

110 Engine Removal and Installation

GENERAL	110-1	ENGINE REMOVAL AND INSTALLATION	
Warnings and Cautions	110-2	(N52, N54 ENGINE)	110-6
ENGINE REMOVAL AND INSTALLATION		N52, N54 engine, removing and installing	110-6
(M54 ENGINE)	110-3	ENGINE REMOVAL AND INSTALLATION	
M54 engine, removing and installing	110-3	(V8 ENGINE)	110-8
		V8 engine, removing and installing	110-8

GENERAL

This repair group includes an overview of M54, N52, N54 (6-cylinder) and N62 (V8) engine removal and installation.

Transmission removal is required before the engine can be removed.

See also:

- **020 Maintenance** for engine covers removal
- **100 Engine-General** for engine codes and applications
- **121 Battery, Starter, Alternator**
- **170 Radiator and Cooling System**
- **180 Exhaust System**
- **230 Manual Transmission**
- **231 Sequential Manual Gearbox (SMG)**
- **240 Automatic Transmission**
- **260 Driveshafts**
- **310 Front Suspension**
- **410 Fenders, Engine Hood**

110-2 Engine Removal and Installation

Warnings and Cautions

Warnings and Cautions

WARNING—

- The fuel system is designed to retain pressure even when the ignition is OFF. When working with the fuel system, loosen fuel lines slowly to allow residual fuel pressure to dissipate. Avoid spraying fuel.
- Before beginning any work on the fuel system, place a fire extinguisher in the vicinity of the work area.
- Fuel is highly flammable. When working around fuel, do not disconnect any wires that could cause electrical sparks. Do not smoke or work near heaters or other fire hazards.
- Loosen the fuel tank cap to release pressure in the tank before working on the tank or lines.
- When disconnecting a fuel hose, wrap a shop towel around the end of the hose to prevent fuel spray.
- Do not use a work light with an incandescent bulb near any fuel. Fuel may spray on the hot bulb causing a fire.
- Make sure the work area is properly ventilated.

CAUTION—

- If the MIL (malfunction indicator light, also called Check Engine or Service Engine Soon light) is illuminated, see **OBD On-Board Diagnostics** for DME fault code information.
- If other system faults are indicated by an illuminated ABS, SRS or DSC warning light, see the appropriate repair group in this manual or an authorized BMW dealer for more information on fault codes.
- Magnesium crankcase requires aluminum fasteners.
- Steel fasteners may not be used in place of aluminum fasteners due to the threat of corrosion.
- Aluminum fasteners may be marked with blue paint. Use a magnet to identify.
- Replace aluminum fasteners each time they are loosened.

ENGINE REMOVAL AND INSTALLATION (M54 ENGINE)

Be sure to cover painted surfaces before beginning the removal procedure. As an aid to installation, label components, wires and hoses before removing them. Do not reuse gaskets, O-rings or seals during reassembly.

WARNING—

- Due to risk of personal injury, be sure the engine is cold before beginning the removal procedure.

M54 engine, removing and installing

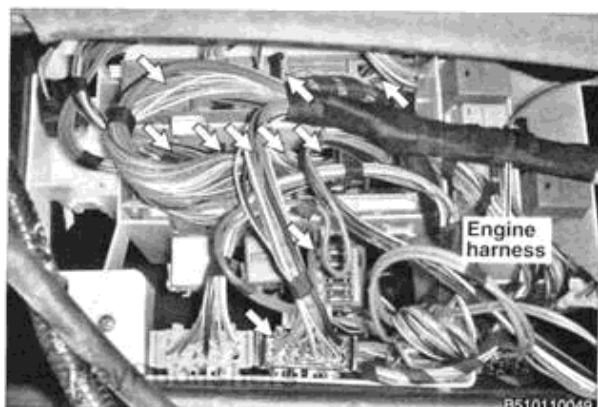
- Place hood in service position. See **410 Fenders, Engine Hood**.
- Remove exhaust system. See **180 Exhaust System**.
- Secure engine with BMW special tool 00 6 000 engine support or equivalent.
- Disconnect negative (–) cable from battery.

CAUTION—

- Prior to disconnecting the battery, read the battery disconnection cautions in **001 Warnings and Cautions**.

- Remove transmission. See **230 Manual Transmission, 231 Sequential Manual Gearbox (SMG) or 240 Automatic Transmission**.
- Drain engine oil.
- Drain engine coolant.
- Remove air cleaner housing and fresh air ducts. See **130 Fuel Injection**.
- Remove fan cowl with electric cooling fan. See **170 Radiator and Cooling System**.
- Remove radiator. See **170 Radiator and Cooling System**.
- Remove coolant expansion tank. See **170 Radiator and Cooling System**.
- Remove intake manifold. See **130 Fuel Injection**.

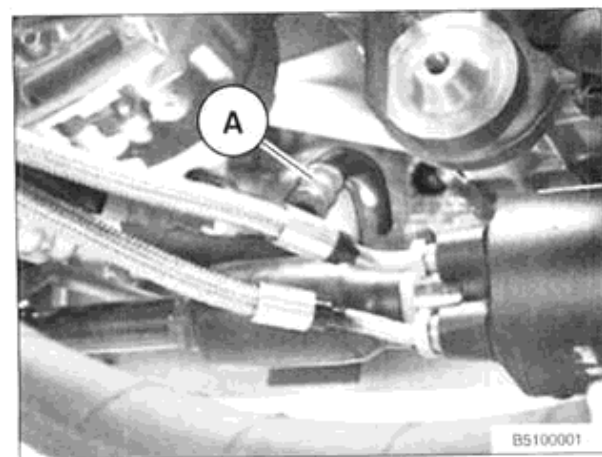
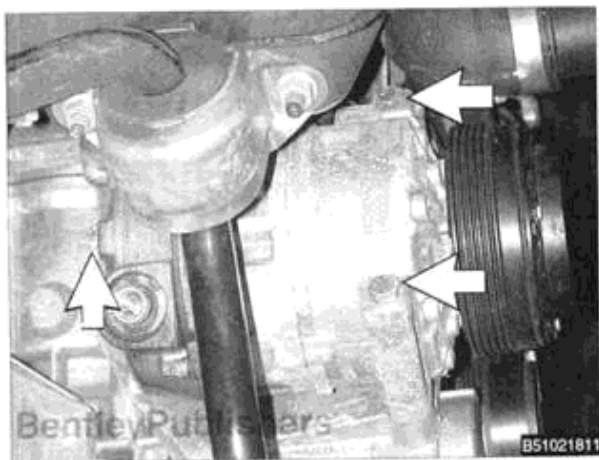
- ◀ Working in E-box, detach engine wiring harness connectors from ECM, transmission control module, engine electronics fuse carrier and other connectors (**arrows**).
- Disconnect electrical connectors and harness from ignition coils and lay harness aside.



110-4 Engine Removal and Installation

M54 engine, removing and installing

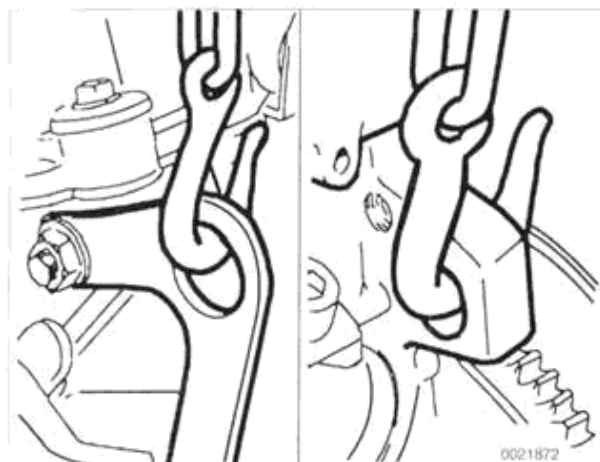
- Disconnect positive battery cable (**arrow**) at intake manifold.
- Remove vacuum line from brake booster.
- Disconnect vapor line from fuel tank vent valve.
- Remove pre-catalyst and post-catalyst oxygen sensors. See **180 Exhaust System**.
- Working at right side engine mount bracket, remove ground cable.
- Remove engine accessory belt. See **020 Maintenance**.
- Remove power steering pump with bracket. See **320 Steering and Wheel Alignment**.
- Remove A/C compressor mounting bolts (**arrows**) and lift A/C compressor off its mounting bracket without disconnecting, distorting, or deforming refrigerant lines. Suspend from body using stiff wire.



- Vehicle with dynamic drive (active stabilizer bar): Working at front stabilizer bar, remove hydraulic line (**A**).
- Working above engine, remove engine mount fasteners.

Engine Removal and Installation 110-5

M54 engine, removing and installing



- ◀ Install engine lifting device (BMW 11 0 000 or equivalent) to the front and rear engine supports and raise engine until its weight is supported.
- Carefully raise engine out of engine compartment, checking for any wiring, fuel lines, or mechanical parts that might become snagged as engine is removed.
- Installation is reverse of removal, noting the following:
 - Replace gaskets, O-rings and seals.
 - Use new fuel injector seals.
 - Check that engine drive belts properly engage pulley grooves.
 - Inspect O-ring seal between mass air flow sensor and air filter housing. To facilitate reassembly, coat seal with acid-free grease.
 - Change engine oil and filter and check all other fluid levels. See **020 Maintenance**.
 - Refill and bleed cooling system. See **170 Radiator and Cooling System**.

CAUTION—

- Use new fasteners for reinstalling front end reinforcement.
- When reattaching throttle assembly harness connector, connector is fully tightened when arrows on connector and plug line up.

110-6 Engine Removal and Installation

N52, N54 engine, removing and installing

ENGINE REMOVAL AND INSTALLATION (N52, N54 ENGINES)

Be sure to cover painted surfaces before beginning the removal procedure. As an aid to installation, label components, wires and hoses before removing them. Do not reuse gaskets, O-rings or seals during reassembly.

WARNING —

- Due to risk of personal injury, be sure the engine is cold before beginning the removal procedure.

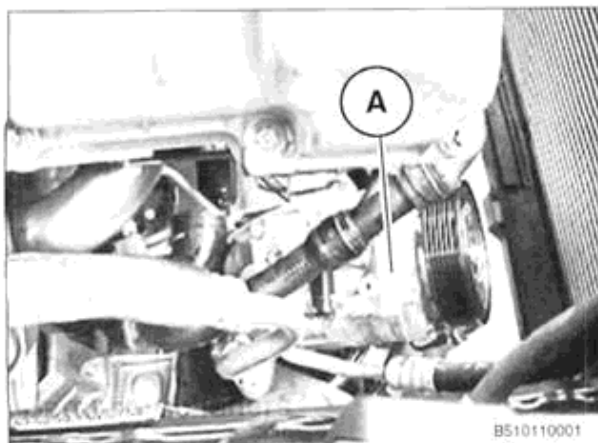
N52, N54 engine, removing and installing

- Place hood in service position. See **410 Fenders, Engine Hood**.
- Remove exhaust system. See **180 Exhaust System**.
- Remove transmission. See **230 Manual Transmission** or **240 Automatic Transmission**.
- Drain engine oil.
- Drain engine coolant.
- Disconnect negative (–) cable from battery.

CAUTION —

- Prior to disconnecting the battery, read the battery disconnection cautions in **001 Warnings and Cautions**.

- Remove air cleaner housing and fresh air ducts. See **131** or **132 Fuel Injection**.
- Remove fan cowl with electric cooling fan. See **170 Radiator and Cooling System**.
- Remove radiator. See **170 Radiator and Cooling System**.
- Remove thermostat. See **170 Radiator and Cooling System**.
- Remove all cooling system hoses from vehicle.
- Remove intake manifold. See **131** or **132 Fuel Injection**.
- Remove vacuum line from brake booster.
- Disconnect electrical connectors and harness from ignition coils and lay harness aside.
- Disconnect engine electrical harness and lay aside.
- Turbo engine: Remove fuel supply line to high pressure fuel pump. See **160 Fuel Tank and Fuel Pump** for high pressure fuel pump removal and installation.
- Remove A/C compressor (**A**) from engine and set on front axle carrier and secure with stiff wire. Do not disconnect A/C lines or discharge system.

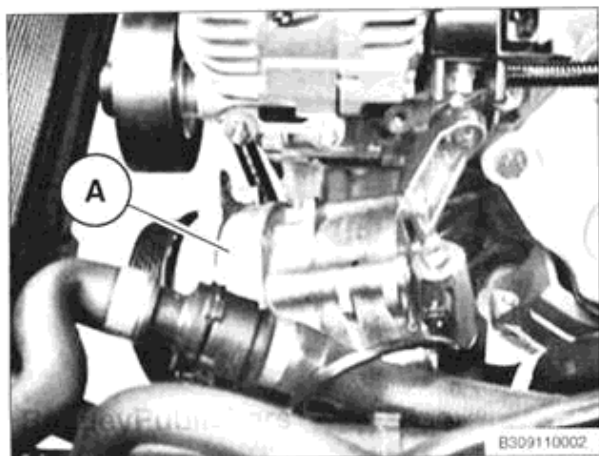


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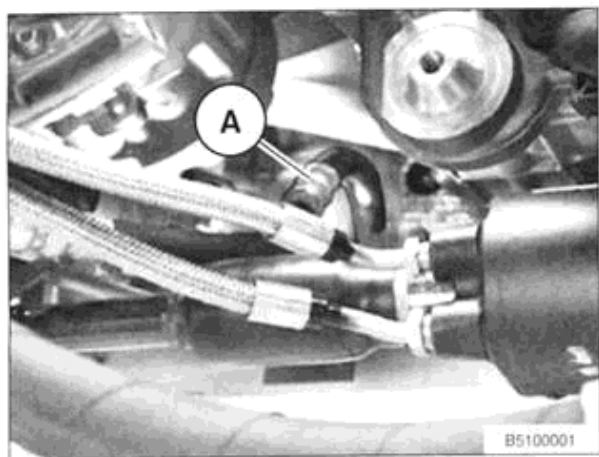
Engine Removal and Installation 110-7

N52, N54 engine, removing and installing

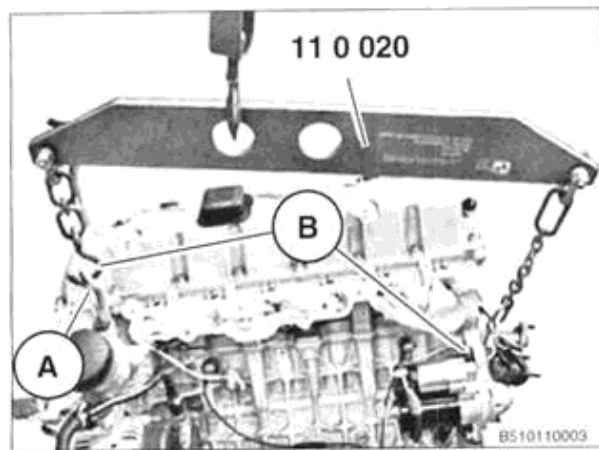
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- Remove power steering pump (A), set on front axle carrier and secure with stiff wire. Do not disconnect hydraulic lines.



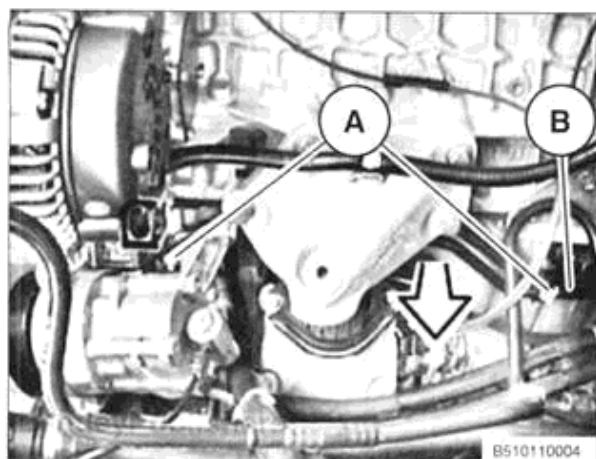
- Vehicles with dynamic drive (active stabilizer bar):
Working at front stabilizer bar, remove hydraulic line (A).



- Install engine tow hook (from tool kit in trunk) to front of engine (A).
Attach BMW special tool 11 0 020 to engine using only specified mounting places (B).

110-8 Engine Removal and Installation

V8 engine, removing and installing



- ◀ If equipped with automatic transmission: Raise engine 10 cm (4 in) and remove fasteners (A) for ATF cooler lines (B).
- Remove engine from vehicle using engine hoist attached to BMW special hook 11 0 020.
- Raise engine slowly while watching carefully to make sure no lines, wires or hoses become snagged.
- Installation is reverse of removal. Remember to:
 - Replace aluminum fasteners.
 - Check for fuel leaks.
 - Check and clear any fault codes using BMW scan tool.
 - Refill and bleed cooling system. See **170 Radiator and Cooling System**.

CAUTION—

- Use new fasteners for reinstalling front end reinforcement.

ENGINE REMOVAL AND INSTALLATION (V8 ENGINE)

Be sure to cover painted surfaces before beginning the removal procedure. As an aid to installation, label components, wires and hoses before removing them. Do not reuse gaskets, O-rings or seals during reassembly.

WARNING—

- Due to risk of personal injury, be sure the engine is cold before beginning the removal procedure.

V8 engine, removing and installing

- Place hood in service position. See **410 Fenders, Engine Hood**.
- Remove exhaust system. See **180 Exhaust System**.
- Secure engine with BMW special tool 00 6 000 engine support or equivalent.
- Disconnect negative (–) cable from battery.

CAUTION—

- Prior to disconnecting the battery, read the battery disconnection cautions in **001 Warnings and Cautions**.

- Remove transmission. See **230 Manual Transmission**, **231 Sequential Manual Gearbox (SMG)** or **240 Automatic Transmission**.
- Drain engine oil.
- Drain engine coolant.
- Remove air cleaner housing and fresh air ducts. See **133 Fuel Injection**.
- Remove radiator. See **170 Radiator and Cooling System**.

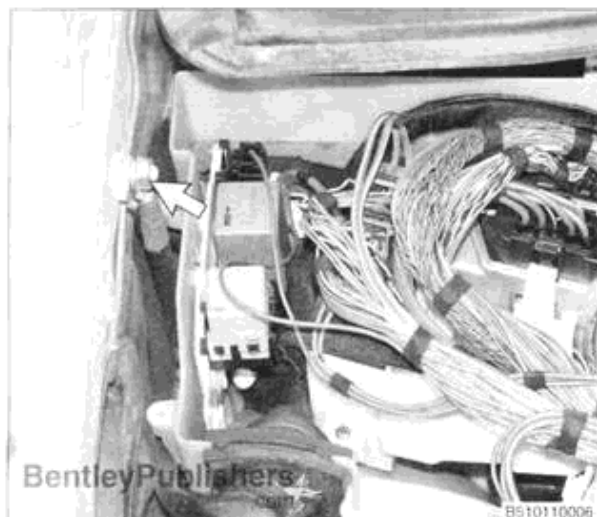
Engine Removal and Installation 110-9

V8 engine, removing and installing

- Remove coolant expansion tank. See **170 Radiator and Cooling System**.

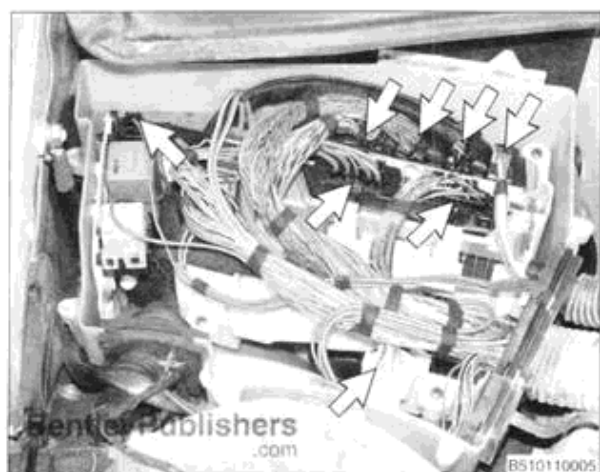
- Remove intake manifold. See **133 Fuel Injection**.

- ◀ Working near right front strut tower, remove ground cable (**arrow**).



- ◀ Working in E-box, detach engine wiring harness connectors from ECM, transmission control module, engine electronics fuse carrier and other connectors (**arrows**).

- Disconnect electrical connectors and harness from ignition coils and lay harness aside.

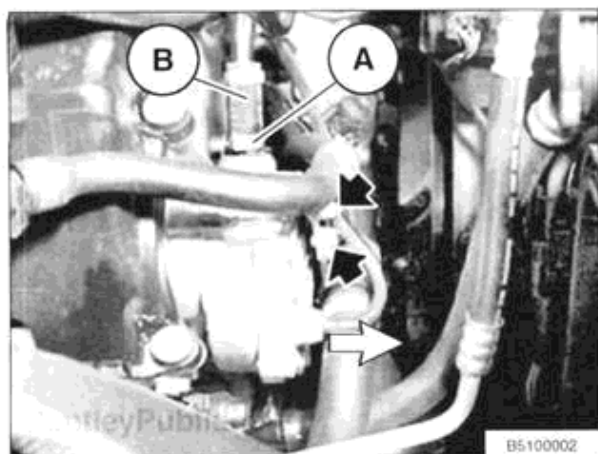


- ◀ Disconnect jump start terminal cable (**arrow**).

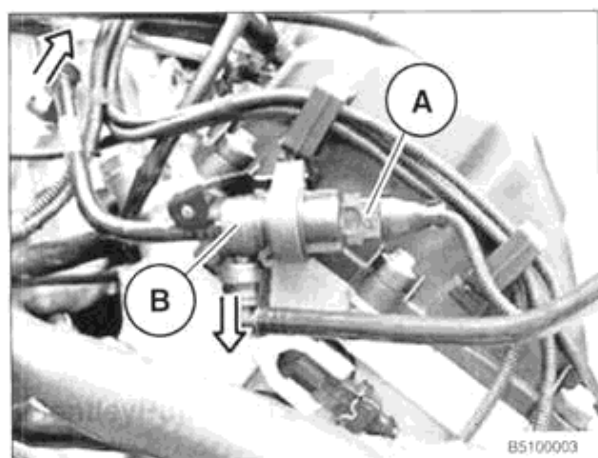


110-10 Engine Removal and Installation

V8 engine, removing and installing

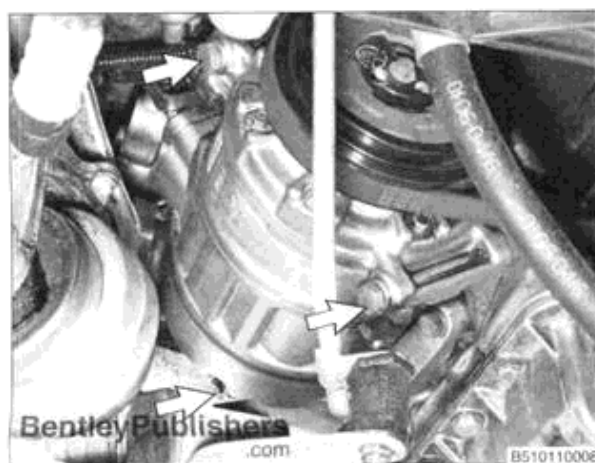


- Remove clamp (A) and discard. Remove line (B). Remove hose clamps (black arrows) and hoses. Remove vacuum line (white arrow).



- Working at fuel tank vent valve (B), remove electrical connector (A) and emission lines (arrows).

- Remove pre-catalyst and post-catalyst oxygen sensors. See **180 Exhaust System**.
- Working at right side engine mount bracket, remove engine ground cable.
- Remove engine accessory belt. See **020 Maintenance**.
- Remove vibration damper (crankshaft pulley). See **117 Camshaft Timing Chain**.
- Remove power steering pump with bracket. See **320 Steering and Wheel Alignment**.
- Remove A/C compressor idler pulley.



- Remove A/C compressor mounting bolts (arrows) and lift A/C compressor off its mounting bracket without disconnecting, distorting, or deforming refrigerant lines. Suspend from body using stiff wire.

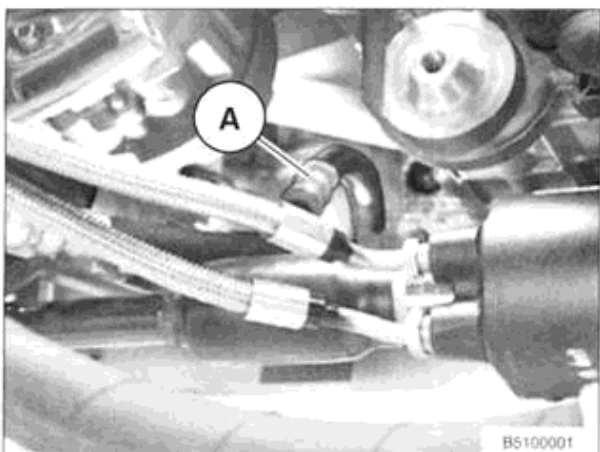
Engine Removal and Installation 110-11

V8 engine, removing and installing

110



- Remove lower steering shaft universal joint (arrow).



- Vehicles with dynamic drive (active stabilizer bar):
Working at front stabilizer bar, remove hydraulic line (A).
- Working above engine, remove engine mount fasteners.



- Install engine lifting device (BMW 11 0 000 or equivalent) to the front and rear engine supports and raise engine until its weight is supported.
- Carefully raise engine out of engine compartment, checking for any wiring, fuel lines, or mechanical parts that might become snagged as engine is removed.

110-12 Engine Removal and Installation

V8 engine, removing and installing

- Installation is reverse of removal, noting the following:
 - Replace gaskets, O-rings and seals.
 - Check that engine drive belts properly engage pulley grooves.
 - Change engine oil and filter and check all other fluid levels. See **020 Maintenance**.
 - Check and clear any fault codes using BMW scan tool.
 - Refill and bleed cooling system. See **170 Radiator and Cooling System**.

CAUTION—

- Use new fasteners for reinstalling front end reinforcement.
- When reattaching throttle assembly harness connector, connector is fully tightened when arrows on connector and plug line up.

