



KONVEKTA

Thermo Systems

Operating Instruction

for KONVEKTA

air conditioning unit

KL40T



with control KS60/12V

Version:

- 12 Volt DC
- I-circuit
- Recirculated Air / Fresh Air
- Heating

ID#: BBA-KL40T12AI
Version: A01

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- Maintenance Schedule [WVP07050618](#)
- Wirung diagram no. BK1-400-065

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.

It contains:

- Operating instructions
- Safety information 
- Service information

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 unadmitted fuels or the non-observance of safety provisions.

KONVEKTA will annul without prenotice 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 air conditioning unit's type:

- **KL40T / 12V**

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 corresponds to the security prescriptions of the EC # 89/392/EWG i.d.F. 91/368/EWG and 93/44/EWG.

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.

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

I. 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)

1.1. Air conditioning unit

Type		KL40T
Refrigerant		R134a
- quantity approx.	lbs [kg]	5,5 [2,5]
- quantity approx. with FB	lbs [kg]	7,3 [3,3]
Operating voltage	Volt DC	12
Current consumption	Ampere	88
Cooling capacity with K VX40	BTU/h [Watt]	61.473 [18.000]
Cooling capacity with K VX30 or TM3 I	BTU/h [Watt]	51.228 [15.000]
Cooling capacity with TM2 I	BTU/h [Watt]	40.982 [12.000]
Heating capacity Q=100	BTU/h [Watt]	85.379 [25.000]
Air volume @ 0 static pressure	[CFM] [m ³ /h]	2.350 [4.000]
Measurements:		
- length	inch [mm]	77,4 [1.966]
- width	inch [mm]	53,9 [1.368]
- height	inch [mm]	8,7 [221]
- weight	lbs [kg]	152,1 [69]

Type of switch	Part no	Switch-off pressure	Switch-on pressure
Low pressure	H11-001-357	0.3 ± 0.1 bar off	2.1 ± 0.2 bar on
Excess pressure	H11-001-358	25.5 ± 0.5 bar off	18.0 ± 0.5 bar on

1.2. 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.

Kompressor Typ	KVX40/390	KVX30/325	HDC 33	TM21
Weight (kgs) approx. [IBS]	33 [72,8]	24,5 [54]	15,5 [34,2]	9,7 [21,4]
Oil brand	Esteröl SE55	Esteröl SE55	ZXL 100PG	ZXL 100PG
- quantity (kgs) [IBS]	2 [4,4]	2 [4,4]	0,5 [1,1]	0,18 [0,4]
Magnetic clutch ¹⁾	12 / 24V DC	12 / 24V DC	12 / 24V DC	12 / 24V DC
- Weight (kgs) [IBS]	12 [26,5]	7,6 [16,8]		

1) ∅ depending on vehicle type

2. Intended use

The **KONVEKTA** air conditioning unit is 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 instructions as well as the proof of regular inspections.

3. General information 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.

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 copper- and aluminium components can not 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.

^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.

4. Operation with control KS60



Attention! Please note DIP-Code 09! See instruction TD00382A

4.1. General information

The air conditioning control **KS60** 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. LED is shining red if button is pressed or if unit is in operation. Control board KS60 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 (LED green) is also activated.

Note:

We recommend driving with automatic mechanism (*Key S5, see 0*). Additionally to the automatic the following functions can be activated:

- a) **Recirculated – Fresh Air operation** – close flap manually, in order to prevent the entrance of exhaust fumes (in tunnels)
- b) **REHEAT**-function to dehydrate the steamed up wind shield

Auto-test

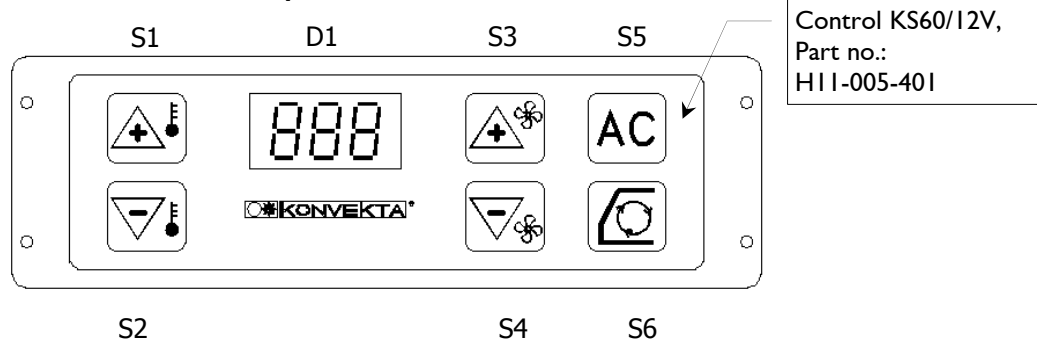
If voltage supply to unit is interrupted, unit starts a self test immediately after reset. All in- and outlets are checked. After self-test, actual temperature can be read on display (if ignition is ON), *or...* if ignition is OFF an LED flashes on display.



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.

4.2. Operation panel / function of the keys



	Short.	Function
	D1	3-figure display
	S1	required room temperature can be adjusted (increase) 59 to 82.4°F
	S2	required room temperature can be adjusted (decrease) 59 to 82.4°F
	S3	required air volume can be adjusted (increase), step 1 or 2 -manually
	S4	required air volume can be adjusted (decrease), step 1 or 2 -manually
	S5	A/C automatic (A/C ON/OFF)
	S6	Recirculated Air operation Close resp. open Recirculated air flap; In case of closed recirculated air flap , LED inside key button is indicating .

4.3. Storing of functions

If **ignition** is turned **off**, the following data will be stored always:

- AUTO – function
- Desired temperature

4.4. Operation of a/c system

- Start vehicle engine (refer to orig. operating instruction of the vehicle).
- The air conditioner is activated by means of key S5  „a/c automatic“, LED inside key button is indicated. Pressing key S5  again, air conditioner switched off. The blowers are regulated automatically.
- With key S3  or S4  the required air volume can be adjusted manual.



ATTENTION:

In case of trouble in the a/c cooling circuit the LED-display (key S5 , see 5.3) is lighting up. Operation of the a/c system only after verification by qualified a **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.

4.5. Adjustment of temperature

If a/c-unit is operating, vehicle inside temperature can be adjust with key S1  or S2 , in a range of 59°F up to 82.4°F. In case of operating key (+) or (-), temperature can be increased or reduced. The actual temperature can be read on display.

4.6. Recirc. Air operation

In case of recirculated air operation (key S6  activated), 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.

Starting of the recirculated air operation: Press key S6 , the LED-display will light up.

This position should not be adjusted very long. If windows are misting up, return air operation should be switched off:

If key S6 is pressed again the return air flap will be **reactivated** and fresh air operation restarted. The LED-display will **go out**.

Automatic In case of a temperature difference of more than 5°C between the set temperature (adjusted value) to the existing temperature the return air flaps switch to recirculated air operation

Manual If the button S6 is pressed, the recirculated air function of the return air flaps will be maintained independently from a temperature difference

4.7. REHEAT activate / stop

Switching on of the air-conditioning system via button **S5**  afterwards the key **S5**  will be pressed shortly twice (double click). **REHEAT** will be activated for a period of 20 minutes, the **LED-display will light up at the same time.**

- ⇒ Operation of the blowers at the highest speed level by key **S3**  (increase of the air flow output)
- ⇒ Recirculated air operation must be switched off.

The premature termination of the **REHEAT** is possible by double-pressing the key **S5** .

4.8. Display of air duct temperature

While pressing buttons **S1**  and **S6**  actual air duct temperature is displayed for 2 seconds.

4.9. Indicate outside temperature => only in case of a/c units with heating option

While pressing buttons **S1**  and **S4**  actual outside temperature is displayed for 2 seconds.

5. Maintenance / Servicing

Please arrange regular dates for maintenance works and services with a KONVEKTA service station, as indicated in maintenance schedule bus no. [VVP07050618](#).

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.

- 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 (EG) 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 KONVEKTA 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

5.1. Return air grid

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



Important:

- If the filter is soiled, the cooling performance of the air conditioner will decrease.
In case the a/c unit will be operated continuously with dirty filter, the evaporator blowers and cooling compressor will be damaged
- **It is not allowed to operate the air conditioner without filter.**
- **If filter is defective, filter must replace!**

5.2. Condenser coil

Always keep condenser coil fins clean. Severe soiling causes excess pressure within the a/c-unit system and it automatically stops working.

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

5.3. 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 LED  flashes up	thermostat open	- check inside temperature - re-adjust thermostat	② ②
	electric connections disconnected	check electric connections at switchboard	①
	relay defective	check relay, replace if necessary	①
	defrost thermostat has switched off	check evaporator blower, replace if necessary	①
	outside temperature too low (possible icing of evaporator)	switch on "ventilation" only	②
	evaporator coil dirty	clean evaporator coil with compressed air	①
	excess pressure (pressure too high)	- check axial fans - check fuses at switchboard - clean condenser coil with compressed air	① ① ①
	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, re fill refrigerant	①
	low pressure, dryer clogged	replace dryer	①
	low pressure, screen of expansion valve clogged	clean screen; replace dryer	①
	magnetic clutch	check connections at magnetic clutch	①
	compressor does not compress	check high and low pressure, replace compressor if necessary	①
Loud noise at compressor	defective bearing at compressor	replace either bearing or entire compressor	①
	slack V-belt	check V-belt at compressor drive	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

② = By user

6. 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

7. Adequate waste management

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 (EWC) No.3093/94 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 skilled personnel are 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)

8. History of modification

version	date	name	remark	file
A00	17.11.2011	B. Keßler	Source file	BAKL40T12AI
A01	12.01.2012	B. Keßler	Added notice safety instructions on page 3.	BAKL40T12AI

KONVEKTA Thermo Systems		Maintenance Schedule		WP 07 05 06 18 Page 1 of 2				
Title:		Maintenance Schedule Bus – HLK- total system		Date: 11.11.2009				
Valid for:		Maintenance staff		file: WPP07050618-R02 Wartung Bus englisch				
Item:	Maintenance- / Repair Features	Test parameter / settings	Comments	Maintenance Intervals				
WK				A	B	C	D	E
1.	Check refrigerant status of the conditioning system (at sight glass)				X	X	X	X
2.	Check oil filling of compressor (at sight glass)		After 10 min. running time the oil level should be visible in the sight glass		X	X	X	X
3.	Check function of high pressure switch (HP)	OFF: 25.0 bar (+/-0,5) / ON: 18.0 bar (+0,5/-0,5) OFF: 25,0 bar (+0/-1,2) / ON: 20,0 bar (+0,6/-0,6)	Only for EvoBus with Wabco-control				X	X
4.	Check function of low pressure switch (LP)	OFF: 0,3 bar (+/-0,1) / ON: 2,1 bar (+/-0,2) OFF: 0,2 bar (+0,1/-0,2) / ON: 0,4 bar	Only for EvoBus with Wabco-control				X	X
5.	Exchange filter drier		And after every intervention in the refrigeration circuit				X	X
6.	Check if condenser and evaporator battery are dirty, if necessary clean them	With compressed air only, not with high-pressure cleaner!				X	X	X
7.	Check refrigerant receiver	Visual inspection	Exchange in case of corrosion and mechanical damage				X	X
8.	Check all air filters for fouling, if necessary renew them			X	X	X	X	X
9.	Check function of air flaps						X	X
10.	Check function of all condenser fans				X	X	X	X
11.	Check function of all evaporator blowers				X	X	X	X
12.	Check all condensate drains		Lip valves should be in stock				X	X
13.	Check all air-conditioning conduits for fit and impermeability	system pressure of 15 bar	Do not use any contrast medium				X	X
14.	Check all heating conduits for fit and impermeability						X	X
15.	Check all water valves for function and impermeability						X	X

Item:	Maintenance- / Repair Features	Test parameter / settings	Comments	Maintenance Intervals				
WK				A	B	C	D	E
16.	Exchange oil filling of compressor	Oil type: Triton SE 55	Amount: KV4-KV6: 2,5 liters KVX40, 2.0 I / KVX50: 2,6 liters					X
17.	Check screwed connections at compressor and bracket on tight fit				X	X	X	X
18.	Check condition of v-belt at compressor				X	X	X	X
19.	Check tension of v-belt at compressor				X	X	X	X
20.	Check all temperature sensors for function and fit						X	X
21.	Check electrical connections and the fuses					X	X	X
22.	Check Heating capacity	max. heat					X	X
23.	Check Cooling capacity	max. cooling					X	X
	Maintenance Intervals for countries with a moderate climate	Maintenance Intervals for countries with a hot climate (countries with temperatures predominantly >40°C)	Maintenance Intervals for tropical countries with predominantly high humidity					
A	Monthly maintenance works	maintenance works every two weeks	Monthly maintenance works					
B	----	maintenance works every three months	maintenance works every three months					
C	Half-yearly maintenance works	Half-yearly maintenance works	Half-yearly maintenance works					
D	Yearly maintenance works	Yearly maintenance works	Yearly maintenance works					
E	maintenance works every 3 years	every 3 years or every 5000 hours of operation	every 3 years or every 5000 hours of operation					

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T. Vierheilig (TKD)	P. Peterser-Ross (PM3)	B. Kern (TKD)	R02
Date, Signature	Date, Signature	Date, Signature	Replaces Version: R01 of: 01.06.2006