Technical leadership starts with ideas.

Operating Instruction

for KONVEKTA Air Conditioning unit

KL30 / KL30T

with control K5

Versions:

- **12 / 24 Volt DC**
- **Recirculated Air**
- **Fresh Air**
- **Heating**

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ID#: BBA-KL30T12AB
Version: A02

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Contents

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- 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].

[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 a/c-units type:

- **KL30/12V**
- **KL30T/12V**
- **KL30/24V**
- **KL30T/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 notice. Guarantee and liability conditions of **KONVEKTA AG**'s general business conditions are not enlarged by the above notes.

Manufacturer: **KONVEKTA AG, P.O. Box 2280, D-34607 Schwalmstadt**

1. Technical data

Important!

In vehicles that are equipped with an a/c unit with heating function the heating medium has to consist of water/glycol – antifreeze protection (conform the mixing ratio to manufacturers` instructions). This is absolutely necessary to prevent the heaters from frost damage!
(The prevalent antifreeze filling of the vehicle manufacturers goes down to -40°C)

Type:		KL30	KL30T
Refrigerant		R134a	
GWP		1.430	
-- quantity	[kgs] *approx.*	1,4	1,5
Operating voltage *resp.*	[Volt DC]	12 24	12 24
Current consumption: (three-stage) at 13V: (three-stage) at 26V:	[Ampere]	 44 22	 58 29
Cooling capacity with SD7H15	[Watt]	10.000	10.000
Heating capacity Q= 80	[Watt]	15.000	15.000
Evaporator – Air volume*, *free-blowing*	[m^3/h] three-stage	 2.000	 2.000
Measurements:			
- length	[mm]	2.192	2.192
- width	[mm]	886	886
- **hight,** - **depending on roof radius**	[mm]	169 160 – 169	169 160 – 169
Weight of unit, Version:			
- **Recirculated Air**	[kgs] *approx.*	44	46
- **Fresh Air**	[kgs] *approx.*	45	47
- **Heating**	[kgs] *approx.*	46	48

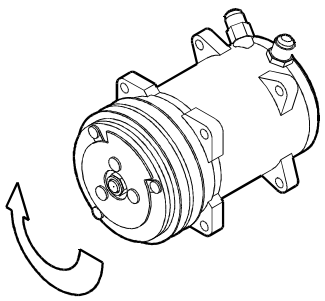
* with standard fans and/or blowers

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!

⇨ **Compressor type depending on scope of delivery, see identification plate at compressor.**

Compressor Type	SD7H15
Weight (kgs) approx.[1)]	7,5
Oil brand - quantity (liter)	PAG/ depending on version[3)]
Magnetic clutch[2)]	24V DC



Attention for SD7H15:
only clockwise rotation

[1)] Weight without Electro-magnetic clutch (with clutch app. + 10kgs).
[2)] ø depending on vehicle type
[3)] List is attached to compressor, (Instruction no: TD00031A)

2. Intended use

The **KONVEKTA** air conditioning unit is an air conditioning system that works with the ozone friendly refrigerant R134a 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 instructions as well as the proof of regular inspections.

3. 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 a/c unit is damaged, switch it off immediately.** To avoid further damage have it check at a KONVEKTA Service Station[①]. Only after that you can take unit into operation.

[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*

3.1. 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 cupper- and aluminium components can not be ruled out. The cupper- 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.

4. Introduction control K5

The air conditioning control **K5** is a control and regulation device for air conditioners in modern buses. The bus driver is relieved from all questions of an optimum air conditioning in the passengers' compartment by a simple and clear handling.
All functions of the a/c unit are adjustable by different key-buttons. Every button has an indicating lamp, called ***LED*** used as a control function of the buttons or in case of operating. Control board **K5** is connected onto the original dash board lightning of the vehicle. This means that in case of running vehicle lamp, night lightning of control board is also activated.

Auto-test

After activation the control unit performs an auto-test which lasts 20 seconds. Only after finishing this test the control outputs of the unit are unblocked.
Afterwards the adjusted temperature is indicated.

5. Operation

Danger of accidents!

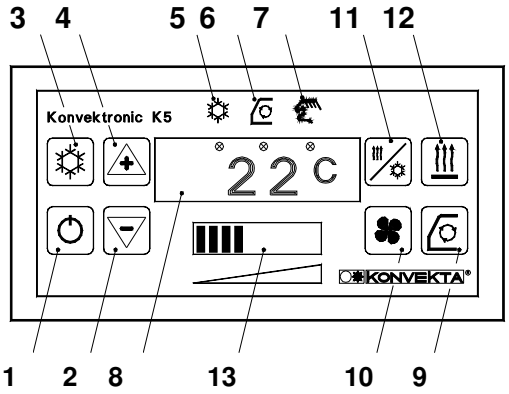
- Focussing your attention on the road traffic is of top priority
- Only operate your air conditioning unit when the traffic situation allows it
- Make sure you can clearly recognize and read all operation- and display-elements at any time
- Protect all displays against irritating sun glare and any other 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

5.1. Operation panel / function of the keys

Note:

After the switching on the control is adjusted to the set value stored before it was switched off.

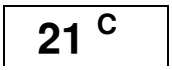
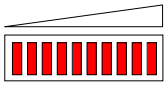
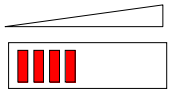
1	Key for switching the control ON/OFF.
2	Key for reduction of the selected temperature setting, Alternatively: Manual adjustment „slow speed“.
3	Key for switching ON/OFF the a/c operation.
4	Key for increasing the desired room temperature setting,aufwärts; alternatively: Manual adjustment "high speed“
5	LED lamp indicates that a/c operation is activated.
6	LED lamp indicates that circulated air function is activated.
7	LED lamp indiactes that a manual set-up was effected.
8	4-digit seven-segmental display for indication of the selected room temperature (°Celsius or °Fahrenheit); Alternatively: Error code indication in case of trouble.
9	Key for switch-over fresh air- / circulated air operation.
10	Shift-key fan speed manual / automatic
11	Key for switching the REHEAT-operation ON/OFF.
12	Shift-key heating operation manual / automatic.
13	Illuminated display indicates the fan speed (in 10%- steps), Alternatively: Indication of the heating valve position.



5.2. A/C operation ON / OFF

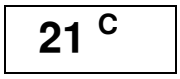
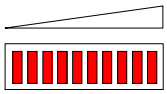
Start vehicle engine *(refer to orig. operating instruction of the vehicle).* **Note:** If only the vehicle ignition was switched on without starting the vehicle engine, the blower speed will be reduced to the lowest level after 10 min. in order to prevent a considerable discharge of the vehicle battery.	
Software- and control unit number is indicated for 5sec.	**0 - 2 F**
Switch **ON** control: ***NOTE:*** *After activation the control unit performs an auto-test which lasts 20 seconds. Only after finishing this test the control outputs of the unit are unblocked.*	*press key*
The last selected desired temperature, e.g. B. 28°C is indicated:	**28 C**
Switch ON a/c operation: By pressing key you can select the desired temperature downwards (e.g. from 28°C up to 21°C = press 7 times) The new set-value will be shown in the display: *The a/c operation is activated since the room temperature exceeds the set-value by 7K. The blower speed is 100%, since the difference between room temperature and set value exceeds 3K.* *In case the room temperature and set value are roughly equal the blower speed will be reduced and after the room temperature and set value have reached the same level the evaporator blowers will operate at the lowest possible speed.*	*press key,* • LED lights up , a/c operation activated adjusted temperature e.g.: **28 C** is indicated. *press key 7xtimes* new set-value: **21 C** will be indicated and stored after 5sec.
Switch Off a/c operation:	*press key*, LED • goes out, a/c operation is switched OFF

5.2.1. Manual adjustment of the blower speed

The set value will be indicated in the display.	e.g. 21 °C: 
The blower speed will be indicated by an illuminated display.	e.g. speed 100%: 
Push shift-key „fan speed manual/automatic“:	*Press key*  :  • LED „*manual adjustment*“ is lighting up
Reduction of the blower speed:	e.g. press 6 times :   new fan speed will be indicated: – After 5 sec. the new fan speed will be stored. – The new fan speed will be indicated. **The automatic blower speed is deactivated.**
Note: By pressing again the fan key the automatic operation will be reactivated. The fan speed is regulated depending on the difference between the existing and set value.	*press key*  :  • **LED „manual adjustment“ goes out. Automatic blower speed is activated**.

5.3. Heating operation fully automatic→only in case of a/c units with heating option

– Basis: Actual existing room temperature of 10 °C

Desired temperature is indicated:	e.g. 21 °C: 
Blower speed actually 100%, will be indicated with an illuminated display.	e.g. speed 100%: 

Heating operation is activated since the room temperature is 11K below the set value. The evaporator blower operates with the lowest possible speed. The blower speed will be increased since the room temperature is more than 3 K below the set value. A requirement therefore is that the air outlet temperature is higher than the set value. When room temperature and set value reach roughly the same level the fan speed will be reduced. After room temperature and set value have reached exactly the same level the evaporator blower will operate at the lowest possible speed. The heating valve is 100% opened. When room temperature and set value reach roughly the same level the heating valve will be cycle timed - see *PID- performance*. The air outlet temperature will be constantly kept at the level necessary to achieve the preselected set value.

5.3.1. Manual heating operation→*only in case of a/c units with heating option*

Press shift-key heating operation:	*press key* , • **LED** *„manual Adjustment“* ***is lighting up***
„H“ for manual adjustment of the heating valve will be indicated in the display.	**H**
The valve control will be indicated by an illuminated display.	display 100%:
Reduction of the heating valve adjustment: – heating valve adjustment 30% will be indicated and after 5 sec. the new value will be stored. – Automatic heating is deactivated.	e.g. *press key 7 times*: : New heating valve adjustment 30% will be indicated:
Note: By pressing again the heating key the automatic operation will be reactivated. The heating valve will be switched on/off automatically depending on the difference between existing value and set value.	*press key* : • **LED** *„manual Adjustment“* **goes out** **Automatic heating is activated**.

5.4. REHEAT activate / stop→only for in case of a/c units with heating option

Note:

In the REHEAT- operation the compressor is constantly operating in order to dehumidify the air. If required the heating is switched on by the control panel in order to prevent that the selected room temperature changes.

REHEAT- operation is restricted to max. 10 min. After 10 min. the REHEAT operation is stopped by the control panel.. **REHEAT** will be activated for a period of 10 minutes.

Activate REHEAT operation	*press key* , REHEAT -operation is activated
„rH“ will be indicated in the display:	**rH**
Blower speed 100% will be indicated with an illuminated display.	blowerspeed 100%:
REHEAT Betrieb deaktivieren	*press again* , REHEAT - operation is deactivated
Set temperature value will be indicated	e.g.21 °C: **21 C**
Blower speed of actually 60% will be indicated with an illuminated display.	e.g. blower speed 60%:

5.5. Switch Recirc. air operation→only in case of a/c units with Rec. air flaps option

In case of recirculated air operation, the income of fresh air is interrupted and the air inside the vehicle is going to be circulated which avoids that outside air, possibly dirty because of exhaust fumes (tunnel driving) has a chance to penetrate into interior room of the vehicle.
If windows are misting up, return air operation should be switched off:

Switch over from circulated air operation to fresh air operation: ***NOTE:*** If key  is pressed again the fresh air flap will be **reactivated** and circulated air operation re-started (LED-display will light up).	 • LED light up, recirculated air operation is active *Press key*  ,  • LED is not lighting, fresh air operation re-started

☐ **Note:** After the switching on the control is adjusted to the set value stored before it was switched off.

5.6. Change over of the temperture indication to ° Fahrenheit

Switch over: **Note:** By pressing the „-“and „circulated air“-key the temperature indication switches over to *Celsius* again.	 *press constantly, afterwards press the key* Preselected set temperature value will be indicated in ° Fahrenheit. **5 0 F**

6. Maintenance / Servicing

Maintenance and service works have to be done in accordance with the *“Maintenance Schedule Bus, Item 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[①].
Before carrying out any maintenance works at your air conditioning unit, carefully read the KONVKETA safety provisions (TD00052A[②]) 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.

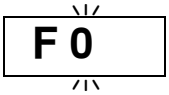
② Source of supply: **KONVEKTA AG**, P.O. Box 2280, D-34607 Schwalmstadt

6.1. Trouble indication in the display

ATTENTION:
In case of trouble indication in the display (*F0* resp. *F1*) the control panel is not ready for operation. Operation of the a/c system only after verification by qualified a ***KONVEKTA***-Service- Station[①]**.**

6.1.1. Trouble at the temperature sensor F0 (room sensor, blue):

A trouble at the room temperature sensor will be indicated by a flashing display.



The control panel is not ready for operation. Only after the fault-finding and removal (for ex. cable rupture, short-circuit, sensor not connected) the control panel can be operated again.

6.1.2. Trouble at the temperature sensor F1 (air outlet, yellow):

A trouble at the air outlet temperature sensor will be indicated by a flashing display.

The control panel is not ready for operation. Only after the fault-finding and removal (for ex. cable rupture, short-circuit, sensor not connected) the control panel can be operated again.

6.2. Troubleshooting

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

Trouble	**Cause**	**Repair - *only by refrigeration expert*** [①]
A/c is not running	Thermostat is open	- Check inside temperature[②] - Reset the thermostat
	Electric wiring disconnected	- Check electric connections at switchboard
	Relay defective	- Check relay
	Defrost thermostat is switched off	- Check evaporator fan if not in operation it may need to be replaced
	Outside temperature is too low (vaporiser may be iced over)	- Switch on the ventilation only[②]
	Evaporator coil dirty	- Clean evaporator coil with compressed air
	Magnetic clutch	- Check connections at magnetic clutch
	Compressor does not compress	- Check pressure at suction and discharge side replace compressor, if necessary
	Excess pressure	- Check if the ring fans are running - Check the safety automatic on the panel and press in - Clean the condenser blades[②]
	High pressure due to high outside temperature	– Let the unit run until the pressure is stabilised[②]
	Leak in the unit, lack of coolant	- Check unit for leaks - Refill refrigerant
	Drier is blocked – low pressure	- Replace drier
	Thermo - exp valve filter is blocked	– Clean filter and renew drier
Strong noise at compressor	Defect bearing on compressor.	- Replace bearing or complete compressor only
	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).

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[3] Source of supply:
- Bundesanzeiger
- Beuth Verlag
- dtv (Deutscher Taschenbuch Verlag

9. History of modification

Version	Date	Name	Remark	File
A00	16.04.2008	B. Keßler	Source file	BAKL30T12AB
A01	19.10.2016	B. Keßler	File completely updated	BAKL30T12AB
A02	28.02.2017	B. Keßler	Information on the operating instructions and technical data expanded with F-gas-regulation	BAKL30T12AB