

640 Heating and Air Conditioning

GENERAL	640-1	A/C compressor, replacing (M30 engine) . . .	640-13
HEATER AND CONTROLS	640-1	A/C compressor, replacing (M60 or M70 engine)	640-14
Blower motor, removing and installing	640-1	A/C Compressor Clutch	640-15
Blower final stage, replacing	640-2	A/C condenser, replacing	640-16
Heater valve, replacing	640-4	A/C receiver/drier, replacing	640-17
Auxiliary coolant pump, replacing	640-4	A/C evaporator and expansion valve, removing and installing	640-18
Heater core, replacing	640-5	A/C evaporator temperature sensor, replacing	640-21
Outside temperature sensor, replacing	640-7	Microfilter, replacing	640-22
Heater core temperature sensor, replacing ..	640-8	A/C control module, removing and installing	640-23
Heater and A/C control head removing and installing	640-9		
Sensor fan for interior temperature, replacing	640-9		
Air distribution motors, replacing	640-10		
AIR CONDITIONING	640-11		
A/C system, warnings and cautions	640-12		

TABLES

a. Blower Motor Test Values	640-2
b. Outside Temperature Sensor Test Values	640-8
c. Heater Core Temperature Sensor Test Values	640-8
d. Evaporative Temperature Sensor Test Values	640-22
e. A/C System Refrigerant Capacities	640-24

GENERAL

The repair information given under this heading applies to the heating and air conditioning system. Many of the procedures require that the A/C refrigerant charge be evacuated. See **A/C System Warnings and Cautions** later in this repair group.

HEATER AND CONTROLS

Blower motor, removing and installing

- Disconnect negative (–) battery cable. See **020 Maintenance**.

CAUTION—

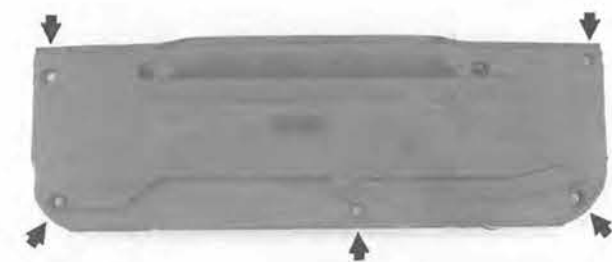
Prior to disconnecting the battery, read the battery disconnection cautions given at the front of this manual on page viii.

- Remove hoses at coolant expansion tank at engine compartment rear bulkhead and disconnect electrical connector from level sensor in tank. Unbolt expansion tank and move aside.
- Unclip wire harness protective cover on rear bulkhead. Cut wire ties as necessary.

HEATER AND CONTROLS

640-2 HEATING AND AIR CONDITIONING

- Remove bulkhead splash shield by removing 5 retaining screws (arrows).



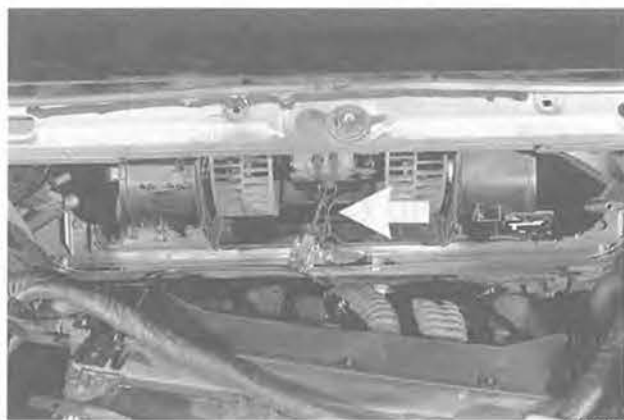
0011862

- Unhook blower motor housing cover retaining strap (arrow) and remove cover.
- Disconnect electrical connectors from blower motor.



0011863

- Disengage blower motor retaining strap. Pry up on strap to release.
- Remove blower motor from cowl opening.
- Installation is reverse of removal. Blower motor test specifications are listed in Table a.



0011864

Table a. Blower Motor Test Values

Testing voltage	13 volts DC
Operating voltage	9–15 volts DC
Current consumption (approx.)	12 amps
Maximum speed	3600–4000 rpm
Axial play (max. allowable)	1.0 mm (0.04 in.)

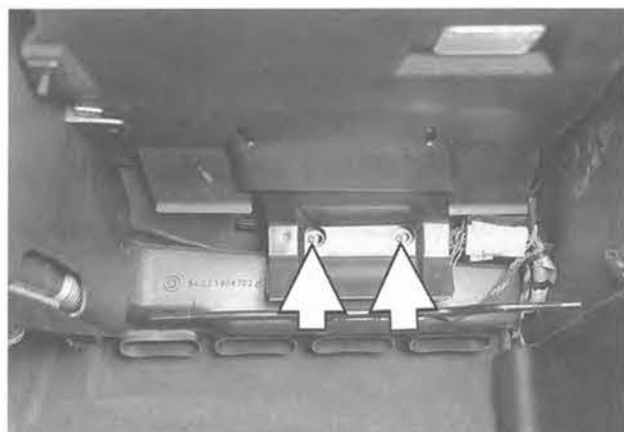
Blower motor final stage, replacing

Blower motor speed is regulated through the blower final stage, often referred to as the "sword".

- Remove glove compartment. See 513 Interior Trim.

HEATING AND AIR CONDITIONING 640-3

- Remove carpet trim piece from right side of center console. A screw retains trim piece at front end.
- Remove ventilation air duct retaining screws (**arrows**) and clips. Pull air duct down and out.
- Disconnect all plugs on heater/A/C control module and from final stage. Move wire harness aside.



0011867

- Remove final stage mounting screws (**arrows**).



0011868

- Remove final stage by pulling to right.
- Installation is reverse of removal.



0017193

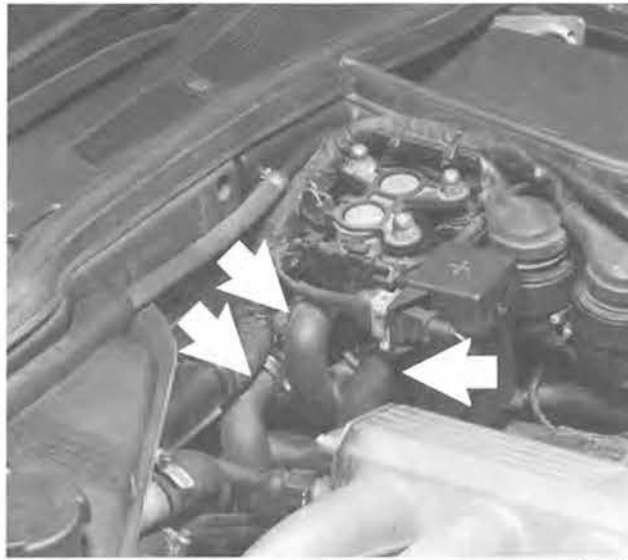
HEATER AND CONTROLS

640-4 HEATING AND AIR CONDITIONING

Heater valve, replacing

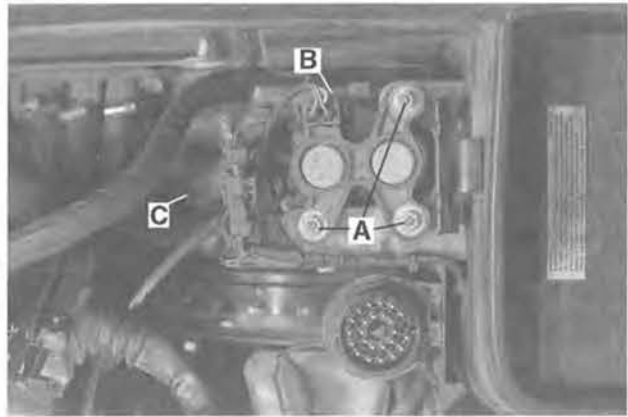
The heater valve is located in the rear of the engine compartment on the driver's side.

- Drain engine coolant. See **170 Radiator and Cooling System**.



0017189

- Disconnect coolant hoses from heater valve (**arrows**).
- Disconnect hose from auxiliary coolant pump. See **Auxiliary coolant pump, replacing**.



0011870

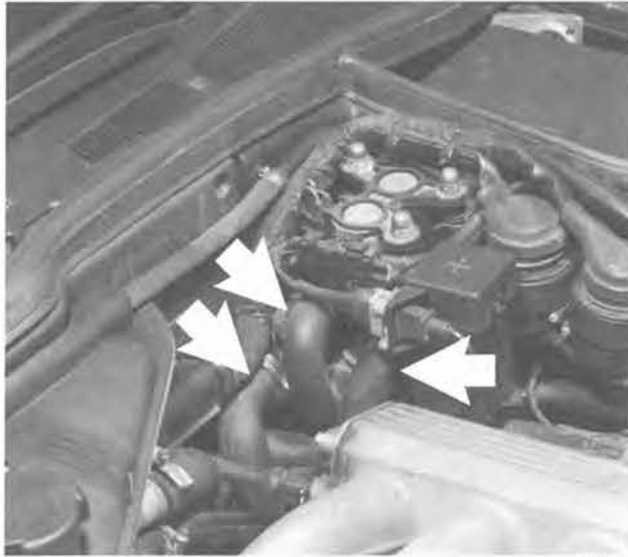
- Disconnect harness connector (**B**) and coolant hose (**C**). Remove mounting nuts (**A**) from heater valve. Lift out heater valve together with auxiliary coolant pump.
- Separate auxiliary coolant pump from heater valve.
- Installation is reverse of removal. Fill and bleed cooling system. See **170 Radiator and Cooling System**.

Auxiliary coolant pump, replacing

The auxiliary coolant pump is electrically operated and provides additional coolant circulation to the heater core. The pump is located in the rear of the engine compartment directly below the heater valve.

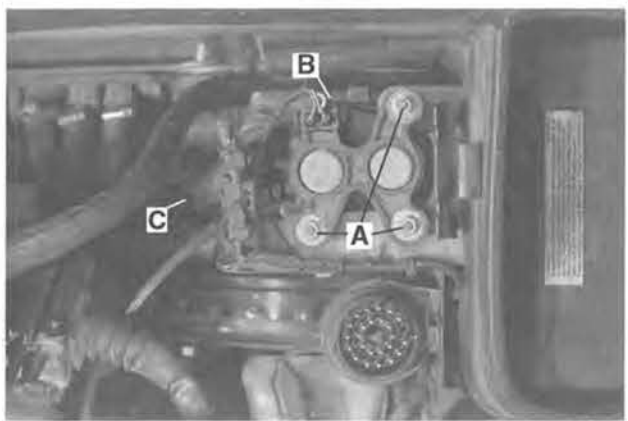
- Drain engine coolant. See **170 Radiator and Cooling System**.

HEATING AND AIR CONDITIONING 640-5



0017189

- Disconnect coolant hoses (**arrows**) from rear bulkhead in engine compartment.



0011870

- Remove harness connector (**B**) and coolant hose (**C**). Remove mounting nuts from heater valve. Remove heater valve from mount together with auxiliary coolant pump.
- Remove clamp from auxiliary coolant pump and remove pump from heater valve.
- Installation is reverse of removal. Fill and bleed cooling system. See **170 Radiator and Cooling System**.

Heater core, replacing

NOTE—

Heater core removal requires removal of SRS airbag(s), dash board and center console. See **513 Interior Trim**.

- Disconnect negative (–) battery cable. See **020 Maintenance**.

CAUTION—

Prior to disconnecting the battery, read the battery disconnection cautions given at the front of this manual on page viii.

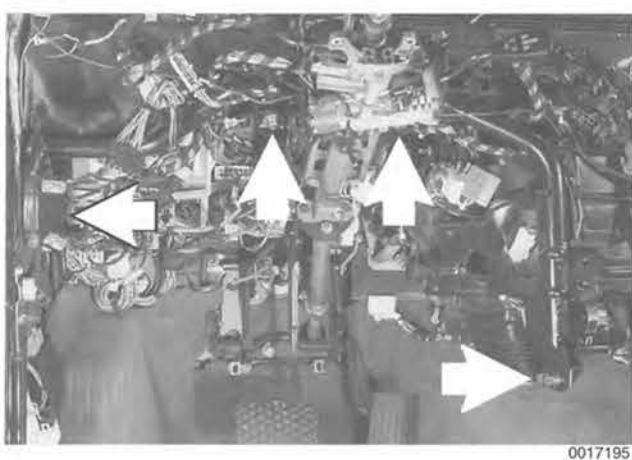
- Drain engine coolant. See **170 Radiator and Cooling System**.
- Remove center console and dashboard. See **513 Interior Trim**.
- Remove rear air distribution tube from top of center tunnel.

HEATER AND CONTROLS

640-6 HEATING AND AIR CONDITIONING



- Disconnect heater hoses (**arrows**) at rear of engine compartment.



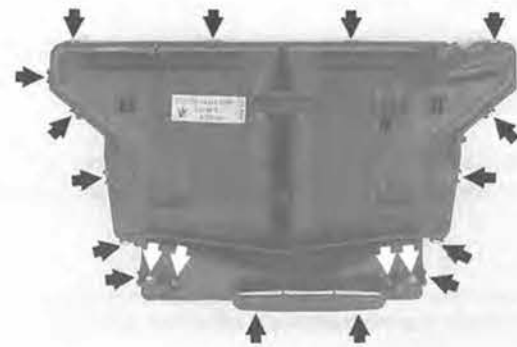
- Steering column reinforcement bracket mounting bolts (**arrows**).



- Remove glove compartment support frame mounting bolts (**arrows**).
- Cut wire ties holding wire harness to heater box cover inside car and move harness aside.

HEATER AND CONTROLS

HEATING AND AIR CONDITIONING 640-7



0011872

- Remove clips (**black arrows**), nuts and screws (**white arrows**) from heater box cover.



0011873

- Remove heater pipe mounting bolts (**arrows**) on heater core.
- Remove heater pipes from heater core.
- Remove heater core by lifting out from right side.
- Installation is reverse of removal.
 - Use new O-rings when mounting pipes to heater core.
 - Use new hose clamps to reattach heater hoses.
 - Fill and bleed cooling system. See **170 Radiator and Cooling System**.

Outside temperature sensor, replacing

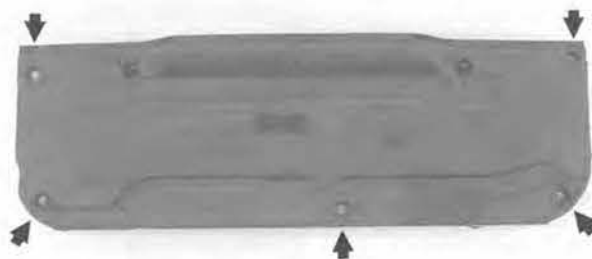
The outside temperature sensor is mounted in the blower motor housing, behind the engine compartment rear bulkhead splash shield.

- Disconnect negative (–) battery cable. See **020 Maintenance**.

CAUTION—

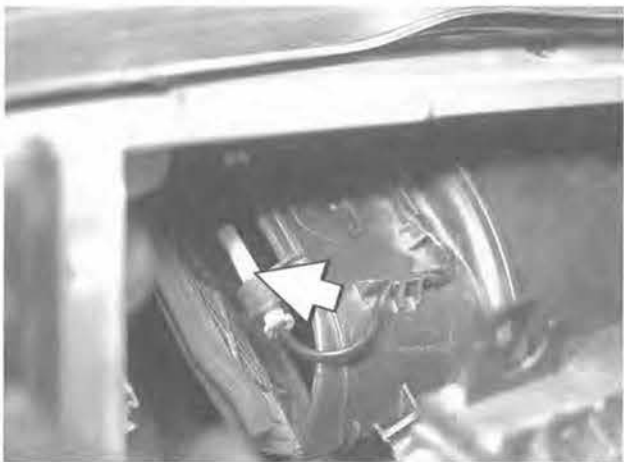
Prior to disconnecting the battery, read the battery disconnection cautions given at the front of this manual on page viii.

- Remove hose from coolant expansion tank and disconnect electrical plug from level sensor at tank. Unbolt expansion tank and move aside.
- Unclip wire harness protective cover on rear bulkhead. Cut wire ties as necessary.
- Remove bulkhead splash shield by removing 5 retaining screws (**arrows**).



0011862

640-8 HEATING AND AIR CONDITIONING



0011874

Slide outside temperature sensor (arrow) out of blower housing.

Replace sensor by cutting sensor wiring approximately 30 mm (1.2 in.) from sensor end. Remove approximately 40 mm (1.6 in.) of insulation from sensor harness.

Install heat shrink tubing on finished wiring splice. Connect wires from new sensor to harness wires and solder in place.

NOTE—

To minimize danger of a short circuit, reconnect and solder the sensor wiring so that wire splices are offset from each other.

Installation is reverse of removal. Outside temperature sensor test values are listed in Table b.

Table b. Outside Temperature Sensor Test Values

Test temperature	Resistance
0°C (32°F)	2.69 - 3.46 k ohms
10°C (50°F)	1.74 - 2.11 k ohms
20°C (68°F)	1.15 - 1.32 k ohms
25°C (77°F)	0.95 - 1.05 k ohms
30°C (86°F)	0.76 - 0.87 k ohms
40°C (104°F)	0.49 - 0.60 k ohms

Heater core temperature sensor, replacing

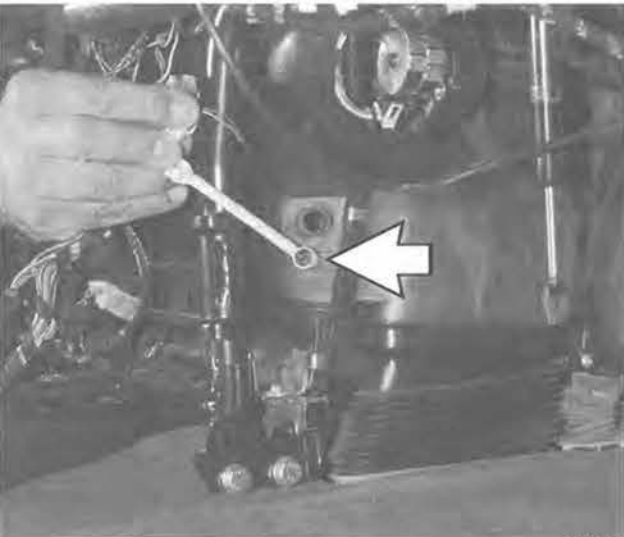
Remove center console. See 513 Interior Trim.

Disconnect harness connector from sensor (arrow) and carefully pry out sensors from heater core housing. (Right side shown).

Installation is reverse of removal. Heater core temperature sensor test values are listed in Table c.

Table c. Heater Core Temperature Sensor Test Values

Test temperature	Resistance
-20 °C (4°F)	84.39 - 109.61 k ohms
-10°C (14°F)	48.58 - 62.09 k ohms
0°C (32°F)	28.89 - 36.40 k ohms
20°C (68°F)	11.13 - 13.83 k ohms
60°C (140°F)	2.19 - 2.78 k ohms
100°C (212°F)	0.58 - 0.77 k ohms



0011875

Heater and A/C control head, removing and installing

E32 models are equipped with an automatic climate control system designated IHKA. The system control head has three groups of three push buttons in the lower part of the panel and three rotary dials in the upper part.

- Working carefully at center console opening, pry out control head.
- Detach IHKA Heater and A/C control head harness connectors (arrows) and remove control head.
- Installation is reverse of removal.

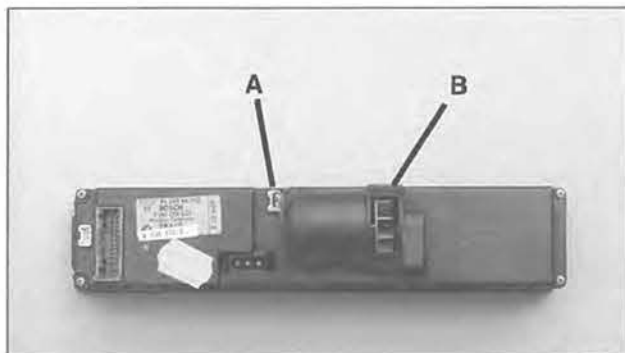


0017190

Sensor fan for interior temperature, replacing

A small electric fan, installed in the A/C control head, draws cabin air past the climate control temperature sensor.

- Remove A/C control head as described earlier.
- Disconnect electrical connector (A) from top of control head housing. Pry open plastic housing and remove sensor fan (B).
- Installation is reverse of removal.



0017183

Air distribution motors, replacing

The distribution of air is controlled by a series of flaps that are actuated by stepper motors. There are ten distribution motors located around the heater/AC box area. Replacement of the motors is best accomplished after removing the center console and other dash trim panels as required.

◀ Air distribution motors in IHKA heater box.

- Disconnect negative (–) battery cable. See **020 Maintenance**.

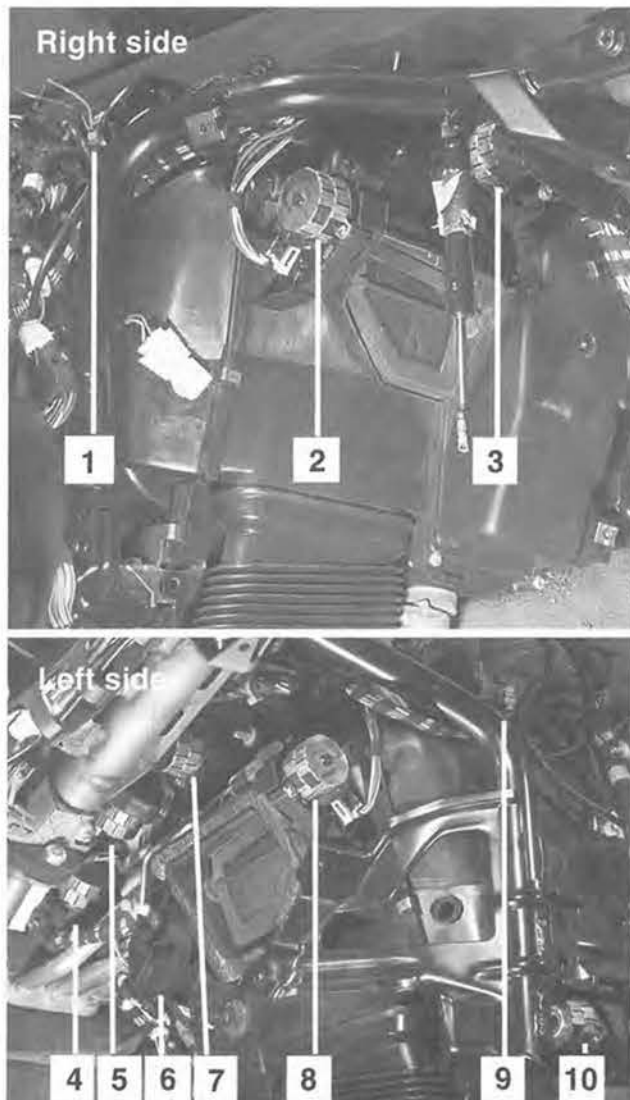
CAUTION—

Prior to disconnecting the battery, read the battery disconnection cautions given at the front of this manual on page viii.

- Remove center console, lower dash panels and glove box. See **513 Interior Trim**.

NOTE—

Dashboard removal may be necessary for upper motors on some models.



- | | |
|-------------------------------|------------------|
| 1. Blend door | 6. Defrost vents |
| 2. Right footwell | 7. Center vent |
| 3. Center vent | 8. Left footwell |
| 4. Defroster, temp regulation | 9. Blend doors |
| 5. Fresh air/recirculation | 10. Rear vents |

0017196/0017197



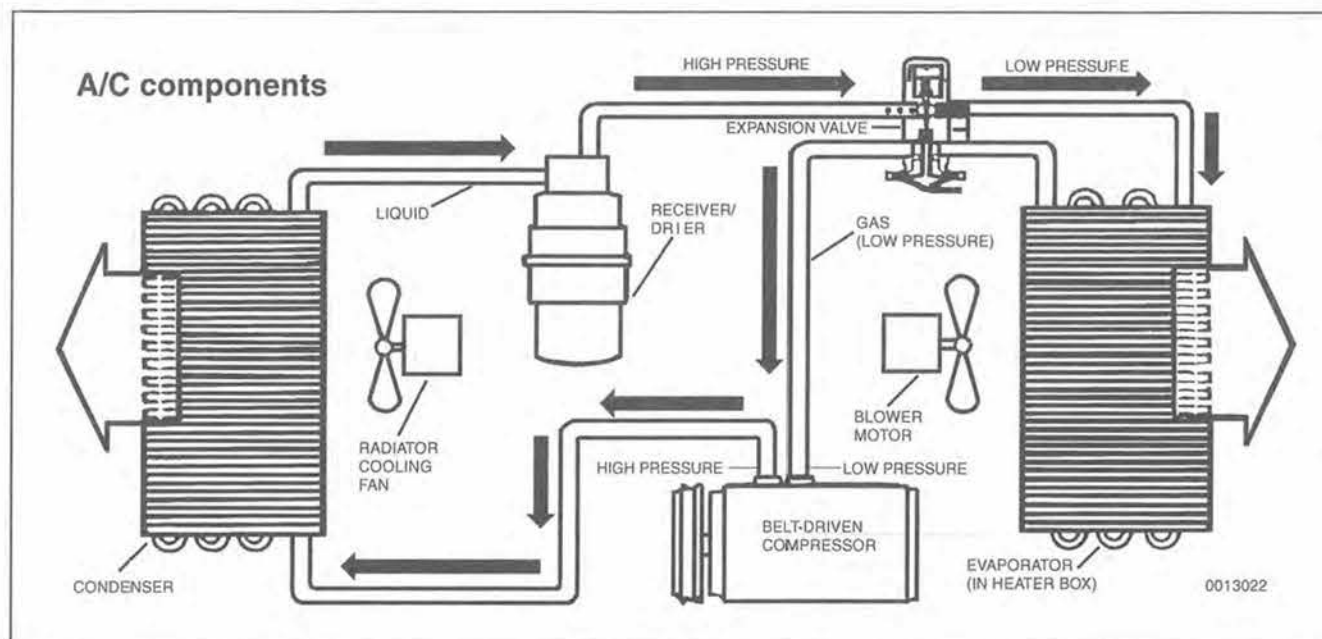
0011877

➤ To remove an air distribution motor, disconnect harness connector and unclip (**arrow**) motor with gearbox from heater box.

AIR CONDITIONING

This section covers removal and installation of air conditioning components. A/C refrigerant discharge, evacuation and recharge are not covered here.

The subassemblies and lines of the air conditioner are filled with either refrigerant R-12 (1989–1992 cars) or R-134a (1993–1994 cars).



A/C system, warnings and cautions

WARNING—

- *Work in a well ventilated area. Avoid breathing refrigerant vapors. Exposure may irritate eyes, nose, and throat. Switch on exhaust/ventilation systems when working on the refrigerant system.*
- *Always be careful that refrigerant does not come in contact with your skin. Always wear hand and eye protection (gloves and goggles) when working around the A/C system. If refrigerant does come in contact with your skin or eyes:*
 - Do not rub skin or eyes*
 - Immediately flush skin or eyes with cool water for 15 minutes*
 - Rush to a doctor or hospital.*
 - Do not attempt to treat yourself.*
- *Refrigerant gases are heavier than air, displace oxygen and may cause suffocation in areas of poor circulation, for example under a car.*
- *Do not discharge/charge the A/C system without proper equipment and training. Damage to the vehicle and personal injury may result.*
- *The A/C system is filled with refrigerant gas which is under pressure. Pressurized refrigerant in the presence of oxygen may form a combustible mixture. Never introduce compressed air into any container (full or empty), capped off A/C component, or piece of service equipment.*
- *State and local governments may have additional requirements regarding air conditioning servicing. Always comply with state and local laws.*
- *Do not expose any component of the A/C system to high temperatures (Above 80°C/176°F) or open flames. Excessive heat will cause a pressure increase which could burst the system.*
- *Keep refrigerant away from open flames. Poisonous gas will be produced if it burns. Do not smoke near refrigerant gases for the same reason.*
- *Electric welding near refrigerant hoses causes R-134a to decompose. Discharge system before welding.*

CAUTION—

- *The mixture of refrigerant oil (PAG oil) and refrigerant R-134a attacks some metals and alloys (for example, copper) and breaks down certain hose materials. Use only hoses and lines that are identified with a green stripe or the lettering "R-134a".*
- *Immediately plug open connections on A/C components to prevent dirt and moisture contamination.*
- *R-134a and R-12 systems use different size service fittings. Never use adapters to convert an R-12 fitting to R-134a size.*
- *Do not steam clean condensers or evaporators. Use only cold water or compressed air.*

CAUTION—

- It is recommended that all service to the A/C system refrigerant components be left to an authorized BMW dealer or other qualified A/C service facility. If any of the refrigerant components are disconnected or removed, special equipment, supplies, and new parts will be needed to remove moisture from the system and recharge the refrigerant before it is closed back up.
- As of January 1, 1992 any person who services a motor vehicle air conditioner must, by law, be properly trained and certified, and use approved refrigerant recycling equipment. Technicians must complete an EPA-approved recycling course to be certified.
- Do not top-off a partially charged refrigerant system. Discharge system, evacuate and then recharge system.
- Service equipment for the R-134a and R-12 systems are not compatible. Use proper service equipment. Damage to both vehicle and service equipment will result from R-12 contamination of R-134a.

A/C compressor, replacing (M30 engine)

- Following manufacturer's instructions, connect an approved refrigerant recovery/recycling/recharging unit to A/C system and discharge system.
- Disconnect negative (–) battery cable. See **020 Maintenance**.

CAUTION—

Prior to disconnecting the battery, read the battery disconnection cautions given at the front of this manual on page viii.

- Remove air cleaner assembly from right (passenger side) front corner of engine compartment.
- Remove drive belt from A/C compressor. See **020 Maintenance**.
- Cut tie-wrap retaining A/C compressor electrical harness to refrigerant hose. Disconnect harness connector from compressor.
- Detach A/C pressure and suction hoses (**arrows**) from compressor. Plug hoses and fittings immediately.
- Raise and support car.

WARNING—

Make sure the car is stable and well supported at all times. Use a professional automotive lift or jack stands designed for the purpose. A floor jack is not adequate support.

- Remove engine splash shield from under car.
- Loosen (but do not remove) compressor mounting nuts.
- Swing compressor towards engine and remove drive belt.



0011878

640-14 HEATING AND AIR CONDITIONING

- Remove compressor mounting nuts and remove compressor.
- Installation is reverse of removal. Replace O-rings at pressure fittings.

CAUTION—

Do not re-use O-rings when reconnecting refrigerant lines. Always replace O-rings.

- Be sure there is sufficient oil in compressor.
- Before recharging, evacuate system for at least 30 min.
- Recharge system following equipment manufacturer's instructions.

Tightening Torques (M30 engine)

- A/C compressor to engine block 22 Nm, (17 ft-lb)
- A/C line flange to A/C compressor
 - 5/8 in. line 20 Nm (15 ft-lb)
 - 3/4 in. line 39 Nm (29 ft-lb)
 - 7/8 in. line 42 Nm (31 ft-lb)
 - 1 1/16 in. line 48 Nm (35 ft-lb)

A/C compressor, replacing (M60 or M70 engine)

- Following manufacturer's instructions, connect an approved refrigerant recovery/recycling/recharging unit to A/C system and discharge system.

WARNING—

Do not discharge/charge the A/C system without proper equipment and training. Damage to the vehicle and personal injury may result. Read warnings and cautions given earlier.

- Disconnect negative (–) battery cable. See **020 Maintenance**.

CAUTION—

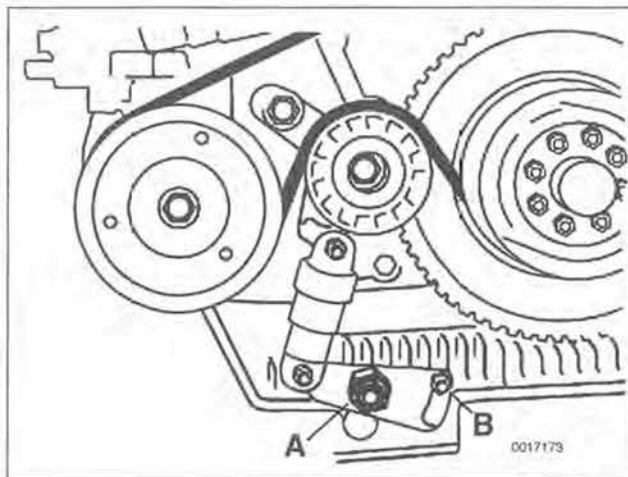
Prior to disconnecting the battery, read the battery disconnection cautions given at the front of this manual on page viii.

- Raise and safely support car.

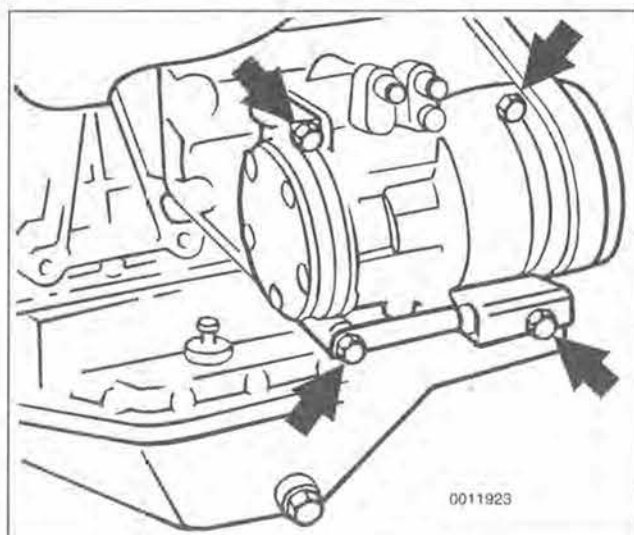
WARNING—

Make sure the car is stable and well supported at all times. Use a professional automotive lift or jack stands designed for the purpose. A floor jack is not adequate support.

- Remove engine splash shield from under car.
- To remove A/C compressor drive-belt, loosen nuts **A** and **B**. Swivel adjuster down and retighten nut **B**.
- Remove A/C compressor drive belt.



AIR CONDITIONING



- Disconnect suction and pressure hoses from A/C compressor. Plug openings immediately.
- Remove A/C compressor mounting bolts (arrows) and remove compressor. M60 engine shown. M70 engine is similar.
- Installation is reverse of removal.

CAUTION —

Do not re-use O-rings when reconnecting refrigerant lines. Always replace O-rings.

- Be sure there is sufficient oil in compressor.
- Before recharging, evacuate system for at least 30 min.
- Recharge system following equipment manufacturer's instructions.

Tightening Torques (M60/M70 engine)

- A/C compressor to engine block . . . 22 Nm (17 ft-lb)
- A/C line flange to A/C compressor
 - 5/8 in. line . . . 20 Nm (15 ft-lb)
 - 3/4 in. line . . . 39 Nm (29 ft-lb)
 - 7/8 in. line . . . 42 Nm (31 ft-lb)
 - 1 1/16 in. line . . . 48 Nm (35 ft-lb)

Oil Capacities for A/C Compressors

- R12 drum type . . . 300 cm³
- R12 impeller type . . . 200 cm³
- R134a Nippondenso . . . 160-190 cm³
- R134a Seiko Seiki . . . 180-200 cm³

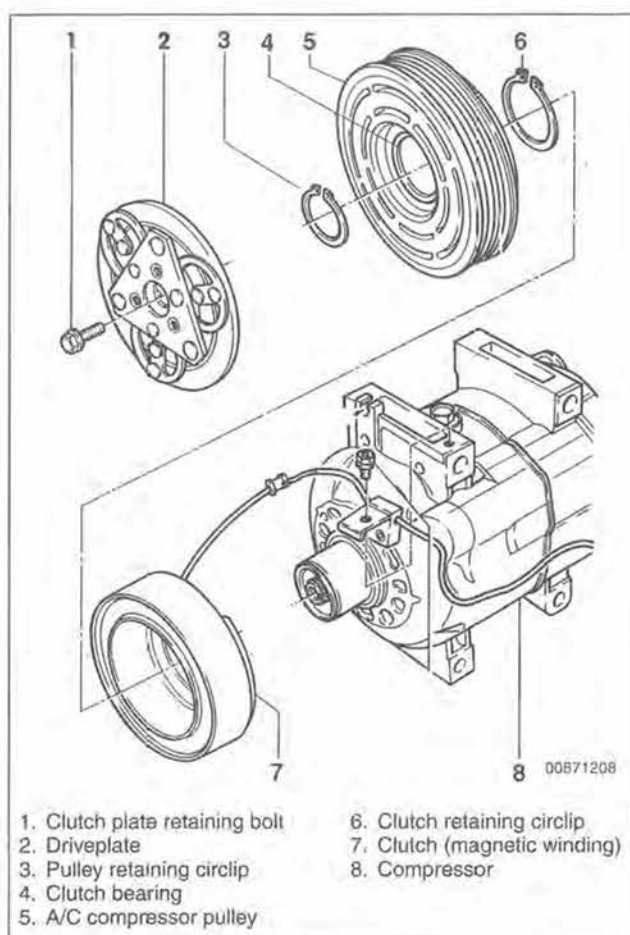
A/C Compressor Clutch

The compressor clutch can be replaced without disturbing the sealed refrigerant system, although clearances may be very tight. Remove splash shield from below engine and detach the compressor from the compressor bracket to gain extra clearance.

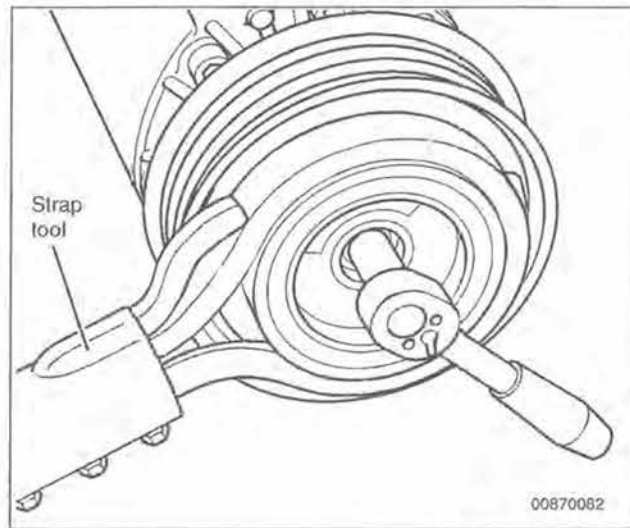
- A/C compressor and clutch components.

CAUTION —

Do not allow compressor to hang by refrigerant lines. Hang compressor from chassis using stiff wire.



640-16 HEATING AND AIR CONDITIONING



- ◀ A/C compressor driveplate must be held stationary with strap tool or equivalent to allow removal of retaining bolt.
- Remove drive plate and pulley to access clutch magnetic winding.

NOTE—

- BMWs are equipped with compressors from various manufacturers. Special tools may be required to remove driveplate or pulley.
- During installation make sure to reinstall all spacer shims. The correct spacing between clutch drive plate and pulley is 0.5 - 0.8 mm (0.020 - 0.031 in).

Tightening Torque

- Compressor clutch bolt to compressor shaft 20 Nm (15 ft-lb)
- Compressor to engine 22 Nm (17 ft-lb)

A/C condenser, replacing

- Following manufacturer's instructions, connect an approved refrigerant recovery/recycling/recharging unit to A/C system and discharge system.

WARNING—

Do not discharge/charge the A/C system without proper equipment and training. Damage to the vehicle and personal injury may result. Read warnings and cautions given earlier. Read warnings and cautions given under A/C system, warnings and cautions.

- Disconnect negative (–) battery cable. See **020 Maintenance**.

CAUTION—

Prior to disconnecting the battery, read the battery disconnection cautions given at the front of this manual on page viii.

- Remove front bumper and center radiator grille. See **510 Exterior Trim, Bumpers**.
- Detach electrical connector from auxiliary cooling fan and remove fan. See **170 Radiator and Cooling System**.
- Detach A/C lines from lower right corner of condenser. Plug lines and fittings immediately.



0011882

- Remove A/C condenser mounting bolts (arrows) on radiator support.
- Lift up condenser to disengage from lower mounts and remove from below.
- Installation is reverse of removal.

CAUTION—

- Do not re-use O-rings when reconnecting refrigerant lines. Always replace O-rings.
- When installing a new condenser always replace the receiver/drier unit.

- Before recharging, evacuate system for at least 30 min.
- Recharge system following equipment manufacturer's instructions.
- For capacities, see **Table e**.

Tightening Torques (A/C condenser)

- A/C lines to receiver/drier

5/8 in. line	20 Nm (15 ft-lb)
3/4 in. line	39 Nm (29 ft-lb)
7/8 in. line	42 Nm (31 ft-lb)

A/C receiver/drier, replacing

The A/C receiver/drier is mounted in the right side of the engine compartment beneath the windshield washer tank.

CAUTION—

- The receiver/drier must be replaced when*
- There is dirt in the A/C system
 - The compressor has seized or has been replaced for any reason
 - The condenser or evaporator are replaced for any reason
 - The A/C system is leaking and there is no more refrigerant
 - The A/C system was open for 24 hours or more.

NOTE—

There have been two types of receiver/driers installed on E32 cars. Up to 9/1988, three separate switches were used to monitor the receiver/drier. On 9/1989 and later cars, one switch with three functions was used.

- Following manufacturer's instructions, connect an approved refrigerant recovery/recycling/recharging unit to A/C system and discharge system.

WARNING—

Do not discharge/charge the A/C system without proper equipment and training. Damage to the vehicle and personal injury may result. Read warnings and cautions given earlier.

640-18 HEATING AND AIR CONDITIONING



0017182

- Disconnect negative (–) battery cable. See **020 Maintenance**.

CAUTION—

Prior to disconnecting the battery, read the battery disconnection cautions given at the front of this manual on page viii.

- Remove right headlight assembly. See **630 Exterior Lighting**.
- Disconnect harness connectors from windshield washer tanks (upper and lower) and remove both tanks. See **611 Wipers and Washers**.
- Detach refrigerant pressure lines from receiver/drier.
- Detach A/C receiver/drier harness connector and remove mounting bolts (**arrows**). R12 type receiver/drier.
- Remove receiver/drier complete with safety switch(es).
- Installation is reverse of removal.

CAUTION—

Do not re-use O-rings when reconnecting refrigerant lines. Always replace O-rings.

- Change switch(es) over to new receiver/drier.
- Before recharging, evacuate system for at least 30 min.
- Recharge system following the equipment manufacturer's instructions.

Tightening Torques (A/C receiver/drier)

- A/C lines to receiver/drier
 - 5/8 in. line 20 Nm (15 ft-lb)
 - 3/4 in. line 39 Nm (29 ft-lb)
 - 7/8 in. line 42 Nm (31 ft-lb)
- Pressure switches
 - High/med 25 Nm (18 ft-lb)
 - Low 19 Nm (14 ft-lb)
 - 3-way 25 Nm (18 ft-lb)

A/C evaporator and expansion valve, removing and installing

- Following manufacturer's instructions, connect an approved refrigerant recovery/recycling/recharging unit to A/C system and discharge system.

WARNING—

Do not discharge/charge the A/C system without proper equipment and training. Damage to the vehicle and personal injury may result. Read warnings and cautions given earlier.

HEATING AND AIR CONDITIONING 640-19

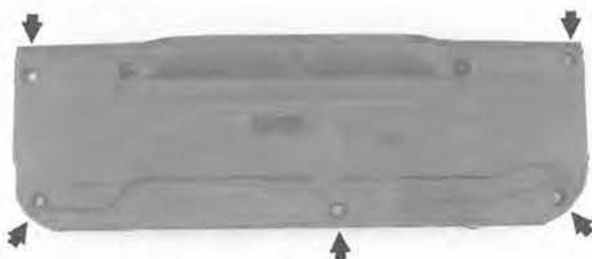
- Disconnect negative (–) battery cable. See **020 Maintenance**.

CAUTION—

Prior to disconnecting the battery, read the battery disconnection cautions given at the front of this manual on page viii.

- Remove hose from coolant expansion tank and disconnect electrical connector from level sensor in tank. Unbolt tank and move aside.
- Unclip wire harness protective cover on engine compartment rear bulkhead. Cut wire ties as necessary.

- Remove 5 bulkhead splash shield retaining screws (arrows).



0011862



0011886

- Working in cowl area remove mounting nut and screws (arrows) at refrigerant line fitting.

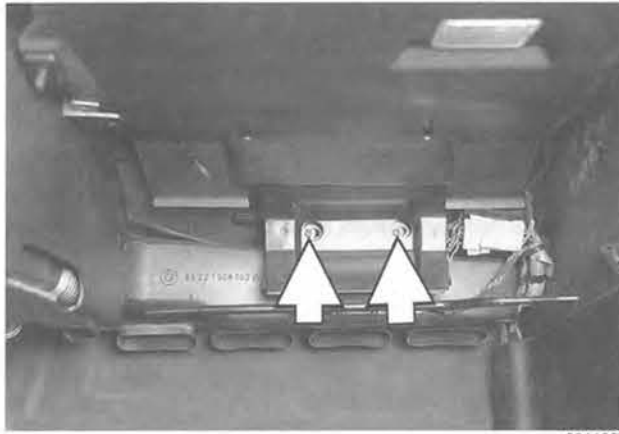
NOTE—

Nut on refrigerant fitting may be fastened with Loctite®270. Heating with a hot air blower may be necessary to loosen.

- Remove carpeted trim panel on right side of center console. Remove center console and glove box. Remove glove box support frame. See **513 Interior Trim**.

AIR CONDITIONING

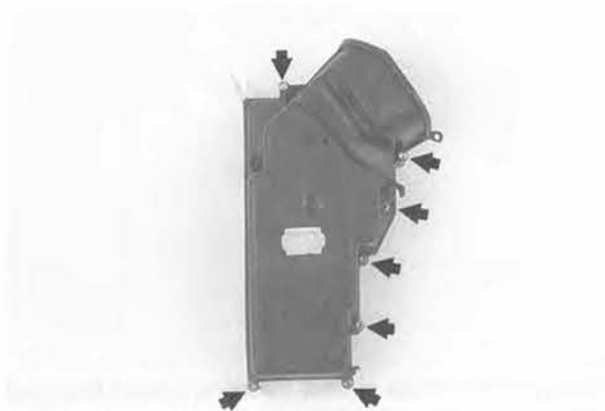
640-20 HEATING AND AIR CONDITIONING



0011867

Remove screws (**arrows**) retaining ventilation duct and remove duct.

— Cut wire ties holding wire harness to right side of heater housing and disconnect and move wiring to gain access to evaporator cover.



0011888

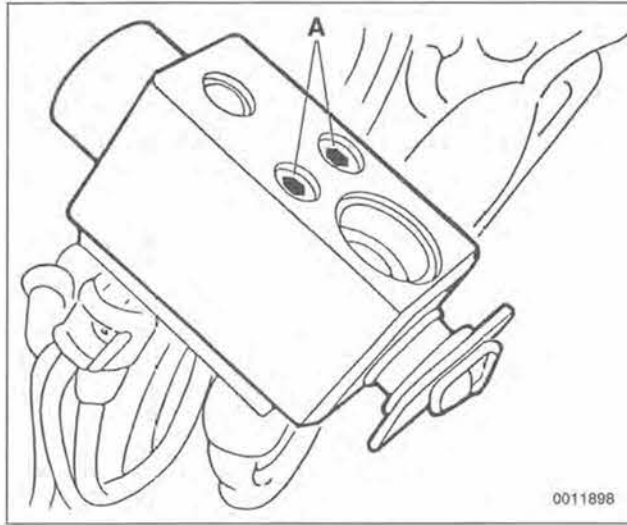
Remove evaporator cover mounting screws (**arrows**) and remove cover.



0011887

Remove screw (**arrow**) from expansion valve and separate refrigerant line fitting from expansion valve. Discard O-rings.

AIR CONDITIONING



Remove expansion valve mounting screws (A) and remove valve.

- Slide evaporator out of housing.
- Installation is reverse of removal.

CAUTION—

Do not re-use O-rings when reconnecting refrigerant lines. Always replace O-rings.

- Before recharging, evacuate system for at least 30 min.
- Recharge system following equipment manufacturer's instructions.
- For capacities, see **Table e**.

A/C evaporator temperature sensor, replacing

The evaporator temperature sensor is mounted in the left side of the evaporator housing behind the center console. The sensor can be reached after removing the carpeted trim panel from the left side of the console.

- Disconnect negative (–) battery cable. See **020 Maintenance**.

CAUTION—

Prior to disconnecting the battery, read the battery disconnection cautions given at the front of this manual on page viii.

- In left footwell, remove carpeted trim panel from center console.

Disconnect electrical connector from evaporator temperature sensor and pull sensor (arrow) straight out of evaporator housing.

- Installation is reverse of removal. **Table d** lists evaporator temperature sensor test values.



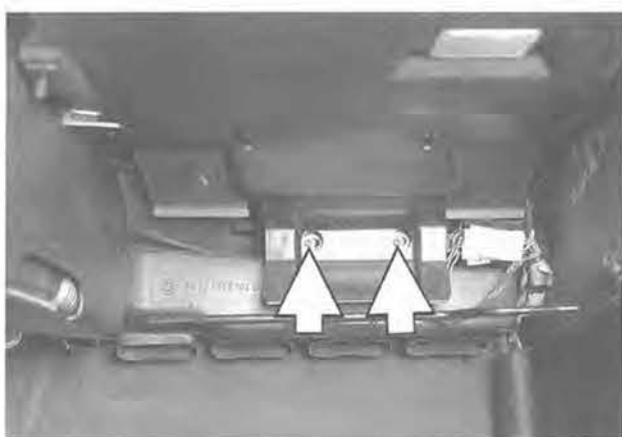
Table d. Evaporative Temperature Sensor
Test Values

Test Temperature	Resistance
-5°C (23°F)	11.4 - 11.9 k ohms
0°C (32°F)	8.8 - 9.2 k ohms
5°C (41°F)	6.8 - 7.2 k ohms
10°C (50°F)	5.3 - 5.6 k ohms
15°C (59°F)	4.2 - 4.5 k ohms
20°C (68°F)	3.3 - 3.6 k ohms
25°C (77°F)	2.6 - 2.9 k ohms
30°C (86°F)	2.1 - 2.3 k ohms
35°C (95°F)	1.7 - 1.9 k ohms

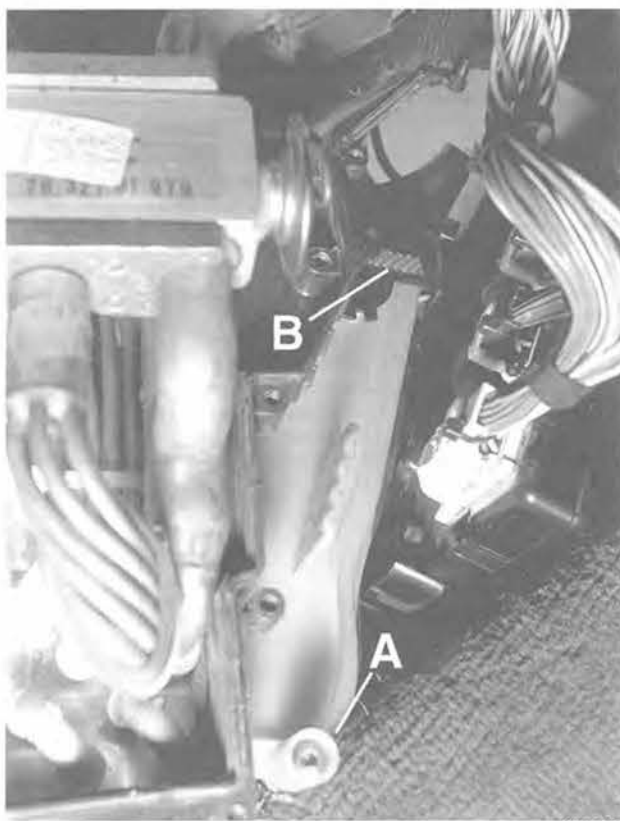
Microfilter, replacing

Outside air comes into the car through a filter fitted in the forward portion of the heater box and accessible through the right footwell. Some early E32 cars are not equipped with a pollen microfilter. In general, 1988 through 1990 cars do not have a filter. Some 1991 cars may and may not have a filter.

- From inside car, remove glove box. See **513 Interior Trim**.
- In right footwell, remove carpeted trim panel from center console.
- Remove trim panel from above glove compartment.
- Remove two screws (**arrows**) retaining ventilation duct and remove duct.



0011867



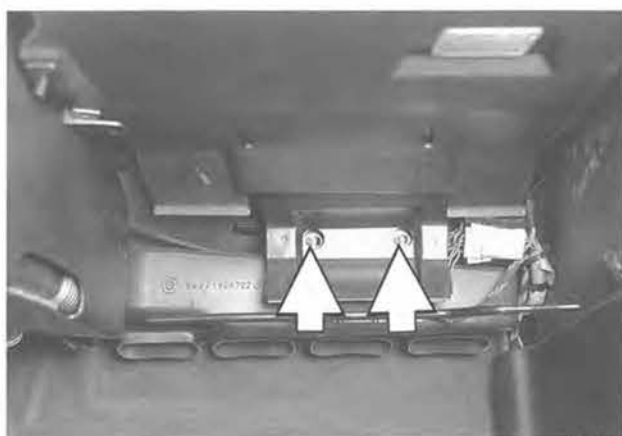
0011889

- Remove cover screw (A) from microfilter housing and turn locking lever (B) to release.
- Pull microfilter out of housing and discard.
- Installation is reverse of removal.

A/C control module, removing and installing

The A/C control module is mounted ahead of the evaporator on top of the transmission tunnel.

- Remove glove compartment. See **513 Interior Trim**.
- Remove center console carpeted side panels at right and left sides.
- Remove screws retaining trim panel above glove box and remove trim panel, disengaging from clip at rear.
- Remove retaining screws (arrows) or clips retaining ventilation duct and remove duct.
- Separate electrical connectors from A/C control module on right and left sides. Push aside wiring harness.



0011867

640-24 HEATING AND AIR CONDITIONING



Depress clip (arrow) and slide control module out.

Table e. A/C System Refrigerant Capacities

	Quantity
R-12 refrigerant	1925 g $\pm$ 25 g (4.24 lbs. $\pm$ 0.05 lbs.)
R-134a refrigerant	1550 g $\pm$ 25 g (3.42 lbs. $\pm$ 0.05 lbs.)
R-134a oil Nippondenso Seiko Seike	160 ml + 30 ml 180 ml $\pm$ 20 ml
PAG oil SP-10	200 ml $\pm$ 20 ml (6.8 oz. $\pm$ 0.7 oz.)

