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## NOTE

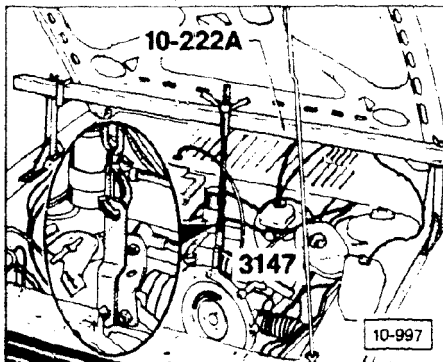
Remove engine from top without transmission

## Do not disconnect

- wire to clutch operating cylinder
- hoses or brackets from power steering pump
- A/C hoses

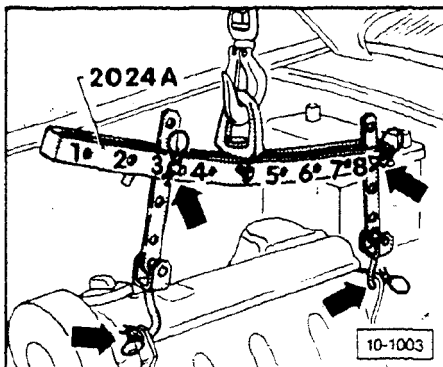
## CAUTION

Coolant/antifreeze **must not** be reused when replacing engine, cylinder head, cylinder head gasket, radiator and heater core.



- disconnect battery ground strap
- remove clutch operating cylinder on manual transmission
- remove radiator
  - save anti-freeze for reuse (see caution)
- remove power steering pump and attach to body
- remove compressor mounting bolts together with mount and move to one side

- prop up transmission with support 10-222A transmission mount 3147
- insert transmission mount 3147 in the upper hole for the engine/transmission mounting bolt (M 12)



- attach engine sling as shown and take weight with crane

Pulley side lower (**left arrow**)

Third hole in vertical at position 3

Flywheel side lower (**right arrow**)

Third hole in vertical bar at position 8

The positions marked 1-4 on the bar must be towards the pulley side. The holes in the hooks are counted **upwards** from the hook.

## CAUTION

Use cotter pins on hooks and holding pins (**arrows**) to secure tool.

## CAUTION

Guide engine carefully when lifting to avoid damage to body.

## Tightening Torques

Cover plate to transmission/engine	10 Nm (7 ft lb)
Exhaust pipe front to transmission bracket	25 Nm (18 ft lb)
Control pressure regulator to engine block	10 Nm (7 ft lb)
Cold start valve to intake manifold	10 Nm (7 ft lb)
Front engine support to cylinder block	25 Nm (18 ft lb)
Engine bearing to engine support	35 Nm (26 ft lb)
Mounting bolts engine/transmission M 12	55 Nm (41 ft lb)
Radiator to rubber bonded bushing lower	10 Nm (7 ft lb)
Exhaust pipe to exhaust manifold	30 Nm (22 ft lb)
A/C compressor — bracket to cylinder block M 8:	25 Nm (18 ft lb)
M 10:	30 Nm (22 ft lb)

## Engine, installing

Install in reverse order of removal. Note the following:

- check clutch release bearing for wear, replace if necessary
- lubricate clutch release bearing, driveshaft lightly with MoS<sub>2</sub> grease
- check and ensure that the dowels for centering engine/transmission are in cylinder block
- replace self-locking nuts for engine mounts
- lower engine onto mounts
- loosely install self-locking nuts for engine mounts
- rock or shake engine on mounts to align
- adjust accelerator cable (see repair group 20)
- reconnect all electrical connections (see repair group 97)
- fill coolant (see repair group 19)
- check and adjust engine oil level (see repair group 17)
- adjust engine timing/idle (see repair group 25, 28)
- align exhaust system, without tension (see repair group 26)

## NOTE

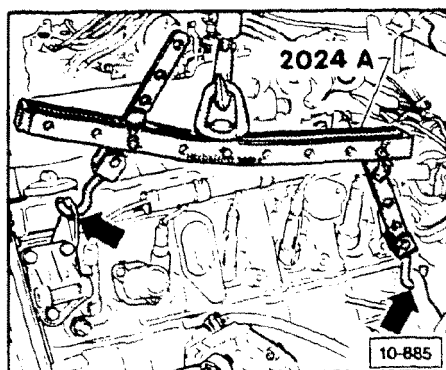
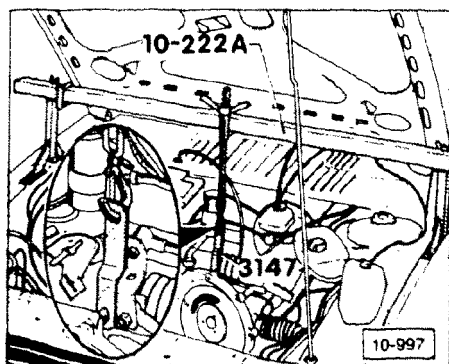
Remove engine from top without transmission.

## Do not disconnect

- wire to clutch operating cylinder
- hoses or brackets from power steering pump
- A/C hoses

## CAUTION

Coolant/antifreeze **must not** be reused when replacing engine, cylinder head, cylinder head gasket, radiator and heater core.



## CAUTION

Use cotterpins on hooks and holding pins (arrows) to secure tool.

## Engine, removing

- disconnect battery ground strap
- on manual transmission vehicles, disconnect clutch operating cylinder
- remove power steering pump (**with hoses connected**) and attach to body
- remove compressor mounting bolts together with mount and move to one side
- tie compressor back with wire
- disconnect radiator hoses
  - save anti-freeze for reuse (see caution)
- remove radiator, cowl and fan
- remove bumper (see group 63)
- remove center apron, lower crossmember
- remove left upper engine/transmission bolt
- remove distributor cap, lay to side
- position tool 10-222A
- place tool 3147 into position without damage to ignition wires
- insert tool 3147 into empty hole
- position support bar 10-222A on inner fender mounting area
- attach draw hook as shown
- raise/lower transmission with wing nut to desired height

- attach engine sling as shown and take weight with crane

Pulley side (**left arrow**)

First hole in vertical at position 3.

Flywheel side (**right arrow**)

Fourth hole in vertical bar at position 8

The positions marked 1-4 on the bar must be towards the pulley side. The holes in the hooks are counted **upwards** from the hook.

## CAUTION

Guide engine carefully when lifting to avoid damage to body.

## Tightening torques

### Engine to transmission

M 8	20 Nm (15 ft lb)
M 10	45 Nm (33 ft lb)
M 12	56 Nm (41 ft lb)

### Exhaust pipe to transmission bracket

25 Nm (18 ft lb)

### Exhaust pipe to exhaust manifold

35 Nm (26 ft lb)

### Front engine support to body

70 Nm (53 ft lb)

### Torque reactor to engine

45 Nm (33 ft lb)

### Engine support to engine bearing

45 Nm (33 ft lb)

### Stop collar to cross support lower

45 Nm (33 ft lb)

### Alternator to engine M 10

45 Nm (33 ft lb)

### Alternator to engine M 8

35 Nm (26 ft lb)

### Power steering pump

20 Nm (15 ft lb)

## Engine, installing

Install in reverse order of removal. Note the following:

- check clutch release bearing for wear, replace if necessary
- lubricate clutch release bearing, driveshaft lightly with MoS<sub>2</sub> grease
- check and ensure that the dowels for centering engine/transmission are in cylinder block
- replace self-locking nuts for engine mounts
- lower engine onto mounts
- loosely install self-locking nuts for engine mounts
- rock or shake engine on mounts to align
- adjust accelerator cable (see repair group 20)
- reconnect all electrical connections (see repair group 97)
- fill coolant (see repair group 19)
- check and adjust engine oil level (see repair group 17)
- adjust engine timing/idle (see repair group 25, 28)
- align exhaust system, without tension (see repair group 26)

## Corrosion protection, engine

### **WARNING**

Follow all application and safety instructions on labels.

### **Note**

When washing the engine compartment, only use commercially available grease cutting solvents made especially for this purpose.

If it becomes necessary to steam clean or wash the engine compartment, the wax-based protective coating is usually lost.

Reapply wax-based protective coating using Preservative wax **AKR 321 M15 4** (transparent), **AKR 321 M16 10** (transparent) or equivalent, to all engine compartment panels, seams, flanges, cavities and engine assembly surfaces.

### **CAUTION**

Part numbers are for reference only.  
Always check with your Parts Department for latest parts information.

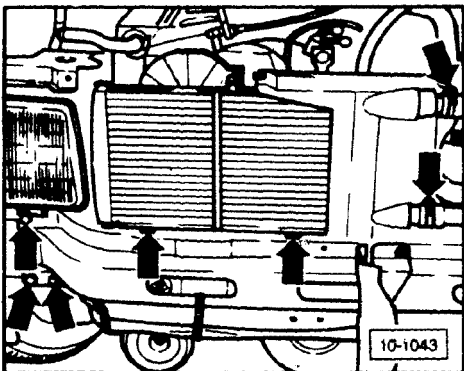
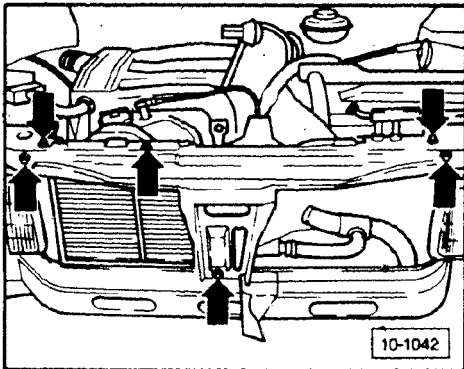
## Engine, removing

- disconnect battery wiring, loosen battery hold down and remove battery
- remove upper radiator trim
- remove sound absorber pan beneath radiator
- remove shroud bracket from transmission mount
- place drain pan under vehicle
- unfasten coolant hose on radiator and drain coolant

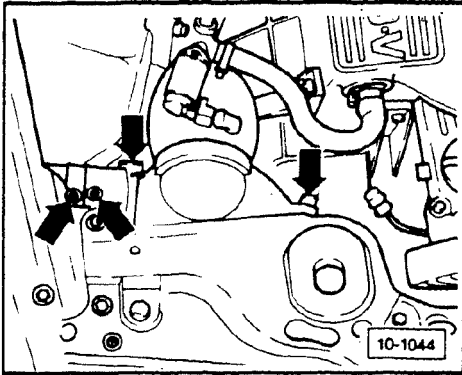
### CAUTION

Do not re-use engine coolant, replace with a fresh mixture.

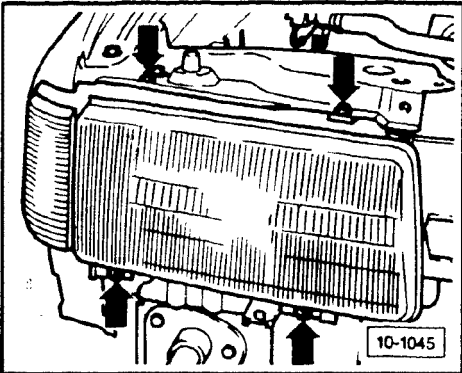
- remove radiator grille, see Group 66
- (vehicles with A/C) unclip the outside temperature sensor from radiator grille
- remove front bumper, see Group 63
- unhook release cable from hood, see Group 55
- remove radiator (upper) cross member



- remove auxiliary coolant radiator
- unclip wiring harness from lower cross member
- remove lower cross member



- remove intake hose
- unfasten cover for intake hose housing
- pull out housing from top

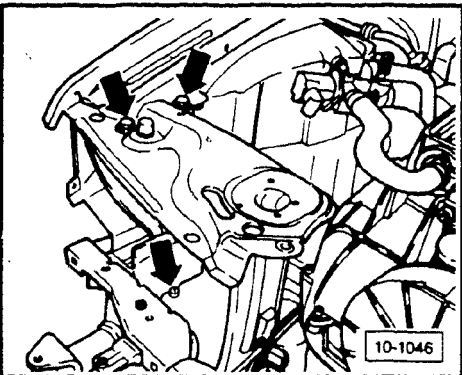


## Removing right headlamp

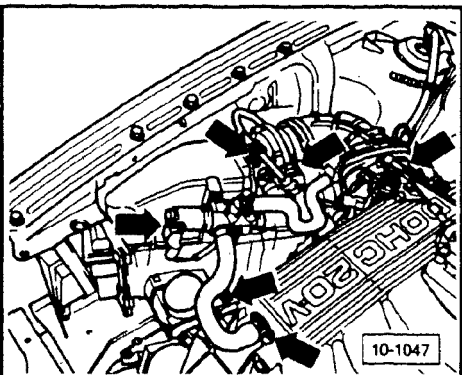
- remove harness connector for turn signal and headlamps, leave wires exposed

### Note

When re-assembling headlamp first reconnect harness connectors for the turn signal and headlamp before re-inserting headlamp.

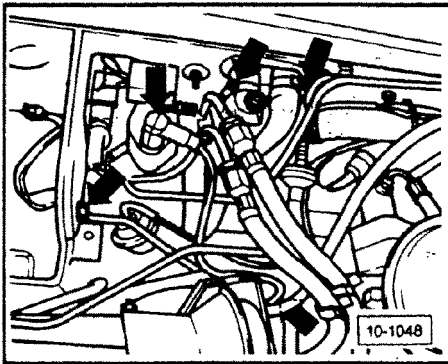


- remove upper radiator support, right

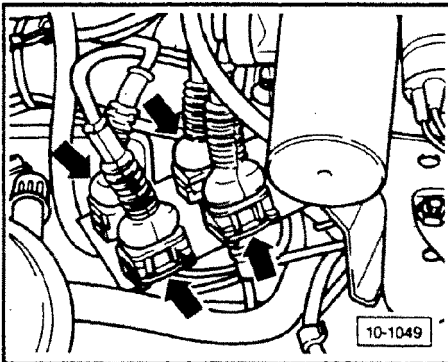


- disconnect clamp from wiring harness to air flow sensor
- disconnect harness connector from air flow sensor
- remove harness connector from idle stabilizer valve

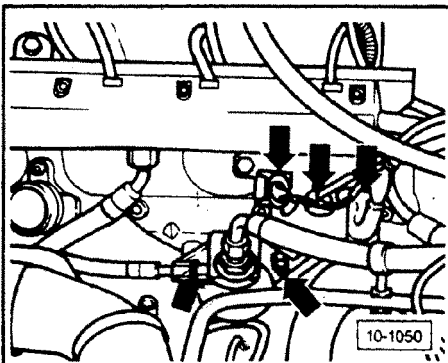




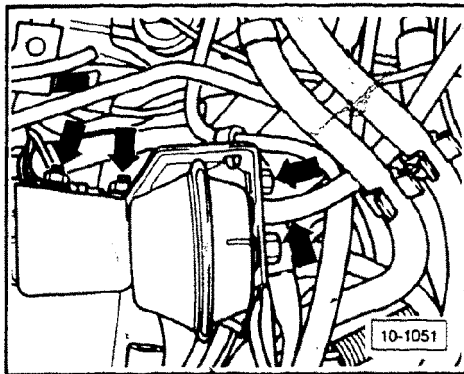
- disconnect pre-heater hose from air filter to heat stove
- loosen hose clamp
- remove air filter housing mounting bolt
- remove air filter housing assembly complete with air flow sensor and intake air boot



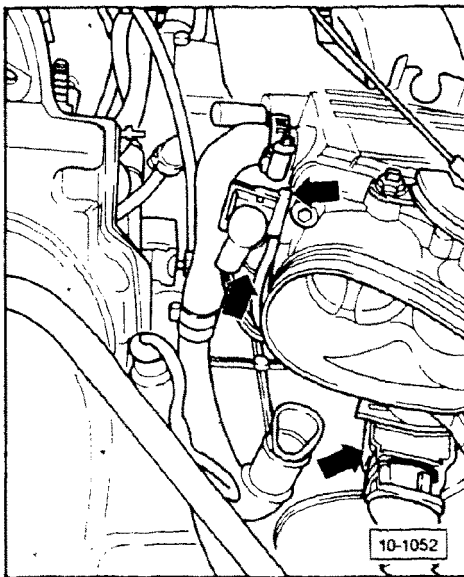
- disconnect high tension lead between distributor and ignition coil
- unclip distributor cap
- disconnect Hall sender harness connector at distributor
- remove battery ground cable
- disconnect coolant hoses to heater core



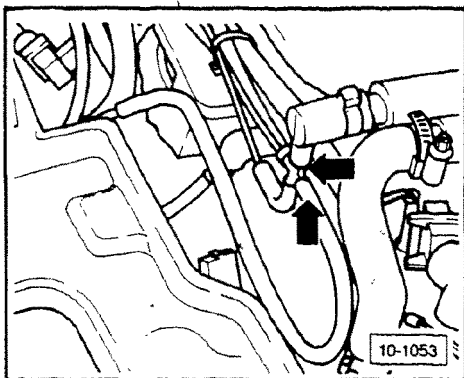
- separate harness connectors on fire wall for engine speed sensor (gray), ignition timing reference sensor (black), and both knock sensors (red, white)
- disconnect harness connectors (upper arrows)
- disconnect fuel pressure regulator



- remove clamp on cruise control bracket
- disconnect ground wires
- remove vacuum hose



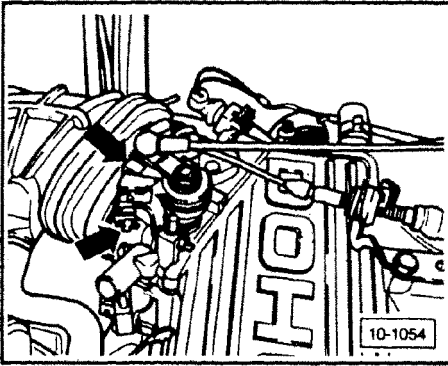
- disconnect throttle potentiometer harness connector, idle switch and thermoswitch fan afterrun



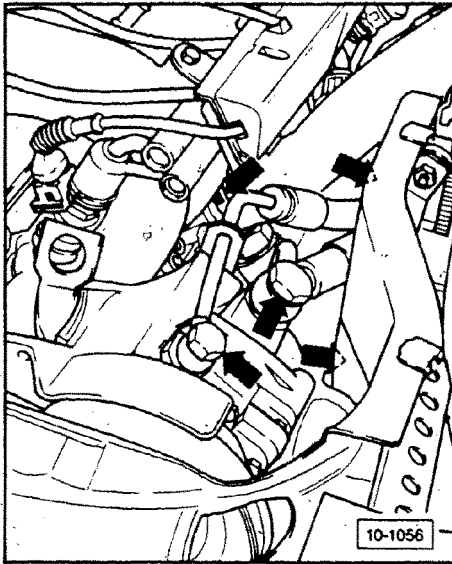
- remove vacuum lines

## Note

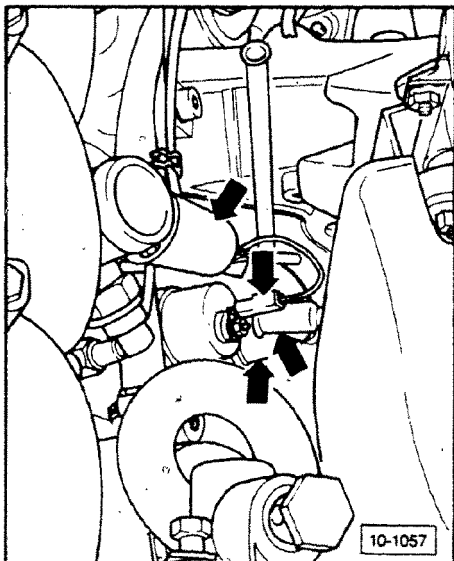
If tie wraps are removed, new ones must be installed in the original locations.



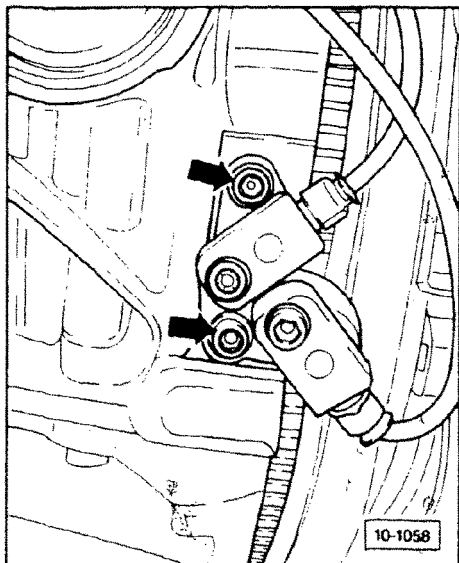
- unclip accelerator cable from throttle and let hang to one side



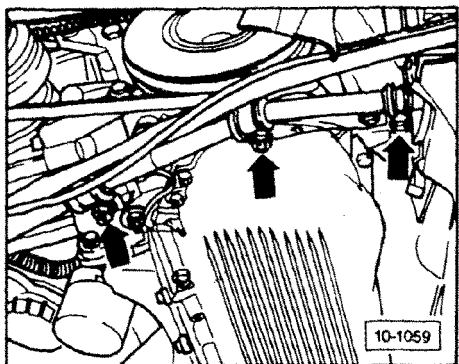
- unfasten feed and return hoses on central hydraulic pump
- disconnect coolant hose on cylinder head
- remove air duct on radiator



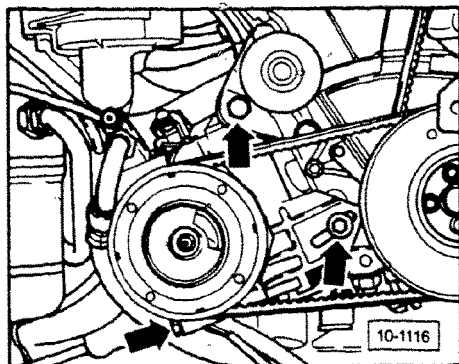
- remove harness connectors for oil pressure switch, oil pressure sender and thermoswitch, leaving wiring harness exposed



- remove bracket complete with ignition timing reference sender and engine speed sensor (two bolts, **arrows**)



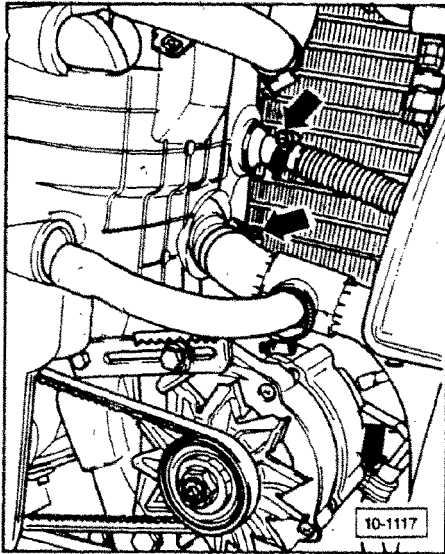
- (vehicles with A/C) loosen clamps for wire from A/C compressor to condenser



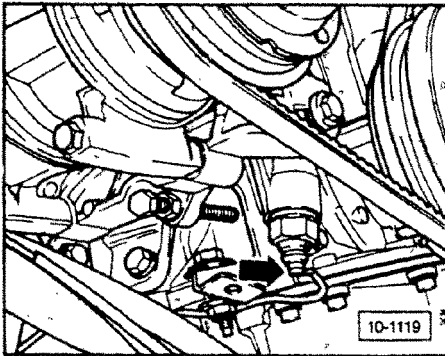
- loosen v-belt tension for A/C compressor
- remove A/C compressor and fasten oh right side rail with wire

## CAUTION

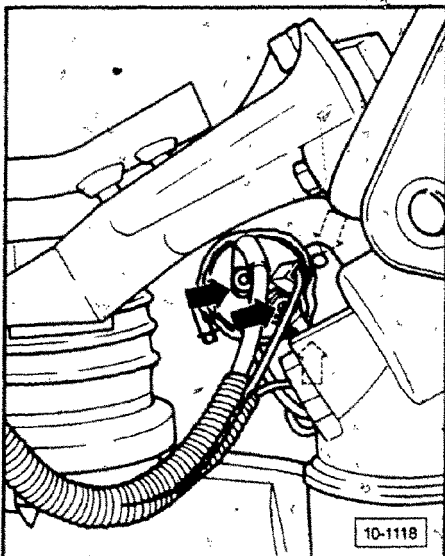
Do not bend refrigerant lines.



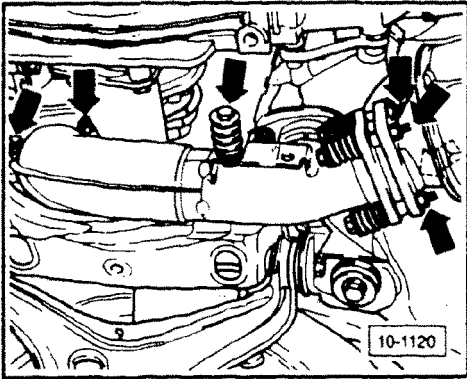
- remove coolant hose.
- loosen hose clamp on oil cooler
- place drain pan under vehicle
- loosen wiring clamp on alternator, disconnect wires and leave hanging



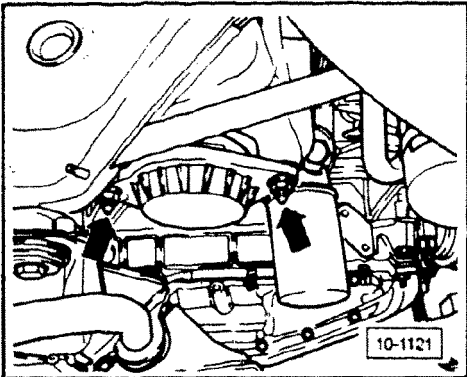
- disconnect wire from oil temperature sender and leave hanging



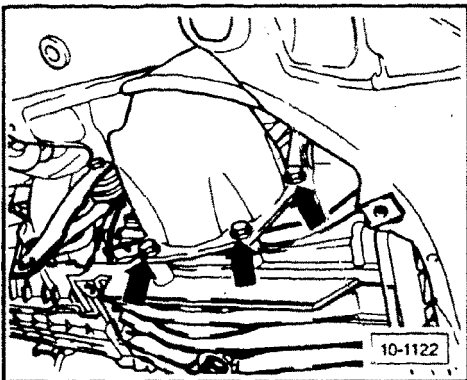
- disconnect wires to starter
- remove starter



- remove front exhaust pipe



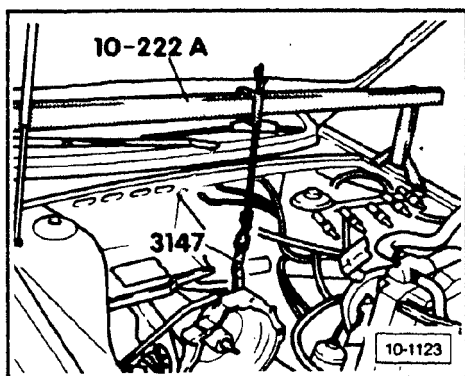
- remove right engine mount



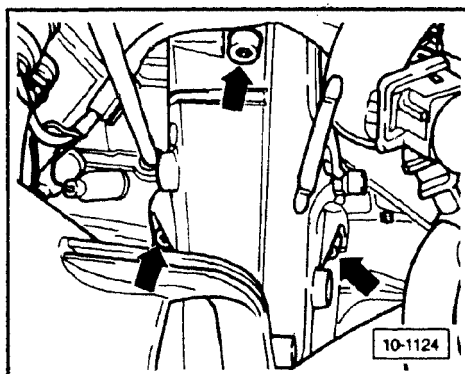
- remove heat shield for transmission drive shaft

## Note

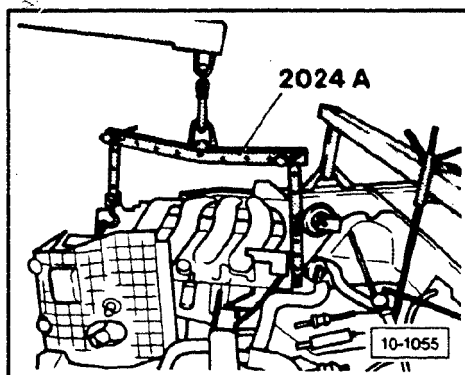
The lower starter mounting bolt should be pushed back to the stop on the drive shaft to avoid damaging the bolt during engine installation.



- remove upper most left engine/transmission mounting bolt and attach draw hook 3147
- place support bar 10-222 A on inner fender mounting area
- attach 3147 draw hook to support bar 10-222 A
- raise/lower transmission to desired height by adjusting wing nut



- remove left engine mount
- remove engine-transmission mounting bolts



- attach engine sling 2024 A to engine as shown

## Note

To balance the engine assembly at its center of gravity insert the hook into the rail holes as shown in the illustration.

- position crane (watch for A/C compressor)
- attach 2024 A lifting hook to crane
- ensure that all crane and hook fastening points are tight
- pry engine from transmission
- lift engine and remove from front

## CAUTION

Carefully guide the engine while removing, to avoid damaging the drive shaft, clutch and sheet metal.

## Engine, installing

### Note

Installation procedure is the reverse of removal, however; keep the following points in mind:

- ensure that the engine/transmission alignment dowels are installed in cylinder block, install if missing
- always replace self locking nuts
- adjust accelerator cable, see Group 20
- fill cooling system, see Group 19
- check engine oil level before starting engine
- check automatic transmission oil level
- adjust exhaust system tension-free see Group 26

### Note

Replace all tie wraps which have been removed in the same location.

To install A/C compressor see Group 87, removing and installing.

### CAUTION

After tensioning the V-belt, turn tensioning bolt approximately 10 mm (0.4 in) from engine block.



Tightening Torques:	
Engine to transmission M8 M10 M12	20 Nm (15 ft lb)
	45 Nm (33 ft lb)
	60 Nm (44 ft lb)
Right and left engine support	45 Nm (33 ft lb)
A/C compressor to bracket	25 Nm (18 ft lb)
Exhaust pipe to transmission bracket	25 Nm (18 ft lb)
Engine mount to engine support	40 Nm (30 ft lb)
Engine mount to body	40 Nm (30 ft lb)