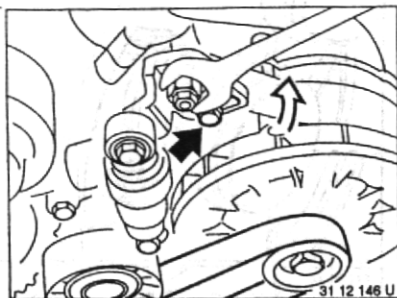


Alternator Pipe Routing Plan:
Connection on firewall at driver's side.



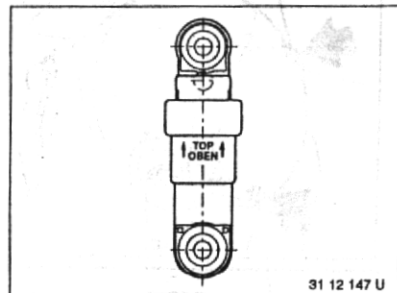
Pipe routing on engine.

12-31/5



12 31 ... TIGHTENING DRIVE BELT

Tighten tensloner with a fork wrench until the bolt in the slot bears against the stop.
Tighten bolt.
Hydraulic drive belt tensloner is ready for operation afterwards.

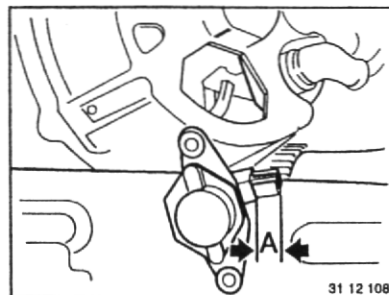


Note:
The hydraulic drive belt tensloner is filled with oil, so that a removed element must always be stored standing upright.
Incorrectly stored elements can normally be bled by compressing several times.

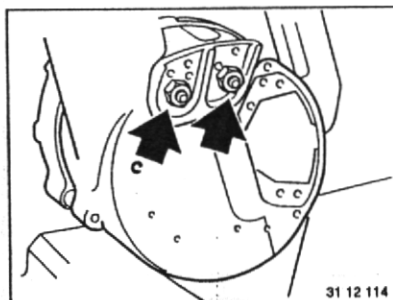
12-32/1

12 32 000 REPLACING VOLTAGE REGULATOR

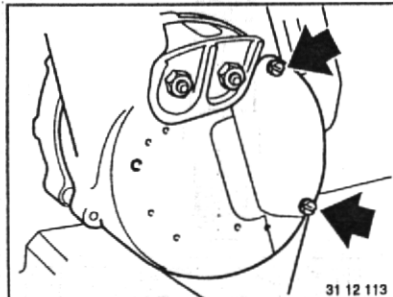
Disconnect ground leads on batteries.



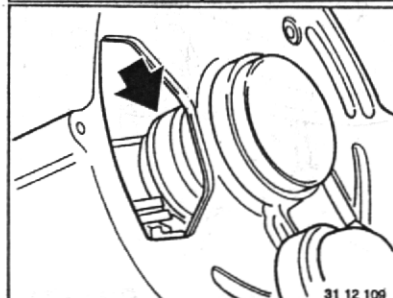
Installation:
Clean contact surfaces and check tension of contact springs, bending if necessary.



Remove alternator – see 12 31 020.
Take off cover.



Unscrew screws.
Remove voltage regulator.

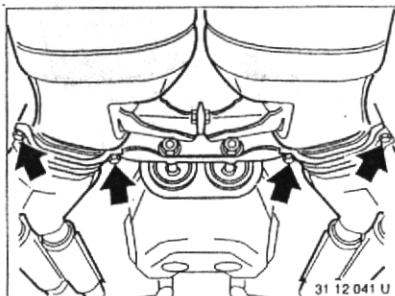


Check slip ring for wear, machining if necessary – see 12 31 200 In Construction Group Repair Manual.

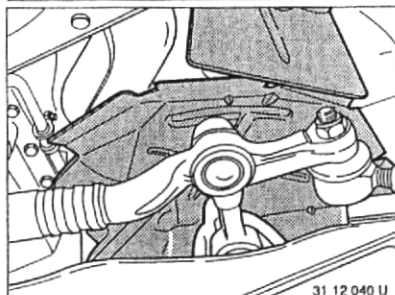
12-41/1

12 41 020 REPLACING STARTER

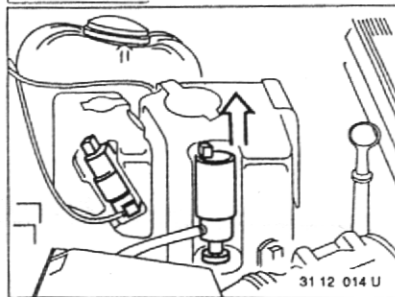
Read fault memory.
Disconnect battery ground leads.
If not mentioned to the contrary, the steps are applicable to automatic and manual transmissions.



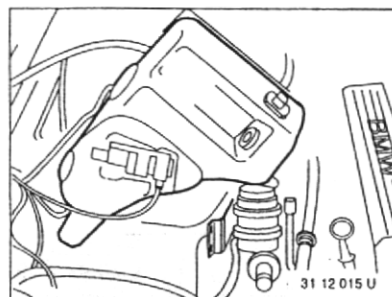
Unscrew exhaust assembly on transmission brackets and on intermediate rubber mounts.
Remove complete exhaust assembly.



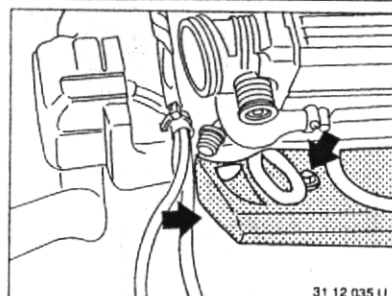
Unscrew heat shields on reversing lever.



Empty washing fluid tank for headlight cleaners.
Remove and place pump aside.



Place tank aside.



Unscrew heat shields on intake manifold.
Unscrew lines on starter connection point.

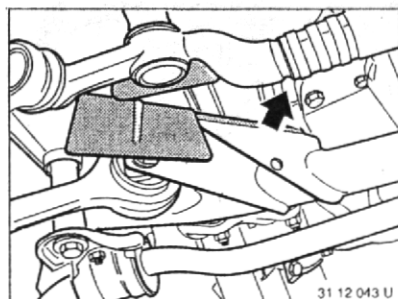
Unscrew split pipes on manifolds.
Remove front split pipe first, and then rear split pipe upwards.
Refer to Instructions in Group 18.

Automatic Transmission:
Extend tool – see sketch.

12-41/2

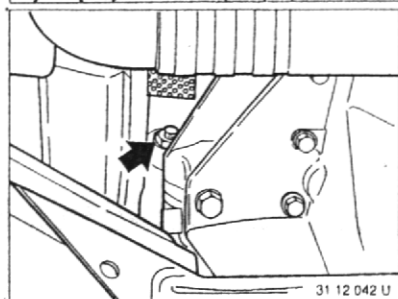
Automatic Transmission:
Unscrew upper starter mounting bolt.
Apply tool between firewall and wire harness of electronic box from above.

Unscrew upper starter bolt.
Unscrew bolts from above (direction of manifold).



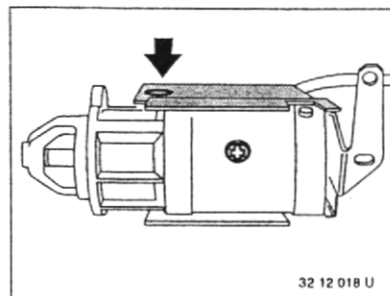
31 12 043 U

Manual Transmission:
Unscrew upper starter bolt from under-side of car.



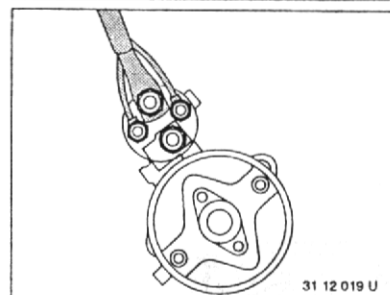
31 12 042 U

Unscrew bracket on engine block.
Unscrew lower starter bolt.



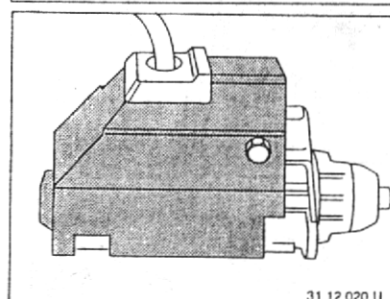
32 12 018 U

Remove starter downward.
Unscrew heat shield.
Unscrew bracket.



31 12 019 U

Installation:
Check for correct location when installing the starter lead, as otherwise the heat shield cannot be mounted.



31 12 020 U

Guide in front split pipe from underneath first.
Check installed location of bolts and springs.
Refer to Group 18 for additional instructions.

12-70/1

12 70 500 CHECKING EXTERNAL SAFETY PATH

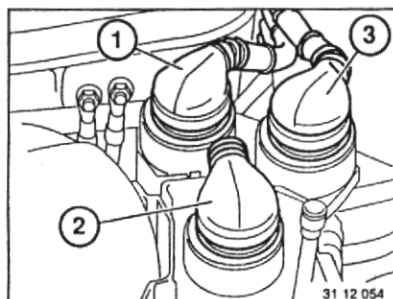
Note:

Read fault memory of the EML control unit prior to mounting the testing adapter.

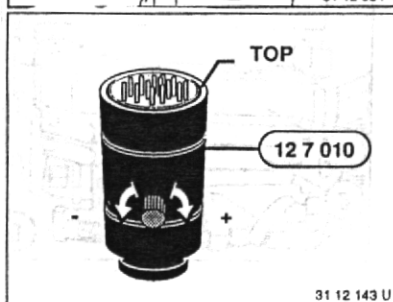
Remove adapter.
Connect EML plug.

Note:

Erase fault memory in the EML control unit.



- 1 = Plug - DME 1
- 2 = Plug - DME 2
- 3 = Plug - EML



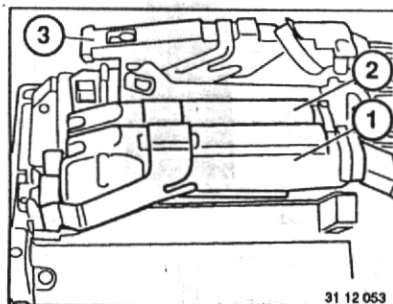
Switch off ignition.
Disconnect EML plug and mount testing adapter 12 7 010.
Check installed direction of the testing adapter.
Knurled wheel in "-" position.

Start engine and regulate to a speed of approx. 2,500 rpm with the knurled wheel.
Now operate the brake pedal, which should cause the engine speed to drop "immediately" because of overrun shut-off.
If this is applicable, the external safety path is okay.

12-71/1

12 71 530 REPLACING CONTROL UNIT FOR ELECTRONIC ENGINE POWER CONTROL

Unscrew cover of electronic box.



Caution!

Always comply with the instructions
on page 12-00/1.

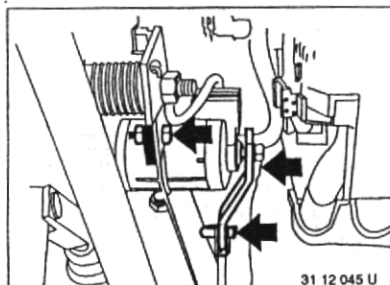
- 1 = DME control unit 1
- 2 = DME control unit 2
- 3 = EML control unit

Important!

Always carry out the following test
after replacing the EML control unit:
Check safety path of electronic engine
power control – see procedures in
12 70 500.

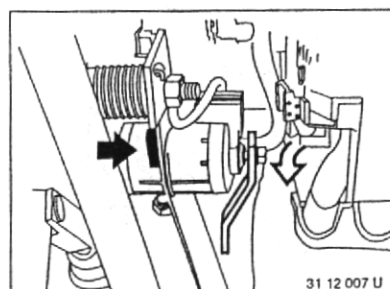
**12 72 520 REMOVING AND INSTALLING
OR REPLACING PEDAL
VALUE SENDER**

Switch off Ignition.
Remove trim panel on dashboard at
bottom left – see 51 45 180.

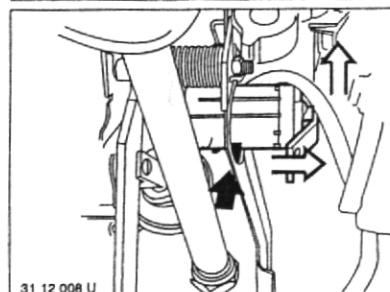


Removing Pedal Value Sender:
Disconnect arm on accelerator pedal.
Unscrew arm on pedal value sender
and pry off carefully.
Unscrew both bolts.
Disconnect plug.

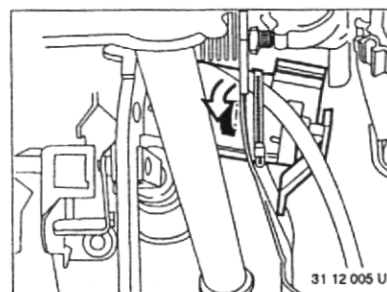
Important!
Pedal value sender must not be loaded
in axial direction, as pedal value sender
would be damaged in advance.



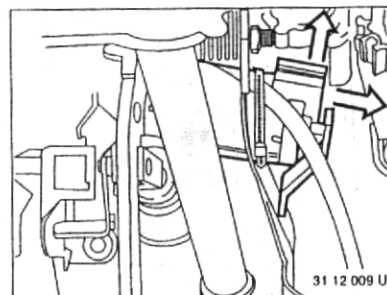
Turn pedal value sender anticlockwise
approx. 45°, so that the front mounting
eye can be worked out through the
oval opening of the pedal console.



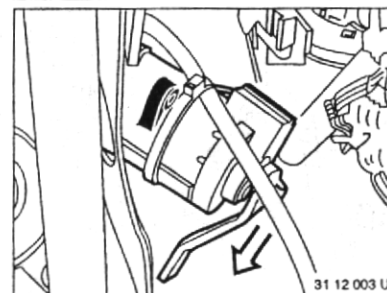
Work out the mounting eye.
Press pedal value into the noise insu-
lating sheet slightly and pull out.



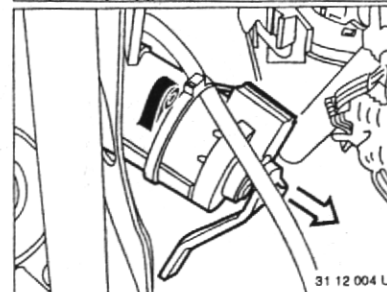
Turn pedal value sender clockwise, un-
til the mounting eye can be worked out
through the opening.



Press up pedal value sender into the
noise insulating sheet, so that the sec-
ond mounting eye can be worked out
of the pedal console.

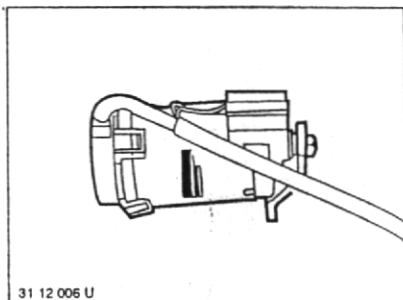


Turn pedal value sender anticlockwise
approx. 60°, tilt downward in direction
of the heater pipes and remove down-
ward.



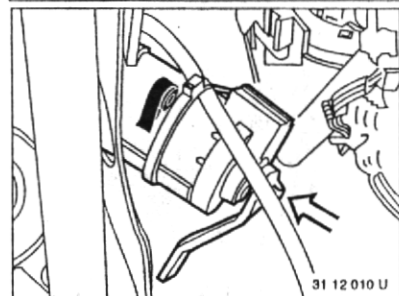
Turn pedal value sender until eyes are
again aligned with hole pattern of the
holder.

12-72/2



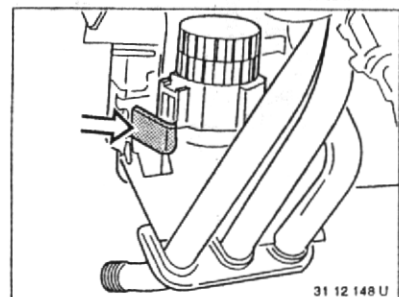
31 12 006 U

Installing Pedal Value Sender:
Installation will be easier with the lead of the pedal value sender positioned as shown.



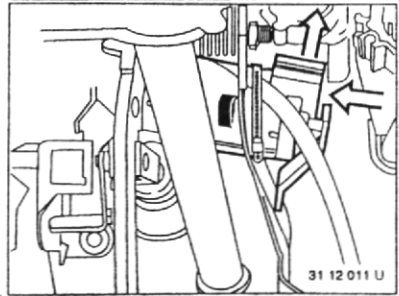
31 12 010 U

Work in pedal value sender that the electric lead outlet is inclined past the heater pipes.



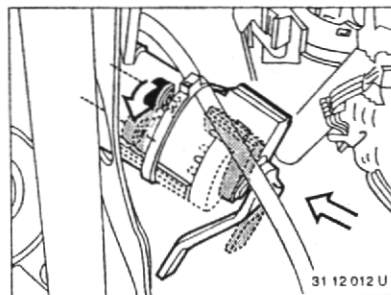
31 12 148 U

Bend clip of heater mounting screw away.



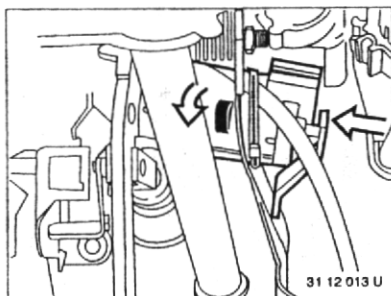
31 12 011 U

Press pedal value sender forward at an angle in direction of the firewall. Work rear end of the pedal value sender into the pedal console.



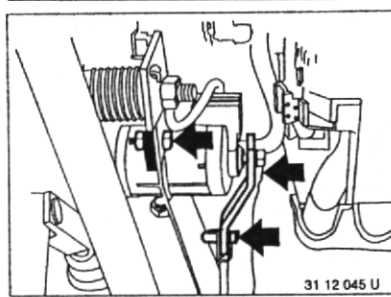
31 12 012 U

Turn pedal value sender clockwise until the front mounting eye is on the oval opening. Press pedal value sender up into the noise insulating sheet. Work in eye.



31 12 013 U

Turn pedal value sender until the second mounting eye is above the oval opening. Work in eye.



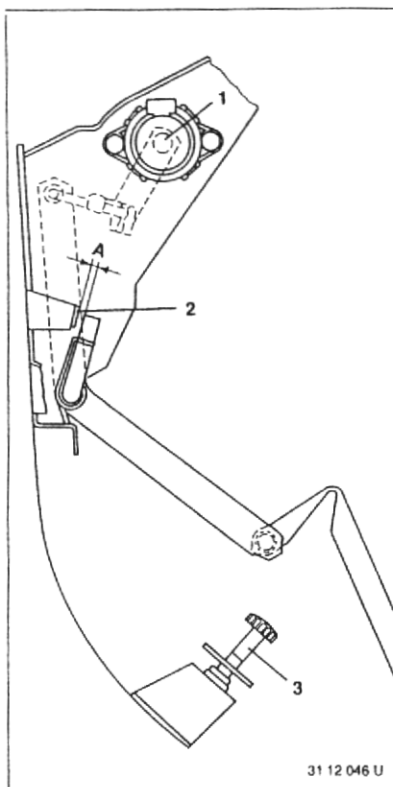
31 12 045 U

Install bolts. Mount arm. Secure lead with wire strap. Tightening torque*.

Important!
Pedal value sender must not be loaded in axial direction, as pedal value sender could be damaged in advance.

Mount plug.
Adjusting and Checking Function of Pedal Value Sender:
See Adjusting Accelerator Pedal in 12 72
Check safety path – see 12 70 500.

* See Specifications



12 72 550 CHECKING AND ADJUSTING PEDAL VALUE SENDER KINEMATIC

1. Idle Position

Loosen hexagon nut (1) on pedal value sender.

Produce a gap A of 3 mm (0.118") between the accelerator pedal shaft and idle stop (2) (clamp a feeler gage blade or something similar between).

Tighten hexagon nut (1) on pedal value sender to correct torque*.

Support arm on pedal value sender while tightening.

2. Full Load Position

a) Manual Transmission

Operate accelerator pedal to kickdown pressure point in the pedal value sender. Turn knurled head screw (3) to bear on the accelerator pedal in this position and lock.

b) Automatic Transmission

Operate accelerator pedal to kickdown pressure point in the pedal value sender. Adjust knurled head screw (3) in this position to have a distance of 6 mm (0.236") between the knurled head screw and accelerator pedal. Lock the knurled head screw.

Important!

Check pedal value sender with a diagnosis tester after adjusting. Connect tester, switch on ignition and press accelerator pedal to the full load stop. Compare actual voltage value displayed on the tester with the nominal value, correcting the adjustment if necessary.

Specification:

a) Manuals	=	3.15 ... 3.3 V
b) Automatics	=	3.7 ... 3.8 V

Specification:

Idle speed = min. 353 mV

Idle Speed = max. 451 mV

Check safety path – see 12 70 500.

Note:

Read EML fault memory before installation of the testing adapter.

* See Specifications

On-board Diagnosis

The DME control unit recognizes exhaust relevant faults and displays them by lighting up the "Check Engine" control lamp continuously. Check Engine control lamp – see Group 62. The fault lamp comes on after turning on the Ignition and goes out when the engine runs. It is on continuously while the engine is running, if there is a fault.

Flashing codes help in locating faults precisely and eliminating them.

Fault Output:
Activate flashing code output: Ignition ON, operate full load contact 5 times within 5 seconds.
Fault output begins.
See sample fault: faulty NTC coolant – code 1223.

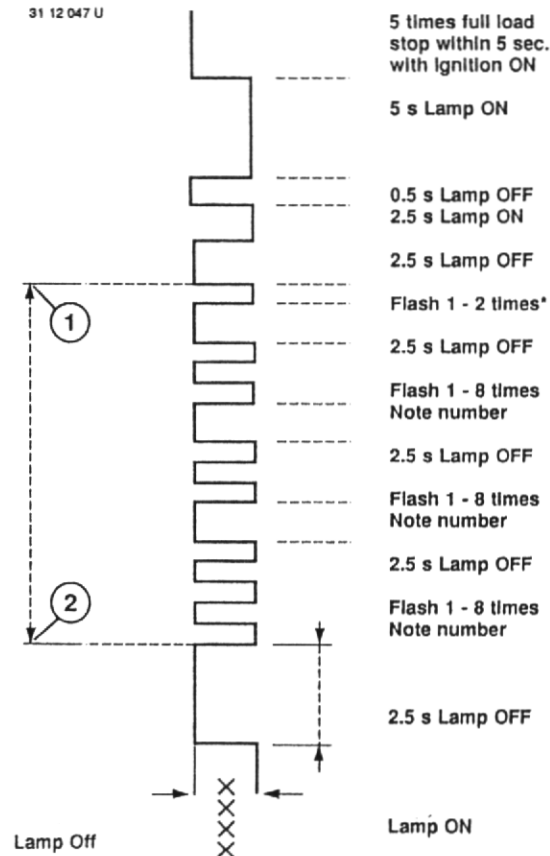
1 = Start of fault code

2 = End of fault code

Note:
Each additional call must be activated again.
Code X444 - fault no longer stored.
Code X000 (long dark phase) - after fault output = end of output.

Sample Fault Code: NTC Coolant
Code 1223

31 12 047 U



* Two times for M 70
Left cylinder bank

TABLE OF FAULT CODES FOR DME 1.7

Code	Fault Branch
x111	Ignition
x211	Control unit (self test)
x215	Air mass sensor
x221	Oxygen sensor
x222	Oxygen control
x223	NTC coolant (see fault example)
x224	NTC intake air
x231	Monitor of bat. voltage supply to contr. unit
x251	Injector final stage 1 (cylinders 2,4,6)
x252	Injector final stage (cylinders 7,9,11)
x261	Elec. fuel pump relay final stage
x263	Tank venting final stage
x264	Relay 3 final stage (oxygen sensor heating)
x268	Idle speed, CO potentiometer
x278	Ignition timing correction
x512	AC compressor shutoff
x513	Final stage pln 18
x515	Converter lockup clutch
x516	Speed signal
x517	MSR signal
x518	ASC signal
x818	Final stage

Remarks:

FL = Fault lamp

VL = Full load

Table 1: CARB Flashing Code Scope

Remarks:

x= 2 for M 70 control unit of left engine side
(cyl. 7 ... 12)x= 1 for M 70 control unit of right engine side
(cyl. 1 ... 6) and all other engines

Fault memory empty: code x444

Fault memory cancellation: versions.

1. Disconnect DME control unit on power supply by, for example, unplugging the control unit.
2. Put out cancel fault memory command with a BMW SERVICE TESTER (see car electric/electronic test plan).
3. Reactivate with Ignition "ON" while flashing code x000 is being put out; close (make) the full load switch 10 seconds.