COMBIVERT

GB

Installation Guideline A-Housing

00.F5.BEM-KA02

KEB

11/2004

This manual describes the KEB COMBIVERT F5. Particular attention is paid to the installation, the connection as well as the basic operation. Due to the various application and programming possibilities, the application-specific connection and/or wiring diagram, the parameter adjustment as well as instructions to the start-up are to be taken from the documentation of the machine manufacturer.
A list of instruction manuals and documents giving assistance for the construction, documentation and service is provided at the end of this manual. The **safety and warning notes** listed in this instruction manual as well as in other documentation must be observed at any rate to ensure a safe operation. The safety and warning instructions specified in this manual do not lay claim on completeness. KEB reserves the right to change/adapt specifications and technical data without prior notice. The used pictograms have following significance:

Danger
Warning
Caution

Attention,
observe at
all costs

Information
Aide
Tip

Table of Contents

Important, absolutely read

1. Safety and Operating Instructions

Safety and Operating Instructions for drive converters

(in conformity with the Low-Voltage Directive 73/23/EWG)

1. General

In operation, drive converters, depending on their degree of protection, may have live, uninsulated, and possibly also moving or rotating parts, as well as hot surfaces.

In case of inadmissible removal of the required covers, of improper use, wrong installation or maloperation, there is the danger of serious personal injury and damage to property.

For further information, see documentation.

All operations serving transport, installation and commissioning as well as maintenance are to be carried out by **skilled technical personnel** (Observe IEC 364 or CENELEC HD 384 or DIN VDE 0100 and IEC 664 or DIN/ VDE 0110 and national accident prevention rules!).

For the purposes of these basic safety instructions, „skilled technical personnel" means persons who are familiar with the installation, mounting, commissioning and operation of the product and have the qualifications needed for the performance of their functions.

2. Intended use

Drive converters are components designed for inclusion in electrical installations or machinery.

In case of installation in machinery, commissioning of the drive converter (i.e. the starting of normal operation) is prohibited until the machinery has been proved to conform to the provisions of the directive 89/392/EEC (Machinery Safety Directive - MSD). Account is to be taken of EN 60204.

Commissioning (i.e. the starting of normal operation) is admissible only where conformity with the EMC directive (89/336/EEC) has been established.

The drive converters meet the requirements of the Low-Voltage directive 73/23/EEC. They are subject to the harmonized standards of the series DIN EN 50178/VDE 0160 in conjunction with EN 60439-1/ VDE 0660, part 500, and EN 60146/ VDE 0558.

The technical data as well as information concerning the supply conditions shall be taken from the rating plate and from the documentation and shall be strictly observed.

3. Transport, storage

The instructions for transport, storage and proper use shall be complied with.

The climatic conditions shall be in conformity with EN 50178.

4 Installation

The installation and cooling of the appliances shall be in accordance with the specifications in the pertinent documentation.

The drive converters shall be protected against excessive strains. In particular, no components must be bent or isolating distances altered in the course of transportation or handling. No contact shall be made with electronic components and contacts.

Drive converters contain electrostatic sensitive components which are liable to damage through improper use. Electric components must not be mechanically damaged or destroyed (potential health risks).

5. Electrical connection

When working on live drive converters, the applicable national accident prevention rules (e.g. VBG 4) must be complied with.

The electrical installation shall be carried out in accordance with the relevant requirements (e.g. cross-sectional areas of conductors, fusing, PE connection). For further information, see documentation.

Instructions for the installation in accordance with EMC requirements, like screening, earthing, location of filters and wiring, are contained in the drive converter documentation. They must always be complied with, also for drive converters bearing a CE marking. Observance of the limit values required by EMC law is the responsibility of the manufacturer of the installation or machine.

6. Operation

Installations which include drive converters shall be equipped with additional control and protective devices in accordance with the relevant applicable safety requirements, e.g. act respecting technical equipment, accident prevention rules etc.. Changes to the drive converters by means of the operating software are admissible.

After disconnection of the drive converter from the voltage supply, live appliance parts and power terminals must not be touched immediately because of possibly energized capacitors. In this respect, the corresponding signs and markings on the drive converter must be respected.

During operation, all covers and doors shall be kept closed.

7. Maintenance and servicing

The manufacturer's documentation shall be followed.

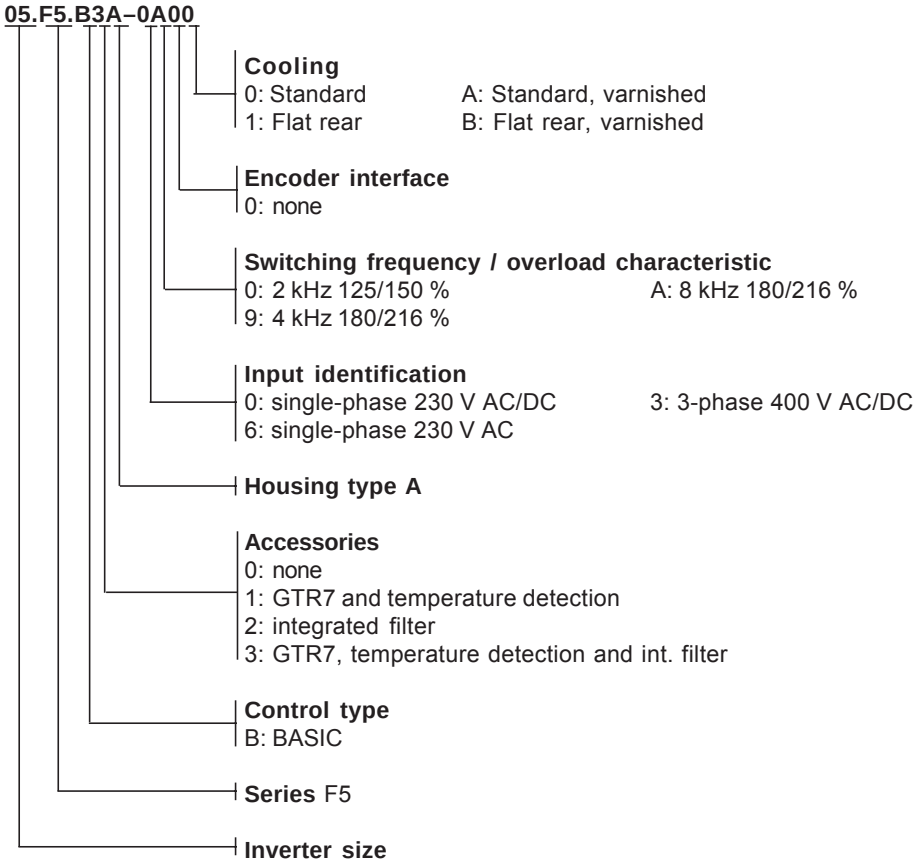
KEEP SAFETY INSTRUCTIONS IN A SAFE PLACE!

2. Product description

2.1 Intended use

The frequency inverter KEB COMBIVERT F5 serves exclusively for the control and regulation of asynchronous motors. The operation of other electric consumers is prohibited and can lead to the destruction of the unit.
Frequency inverter are components which are intended for the installation in electric systems or machines.

2.2 Unit identification



2.3 Technical data

Inverter Size		**05**	**07**		**05**	**07**	**09**
Housing size		**A**	**A**		**A**	**A**	**A**
Phases		**1**	**1**		**3**	**3**	**3**
Output rated power	[kVA]	0,9	1,6		0,9	1,8	2,8
Max. rated motor power	[kW]	0,37	0,75		0,37	0,75	1,5
Output rated current	[A]	2,3	4		1,3	2,6	4,1
Max. short time current	[A]	4,1	7,2		2,3	4,7	7,4
OC-tripping current	[A]	5	8,6		2,8	5,6	8,9
Input rated current	[A]	4,6	8		1,8	3,6	6
Max. permissible mains fuse (inert)	[A]	16	16		10	10	10
Rated switching frequency	[kHz]	4	4	8	4	4	4
Max. switching frequency	[kHz]	8	4	8	4	4	4
Power loss at rated operation	[W]	30	55	60	45	50	60
Min. braking resistor	[Ohm]	100	100		390	180	110
Typ. braking resistor	[Ohm]	180	100		620	300	150
Max. braking current	[A]	4,5	4,5		2,2	4,5	7
Mains voltage U_N	[V]	180...260 ±0			305...500 ±0		
Mains frequency	[Hz]	50 / 60 ±2			50 / 60 ±2		
Input rated voltage	[V]	**230**			**400**		
Output voltage	[V]	3 x 0...U_N					
Output frequency	[Hz]	0...400					
Min. motor line cross section	[mm²]	1,5			1,5		
Max. motor line length (shielded)	[m]	10 (B) [1]			10 (A)		
Max. motor line length (unshielded)	[m]	35	50		15	40	50

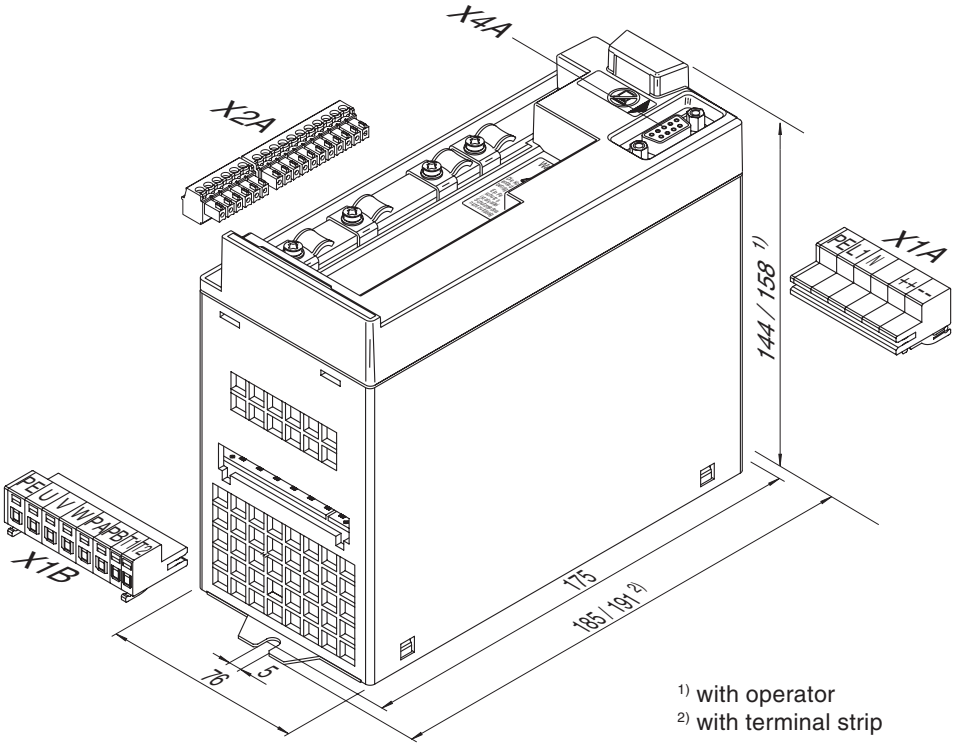
[1] Considerable longer motor lines are possible with ferrite rings (part no. 00.90.396-2620) and low-capacity cable (phase/phase<65 pF/m, phase/shielding<120 pF/m) at the output - please contact KEB

(A) EN55011 class A

(B) EN 55011 class B

Site altitude max. 2000 m. With site altitudes over 1000 m a derating of 1 % per 100 m must be taken into consideration.

2.4 Dimensions and Terminals



1) with operator
2) with terminal strip

X1A	Connection for power supply
X1B	Connection for motor, braking resistor and temperature detection
X2A	Connection for control lines
X4A	Connection for operator or HSP5 service cable

Weight: 1,1 kg

3. Installation and Connection

3.1 Control cabinet installation

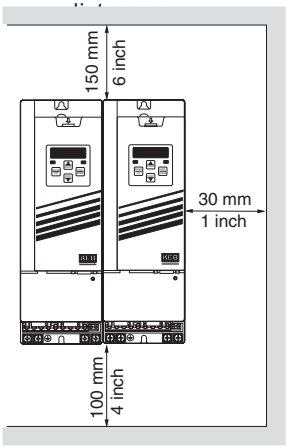
Protective system (EN 60529):	IP20
Operation temperature*):	-10...45 °C (14...113 °F)
Storage temperature:	-25...70 °C (-13...158 °F)
max. heat sink temperature:	
Size 05 (230 V):	100 °C (212 °F)
Size 07 (230 V):	95 °C (203 °F)
Size 05/07/09 (400 V):	90 °C (194 °F)
Climatic category (EN 60721-3-3):	3K3
Environment (IEC 664-1):	Pollution degree 2
Vibration/Jolt according to:	German. Lloyd; EN50155

The flat-rear design requires cooling measures by the machine builder. This can be in the best case no further measure at all (e.g. at cyclic operation with down times) up to the dissipation of the entire, indicated heat loss at rated operation.

⚠ Protect the COMBIVERT against aggressive gases and aerosols !

*) At housing size 05 / 230 V and field bus operation max. 40 °C

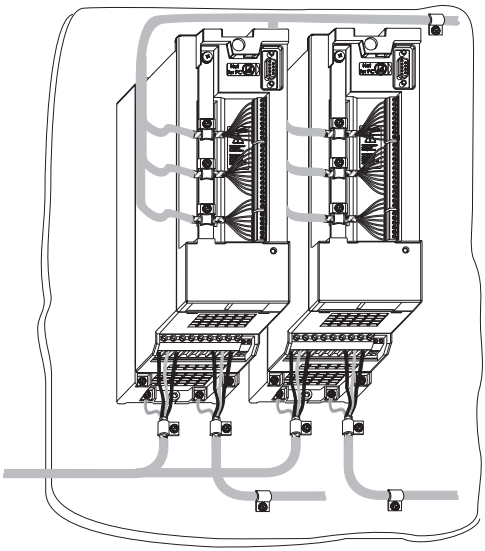
Installation position and min.



3.2 EMC-conform Installation

- Always apply the shielding of motor and control cables over a large contact surface on both sides.
- Distance between control and power cables at least 10..20 cm (4...8 inch).
- Lay motor and power cable separately.
- If it cannot be avoided, cross control and power cables in a right angle.
- Install all cables as close as possible to the mounting plate - ideal in a metal cable duct.
- Mount COMBIVERT well conducting with the mounting plate. Remove the paint beforehand.

You can find further instructions regarding the EMC-conform wiring in the Internet at KEB.

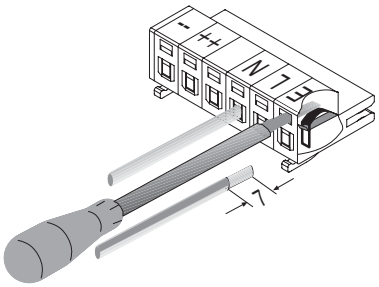


3.3 Connection of Power Circuit

3.3.1 Wiring instructions

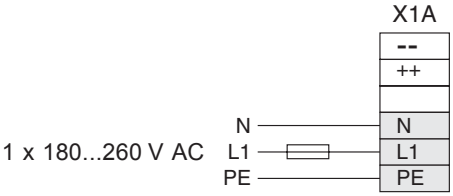
- core cross-section 1,5 mm²
- strip 7mm
- optional use of wire-end ferrule
- after arresting the cable by removing the screwdriver absolutely check for a firm fit

attach / remove terminal strip only at tensionless state

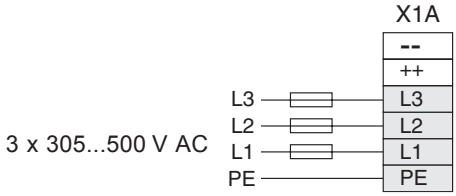


3.3.2 Mains connection terminal strip X1A

Mains connection 230 V 1-phase

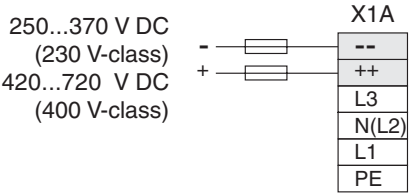


Mains connection 400 V 3-phase



- Fuse (see chapter 2.3) or power protective switch
- 1-phase inverter RCD type A or type B
- 3-phase inverter RCMA with separator or RCD type B
- at DC-supply pay attention to the permissible voltage range of the fuses

DC connection



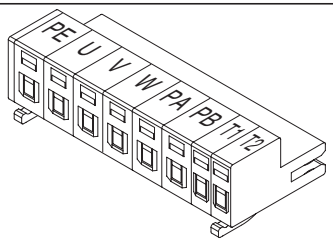
Absolutely observe the connecting voltage of the KEB COMBIVERT. A 230V-unit will be immediately destructed on a 400V-power supply.

Never exchange the mains and motor cables.

Some countries demand that the PE-terminal is directly connected to the terminal box (not over the mounting plate).

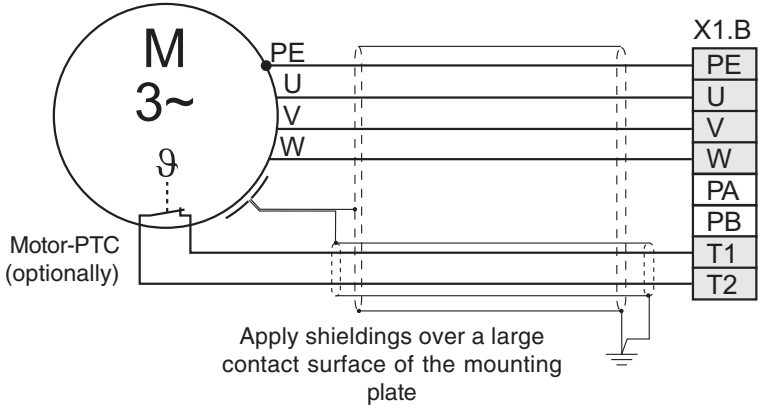
3.3.3 Terminal X1B

- PE Connection for earthing
- U, V, W Motor connection
- PA, PB Braking resistor
- T1, T2 Temperature sensor / switch



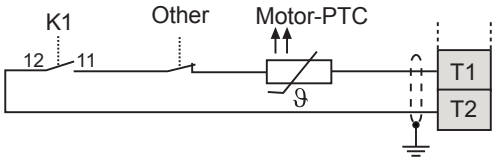
3.3.4 Motor connection

⚠
- Observe correct phase sequence of the motor!
- max. motor line length see chapter 2.3



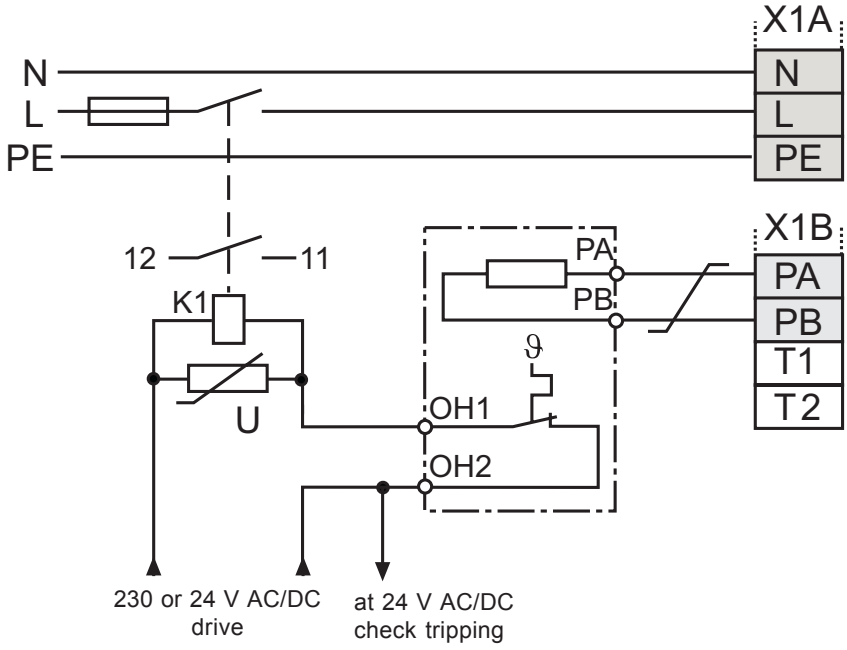
3.3.5 Connection of the temperature monitoring

- Terminals T1, T2
- Tripping resistance 1.65...4 kOhm
- Reset resistance 0.75...1.65 kOhm
- Design in accordance with VDE 0660 Part 302
- This function can be activated by the machine builder by software
- Do not lay connecting cable together with control cable
- Permissible in the motor cable only with double shielding
- Connect relay K1 for fire prevention in regenerative operation (see 3.3.6)



3.3.6 Connection of a braking resistor with temperature monitoring in accordance with UL

- PA, PB Connection for braking resistor
- Technical data (see chapter 2.3)
- During clearing of the temperature monitoring the input voltage is switched off
- for additional protection in regenerative operation connect the auxiliary contacts 11 and 12 of the line contactor K1 (see 3.3.5)



Braking resistors can develop very high surface temperatures, therefor install as safe-to-touch as possible.

3.4 Control Board Basic

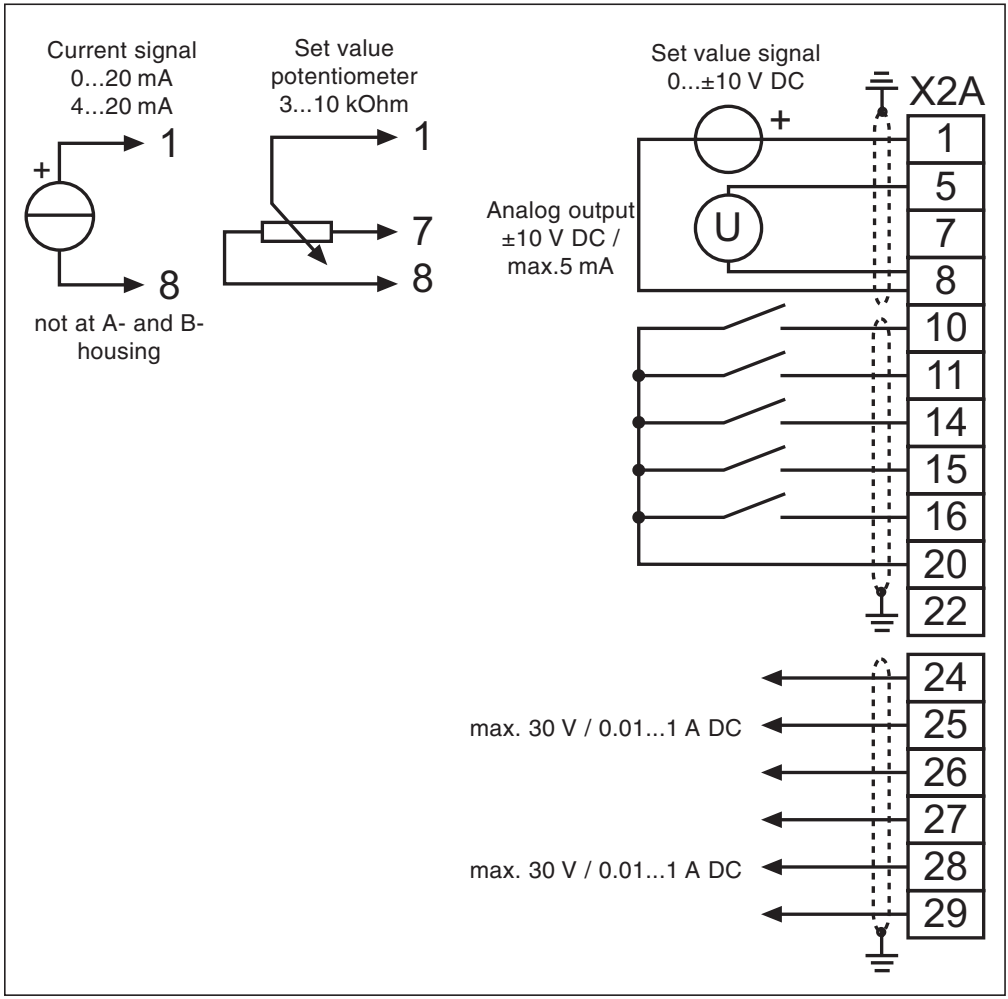
3.4.1 X2A Control Terminal Strip

- Tightening torque 0,22...0,25 Nm (2 lb inches)
- Use shielded/drilled cables
- Lay shield only on the inverter side onto earth potential

X2A

PIN	Function	Name	Description
1	+ Set value input	AN1+	Differential voltage inputs 0...±10 VDC; Ri = 55kOhm
2	- Set value input	AN1-	AN1: Setting of the analog set value
	Progr. analog outputs		0...±10 VDC / max. 5 mA; defined by the manufacturer
5	Analog output 1	AO1	Output of the actual output frequency 0...±100 Hz
7	+ 10 V Output	CRF	Reference voltage for set value poti (max. 4 mA)
8	Analog Mass	COM	Mass for analog in- and outputs
	Prog. Digital inputs		Function of the inputs is defined by the manufacturer
10	Fixed frequency 1 (CP.19)	I1	13...30 VDC ±0% smoothed; Ri: 2,1 kOhm; scan time 2 ms
11	Fixed frequency 2 (CP.20)	I2	I1 + I2 = Fixed frequency 3 (CP.21)
14	Forward	F	Preset rotation;
15	Reverse	R	Forward has priority
16	Control release/ Reset	ST	Power modules are enabled; reset at opening
20	24 V-Output	U_{out}	Supply of the programmable inputs
22	Digital Mass	0V	Potential for digital in- /outputs
24	Relay 1 / NO contact	RLA	Programmable relay output (CP.31)
25	Relay 1 / NC contact	RLB	Load ability max. 30 VDC / 0.01...1A
26	Relay 1 / switching contact	RLC	Factory setting: Fault relay
27	Relay 2 / NO contact	FLA	Programmable relay output (CP.32)
28	Relay 2 / NC contact	FLB	Load ability max. 30 VDC / 0.01...1A
29	Relay 2 / switching contact	FLC	Factory setting: Frequency dependent switch

3.4.2 Connection of the control terminal strip



To avoid interferences a separate shielding must be provided for analog and digital control lines. Depending on the use of the relay outputs, an extra shielding is to be used, too.

In case of inductive load on the relay outputs a protective wiring must be provided (e.g. free-wheeling diode)!

4 Operation of the Unit

4.1 Operation Accessories

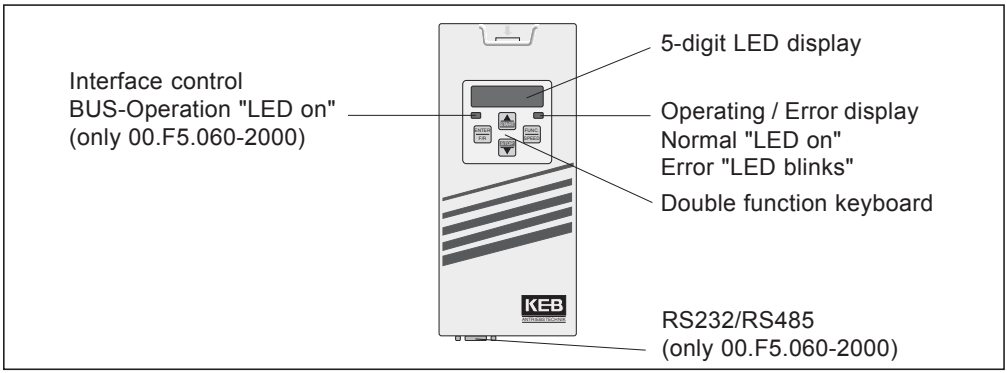
4.1.1 With HSP5 cable and without operator

A special cable (part number 00.F5.0C0-0010) is necessary for the control of the KEB COMBIVERT without operator. It is connected between the HSP5-interface X4A and a serial RS232-PC-interface (COM1 or COM2). The operation takes place via the PC-program COMBIVIS.

The HSP5-cable has an integrated level converter. The connection of a serial standard cable would destroy the PC-interface.

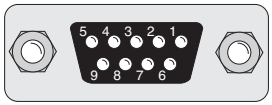
4.1.2 Digital operator (part number 00.F5.060-1000)

As an accessory for the local operation of the KEB COMBIVERT F5 an operator is available. To prevent malfunctions, the inverter must be brought into nOP status before connecting / disconnecting the operator (open control release). When starting the inverter, it is always started with the last stored values or the factory setting.



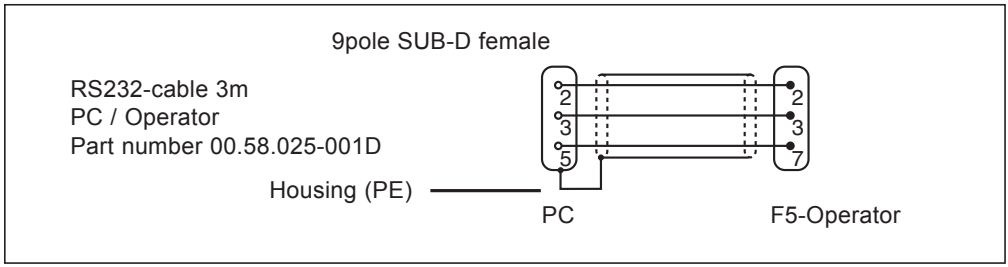
4.1.3 Interface operator (part number 00.F5.060-2000)

The interface operator corresponds to the functional range of the digital operator. However, it is enhanced by a serial RS232/485-interface.



PIN	RS485	Signal	Meaning
1	-	-	reserved
2	-	TxD	Transmission signal/RS232
3	-	RxD	Receive signal/RS232
4	A'	RxD-A	Receive signal A/RS485
5	B'	RxD-B	Receive signal B/RS485
6	-	VP	Supply voltage-Plus +5V (I_{max}=10mA)
7	C/C'	DGND	Data reference potential
8	A'	TxD-A	Transmission signal A/RS485
9	B'	TxD-B	Transmission signal B/RS485

A RS232-cable is needed to connect the interface operator with the PC. The assignment is represented on the following page.



4.1.4 Remote control (HSP5-extension)

The HSP5-extension is connected between the COMBIVERT and the operator. It serves for the remote control of the COMBIVERT. The HSP5-extension is equipped with special cable drivers. Therefore the use of conventional RS232-cables is not permitted. The last three digits of the part number indicate the length of the cable in dm (00.F5.0C0-1005, -1010, -1030 and 1100).

4.1.5 Other operators

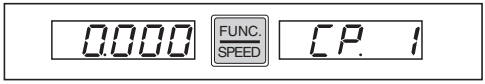
In addition to the described operators the KEB COMBIVERT can be equipped with further operators for special applications (Profibus, Interbus, Sercos, CAN, DeviceNet). You find further information on that on our home page.

4.2 Keyboard Operation

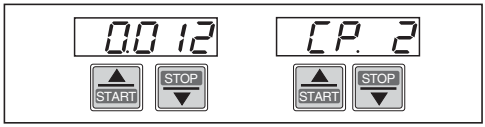
4.2.1 Parameter numbers and values

When switching on KEB COMBIVERT F5 the value of parameter CP.1 appears.

The **function key** (FUNC) changes between the parameter value and parameter number.

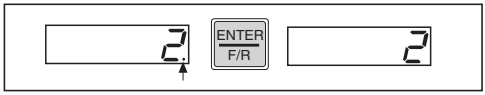


With **UP** and **DOWN** the value of the parameter number is increased/ decreased with **changeable** parameters.



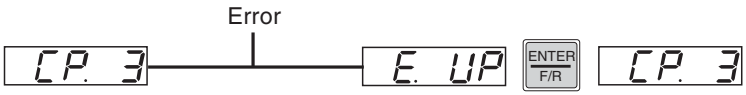
Principally during a change, parameter values are immediately accepted and stored non-volatile. However, with some parameters it is not useful that the adjusted value is accepted immediately. In these cases the adjusted value is accepted and stored non-volatile by pressing **ENTER**. When this type of parameter is changed a point appears behind the last digit.

By pressing „ENTER“ the adjusted value is accepted and non-volatile stored.



4.2.2 Resetting error messages

If a malfunction occurs during operation, the actual display is overwritten by the alarm message. The alarm message in the display is reset by ENTER.



With ENTER only the error message in the display is reset. In order to reset the error itself, the cause must be removed or a power-on reset must be made.

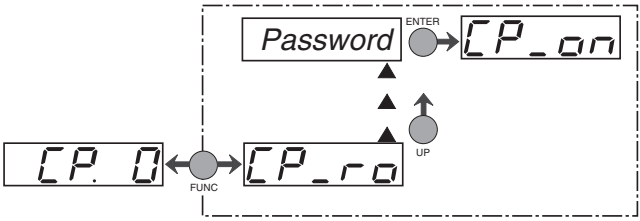
4.2.3 Password input

The KEB COMBIVERT is outfitted with a comprehensive password protection. In dependence on the entered password the following modes are possible:

Display	mode
CP_ro	End customer menu (CP-Parameter) read-only
CP_on	End customer menu (CP-Parameter) read/write
CP_SE	Service menu (like end customer menu, but with the original parameters)
APPL	Application menu (all parameter groups and parameters are visible)
none	Drive mode (COMBIVERT can be put into operation by the keyboard)

The menu admissible for the application is defined by the machine builder. The password input is generally made over the parameter CP.0. The adjusted password/menu is maintained even after switching off.

Example*: Changing the CP-parameter from read-only to read/write*



5. Parameter description

Parameter		Setting range	Reso-lution	De-fault	Unit	↵	Origin
CP.0	password input	0...9999	1	-	-	-	ud.1
CP.1	actual frequency display	-400...400	0,0125	0	Hz	-	ru.3
CP.2	set frequency display	-400...400	0,0125	0	Hz	-	ru.1
CP.3	inverter status display	0...255	1	0	-	-	ru.0
CP.4	apparent current	0...6553,5	0,1	0	A	-	ru.15
CP.5	apparent current/peak value	0...6553,5	0,1	0	A	-	ru.16
CP.6	utilization	0...65535	1	0	%	-	ru.13
CP.7	intermediate circuit voltage	0...1000	1	0	V	-	ru.18
CP.8	interm. circuit vol./peak value	0...1000	1	0	V	-	ru.19
CP.9	output voltage	0...778	1	0	V	-	ru.20
CP.10	minimal frequency	0...400	0,0125	0	Hz	-	op.6
CP.11	maximal frequency	0...400	0,0125	0	Hz	-	op.10
CP.12	acceleration time	0,00...300,00	0,01	5	s	-	op.28
CP.13	deceleration time (-1=CP.12)	-0,01...300,00	0,01	5	s	-	op.30
CP.14	s-curve time	0,00...5,00	0,01	0	s	-	op.32
CP.15	boost	0,0...25,5	0,1	2	%	-	uf.1
CP.16	rated frequency	0...400	0,0125	50	Hz	-	uf.0
CP.17	voltage stabilization	0...650 V (off)	1	0	V	E	uf.9
CP.18	switching frequency	0...LTK	1	LTK	-	E	uf.11
CP.19	fixed frequency 1	-400...400	0,0125	5	Hz	-	op.21
CP.20	fixed frequency 2	-400...400	0,0125	50	Hz	-	op.22
CP.21	fixed frequency 3	-400...400	0,0125	70	Hz	-	op.23
CP.22	DC braking / mode	0...9	1	7	-	E	pn.28
CP.23	DC braking / time	0,00...100,00	0,01	10	s	-	pn.30
CP.24	max. ramp current	0...200	1	140	%	-	pn.24
CP.25	max. constant current	0...200	1	200:off	%	-	pn.20
CP.26	speed search condition	0...15	1	8	-	E	pn.26
CP.27	quick stop time	0,00...300,00	0,01	2	s	-	pn.60
CP.28	reaction of ext. overtemperat.	0...7	1	7	-	-	pn.12
CP.29	analog output 1 / function	0...20	1	2	-	E	an.31
CP.30	analog output 1 / amplification	-20,00...20,00	0,01	1	-	-	an.33
CP.31	relay output 1 / function	0...76	1	4	-	E	do.2
CP.32	relay output 2 / function	0...76	1	27	-	E	do.3
CP.33	relay output 2 / switching level	±30000,00	0,01	4	-	-	le.3
CP.34	source of rotation direction	0...9	1	2	-	E	op.1
CP.35	AN1 set value selection	0...2	1	0	-	E	an.0
CP.36	AN1 zero hysteresis	-10,0...10,0	0,1	0,2	%	-	an.4

CP.3 Inverter status

In parameter „inverter status“ the actual operating condition of the frequency inverter is displayed. In the case of an error the current error message is displayed, even if the display has already been reset with ENTER (error-LED on the operator is still blinking).

nOP "no Operation" control release not bridged, modulation switched off, output voltage = 0 V, drive is not controlled.

LS "Low Speed" no rotation preset, modulation switched off, output voltage = 0 V, drive is not controlled.

FAcc "Forward Acceleration" drive accelerates with direction of rotation forward.

FdEc "Forward Deceleration" drive decelerates with direction of rotation forward.

rAcc "Reverse Acceleration" drive accelerates with direction of rotation reverse.

rdEc "Reverse Deceleration" drive decelerates with direction of rotation reverse.

Fcon "Forward Constant" drive runs with a constant speed and direction of rotation forward.

rcon "Reverse Constant" drive runs with constant speed and direction of rotation reverse.

Status messages and information about the cause and removal are to be found in *www.keb.de ==>Documentation ==> Operating Instructions ==> Other ==> Service informations ==> Error and status messages.doc*.

CP.17 Voltage stabilization

With this parameter a regulated output voltage in relation to the rated frequency can be adjusted. For that reason voltage variations at the input as well as in the intermediate circuit only have a small influence on the output voltage (U/f-characteristic). The function allows, among other things, an adaption of the output voltage to special motors.

CP.22 DC braking / Mode

With DC-braking the motor is not decelerated by the ramp. Quick braking is caused by D.C. voltage, which is applied onto the motor winding. This parameter determines how the dc-braking is triggered.

Value	Activation
0	DC-braking deactivated
1	DC-braking at switch off of the direction of rotation and upon reaching 0 Hz. The braking time is CP.23 or until the next direction of rotation.
2*	DC-braking as soon as setting for the direction of rotation is absent.
3*	DC-braking as soon as the direction of rotation changes or is absent.
4*	DC-braking on disabling the direction of rotation and if the real frequency falls below 4 Hz.
5*	DC-braking when the real frequency falls below 4 Hz and the drives decelerates
6*	DC-braking as soon as the set value falls below 4 Hz.
7*	DC-braking when input I4 is switched. At control circuit B = value "0"
8	DC-braking as long as input I4 is switched. At control circuit B = value "0"
9	DC-braking after switching on the modulation on.

* Braking time depends on the actual frequency.

CP.24 Max. ramp current

This function protects the frequency inverter against switching off through overcurrent during the acceleration ramp. When the ramp reaches the adjusted value,it is stopped so long until the current decreases again. CP.3 displays "LAS" at active function.

CP.25 Max. constant current

This function protects the frequency inverter against switch off through overcurrent during constant output frequency. When exceeding the adjusted value, the output frequency is reduced until the value drops below the adjusted value. CP. 3 displays "SSL" at active function.

CP.26 Speed search condition

When connecting the frequency inverter onto a decelerating motor, an error can be triggered by the differing rotating field frequencies. With activated speed search the inverter searches for the actual motor speed, adapts its output frequency and accelerates with the adjusted ramp to the given set value. During speed search CP.3 displays "SSF". The parameter determines, under what conditions the functions operate.
In case of several conditions the sum of the value must be entered. Example: CP.26 = 12 means after reset **and** after auto-reset UP.

Value	Condition
0	Function off
1	at control release
2	at switch on
4	after reset
8	after Auto-Reset UP

CP.28 Response of external overtemperature

CP.28 determines the response of the drive on the external temperature monitoring. At factory setting the function is switched off. In order to activate this function the power circuit terminals T1/T2 must be connected. After that the response can be adjusted according to following table. If overheat no longer exists, the message E.ndOH (or A.ndOH) is output. Only then the error can be reset or the automatic restart can be carried out.

CP.28	Display	Response	Restart
0	**E.dOH**	Immediate disabling the modulation	Remove fault; reset
1*	**A.dOH**	Quick stop / disabling the modul. after reaching speed 0	
2*	**A.dOH**	Quick stop / holding torque at speed 0	
3	**A.dOH**	Immediate disabling the modulation	Autoreset, if no fault is present
4*	**A.dOH**	Quick stop / disabling the modul. after reaching speed 0	
5*	**A.dOH**	Quick stop / holding torque at speed 0	
6*	**none**	No effect to the drive; With CP.31/32 an external module can be controlled (e. g. fan)	inapplicable
7	**none**	No effect to the drive; **!Malfunction not present!** External temperature monitoring is not activated.	

*) If the motor is still too hot after 10 seconds, the error E.dOH is triggered and the modulation is switched off!

CP.29 Analog output 1 / Function

CP.29 defines the function of analog output 1.

Value	Function	Standardization 0...100 % (±100 %)
0	absolute actual frequency CP.3	0...100 Hz
1	absolute set frequency CP.2	0...100 Hz
2	actual frequency CP.3	0...±100 Hz
3	set frequency CP. 2	0...±100 Hz
4	output voltage CP.9	0...500 V
5	DC link voltage CP.7	0...1000 V
6	apparent current CP.4	0...2 • rated current
7	active current ru.17	0...2 • ±rated current
8-10	only application mode	
11	absolute active current ru.17	0...2 • rated current
12	power stage temperature ru.38	0...100 °C
13	motor temperature ru.46	0...100 °C
14-18	only application mode	
19	ramp output frequency ru.2	0...±100 Hz
20	absolute ramp output frequency ru.2	0...100 Hz

CP.31 Relay output 1 / function (terminals X2A.24...26)
CP.32 Relay output 2 / function (terminals X2A.27...29)

The switching level of CP.31 is pre-set to 100,00.
The switching level of CP.32 is adjusted by CP.33!

Value	Function
0	No function (generally off)
1	Generally on
2	Run signal; also by DC-braking
3	Ready signal (no error)
4	Fault relay
5	Fault relay (without auto-reset)
6	Warning or error message at abnormal stopping
7	Overload pre-warning
8	Overtemperature alert signal power stage
9	External Overtemperature alert signal motor
11	Overtemperature alert signal interior OHI
12	Cable breakage 4...20 mA on analog input 1
14	max. constant current (Stall, CP.25) exceeded
15	max. ramp current (LA-Stop, CP.24) exceeded
16	DC-braking active
20	Actual value = set value (CP.3 = Fcon, rcon; not at noP, LS, error, SSF)
21	Accelerate (CP.3 = FAcc, rAcc, LAS)
22	Decelerate (CP.3 = FdEc, rdEc, LdS)
23	Real direction of rotation = set direction of rotation
24	Utilization (CP.6) > switching level
25	Active current > switching level
26	Intermediate circuit voltage (CP.7) > switching level
27	Real value (CP.1) > switching level
28	Set value (CP.2) > switching level
31	Absolute set value at AN1 > switching level
32	Absolute set value at AN2 > switching level
34	Set value at AN1 > switching level
35	Set value at AN2 > switching level
40	Hardware current limit activated
41	modulation on
44	Inverter status > switching level
45	Power stage temperature > switching level
46	Motor temperature > switching level
47	Ramp output value > switching level
48	Apparent current (CP.4) > switching level
49	Forward running (not at nOP, LS, abnormal stopping or error)
50	Reverse running (not at nOP, LS, abnormal stopping or error)
63	Absolut ANOUT1 > switching level
64	Absolut ANOUT2 > switching level
65	ANOUT1 > switching level
66	ANOUT2 > switching level
70	Driving current active (safety relay)
73	Absolute active power > switching level
74	Active power > switching level

No listed values are only for application mode.

CP.34 Source of rotation direction

The source rotation setting and the mode of evaluating the rotation setting is defined with this parameter (Enter-Parameter). With CP.34 one does not modify the rotation source of the fixed frequencies (CP.19... 21).

Value	Direction of rotation
0/1	Only application mode
2	Setting by way of terminal strip forward/reverse; negative set values are set to zero (factory setting).
3	Setting by way of terminal strip forward/reverse; the sign of the set point values have no effect on direction of rotation.
4	Setting by way of terminal strip run/stop (X2A.14) and forward/reverse (X2A.15); negative values are set to zero
5	Setting by way of terminal strip run/stop (X2A.14) and forward/reverse (X2A.15); the sign of the set point values have no effect on direction of rotation.
6	Set value dependent, positive value = clockwise rotation; negative value-counterclockwise rotation; Status "Low speed" (LS) if no terminal For or Rev is active
7	Set value dependent, positive value = clockwise rotation; negative value = counter clockwise rotation clockwise rotation is indicated if set value is "0"
8/9	Only application mode

CP.35 AN1 Set value selection

The set value input 1 (AN1) at the F5-GENERAL control can be triggered by various signal levels. In order to correctly evaluate the signal, this parameter must be adapted to the signal source. At the F5-BASIC control in A or B housing the signal source may not be re-adjusted.

Value	Set value signal
0	0...±10 V DC / Ri = 56 kOhm
1	0...+20 mA DC / Ri = 250 Ohm
2	4...20 mA DC / Ri = 250 Ohm

6. Certifications

6.1 CE-Marking

CE marked frequency inverter and servo drives were developed and manufactured to comply with the regulations of the Low-Voltage Directive 73/23/EEC.
The inverter / servo drive must not be started until it is determined that the installation complies with 89/392/EEC (machine directive) as well as the EMC-directive (89/336/EEC)(note EN60204).
The frequency inverters / servo drives meet the requirements of the Low-Voltage Directive 73/231/EEC. The harmonized standards of the series EN 50178 in connection with EN 60439-1 and EN 60146 were used.
This is a product of limited availability in accordance with IEC 61800-3. This product may cause radio interference in residential areas. In this case the operator may need to take corresponding measures.

6.2 UL / CUL - Marking

c UL UL **To be conform according to UL and CUL for the use on the North American and Canadian Market the following instructions must be observed:**

- Inverter is suitable for use on a circuit capable of delivering not more than 10 kA rms (symmetrical), 240 V AC or 480 V AC maximum
- Maximum surrounding air temperature 45 °C (113 °F)
- For control cabinet mounting as „Open Type“
- For use in a pollution degree 2 environment
- Motor protection by adjustment of current parameters
- Not incorporated with overspeed protection
- Power terminal tightening torque (see type plate)
- Control terminal tightening torque (see chapter 3.4)
- Overload protection at 130 % of inverter output rated current (see type plate)
- Refer to this installation instructions for proper wiring

7. Additional Manuals

You find supplementary manuals and instructions for the download under

www.keb.de > Documentation >Operation instruction

General instructions
- Part 1 EMC-and safety instructions

Unit-specific instructions
- Part 2 Power Circuit
- Part 3 Control Circuit

Service notes
- Up- /Download of parameter lists with KEB COMBIVERT
- Error messages

Instruction and information for construction and development
- Application Manual
- Preparation of a user-defined parameter menu
- Programming of the digital inputs

All documents are also available in printed version, however we have to charge a nominal fee for these.

Karl E. Brinkmann GmbH
Försterweg 36-38 • **D**-32683 Barntrup
fon: +49 5263 401-0 • fax: +49 5263 401-116
net: www.keb.de • mail: info@keb.de

KEB Antriebstechnik GmbH & Co. KG
Wildbacher Str. 5 • **D**–08289 Schneeberg
fon: +49 3772 67-0 • fax: +49 3772 67-281
mail: info@keb-combidrive.de

KEB Antriebstechnik Austria GmbH
Ritzstraße 8 • **A**-4614 Marchtrenk
fon: +43 7243 53586-0 • fax: +43 7243 53586-21
Kostelni 32/1226 • **CZ**-370 04 Ceské Budejovice
fon: +420 38 7319223 • fax: +420 38 7330697
net: www. keb.at • mail: info@keb.at

KEB Antriebstechnik
Herenveld 2 • **B**-9500 Geraadsbergen
fon: +32 5443 7860 • fax: +32 5443 7898
mail: vb.belgien@keb.de

KEB CHINA Karl E. Brinkmann GmH
(Xinmao Building, Caohejing Development Zone)
No. 99 Tianzhou Road (No.9 building, Room 708)
CHN-200233 Shanghai, PR. China
fon: +86 21 54503230-3232 • fax: +86 21 54450115
net: www.keb.cn • mail: info@keb.cn

KEB CHINA Karl E. Brinkmann GmH
No. 36 Xiaoyun Road • Chaoyang District
CHN-10027 Beijing, PR. China
fon: +86 10 84475815 + 819 • fax: +86 10 84475868
net: www.keb.cn • mail: hotline@keb.cn

KEB Antriebstechnik Austria GmbH
Organizacni slozka
Kostelni 32/1226
CZ-370 04 Ceske Budejovice
fon: +420 38 7699111 • fax: +420 38 7699119
mail: info.keb@seznam.cz

KEB España
C/ Mitjer, Nave 8 - Pol. Ind. LA MASIA
E-08798 Sant Cugat Sesgarrigues (Barcelona)
fon: +34 93 897 0268 • fax: +34 93 899 2035
mail: vb.espana@keb.de

Société Française KEB
Z.I. de la Croix St. Nicolas • 14, rue Gustave Eiffel
F-94510 LA QUEUE EN BRIE
fon: +33 1 49620101 • fax: +33 1 45767495
net: www.keb.fr • mail: info@keb.fr

KEB (UK) Ltd.
6 Chieftain Buisiness Park, Morris Close
Park Farm, Wellingborough **GB**-Northants, NN8 6 XF
fon: +44 1933 402220 • fax: +44 1933 400724
net: www.keb-uk.co.uk • mail: info@keb-uk.co.uk

KEB Italia S.r.l.
Via Newton, 2 • **I**-20019 Settimo Milanese (Milano)
fon: +39 02 33500782 • fax: +39 02 33500790
net: www.keb.it • mail: kebitalia@keb.it

KEB - YAMAKYU Ltd.
15–16, 2–Chome, Takanawa Minato-ku
J–Tokyo 108-0074
fon: +81 33 445-8515 • fax: +81 33 445-8215
mail: ky-sales@f4.dion.ne.jp

KEB - YAMAKYU Ltd.
711, Fukudayama, Fukuda
J–Shinjo-Shi, Yamagata 996 - 0053
fon: +81 233 29-2800 • fax: +81 233 29-2802
mail: ky-sales@f4.dion.ne.jp

KEB Nederland
Leidsevaart 126 • **NL**–2013 HD Haarlem
fon: +31 23 5320049 • fax: +31 23 5322260
mail: vb.nederland@keb.de

KEB Polska
ul. Budapesztańska 3/16 • **PL**–80-288 Gdańsk
fon: +48 58 524 0518 • fax: +48 58 524 0519
mail: vb.polska@keb.de

KEB Portugal
Avenida da Igreja – Pavilão A n. º 261 Mouquim
P-4770 - 360 MOUQUIM V.N.F.
fon: +351 252 371318 + 19 • fax: +351 252 371320
mail: keb.portugal@netc.pt

KEB Taiwan Ltd.
No.8, Lane 89, Sec.3; Taichung Kang Rd.
R.O.C.-Taichung City / Taiwan
fon: +886 4 23506488 • fax: +886 4 23501403
mail: info@keb.com.tw

KEB Korea Seoul
Room 1709, 415 Missy 2000
725 Su Seo Dong, Gang Nam Gu
ROK-135-757 Seoul/South Korea
fon: +82 2 6253 6771 • fax: +82 2 6253 6770
mail: vb.korea@keb.de

KEB Sverige
Box 265 (Bergavägen 19)
S-4393 Hälsö
fon: +46 31 961520 • fax: +46 31 961124
mail: vb.schweden@keb.de

KEB America, Inc.
5100 Valley Industrial Blvd. South
USA-Shakopee, MN 55379
fon: +1 952 224-1400 • fax: +1 952 224-1499
net: www.kebamerica.com • mail: info@kebamerica.com