



KONVEKTA

The Innovation Company.

Operating Instruction

for KONVEKTA Air Conditioning unit

KL40T / KL45T / KL46T



with climate control KS40

Versions:

- 12 / 24 Volt DC
- Recirculated Air
- Fresh air

ID#: BBA-KL40T12AL
Version: A00

Konvekta AG

Am Nordbahnhof 5
34613 Schwalmstadt
Germany

☎ +49 (0) 66 91 / 76 – 0
📠 +49 (0) 66 91 / 76 -
200
✉ Info@konvekta.com
www.konvekta.com

Contents

Page:

• Introduction	3
• Information on the operating instructions.....	4
1. Technical data.....	4
1.1. Compressors	4
2. Generally information for a/c unit.....	5
2.1. Intended Use	5
2.2. Operating conditions	5
3. Operation.....	5
3.1. General description KS40	6
3.2. Control / Key function with "ignition on" (ZE)	6
3.3. Key function with "Motor on" (ME) and active controller	6
3.4. Display function	7
4. Functional description	7
4.1. Display.....	7
4.2. Room temperature control	7
4.3. Ventilation.....	7
4.4. Circulating air.....	7
4.5. Additional key functions	8
4.5.1. Temperature request	8
4.5.2. Switchover unit °C / °F	8
4.5.3. Contrast LCD	8
4.6. Background functions	8
4.6.1. Procedures for switching on the power supply (KL15) ignition	8
4.6.2. Operations when the motor is switched on/off (release D+/climate)	8
4.6.3. Automatic blower configuration	9
5. Error handling diagnosis.....	9
6. Maintenance / Service	9
6.1. Compressor type K VX	9
6.2. Return air grid	9
6.3. Condenser coil.....	10
6.4. Troubleshooting	10
7. Warranty Conditions.....	10
8. Waste disposal in accordance with legal provisions	11
9. History of modification.....	11

Appendix:

- Maintenance Schedule Bus [WP07050618](#)

Introduction

These operating instructions have been written for drivers, operators and the maintenance staff of your air conditioning unit.

In this context, we refer implicitly to the compliance with our general installation guidelines. These can be obtained from the KONVEKTA technical after sales service: TKD@konvekta.com.

Please observe our valid safety instructions, available under www.konvekta.de/asv.html. In case of order placement or any other conclusion of contract the safety instructions get integral part of the contract.

These operating instructions have to be read carefully and made use of before the first start-up and after that regularly by each person who is involved in handling the machine:

- Operation including troubleshooting and waste disposal of fuels and auxiliary agents.
- Servicing, inspection, repair
- Transport.

This facilitates the handling and avoids trouble caused by improper operation. Working in compliance with these operating instructions increases operation reliability and service life of the air conditioning unit and reduces life cycle costs.

Please complete these instructions by adding the national provisions for prevention of accidents and environmental protection.

These instructions are part of the air conditioning unit. Always have a copy at hand in the driver's cabin.

You will certainly understand that we will not recognize any warranty claims due to improper handling, inadequate maintenance, applications that do not correspond with the determined use, utilization of non-admitted fuels or the non-observance of safety provisions.

KONVEKTA will annul without notice all obligations concerning guarantee, service contracts etc. regardless if granted by KONVEKTA or its distributors in case other than original KONVEKTA spare parts or parts bought from KONVEKTA AG have been used for maintenance and repair. These operating instructions contain all necessary information to operate your air conditioning unit. In case you need more explanations please contact the next KONVEKTA service station.

① On our website www.konvekta.com in category >service< you will find a survey of contact details of all our service partners close to your location.

Information on the operating instructions

These operating instructions are valid for the air conditioners type:

• **KL40T/12V • KL40T/24V • KL45T/12V • KL45T/24V • KL46T/12V • KL46T/24V**

☞ When taking the unit into operation we recommend adding the following data. This will also be important for your orders of spare parts, and in case of warranty.

Serial number of the unit:	
Order No.:	
Year of construction:	/ (MM/JJ)
Date of first operation:	// (TT/MM/JJ)

The machine is in accordance with the EC machinery directive 2006/42/EC.

The unit contains or needs fluorinated greenhouse gas for operation and is subject to identification requirements in accordance with F-Gas Regulation 517/2014.

Due to the fact that scope of supply depends on the order, equipment of your product may differ in some parts of description.

In case your product is equipped with details not shown or described in the operating instruction, your KONVEKTA -Service-Station will always be at disposal for informing you about correct operation.

In the course of further developments we reserve the right to technical modifications without prenotice. Guarantee and liability conditions of **KONVEKTA AG's** general business conditions are not enlarged by the above notes.

Indications and photos should neither be copied and circulated nor used for competitor's purposes. All rights according to the copyright remain expressly reserved.

Hersteller: KONVEKTA AG, Postfach 2280, D-34607 Schwalmstadt

1. Technical data

Type:		KL40T	KL45T	KL46T
Refrigerant		R134a		
GWP		1.430		
- quantity with front box	[kg] approx.	2,5 3,3	2,5 3,3	2,5 3,3
Operating voltage	[Volt DC]	12 24	12 24	12 24
Current consumption (3-stage) at 13V: (3-stage) at 26V: (stageless) at 26V	[Ampere]	88 44 53	88 44 53	88 44 53
Cooling capacity with K VX40 K VX30 or TM31 TM21	[W]	18.000 15.000. 12.000	18.000 15.000. 12.000	21.000 - -
Evaporator – Air volume*, free-blowing	[m ³ /h] 3-stage stage less	4.000 4.400	4.000 4.400	4.000 4.400
Measurements:				
- length	[mm]	1.966	1.985	1.985
- width	[mm]	1.368	1.336	1.336
- height, - depending on roof radius	[mm]	221 188	234 188	239 193
Weight of unit, Version:				
- Recirculated Air	[kg] approx.	65,5	78,5	81
- Fresh Air	[kg] approx.	66,5	79,5	82

* With standard fans and / or blowers

1.1. Compressors



Important to avoid leakages at the shaft seal of the compressor: The compressor should be started every 4 weeks for approx. 15 minutes! This also applies when the vehicle is not into operation for a longer period or when the air conditioning unit is not used!

Kompressor Type	K VX40/390	K VX30/325	HDC 33	TM21
Weight (kg) approx.	33	24,5	15,5	9,7
Oil brand	Esteröl SE55	Esteröl SE55	ZXL 100PG	ZXL 100PG
- quantity (kg)	2	2	0,5	0,18
Magnetic clutch ¹⁾	12 / 24V DC	12 / 24V DC	12 / 24V DC	12 / 24V DC
- Weight (kg)	12	7,6		

¹⁾ ø depending on vehicle type

2. Generally information for a/c unit



Attention in case of roof top a/c units: Never switch on the a/c unit during car-wash!

- The a/c unit is operational with running engine only.
- At cooling operation the humidity inside the vehicle is decreased, which avoids steamed up windows.
- The a/c unit works most effectively with windows and doors shut. If, however, the interior of the standing vehicle has been heated up severely by exposure to sunlight, short-time opening of windows and doors may accelerate the cooling down process.
- At high outside temperature and humidity condensate might drip off the evaporator and make a puddle under the vehicle. This is quite normal and no sign for a leakage.
- The filter in the return air grid (optional) retains pollution. If the external air is contaminated with gas switch over to return air operation. The filter should be cleaned or replaced respectively on a regular basis so that the capacity of the a/c unit is not affected.
- If you think that the air conditioning unit has been damaged switch it off immediately in order to avoid further damage. The air conditioning unit may be taken into operation again only after it has been checked at a KONVEKTA Service Station.

2.1. Intended Use

The **KONVEKTA** air conditioner represents an air conditioning system that works with the ozone friendly refrigerant R 134a and which creates a pleasant and individually adjustable room temperature by means of forced convection. The determined use includes also the observance of the Operating instruction and the proof of regular inspections as well.

2.2. Operating conditions

NOTE: KONVEKTA uses components made of copper and aluminium, which last a whole unit lifetime under normal environmental conditions. Should the units be operated under aggressive environmental conditions, i.e. air containing salt-, phosphate- or ammoniac extremely, a corrosion of the copper- and aluminium components cannot be ruled out. The copper- and aluminium components of the KONVEKTA systems are not suitable for such extreme application conditions. We indicate emphatically, that corrosion is not subject to warranties for defects. KONVEKTA does not take over any warranties for defect, neither for corrosion nor for consequential damage resulting there from, nor for damages caused by cleaning the systems with highly compressed or corrosion advancing substances.

3. Operation



Danger of accident!

- Focussing your attention on the road traffic is of top priority
- Only operate your air conditioning unit when the traffic situation allows it
- Make sure you can clearly recognize and read all operation- and display-elements at any time
- Protect all displays against irritating sunglare and any other optical disturbances
- Please note that the control panel keys have not been designed for heavy stressing
- Excessive or fast pressing of the keys for adjusting the set temperature does not accelerate the cooling down process. It possibly damages the control panel and so affects the general performance of the air conditioning unit.

3.1. General description KS40

The KS40 climate control is used to control a bus air-conditioning system consisting of compressor, condenser, evaporator and recirculation flap.

The interior temperature is recorded by a sensor in the return air of the air-conditioning system, the outside temperature is also optionally recorded by a sensor.

The control unit can be mounted directly in a cut-out in the instrument panel or via the Konvekta adapter housing B59-AA3-097 and the mounting frame T11-000-108 in a radio DIN shaft. Cut-out size: 90,5/+0,5/-0mm x 43,5/+0,5/-0mm and wall thickness cut-out: 2mm - 4mm.

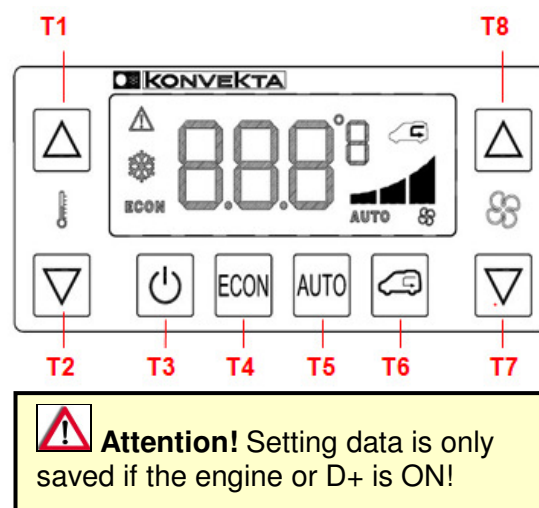
Operation is via a safety shutdown mat, which also serves as a seal. Information is displayed on a segment LCD.

The device can be used in vehicles with 12V or 24V on-board power supply. It is connected to the vehicle via a 16-pin male connector. The permissible ambient temperature is -40°C...85°C.



3.2. Control / Key function with "ignition on" (ZE)

Key	Significance	Key function
T3	On/ Off key	Switching the device on/off
T7	Blower Minus key	Switching off blower
T8	Blower Plus key	Switching on blower(max. 1 level for 5 minutes)
T1+T2 simultaneously	Temperature request	Displays outdoor or indoor temperature for 10 seconds
T1+T8 simultaneously	Contrast	Increasing contrast by 1 level
T7+T8 simultaneously	Temperature unit	Temperature unit change-over from °C to °F and vice versa

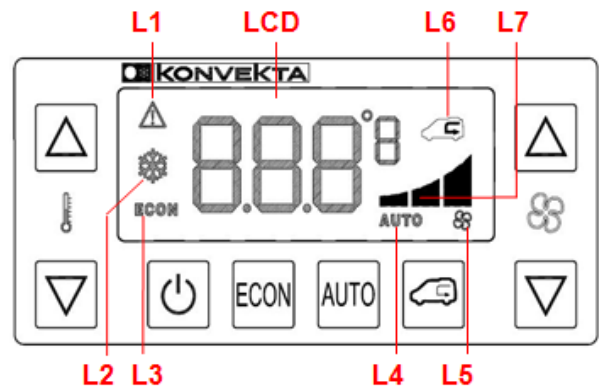


3.3. Key function with "Motor on" (ME) and active controller

Key	Significance	Key function
T1	Setpoint temperature Plus key	Increasing the setpoint temperature by 1 °C or 1-2°F per key-stroke
T2	Setpoint temperature Minus key	Reducing the setpoint temperature by 1 °C or 1-2°F per key-stroke
T3	On/Off key	Switching the device on/off
T4	Economy (AC-lock)	Locking the cooling function
T5	Automatic	Activation of the automatic blower and recirculation control.
T6	Recirculation key	Switching between fresh air and recirculation mode.
T7	Blower Minus key	Reducing the manual blower level.
T8	Blower Plus key	Increasing the manual blower level.
T1+T2 simultaneously	Temperature request	Displays indoor temperature for 10 seconds, after pressing again the keys the ambient temperature is displayed if an ambient sensor is installed (point 3.5.1).
T1+T8 simultaneously	Contrast	Increasing contrast by 1 level (point 3.5.3).
T7+T8 simultaneously	Unit temperature	Change-over temperature unit °C to °F and vice versa (point 3.5.2).

3.4. Display function

Display	Significance
LCD	Standard display Setpoint temperature
L1	Warning / Error display
L2	Air conditioner active
L3	Economy aktiv / Air conditioner locked
L4	Automatic blower and recirculation control active
L5	Manual blower control active
L6	Recirculation mode active
L7	Display blower level 0...4



4. Functional description

4.1. Display

The setpoint temperature is displayed as the basic display when the device is active. The display and keypad are backlit. When the device is inactive, the display is dark with a flashing decimal point. When certain functions are called up, the corresponding information is briefly displayed. During the test mode, the display is used for information output.

4.2. Room temperature control

When the unit is active, the room temperature control starts after starting the engine. The desired room temperature can be set using the plus/minus keys T1  and T2 . The adjustable temperature range is 15° ... 35°C or 59° ... 95°F.

If a room temperature sensor error occurs ( on), the unit will operate at an equivalent value of 22°C. This makes operation possible despite an error (s. item 4).

The air conditioning system is controlled to the room temperature with a hysteresis of +/- 2K.

At outside temperatures below 5°C the cooling function remains disabled and above 7°C it is enabled again. If no outdoor temperature sensor is connected, the cooling function is always possible.

The cooling function can be disabled via the "Economy" function. (Key T4 ).

4.3. Ventilation

When the unit is active and the motor is running, the plus/minus keys T7  and T8  can be used to set the desired ventilation stage in 3 or 4 stages respectively.

Optionally, the automatic blower function can be activated by pressing the key T5 .

If the motor (D+ off) is switched off, the ventilation can only be activated on the smallest stage and switches off completely after 5 minutes.

If the door signal is active, the ventilation is switched to the lowest level. After closing the door the lowest level remains active for 10 seconds. Then, the controller returns to the previously set ventilation stage.

4.4. Circulating air

After switching on the power supply, the recirculation mode is switched on. When the motor is running, the function can be switched over manually via key T6 .

The flap moves in 15 seconds into the set position.

Function when automatic control is switched on (T5  on):

Recirculation mode, if:

- no manual operation in the last 10 minutes AND
- ambient temperature > 35°C OR
- room above 4K too warm

Fresh air operation, if:

- no manual operation during the last 10 minutes AND
- ambient temperature < 33 °C AND
- room too cold

4.5. Additional key functions

4.5.1. Temperature request

T1  T2  press simultaneously:

Pressing the key combination in the basic state (setpoint display), switches to the display of the room temperature. Pressing the key combination again during the room temperature display, switches to the outdoor temperature display. The temperature display first shows 1 second "in" (room temperature) or "out" (outside temperature), then for 10 seconds the appropriate temperature.

4.5.2. Switchover unit °C / °F

Press T7  T8  simultaneously for 4 seconds:

Switching over the temperature unit immediately causes the setpoint and temperature to be displayed in the selected unit.

The internal processing of the setpoint value continues in Celsius degree steps. This is why the Fahrenheit display usually jumps by 2 digits when adjusting the setpoint.

4.5.3. Contrast LCD

Press T1  T8  simultaneously:

Pressing the key combination switches the contrast of the LCD display up one level. When the highest level 7 is reached, the display switches back to minimum contrast. The factory setting is level 4.

4.6. Background functions

The background functions run automatically without operator intervention.

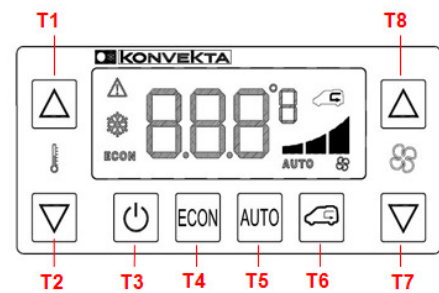
4.6.1. Procedures for switching on the power supply (KL15) ignition

After switching on the power supply, "314" is displayed for 1 second:

- Stored settings are accepted:
 - Setpoint temperature
 - Operating status Auto/blower level or OFF
 - Contrast LCD
 - Temperature display mode Celsius/Fahrenheit
 - Blower 3- or 4-stage
- Evaluation of the supply voltage 12/24V. The distinction threshold is 15.8V. The lighting brightness is thereby adapted to the on-board voltage.

4.6.2. Operations when the motor is switched on/off (release D+/climate)

- When the motor is switched on, the auto/blower stage state is taken over from the last setting. If no data is available (e.g. initial switch-on), the Auto function is activated.
- When the motor is switched off, the blowers are switched back to stage 1 if the blower or auto function is active. The flap moves to recirculation position. In addition, the setting values are stored, if the data has been changed:
 - Setpoint temperature
 - Operating status Auto/blower level or OFF
 - Contrast LCD
 - Temperature display mode Celsius/Fahrenheit
 - Blower 3- or 4-stage

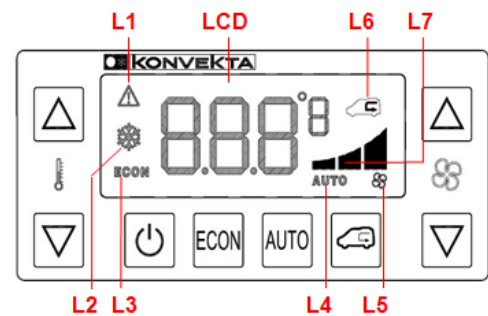


 **Attention!** Setting data is only saved if the engine or D+ is ON!

4.6.3. Automatic blower configuration

The climate control can be operated with 3- or 4-stage units. The configuration is automatically detected when the fans are switched on for the first time and saved when the motor is switched off.

5. Error handling diagnosis



During operation, the indoor temperature sensor is monitored for cable break and short circuit, the outdoor temperature sensor for short circuit.

If an error occurs, the symbol L1 (⚠) is displayed in the LCD.

When interrogating the temperature values, the character sequence "0-" is displayed in the case of a short circuit, a cable break by "-0".

If the outdoor sensor is missing, "-84°C" is shown in the display.

If a fault is detected in the interior sensor, the replacement value of 22°C is used in the temperature control and fan automatic. This allows emergency operation of the air-conditioning system by adjusting the setpoint. At the setpoint setting ≤ 20°C the cooling mode is started. In the automatic blower and recirculating air mode (AUTO) stage 2 or higher is activated. In the manual blower adjustment mode the stages 1 to max. 3 or 4 can be selected. The air-conditioning system is monitored after the compressor is switched on.

When a fault occurs (high or low pressure), the compressor and the condenser fans are switched off and remain locked until the ignition is switched off. The error is also indicated by the symbol L1 (⚠) in the LCD.

6. Maintenance / Service

Please arrange regular dates for maintenance works and services with a KONVEKTA service station, as indicated in maintenance schedule bus no.: [WP07050618](#).

- Only qualified staff is allowed to carry out these works! -

For general instructions on repair- and maintenance works please contact via email:

TKD@konvekta.com



Danger of accidents!

Qualified staff in charge of installation and maintenance have to be trained in accordance with EN 378-Part 4 and (EC) No.307/2008 and must strictly follow the legal provisions.

Any works or modifications at the air conditioner which are carried out improperly can lead to malfunction and so endanger operational reliability. We recommend having all works and modifications carried out at an authorized **KONVEKTA** Service Station. Before carrying out any maintenance works at your air conditioning unit, carefully read the KONVEKTA safety provisions (TD00052A①) in order to avoid any dangers and accidents!

① On our website www.konvekta.com in category >service< you will find a survey of contact details of all our service partners close to your location.

② Source of supply: **KONVEKTA AG**, P.O. Box 2280, D-34607 Schwalmstadt

6.1. Compressor type K VX

The First oil change at the first maintenance of the vehicle and then approx. every 3 years. At every oil change the oil suction strainer has to be cleaned. Observe the oil quantity according to the compressor type.

6.2. Return air grid

Clean the return air grid in the passenger area monthly, **in case of enormous dirt weekly.**

6.3. Condenser coil

The condenser coil fins have to be cleaned with compressed air at least **once a year**, in case of **severe soiling more often**.

 **Note:** Always keep condenser coil fins clean. Severe soiling cause's excess pressure within the a/c-unit system and it automatically stops working.

6.4. Troubleshooting



Only qualified staff is allowed to carry out these works!

Trouble	Cause	Repair <i>only by refrigeration expert</i> ^①
a/c is not running	magnetic clutch / compressor is not switched on	– check inside temperature, adjust new if necessary ^② – check connections at magnetic clutch
	electric connections disconnected	– check electric connections at switchboard
	relay defective	– check relay
	defrost thermostat has switched off	– check evaporator blower, replace if necessary
	outside temperature too low (possible icing of evaporator)	– switch on "ventilation" only ^②
	evaporator coil dirty	– clean evaporator coil with compressed air
	compressor does not compress	– check high and low pressure, replace compressor if necessary
	excess pressure (pressure too high)	– check axial fans – check fuses at switchboard – clean condenser coil with compressed air
	excess pressure caused by high outside temperature	– run unit until pressure has stabilized ^②
	leakage in a/c unit, lack of refrigerant	– check a/c unit for leakages, – refill refrigerant
	low pressure, dryer clogged	– replace dryer
	low pressure, screen of expansion valve clogged	– clean screen; replace dryer
Loud noise at compressor	defective bearing at compressor	– replace either bearing or entire compressor
	slack V-belt	– check V-belt at compressor drive

^① On our website www.konvekta.com in category >service< you will find a survey of contact details of all our service partners close to your location.

^② By user

7. Warranty Conditions

The current „General Warranty Conditions KONVEKTA AG“ will apply. A copy will be furnished by the warranty department. Please contact gwl@konvekta.com.

8. Waste disposal in accordance with legal provisions

After the phase of use the last proprietor is responsible for the adequate waste management. The environmental regulations in the exporting country must be observed.

The following list contains the most important regulating literature, valid for the *Federal Rep. of Germany*:

- Resolution for dangerous substances
- Law for waste circulation (KRW/AfgG))
- Resolution for the proofs of utilization and removal
- Criminal Code (StGB) 28th section „criminal acts against the environment” §326 - Environment jeopardizing waste management
- Law of chemicals § 27 - penal prescriptions
- Resolution for used oil
- Law of water balance
- Resolution for the waste management of old cars and the adaptation of road prescriptions
- Resolution (EC) No. 2037/2000 of the European Parliament and of the Council for materials that affect the ozone layer
- Resolution to prohibit certain ozone destroying halogen hydrocarbons.

The used refrigerant endangers the environment. When dealing with refrigerants the existing prescriptions and regulations are to be followed. **Only qualified staff is allowed to carry out these works!**

Water endangering substances - acc. to §§19g-19l - are solid, liquid, and gaseous substances. e.g.: mineral and tar oils (cooling oils), halogen containing organic combinations (refrigerants).

- © Source of supply:
- Bundesanzeiger
 - Beuth Verlag
 - dtv (Deutscher Taschenbuch Verlag)

9. History of modification

Version	Date	Name	Remark	File
A00	13.02.2019	B. Keßler	Source file	BAKL40T12AL