64 00 ... Information on using cleaning agent/paints (personal protection equipment)



Warning!

Use of cleaning agents/paints not compliant with instructions can cause serious injuries or burns!

Handling cleaning agents/paints can trigger allergic skin and respiratory reactions!



Important!

Observe following instructions:

- Store cleaning agents/paints only in a secure cabinet.
- Keep cleaning agents/paints away from naked flames and other sources of ignition.
- Protect cleaning agents/paints from high temperatures and direct sunlight.
- Always keep an eye douche on hand, change the water regularly (once a month).



Important!

Observe following instructions before use:

- Manufacturer's instructions (on container/packaging)
- Hazard warnings (on container/packaging)
- Manufacturer's instructions on package insert
- Material safety data sheet of manufacturer
- Product information in EPC
- National market regulations



Important!

Observe following instructions during use:

- Do not eat, drink or smoke while working with these products.
- Avoid direct contact with skin and eyes.
- Wear personal protective clothing/equipment.
- Ensure that all enclosed areas are well ventilated or extract fumes directly.
- Immediately change working clothes soiled with cleaning agent/paint.
- After finishing work, wash your hands and apply protective skin cream.



Important!

Follow hazard warnings and wear personal protection equipment!

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First Aid:

- If product comes in contact with eyes, immediately flush with running water for about 10 - 15 minutes. Seek the advice of eye specialist.
- In the event of skin contact and where applicable an allergic skin reaction, clean the affected areas immediately with soap and water and then apply silicone-free skin cream. Seek advice of physician.
- If an adhesive product is swallowed, rinse mouth/parts of mouth thoroughly with running water. Drink 1-2 glasses of water. Do not induce vomiting. Consult a doctor.
- After inhaling vapours ensure ample supply of fresh air. Keep calm, keep respiratory tracks clear and call doctor.



Recycling:

Dispose of cleaning agents/paints in a professional manner!

Observe national/country-specific disposal regulations.

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64 00 ... Overview of A/C service station

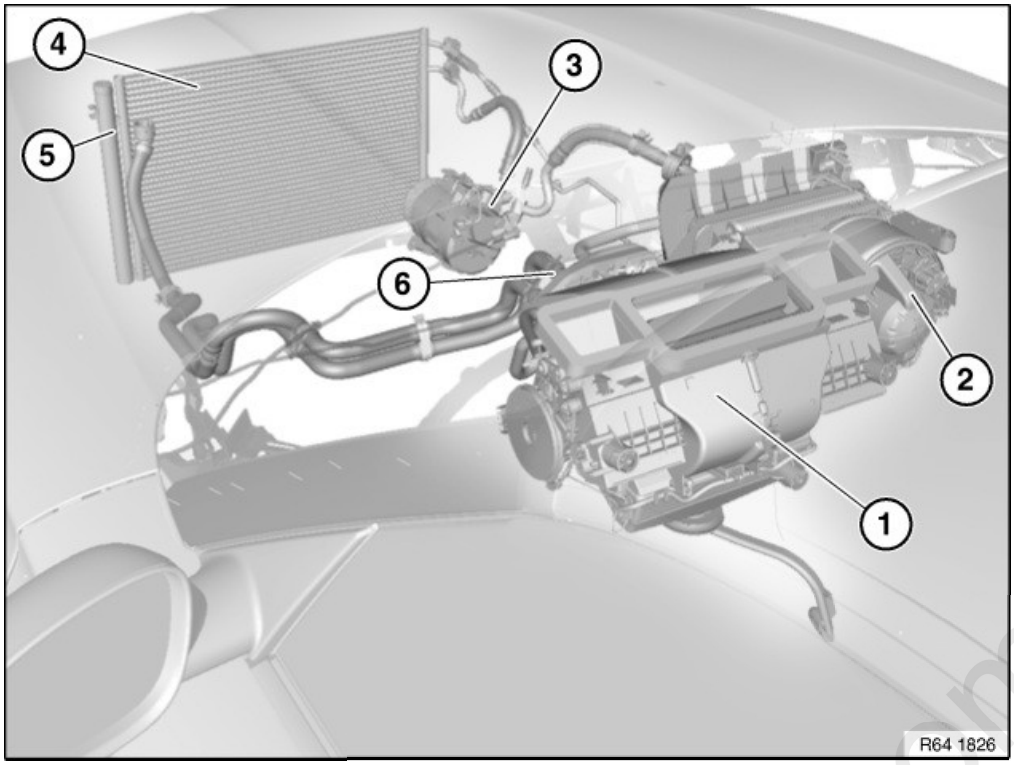
The following table shows an overview of the currently offered A/C service station depending on the refrigerant.*Note:*

> The different refrigerant connections for C2H2F4 and R1234yf play no role during flushing, as the A/C service station is connected with the refrigerant circuit of the vehicle via the refrigerant line from the air conditioning compressor.

Description	Order number	Refrigerant		Flushing of Refrigerant circuit		Accessories for flushing
		R134a	R1234yf	Yes	No	Order number
Beissbarth 4100a	81 34 2 286 739	x		x		81 34 2 286 908
760R	81 34 2 289 569	x		x		81 34 2 289 571
WAECO AirCon Service Center	81 34 2 147 235	x		x		81 34 2 286 909
WAECO 2500 Low Emission	81 34 2 286 807	x		x		81 34 2 286 909
TEXA 770S	81 34 2 286 318		x		x	
BEISSBARTH 5100yf	81 34 2 286 325		x		x	
WAECO BMW 5000 Low Emission	81 34 2 286 324		x		x	

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64 00 .. Overview of heater - A/C system components



1 Heating and air-conditioning unit with mounted parts
2 Remove fan for heater - A/C system
3 Compressor for A/C system
4 Capacitor for heater - A/C system
5 Dryer flask for air conditioning (included in the capacitor)
6 Expansion valve

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64 00 ... Overview of refrigerant oil to be filled

The following table shows an overview of which refrigerant oil may be added to which vehicle.*Note:*

The refrigerant oil to be filled can be found on the type plate on current vehicles.

Depending on the version and country, it may happen that the following table specifies a different refrigerant oil than the factory-filled refrigerant oil. This is permissible in certain cases. Observe notes on the refrigerant and refrigerant oil.

Model series		R134a	R1234yf	ND-8	Sanden SP-A2
E	All vehicles with combustion engines	x		x	
	E72 Hybrid	x		x	
F (BMW and MINI)	All vehicles with combustion engines	x		x	
	All vehicles with combustion engines		x		x
	Hybrid	x		x	
	Hybrid		x	x	
	PHEV	x			x
	PHEV		x		x
G	All vehicles with combustion engines	x			x
	All vehicles with combustion engines		x		x
	PHEV	x			x
	PHEV		x		x
I	All	x			x
	All		x		x
R (MINI)	All vehicles with combustion engines	x		x	
	All vehicles with combustion engines		x		x
RR	RR1, RR2, RR3 before model facelift	x		x	
	RR4 with optional rear air conditioning	x		x	
	All other vehicles	x			x
	All other vehicles		x		x

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00 Safety information for working on vehicles with automatic engine start-stop function (MSA)



Warning!

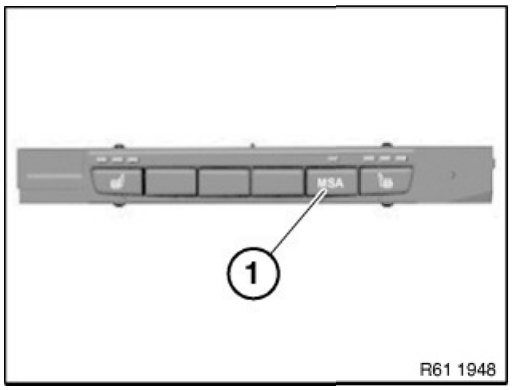
If the engine hood/bonnet contact is pulled upwards (workshop mode), the information "switch closed" is output. The automatic engine start-stop function is active.

An automatic engine start is possible.

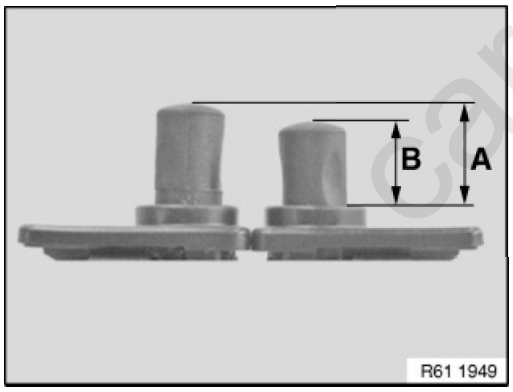
Observe safety precautions when working on MSA vehicles.

Before carrying out practical work on the engine, always ensure that the MSA functionality is deactivated so as to prevent automatic engine starting while work is being carried out in the engine compartment.

MSA function is deactivated by:



- Deactivate MSA by means of button (1) in passenger compartment
- Open seat belt buckle and driver's door



- Open engine bonnet/hood and ensure that engine hood/bonnet contact is not in workshop mode
  - Workshop mode

    A = 10 mm
  - Basic setting (engine hood/bonnet open)

    B = 7 mm

To make sure that the engine hood/bonnet contact is at the basic setting, if necessary press the hood/bonnet contact up to the limit position before starting work and slowly release.



When working with diagnosis tools:

- Observe instructions in diagnosis tool

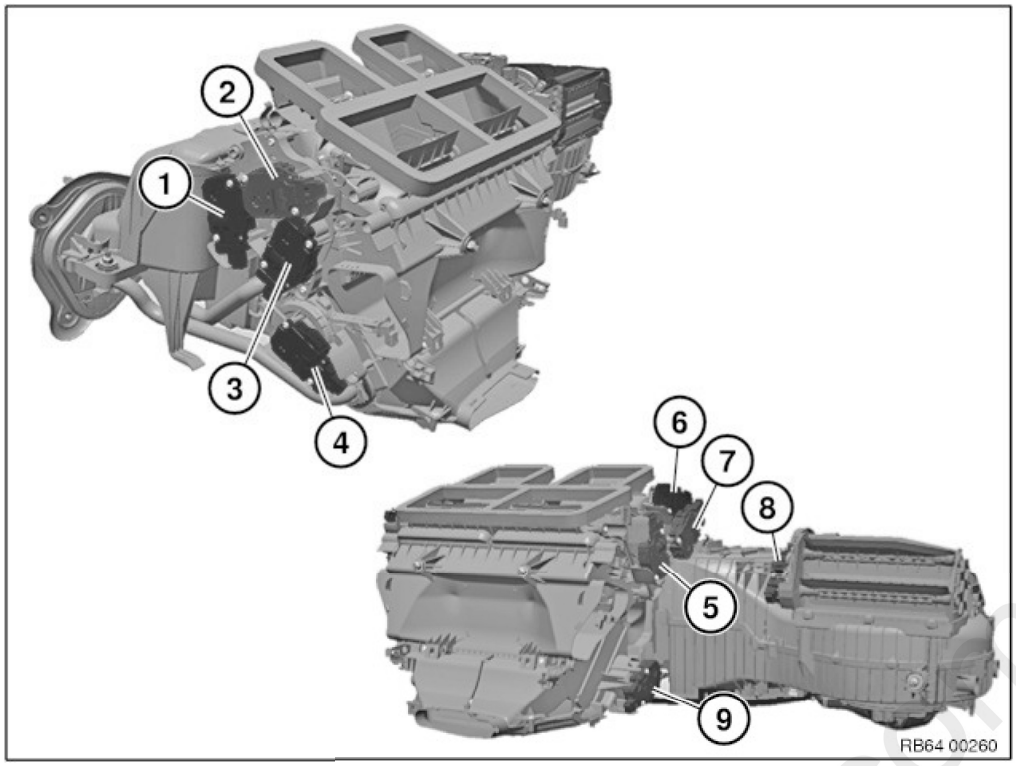
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Note:
For further information on automatic engine start-stop function (MSA):

- Refer to the Service Information (bulletin) (for manual transmissions) Service Information (bulletin) 61 01 07 335
- Refer to the Service Information (bulletin) (for automatic transmissions or twin-clutch gearboxes) Service Information (bulletin) 61 01 10 629

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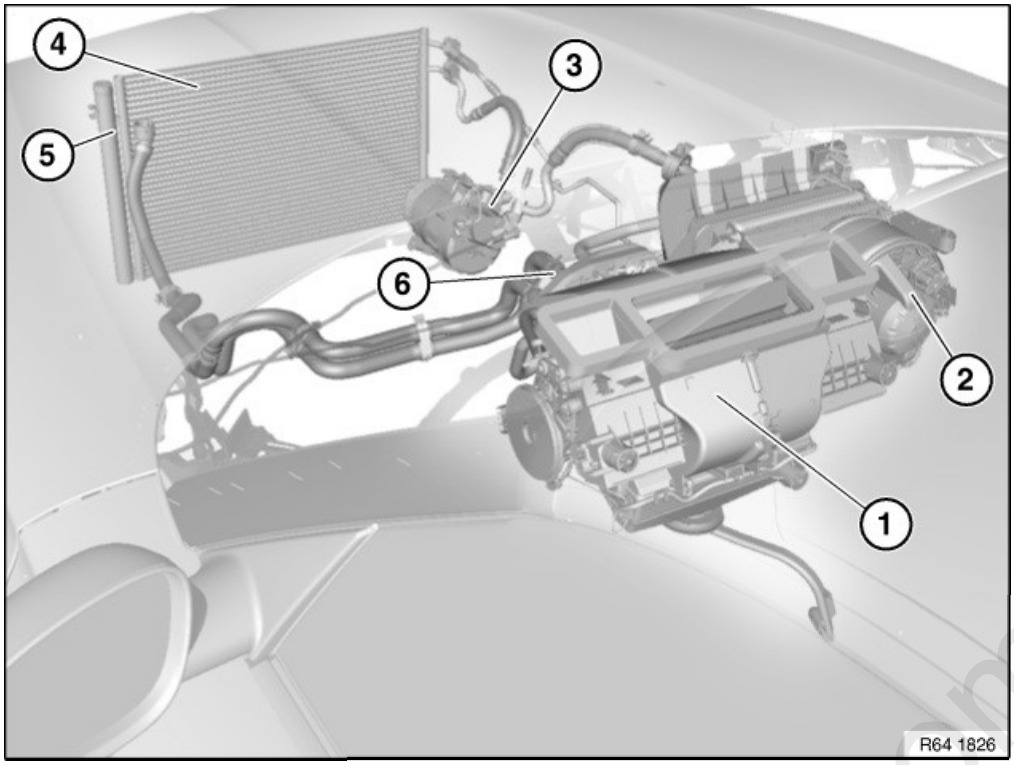
64 11 .. Overview of actuator drives on heater/air conditioner



1 Actuator drive, blending flap, left
2 Actuator drive, ventilation flap, left
3 Actuator drive, air mixing flap, left
4 Actuator drive, rear compartment flap
5 Actuator drive, air mixing flap, right
6 Actuator drive, defroster flap
7 Actuator drive, ventilation flap, right
8 Actuator drive, fresh air/recirculated air flap
9 Actuator drive, blending flap, right

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64 00 .. Overview of heater - A/C system components



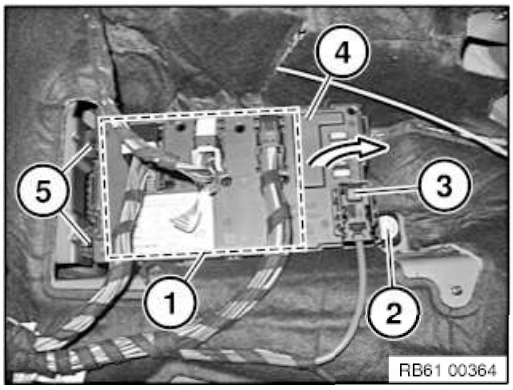
1 Heating and air-conditioning unit with mounted parts
2 Remove fan for heater - A/C system
3 Compressor for A/C system
4 Capacitor for heater - A/C system
5 Dryer flask for air conditioning (included in the capacitor)
6 Expansion valve

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61 35 275 Remove and install (replace) control unit Rear Electronic Module (REM)

Necessary preliminary tasks:

- Disconnect the negative battery cable



Unlock and disconnect all plug connections in area (1).

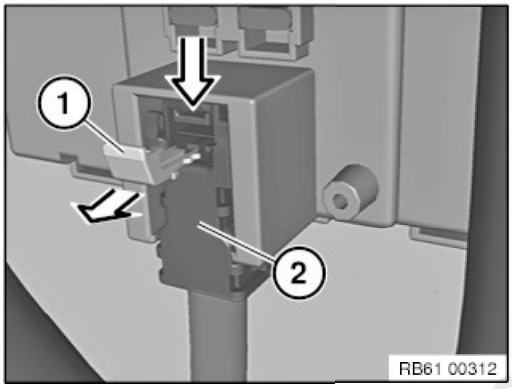
Unlock and disconnect positive battery cable (3). (Note removal instructions below)

Release screw (2).

Tightening torque 61 35 4AZ.

Remove control unit (4) from guides (5) in direction of arrow.

Installation note:
Make sure all plug connections are correctly latched.



Important!
Risk of damage to positive battery cable connector!

Unlock the positive battery cable connector:

1. Loosen lock (1) in direction of arrow.
2. Unlock top positive battery cable connector (2) in direction of arrow.
3. Disconnect battery positive lead (2).

Replacement:

Carry out vehicle programming/coding.

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64 11 206 (N47, N57) Remove and install / replace the heating and air-conditioning unit



Special tools required:

- 00 9 030
- 17 2 050
- 32 1 270



Warning!

Danger of injury!

Refrigerant circuit is under high pressure!

Avoid contact with refrigerant and refrigerant oil.

Read and comply with safety information:

- Handling refrigerant
- Handling refrigerant oil



Attention!

Risk of damage!

Restart engine only when air conditioning has been correctly filled.

Follow notes for opening and replacing parts in refrigerant circuit.

If Air conditioning is opened for more than 24 h: Replace the air conditioning condenser.

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Required preliminary work for the **removal and installation** of the heating and air-conditioning unit:

- Drain off air conditioning system
- Remove support for dashboard
- Remove electronics box

Required preliminary work for the **replacement** of the heating and air-conditioning unit and the subsequent modification of the controller drives:

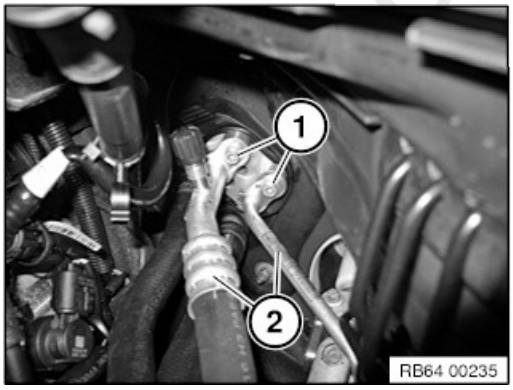
- Remove right glove box with housing
- Ignition ON
- Use the BMW diagnosis system to move the controller drives into the installation position as follows:
  - Service functions
  - Body
  - Heating and air conditioning functions
  - Flap motors
  - Installation position of flap motors
- Disconnect all plug connections from the control unit for the heating and air-conditioning system
- Ignition off
- Disconnect negative battery lead
- Drain off air conditioning system
- Remove support for dashboard
- Remove electronics box

Recycling

Coolant emerges when coolant lines are detached. Have a suitable collecting vessel ready.

Catch and dispose of escaping coolant.

Observe country-specific waste disposal regulations.



Release screws (1).

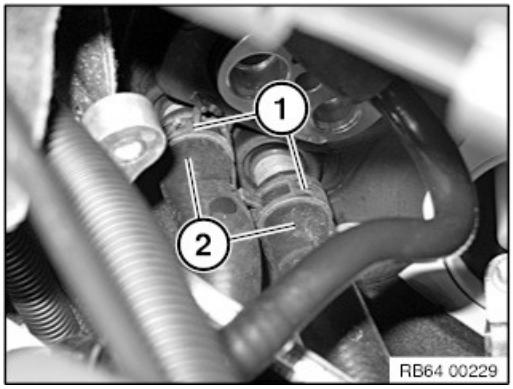
Tightening torque 64 53 1AZ.

Disconnect refrigerant lines (2) and lay to one side.

Installation note:
Renew sealing rings.

Use special tool 00 9 030 to mount sealing rings without damaging them.

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Attention!

Connections must not be mixed up!

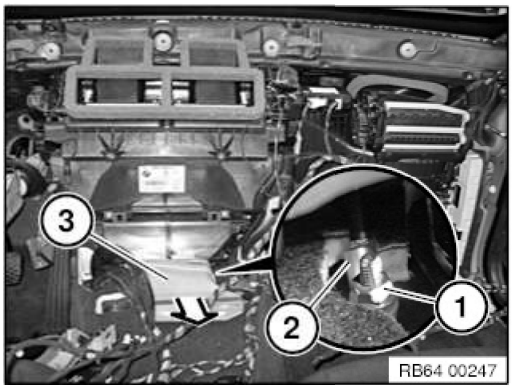
Mark connection sequence of water hoses prior to removal.

Release hose clamps (1) with special tool 17 2 050 and detach coolant hoses (2).

Attention!

Carefully blow out coolant connections on heat exchanger for heating system to remove remaining coolant.

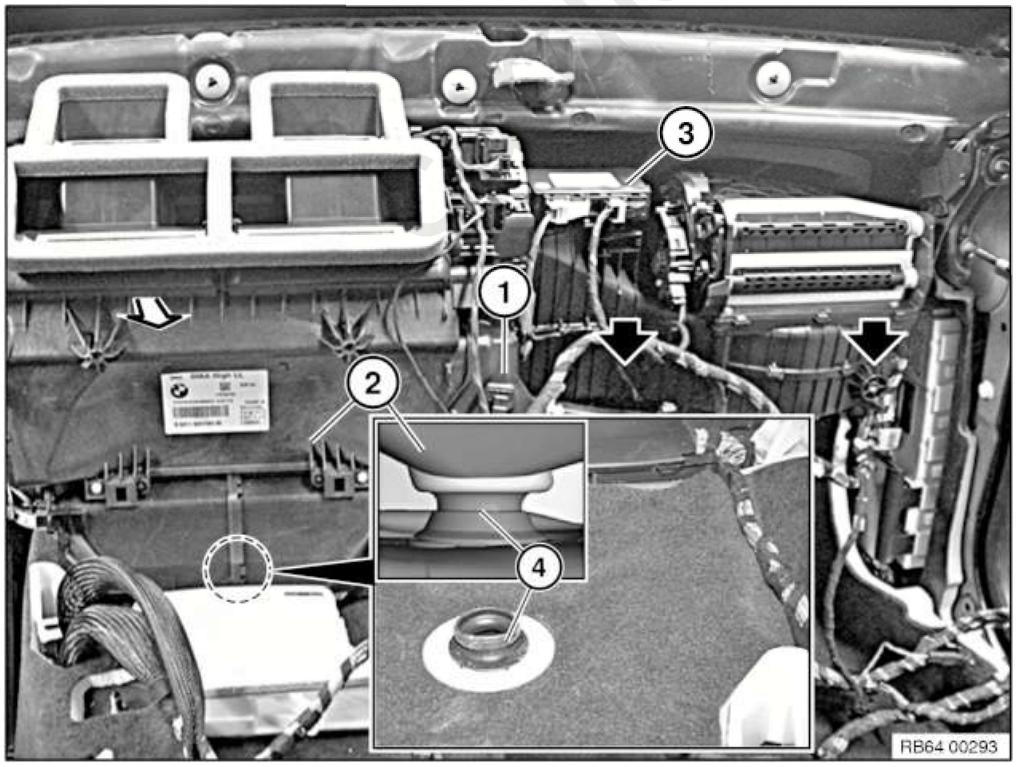
Seal openings or lines on heat exchanger for heating system with special tool 32 1 270 to avoid escape of media and contamination.



Pull off air duct (3) in direction of arrow.

Fold the carpet up and loosen the nut (1).

Remove ground cable (2).



Warning!

Protect passenger compartment against emerging coolant.

Unfasten plug connection (3) and disconnect.

Unclip the air duct (1) to the right of the heating and air-conditioning unit (2).

Unclip the wiring harness at the marked points.

Feed out heating and air-conditioning unit (2) in direction of arrow.

Important!

In the event of incorrect installation, there is a risk of water damage in the passenger compartment!

Installation note:

Apply lubricant G14 to the condensate drain (4) before installing the heating and air-conditioning unit (2).

Heating and air-conditioning unit (2) must fit exactly on condensate drain (4).

Perform a visual inspection after installing the heating and air-conditioning unit (2).



Replacement:

- Remount evaporator
- Remount heat exchanger for heating system
- Remount expansion valve
- Remount all controller drives
- Remount electric auxiliary heater (front)



After installation:

- Evacuate and fill air conditioning
- Bleed and fill cooling system

  ATTENTION!

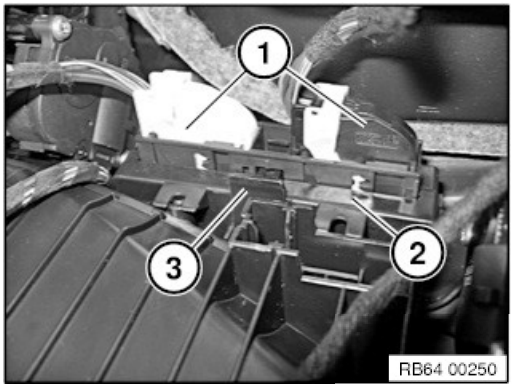
  Filling and bleeding must not be performed in ECO-PRO MODE!

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64 11 380 Removing and installing / replacing control unit for air conditioning

Necessary preliminary tasks:

- Remove glove box



Unlock plug connections (1) and disconnect.
Unlock latch mechanismÂ (3) downward.
Pull out control unit (2).

Replacement:
Carry out vehicle programming/encoding.

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64 11 377 Removing and installing control panel of heater/air conditioning system

Necessary preliminary tasks:

- Remove radio and A/C control panel

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61 31 321 Removing and installing radio and A/C control panel

Special tools required:

- 00 9 340

Attention!
Risk of damage!

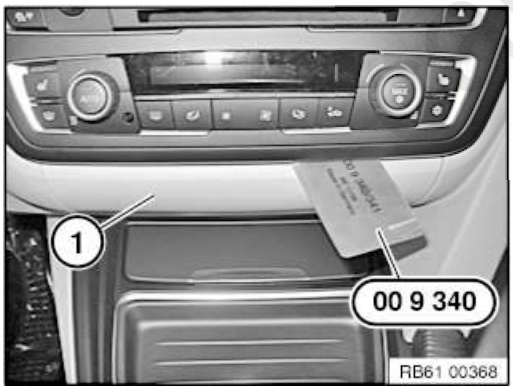
A hard disk is installed in the Car Information Computer (CIC).
Carry out mechanical work on the CIC and adjacent components with care.
Avoid subjecting the CIC to vibration/shocks.

Attention!
Read and comply with notes on protection against electrostatic damage (ESD protection).

Attention!
Carry out installation in a dust-free workshop area only.
To avoid damage, do not touch or dirty the display area.

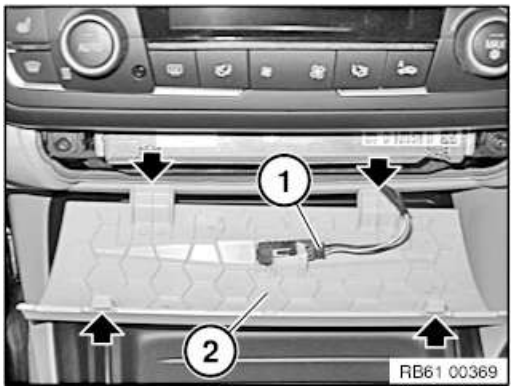
Necessary preliminary tasks:

- Remove decorative strip on dashboard in middle



Insert special tool 00 9 340 as illustrated.
Carefully lever out trim (1) towards front and unclip.

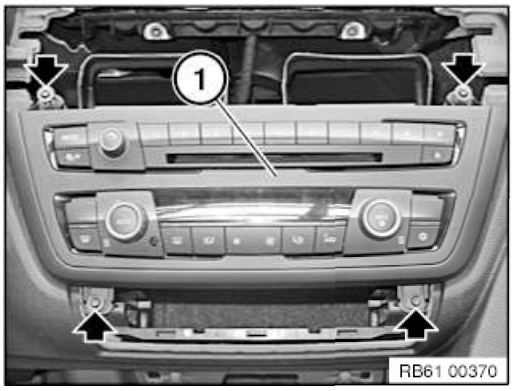
rdiagn.com



Unfasten plug connection (1) and disconnect.

Remove cover (2).

Installation note:
Retaining lugs and guides must not be missing or damaged.



Release all screws (arrow).

Pull control panel (1) forwards slightly.

Unlock associated plug connections and disconnect.

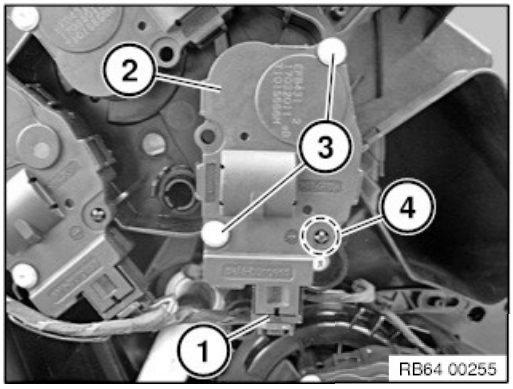
Remove the control panel (1).

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64 11 866 Removing and installing/replacing actuator drive for blending flap (left)

Necessary preliminary tasks:

- Remove instrument panel trim



Note:
For purposes of clarity, illustration shows removed heating and air conditioning unit.

Release screws (3).

Remove actuator drive (2).

Unfasten plug connection (1) and disconnect.

Installation note:
Make sure actuator drive (2) is correctly seated in guide (4).

Important!

Servomotors must be readdressed in the event of replacement!

Addressing can only be carried out with the BMW diagnosis system.

Service functions:

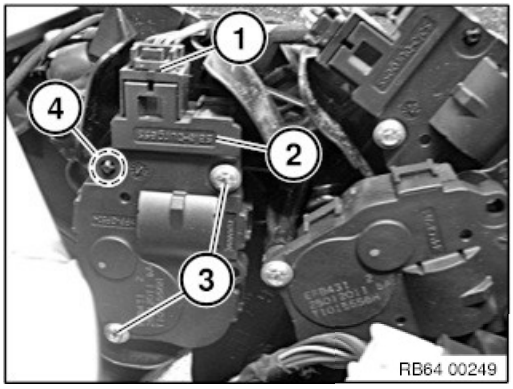
- Body
- Heating and air conditioning function
- Flap motors
- Readdress flap motors

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64 11 872 Removing and installing/replacing actuator drive for blending flap (right)

Necessary preliminary tasks:

- Remove glove box



Release screwsÂ (3).

Unfasten plug connection (1) and disconnect.

Remove actuator drive (2).

Installation note:
Make sure actuator drive (2) is correctly seated in guide (4).

Servomotors must be readdressed in the event of replacement!

Addressing can only be carried out with the BMW diagnosis system.

Service functions:

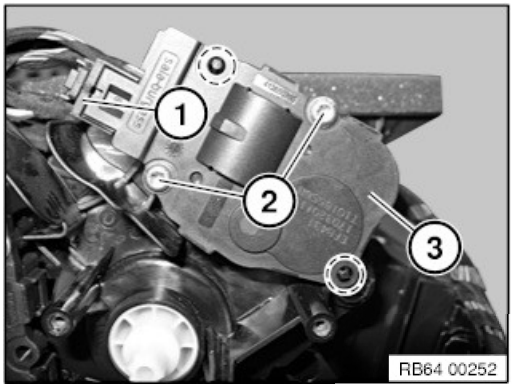
- Body
- Heating and air conditioning function
- Flap motors
- Readdress flap motors

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64 11 868 Removing and installing/replacing actuator drive for defrosting flap

Necessary preliminary tasks:

- Remove actuator drive for ventilation flap, right



Note:
For purposes of clarity, illustration shows removed heating and air-conditioning unit.

Unfasten plug connection (1) and disconnect.

Unfasten screws (2).

Remove actuator driveÂ (3).

Installation note:
Ensure that the actuator drive (3) is correctly seated at the marked locations in the guides.

Important!

Servomotors must be readdressed in the event of replacement!

Addressing can only be carried out with the BMW diagnosis system.

Service functions:

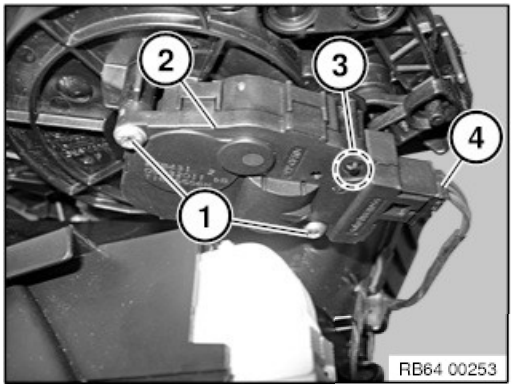
- Body
- Heating and air conditioning function
- Flap motors
- Readdress flap motors

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64 11 806 Removing and installing/replacing actuator drive for fresh / recirculated air flap

Necessary preliminary tasks:

- Remove Heating/air conditioning control unit



Note:
For purposes of clarity, illustration shows removed heating and air-conditioning unit.

Release screws (1).

Pull off actuator driveÂ (2).

Unlock plug connection (4) and disconnect.

Installation note:
Make sure actuator drive (2) is correctly seated in guide (3).

Important!

Servomotors must be readdressed in the event of replacement!

Addressing can only be carried out with the BMW diagnosis system.

Service functions:

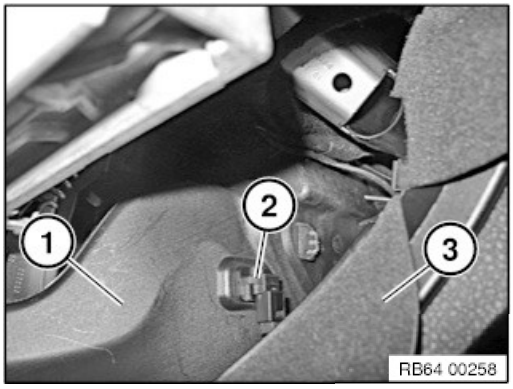
- Body
- Heating and air conditioning function
- Flap motors
- Readdress flap motors

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64 11 908 Removing and installing/replacing footwell temperature sensor (left)

Necessary preliminary tasks:

- Remove lower section of steering column shroud



Feed out foam material (3) downwards as pictured.

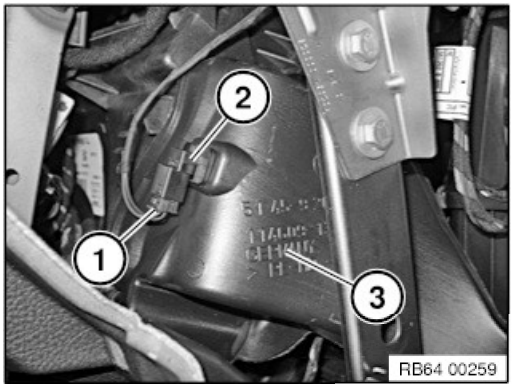
Pull temperature sensor (2) out of the air duct (1) and disconnect the corresponding plug connection.

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64 11 908 Removing and installing/replacing footwell temperature sensor (right)

Necessary preliminary tasks:

- Remove glove box



Unfasten plug connection (1) and disconnect.

Remove temperature sensor (2) from air duct (3).

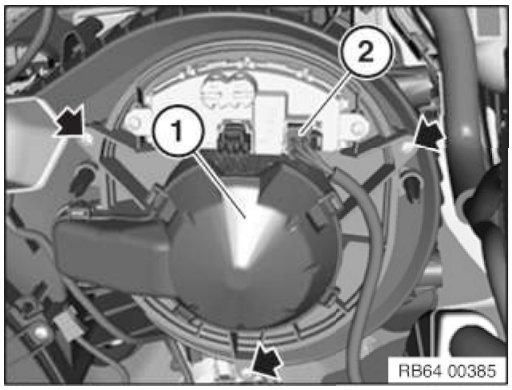
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64 11 213 Removing and installing/replacing heater/air conditioner fan

Necessary preliminary tasks:

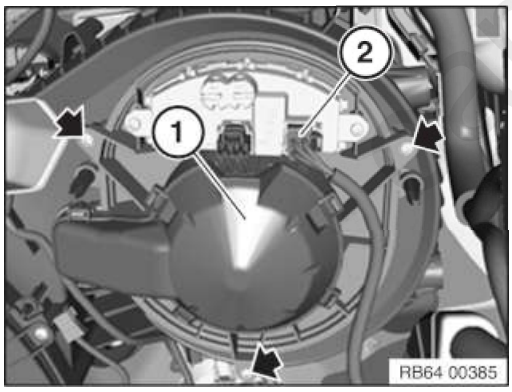
- Dismantle instrument panel trim at bottom right

Removal:



Unlock plug connections (2) and disconnect.
Release screws at marked points.
Remove blower (1).

Installation:

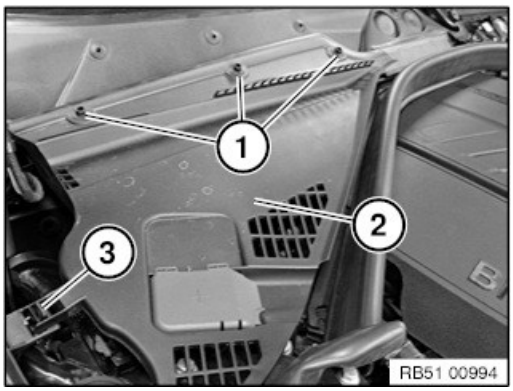


Install the blower (1).
Evenly tighten marked screws.
Tightening torque 64 31 2AZ.
Connect and lock the plug connections (2).

Required reworking:

- Install instrument panel trim, bottom right

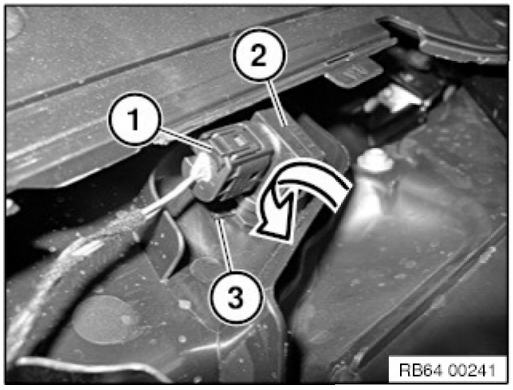
64 11 991 Removing and installing/replacing sensor for automatic recirculated air control (AUC)



Release locks (1).

Unlock catch (3).

Remove cover (2).



Unfasten plug connection (1) and disconnect.

Unscrew automatic air recirculation control sensor (2) in direction of arrow and remove.

Installation note:
Make sure retaining lug (3) is correctly seated in trim panel.

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64 11 891 Replace control panel for heater/air conditioning system

Important!

Read and comply with notes on protection against electrostatic discharge (ESD protection).

Important!

Retrofitting must only be done in the supplied installation cassettes.

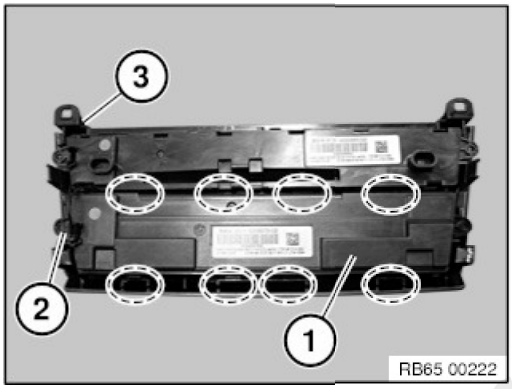
Use of supplied gloves is mandatory.

Carry out installation in a dust-free workshop area only.

To avoid damage, do not touch or dirty the display field.

Necessary preliminary tasks:

- Remove radio and IHKA controls



Disconnect plug connection (2).

Unclip AC control panel (1) at marked points with a suitable tool (e.g. screwdriver - 3 mm blade).

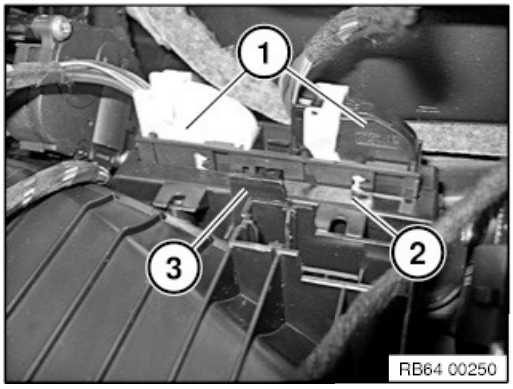
Remove AC control panel (1) from cover (3).

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64 11 832 Replace the actuator drive for the ventilation flap, right (High A/C system)

Necessary preliminary tasks:

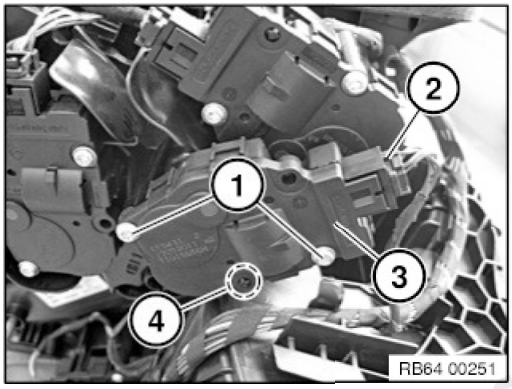
- Remove glove box



Unlock plug connections (1) and disconnect.

Unlock latch mechanism (3) downward.

Pull out control unit (2).



Note:
For purposes of clarity, illustration shows removed heating and air conditioning unit.

Release screws (1).

Unfasten plug connection (2) and disconnect.

Remove actuator drive (3).

Installation note:
Make sure actuator drive (3) is correctly seated in the guide (4).

Replacement:

Servomotors must be readdressed in the event of replacement!

Addressing can only be carried out with the BMW diagnosis system.

Service functions:

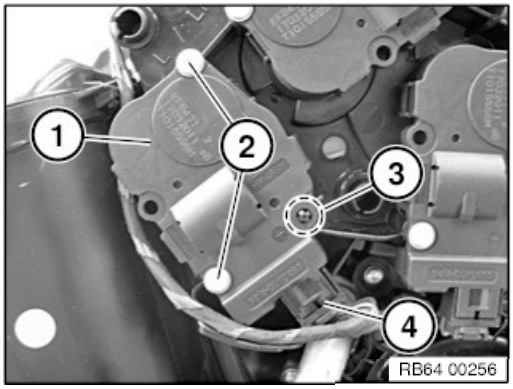
- Body
- Heating and air conditioning function
- Flap motors
- Readdress flap motors

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64 11 835 Replacing actuator drive for left blending flap

Necessary preliminary tasks:

- Remove instrument panel trim



Note:
For purposes of clarity, illustration shows removed heating and air conditioning unit.

Unfasten screws (2).

Remove actuator drive (1).

Unlock plug connection (4) and disconnect.

Installation note:
Make sure actuator drive (1) is correctly seated in the guide (3).

Replacement:

Servomotors must be readdressed in the event of replacement!

Addressing can only be carried out with the BMW diagnosis system.

Service functions:

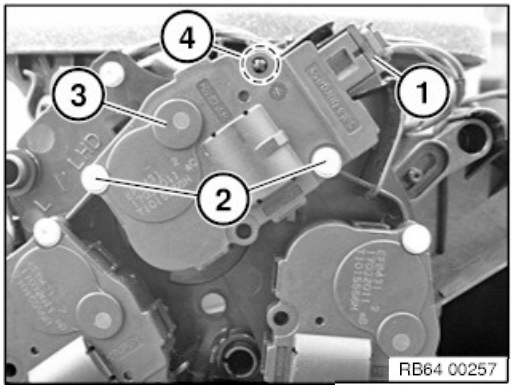
- Body
- Heating and air conditioning function
- Flap motors
- Readdress flap motors

cardiagn.com

64 11 830 Replacing actuator drive for left ventilation flap (High A/C system)

Necessary preliminary tasks:

- Remove instrument panel trim



Note:
For purposes of clarity, illustration shows removed heating and air-conditioning unit.

Unfasten screws (2).

Remove actuator drive (3).

Unfasten plug connection (1) and disconnect.

Installation note:
Make sure actuator drive (3) is correctly seated in the guide (4).

Replacement:

Servomotors must be readdressed in the event of replacement!

Addressing can only be carried out with the BMW diagnosis system.

Service functions:

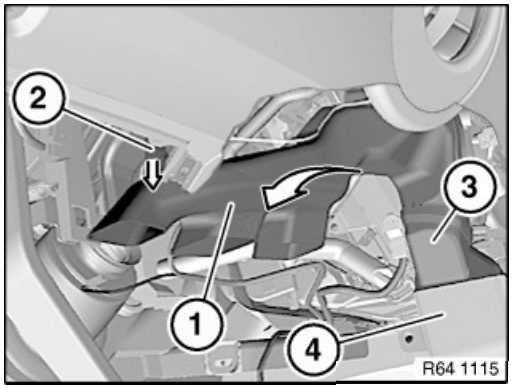
- Body
- Heating and air conditioning function
- Flap motors
- Readdress flap motors

cardiagn.com

64 11 850 Replacing actuator drive for rear compartment flap

Necessary preliminary tasks:

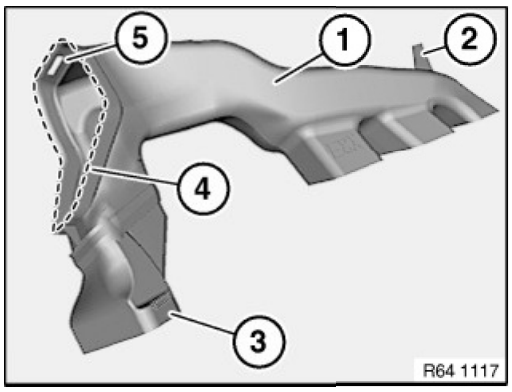
- Remove trim panel for pedal mechanism.



Note:
Lower instrument panel trim partially shown.

Detach left footwell heating duct (1) in area (2) in direction of arrow.

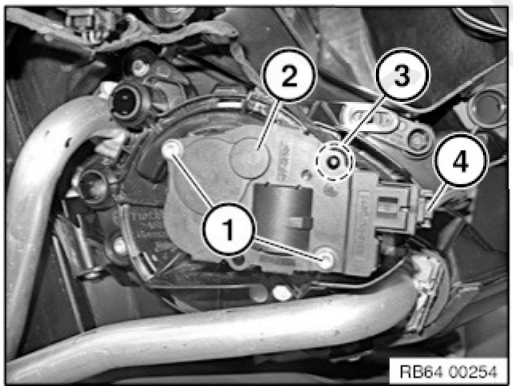
Detach left footwell heating duct (1) with adapter (3) from heating and air conditioning and remove in direction of arrow from left rear compartment heating duct (4).



Installation note:
Make sure clamp (2) is correctly seated on left footwell heating duct (1).

Insert footwell heating duct (1) with adapter (3) in rear compartment heating duct (4).

Attach footwell heating duct (1) in area (4) to heating and air-conditioning unit. Make sure assembly is locked exactly at point (5).



Note:
For purposes of clarity, illustration shows removed heating and air-conditioning unit.

Release screws (1).

Unlock plug connection (4) and disconnect.

Remove actuator drive (2).

Installation note:
Make sure actuator drive (2) is correctly seated in guide (3).

Important!

Servomotors must be readdressed in the event of replacement!

Addressing can only be carried out with the BMW diagnosis system.

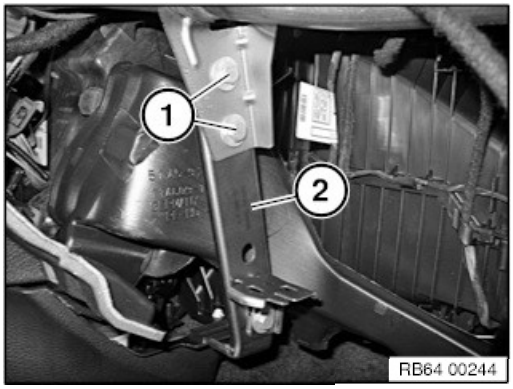
Service functions:

- Body
- Heating and air conditioning function
- Flap motors
- Readdress flap motors

64 11 837 Replacing actuator drive for right stratification flap

Necessary preliminary tasks:

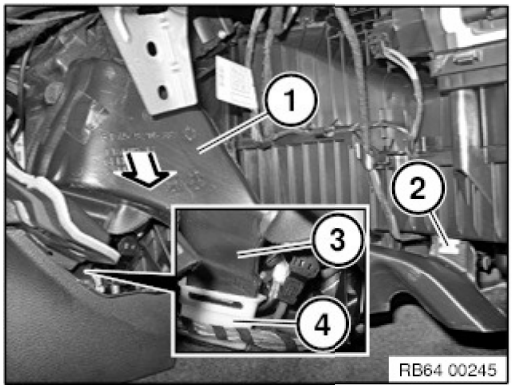
- Remove glove box



Note:
Mark position before removing holder (2).

Release screws (1).

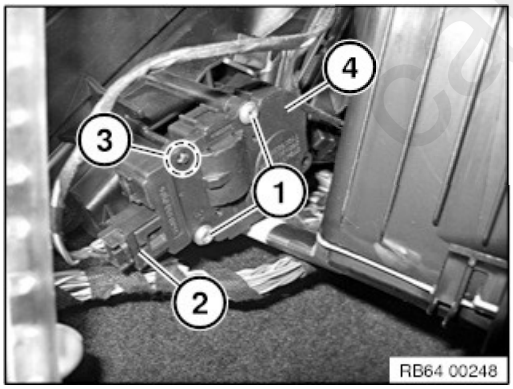
Take off holder (2).



Unclip air duct (1) downward at retaining clasp (2).

Pull off air duct (1) in direction of arrow.

Installation note:
Air duct (3) must be correctly engaged in duct (4).



Release screws (1).

Unfasten plug connection (2) and disconnect.

Remove actuator drive (4).

Installation note:
Make sure actuator drive (4) is correctly seated in the guide (3).

Replacement:

Servomotors must be readdressed in the event of replacement!

Addressing can only be carried out with the BMW diagnosis system.

Service functions:

- Body
- Heating and air conditioning function
- Flap motors
- Readdress flap motors

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64 11 ... Replacing condensation water drain hose of heating and air conditioning system

Special tools required:

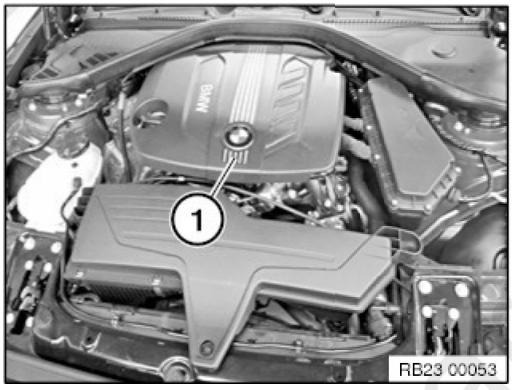
- 23 4 050
- 00 2 030

Necessary preliminary tasks:

- Remove intake filter housing
- Release left charge air duct at throttle valve
- Partially release propeller shaft
  - Disconnect propeller shaft at transmission.
  - Release centre mount.
  - Tie up the propeller shaft to the vehicle underbody.

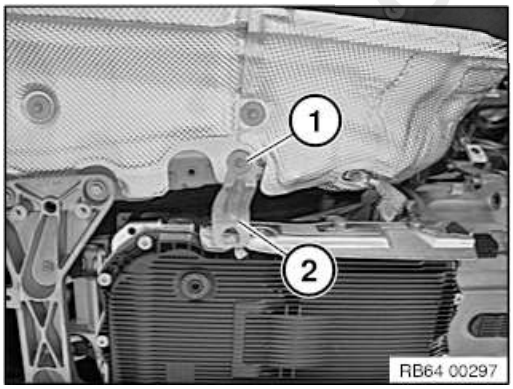
    Note:

    A too high deflection angle on the propeller shaft can cause preliminary damage to the joint/propeller shaft!



Note:
Picture for example purposes.

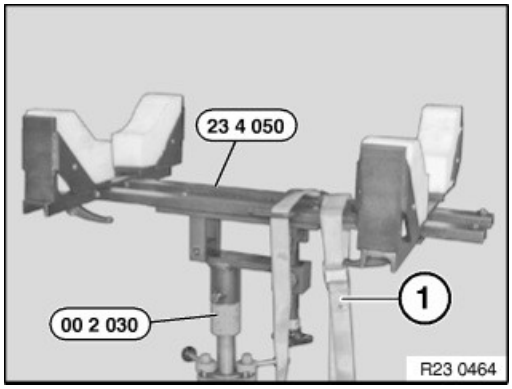
Remove acoustic cover (1).



Slacken nut (1).

Take off holder (2).

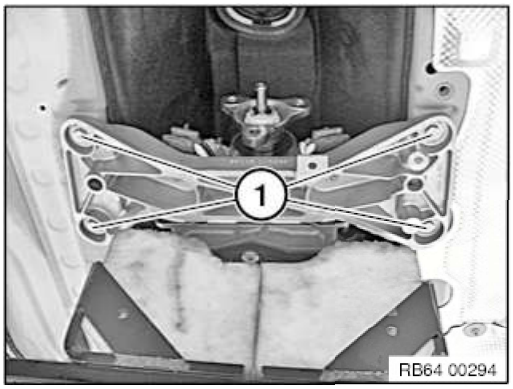
carldiagn.com



Supporting transmission:

Support transmission with special tools 23 4 050 , 00 2 030 .

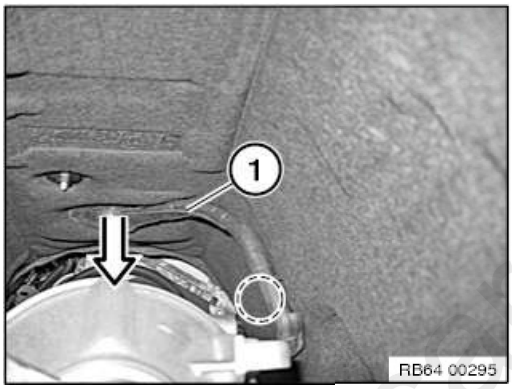
Secure transmission to mounting with tensioning strap (1).



Release screws (1).

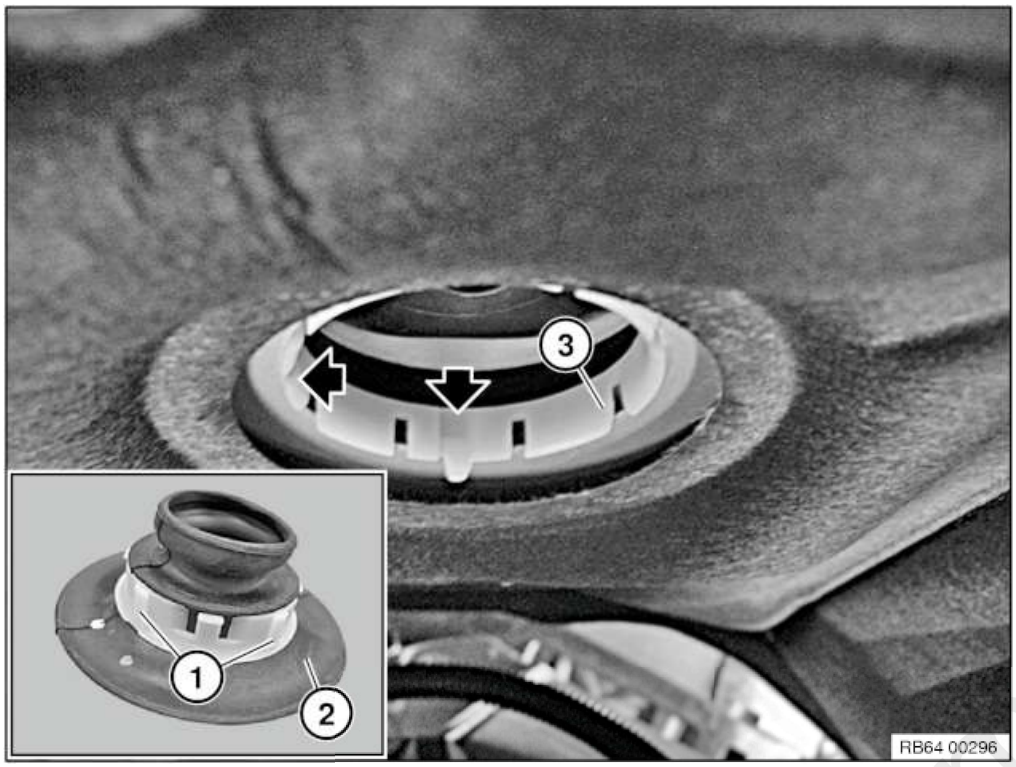
Tightening torque 22 32 3AZ.

Slightly lower the transmission.



Release condensation water drain hose (1) in marked area and remove in direction of arrow.*Installation note:*
Firstly secure condensation water drain hose (1) in marked area then lock it by turning slightly to left and right top.

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Installation note:
Guides (1) on condensation water drain hose (2) must be inserted exactly at marked points in retaining ring (3).

Make sure condensation water drain hose (2) is correctly fitted.

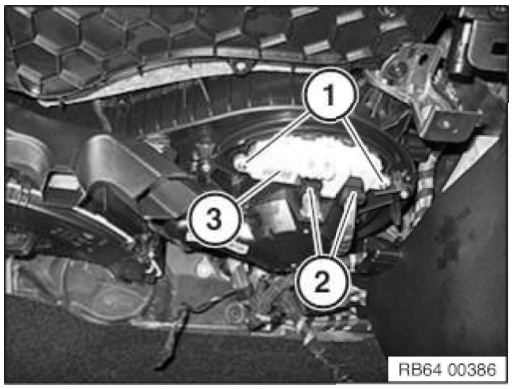
cardiagn.com

64 11 225 Replacing controller for heating and air conditioning system blower

Necessary preliminary tasks:

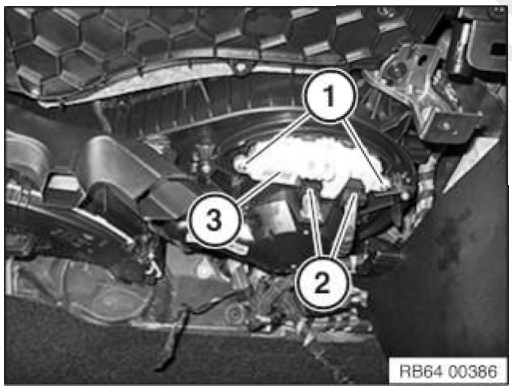
- Remove bottom right dashboard trim panel

Removal:



Release screws (1).
Unlock plug connections (2) and disconnect.
Remove controller (3) downwards.

Installation:



Install controller (3) towards top.
Tighten down screws (1).
Tightening torque 64 31 3AZ.
Connect and lock the plug connections (2).

Required reworking:

- Install bottom right instrument panel trim panel

rdiagn.com

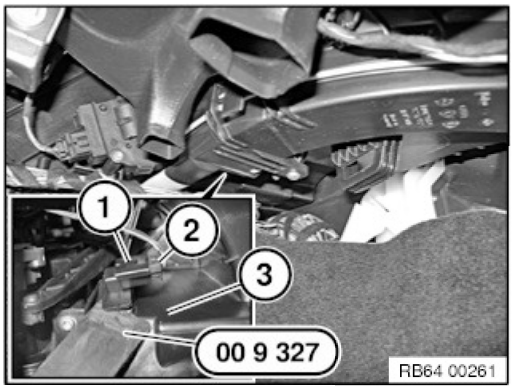
64 11 943 Replacing evaporator temperature sensor

Special tools required:

- 00 9 327

Necessary preliminary tasks:

- Remove instrument panel trim at bottom right



Disconnect plug connection (2).

Unclip the evaporator temperature sensor (1) with special tool 00 9 327 from the heating and air-conditioning unit (3) and remove.

Installation note:
Ensure evaporator temperature sensor (2) is correctly seated.

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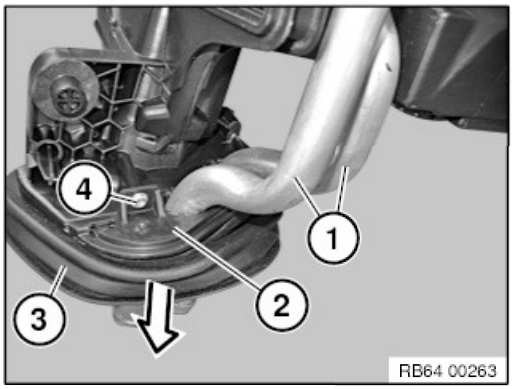
64 11 208 Replacing heat exchanger

Special tools required:

- 00 9 030

Necessary preliminary work:

- Remove heating and air-conditioning unit



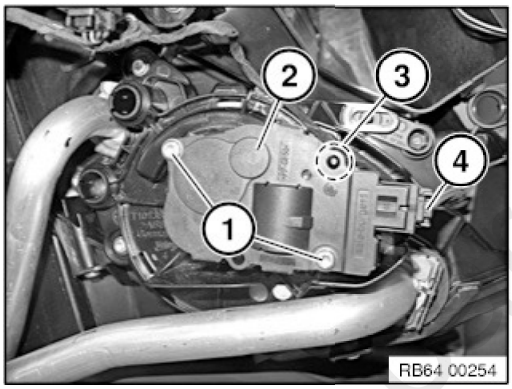
Slide rubber grommet (3) with foam seal forward slightly.

Release screw (4).

Carefully open holder (2) and feed out pipes(1) past rubber grommet (3).

Installation note:
If necessary, replace rubber grommet (3) and/or foam seal.

Make sure rubber grommet (3) is correctly seated on line clip (2).

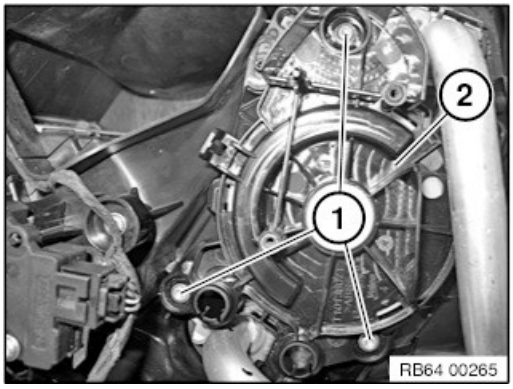


Release screws (1).

Unlock plug connection (4) and disconnect.

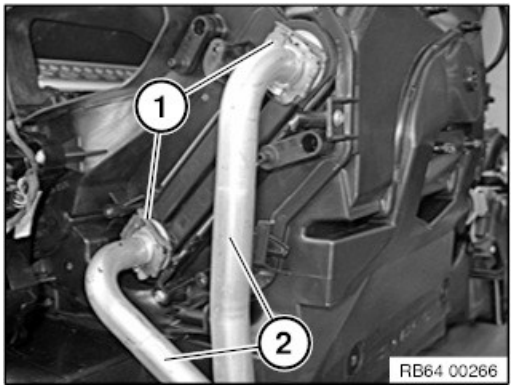
Remove actuator drive (2).

Installation note:
Make sure actuator drive (2) is correctly seated in guide (3).



Release screws (1).

Remove housing (2).

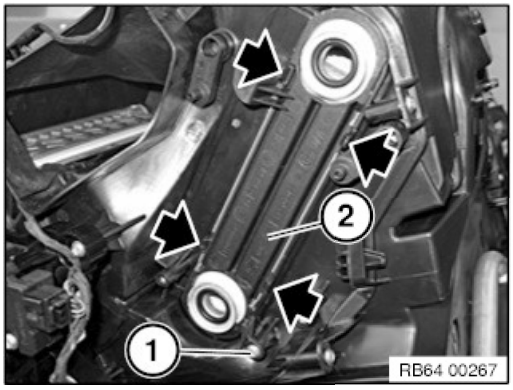


Loosen clasp (1).

Remove pipes (2).

Installation note:
Replace clasps (1) and sealing rings.

Use special tool 00 9 030 to mount sealing rings without damaging them.



Release screw (1).

Unlock heater (2) at marked points and pull out toward the front.

Installation note:
Make sure the heater (2) is correctly latched at the marked points.

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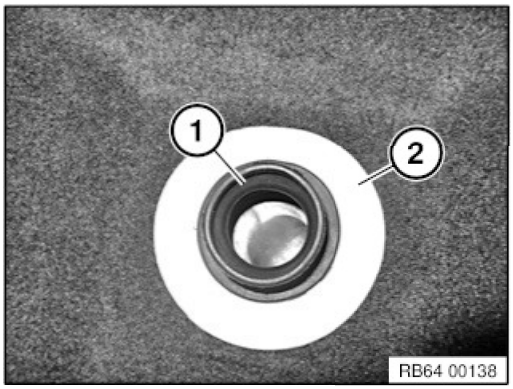
64 11 ... Replacing retaining ring for condensation drain hose

Special tools required:

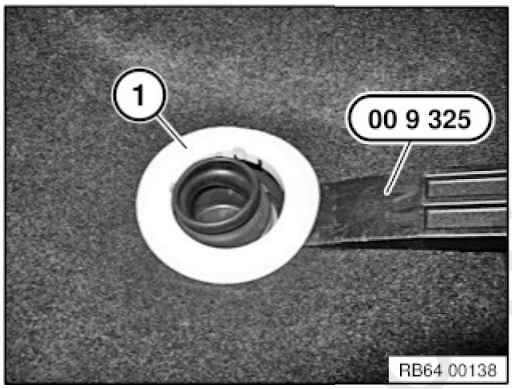
- 00 9 325

Necessary preliminary tasks:

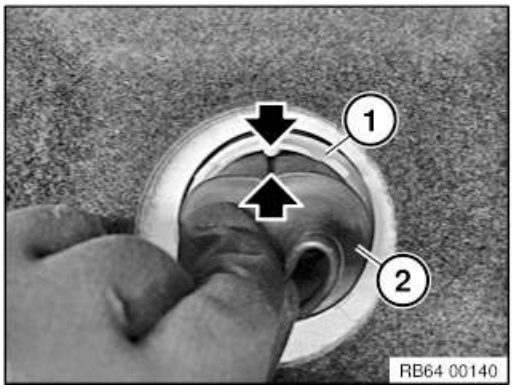
- Remove heater/air conditioner



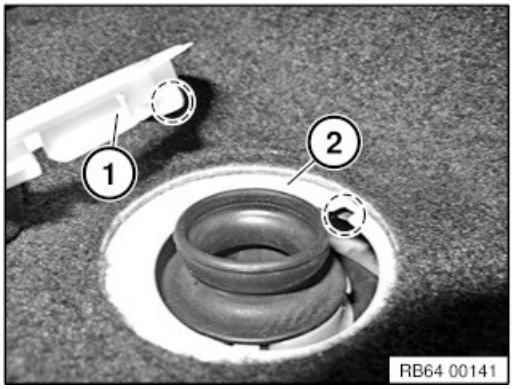
Press out condensation drain hose (1) from retaining ring (2) towards bottom.



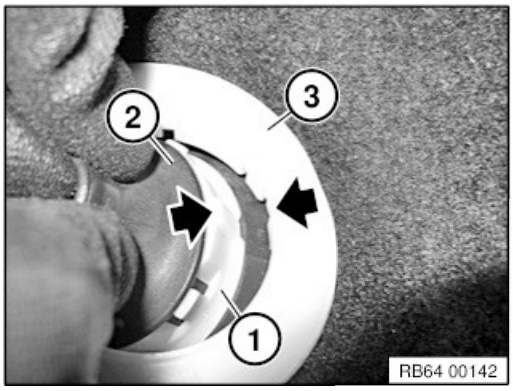
Remove retaining ring (1) with special tool 00 9 325 .



Installation note:
Guide of bottom retaining ring (1) must fit correctly in recess of condensation drain hose (2).



Installation note:
Guide on top retaining ring (1) must fit correctly in recess on body (2).



Installation note:
Guide on bottom retaining ring (1) must be inserted correctly in recess on top retaining ring (3).

Make sure condensation drain hose (2) is correctly fitted in top retaining ring (3).

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64 12 ... Initialising Telestart hand-held transmitter

Note:
The Telestart hand-held transmitter must be initialised when:

- Hand-held transmitter is replaced
- Car Access System control unit is replaced

The auxiliary heater is switched on with the hand-held transmitter and at a preselected switch-on time under an ambient temperature of approx. 15 °C.

Heating can be activated directly in the Central Information Display at any ambient temperature. To do so, go to the parking function menu under direct operation and mark the auxiliary heating box.

Note:
Initialisation can only be carried out with the BMW diagnosis system.

Follow instructions and specifications in procedure.

Service functions:

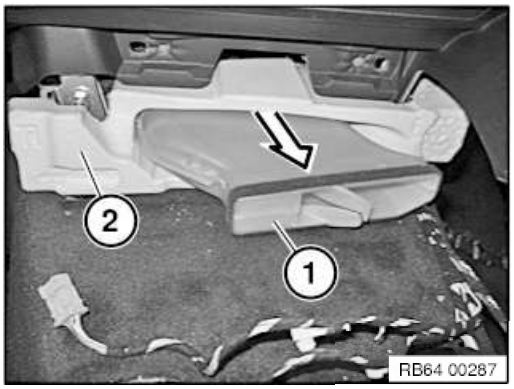
- Complete vehicle
- Body
- Air conditioning function
- Telestart transmitter
- Initialisation

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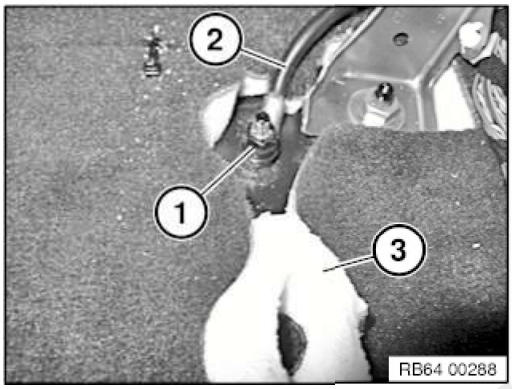
64 12 670 Replacing electric auxiliary heater -front-

Necessary preliminary tasks:

- Remove centre console.
- Remove glove box



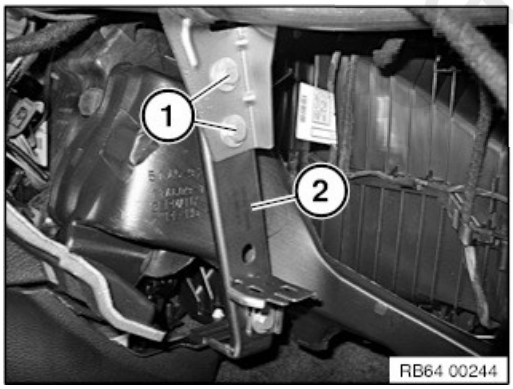
Remove air duct (1) and sound insulation (2) in direction of arrow.



Fold up the carpet (3) as shown.

Slacken nut (1).

Remove ground cable (2).

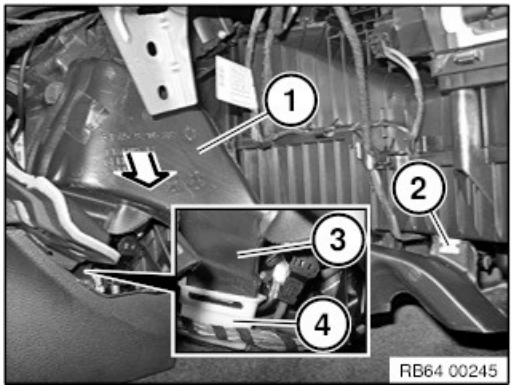


Note:
Mark position before removing holder (2).

Release screws (1).

Take off holder (2).

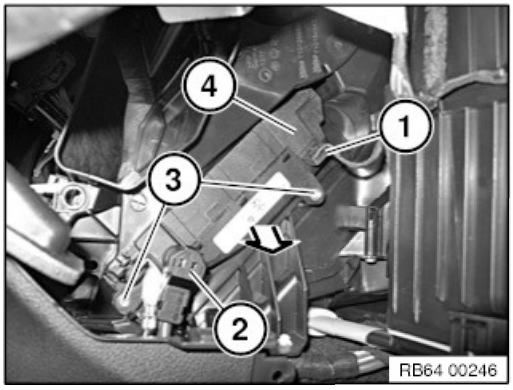
ardiagn.com



Unclip air duct (1) downward at retaining clasp (2).

Pull off air duct (1) in direction of arrow.

Installation note:
Air duct (3) must be correctly engaged in duct (4).



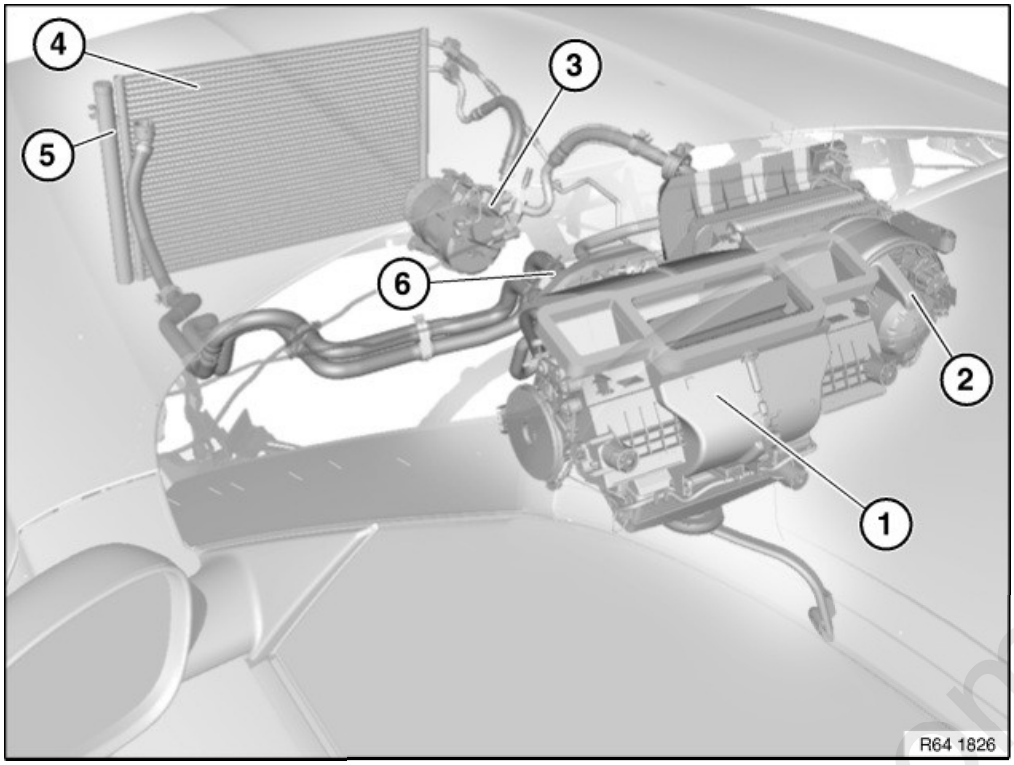
Disconnect plug connections (1) and (2).

Release screws (3).

Auxiliary heater (4) in direction of arrow.

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64 00 .. Overview of heater - A/C system components



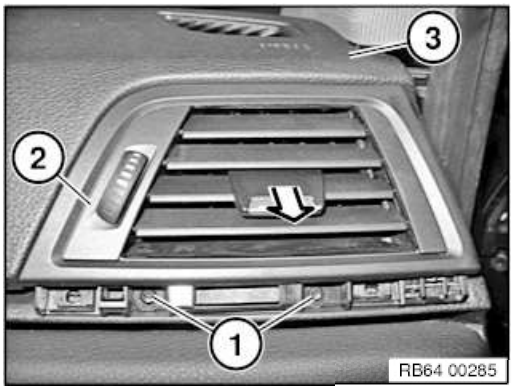
1 Heating and air-conditioning unit with mounted parts
2 Remove fan for heater - A/C system
3 Compressor for A/C system
4 Capacitor for heater - A/C system
5 Dryer flask for air conditioning (included in the capacitor)
6 Expansion valve

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64 22 125 Removing and installing (replacing) right fresh air grille

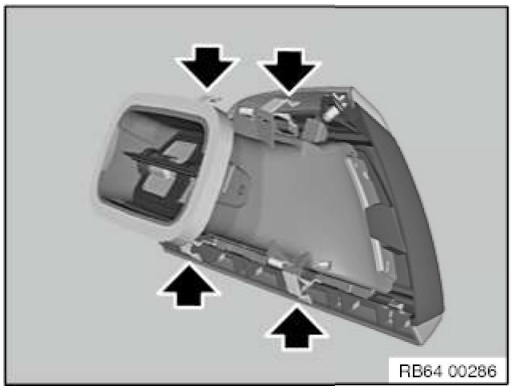
Necessary preliminary tasks:

- Remove decorative strip on dashboard on right



Release screws (1).

Remove fresh air grille (2) in direction of arrow from dashboard (3).



Installation note:
Clamps marked with arrows must not be bent or damaged, and must be renewed if they are.

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64 22 115 Removing and installing left fresh air grille

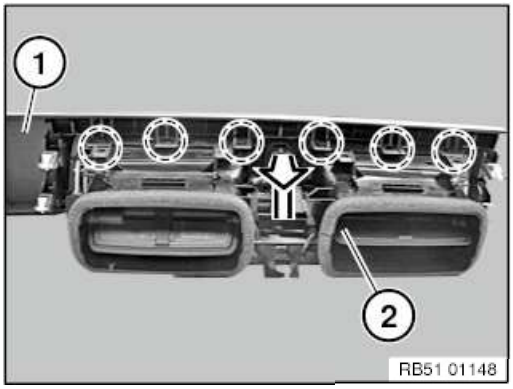
Note:
Operation is described under Removing and installing left decorative strip.

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64 22 165 Removing and installing/replacing centre fresh air grille

Necessary preliminary tasks:

- Remove right decorative trim on dashboard



Replacement:

Carefully unlock retaining lugs in marked area.

Remove fresh air grille (2) from decorative trim (1) in direction of arrow.

Replacement:

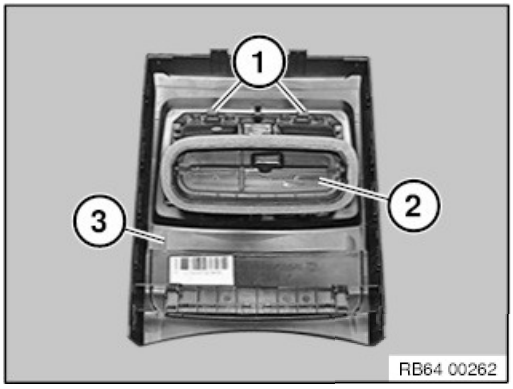
Modify switch for hazard warning system/central locking

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64 22 191 Removing and installing/replacing rear cabin fresh air grille (High A/C system)

Necessary preliminary tasks:

- Remove rear centre console trim



Unclip the retaining lugs (1) of the fresh air grille (2) toward the bottom.

Remove the fresh air grille (2) from the cover (3) toward the front.

Installation note:
Retaining lugs (1) must not be damaged.

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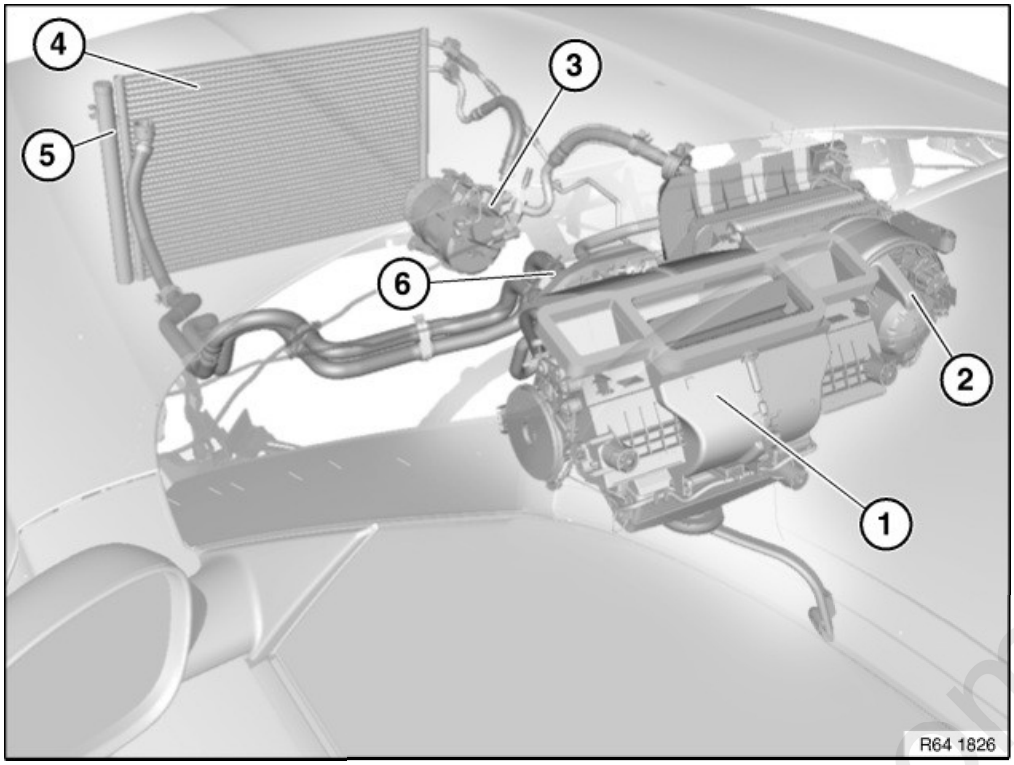
64 22 118 Replace fresh air grille, left



Note:
This work is described under Replacing decorative strip, left.

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64 00 .. Overview of heater - A/C system components



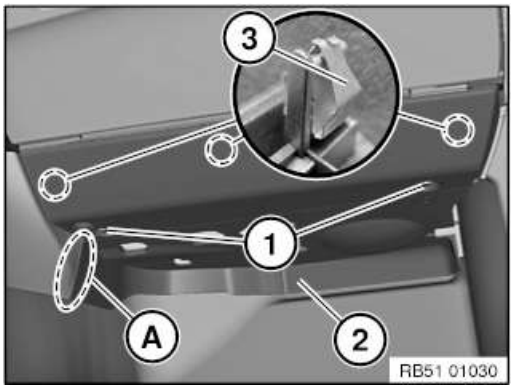
1 Heating and air-conditioning unit with mounted parts
2 Remove fan for heater - A/C system
3 Compressor for A/C system
4 Capacitor for heater - A/C system
5 Dryer flask for air conditioning (included in the capacitor)
6 Expansion valve

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64 31 010 Replace the microfilter for the interior ventilation \PREMIUM

PRELIMINARY WORK

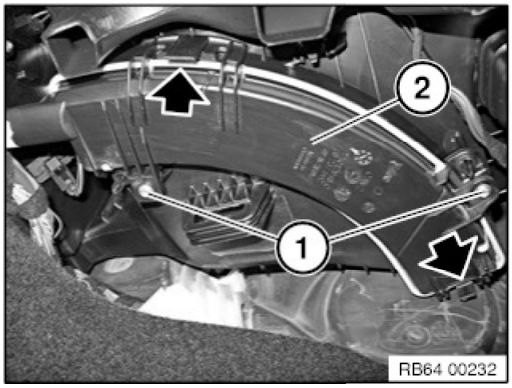
1 – Removing the bottom left instrument panel trim



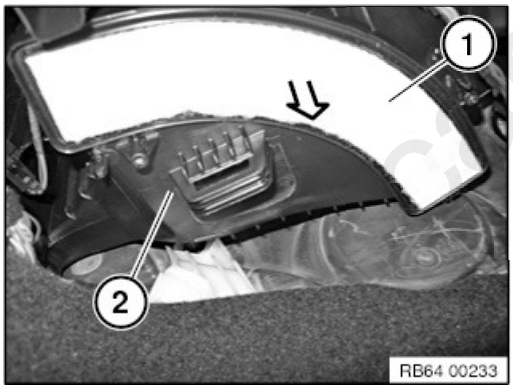
- Loosen screw connections (1).
- Loosen the instrument panel trim (2) using the clips (3) and remove towards the bottom in this area (A).
- Slightly lower the instrument panel trim (2) and disconnect the plug connection behind it.
- Remove the instrument panel trim (2) and put to one side.

MAIN WORK

2 – Remove microfilter for passenger compartment ventilation



- Loosen screws (1).
- Release the latch mechanisms in the highlighted areas (arrows) and remove the cover (2).



- Pull out the microfilter for interior ventilation (1) from the filter housing (2)in the direction of the arrow.

3 – Installing the microfilter for the interior ventilation

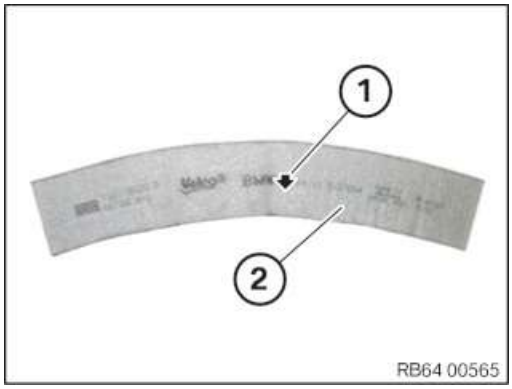
RISK OF DAMAGE

Damage to the heating and air conditioning system.

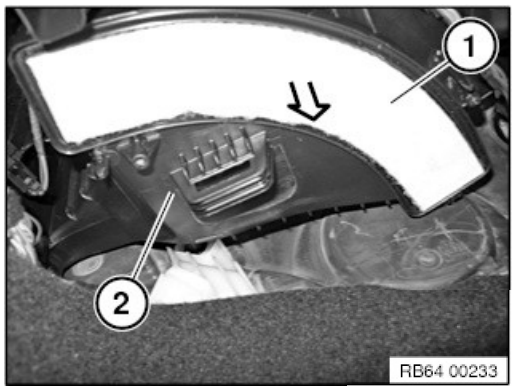
Use of unapproved microfilters may cause impairment of functions in the air conditioning.

- Only operate the heating and air conditioning system with the specified microfilter.

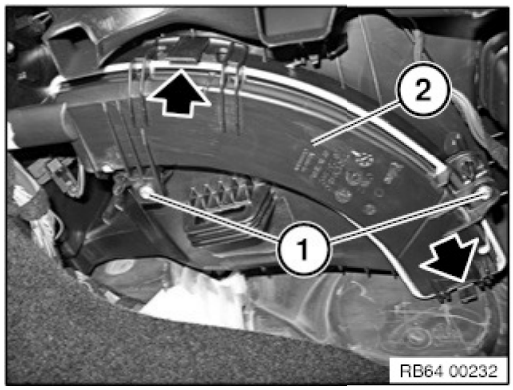
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- Position the microfilter for interior ventilation (2) so that the direction arrow (1) points **in** the direction of travel.



- Insert the microfilter for interior ventilation (1) into the filter housing (2) in the **opposite** direction of the arrow.



- Insert the cover (2) and engage at the marked points (arrows).
- Tighten the screws (1).

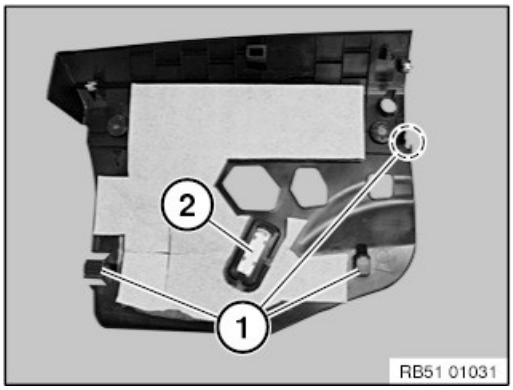
Microfilter cover to heating and air-conditioning unit

	2 Nm

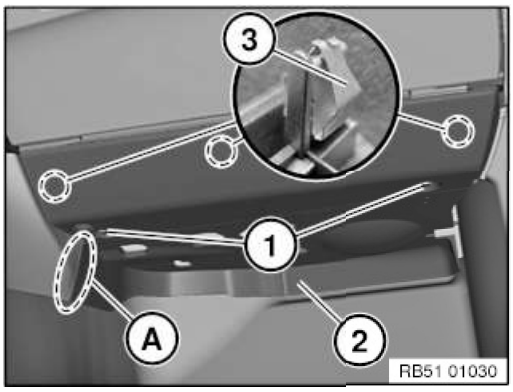
- Check the water drain hose on the heating and air-conditioning unit and on the cover (2) has been routed correctly.

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4 – Installing the botto right instrument panel trim



- Check the guides (1) for damage, if necessary, replace the instrument panel trim (2).
- Connect the footwell light connector (2).



- Insert the instrument panel trim (2) in this area (A) behind the centre console.
- Clip in the clips (3) at the instrument panel towards the top.
- Tighten the screw connections (1).

Dashboard trim panel at bottom on support

			4,6 Nm

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Additional Information

Overview of Tightening Torques

Microfilter cover to heating and air-conditioning unit — Used in step 3

	2 Nm

Dashboard trim panel at bottom on support — Used in step 4

			4,6 Nm

64 31 010 Replacing microfilter for interior ventilation

Attention!

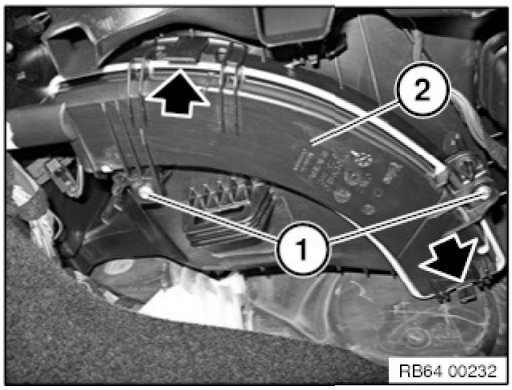
Risk of damage!

Air conditioning must not be operated without the prescribed filter element.

Necessary preliminary tasks:

- Remove bottom right dashboard trim panel

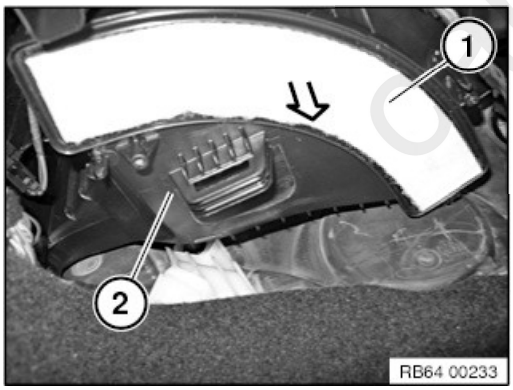
Removal:



Release screws (1).

Loosen the latch mechanisms (arrow).

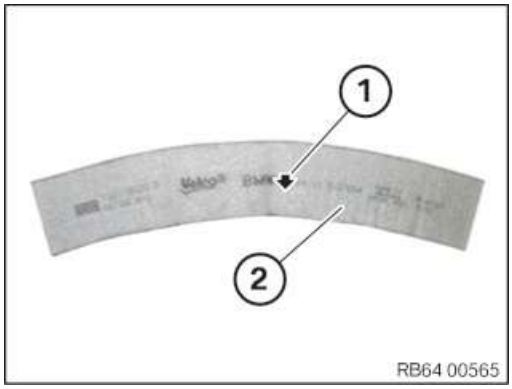
Partially remove lid (2).



Pull the microfilter (1) out of the heating and air-conditioning unit (2) in the direction of the arrow.

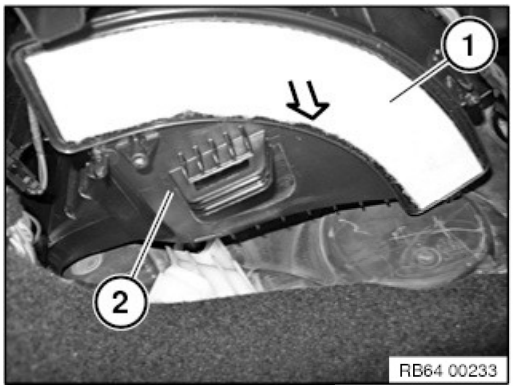
Installation:

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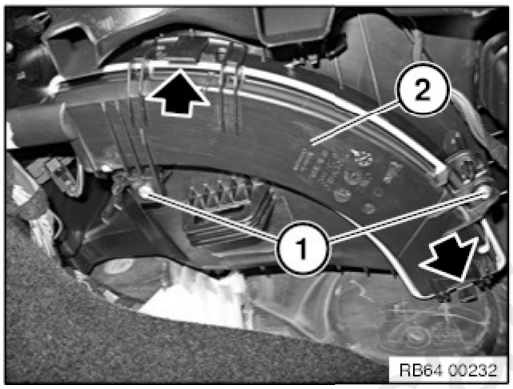


Installation note:
Direction arrow (1) on microfilter (2) must point in direction of travel.

Make sure microfilter (2) is correctly fitted.



Slide microfilter (1) in direction of arrow into the heating and air-conditioning unit (2).



Attention!

Risk of water damage in the passenger compartment!

Water drain hose must be fitted correctly to heating and air-conditioning unit and lid (2).

Install lid (2) and engage latch mechanisms (arrow).

Tighten down screws (1).

Tightening torque 64 31 1AZ.

Required reworking:

- Install bottom right instrument panel trim panel

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64 50 ... A/C performance test

Observe the following conditions prior to the A/C performance test:

1. Connect diagnosis system. Check of the fault memory (no faults in the fault memory).
2. Attach a thermometer with separate display element to the head restraint. Lay display element outwards out of passenger compartment.
3. Perform the test in a suitable workshop area with an ambient temperature above 18° C.
4. Vehicle temperature should be approximately the same as the ambient temperature in the workshop.
5. Engine must be at operating temperature (does not apply for electric vehicles).
6. ECO PRO mode must not be switched on.

Heat passenger compartment:

- ”A/C button” is **not** activated during the heating process
- Close all side windows and doors
- Set air recirculation function.
- Select air distribution mode for footwell and defrosting.
- *On vehicles with CID*: In A/C menu (CID) in Air distribution index tab: select 100 % footwell for driver and front passenger and 100 % defrosting for driver (this applies here to driver and front passenger)
- Maximum temperature setting
- Maximum blower speed
- Start engine (does not apply for electric vehicles)

Cool down passenger compartment:

Switch on air conditioning compressor with "A/C button" at a vehicle interior temperature of 45 °C (measured at the head restraint).

On vehicles with MAX-AC button:

- Activation of MAX-AC (= maximum cooling power)

On vehicles without MAX-AC button:

- Set maximum cooling power by means of following steps:
  - Setting minimum temperature
  - Blower setting maximum
  - Stratification maximum cold (4 blue bars)
  - Only ventilation open
  - Close remaining flaps (air outlet **only** from centre fresh air grille, left and right)

After 5 min, measure both ventilation temperatures with a thermometer at the same time (centre, left and right fresh air grille). The measured temperature must be ≤ 16 °C and the difference between right and left may not be greater than 2 °C.

If one or both temperature specifications is not reached drain off heating and air conditioning system. Measure the amount of refrigerant drawn off and compare with the nominal fill amount.

Check whether refrigerant loss is present:

- If there is a permissible loss of refrigerant, fill the refrigerant circuit with the nominal fill amount.
- If there is an impermissible loss of refrigerant, check the refrigerant circuit for tightness. After rectifying the leak, fill the refrigerant circuit with the nominal fill amount.
- If there is no refrigerant loss, continue troubleshooting using the pressure measurement (only possible for vehicles with unregulated air conditioning compressor up to series E46/E53).

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64 50 010 Drawing off, evacuating and filling heating and air conditioning system (R1234yf)



Warning!

Only persons in possession of a professional certificate of competence for the maintenance and repair of heating and air conditioning systems are authorised to carry out repair work on the refrigerant circuit. It must be available no later than 04 July 2010 (applies only to EU countries; follow country-specific regulations in non-EU countries).

Refrigerant circuit is under high pressure!

- If the protective caps on the filling valves are difficult to open, there is a danger of injury from leaking valve inserts.

Repairs may only be carried out on a depressurised refrigerant circuit!

- Before conducting repairs, check the actual pressure drop on the pressure gauge of the A/C service station

Avoid contact with refrigerant and refrigerant oil.

- Observe safety information for handling refrigerant R1234yf
- Follow safety information for handling refrigerant oil.



Attention!

Risk of damage!

Only BMW-approved R1234yf refrigerant may be used (refer to sourcing reference: Operating Fluids).

Restart engine only when air conditioning has been correctly filled.

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Vehicle-specific notes:

Only I01:

To access the connections for the refrigerant lines, remove front luggage compartment well.

Only I12:

Attention!

Risk of damage!

Risk of paint damage and scratches!

Open engine compartment lid to access the connections of the refrigerant lines.

Open and close the engine compartment lid as specified in the instructions without exception!

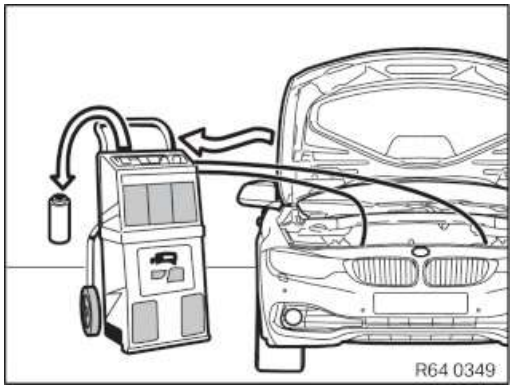
BMW i, Plug-in Hybrid Electric Vehicle and vehicles with rear passenger compartment air conditioning:

To ensure almost full draining of the refrigerant circuit or the hybrid battery cooling system, run the following test module:

- Body
- Air conditioning function
- Drain / fill the refrigerant circuit
- Drain/fill the refrigerant circuit (without I01 with heat pump)
- Drain/fill the refrigerant circuit of the heat pump (I01 with heat pump)

After filling the refrigerant circuit, delete the fault memory.

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Attention!

For R1234yf, an A/C service station especially suited for this refrigerant must be used!

A/C service station for R134a must not be used!

Comply with the notes on refrigerant (R134a, R1234yf) and refrigerant oil (Sanden SP-A2).

Risk of damage!

Carefully move the climate service station!

Comply with the operating instructions and service interval for the A/C service station!

Make sure that the hoses of the A/C service station are drained after the drawing off or filling procedure!

The climate service station contains highly sensitive components, such as scales. These components will be damaged due to improper handling, such as fast driving over a bump. This will result in a significant reduction of the measuring accuracy when drawing off and filling.

Attention!

The vehicle must be parked on the floor during all drawing off, evacuation and filling procedures!

Filling a raised vehicle will result in insufficient filling levels.

Note:
Perform A/C performance test in event of customer complaint!

If the system fails the test, draw off, evacuate and fill the air conditioning in accordance with the operating instructions of the relevant service station.

Instructions for drawing off air conditioning:
Before evacuation, the A/C service station will investigate the refrigerant.

If the refrigerant is consistent with the requirements, evacuation is continued.

If the refrigerant fails to meet the requirements, then a special procedure must be complied with when drawing off and disposing of this refrigerant.

In order to enhance the separation of refrigerant and refrigerant oil, allow the Air conditioning to run for a few minutes before drawing off.

The limits the entrainment of refrigerant oil while it is drawn off.

Drawn-off refrigerant oil must be changed and reintroduced via the A/C service station.

During drawing off, set the blower of the heating and air-conditioning unit to the middle blower speed. This ensures that drawing off is more effective since the pressure on the low pressure side increases.

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Recycling:

Dispose of drawn-off refrigerant oil as hazardous waste.

Observe country-specific waste disposal regulations.

Note in case of contaminated refrigerant R1234yf:
If the A/C service station for R1234yf refrigerant identifies contaminated refrigerant in the refrigerant circuit of the vehicle before evacuation, then a special procedure to draw off and dispose of this refrigerant must be followed.



Instructions for evacuating off air conditioning:

Before each filling, evacuate the refrigerant circuit.

Observe an evacuation time of at least 30 minutes.

The evacuation procedure removes all traces of ambient air, water vapour and any other gases present from the heating and air conditioning system. This enables subsequent system filling with refrigerant.

If the vacuum does not remain stable when the system is off, run the procedure for leaks in the refrigerant circuit.

During evacuation, set the blower of the heating and air-conditioning unit to the middle blower speed. This ensures that evacuation is more effective since the pressure on the low pressure side increases.

Notes for filling heating and air conditioning system:

In certain cases, Sanden SP-A2 refrigerant oil must be injected into the refrigerant circuit.

Before filling with refrigerant, replace the refrigerant oil entrained during drawing off.

Also top up any lost fluid as indicated in the table:

Loss of R1234yf refrigerant

Table 1 indicates the permitted loss of refrigerant after a specific period of time. There is no leak. refrigerant oil may not be topped up.

Table 2 indicates the amount of refrigerant oil must be topped up with an unapproved loss of refrigerant due to a leak after a specific period of time.

Different cases:

a. Loss of refrigerant per **Table 1** is not exceeded
   - Top up lost R1234yf refrigerant
   - It is not permitted to top up the refrigerant oil

b. Loss of refrigerant per **Table 1** is exceeded
   - Top up lost R1234yf refrigerant
   - refrigerant oil must be topped up **additionally** per Table 2

Table 1: **Number of years since last filling**	0 - 1	1 - 2	2 - 3	3 - 4	4 - 5
Permissible loss [g] --> Do not top up refrigerant oil	≤ 30	≤ 60	≤ 90	≤ 120	≤ 150

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Table 2: Number of years since last filling	Loss of R1234yf refrigerant [g]	Top up quantity refrigerant oil
0 -1	< 120	0
	120 - 150	10
	> 150	20
1 - 2	< 180	0
	180 - 210	10
	> 210	20
2 - 3	< 240	0
	240 - 270	10
	> 270	20
3 - 4	< 300	0
	300 - 330	10
	> 330	20
4 - 5	< 360	10
	> 360	20



Follow notes for opening and replacing parts in refrigerant circuit.

Depending on the type of component replaced on the heating and air conditioning system, it may be necessary to the top up the refrigerant oil, even if no measurable losses have occurred during drawing off. Follow the notes provided by the air conditioning manufacturer, taking account of the tolerances (and inaccuracies) indicated in the operating instructions of the relevant service station.

Information on the required refrigerant capacity for the entire air conditioning is contained on the type plate (1) in the engine compartment.

If necessary, refer to the Technical Data for capacities.

Installation note:

Reseal refrigerant filler necks on vehicle with sealing caps.

64 50 010 Drawing off, evacuating and filling heating and air conditioning system (R134a)



Warning!

Only persons in possession of a professional certificate of competence for the maintenance and repair of heating and air conditioning systems are authorised to carry out repair work on the refrigerant circuit. It must be available no later than 04 July 2010 (applies only to EU countries; follow country-specific regulations in non-EU countries).

Refrigerant circuit is under high pressure!

- If the protective caps on the filling valves are difficult to open, there is a danger of injury from leaking valve inserts.

Repair work may only be carried out on a depressurised refrigerant circuit!

- Before conducting repairs, check the actual pressure drop on the pressure gauge of the A/C service station

Avoid contact with refrigerant and refrigerant oil.

- Follow safety instructions for handling R134a refrigerant.
- Follow safety information for handling refrigerant oil.



Attention!

Risk of damage!

Only BMW-approved R134a refrigerant may be used. (refer to sourcing reference: Operating Fluids)

Restart engine only when air conditioning has been correctly filled.

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Vehicle-specific notes:

E60/E61 M5only:

To access refrigerant line connections, the right intake silencer housing must be removed.

Only F01/F02/F03/F04/F06/F12/F13 (N63) from 07/2012:

To access refrigerant line connections, the right intake port must be removed.

Only F02/F03/F04 and all Plug-in Hybrid Electric Vehicles:

To guarantee a complete draining of refrigerant from the automatic rear passenger compartment air conditioning or the hybrid battery cooling system,

Run the following test module:

- Car body service
- Air conditioning function
- Drain / fill up refrigerant circuit

F23 / F33 / F87 only:

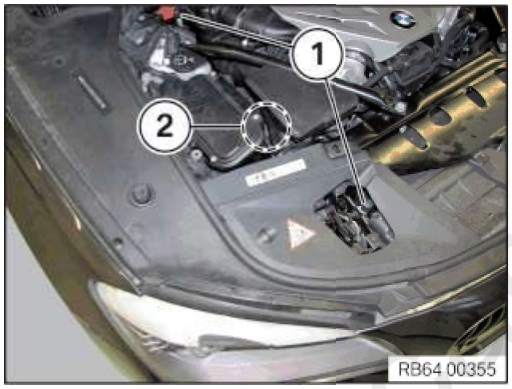
To access refrigerant line connections, the left front end strut must be removed.

Only M3 F8x:

In order to access the connections of the refrigerant lines, undo charge air cooler and place to one side.

Only F20, F21, F22, F23, F30, F31 with B38 engine:

To access refrigerant line connections, the electronics box must be removed.

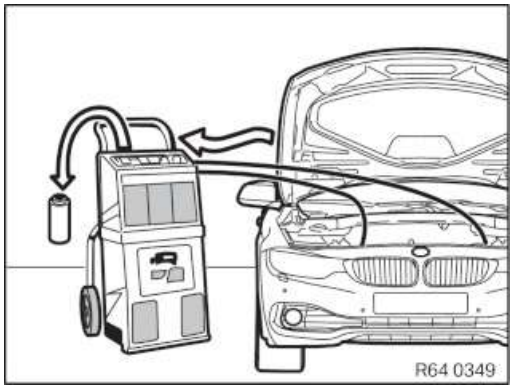


Note:
On the F01, F02, F10, F11, an additional refrigerant low pressure connection (2) may be installed specific to the engine and model year.

This refrigerant low pressure connection (2) is not to be used in the inspection!

Use exclusively refrigerant connections (1) for drawing off, evacuating and filling!

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Attention!

Risk of damage!

Comply with SI 08 07 10 (669)!

Carefully move the climate service station!

Comply with the operating instructions and service interval for the A/C service station!

Make sure that the hoses of the A/C service station are drained after the drawing off or filling procedure!

The climate service station contains highly sensitive components, such as scales. These components will be damaged due to improper handling, such as fast driving over a bump. This will result in a significant reduction of the measuring accuracy when drawing off and filling.

Attention!

The vehicle must be parked on the floor during all drawing off, evacuation and filling procedures!

Filling a raised vehicle will result in insufficient filling levels.

Note:
Comply with the notes on refrigerant (R134a, R1234yf) and refrigerant oil (Sanden SP-A2).

Note:
In the event of complaints, perform A/C performance test!

If the system fails the test, draw off, evacuate and fill the air conditioning in accordance with the operating instructions of the relevant service station.

Instructions for drawing off air conditioning:

To help separation of refrigerant and refrigerant oil, run engine at low speed (800-1200 rpm) and with air conditioning switched on for a few minutes.

The limits the entrainment of refrigerant oil while it is drawn off.

Drawn-off refrigerant oil must be changed and reintroduced via the A/C service station.

During drawing off, set the blower of the heating and air-conditioning unit to the middle blower speed. This ensures that drawing off is more effective since the pressure on the low pressure side increases.

Recycling:

Dispose of drawn-off refrigerant oil as hazardous waste.

Observe country-specific waste disposal regulations.

Instructions for evacuating off air conditioning:

Before each filling, evacuate the refrigerant system.

Observe an evacuation time of at least 30 minutes.

The evacuation procedure removes all traces of ambient air, water vapour and any other gases present from the heating and air conditioning system. This enables subsequent system filling with refrigerant.

If the vacuum does not remain stable when the system is off, run the

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procedure for leaks in the refrigerant circuit.

During evacuation, set the blower of the heating and air-conditioning unit to the middle blower speed. This ensures that evacuation is more effective since the pressure on the low pressure side increases.

Notes for filling heating and air conditioning system:

In certain cases, Sanden SP-A2 refrigerant oil must be injected into the refrigerant circuit.

Before filling with refrigerant, replace the refrigerant oil entrained during drawing off.

Also top up any lost fluid as indicated in the table:

Loss of R134a refrigerant

Table 1 indicates the permitted loss of refrigerant after a specific period of time. There is no leak. refrigerant oil may not be topped up.

Table 2 indicates the amount of refrigerant oil must be topped up with an unapproved loss of refrigerant due to a leak after a specific period of time.

Different cases:

a. Loss of refrigerant per **Table 1** is not exceeded
   - Top up lost R134a refrigerant
   - It is not permitted to top up the refrigerant oil

b. Loss of refrigerant per **Table 1** is exceeded
   - Top up lost R134a refrigerant
   - refrigerant oil must be topped up **additionally** per Table 2

Table 1: **Number of years since last filling**	0 - 1	1 - 2	2 - 3	3 - 4	4 - 5
Permissible loss [g] --> Do not top up refrigerant oil	≤ 30	≤ 60	≤ 90	≤ 120	≤ 150

Table 2: **Number of years since last filling**	**R134a loss of coolant [g]**	**Top up quantity refrigerant oil**
0 -1	< 120	0
	120 - 150	10
	> 150	20
1 - 2	< 180	0
	180 - 210	10
	> 210	20
2 - 3	< 240	0
	240 - 270	10
	> 270	20
3 - 4	< 300	0
	300 - 330	10
	> 330	20

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4 - 5	< 360	10
	> 360	20

Attention!

Only **F10/F11** with **B47 engine** and production date **to 02/2015**:

For these vehicles, an **additional 30 g** must be added to the drawn off/determined amount of refrigerant oil!



Follow notes for opening and replacing parts in refrigerant circuit.

Depending on the type of component replaced on the heating and air conditioning system, it may be necessary to the top up the refrigerant oil, even if no measurable losses have occurred during drawing off. Follow the notes provided by the air conditioning manufacturer, taking account of the tolerances (and inaccuracies) indicated in the operating instructions of the relevant service station.

Information on the required refrigerant capacity of the air conditioning is found on the type plate (1).

If necessary, refer to the Technical Data for capacity.

Installation note:

Reseal refrigerant filler necks on vehicle with sealing caps.

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64 50 ... Instructions for handling R1234yf refrigerant

Work on the refrigerant circuit may only be carried out by experts!

Avoid all contact with liquid or gaseous R1234yf. Wear protective goggles and gloves when working on the refrigerant circuit.

- Follow safety information for handling refrigerant R1234yf!

Warning!

> Although R1234yf at normal temperature is non-toxic, non-flammable and not explosive in air in any mixture ratio, it is still essential to follow various safety precautions. **At higher temperatures, R1234yf is inflammable.**

As a gas, R1234yf is colourless, odourless and heavier than air. If it enters the atmosphere, this may result in an imperceptible danger of asphyxiation or in cardiac palpitations, especially in workshop pits. Ventilate rooms adequately; if necessary, turn on installed extractor systems.

Store filled refrigerant pressure flasks so that they are not subject to direct sunlight or other heat sources (at maximum 45 °C). Also avoid exposing them to mechanical stress (e.g. by dropping).

Do not weld or solder on to filled air conditioning systems or in rooms into which R1234yf may have leaked. Exposure to flames or high temperatures (≥ 50 °C) may give rise to toxic products of decomposition (hydrofluoric acid). For this reason, do not smoke either.

In the event of fire, carbon dioxide (CO2), extinguishing powder and a sprayed water jet are deemed to be suitable extinguishing agents. Cool reservoirs at risk with a sprayed water jet (risk of bursting!).

If the protective caps on the filler valves are difficult to open, there is a risk of injury from leaking valve inserts (high pressure).

The filled refrigerant circuit of the A/C system is subject to excess pressure. Before carrying out repairs on the A/C system, it is absolutely essential to draw off the refrigerant.

- Before conducting repairs, check the actual pressure drop on the pressure gauge of the A/C service station

R1234yf must be drawn off, cleaned and returned to the A/C system using an A/C service station following the relevant operating instructions.

For a properly functioning A/C system, it is essential to have the greatest possible levels of cleanliness when working on the A/C system and the longest possible evacuation (at least 30 minutes dehumidification from refrigerant circuit) before each filling of the A/C system.

R1234yf easily absorbs moisture. Therefore, seal off opened pipes, air conditioning condenser, evaporator, air conditioning compressor and dryer flask immediately with seal plugs.

- If air conditioning has been completely drained by a leak, accident or repair, the desiccant insert must be replaced as excessive moisture may have entered the system.

With replacement parts, the plugs may only be removed immediately before the lines are connected. In the event of warranty claims, the old parts must be provided with plugs to be able to determine the cause of the damage.

Installation note:

After each refilling of an air conditioning, check that protective caps of filling valves are hand-tight. They serve as additional seals.

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64 52 ... Instructions for opening and part exchange in refrigerant circuit



Special tools required:

- 00 9 030
- 32 1 270

Warning!

- Avoid contact with refrigerant and refrigerant oil
- Follow safety informations for handling refrigerant
- Follow safety information for handling refrigerant oil

Attention!

- Always use new O-rings each time A/C connections are opened (refer to Electronic Parts Catalogue)
  They must **not** be coated.
  Use special tool 00 9 030 to install sealing rings without damaging them.
- Open the referigerant circuit for as short of a period as possible.
- Close all components and lines in the refrigerant circuit and return parts **immediately** following the removals at openings with special tool 32 1 270 to prevent penetration of moisture or foreign objects.
- If the refrigerant circuit was closed at the openings with special tool 32 1 270 but it remains open for more than 24 h, the dryer insert for the air conditioning must be replaced.

I. **Part replacement as preliminary work fur further repair work and part replacement based on gradual leakage.**
(minor leak, e.g. hairline crack)

Procedure:

- Draw off heating and air conditioning system, then determine drawn-off amount of refrigerant oil
- Carry out part replacement
- Replace removed refrigerant oil and additionally top up with new refrigerant oil according to components replaced:
  - Compressor: refer to Notes on compressor replacement
  - Evaporator: 10 ml
  - Air conditioning condenser: 20 ml
  - Desiccant insert / dryer flask: 20 ml
  - Each replaced refrigerant line: 10 ml
  - Air conditioning condenser with integrated dryer flask: 40 ml
  - Safety pressure switch and gasket: no additional refrigerant oil
  - Only I01: Radiator, high-voltage battery unit: 20 ml
- Evacuate and fill air conditioning system

II. **Part replacement due to sudden leakage**
(major leak, e.g. pipe break due to accident)

Procedure:

- Draw off heating and air conditioning system, then determine drawn-off amount of refrigerant oil
- Carry out part replacement
- Replace removed refrigerant oil and additionally top up with new refrigerant oil according to components replaced:
  - Compressor: refer to Notes on compressor replacement
  - Evaporator: 35 ml
  - Air conditioning condenser: 35 ml
  - Desiccant insert / dryer flask: 55 ml
  - Each replaced refrigerant line: 35 ml
  - Air conditioning condenser with integrated dryer flask: 55 ml

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    - Safety pressure switch and gasket: no additional refrigerant oil
    - Only I01: Radiator, high-voltage battery unit: 35 ml
- Evacuate and fill A/C system

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64 53 ... Instructions for replacement of air conditioning capacitors and radiator/coolers

Attention!

Even when they are correctly installed or due to normal driving, radiators (oil cooler, radiator, charge air cooler) or air conditioning condensers may show slight impressions or deformations on their discs (1).

A slight sag with a large radius for the air conditioning condenser is also permissible.

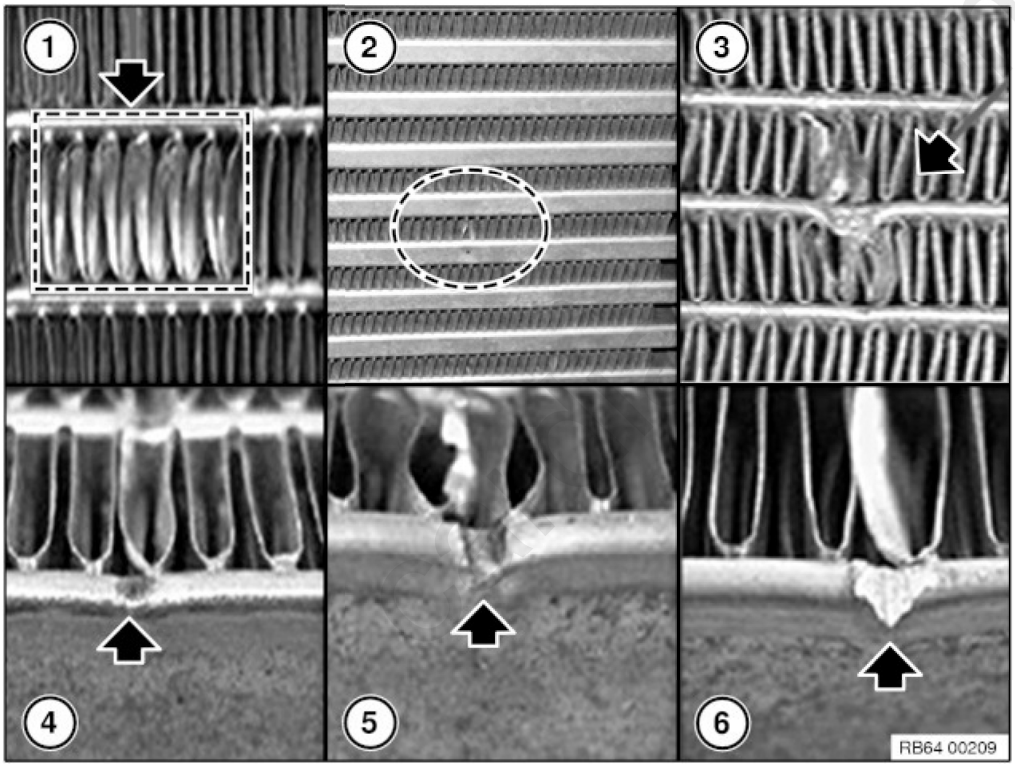
As long as tightness/function are not degraded and an adequate distance of a few mm between the radiator and air conditioning condenser remains in place, **this is not damage in either case.**

Radiators or air conditioning condensers are not to be replaced in these cases!

Note:

The deformations shown in Fig.Â (1) can be bent back with a standard fin comb..

Damage to lines carrying media or on the flat pipe require exchange of the radiator or air conditioning condenser (2-6).



Dryer flask (integrated in the air conditioning condenser):

Round dents/depressions are permitted.

The air conditioning condenser is not to be replaced in this case.

64 50 ... Leak detection with forming gas

Note:
Leak detection with forming gas replaces the leak detection that is restricted in EU countries using UV.

Observe national regulations in all other countries!



Attention!

Compliance with the manufacturer's operating instructions provided in the equipment case is absolutely mandatory!

Comply with SI 08 08 10 (670)!

Read and comply with the manufacturer's operating instructions provided with the special tool particularly with regard to accident prevention, health protection and environmental protection.

Only the basic procedure is described in the following!



Attention!

Wear personal protective clothing/equipment!

Note:
Determine the customer's use behaviour prior to leak detection!

Certain user behaviours can lead to a loss of refrigerant from the refrigerant circuit even if there is no leak. This may occur if the customer has not used the air conditioning for a period of more than six months. This may cause O-rings to harden and refrigerant may escape. In this case, it will be sufficient to fill the refrigerant circuit again and switch on the air conditioning for approximately 10 minutes while the engine is running.

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Necessary preliminary work:

- **If components of the refrigerant circuit are contaminated, clean the engine compartment. Otherwise, the sensor head of the leak detector will become contaminated.**

  Comply with notes and instructions on handling high pressure cleaner.
- Drain off air conditioning system
- Fill the air conditioning with forming gas
- Set pressure to 5 bar

To reach the components of the refrigerant circuit with leak detector, specific parts must be removed depending on the vehicle.

Remove the following parts first immediately before the check of the respective components:

- Drive belt from air conditioning compressor
- Centre fresh air grille
- Covers
- Trim panels
- Air duct
- Intake silencer
- Bulkheads
- Parts of the interior equipment (automatic rear air-conditioning system)

In some vehicles it is necessary to open the air flaps of the automatic air flap control.

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Vehicle-specific notes:

Only I01:

To access the connections for the refrigerant lines, remove front luggage compartment well.

Only I12:

Attention!

Risk of damage!

Risk of paint damage and scratches!

Open engine compartment lid to access the connections of the refrigerant lines.

Open and close the engine compartment lid as specified in the instructions without exception!

Only BMW i and hybrid vehicles:

To ensure almost full draining of the refrigerant circuit or the hybrid battery cooling system, run the following test module:

- Body
- Air conditioning function
- Drain / fill the refrigerant circuit
- Drain / fill the refrigerant circuit
- Drain/fill refrigerant circuit of heat pump (onlyI01 with heat pump)

Delete fault memory after filling refrigerant circuit.

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Attention!

Always perform the leak detection with a pressure of **5 bar at first**!

This is absolutely necessary to find certain leaks, such as in the area of the O-rings.

If no leak is detected, repeat the leak detection with **10 bar**.

Attention!

The leak detection may not be performed **more than 3 h** after filling the refrigerant circuit with forming gas!

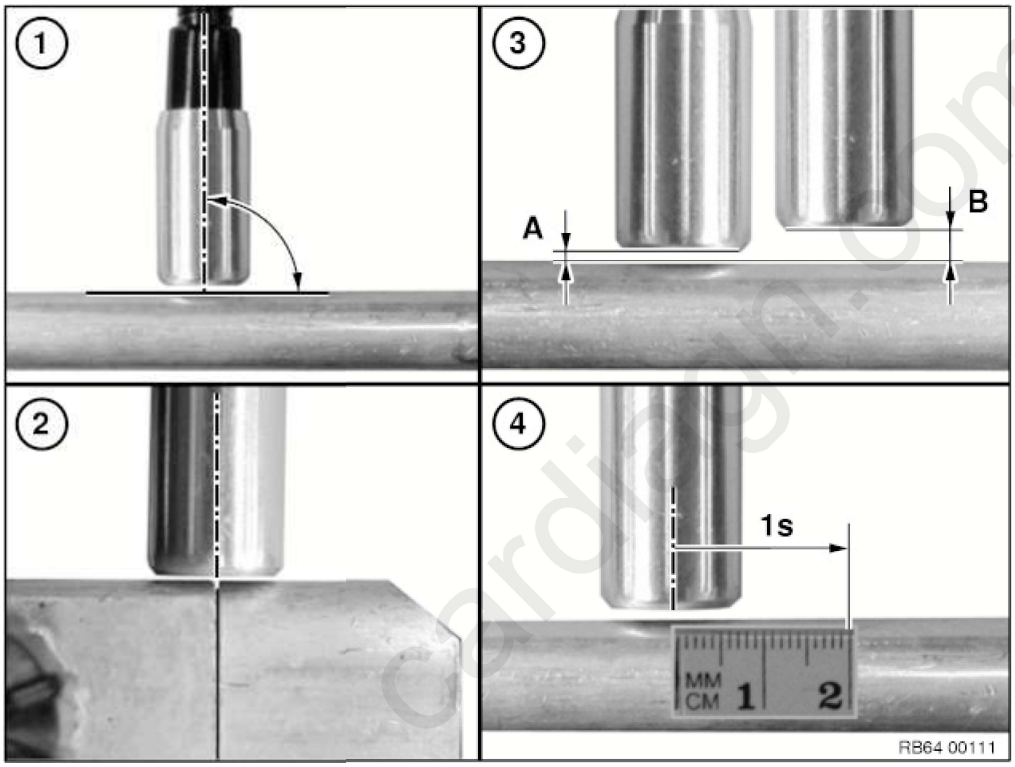
Forming gas consists of 95% nitrogen and 5% hydrogen. The leak detector will detect hydrogen. If this is leaking from the refrigerant circuit even though the pressure remains, the leak detection bears no results.

Attention!

Risk of damage!

Maximum approved pressure: **10 bar**

Do not start the engine during the entire procedure!



Notes for handling the leak detector:

1. Sensor head should always stand vertical to the surface to be checked.
2. Sensor head must always be aligned to the centre of the point to be checked. Slowly guide the sensor head around the point (e.g. connection point, sealing surface, etc.).
3. The optimal distance (A) between sensor head and surface to be checked should permanently be approximately 1 mm.
   Maximum distance (B) at points that are difficult to access approximately 5 mm.
4. Checking speed may not be more than maximum 2 cm per s.

Note:
If the leak detector displays a leak, remove the sensor head from the leak for approximately 10 s.
Then check if the leak is still displayed at the same point. Repeat the process up to three times,
to ensure that a leak is actually present at this point.

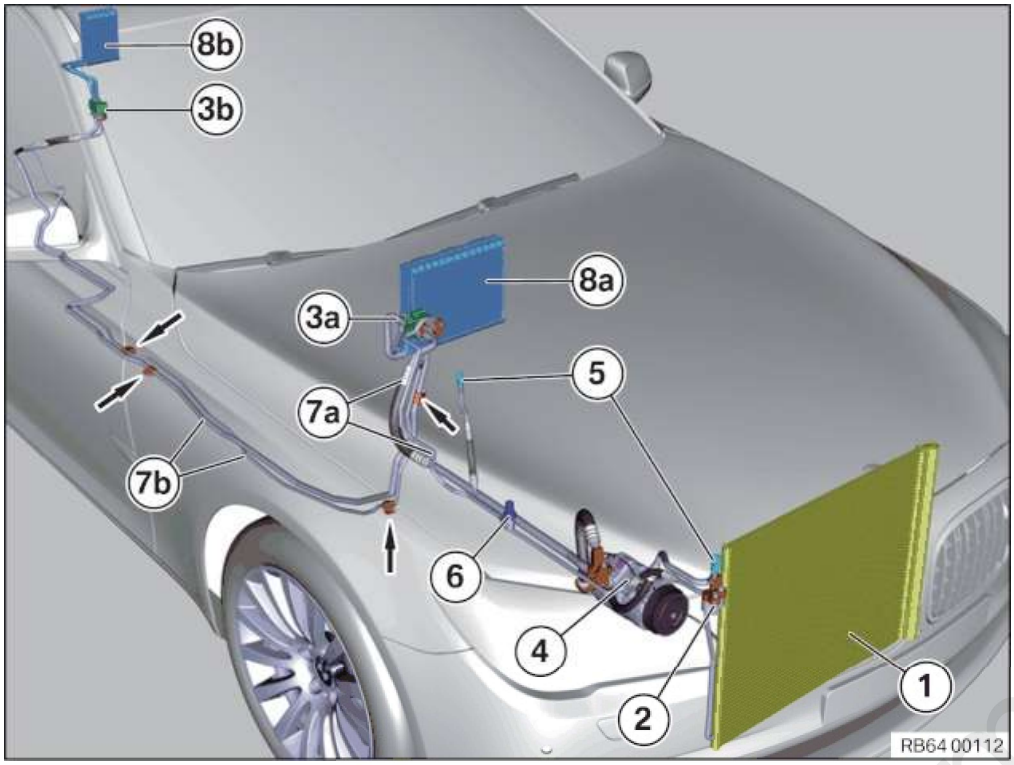
Note:
Replace the leaking component. Relieve the pressure from the refrigerant circuit prior to replacement.

Attention!

Compliance with the instructions above is absolutely mandatory!

Non-compliance will significantly reduce the efficiency of leak detection!

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Note:
The graphic shows the example of the refrigerant circuit on the F02 with the automatic rear air-conditioning system optional equipment .

Refrigerant circuits on other vehicles may differ from the graphic.

Refrigerant circuits of BMW i vehicles differ a lot from the figure:

Overview components refrigerant circuitI01

Overview components refrigerant circuitI12

Note additional components during leak detection in these vehicles!

Overview of positions to be checked:

1. Air conditioning condenser
2. Connection point between air conditioning condenser and refrigerant line
3. a) Expansion valve, front (vehicles with and without automatic rear air-conditioning system)

   b) Expansion valve, rear (vehicles with automatic rear air-conditioning system)
4. Air conditioning compressor
5. Filler neck high pressure and low pressure
6. Refrigerant pressure sensor
7. a) Refrigerant line, front (vehicles with and without automatic rear air-conditioning system)

   b) Refrigerant line, rear (vehicles with automatic rear air-conditioning system)
8. a) Evaporator, front (vehicles with and without automatic rear air-conditioning system)

   b) Evaporator, rear (vehicles with automatic rear air-conditioning system)

Note:
Refrigerant line connection points are identified by arrows.

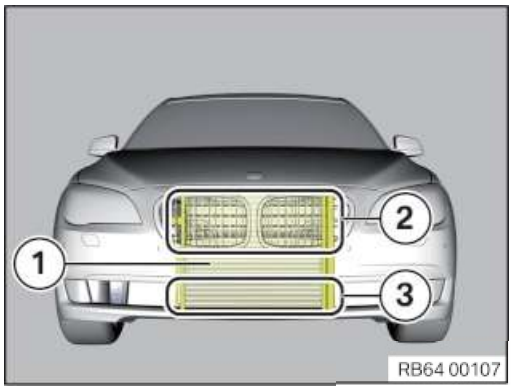
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Checking sequence:

1. Check of components 1, 2, 3a, 4, 5, 6, 7a and 8a of the automatic front air-conditioning system.

   If no fault found:

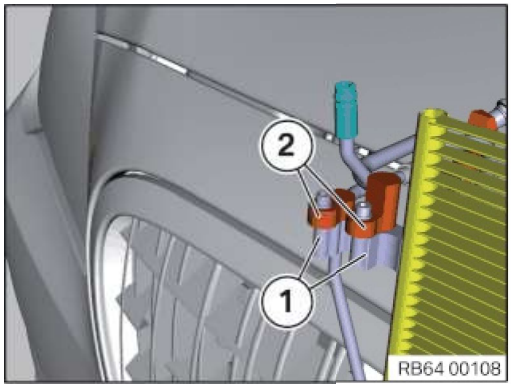
2. Check of components 3b, 7b, 8b and connection points of the automatic rear air-conditioning system.



1. Air conditioning condenser:

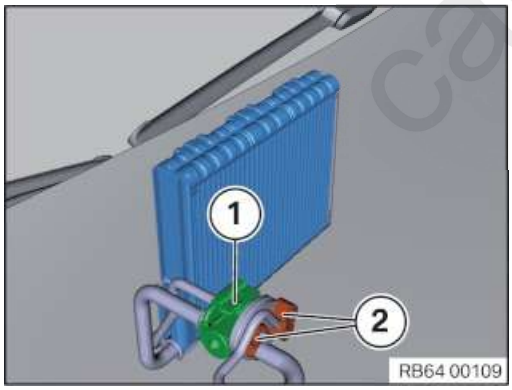
Damage caused by stone chipping, etc. is the most frequent cause of air conditioning condenser leaks (1):

1. Visual inspection in the area of the radiator grille (2) and air inlet grille, centre (3).
2. Check damaged points first.
3. Check the remainder of the air conditioning condenser.



2. Connection point capacitor - refrigerant line

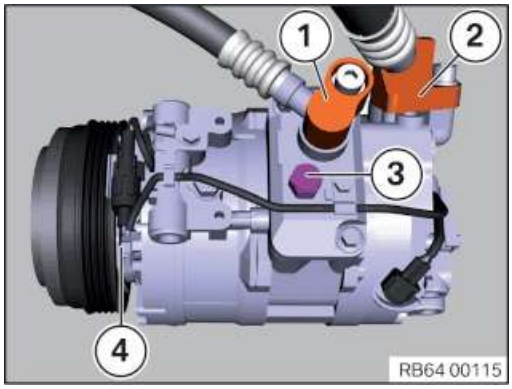
Check the connection point between the connection at the air conditioning condenser (1) and refrigerant lines (2).



3. Expansion valve:

Check the connection point between the expansion valve (1) and refrigerant lines (2).

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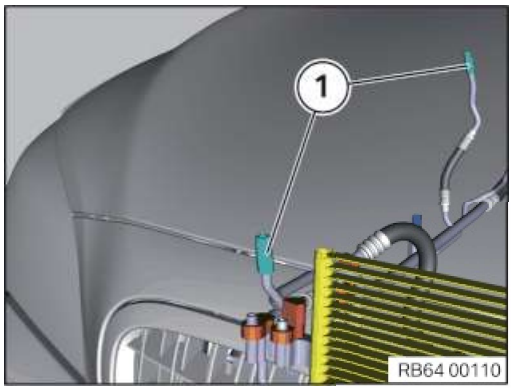


4. A/C compressor:

Remove drive belt from air conditioning compressor.

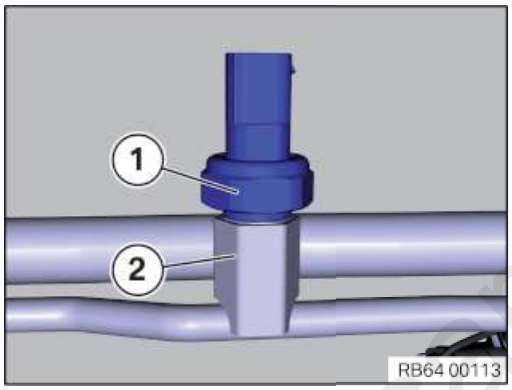
Check the following components on the air conditioning compressor:

1. High-pressure connection
2. Low pressure connection
3. Pressure relief valve
4. Radial shaft seal of the magnetic coupling: Turn the magnetic coupling several times by hand during the leak detection.



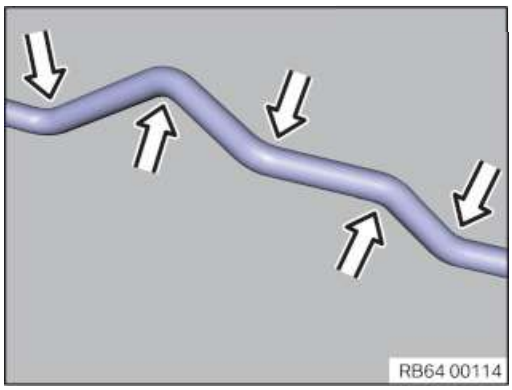
5. Filler neck

Blow out the fuel filler neck (1) prior to checking.



6. Refrigerant pressure sensor

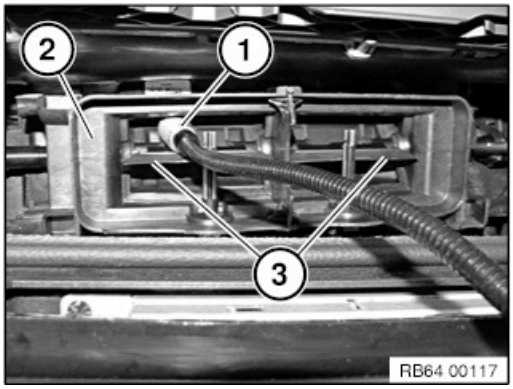
Check the sealing surface between the refrigerant pressure sensor (1) and the refrigerant line (2).



7. Refrigerant lines:

1. Perform visual inspection
2. Check damaged points first.
3. Check bending points at points marked with an arrow. Leaks occur especially frequently at these points.
4. Check the remainder of the refrigerant line.

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8. Evaporator:

Remove the centre fresh air grille.

Compliance with the following settings is **absolutely** required:

- Air recirculation function On
- Lowest blower speed
- Lowest temperature
- Set the air distribution to ventilation (air may only flow out of the centre fresh air grille)

Position sensor head (1) in air duct of middle fresh air grille (2) as illustrated and move slowly from inside to outside above and below air flap (3). Carry out this operation on the left and right fresh air grilles.

Attention!

Some vehicles have an expansion valve directly next to the fresh air intake for the passenger compartment.

In this case the expansion valve must be covered!

Following the completed leak detection:

- Evacuate and fill heating and air conditioning system

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64 50 ... Leak detection with ultraviolet additives (UV additives) (BMW leak-testing case)



Leak detection using ultraviolet additives is generally not recommended as the UV additives lead to an uncontrolled over oiling of the refrigerant circuit. This results in a reduction of the cooling power. Leak detection with forming gas is preferable.

Leak detection using ultraviolet additives is permitted for refrigerants R134a and R1234yf.

Attention!

In EU countries it is prohibited by law to fill a knowingly leaking refrigerant circuit with the refrigerants (R134a and R1234yf):

- If a leak is suspected in the refrigerant circuit, refilling with refrigerant and UV additives for the purpose of a subsequent leak detection **is not permitted**

  In this case, carry out the leak detection with forming gas
- UV additives **must be filled only in a tight refrigerant circuit**

Observe national regulations in all other countries!



Attention!

It is absolutely essential to read and comply with the equipment manufacturer's operating instructions provided in the leak testing case!

Read and comply with the manufacturer's operating instructions provided with the leak testing case with regard to accident prevention, health protection and environmental protection.

Use only BMW-approved UV additives (e.g. TRACER).

Only the basic procedure is described in the following!

Attention!

UV additives may not be used in vehicles with electric A/C compressors!



Warning!

Avoid contact with refrigerant.

Follow safety precautions when handling refrigerant.

Attention!

Ultraviolet lamp gets very hot in the radiation area!

Do not use the ultraviolet lamp without the filter glass.

Eyes and skin will suffer damage if the ultraviolet lamp is used without the filter glass.

When using the ultraviolet lamp, wear the safety goggles provided in the leak testing case.

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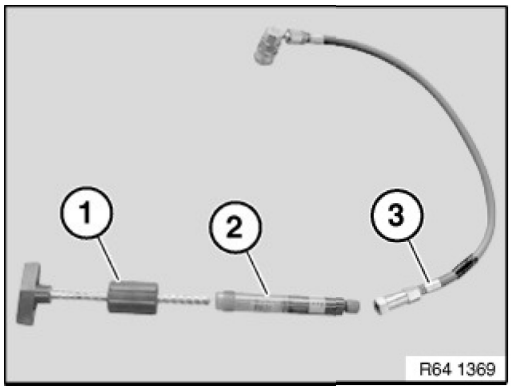
Note:

- Fill the hose system of the hand pump completely with UV additive PRIOR to use
- The UV additive may be used exclusively for BMW-approved refrigerant oils
- Do not operate the air conditioning while the hand pump is connected or in use
- The air conditioning must always be filled with an adequate amount of refrigerant to enable the UV additives to be properly distributed

Necessary preliminary work:

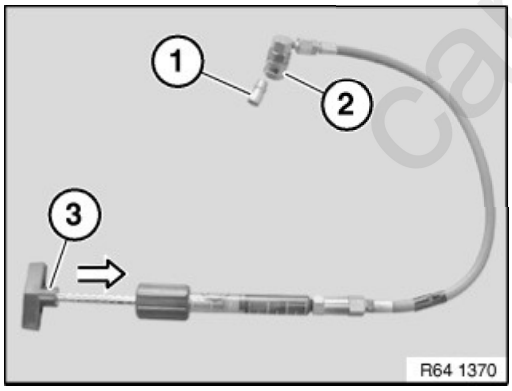
Before actually testing for leaks, check the entire refrigerant circuit using the UV leak detection lamp to ensure that no UV additive is already in the area of the refrigerant circuit.

Leak areas which have already been detected by UV light must carefully cleaned with the cleaning agent provided in the leak testing case.



On initial use:

Connect hand pump (1) to additive cartridge (2) and pipe section (3).



On initial use:

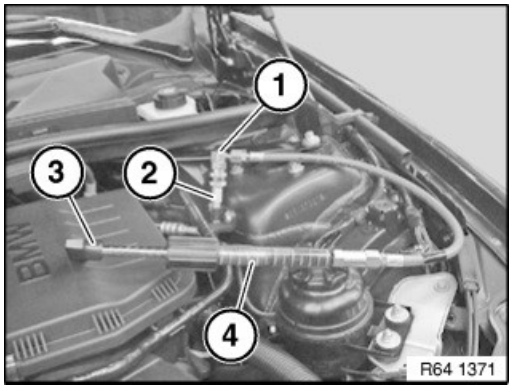
Attach vent valve (1) to quick-release coupling (2).

Turn handle (3) on hand pump to advance the piston until a small amount of UV additive emerges. This vents the hose system.

Attention!

The entire hand pump with hose system must not be disassembled again once filling has been completed.

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Attach quick-release coupling (1) to low-pressure connection (2) of air conditioning system.

Turn handle on hand pump (3) until the required amount of UV additive is added.

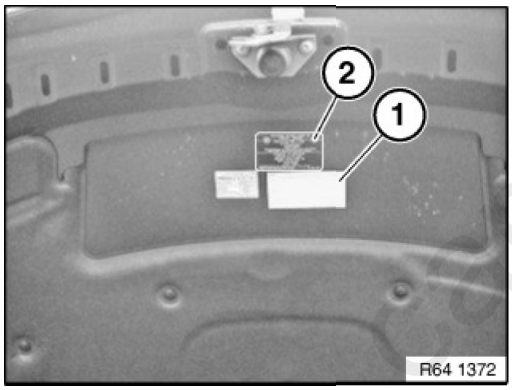
The quantity of UV additive to be added is dependent on the amount of refrigerant in the refrigerant circuit:

- Air conditioning systems with refrigerant filling up to 900 g: one graduation mark (4) on additive cartridge
- Air conditioning systems with refrigerant filling in excess of 900 g: two graduation marks (4) on additive cartridge

Note:
After filling remove the quick-release coupling (1). If necessary, clean the areas with contaminated with UV additive using the cleaning agent contained in the leak testing case.

Further tasks:

- Start engine
- Run air conditioning at highest level for 5 - 10 minutes in order to ensure adequate distribution of dye in the system
- Turn off engine.
- Check all the components of the refrigerant circuit for any leaks
- Possible leaks are displayed in green when using the UV leak detecting lamp and UV-absorbing safety goggles



Complete accompanying information label (1) with the relevant data and attach in an easily visible position next to the type plate (2).

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64 50 ... Note for handling R134a refrigerant

Work on the refrigerant circuit may only be carried out by experts!

Avoid all contact with liquid or gaseous R134a. Wear protective goggles and gloves when working on the refrigerant circuit.

- Follow safety information for handling R134a refrigerant

Warning!

> Although R134a at normal temperature is non-toxic, not inflammable and not explosive in air in any mixture ratio, it is still essential to follow various safety precautions.

As a gas, R134a is colourless, odourless and heavier than air. If it enters the atmosphere, this may result in an imperceptible danger of asphyxiation or in cardiac palpitations, especially in workshop pits. Ventilate rooms adequately; if necessary, turn on installed extractor systems.

Store filled refrigerant pressure flasks so that they are not subject to direct sunlight or other heat sources (at maximum 45 °C). Also avoid exposing them to mechanical stress (e.g. by dropping).

Do not weld or solder on to filled heating and air conditioning systems or in rooms into which R134a may have escaped. Exposure to flames or high temperatures (≥ 50 °C) may give rise to toxic decomposition products (fluorine gas). For this reason, do not smoke either.

In the event of fire, carbon dioxide (CO2), extinguishing powder and a sprayed water jet are deemed to be suitable extinguishing agents. Cool reservoirs at risk with a sprayed water jet (risk of bursting!).

If the protective caps on the filler valves are difficult to open, there is a risk of injury from leaking valve inserts (high pressure).

The filled refrigerant circuit of the A/C system is subject to excess pressure. Before carrying out repairs on the A/C system, it is absolutely essential to draw off the refrigerant.

- Before conducting repairs, check the actual pressure drop on the pressure gauge of the A/C service station

R134a must be drawn off, cleaned and returned to the air conditioning using an A/C service station following the relevant operating instructions.

For a properly functioning A/C system, it is essential to have the greatest possible levels of cleanliness when working on the A/C system and the longest possible evacuation (at least 30 minutes dehumidification from refrigerant circuit) before each filling of the A/C system.

R134a absorbs very small amounts of moisture. Therefore, seal off opened pipes, air conditioning condenser, evaporator, air conditioning compressor and dryer flask immediately with seal plugs.

- If air conditioning has been completely drained by a leak, accident or repair, the desiccant insert must be replaced as excessive moisture may have entered the system.

With replacement parts, the plugs may only be removed immediately before the lines are connected. In the event of warranty claims, the old parts must be provided with plugs to be able to determine the cause of the damage.

Installation note:

After each refilling of an air conditioning, check that protective caps of filling valves are hand-tight. They serve as additional seals.

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64 50 ... Notes on the refrigerant (R134a, R1234yf) and refrigerant oil



Attention!

Specific to the country , **2 different refrigerants** (R134a, R1234yf) are used.

Specific to the country, the vehicle and the year of manufacture **2 different refrigerant oils** (ND-8, Sanden SP-A2) are used.

Before carrying out repairs on the refrigerant circuit, always determine which refrigerant/refrigerant oil is used in the vehicle!

Refrigerant: This information can be found on the **type plate** on the bonnet.

Refrigerant oil: This information can be found on the **type plate** on the front flap in vehicles with a production date from 2013.



R1234yf refrigerant is used **in the following countries**:

Observe notes on handling R1234yf refrigerant!

Europe				Asia	America
Belgium	Great Britain	Malta	Sweden	Israel	USA
Bosnia and Herzegovina	Ireland	Macedonia	Switzerland	Turkey	Canada
Bulgaria	Iceland	The Netherlands	Slovakia	India*	
Denmark	Italy	Norway	Slovenia	South Korea	
Germany	Croatia	Austria	Spain		
Estonia	Latvia	Poland	Czech Republic		
Finland	Liechtenstein	Portugal	Hungary		
France	Lithuania	Romania	Cyprus		
Greece	Luxembourg	Serbia			

*Only applies to vehicle models with Europe version. All other vehicle models have R134a.

Introduction of R1234yf refrigerant:

European countries listed in the table, Turkey and Israel:

- BMW i as of 09/2013
- from 07/2016, BMW, MINI, RR

USA and Canada:

- from 07/2016 BMW, BMW i, MINI

South Korea:

- from 11/2018 BMW, BMW i, MINI

The introduction date may vary slightly according to the specific country and model.

The refrigerant R134a will continue to be used **in all other countries**.

Observe notes on handling R134a refrigerant!

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Refrigerant oil Sanden SP-A2 is used for both, R1234yf and R134a.

Observe notes on handling refrigerant oil!

Attention!

I01, I12 with production date up to 08/2014:

In the national-market version with R134a a wrong refrigerant oil is present on the type plate

Always use Sanden SP-A2

(Part number of Sanden SP-A2: 2 339 920)

Attention!

Only vehicles with a production date from 09/2013 and **R1234yf** refrigerant/Sanden **SP-A2** refrigerant oil can be filled using the A/C service station for **R1234yf**.

In addition to vehicles with a production date from 09/2013, also all previous vehicles **without the electric A/C compressor** with **R134a** refrigerant and both **ND-8** and Sanden **SP-A2** refrigerant oil can be filled using the A/C service station for **R134a**.

Exception:

BMW i and hybrid vehicles (with an electric A/C compressor) that are filled with **R134a** refrigerant/Sanden **SP-A2** refrigerant oil. These vehicles must be injected with Sanden **SP-A2** refrigerant oil.

When filling the refrigerant circuit with R134a, always ensure you use the correct, vehicle-specific refrigerant oil type!

The previous ND-8 refrigerant oil must not be mixed with Sanden SP-A2 refrigerant oil!

In other words, the refrigerant oil ND-8 must not be filled in refrigerant circuits which were filled with Sanden SP-A2 in the factory.

Sanden SP-A2 refrigerant oil may be mixed with ND-8 refrigerant oil in vehicles without an electric A/C compressor.

In other words, the refrigerant oil Sanden SP-A2 must be filled in refrigerant circuits which were filled with ND-8 in the factory.

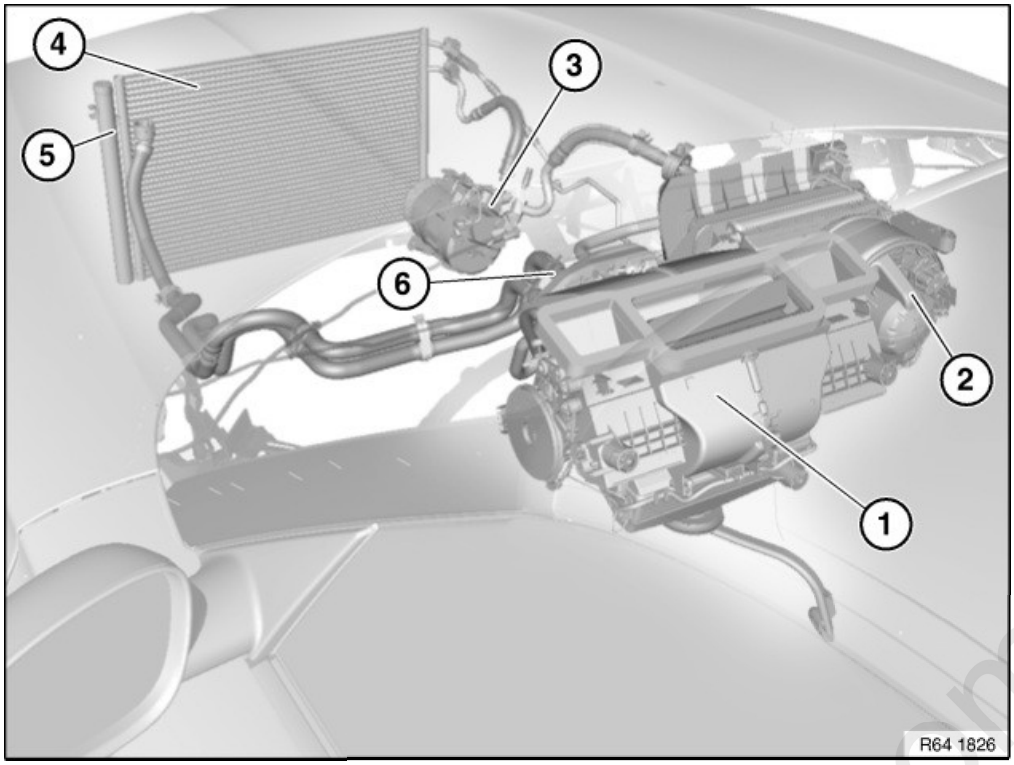
However, this is permitted **only** in vehicles **starting from** F-series.

Note the overview of the refrigerant oil to be filled.

To prevent inadmissibly mixing the different refrigerant oil types, rinse the A/C service station hoses after each drawing off/filling procedure!

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64 00 .. Overview of heater - A/C system components



1 Heating and air-conditioning unit with mounted parts
2 Remove fan for heater - A/C system
3 Compressor for A/C system
4 Capacitor for heater - A/C system
5 Dryer flask for air conditioning (included in the capacitor)
6 Expansion valve

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64 50 ... Safety information for handling refrigerant R1234yf



Warning!

Danger of injury!

Refrigerant circuit is under high pressure! Work on the refrigerant circuit may only be carried out by experts!

Draw off refrigerant without fail BEFORE all repair work on the refrigerant circuit.

The refrigerant circuit is depressurised AFTER drawing off.

- The pressure gauge on the A/C service unit must be checked for the actual pressure drop prior to repair work.

It is absolutely essential to read and observe the relevant operating instructions for the A/C service unit used!

At high temperatures, R1234yf is inflammable!



Protective measures/rules of conduct:

- Wear safety goggles
- Wear oil-resistant protective gloves
- Do not smoke!
- Observe country-specific safety regulations.



First aid measures:

- Eye contact: In the event of contact with the eyes, rinse immediately with plenty of running water and consult an ophthalmologist.
- Skin contact: In the event of contact with skin, remove affected clothing immediately and rinse with plenty of water.
- After inhalation: If refrigerant vapours are inhaled in greater concentrations, remove the person affected to an area of fresh air and keep them under supervision. Call for a doctor. If breathing problems are experienced, breathe additional oxygen. If the person affected is breathing with difficulty or has stopped breathing, incline the person's head at the neck and administer the kiss of life.

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64 50 ... Safety informations for handling refrigerant oil



Warning!

Danger of injury!

Refrigerant circuit is under high pressure! Work on the refrigerant circuit may only be carried out by experts!

Draw off refrigerant without fail BEFORE all repair work on the refrigerant circuit.

The refrigerant circuit is depressurised AFTER drawing off!

- Before conducting repairs, check the actual pressure drop on the pressure gauge of the A/C service station

Read and comply with the relevant operating instructions for the A/C service station used!



Protective measures/rules of conduct:

- Wear safety goggles
- Wear oil-resistant protective gloves
- Do not smoke!
- Observe country-specific safety regulations.



First aid measures:

- If swallowed: Do NOT induce vomiting, unless expressly instructed to do so by medical personnel. Do not administer anything to an unconscious person through their mouth. Consult a doctor immediately if larger quantities of this substance are swallowed. Loosen tight-fitting items of clothing (e.g. collar, tie, belt or similar).
- Eye contact: Remove contact lenses if worn. In the event of eye contact, rinse eyes for at least 15Â minutes with plenty of water. It is essential to use WARM WATER. Consult a doctor.
- Skin contact: In the event of skin contact, rinse immediately with plenty of water. Remove contaminated clothes and shoes. Wash affected clothes before wearing again. Clean shoes thoroughly before reusing. **Call for a doctor**.
- After inhalation: If inhaled, take the person affected outside into fresh air immediately and keep them under supervision. **Call for a doctor**. If breathing difficulties are experienced, administer additional oxygen. If the person affected stops breathing, administer the kiss of life.



Important!

Refrigerant is hygroscopic and must therefore be stored in suitable containers that are sealed airtight!

refrigerant oil is non-combustible and non-explosive at normal temperatures. Nevertheless, the following points must be observed:

- Do not store in the vicinity of flames, heat sources or strongly oxidising materials
- Suitable extinguishants are carbon dioxide (CO_2) dry extinguishant and foam

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Recycling

Catch and dispose of emerging refrigerant oil.

Observe country-specific waste disposal regulations.

Absorb escaping refrigerant oil with fluid-binding material.

Notify the relevant authorities if larger amounts of refrigerant are discharged into aboveground water supplies, drainage systems or subsoil.

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64 50 ... Safety informations for handling tetrafluorethane refrigerant R134a



Warning!

Danger of injury!

Refrigerant circuit is under high pressure! Work on the refrigerant circuit may only be carried out by experts!

Draw off refrigerant without fail BEFORE all repair work on the refrigerant circuit.

The refrigerant circuit is depressurised AFTER drawing off.

- The pressure gauge on the A/C service unit must be checked for the actual pressure drop prior to repair work.

It is absolutely essential to read and observe the relevant operating instructions for the A/C service unit used!



Protective measures/rules of conduct:

- Wear safety goggles
- Wear oil-resistant protective gloves
- Do not smoke!
- Observe country-specific safety regulations.



First aid measures:

- Eye contact: In the event of contact with the eyes, rinse immediately with plenty of running water and consult an ophthalmologist.
- Skin contact: In the event of contact with skin, remove affected clothing immediately and rinse with plenty of water.
- After inhalation: If refrigerant vapours are inhaled in greater concentrations, remove the person affected to an area of fresh air and keep them under supervision. Call for a doctor. If breathing problems are experienced, breathe additional oxygen. If the person affected is breathing with difficulty or has stopped breathing, incline the person's head at the neck and administer the kiss of life.

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64 51 001 Cleaning evaporator (right-hand drive vehicle)



Special tools required:

- 2 289 613



Warning!

When handling cleaning agent, observe following protective measures:

Wear protective rubber gloves and protective goggles.

If cleaning agent comes into contact with eyes or skin, wash immediately with lots of water.

Comply with notes and instructions on handling cleaning agents



Note:
For information on cleaning agent and rinsing again, refer to Service Information.

For spraying device, observe Service Information Spraying device for the air conditioning system.



Important!

To avoid dirtying vehicle interior:

- Close all air vents
- The air conditioning must be set to the air recirculation function
- Cover carpet in work area



Recycling:

Carry out the cleaning operation in a suitable washing bay as the emerging cleaning agent escapes through the drain openings in the transmission tunnel.

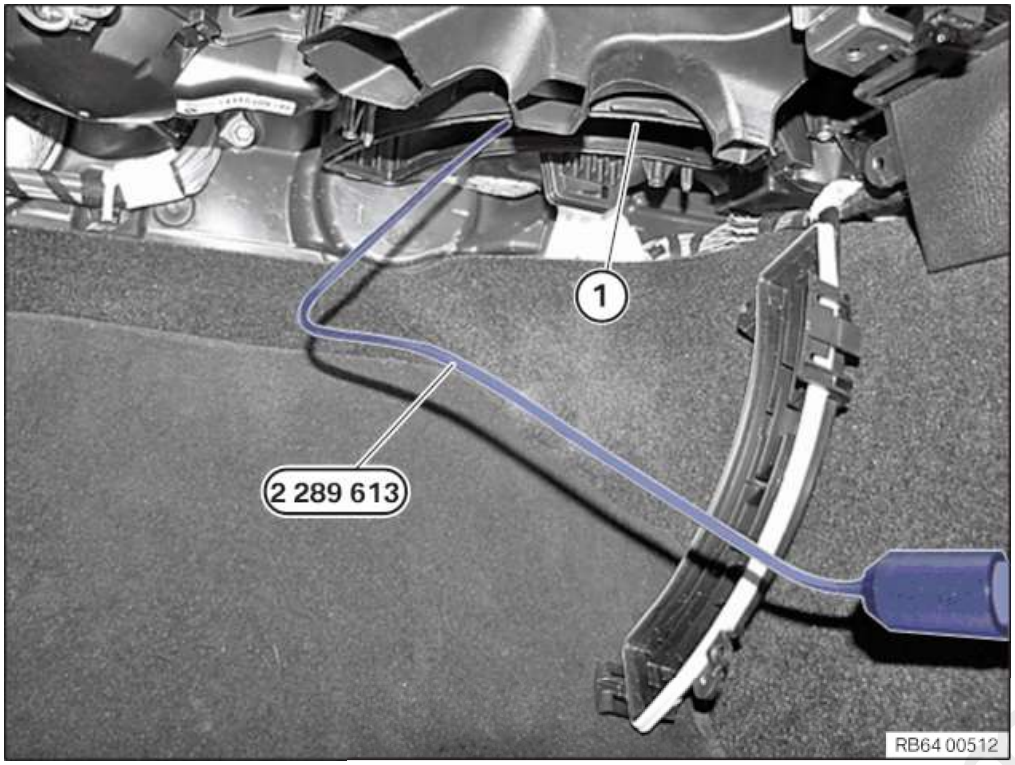
After completing cleaning, allow the vehicle to drip-dry for approx. 5 minutes.



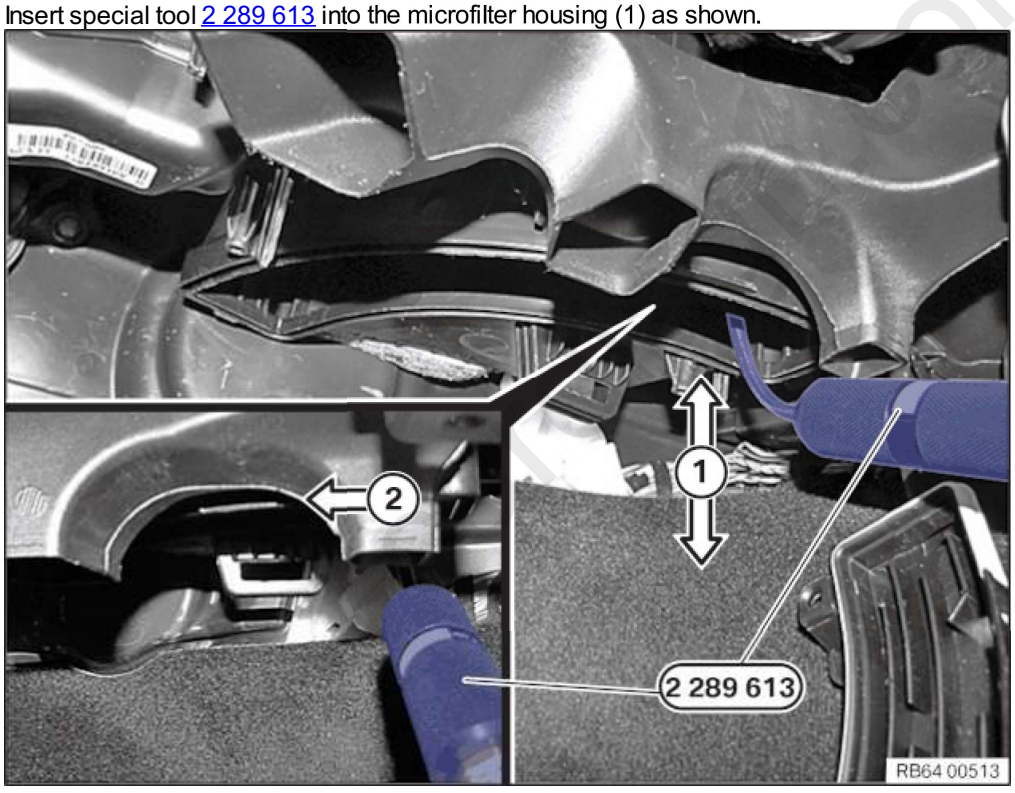
Necessary preliminary work:

- Remove rear underbody protection
- Remove microfilter for passenger compartment ventilation

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Insert special tool 2 289 613 into the microfilter housing (1) as shown.



Position special tool 2 289 613 up against the top right limit position as shown.

Move special tool 2 289 613 from the top downwards (1) to limit position.

Note:
If special tool 2 289 613 jams:

Move special tool 2 289 613 slightly to the left (2) until it can be moved from the top to the bottom.



Note:
Set air conditioning to footwell ventilation and fresh air mode. Open side windows/doors.

Start the vehicle and let the air conditioning run for approx. 5 minutes at maximum blower output.

In order to eliminate the last remnants of cleaning agent, repeat this process shortly before handover to the customer.

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64 51 001 Cleaning the evaporator (left-hand drive vehicle)



Special tools required:

- 2 344 001



Warning!

When handling cleaning agent, observe following protective measures:

Wear protective rubber gloves and protective goggles.

If cleaning agent comes into contact with eyes or skin, wash immediately with lots of water.

Comply with notes and instructions on handling cleaning agents



Note:
For information on cleaning agent and rinsing again, refer to Service Information.

For spraying device, observe Service Information Spraying device for the air conditioning system.



Important!

To avoid dirtying vehicle interior:

- Close all air vents
- The air conditioning must be set to the air recirculation function
- Cover carpet in work area



Recycling:

Carry out the cleaning operation in a suitable washing bay as the emerging cleaning agent escapes through the drain openings in the transmission tunnel.

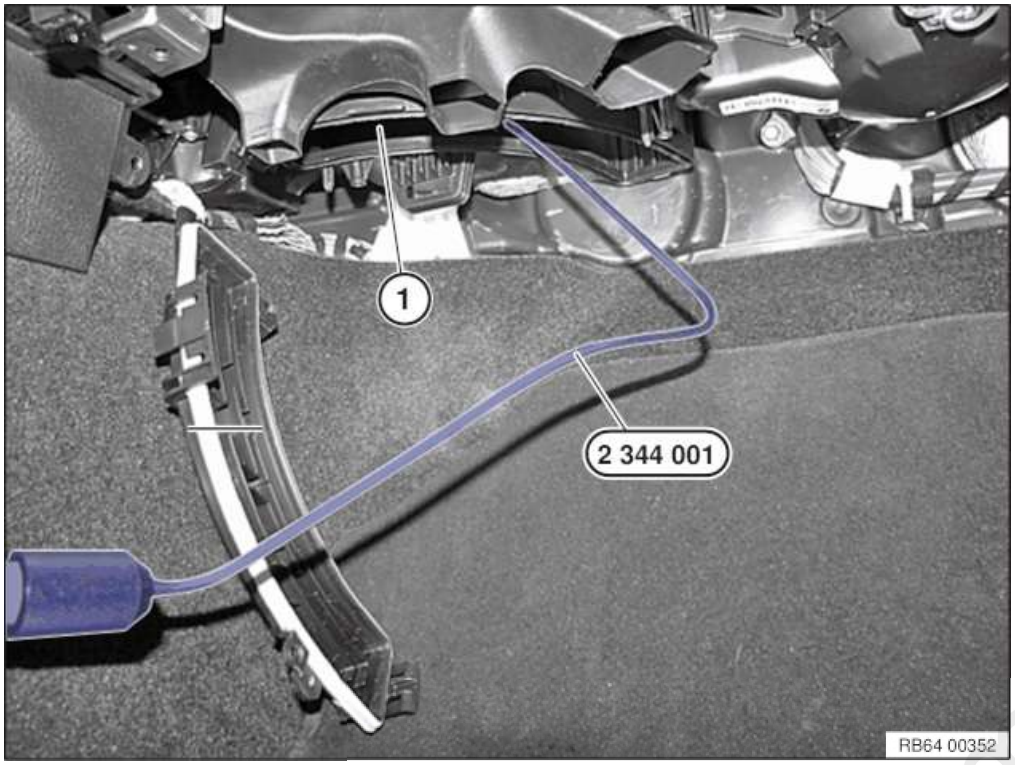
After completing cleaning, allow the vehicle to drip-dry for approx. 5 minutes.



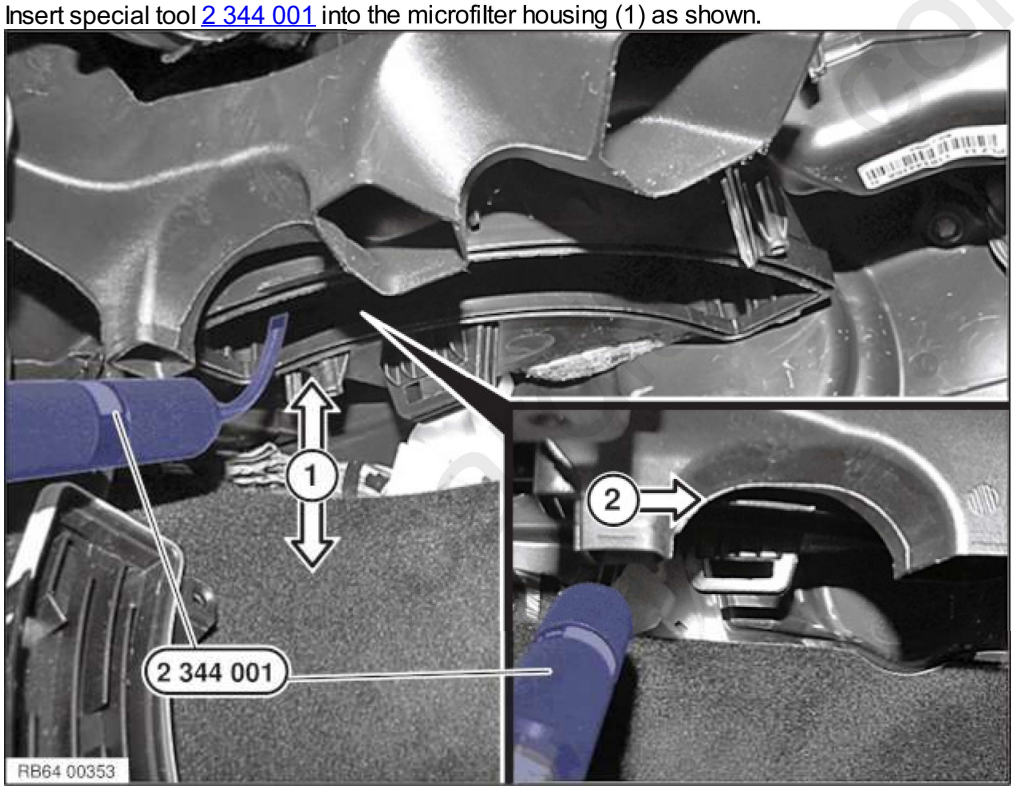
Necessary preliminary work:

- Remove rear underbody protection
- Remove microfilter for passenger compartment ventilation

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Insert special tool 2 344 001 into the microfilter housing (1) as shown.



Position special tool 2 344 001 up against the top left limit position as shown.

Move special tool 2 344 001 from the top downwards (1) to limit position.

Note:
If special tool 2 344 001 jams:

Move special tool 2 344 001 slightly to the right (2) until it can be moved from the top to the bottom.



Note:
Set air conditioning to footwell ventilation and fresh air mode. Open side windows/doors.

Start the vehicle and let the air conditioning run for approx. 5 minutes at maximum blower output.

In order to eliminate the last remnants of cleaning agent, repeat this process shortly before handover to the customer.

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64 52 ... Instructions for opening and part exchange in refrigerant circuit



Special tools required:

- 00 9 030
- 32 1 270

Warning!

- Avoid contact with refrigerant and refrigerant oil
- Follow safety informations for handling refrigerant
- Follow safety information for handling refrigerant oil

Attention!

- Always use new O-rings each time A/C connections are opened (refer to Electronic Parts Catalogue)
  They must **not** be coated.
  Use special tool 00 9 030 to install sealing rings without damaging them.
- Open the referigerant circuit for as short of a period as possible.
- Close all components and lines in the refrigerant circuit and return parts **immediately** following the removals at openings with special tool 32 1 270 to prevent penetration of moisture or foreign objects.
- If the refrigerant circuit was closed at the openings with special tool 32 1 270 but it remains open for more than 24 h, the dryer insert for the air conditioning must be replaced.

I. **Part replacement as preliminary work fur further repair work and part replacement based on gradual leakage.**
(minor leak, e.g. hairline crack)

Procedure:

- Draw off heating and air conditioning system, then determine drawn-off amount of refrigerant oil
- Carry out part replacement
- Replace removed refrigerant oil and additionally top up with new refrigerant oil according to components replaced:
  - Compressor: refer to Notes on compressor replacement
  - Evaporator: 10 ml
  - Air conditioning condenser: 20 ml
  - Desiccant insert / dryer flask: 20 ml
  - Each replaced refrigerant line: 10 ml
  - Air conditioning condenser with integrated dryer flask: 40 ml
  - Safety pressure switch and gasket: no additional refrigerant oil
  - Only I01: Radiator, high-voltage battery unit: 20 ml
- Evacuate and fill air conditioning system

II. **Part replacement due to sudden leakage**
(major leak, e.g. pipe break due to accident)

Procedure:

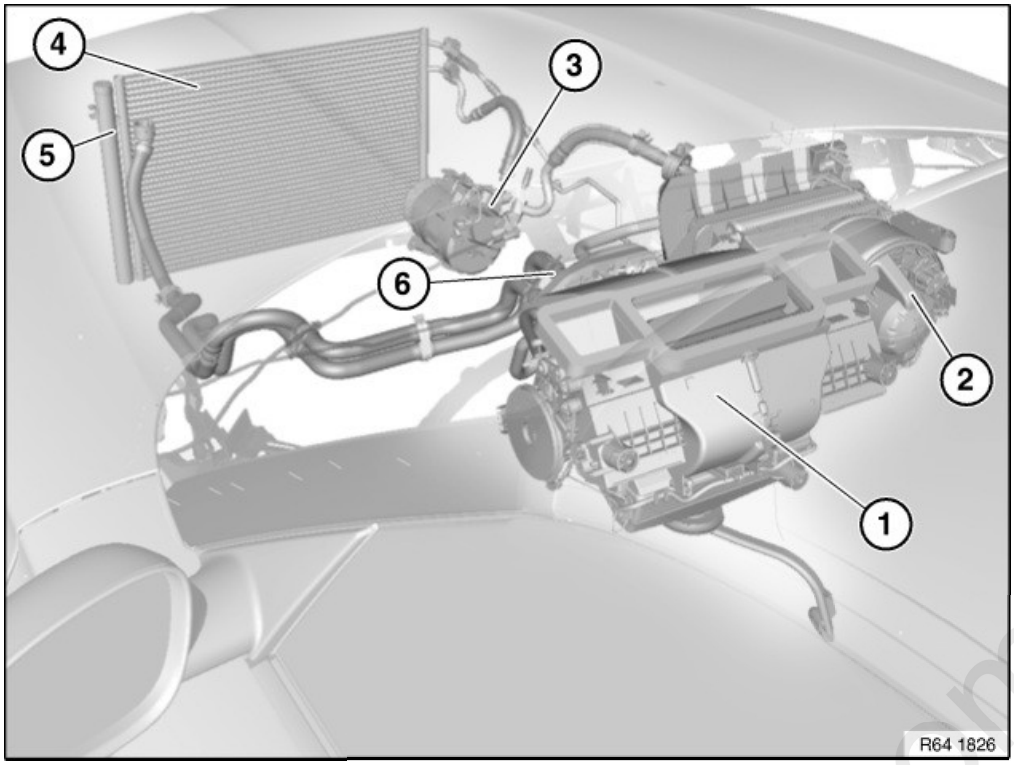
- Draw off heating and air conditioning system, then determine drawn-off amount of refrigerant oil
- Carry out part replacement
- Replace removed refrigerant oil and additionally top up with new refrigerant oil according to components replaced:
  - Compressor: refer to Notes on compressor replacement
  - Evaporator: 35 ml
  - Air conditioning condenser: 35 ml
  - Desiccant insert / dryer flask: 55 ml
  - Each replaced refrigerant line: 35 ml
  - Air conditioning condenser with integrated dryer flask: 55 ml

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    - Safety pressure switch and gasket: no additional refrigerant oil
    - Only I01: Radiator, high-voltage battery unit: 35 ml
- Evacuate and fill A/C system

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64 00 .. Overview of heater - A/C system components



1 Heating and air-conditioning unit with mounted parts
2 Remove fan for heater - A/C system
3 Compressor for A/C system
4 Capacitor for heater - A/C system
5 Dryer flask for air conditioning (included in the capacitor)
6 Expansion valve

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64 51 ... Perform leakage test for evaporator

Special tools required:

- 00 9 030
- 64 5 121
- 64 5 126
- 2 286 737

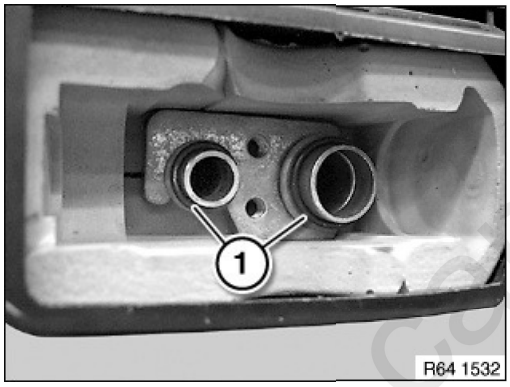
Warning!

Comply with the standard national safety regulations on handling nitrogen.

Ensure that employees are advised of how to handle pressurised vessels and nitrogen gas correctly (danger of asphyxiation). For this purpose, follow the notes and instructions in the technical safety specifications available from the gas supplier.

Necessary preliminary work:

- Remove expansion valve



Note:
Graphic similar.

Renew sealing rings.

Use special tool 00 9 030 to mount sealing rings without damaging them.



Use vehicle screws (1) to screw the special tool 2 286 737 to the retaining clip of the removed expansion valve.

Tightening torque 64 53 9AZ.

Screw special tool 64 5 121 together with special tool 2 286 737 .

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Attention!

Risk of damage: Use only nitrogen pressure bottles with pressure reducers for leak-testing.

Pressurise evaporator to 10 bar **slowly** only. Excessively fast pressurisation and pressures in excess of 20 bar may cause damage to the evaporator.



Connect nitrogen pressure bottle with pressure reducer to pressure gauge and then connect to special tool 64 5 121 (connecting hose).

Note:

- Testing device must be leakproof.
- Ambient temperature and temperature of vehicle must not change during the test procedure
- Do not move the vehicle during this period

Apply test pressure of 10 bar **slowly** and close nitrogen pressure bottle.

Check leak-tightness of testing device and of connection to refrigerant line.

The test pressure is set to 10 bar and must not drop by more than 1.5 bar to 8.5 bar over a test period of 2 hours.

If the pressure loss is greater than 1.5 bar, this indicates that there is a leak in the evaporator unit.



Warning!

After leakage check, unscrew special tool 64 5 121 **slowly** from special tool 2 286 737 to reduce pressure.



After leak-testing:

- Renew sealing rings. Use special tool 00 9 030 to mount sealing rings without damaging them.
- Assemble A/C system
- Evacuate and fill A/C system

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This documentation refers to special tools that were not yet available when going to press.

64 51 580 Perform leakage test for evaporator

WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.

CAUTION

Refrigerant circuit under high pressure.

Danger of injury!

- Note and follow safety information on containers.
- Avoid contact with refrigerant; wear safety goggles and protective gloves.
- For more information see: 64 50 Handling refrigerant and 6450 Notes on repair work on air conditioning

PRELIMINARY WORK

1 – Drawing off the air conditioning

- See additional information.

MAIN WORK

2 – Perform leakage test for evaporator

Prerequisite

The vehicle must be cooled down. Ambient temperature and temperature of vehicle must not change during the test procedure. The vehicle must not be moved during the test procedure. Testing device must be tight.

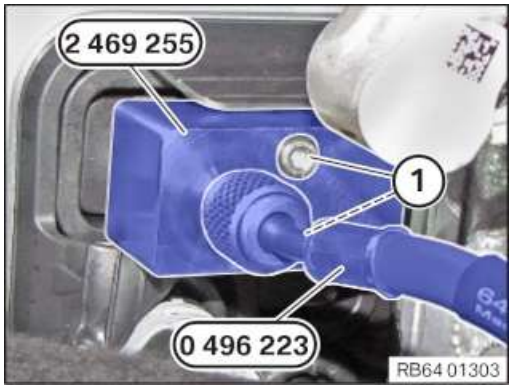
WARNING

Pressure vessel with nitrogen.

Danger of injury! Risk of asphyxiation!

- Ensure there us sufficient ventilation in the surrounding area and protect the pressure vessel against overheating.
- Note information in safety data sheet for nitrogen.

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- Install the new sealing rings with special tool **0 496 714 (00 9 030)** without damaging them.
- Secure special tool with the expansion valve retaining clip with on-board screws (1).
- Connect special tool **0 496 223 (64 5 121)** to special tool .

- Connect nitrogen pressure cylinder with pressure reducer to pressure gauge.
- Connect special tool **0 496 223 (64 5 121)** to pressure reducer.
- Slowly apply test pressure of **maximum 10 bar**.
- Close nitrogen pressure cylinder.

Check

- Check tightness of the testing device and of the connection to the refrigerant circuit by means of e.g. soapy water.

Result

» Leak was detected.

Measure

- Seal the connections prior to the leakage test of the evaporator.

Check

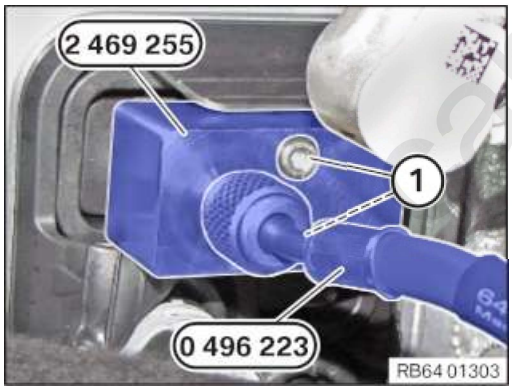
- Evaporator is tight if the adjusted test pressure of 10 bar **drops by 1.5 bar to 8.5 bar** over a test period of 2 h.

Result

» After a test period of 2 h, the pressure drop is more than 1.5 bar.

Measure

- Renew evaporator.



- Slowly unscrew special tool **0 496 223 (64 5 121) for the pressure drop** from special tool after the leakage test.
- Loosen screws (1).
- Remove special tool .

POSTPROCESSES

3 – Evacuate and fill air conditioning

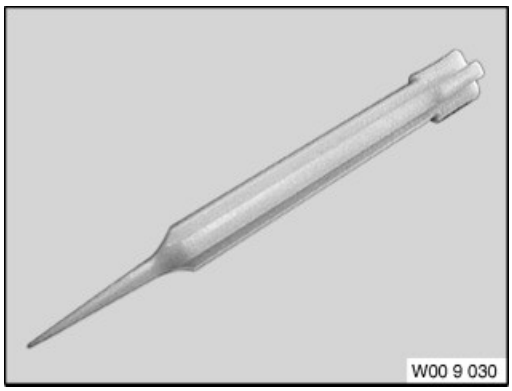
- See additional information.

Additional Information

Overview of Tightening Torques

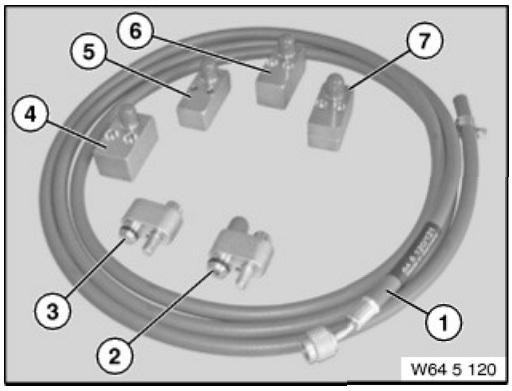
Overview of Special Tools

0 496 714 (00 9 030) Wedge



Common	Used in step 2
Usage	For dismantling O-rings, gaskets and trim panels. This special tool replaces special tool 00 9 316.
Included in the tool or work	
Storage location	A50
Replaced by	
In connection with	
SI-Number	01 20 09 (581)

0 496 223 (64 5 121) Hose



Common	Used in step 2
Usage	(Connection hose with clamp)
Included in the tool or work	0 496 222
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 04 08 (435)

Overview Technical Data

Links

Repair instructions	Used in step
64 50 010 Extract, evacuate and fill air conditioning system	1 3
64 50 010 Drawing off, evacuating and filling air conditioning (R134a)	1 3
64 50 010 Drawing off, evacuating and filling air conditioning (R134a)	1 3
64 50 ... Notes on repairs to air conditioning	1 3
64 50 010 Drawing off, evacuating and filling air conditioning (R1234yf)	1 3
64 50 ... Safety information for handling refrigerant R1234yf	1 3
64 50 ... Safety information for handling tetrafluorethane refrigerant R134a	1 3
64 50 ... Safety informations for handling refrigerant oil	1 3

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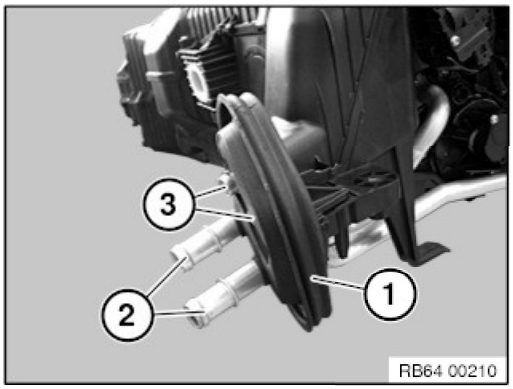
64 51 591 Removing and installing/renewing evaporator

Special tools required:

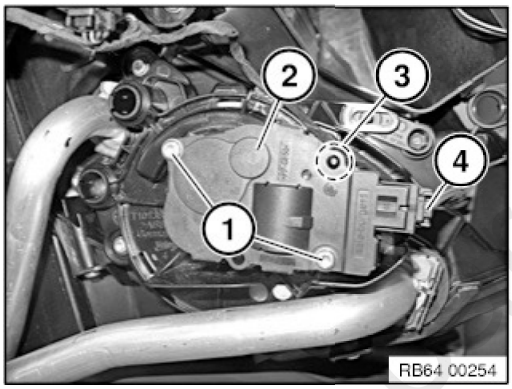
- 00 9 030

Necessary preliminary work:

- Remove heater/air conditioner



Carefully pull rubber grommet (1) and foam seal below it over pipes (2) and (3).*Note:*
If necessary, replace damaged rubber grommet (1) and/or foam seal.

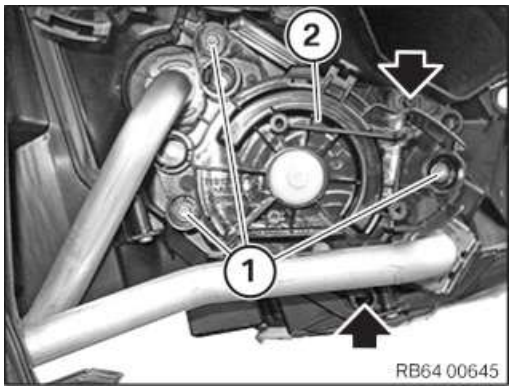


Release screws (1).

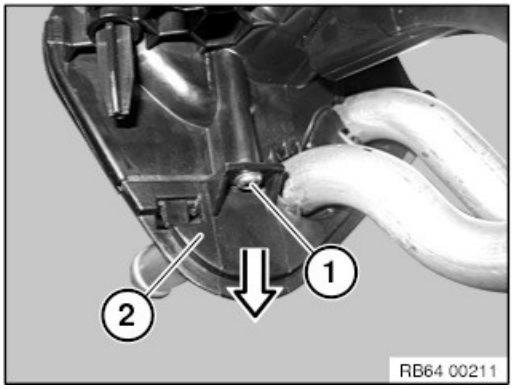
Unlock plug connection (4) and disconnect.

Remove actuator drive (2).

Installation note:
Make sure actuator drive (2) is correctly seated in guide (3).

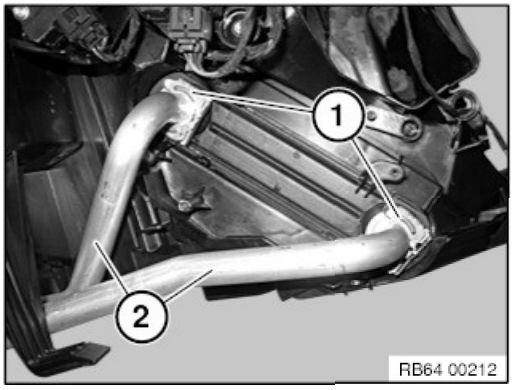


Release screws (1) and remove holder (2) for controller drive.*Installation note:*
Make sure flap mechanism is correctly seated (see arrows).



Release screw (1).

Open holder (2).

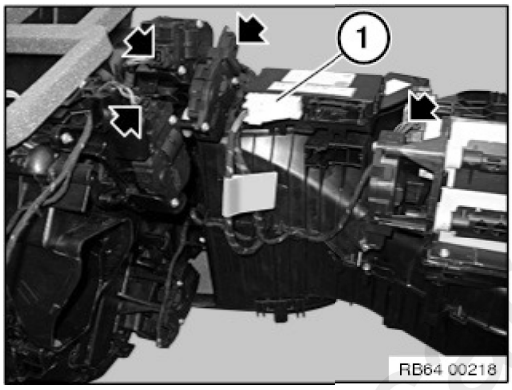


Loosen clasp (1).

Remove double-pipe (2).

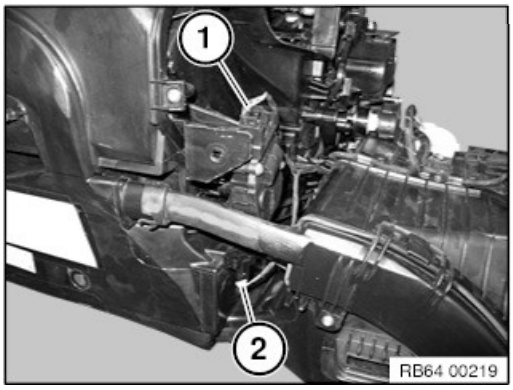
Installation note:
Replace clasps (1) and sealing rings.

Use special tool 00 9 030 to install sealing rings without damaging them.



Release plug connections - actuator drives at the marked points and disconnect.

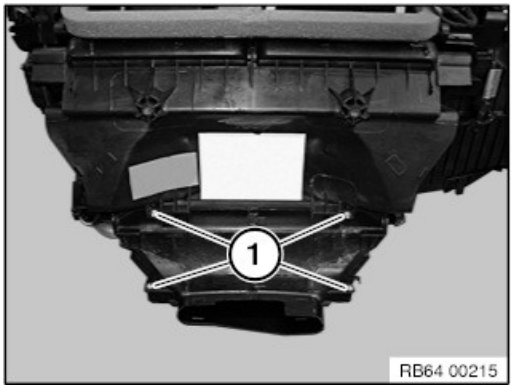
Unfasten plug connection - control unit (1) and disconnect.



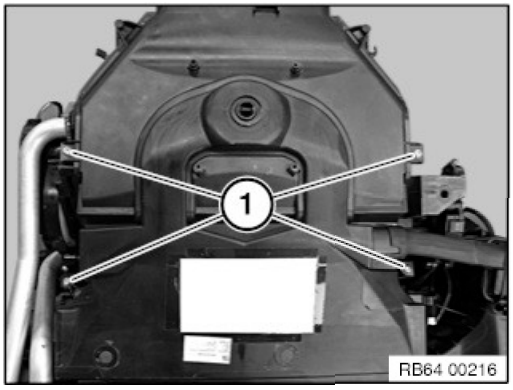
Unfasten plug connection - actuator drive (1) and disconnect.

Disconnect the plug connection - temperature sensor (2) and remove the temperature sensor out of the heating and air-conditioning unit.

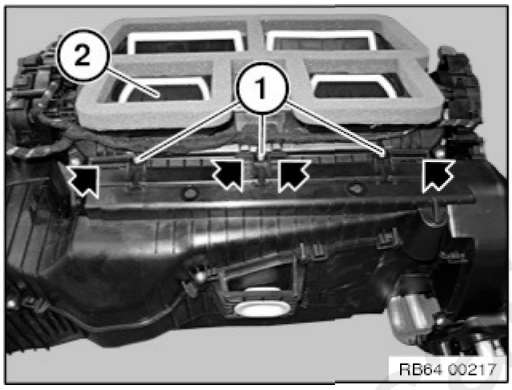
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Release screws (1).



Release screws (1).



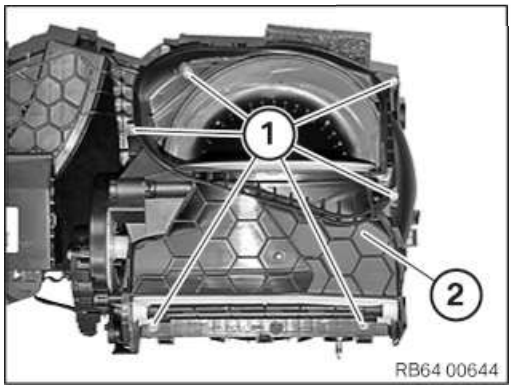
Release screws (1).

Unlock the distributor housing (2) at the marked points.

Remove distributor housing (2).

Installation note:

Ensure that the distributor housing (2) is correctly seated and locked.

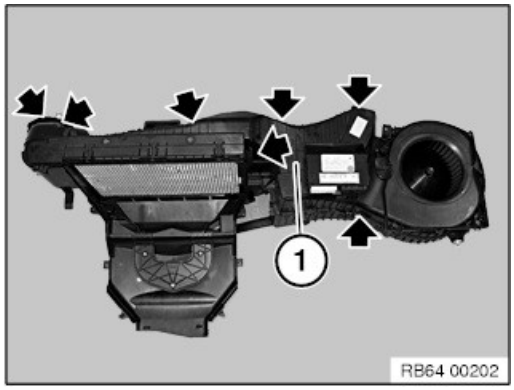


Release screws (1).

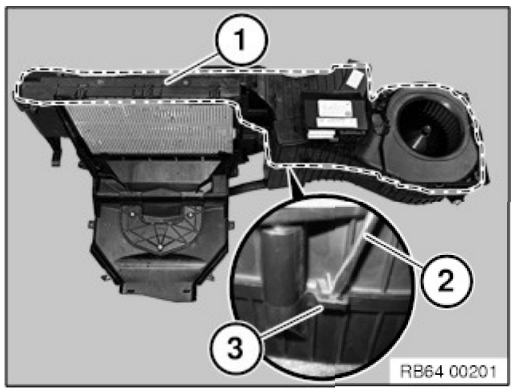
Unlock latch mechanisms using a slotted screwdriver.

Remove housing (2).

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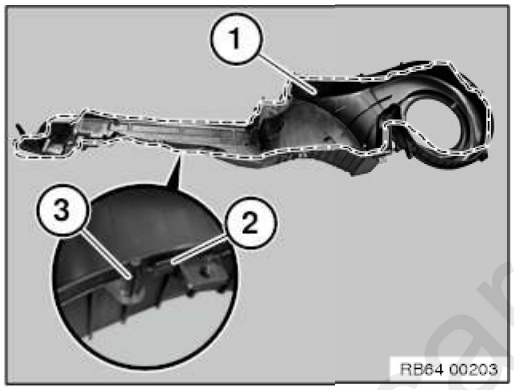


Loosen screws in marked area.



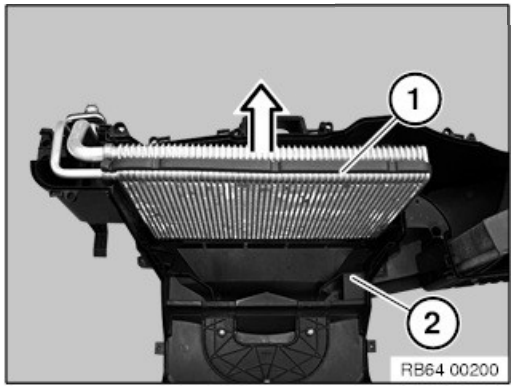
Unlock the latch mechanisms (3) in the marked areas with a slotted screwdriver (2) (approx. 3 mm blade).

Remove upper housing section (1).



Installation note:
Retaining lugs (2) and guide pins (3) must not be damaged.

In the event of damage, replace the complete empty housing (1).



Pull evaporator (1) in direction of arrow out of lower housing section (2) of heating and air-conditioning unit.*Installation note:*
Ensure evaporator (1) is correctly seated in lower housing section (2) of heating and air-conditioning unit.



Attention!

Do not bend the evaporator fins.

If necessary, clean or straighten evaporator fins with slat comb.

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64 51 520 Removing and installing/replacing expansion valve (N47, N57)

Special tools required:

- 00 9 030

Warning!

Danger of injury!

Refrigerant circuit is under high pressure!

Avoid contact with refrigerant and refrigerant fluid.

Read and comply with safety information:

- Handling R 134a tetrafluorethane refrigerant
- Handling refrigerant fluid

Important!

Risk of damage!

Restart engine only when air conditioning system has been correctly filled.

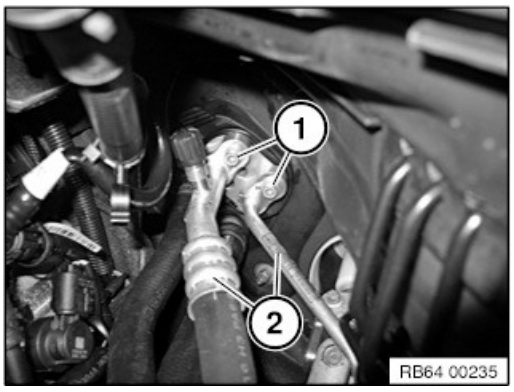
Follow notes for opening and replacing parts in refrigerant circuit.

Note:
If air conditioning system is opened for more than 24 hours:

- Renew condenser assy.

Necessary preliminary tasks:

- Drain off air conditioning system
- Remove electronics box



Release screws (1).

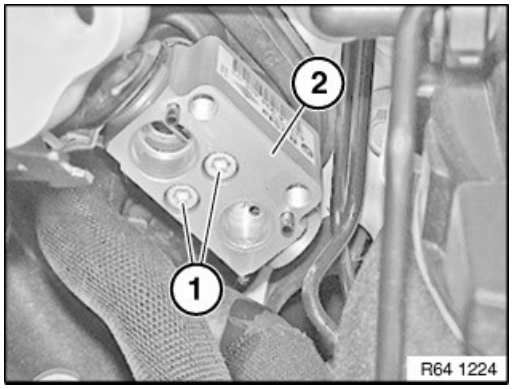
Tightening torque 64 53 1AZ.

Disconnect refrigerant lines (2) and lay to one side.

Installation note:
Replace sealing rings.

Use special tool 00 9 030 to install sealing rings without damaging them.

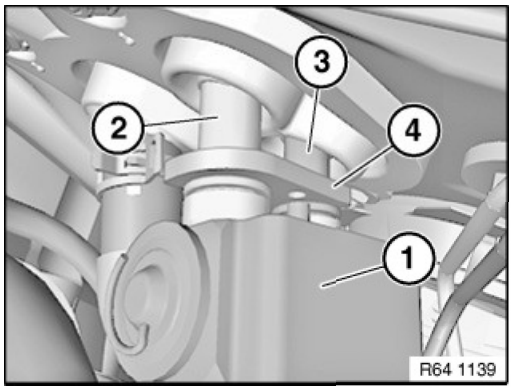
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Release screws (1).

Tightening torque 64 53 2AZ.

Remove expansion valve (2).



Installation note:
Place expansion valve (1) exactly on refrigerant lines (2) and (3).

Fit screws of expansion valve (1) and make sure retaining clip (4) is correctly positioned.

After installation:

- Evacuate and fill air conditioning system

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64 52 ... Instructions for opening and part exchange in refrigerant circuit



Special tools required:

- 00 9 030
- 32 1 270

Warning!

- Avoid contact with refrigerant and refrigerant oil
- Follow safety informations for handling refrigerant
- Follow safety information for handling refrigerant oil

Attention!

- Always use new O-rings each time A/C connections are opened (refer to Electronic Parts Catalogue)
  They must **not** be coated.
  Use special tool 00 9 030 to install sealing rings without damaging them.
- Open the referigerant circuit for as short of a period as possible.
- Close all components and lines in the refrigerant circuit and return parts **immediately** following the removals at openings with special tool 32 1 270 to prevent penetration of moisture or foreign objects.
- If the refrigerant circuit was closed at the openings with special tool 32 1 270 but it remains open for more than 24 h, the dryer insert for the air conditioning must be replaced.

I. **Part replacement as preliminary work fur further repair work and part replacement based on gradual leakage.**
(minor leak, e.g. hairline crack)

Procedure:

- Draw off heating and air conditioning system, then determine drawn-off amount of refrigerant oil
- Carry out part replacement
- Replace removed refrigerant oil and additionally top up with new refrigerant oil according to components replaced:
  - Compressor: refer to Notes on compressor replacement
  - Evaporator: 10 ml
  - Air conditioning condenser: 20 ml
  - Desiccant insert / dryer flask: 20 ml
  - Each replaced refrigerant line: 10 ml
  - Air conditioning condenser with integrated dryer flask: 40 ml
  - Safety pressure switch and gasket: no additional refrigerant oil
  - Only I01: Radiator, high-voltage battery unit: 20 ml
- Evacuate and fill air conditioning system

II. **Part replacement due to sudden leakage**
(major leak, e.g. pipe break due to accident)

Procedure:

- Draw off heating and air conditioning system, then determine drawn-off amount of refrigerant oil
- Carry out part replacement
- Replace removed refrigerant oil and additionally top up with new refrigerant oil according to components replaced:
  - Compressor: refer to Notes on compressor replacement
  - Evaporator: 35 ml
  - Air conditioning condenser: 35 ml
  - Desiccant insert / dryer flask: 55 ml
  - Each replaced refrigerant line: 35 ml
  - Air conditioning condenser with integrated dryer flask: 55 ml

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    - Safety pressure switch and gasket: no additional refrigerant oil
    - Only I01: Radiator, high-voltage battery unit: 35 ml
- Evacuate and fill A/C system

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64 52 ... Notes for changing the air conditioning compressor, determining the amount of refrigerant oil (amount of refrigerant oil of new air conditioning compressor known)

Note:
This procedure only applies if the **new air conditioning compressor has a label with the amount of refrigerant oil**.

A different procedure applies for air conditioning compressors **without a label indicating the amount of refrigerant oil**.

Attention!
Risk of damage!

Remove the air conditioning compressor without damaging and without the use of force!

Air conditioning compressors with plastic belt pulleys:

- Avoid impacts/knocks to plastic belt pulley (caused by tools, contact with base).
- Return faulty air conditioning compressors in their original packaging only and with sealed connected branches.

Attention!
In the event of a mechanical air conditioning compressor failure and the resulting ingress of chips into the refrigerant circuit, replace the following parts:

- Air conditioning compressor
- Air conditioning condenser
- Desiccant insert
- Line to the air conditioning condenser
- Refrigerant oil
- BMW i, PHEV: all expansion valves

BMW i, PHEV:

- Rinse the refrigerant circuit

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All vehicles without I01 with heat pump:

The new air conditioning compressor is filled at the factory with refrigerant oil.

The amount of refrigerant oil in the new air conditioning compressor corresponds to the amount of refrigerant oil for the entire new and unfilled refrigerant circuit.

Only I01 with heat pump:

The new air conditioning compressor and new dryer flask are filled at the factory with refrigerant oil.

The amount of refrigerant oil in the new air conditioning compressor and in the new dryer flask corresponds to the amount of refrigerant oil for the entire new and unfilled refrigerant circuit.

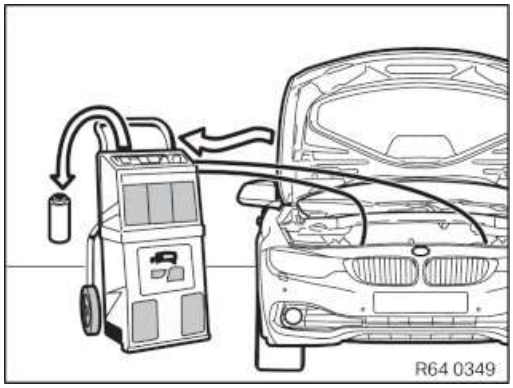
When replacing the air conditioning compressor it is absolutely essential to adapt the amount of refrigerant oil in accordance with the instructions below!

BMW I01with heat pump: An adaptation is also required for the replacement of the dryer flask.

An adaptation of the amount of refrigerant oil is not required in the following cases:

- Replacement of the complete refrigerant circuit.
- If the refrigerant circuit was rinsed (only BMW i, PHEV).

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Step 1:

Determination of the amount of refrigerant oil drawn off from the refrigerant circuit:

- Draw off A/C system.
- Note down the amount of refrigerant oil shown on the A/C service station display.

When evacuating the air conditioning system, refrigerant oil is also extracted and collected in the oil separator of the A/C service station. This amount of refrigerant oil is displayed after the extraction of the air conditioning on the display of the A/C service station.

The refrigerant oil amount specification is located on the label on the air conditioning compressor.

The position of the label can vary depending on the air conditioning compressor.

Information about the amount of refrigerant oil is provided on the label in g, ml or cc.

Ml are specified throughout these repair instructions for adjusting the amount of refrigerant oil, as g or cc closely correspond to ml.

Step 2:

Compare information of amount of refrigerant oil of the present and new air conditioning compressor:

- Read and record amount of refrigerant oil specified on the previous air conditioning compressor.

  (If there is no label, continue with **Step 3, Case 1** .)
- Read and record amount of refrigerant oil specified on the new air conditioning compressor.
- Compare both amounts of refrigerant oil with each other.

Different cases:

1. The information of the amount of refrigerant oil on the present and new air conditioning compressor **is the same**. In this case continue with **Step 3, Case 1**.
2. The information of the amount of refrigerant oil on the present and new air conditioning compressor **is not the same**:

   Different cases:

   1. Information of the amount of refrigerant oil on the present air conditioning compressor **is higher** than the information of the amount of refrigerant oil on the new air conditioning compressor:

      Difference is not taken into account. In this case continue with **Step 3, Case 1**.
   2. Information of the amount of refrigerant oil on the present air conditioning compressor **is lower** than the information of the amount of refrigerant oil on the new air conditioning compressor:

      Generate and record the difference between both amounts of refrigerant oil. After that continue with **Step 3, Case 2**.

Example:

Information of the amount of refrigerant oil of present air conditioning compressor 110 g

Information of the amount of refrigerant oil of new air conditioning compressor 150 g

150 g - 110 g = 40 g correspond to almost 40 ml

Note the difference of 40 ml.

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Step 3:

Determination of the amount of refrigerant oil in the new air conditioning compressor:

- Transfer all of the refrigerant oil remaining in the previous air conditioning compressor into a measuring cup via the oil filler plug.
- Turn the belt pulley during the filling process. This allows more refrigerant oil to flow out of the previous air conditioning compressor.
- Read the amount of refrigerant oil at the measuring cup.

Different cases:

Case 1:

- **Add 10 ml precautionary allowance** to the read amount of refrigerant oil**.**
- Note **at least but a total of 50 ml**.

Example:

20 ml read at measuring cup:

20 ml + 10 ml precautionary allowance = 30 ml < 50 ml

determined amount of refrigerant oil for new air conditioning compressor = 50 ml

Case 2:

- Add the **10 ml precautionary allowance** to the read amount of refrigerant oil.
- Add **the difference to that**.
- Note **at least but a total of 50 ml**.

Example:

Difference = 40 ml

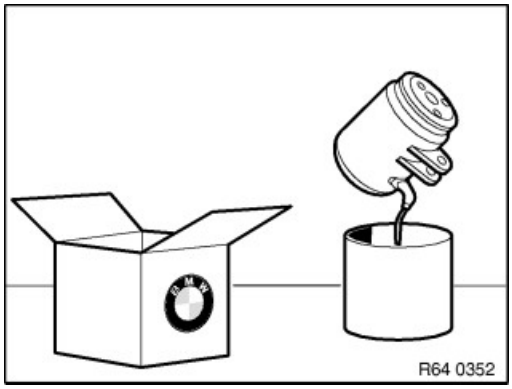
20 ml read at measuring cup:

20 ml + 10 ml precautionary allowance = 30 ml

30 ml + 40 ml difference = 70 ml > 50 ml

determined amount of refrigerant oil for new air conditioning compressor = 70 ml

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Step 4:

Determination of the amount of refrigerant oil to be drained from the new air conditioning compressor:

- Open oil filler plug. Tightening torque 64 52 2AZ.
- Drain the following amount of refrigerant oil from the new air conditioning compressor into a clean measuring cup:

Amount of refrigerant oil to be drained from the new air conditioning compressor = amount of refrigerant oil on the label of the new air conditioning compressor - determined amount of refrigerant oil in the new air conditioning compressor

Example:

Amount of refrigerant oil stated on the label of the new air conditioning compressor: 150 ml

determined amount of refrigerant oil of the new air conditioning compressor: 50 ml

Amount of refrigerant oil to be drained = 150 ml - 50 ml = 100 ml

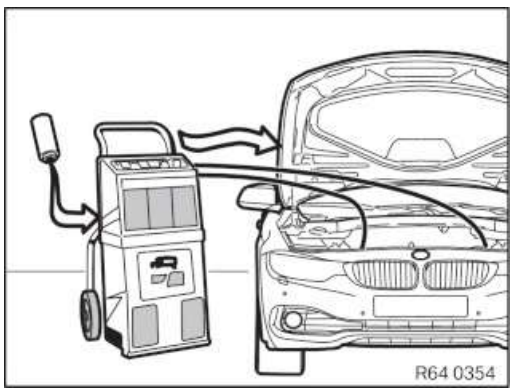
100 ml must be drained from the new air conditioning compressor.

The drained new refrigerant oil can be filled into the expansion tank of the A/C service station after draining.

If the new, drained refrigerant oil is not filled straight away into the expansion tank of the A/C service station, it must be disposed of properly.

On account of its hygroscopic properties, refrigerant oil must not be stored in open collecting vessels.

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Step 5

Fill the refrigerant circuit with the correct amount of refrigerant and refrigerant oil:

- Reassemble the vehicle.
- Evacuate Air conditioning.
- Before filling the air conditioning with refrigerant, again fill in the quantity of refrigerant oil noted in Step 1 as previously drawn off into the system.
- Fill A/C system.

Step 6

Attention!

Risk of damage!

During initial operation of a new air conditioning compressor, it is absolutely essential to carry out the following breaking-in procedure.

Do not exceed idle speed.

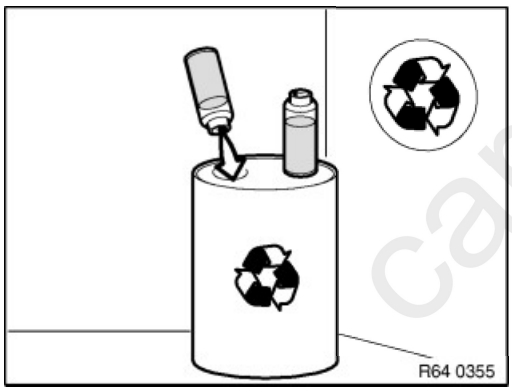
Note:
The breaking-in procedure for the new air conditioning compressor can be carried either manually or with the diagnosis system.

Manual:

- Switch off the air conditioning.
- Set all ventilation outlets in the instrument panel to "OPEN".
- Start engine and let it stabilise at idle speed.
- Set the blower output to a minimum of 75% of the maximum blower output.
- Switch on the air conditioning and allow the engine to run at idle speed for a minimum of 2 minutes.

Carry out the following service function with the diagnosis system:

- Body
- Heating and air conditioning functions
- Run-in protection for A/C compressor



Step 7

Dispose off the drawn off refrigerant oil:

- The refrigerant oil drawn off from the oil separator of the A/C service station and from the previous air conditioning compressor **must not be reused and must be correctly disposed of.**

Observe country-specific waste disposal regulations.

Installation note:
If the refrigerant circuit is open for longer than 24 hours:

- Replace desiccant insert

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64 52 ... Notes on changing the air conditioning compressor, determining the amount of refrigerant oil (amount of refrigerant oil of new air conditioning compressor not known)

Note:
This procedure only applies if the **new air conditioning compressor does not have a label with the amount of refrigerant oil**.

A different procedure applies for air conditioning compressors with a label indicating the amount of refrigerant oil.





Attention!

Risk of damage!

Remove the air conditioning compressor without damaging and without the use of force!

Air conditioning compressors with plastic belt pulleys:

- Avoid impacts/knocks to plastic belt pulley (caused by tools, contact with base).
- Return faulty air conditioning compressors in their original packaging only and with sealed connected branches.



Attention!

In the event of a mechanical air conditioning compressor failure and the resulting ingress of chips into the refrigerant circuit, replace the following parts:

- Air conditioning compressor
- Air conditioning condenser
- Desiccant insert
- Line to the air conditioning condenser
- Refrigerant oil
- BMW i, PHEV: all expansion valves

BMW i, PHEV:

- Rinse the refrigerant circuit

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All vehicles without I01 with heat pump:

The new air conditioning compressor is filled at the factory with refrigerant oil.

The amount of refrigerant oil in the new air conditioning compressor corresponds to the amount of refrigerant oil for the entire new and unfilled refrigerant circuit.

Only I01 with heat pump:

The new air conditioning compressor and new dryer flask are filled at the factory with refrigerant oil.

The amount of refrigerant oil in the new air conditioning compressor and in the new dryer flask corresponds to the amount of refrigerant oil for the entire new and unfilled refrigerant circuit.

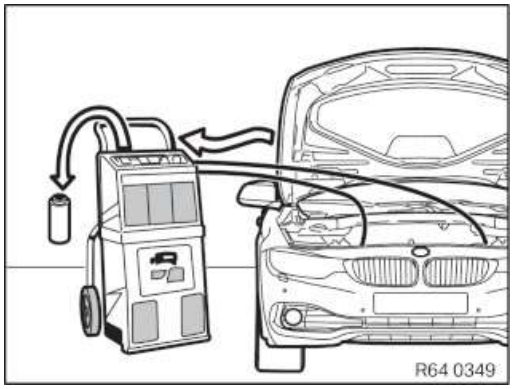
When replacing the air conditioning compressor it is absolutely essential to adapt the amount of refrigerant oil in accordance with the instructions below!

BMW I01with heat pump: An adaptation is also required for the replacement of the dryer flask.

An adaptation of the amount of refrigerant oil is not required in the following cases:

- Replacement of the complete refrigerant circuit.
- If the refrigerant circuit was rinsed (only BMW i, PHEV).

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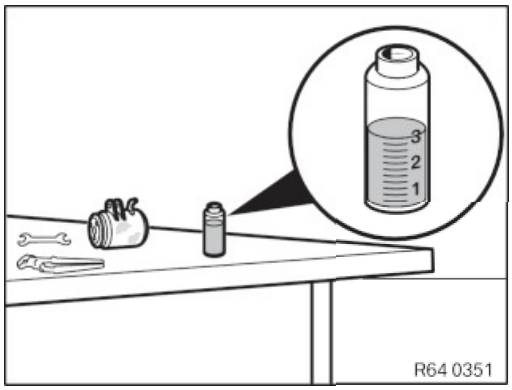


- Draw off A/C system.
- Note down the amount of refrigerant oil shown on the A/C service station display.

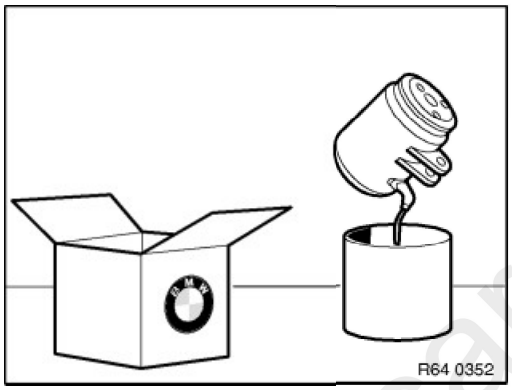
When evacuating the air conditioning system, refrigerant oil is also extracted and collected in the oil separator of the A/C service station. This amount of refrigerant oil is displayed after the extraction of the air conditioning on the display of the A/C service station.



- Transfer all of the refrigerant oil remaining in the previous air conditioning compressor into a measuring cup via the oil filler plug.
- Turn the belt pulley during the filling process. This allows more refrigerant oil to flow out of the previous air conditioning compressor.

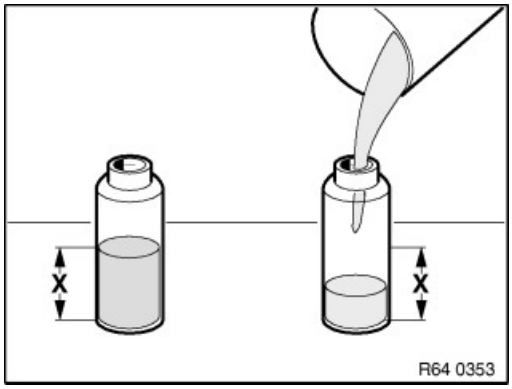


- Read the amount of refrigerant oil at the measuring cup.



- Open oil filler plug. Tightening torque 64 52 2AZ.
- Fill the entire contents of the new air conditioning compressor in a clean collecting vessel.

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- Fill the same quantity of refrigerant oil (from the new air conditioning compressor), as was drained from the present air conditioning compressor, **+ 10 ml precautionary allowance** in a clean measuring cup and again fill it in the new air conditioning compressor **. At least but a total of 50 ml**.

Example:

20 ml read at measuring cup:

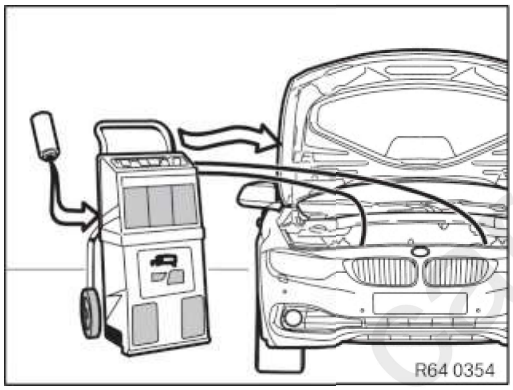
20 ml + 10 ml precautionary allowance = 30 ml < 50 ml

determined amount of refrigerant oil for new air conditioning compressor = 50 ml

The drained new refrigerant oil can be filled into the expansion tank of the A/C service station after draining.

If the new, drained refrigerant oil is not filled straight away into the expansion tank of the A/C service station, it must be disposed of properly.

On account of its hygroscopic properties, refrigerant oil must not be stored in open collecting vessels.



- Reassemble the vehicle.
- Evacuate Air conditioning.
- Before filling the air conditioning with refrigerant, fill in the noted quantity of refrigerant oil previously drawn off, into the system.
- Fill A/C system.

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Attention!

Risk of damage!

During initial operation of a new air conditioning compressor, it is absolutely essential to carry out the following breaking-in procedure.

Do not exceed idle speed.

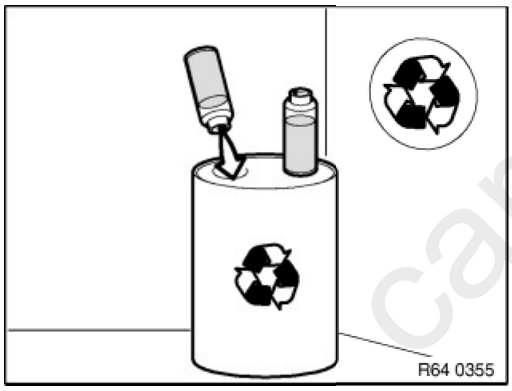
Note:
The breaking-in procedure for the new air conditioning compressor can be carried either manually or with the diagnosis system.

Manual:

- Switch off the air conditioning.
- Set all ventilation outlets in the instrument panel to "OPEN".
- Start engine and let it stabilise at idle speed.
- Set the blower output to a minimum of 75% of the maximum blower output.
- Switch on the air conditioning and allow the engine to run at idle speed for a minimum of 2 minutes.

Carry out the following service function with the diagnosis system:

- Body
- Heating and air conditioning functions
- Run-in protection for A/C compressor



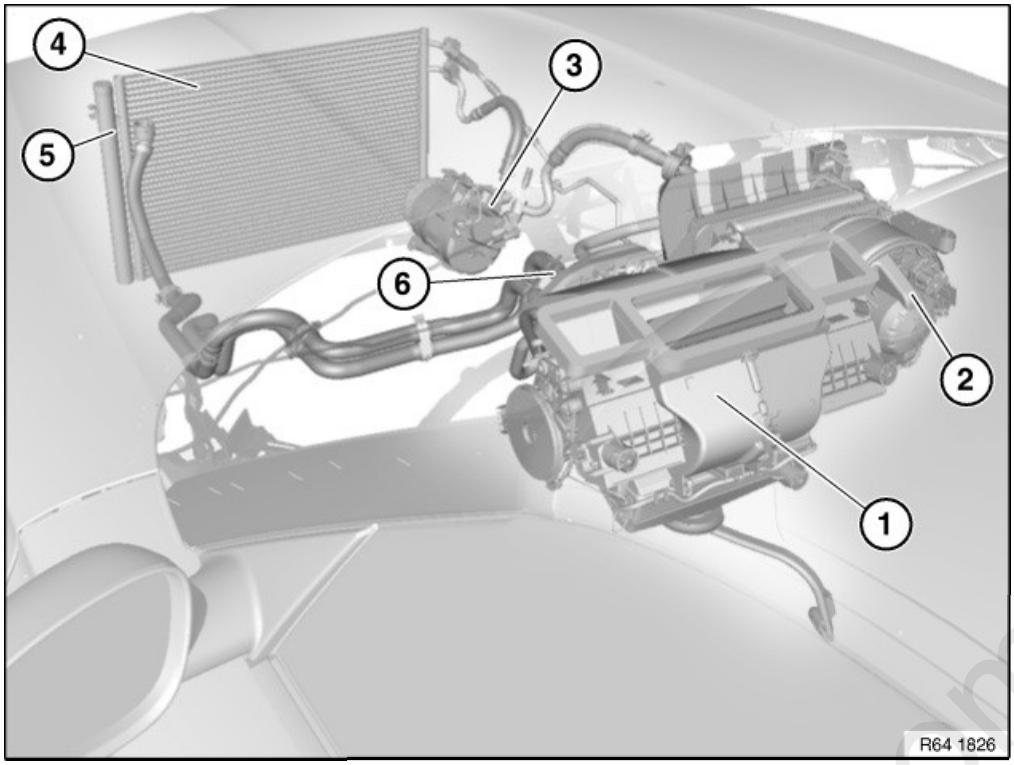
- The refrigerant oil drawn off from the oil separator of the A/C service station and from the previous air conditioning compressor **must not be reused and must be correctly disposed of.**
- Observe country-specific waste disposal regulations.

Installation note:
If the refrigerant circuit is open for longer than 24 hours:

- Replace desiccant insert

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64 00 .. Overview of heater - A/C system components



1 Heating and air-conditioning unit with mounted parts
2 Remove fan for heater - A/C system
3 Compressor for A/C system
4 Capacitor for heater - A/C system
5 Dryer flask for air conditioning (included in the capacitor)
6 Expansion valve

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64 52 523 Replacing air conditioning compressor (N57T)



Special tools required:

- 00 9 030
- 32 1 270



Warning!

Danger of injury!

Refrigerant circuit is under high pressure!

Avoid contact with refrigerant and refrigerant oil.

Read and comply with safety instructions:

- Handling R 134a refrigerant
- Handling refrigerant fluid



Important!

Risk of damage!

Restart engine only when A/C system has been correctly filled.

Read and comply with notes on compressor replacement.

Follow notes for opening and replacing parts in refrigerant circuit.

If Air conditioning is opened for more than 24 h:

Replace condenser for air conditioning.



Necessary preliminary tasks:

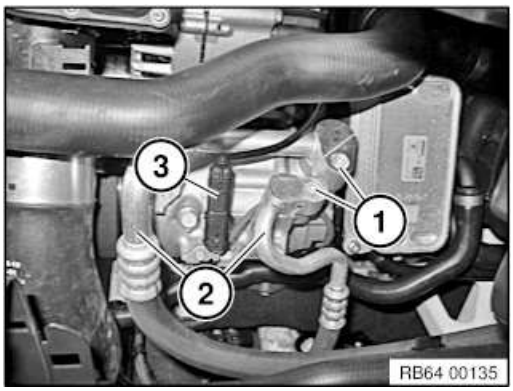
- Drain off air conditioning system
- Remove intake port
- Remove drive belt for alternator



Important!

Seal openings or lines on compressor with special tool 32 1 270 to prevent escape of media and dirt contamination.

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Release screws (1).

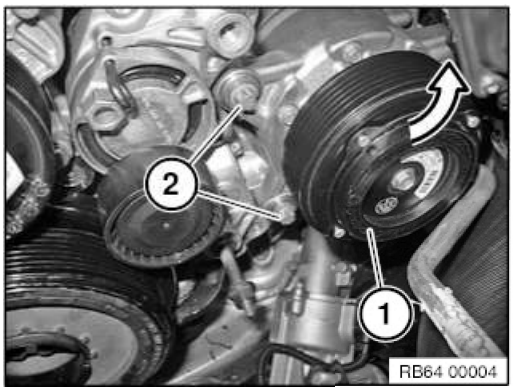
Tightening torque 64 52 1AZ.

Remove pressure and intake pipes (2) and set aside.

Unfasten plug connection (3) and disconnect.

Installation note:
Replace sealing rings.

Use special tool 00 9 030 to mount sealing rings without damaging them.



Note:
Secure compressor against falling out.

Release screws (2) on compressor (1).

Tightening torque 64 52 3AZ.

Feed out compressor (1) in direction of arrow.

Replacement:

- Adjust the amount of refrigerant oil in the new compressor

Important!

Danger of compressor damage!

Danger of customer complaints due to reduced cooling power of the Air conditioning!

Before the installation of the new compressor, it is absolutely necessary to adjust the amount of refrigerant oil in the new compressor !

The safety information must be observed!

After installation:

- Evacuate and fill A/C system

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61 00 ... Safety information on handling hybrid cars

1. *Qualification:*
   All repair work on high-voltage components may **only be performed by specially trained personnel** (qualification: Work on high-voltage inherently save vehicles) must be performed by qualified technicians. Each hybrid car requires additional vehicle specific training with training achievement controls.
   Required training is offered by the BMW Training Academy.
2. *Identification:*
   Observe **warning notices** on high-voltage components. When replacing individual high-voltage components, check if warning stickers are present. Independently attaching warnings is only allowed on the locations provided for them. Use only approved and appropriately identified original new parts.
3. *Rules of conduct/protective measures:*
   - Note operating instructions for handling high-voltage battery units.
   - Do not under any circumstances touch open high-voltage cables and high-voltage components on damaged vehicle before shutting down the high-voltage electrical system.
   - In the event of damage (mechanical, thermal) transition metal oxides, carbon, electrolyte solvents and their products of decomposition may be released.
     Suitable acid-resistant protective clothing/equipment must therefore be used when handling the vehicle!
     - Hand protection: Gloves
     - Eye protection: Safety goggles

     Damaged high-voltage battery units must be stored in an acid-resistant pan in a location in the open that is protected against the weather (sun, rain) and secured against unauthorised access. Do not inhale escaping gasses.
   - Prevent escaping substances from entering drains, pits and the sewer system.
   - Collect any material that is discharged and have it disposed of according to the work instruction, wear acid-resistant protective clothing when doing so.
   - Notify the fire brigade if fire breaks out, clear the area immediately and make accident scene safe. Attempt to extinguish the fire without putting persons in danger (suitable extinguishant: water and water foam).
   - A cut 2nd emergency separation point must be repaired with a butt connector.
4. *Measures before starting work:*
   - Each job on the vehicle must be assigned by appropriately trained personnel. Before work is started, this electrician must place the vehicle in the operating condition required to perform the relevant activity. The qualified personnel's instructions and directions absolutely must be followed. **No work may be carried out without this qualified personnel being consulted first.**
   - It is **not** permitted to work on the high voltage system or on high voltage components while the engine is running.
   - The readiness to drive must be ended before shutting off the voltage of the high-voltage system. The readiness to drive is ended when the driver is absent only under the following conditions:
     1. seat belt buckle unlocked **and**
     2. the driver's door is open **and**
     3. no brake activated **and**
     4. the accelerator pedal is not activated **and**
     5. speed < 3 km/h (2 mph)
   - Work on live high-voltage components is expressly prohibited. Before each operation on the high-voltage system, the system must be isolated from the power supply by qualified personnel (high-voltage safety connector Off) and secured against unauthorised recommissioning (padlock).
   - After each deactivation of the high-voltage system, it is essential to observe a **waiting period** of at least **10 seconds** prior to further work.
   - Before beginning work, it is mandatory to check that the equipment is de-energised and is protected against being energised again.
     Work is only permitted to begin if:
     1. Corresponding display in the KOMBI **High-voltage system deactivated** or

     When a high-voltage warning is active (indicator light, Check Control, etc.), it is essential to determine and eliminate the cause of this warning via the diagnosis system before continuing with any other work.
     If it cannot be definitively established that the equipment is de-energised, work is not permitted to begin. **Danger to life!** Before work begins, a qualified electrician (1000 V AC) must verify that the system is de-energised using appropriate measuring devices and procedures.
     => In this case, Technical Support must be contacted!
   - Do not perform any work on the vehicle while it is charging. Before starting work, disconnect the charging

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cable from the vehicle.
Battery charging may result in heating of the high-voltage battery unit. This heating may lead to sporadic launches of the electric fan (switch-on request from the electric fan). Therefore, work in the vicinity of the electric fan during the charging procedure is prohibited. Ensure freedom of movement of the battery charge lines in the vicinity of the electric fan.

5. *Measures during/after activities:*
   - Identifiable mechanical damage to or tampering with high-voltage components must be reported immediately to the qualified personnel in charge.
   - When carrying out any work on the high-voltage system, it is prohibited to drive externally all the drivetrain components (wheels, gearbox, drive shafts, etc.).
   - *E72 only:* When the “Power Electronic Box Cover” is removed, the high-voltage system is not permitted to be activated. The high-voltage service disconnect must only be used when the "Power Electronics Box Cover" is completely installed.
   - High-voltage cables (orange coating) and their connectors and stop parts **may not** be repaired. If damaged, a cable must always be replaced completely.
   - When working in the vicinity of high-voltage components (identified accordingly with warning stickers and orange-coloured coating), protect these components against damage.
   - The specified work steps in the repair instructions must be adhered to exactly.
   - High-voltage components and their holders must be screwed/bolted to the defined tightening torque. Tightening torques and tightening specifications must be observed.
   - Connecting high-voltage components to body ground is crucial to safety for reasons of equipotential bonding. For this reason, it is prohibited to operate any high-voltage components without them being correctly connected to body ground. The measurements (insulation/potential equalisation measurement) are performed automatically by the vehicle. Manual measurement is not therefore necessary.
     For a correct earthing connection, the retaining elements of high-voltage components must not be painted. Follow further painting notes.
   - Removed high-boltage battery units must be stored in a manner that protects them from misuse and damage.
   - Damaged or warning stickers that are no longer legible on high-voltage components must always be replaced.
6. *Potential compensation:*
   Equipotential bonding lines, high-voltage cables and the battery negative lead to the EME are fitted with safety screws.
   - Clean contact faces and have then checked by a second person.
   - Tighten down screws/bolts to specified torque.
   - Have tightening torque checked by a second person.
   - Both persons must document that the work has been carried out correctly in the vehicle records.

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64 53 ... Instructions for desiccant insert replacement



Special tools required:

- 32 1 270

A desiccant insert that is in a correctly functioning, sealed heating and air conditioning system does **not** have to be changed at regular service-inspection intervals.

However, the dryer flask or desiccant insert must absolutely be replaced in the event of:

- contamination of the refrigerant with swarf (e.g. when the compressor is clamped).
- With depressurised and/or completely drained refrigerant circuit.
- With a refrigerant circuit, which was closed using special tool 32 1 270 but remains open for more than 24 hours.

The desiccant insert cannot be replaced in the following vehicles:

- *1-Series E8x, 3-Series E9x* from 12/2008
- *E84, E89*
- *1-Series F2x, 3-Series F3x*
- *BMW i 01 without heat pump*

In these vehicles, the condenser for the heating and air conditioning system must be replaced.

- *BMW i 01 with heat pump*

On this vehicle the low pressure battery must be replaced.

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64 52 ... Instructions for opening and part exchange in refrigerant circuit



Special tools required:

- 00 9 030
- 32 1 270

Warning!

- Avoid contact with refrigerant and refrigerant oil
- Follow safety informations for handling refrigerant
- Follow safety information for handling refrigerant oil

Attention!

- Always use new O-rings each time A/C connections are opened (refer to Electronic Parts Catalogue)
  They must **not** be coated.
  Use special tool 00 9 030 to install sealing rings without damaging them.
- Open the referigerant circuit for as short of a period as possible.
- Close all components and lines in the refrigerant circuit and return parts **immediately** following the removals at openings with special tool 32 1 270 to prevent penetration of moisture or foreign objects.
- If the refrigerant circuit was closed at the openings with special tool 32 1 270 but it remains open for more than 24 h, the dryer insert for the air conditioning must be replaced.

I. **Part replacement as preliminary work fur further repair work and part replacement based on gradual leakage.**
(minor leak, e.g. hairline crack)

Procedure:

- Draw off heating and air conditioning system, then determine drawn-off amount of refrigerant oil
- Carry out part replacement
- Replace removed refrigerant oil and additionally top up with new refrigerant oil according to components replaced:
  - Compressor: refer to Notes on compressor replacement
  - Evaporator: 10 ml
  - Air conditioning condenser: 20 ml
  - Desiccant insert / dryer flask: 20 ml
  - Each replaced refrigerant line: 10 ml
  - Air conditioning condenser with integrated dryer flask: 40 ml
  - Safety pressure switch and gasket: no additional refrigerant oil
  - Only I01: Radiator, high-voltage battery unit: 20 ml
- Evacuate and fill air conditioning system

II. **Part replacement due to sudden leakage**
(major leak, e.g. pipe break due to accident)

Procedure:

- Draw off heating and air conditioning system, then determine drawn-off amount of refrigerant oil
- Carry out part replacement
- Replace removed refrigerant oil and additionally top up with new refrigerant oil according to components replaced:
  - Compressor: refer to Notes on compressor replacement
  - Evaporator: 35 ml
  - Air conditioning condenser: 35 ml
  - Desiccant insert / dryer flask: 55 ml
  - Each replaced refrigerant line: 35 ml
  - Air conditioning condenser with integrated dryer flask: 55 ml

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    - Safety pressure switch and gasket: no additional refrigerant oil
    - Only I01: Radiator, high-voltage battery unit: 35 ml
- Evacuate and fill A/C system

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64 53 ... Instructions for replacement of air conditioning capacitors and radiator/coolers

Attention!

Even when they are correctly installed or due to normal driving, radiators (oil cooler, radiator, charge air cooler) or air conditioning condensers may show slight impressions or deformations on their discs (1).

A slight sag with a large radius for the air conditioning condenser is also permissible.

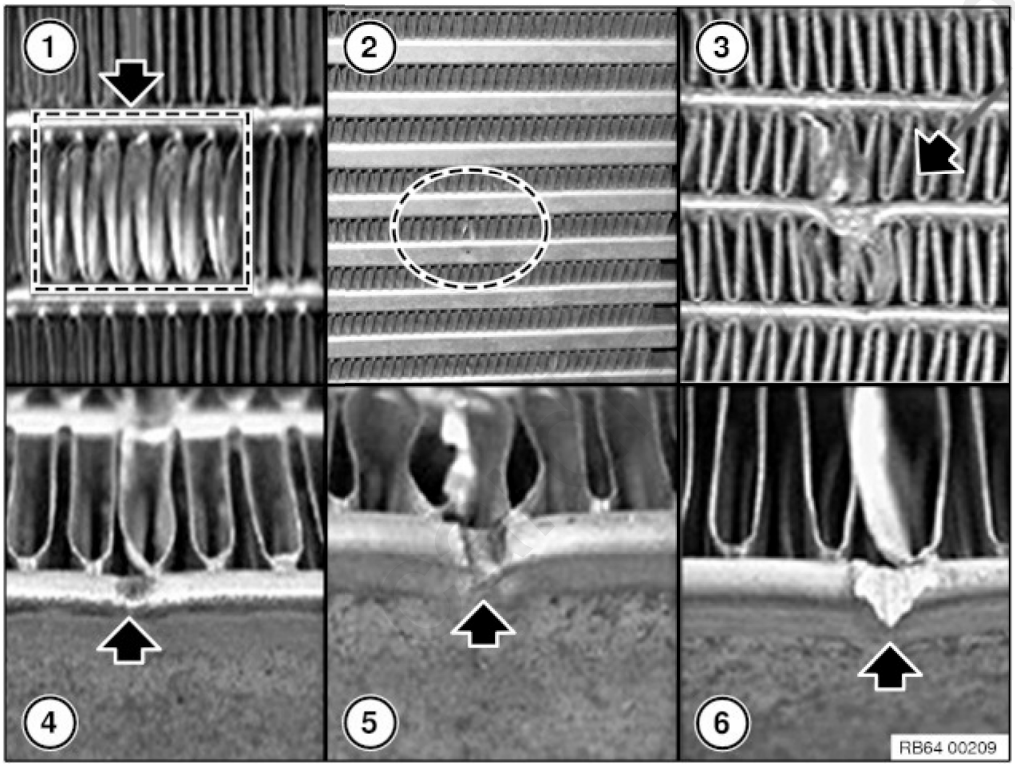
As long as tightness/function are not degraded and an adequate distance of a few mm between the radiator and air conditioning condenser remains in place, **this is not damage in either case.**

Radiators or air conditioning condensers are not to be replaced in these cases!

Note:

The deformations shown in Fig.Â (1) can be bent back with a standard fin comb..

Damage to lines carrying media or on the flat pipe require exchange of the radiator or air conditioning condenser (2-6).

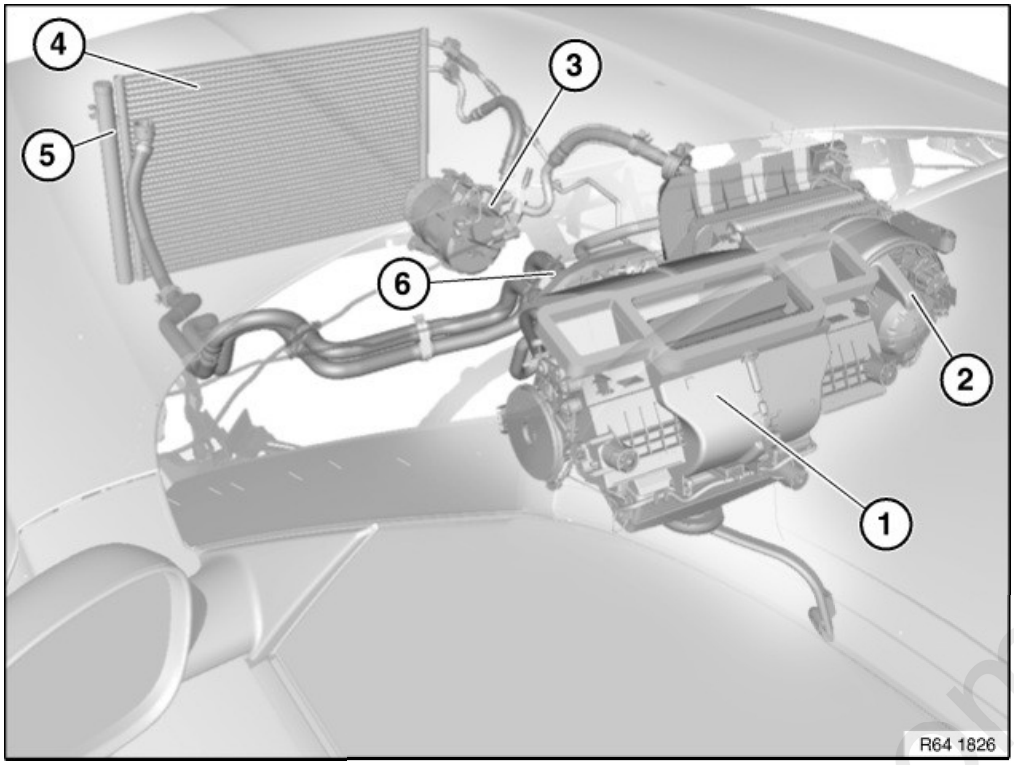


Dryer flask (integrated in the air conditioning condenser):

Round dents/depressions are permitted.

The air conditioning condenser is not to be replaced in this case.

64 00 .. Overview of heater - A/C system components



1 Heating and air-conditioning unit with mounted parts
2 Remove fan for heater - A/C system
3 Compressor for A/C system
4 Capacitor for heater - A/C system
5 Dryer flask for air conditioning (included in the capacitor)
6 Expansion valve

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64 53 551 Removing and installing/replacing capacitor (with desiccant insert) for heating and air conditioning system

Special tools required:

- 00 9 030

Warning!

Danger of injury!

Refrigerant circuit is under high pressure!

Avoid contact with refrigerant and refrigerant oil.

Read and comply with safety information:

- Handling refrigerant
- Handling refrigerant fluid

Attention!

Risk of damage!

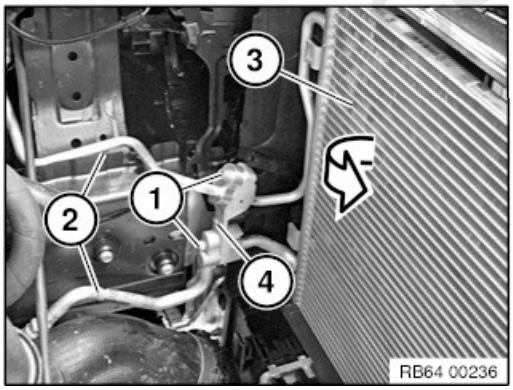
Restart engine only when air conditioning has been correctly filled.

Follow instructions for opening and replacing parts in refrigerant circuit!

Note:
Desiccant insert cannot be replaced separately.

Necessary preliminary work:

- Drain off air conditioning system
- Remove radiator



Release screws (1).

Pull out refrigerant lines (2) from condenser (3) and set aside.

Tightening torque 64 53 3AZ.

Release screw (4).

Remove condenser (3) in direction of arrow.

Installation note:
The fins on the radiator and condenser should not be damaged.

Renew sealing rings.

Use special tool 00 9 030 to install sealing rings without damaging them.

After installation:

- Evacuate and fill heating and air conditioning system

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64 53 520 Replacing safety pressure switch

Warning!

Danger of injury!

Refrigerant circuit is under high pressure!

Follow safety informations for handling R 134a refrigerant.

Avoid contact with refrigerant and refrigerant oil.

Follow safety instructions for handling refrigerant oil.

Important!

Risk of damage!

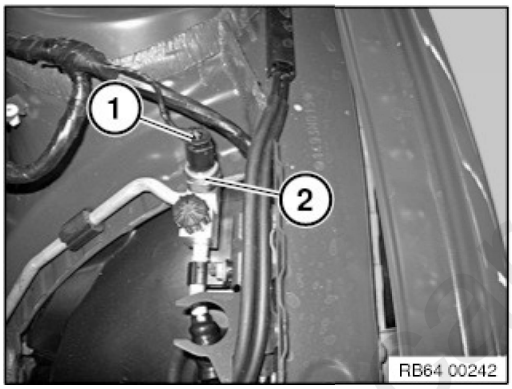
Restart engine only when A/C system has been correctly filled.

Follow instructions for opening and replacing parts in refrigerant circuit.

If air conditioning system is open for longer than 24 hours: replace condenser for air conditioning

Necessary preliminary tasks:

- Drain off air conditioning system



Unfasten plug connection (1) and disconnect.

Release safety switch (2) and remove.

Tightening torque 64 53 8AZ.

After installation:

- Evacuate and fill A/C system

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64 00 ... Information on using cleaning agent/paints (personal protection equipment)



Warning!

Use of cleaning agents/paints not compliant with instructions can cause serious injuries or burns!

Handling cleaning agents/paints can trigger allergic skin and respiratory reactions!



Important!

Observe following instructions:

- Store cleaning agents/paints only in a secure cabinet.
- Keep cleaning agents/paints away from naked flames and other sources of ignition.
- Protect cleaning agents/paints from high temperatures and direct sunlight.
- Always keep an eye douche on hand, change the water regularly (once a month).



Important!

Observe following instructions before use:

- Manufacturer's instructions (on container/packaging)
- Hazard warnings (on container/packaging)
- Manufacturer's instructions on package insert
- Material safety data sheet of manufacturer
- Product information in EPC
- National market regulations



Important!

Observe following instructions during use:

- Do not eat, drink or smoke while working with these products.
- Avoid direct contact with skin and eyes.
- Wear personal protective clothing/equipment.
- Ensure that all enclosed areas are well ventilated or extract fumes directly.
- Immediately change working clothes soiled with cleaning agent/paint.
- After finishing work, wash your hands and apply protective skin cream.



Important!

Follow hazard warnings and wear personal protection equipment!

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First Aid:

- If product comes in contact with eyes, immediately flush with running water for about 10 - 15 minutes. Seek the advice of eye specialist.
- In the event of skin contact and where applicable an allergic skin reaction, clean the affected areas immediately with soap and water and then apply silicone-free skin cream. Seek advice of physician.
- If an adhesive product is swallowed, rinse mouth/parts of mouth thoroughly with running water. Drink 1-2 glasses of water. Do not induce vomiting. Consult a doctor.
- After inhaling vapours ensure ample supply of fresh air. Keep calm, keep respiratory tracks clear and call doctor.



Recycling:

Dispose of cleaning agents/paints in a professional manner!

Observe national/country-specific disposal regulations.

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