



KONVEKTA

The Innovation Company.

Filling Instructions for KONVEKTA Air Conditioning Units with R134a

Leak test,

Evacuation- and Filling Instruction

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1. Means of Presentation

The text statements which are intended as instructions and direct warnings of imminent danger and to which particular attention must be paid are indicated in this manual as follows:

1.1. Safety Instructions Relating to the Chapter

Structure



SIGNAL WORD



Symbol explaining the danger in more detail

Type and source of danger

Possible consequences of non-compliance with the instructions

– Actions to avoid the danger

Degrees of danger



DANGER

A high-risk danger that, if not prevented, could result in death or serious injury.



WARNING

A medium-risk danger that, if not prevented, could result in death or serious injury



ATTENTION

A low-risk danger that, if not prevented, may result in mild to moderate injury.

NOTE

A danger with a negligible degree of risk that, if not prevented, may result in property damage.

1.2. Embedded Safety Instructions

Embedded safety instructions apply to specific actions and are directly integrated into the action.

Structure

- **▲ SIGNAL WORD** type and source of danger
- Possible consequences of non-compliance with the instructions
- Actions to avoid the danger

Degrees of Danger

- **▲ DANGER / WARNING / CAUTION** (see „1.1 Safety Instructions Relating to the Chapter“)
- **GUIDANCE** (without a warning triangle, see „1.1 Safety Instructions Relating to the Chapter“)

1.3. Other Means of Presentation



The Info symbol gives useful information.

- The texts following this mark are enumerations.
- The text following this mark describes the actions to be performed in the order given.
- „“ Texts in quotation marks are links to another chapter or section.

2. Warranty and Liability

The “General Terms and Conditions of Warranties of Konvekta AG” that are valid at the time shall apply at all times. You will receive them in our GWL department: GWL@konvekta.com.

All information and instructions in this manual have been compiled taking into account applicable standards and regulations, the state of technical knowledge and many years of experience and practice.

Warranty and civil liability claims for personal injury and property damage are excluded if they result from one or more of the following causes:

- Use of the Unit contrary to its intended use or improperly,
- improper set-up, start-up, operation, maintenance and cleaning of the Unit,
- failure to follow the instructions and guidance provided in the manual with regard to setting up, start-up, operation, maintenance and cleaning of the Unit,
- engagement of unqualified or untrained personnel,
- structural changes to the Unit (modifications and other changes to the Unit must not be carried out without prior written approval from Konvekta AG. In case of acting against the above provisions, the Unit shall lose its conformity to the standards of the European Communities (EC),
- improperly performed repairs,
- use of non-approved spare parts or use of spare parts that do not correspond to technically established requirements,
- disasters, acts of foreign bodies and force majeure.

We reserve the right to make technical changes as part of improving performance and further development.

2.1. Copyright Protection

This manual is protected by copyright and is intended for your internal use only.

Forwarding it to third parties, reproduction of any kind and in any form - even on a random basis - and processing and/or communication of the content are prohibited without the written permission of Konvekta AG, with the exception of such activities undertaken for internal purposes

Violations oblige to compensation. Further claims are reserved.

2.2. Service / Customer Service



For technical information, please contact our Customer Service Department:

Telephone: +49 (0) 66 91 76-0

e-mail: tkd@konvekta.com

In addition, our employees are constantly interested in new information and experience resulting from the application, which can be valuable for the improvement of our products.

3. Safety



WARNING

Failure to observe the following safety instructions can have serious consequences:

- danger to persons due to electrical, mechanical or chemical influences,
- failure of important Unit functions,
- damage to the environment by spills of hazardous substances.

Before operating the Unit, please read the safety and hazard instructions listed in this section carefully.

In addition to the instructions in this manual, please also observe the generally applicable safety and accident prevention regulations.

In addition to the instructions in this manual, the user/operator should observe current national labour, company, and safety regulations. Current internal company regulations must also be observed.

3.1. Intended Use

Safe operation of the Unit is ensured only if it is used as intended.

The Unit is designed for air conditioning and to set the individual temperature inside the vehicle. The Unit is operated using R134a refrigerant. Konvekta approval must be obtained for the use of alternative refrigerants.

The Unit is not intended to be used for applications other than those specified in this text, any other use will be considered non-compliant.

Intended use also includes:

- compliance with all instructions in this manual,
- adherence to inspection and periodic maintenance schedules,
- use of consumables and auxiliary materials in accordance with applicable safety regulations,
- observance of operating conditions.

The technical specifications given in the technical data must be followed without exception.



Please use the Unit only for its intended purpose, otherwise safe operation will not be ensured.

All personal injuries and property damage resulting from improper use are the responsibility of the user of the Unit, not the manufacturer!

3.1.1. Foreseeable Misuse

Any other use of the Unit beyond its intended use and/or other use may result in serious injury.

- Please use the Unit only as intended.

The Following Operating Conditions are Classified as Misuse:

- Using air conditioning to the driver's seat or passenger seats without special equipment and safety devices.
- Operating beyond the allowable technical limits.
- **Failure to comply with the product safety data sheet for the refrigerant.**
- Failure to comply with regulations and legal provisions in force at the place of use.

3.2. Requirements for Personnel

The unit may only be operated, maintained and repaired by persons who are educated and/or trained for this purpose. These individuals must know the manual and follow it. The respective authorizations of the personnel shall be clearly defined.

The following qualifications are listed in the manual for each scope of work:

Personnel to be Trained

Personnel to be trained, such as apprentices or support staff, are not familiar with all the hazards that can occur when operating the Unit. They may only work on the Unit under the supervision of qualified or trained personnel.

Trained Personnel

Trained personnel have been informed by the operator or by qualified personnel of the tasks they have to carry out and the possible dangers arising from improper conduct.

Qualified Personnel

Qualified personnel are able, on the basis of their professional training, knowledge and experience and their knowledge of the relevant regulations, to carry out the tasks assigned to them and to independently recognize possible dangers and to prevent them.

Furthermore, to the extent required for the respective tasks, they possess the legally prescribed certifications of qualification.

Personnel Qualified in Refrigerants

Personnel qualified in refrigerants (skilled worker or refrigeration mechatronics technician) are able to plan, install and maintain refrigeration equipment and systems based on their professional training, knowledge and experience. They are able to independently recognize possible dangers and prevent them.

3.2.1. Competences

Improper handling of the Unit may result in serious personal injury and substantial property damage. Therefore, only properly qualified personnel should be allowed to perform any activities.

- Only those persons who can be expected to perform their work reliably are allowed as staff. Persons whose reaction speed is impaired by drugs, alcohol, medication or similar are not allowed to work on the Unit.
- All persons working on the Unit must read the manual and confirm by their signature that they have understood it.
- Personnel to be trained may initially work on the Unit only under the supervision of qualified personnel. Successfully completed training must be confirmed in writing.
- Training of personnel is the responsibility of the User.

3.2.2. Obligations of Personnel

Prior to commencing work on the Unit, all persons contracted to work on the Unit agree to:

- observe basic safety and health regulations,
- confirm with their signature that they have read and understood the safety instructions in this manual.

3.2.3. Unauthorized Persons

Unauthorized persons not meeting the requirements for personnel are not aware of the hazards in the work area.

- Keep unauthorized persons away from the work area.
- In cases of doubt, please contact such persons and remove them from the work area.
- Please stop work for the time that unauthorized persons are in the work area.

3.2.4. Training

Personnel must be trained regularly by the user. Record how the training was conducted for better tracking.

Date	Full name	Type of training	Training conducted by	Signature

3.3. General Safety Instructions

- Do not operate or maintain the Unit until you have read this manual.
- Please use the Unit only for its intended purpose (see „3.1 Intended Use“).
- When operating the Unit, refrain from any type of work that adversely affects the safety of people or the Unit.

- Keep all safety and hazard notices attached to the Unit in a legible condition and replace them as necessary.
- Only qualified or trained personnel may work on the Unit (see „3.2 Requirements for Personnel“).
- In case of abnormal operation, turn off the Unit immediately. Have the faults repaired by suitably qualified specialists or by Konvekta AG.
- Always keep this manual at the place where the Unit is operated. Ensure that the manual is available at all times to persons working on the Unit.

3.4. Safety Instructions for Refrigerant R134a



WARNING

The refrigerant manufacturer's safety data sheet must be observed and its instructions must be adhered to.

A	Specification	
	Composition:	R134a (Tetrafluorethan)
	Color:	Colorless
	Odor:	Slightly ethereal
	State of aggregation	Pressure liquefied gas
	Flammability	Non-flammable
	Toxicity:	Non-toxic

B	Hazards
	Contains gas under pressure
	Avoid ignition sources and contact with warm surfaces
	Liquefied gas can cause frostbite.
	Escaping vapors could be highly irritating when they come into contact with fire and glowing objects containing the substances hydrogen fluoride and fluorophosgene.
	High pressures and air contents can cause ignitable mixtures.
	Reaction with alkali and alkaline earth metals. In powdered form, aluminum and zinc catalyze the decomposition.
	Contact with strong bases or alkaline materials may cause violent reactions or explosion.
	Vapors are heavier than air and spread along the ground; Vapors have a suffocating effect.

C	Handling
	Don't eat and drink while working.
	Avoid contact with skin, eyes and inhalation of fumes.
	Provide air supply.
	The product is non-flammable. Cool endangered containers with water
	Do not smoke while working
	From around 20% by volume in the air you breathe, there is a risk of suffocation due to a lack of oxygen
	Continued inhalation of decomposition products may result in pulmonary edema

D	Personal protective equipment	
	Respiratory protection:	When carrying out rescue and maintenance work in storage containers, use a breathing apparatus that is independent of circulating air because of the risk of suffocation due to the displacement of atmospheric oxygen.
	Hand protection:	Leather or polyvinyl alcohol gloves
	Eye protection:	Safety goggles
	Skin protection:	Use skin cream before and after work

E	Behavior in case of danger
	Product is not flammable.
	Match extinguishing measures to the environment
	Cool container with spray bottle.
	In case of fire wear independent working breathing apparatus.

F	First aid measures	
	Skin contact	In case of contact with skin, wash off immediately with plenty of water
	Eye contact	In case of contact with eyes, rinse thoroughly with plenty of warm water and consult a doctor
	Swallowing	Immediately consult a doctor
	Breathe in	Transport the affected persons to fresh air and keep them calm. If breathing stops, provide ventilation with a device. Call a doctor

3.5. Safety Measures Related to Environmental Protection

For all work, observe the regulations on avoiding unnecessary waste generation and proper waste treatment or disposal.

Especially during installation and maintenance work and commissioning, make sure that substances hazardous to groundwater, such as grease, oil, refrigerants, solvent-based cleaning fluids, etc., do not contaminate the ground or run into the sewer system. These substances should be captured in appropriate containers, stored, transported and disposed of according to national laws.

3.6. Personal Protective Equipment

When working on the Unit (assembly / disassembly of parts), regardless of the hazard assessment at the work site, personal protective equipment must be worn to minimize health hazards.

- Always wear personal protective equipment appropriate to the activity while working.
- Observe the instructions posted in the work area regarding personal protective equipment.

The symbols used therein have the following meanings:



Protective Work Clothing

Protective workwear is tight and has low tear strength, has tight sleeves with no protruding elements. It is mainly used to protect against being caught by moving parts of the Unit.

Do not wear rings, chains or other jewellery.



Protective Footwear

Wear non-slip safety shoes for protection against heavy falling parts or against slipping on slippery ground.



Protective Gloves

Wear protective gloves to protect hands from abrasions, scratches, stings, or deeper wounds and from touching hot surfaces or chemicals.



Safety Glasses

Wear safety glasses for protection against high pressure ejecting media or flying parts.

Personal protective equipment must be provided by the user and must comply with applicable requirements.

In addition, national regulations and guidelines as well as internal user instructions, if any, must be observed.

3.7. Emergency Instructions


Preventive Measures

- Always be prepared for accidents or fire.
- Keep first aid equipment (first aid kit, blankets, etc.) and fire extinguishers at hand.
- Familiarize personnel with accident reporting, first aid, firefighting and rescue equipment.
- Keep access routes clear for emergency vehicles.

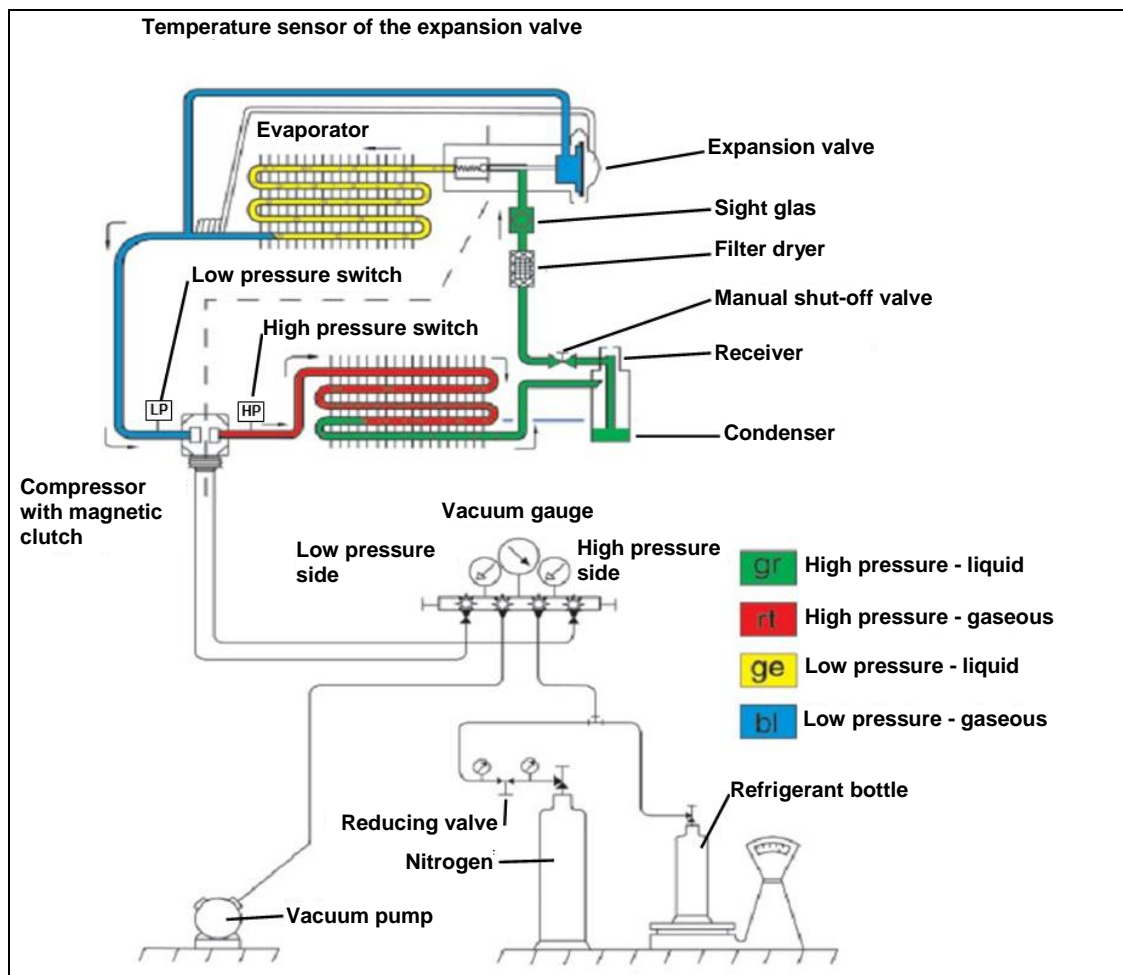
Measures in Case of Accidents

- Rescue people from the danger zone.
- In the event of cardiac and / or respiratory arrest, initiate first aid measures immediately.
- In the event of personal injury, notify the First Aid Officer, a doctor or the ambulance service.
- Clear the access routes for rescue vehicles. If necessary, assign someone to instruct the emergency services
- Extinguish burning oil / grease with a CO2 extinguisher or powder extinguisher.
- Extinguish a fire in the electrical control system with a CO2 extinguisher.

4. Filling Instruction

 | Ideal ambient temperature is at least 22°C or more.

4.1. Schematic Refrigerant Circuit



4.2. General Preparation

- Connect the refrigeration pressure gauge (also called a technician's aid) or service station to the corresponding service connections LP + HP of the air conditioning system. These are usually located on or near the refrigerant compressor.
- Close the shut-off valves HP + LP at the technician's aid/service station keep them closed for the time being.
- Open all magnetic valves in the refrigeration circuit using permanent magnets or electric.
- Open the shut-off valves on the refrigerant compressor or place them in the "middle position/service position".

4.3. Leak Test with Nitrogen (N3)

- Open the nitrogen bottle (N3) and set a pressure on the pressure reducer of approx. 10 bar
- Slowly open the service valve HP (red) at the mechanic aid/service station. After a short time, the pressure should also increase on the LP side (watch the LP pressure gauge).
- Now also slowly open the service valve LP (blue) at the mechanic aid/service station until the pressure between the HP and LP side equalizes (approx. 10 bar), according to the pressure reducer of the nitrogen bottle (N3).
- Close the nitrogen bottle (N3).
- The refrigeration circuit is completely filled with nitrogen (N3) and can now be checked for leaks using a suitable existing leak detector (spray, foam, soapy water, ultrasonic leak detector, etc. ...).
- If the system is tight and no leak is localized, release the nitrogen (N3) back into the environment via a connection on the mechanic aid/service station until the system is completely drained.

4.4. Evacuate / Create Vacuum

- The system can now be evacuated and placed in a vacuum using a vacuum pump.
- Switch on the vacuum pump and open both shut-off valves (HP and LP) at the technician/service station.



Vacuum time varies depending on system size. Experience has shown that it should be at least 90 minutes. The statement also applies here: the longer, the better!

NOTE

Evacuate the hose between the mechanic aid/service station.

- Close again both shut-off valves at the technician's aid/service station

4.5. Refrigerant Filling

- The evacuated system can now be filled with refrigerant.



WARNING

Risk of serious injury if filled improperly!

– Filling may only be carried out by refrigeration technology specialists.

4.5.1. Filling with Service Station

- Enter the filling quantity specified by the manufacturer via the service station (see “Technical Overview Guidelines for Refrigerant Filling Quantities TD01651A”).



The service station is menu-driven and the device instructions must be followed step by step.

4.5.2. Manual Refrigerant Filling

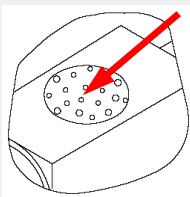
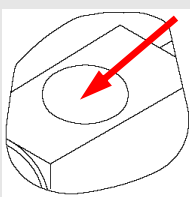
- First fill in the refrigerant via the HP side using a technician's aid.
- To do this, place the refrigerator bottle on a suitable scale.
- Filling via the HP side can be done “liquid”. To do this, slowly open the HP shut-off valve on the assembly aid. After a short time, the pressure should also increase on the LP side (watch the LP pressure gauge)

NOTE

Please note: Never fill in “liquid” via the LP side, otherwise damage to the compressor can occur!

The filling or addition of refrigerant via the LP side is carried out exclusively in “gaseous” form.

- The amount of refrigerant to be supplemented can now be “sucked” into the system via the LP side.
- To do this, the air conditioning must be switched on and put into operation.
- Close the shut-off valve HP on the mounting aid and open the shut-off valve LP. The refrigerant is now sucked from the bottle into the system via the LP connection.
- Once the system has been filled to the level specified by the manufacturer, close the shut-off valve LP on the mounting aid.
- If the filling quantity is not known, refrigerant can be filled in via the LP side until the sight glass in the system is “bubble-free” during operation
This ensures that the refrigerant is completely “liquid” in the area of the sight glass, which is usually located close to the expansion valve.

Sight glass	Cause	Remedy
	Bubbles form in the sight glass: => Lack of refrigerant!	NOTE If the refrigerant level is too low, increased bubble formation can be observed in the sight glass. <ul style="list-style-type: none"> • The Unit must be switched off immediately to avoid damage to the compressor. • Visit a Konvekta Service-Station¹ ! <ul style="list-style-type: none"> – Refill refrigerant – Check system for leaks
	Sight glass clear / bubble-free: refrigerant quantity is correct.	

NOTE

Please note: This only applies to ambient temperatures > 22°C. At low ambient temperatures there is a risk of “overfilling”!

¹ On our homepage www.konvekta.com under the heading >Service< you will find the contact details of the service partners in your area.

4.5.3. System Filled

- When the system is completely filled, close the HP + LP shut-off valves at the technician's aid/service station. The valve on the refrigerant bottle must also be closed.
- Once all test and trial runs have been completed, return the shut-off valves in the refrigeration circuit (usually near the refrigerant compressor) to the “open” position. Remove the two service connections HP + LP from the service port.

NOTE**Environmental damage in case of improper disposal!**

Refrigerants are hazardous to the environment. When handling refrigerants, the applicable national regulations must be observed.

- Refrigerants and lubricants must not get into the groundwater, bodies of water or sewage system.

5. Further documents

The following additional documents are to be considered in addition to these filling instructions. You will find the currently valid, additional documents on our homepage www.konvekta.com under the heading >Service< or you can request them from our technical customer service (see „2.2 Service / Customer Service“).

Homepage / Technischer Kundendienst

Safety regulations **TD00051A_52A**

Technical overview refrigerant **TD01651A**