



Technical leadership starts with ideas.

Operating Instruction

for KONVEKTA

Air Conditioning unit

KL40T / KL45T / KL46T



with control KS140

Versions:

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

ID#: BBBA-KL40T12AC

Version: A05

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

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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.

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 a/c-units type:

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

Die Maschine entspricht der EG-Maschinenrichtlinie 2006/42/EG.

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.

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

1. Technical data air conditioning unit



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:		KL40T	KL45T	KL46T
Refrigerant		R134a		
GWP		1.430		
- quantity with front box	[kgs] approx.	2,5	2,5	2,5
		3,3	3,3	3,3
Operating voltage	[Volt DC]	12	12	12
		24	24	24
Current consumption (3-stage) at 13V: (3-stage) at 26V: (stageless) at 26V	[Ampere]	88	88	88
		44	44	44
		53	53	53
Cooling capacity with K VX40 K VX30 or TM31 TM21	[Watt]	18.000	18.000	21.000
		15.000.	15.000.	-
		12.000	12.000	-
Heating capacity Q= 100	[Watt]	25.000	25.000	25.000
Evaporator – Air volume*, free-blowing	[m³/h] 3-stage stageless	4.000	4.000	4.000
		4.400	4.400	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	234	239
		188	188	193
Weight of unit, Version:				
- Recirculated Air	[kgs] approx.	65,5	78,5	81
- Fresh Air	[kgs] approx.	66,5	79,5	82
- Heating	[kgs] approx.	69	82	84

* 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.

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

¹⁾ ø depending on vehicle type

2. Determined 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.

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 life-time 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.

3.2. General Information air condition control KS140

Auto-test

In case the power supply to the device has been interrupted, the device will automatically conduct an auto test after power supply has been restored. In the course of the test, all inputs and outputs will be checked. Whenever individual air condition components (water valves, sensors, etc.) have been replaced, an auto test needs to be conducted in order to calibrate the control device accordingly.

Process of auto test will be show at the display:

- Code of auto-test (S-Code)	01, 02... etc.
- Indication of all LED's and display indication:	8888
- Indication of control type:	1400
- Indication of software version (resp.):	00 01
	Configuration Softwareversion

3.2.1. Data saved with Ignition Off

When the ignition is switched off, the following preset parameters will be preserved:

- 01- Preset required room temperature
- 03- Automatic operation mode (on or off)

3.2.2. Adjustable Temperature Range

The air condition control serves to control cabin temperature according to the required temperature preset with the Cabin Control Element within the range from 18°C to 25°C.

3.2.3. Interruption of Power Supply

When power supply is interrupted due to an empty or disconnected battery, all user-set parameters (time, comfortable temperature, preset times) will be deleted and need to be set again after power supply has been restored.

After power supply has been restored, air condition control KS140 will conduct an [Auto Test](#) checking all functions of the air condition system and resetting the standard parameters (factory settings). This test will take approx. 2 min.

3.2.4. Operating Modes of Air Condition Control KS 140

The air condition control KS 140 can be operated in 3 different modes:

- Ignition off
- Ignition on, engine off
- Ignition on, engine on

Each operating mode allows different groups of functions to be adjusted and switched on or off:

Display with Ignition Off

When the ignition is switched off and the air condition control functions properly, the lower decimal dot on the display will flash.

Display with Ignition On (Engine On or Off)

When the ignition is switched on, the current time will be displayed.

4. 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 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 airconditioning unit

Note:

We recommend driving with automatic mechanism. Additionally to the automatic the following functions can be activated:

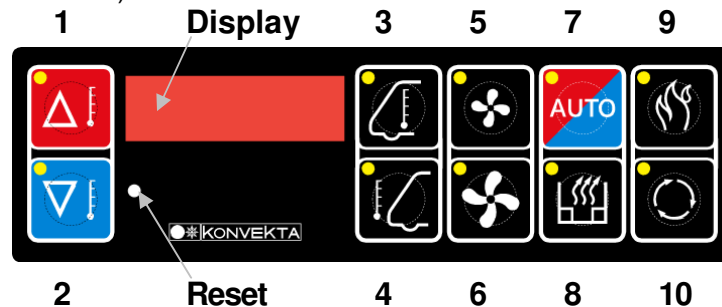
- a) **Return air-flap** manually, in order to prevent the entrance of exhaust fumes (in tunnels)
- b) **REHEAT**-function to deshydrate the steamed up wind shield (only for units with heating option)

All functions of the air conditioning system can be adjusted with buttons. Each of the buttons is equipped with a light emitting diode display (hereinafter called LED) so that its proper function (indicated by LED when pressing the button) and the selected air condition mode (indicated by LED when mode is activated) can be checked.

A display in the cabin control element serves to indicate various parameters (time, required temperature, time functions, etc.).

4.1. Operation panel / function of the keys

By pressing the button T1 or T2 1-time, the parameter is increased or decreased automatically by 1 step (since Version no. 5.0)



Button	Function
T1	to raise required roomtemperature (up to 25 °C).
T2	- call-up of Error Codes (ignition off) - to lower required roomtemperature (up to 18 °C).
T3	to check Actual roomtemperature.
T4	to check outside temperature
T5	for blower level 1 (Half Output).
T6	for blower level 2 (Full Output).
T7	- Automatic Mode On/Off - Double-click: Reheat function activated for 20 minutes
T8	Convectors On/Off.
T9	Additional/Independent Heating On/Off
T10	Circulating Air Mode On/Off
T1+T6	Indication of duct temperature
T1+T8	Indication of convector temperature

4.2. Control Functions with Ignition Off

4.2.1. Time Adjustment

The air condition control is equipped with a 24-hour, 7-day clock. To indicate operation of the clock, the lower decimal dot on the display will flash once every second.

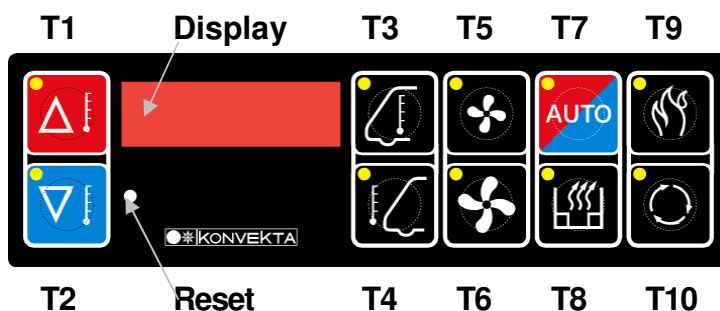
- When simultaneously pressing buttons T1 and T10, the adjustment mode for the time will appear. Subsequently adjust the time with buttons T1 or T2 while keeping button T10 pressed down. After approx. two seconds, the minutes will be run down or up. After 10 seconds, the control will switch to fast run-through.
- Press button T10 again to set the day of the week (1 = Monday, 2 = Tuesday 7 = Sunday).

If within 5 seconds no further input is made, time and day are stored.

When the time has been adjusted, the time and day display will disappear after two seconds, and the lower decimal dot on the display will flash.

➡ **The clock needs to be reset after power failure!**

➡ **The clock can only be set with the ignition switched off!**



4.2.2. Additional / Independent Heating Preset Time Adjustment

The air condition control is equipped with a timer for the additional/independent heating which can be programmed either for each day or for 1 to 7 days in advance. When the timer is active, the 4th decimal dot (first from left) on the display will flash.

The additional/independent heating will start operating at the preset time. Thus, cabin temperature will be adjusted to the preset required level and the engine will be pre-heated.

When simultaneously pressing buttons T1 and T9, the currently set time will be displayed in the following way:

0.07.2

- 1st digit : indicates day (0 = every day, 1 = Monday 7 = Sunday)
- 2nd + 3rd digits: indicate hour (in 24-hour mode)
- 4th digit : indicates minute (in 10-minute steps)

While keeping button T9 pressed down, adjust the required switch-on time with buttons T1 or T2, then switch from OFF to ON by pressing button T10 for approx. 2 seconds.

If within 5 seconds no further input is made, time and day are stored.

- ➔ **The switch-on time needs to be reset after power failure!**
- ➔ **The timer can only be set with the ignition switched off!**

4.3. Control Functions with Ignition On/Engine Off

4.3.1. Manual Operation of Additional/Independent Heating => only for units with heating option

Press button T9 to activate stand-by mode of independent heating and convectors. Stand-by mode is indicated by the corresponding LEDs. Press button T9 again to switch off independent heating and convectors.

4.3.2. Ventilation of Cabin (50% Blower Output)

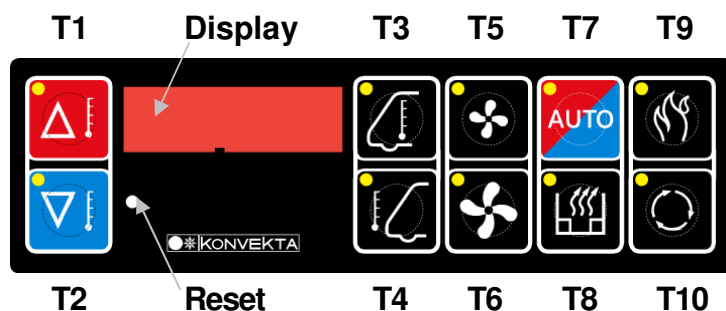
Press button T5 to switch on cabin ventilation. If ventilation is switched on, this will be indicated by the corresponding LED. Press button T5 again to switch off the ventilation.

- ➔ **With the engine off, maximum ventilation output will be 50% of full blower output!**

4.4. Control Functions with Ignition On/Engine On

4.4.1. Operation of Air Conditioning System in Fully Automatic Mode

The automatic operation mode allows a fully automatic operation of the air conditioning system without user intervention. The cabin temperature will be adjusted to the preset comfortable temperature. In automatic operation mode, the temperature will be set automatically to a comfortable 21 °C at all times, in both winter and summer operation. Heating or cooling functions will be switched on or off as required and the blower output will be adjusted to the required air volume.



By pressing button T7, the automatic operation mode will be switched on. Automatic operation mode of the air condition control will be indicated by the corresponding LED. During automatic operation the convectors will be switched to stand-by mode, too, which will also be indicated by the corresponding LED. Press button T7 again to switch off the automatic operation mode.

4.4.2. Operation in Reheat Mode => only for units with heating option

The air condition control is equipped with a re-heat function. This feature enables desiccation of the humid air gathering in the interior of the vehicle in winter

While the air condition system is in automatic operation mode, the re-heat mode can be activated by double-clicking button T7. When switched on, the LED of the automatic button will flash. By double-clicking button T7 again, the re-heat mode will be switched off, and the LED of the automatic button will stop flashing:

When in reheat mode, the following air condition components will be activated

- Compressor
- Condenser
- Evaporator blower automatically
- Circulating air vent of air condition will switch to circulating air mode

By activating the air condition compressor, the humid air in the interior of the vehicle will be desiccated, and then re-heated by the air condition heating.

➔ **Reheat mode will be switched off automatically after approx. 20 minutes**

➔ **This feature is only available with the extra equipment to be ordered separately!**

4.4.3. Adjustment of Comfortable Cabin Temperature

The comfortable temperature can be adjusted in the range between 18°C to 25°C by pressing buttons T1 or T2. The temperature currently set will be displayed during adjustment.

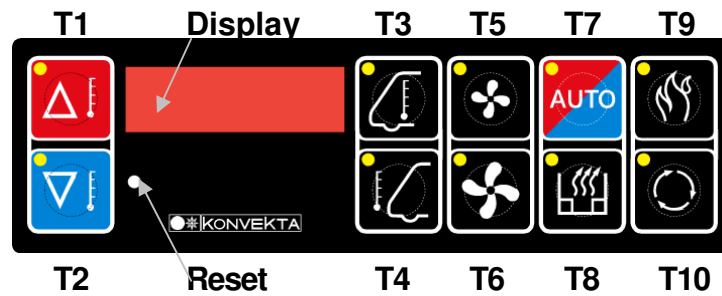
By pressing buttons T1 or T2 for a short time, the comfortable temperature which has been set can be checked on the display without altering it.

4.4.4. Display of room temperature

The current cabin temperature is displayed by pressing button T3, and indicated by the corresponding LED. By pressing button T3 again, the current cabin temperature will disappear from the display, and the time will be displayed.

4.4.5. Display of outside temperature

The current outside temperature is displayed by pressing button T4, and indicated by the corresponding LED. By pressing button T4 again, the current cabin temperature will disappear from the display, and the time will be displayed.



4.4.6. Manual Adjustment of Cabin Ventilation Output

When required, the cabin ventilation output can be increased or decreased manually by selecting 100% or 50% blower output with buttons T5 and T6. The selected function will be indicated by the corresponding LED.

Press button T5 to set ventilation output to half output, and button T6 to set it to full output. Press buttons again to switch off the corresponding function.

4.4.7. Manual Operation of Convectors

In automatic operation mode the convectors are controlled by the air condition control. When operating the air condition control manually or when in automatic operation mode, the convectors, whenever required, can be switched on or off permanently by pressing button T8. Stand-by/operation mode of the convectors is indicated by the corresponding LED.

4.4.8. Operation of Additional/Independent Heating

By pushing button T9, the independent heating will be switched on or off. When the independent heating is switched on, the convectors, in case they are not switched on, will be switched to stand-by mode, too. Operation of the independent heating is indicated by the corresponding LED.

4.4.9. Selection of Fresh Air/Circulating Air Mode for Cabin

The air conditioning system normally runs in fresh air mode. When required, the air conditioning system can be switched to circulating air mode by the user.

The circulating air mode is switched on or off by pressing button T10. Circulating air mode of the air condition control is indicated by the corresponding LED. Press button T10 again to switch off this function.

5. Maintenance / Servicing

Service and maintenance works have to be executed on basis of “Maintenance Schedule, no: [WP05070618](#).”



- 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 accident!

The experts in charge of installation and maintenance works should at least be trained in accordance with the EN 378 - part 4 and (EG) No.307 / 2008 and strictly obey the legal regulations. All works or modifications at the air conditioner which are improperly executed can lead to function troubles and can jeopardize the operation safety. We recommend having works and modifications only executed in a KONVEKTA service station^①. Also the prescribed regular maintenance works should be executed in an authorized KONVEKTA service station^①. Before having the maintenance executed please read carefully the KONVEKTA safety prescriptions (TD00052A^②), in order to avoid 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. Fault processing

If an error occurs in transit or during the self-test, this error is stored under a specific error code number. The stored errors can be checked or cancelled in 2 ways:

Fault review through Control

The stored errors can be reviewed by pushing buttons T2 and T4 **simultaneously**, when ignition is **disactivated**.

- If nothing is displayed, this means that no error has been stored.
- If e.g. E 20 **20** is displayed, this means that an error has occurred in the system.
- By pushing the button T1 the next error can be reviewed.
- By pushing the button T3 the error currently displayed can be cancelled.

Fault review through PC

Through the diagnosis module, by means of PC and relevant diagnosis software, one can check and cancel the stored error/s. The error is clearly shown with its corresponding code.

5.2. Call-up and Deletion of Error Codes

When the ignition is switched off, existing errors can be called up by simultaneously pressing buttons T2 and T4. If no error code is displayed, no malfunction has been established by the control device.

If an error code is displayed and there are more than one error messages, the next error code can be accessed by pressing button T1.

By pressing button T3, the displayed error message will be deleted from the error memory. If there are more than one error messages button T3 must be pressed repeatedly until no more error messages are displayed

- ➡ As soon as all error messages have been deleted from the error memory, an empty display will appear and the central decimal dot will flash

5.3. Return air grid

Reference to Maintenance Schedule Bus No.: WP 07 05 06 18 Item WK15:

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.
- **It is not allowed to operate the air conditioner without filter.**
- **If filter is defective, filter must replace!**
- In case the a/c unit will be operated continuously with dirty filter, the evaporator blowers will be damaged
- Due to a reduction of the evaporator air flow, the a/c function „defrosting“ will be activated more often resulting in a decrease of the cooling capacity and damage of the cooling compressor!

5.4. Condenser coil

Always keep condenser coil fins clean. Severe soiling cause's 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.

5.5. Trouble shooting

Trouble	Cause	Repair by authorized Service Station ^① only
a/c is not running	thermostat open	check inside temperature ^② re-adjust thermostat ^②
	electric connections disconnected	check electric connections at switchboard
	relay defective	check relay, replace if necessary
	defrost thermostat has switched off	check evaporator blower, replace if necessary
	outside temperature too low (possible icing of evaporator)	switch on "ventilation" only
	evaporator coil dirty	clean evaporator 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
	excess pressure (pressure too high)	check axial fans check fuses at switchboard clean condenser coil with compressed air
	low pressure, dryer clogged	replace dryer
	low pressure, screen of expansion valve clogged	clean screen; replace dryer
	magnetic clutch	check connections at magnetic clutch

^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

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

6. 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).

7. History of modification

Version	Date	Name	Remark	File
A00	13.03.2007	S. Pfluger	source file	BAKL40T12AC
A01	10.07.2007	B.Keßler	Added KL45T and technical data	BAKL40T12AC
A02	21.11.2007	B.Keßler	Added item 1 and item 1.1 updated	BAKL40T12AC
A03	14.04.2009	B. Keßler	Pkt 1.2 updated; TM31 replaced by HDC 33.	BAKL40T12AC
A04	28.06.2016	B. Keßler	Added KL46T	BAKL40T12AC
A05	02.03.2017	B. Keßler	Information on the operating instructions and technical data expanded with F-gas-regulation	BAKL40T12AC