



Conversion R12/R134a

The European Parliament has decreed (Gazette no. 2037/2000) that conventional refrigerant (R12) must be replaced by chlorine-free refrigerant (R134a) from 01.01.2001 onwards whenever air conditioning systems have to be opened for maintenance or repair work following this date. Country-specific regulations (e.g. for Germany: decrees by the Ministry of the Environment) must also be heeded. With the aid of retrofit sets e.g. from the *Behr Hella Service* range, a valve removing tool and retrofit labels, air conditioning systems operated with R12 refrigerants can be converted to the new refrigerant R134a. In addition, synthetic refrigerant oil is also required. This has to replace the mineral oil. PAO Oil 68 is particularly suitable here. When PAO Oil 68 is used, there is no longer any need to remove the compressor as long as the oil can be drained or suctioned off (refer also to the Technical Information sheet on PAO Oil 68). Within the course of conversion, the dryer/accumulator also always has to be replaced.



To enable conversion to be carried out without any difficulties, the following procedure should be kept:

Before starting work you must read the Technical Information sheets "Safety instructions on handling refrigerants" and "Removal and installation instructions".

Preliminary check

1. Make sure condenser and radiator are clean
2. Magnetic clutch of the compressor has to switch on and off

Functional check

1. Connect the service station
2. Allow the warm engine to run at 2000 - 2500 min⁻¹
3. Switch on the air conditioning system
4. Set the fan blower to medium speed





5. Check the pressures of the air conditioning system and the temperature of the air being blown through the centre nozzle

If there are functional problems, find and eliminate the cause (refer here also to the Technical Information sheet "Cooling performance/Fault diagnosis")



Leak test

Check the air conditioning system for leaks using an electronic leak detector (part no.: 8PE 351 224-011).

Suctioning off the refrigerant R12

Make sure the system contains the refrigerant R12 by checking the marking on the compressor or vehicle. A gas analysis device can also be used for this purpose.

1. Switch the air conditioning system on
2. Set the fan blower to maximum speed
3. Allow the engine to run at idling speed for several minutes
4. Switch the engine off
5. Connect the R12 service station and suction off the refrigerant into a suitable container and dispose of it*¹



Remove the compressor oil

1. Disconnect the R12 service station
2. Loosen the electrical connection from the magnetic clutch
3. Unscrew the refrigerant lines from the compressor
4. Remove the compressor
5. Empty the compressor oil via the refrigerant connections and the filling opening (if available). To make draining the oil easier, turn the compressor shaft via the pulley by hand.

Do not re-use the oil and dispose of it separately*¹

Fill the compressor with new oil

1. Almost all new compressors are already filled with oil. Nevertheless, the correct filling quantity must always be



checked. This is carried out using a control screw, if available. Otherwise the oil content in the new compressor must be checked by being emptied into a clean fuel measure and corrected if necessary. A syringe or clean fuel measure is used to fill the compressor oil via the filling screw (or via the supply line muffs if the system does not have a filling screw). Details of the correct filling amounts can be found on the compressor, in the air conditioning spare parts catalogue, in numerous technical information sheets or inquired directly from the manufacturer / supplier.

2. Turn the compressor 10 x by hand and re-install it. Start the engine and then operate the air conditioning system for several minutes at idling speed.
3. Screw the refrigerant lines back onto the compressor, replace any O-rings
4. Set up an electrical connection for the magnetic clutch

Replacing the dryer/accumulator

1. Always replace the dryer/accumulator
2. Replace the pressure switch (if not already present on the new dryer/accumulator)
3. Replace any O-rings

Replacing existing O-rings

1. Always*² replace all the O-rings on muffs, connections and valves
2. Always use synthetic compressor oil or special lubricants to grease the O-rings
3. Always push the O-rings up to the prescribed fitting position

Mounting the R134a adapter to R12 filling valves

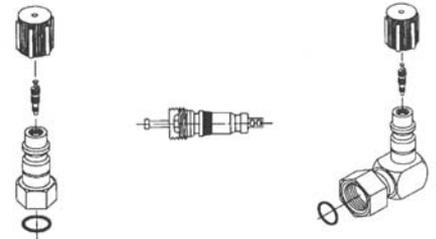
1. Clean the threads of the R12 filling valves and check for damage
2. Use the valve removal tool to screw the inserts out of the R12 filling valves
3. Screw the adapter (the new valve is in the adapter)





to the R12 filling valves

Note: The adapter threads are equipped with a chemical screw locking device which becomes effective after approx. 15 minutes. Removal is then no longer possible. For this reason, specify which adapter is to be used where before starting fitting work (do not mix up high and low pressure adapters). There are also 90° adapters available from the *Behr Hella Service* range for spots which are difficult to reach.



Filling and final inspection

4. Connect service station R134a and produce a vacuum over a period of approx. 30 minutes.
5. Carry out an initial leak check on the basis of the vacuum manometer (vacuum should be retained for at least 10 minutes)
6. Fill the system with the prescribed amount of R134a (approx. 15 % less than the R12 filling amount). Vehicle-specific details can be found in numerous technical information sheets.
7. Heed manufacturer's information

Functional check

1. Start the engine
2. Operate the air conditioning for several minutes at idling speed
3. Switch the heating off
4. Set the fan blower to medium speed
5. Check the high and low pressure of the air conditioning system at a speed of approx. 2000 min⁻¹
6. Check the temperature of the air being blown through the central nozzle
(refer also to the Technical Information sheet "Cooling performance")

Leak test

1. Use the electronic leak detector to check the system



Klima-Service 	
Retrofit / Umrüstung auf R134 a	
Datum der Umrüstung: _____	
Aufgefüllte Kältemittelmenge: _____	
Kompressoröl: Typ: _____	Menge: _____
	



for leaks

2. Switch the engine off, disconnect the service station
3. Complete the conversion label and attach it to the lock carrier in the engine compartment

R12 system does not work:

Quite often, an air conditioning system no longer works properly when it has been converted. In order to determine the exact costs for conversion it is necessary to find out whether the system has any component damage (condenser, compressor etc.) or leaks. This is the only way discrepancies with the customer can be avoided from the very beginning. Proceed as follows:

Use the filling adapter R12/R134a to evacuate the air conditioning system (alternatively the retrofit adapters can also be mounted). Observe the degree of vacuum and how long the vacuum is retained. This will allow you to detect more major leaks immediately. An additional measure would be to test the system using nitrogen. If there are no leaks, the system can be temporarily filled with R134a and operated. The electronic leak detector can now be used to find more minor leaks. If no leaks are found, no component damage (compressor noise etc.) can be perceived and the temperature of the air being blown through the central nozzle is OK, conversion work can begin. It is advisable to add a contrasting agent with the final fill of R134a. This allows any leaks that occur after a longer period of operation to be localised quickly.

Important note:

Refrigerant oil that has been removed with the system refrigerant has to be refilled after evacuation. When replacing components the following quantity of oil generally also has to be topped up, depending on the component concerned (% of the total oil filling quantity): Dryer: ~10% Evaporator: ~20% Condenser: ~10% Pipes: ~10%

If the system is soiled (e.g. dirt, abrasion) or if soiling cannot be excluded, the system has to be flushed (refer to separate information sheet "Flushing").

***1 Disposal**

Stocks of R12 can be forwarded for disposal via the refrigerant supplier. The European waste code (EAK) is: 140401
Refrigerant oils must be disposed of separately and must not be mixed with used oil. Please contact an approved disposal



company in this matter. The European waste code (EAK) is:
130201

Refrigerant consumption can be controlled by the German federal states on the basis of the Environment Statistics Law. For this reason, keeping proof of disposal is recommended.

***2 Always replace O-rings:**

Quite often it is usual practice only to replace those O-rings that can be changed without considerable fitting efforts. This procedure conceals quite a few risks which the customer should be informed about before conversion if not all O-rings are to be replaced:

1. R12 O-rings can only be used to a limited extent with R134a and can start to leak when they come into contact with R134a and/or synthetic oil.
2. O-rings in R12 systems are usually as old as the vehicle itself and/or the air conditioning system to be converted. This fact alone means that the O-rings are probably no longer airtight.