

# G6

## COMBIVERT G6

MADE  
IN  
GERMANY



**High Performance Inverter**  
0.75 ... 30 kW

**KEB**



# High Performance Inverter: **KEB COMBIVERT G6**

The **KEB COMBIVERT G6** series was designed as an “**ALL-IN-ONE**” solution which covers all important requirements for controlled three-phase drives within one device. Therefore a high degree of variability, supporting actual and future technologies, is prepared.

The proven properties of **KEB frequency converters** and **SMM** control algorithm (**S**ensorless **M**otor **M**anagement) have been further developed using new 32 bit micro controllers.

Highest requirements for torque and speed stability are met with the G6-versions

**ASCL** (asynchronous-sensorless control) and

**SCL** (synchronous-sensorless control)

The integrated LCD plain text display with multilingual operator guide and the two-stage parameter model with basic menu (customer parameters) and application menu (application parameters) lend one-of-a-kind user comfort to **KEB COMBIVERT G6**, along with easy handling and a high degree of functionality.

Demand-driven fan and stand-by functions reduce device loss / heat stress in the switching cabinet and increase the system's overall efficiency.

“Pro-active maintenance” features easy-to-replace fans with consistent air flow routing exclusively in the cooling element.

Based on the integrated EMC filters, all devices are ready for installation in the switching cabinet; for multi-use applications, the compact design with direct “row mounting” reduces space requirements to a minimum.

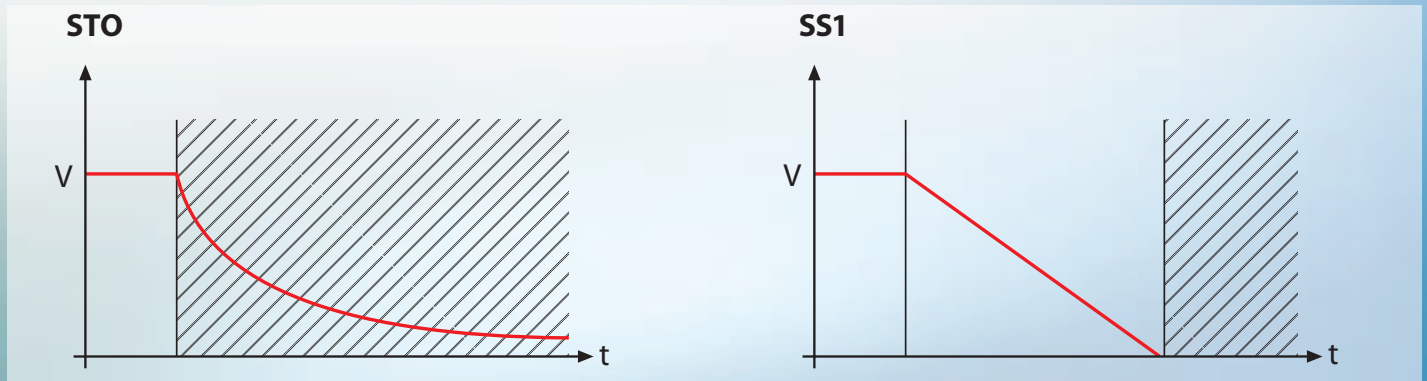
RoHS-compliant production pursuant to guideline 2002/95/EC and the long-life design with high-quality components ensure the investments that have been made into equipment and systems.

**KEB COMBIVERT G6** - the new reference point for industrial applications in machine and plant construction.

## **COMBIVERT G6**

<b>Contents</b>	<b>Page</b>
Integrated flexibility <b>with safety</b>	3
Properties – <b>Control unit</b>	4
Properties – <b>Power stage</b>	5
Data table – <b>Mechanics</b>	6
Data table – <b>Electrical</b>	7
Decentralized high protection degree - <b>Motor mounted inverter</b>	8
Applications - <b>Machine and plant construction / systems</b>	9
<b>KEB COMBIVIS 6</b> - Software	10
<b>KEB COMBILINE</b> - Braking resistors	11
KEB addresses	12

Conform to the actual requirements of the european machine directive the **KEB COMBIVERT G6** offers an integrated 2-channel safety function **STO** according to category 3, EN ISO 13849-1 PL e / IEC EN 62061, SIL 3.



Additionally the function **SS1** can be covered together with an external safety timing relay. The drive is decelerated within a fixed time and is set to **STO** (stop category 1, EN 60204-1).

## KEB COMBIVERT G6 - ON-BOARD - Fieldbus-versions

The **KEB COMBIVERT G6** is prepared for flexible connections to the control level with ON-BOARD fieldbus options for:

(with / without LCD-Display)	(without LCD-Display)	(with / without LCD-Display)	(without LCD-Display)
CAN-Slave	CAN over EtherCAT DS 402	Com.Specification V1.0	in preparation
Profil DS 402	100 MBaud	Device Description V1.0.1	2012

Flexible and customized production results in installation-ready units with 100% functional testing.



# Properties / Functions - Control unit

Control unit	
separated supply 24V DC	✓
RS 232/485 interface, open protocol KEB DIN 66019-II	✓
analogue / digital IO	✓
STO function, 2-channel according category 3, EN ISO 13489-1, PL e / IEC EN 62061, SIL 3	✓

## OEM - User guide

- for direct use in series equipment, **KEB** offers the option of delivering devices ex works, which are fully preset and protected against unauthorised access with a password.

## Quick input/output scanning

- for the 32-pole control clamp, such as for dynamic start-stop applications with high and reproducible repeat accuracy of the movement profile.

## Digital input and outputs

- 8 Digital In
- 2 Digital Out
- 2 Relais
- Pulse-Train (CAN)

## Universal analog inputs / outputs

- 2 Analog In, 0 ... ±10 V, 0 ... ±20 mA, 4 ... 20 mA
- 2 Analog Out (0 ... ±10 V)

## 8 Parameter sets

- with complete set programming offer extensive internal functionality for I/O handling tasks or sequential operation of multiple motors, and can also partially take over otherwise superordinated PLC tasks.

## PID controllers

- process controllers for internal and external variables.

## Brake control

- safe operation of brake and sliding-rotor motors.

## DC-braking

- special stopping without brake resistor

## No-Safety- / No-Display-Version

- on request G6 inverter are also available without safety functionality or LCD and keyboard.



X2A	analog/digital	EtherCAT	CAN	IO-Link	PROFI
1	0 V	0 V	0 V	0 V	0 V
2	U <sub>in</sub>	U <sub>in</sub>	U <sub>in</sub>	U <sub>in</sub>	U <sub>in</sub>
3	0 V	0 V	0 V	0 V	0 V
4	U <sub>out</sub>	U <sub>out</sub>	U <sub>out</sub>	U <sub>out</sub>	U <sub>out</sub>
5	RST	RST	RST	RST	RST
6	ST	ST	ST	ST	ST
7	R	R	R	R	R
8	F	F	F	F	F
9	I2	I2	I2	I2	I2
10	I1	I1	I1	I1	I1
11	I4	I4	I4	I4	I4
12	I3	I3	I3	I3	I3
13	O2	O2	O2	O2	O2
14	O1	O1	O1	O1	O1
15	0 V	0 V	0 V	0 V	0 V
16	CRF	-	CRF	CRF	-
17	AN1-	-	AN1-	AN1-	-
18	AN1+	-	AN1+	AN1+	-
19	AN2-	-	AN2-	AN2-	-
20	AN2+	-	AN2+	AN2+	-
21	COM	-	COM	COM	-
22	AN <sub>out1</sub>	-	AN <sub>out1</sub>	AN <sub>out1</sub>	-
23	COM	-	COM	COM	-
24	AN <sub>out2</sub>	-	AN <sub>out2</sub>	AN <sub>out2</sub>	-
25	R2-C	R2-C	R2-C	R2-C	R2-C
26	R1-C	R1-C	R1-C	R1-C	R1-C
27	R2-B	R2-B	R2-B	R2-B	R2-B
28	R1-B	R1-B	R1-B	R1-B	R1-B
29	R2-A	R2-A	R2-A	R2-A	R2-A
30	R1A	R1-A	R1-A	R1-A	R1-A
31	0 V	R3-C*	Initiator	R3-C*	R3-C*
32	U <sub>out</sub>	R3-A*	-	R3-A*	R3-A*

\* units with special 0 Hz - function

Power stage	
3-ph. 380 ... 480 V AC, +10/-20%, 50/60 Hz and DC-input	✓
EMC according to class C1 and C2 with integrated filter	✓
internal braking transistor (GTR7)	✓

## Integrated EMC solution

built with new innovative core materials and configured

- according to EN61800-3 for environments **C1** and **C2** sized for motor cables, up to 100 m - C2 / 50 m - C1

for especially low leakage currents of the filter component towards the ground

- < 5 mA (low leakage EMC)

and installation-safe due to consistently separated mains and motor connection side.

## Thermo contact analysis

- flexibly adjustable analysis of thermal signals of connected motors (PTC and thermo switches, KTY from E-housing) for advance warning or direct safety shut-down.

## Fully dimensioned

- with high overload characteristic for acceleration and deceleration, primarily configured for load profiles with constant torque.
- true intermediate circuit capacity for absorbing impulse energy and robust behaviour for fluctuations in electricity supply.
- internal DC choke (option from E-housing)

## Worldwide use

- proven through acceptance as per UL/cUL
- configured for mains voltages of min. 380 V to max. 480 V, 50/60 Hz, tolerance +10/-20%
- series DC input includes precharging in device (housing A-C).



**KEB COMBIVERT G6** power supply



**KEB COMBIVERT G6** motor side



**KEB COMBIVERT G6**  
Safety-version with Display

# Data table – Mechanics

Actually 4 different mechanical sizes of **KEB COMBIVERT G6** are covering the power range from 0.75kW - 30kW. Flat Rear\* and push-through are size depending variations for optimizing the cabinet.

Installation size		A	B	C	E
Width <b>W</b>	[mm]	90	90	117	170/198*
Height <b>H</b>	[mm]	185	269	260	340
Depth <b>D</b>	[mm]	204	200	230/175*	280/165*
<b>Mounting</b>		2 x M4	2 x M4	4 x M5	4 x M6 / 10 x M6*
<b>Weight</b>	[kg]	1.5	2.5	4.6	11.3
<b>Cooling</b>					
Ventilated convection		✓	✓	✓	✓
Flat Rear* heat transfer		✓	✓	option	option
External heat		-	-	-	✓

Size	Type	Design	Variant
<b>X</b> <b>X</b> . <b>G</b> <b>6</b> . <b>X</b> <b>X</b> <b>X</b>			<b>3</b> <b>X</b> <b>X</b> <b>X</b>
<b>07 ... 19</b>		<b>C</b> Standard version <b>D</b> CAN version <b>E</b> I/O Link <b>F</b> EtherCAT version <b>G</b> Profinet version	<b>3</b> 3 ph. 400 V <b>A</b> 8 kHz - 180 % I <sub>N</sub> <b>9</b> 4 kHz - 180 % I <sub>N</sub> <b>5</b> 4 kHz - 150 % I <sub>N</sub>
		<b>3</b> GTR7 and internal filter <b>D</b> and with Safety STO	<b>0</b> without Display <b>1</b> with LCD Display <b>2</b> SCL <b>3</b> SCL/LCD <b>4</b> ASCL <b>5</b> ASCL/LCD
		<b>A</b> Housing <b>B</b> <b>C</b> <b>E</b> <b>M</b> Motor inverter	<b>0</b> Ventilated convection <b>1</b> Flat Rear



**KEB COMBIVERT G6**  
Housing E - Flat Rear

### Order sample

Nominal power	1.5 kW	4 kW
Fieldbus	without	EtherCAT
Safety	with	without
LCD-Display	with	not available

**Part No.**                      **09.G6.CDA-3910**                      **12.G6.F3B-3900**

Size	07	09	10	12	13	13	14	15	16	17	18	19
input rating $U_N$ [V]	400 / 480 V*											
mains phases	3											
mains frequency [Hz]	50/60 ±2 %											
Housing size	A			B		C			E			
output power rating [kVA]	1.8	2.8	4	6.6	8.3	11	17	23	29	35	42	
<b>max. motor power rating [kW]</b>	<b>0.75</b>	<b>1.5</b>	<b>2.2</b>	<b>4</b>	<b>5.5</b>	<b>7.5</b>	<b>11</b>	<b>15</b>	<b>18.5</b>	<b>22</b>	<b>30</b>	
output rated current [A]	2.6	4.1	5.8	9.5	12	16.5	24	33	42	50	60	
max. short-time limit current [A]	4.7	7.2	10.4	17.1	21.6	29.7	36	49.5	63	75	90	
OC release current [A]	5.6	8.9	12.5	20.6	25.9	35.6	43.2	59	75	90	108	
input rated current [A]	3.6	6	8	13	17	23	31	43	55	65	80	
max. admissible mains fuse (gG) [A]	16	16	16	20	25	25	35	50	63	80	80	
rated switching frequency [kHz]	8	4	4	4	4	8	4	4	8	4	4	4
max. switching frequency [kHz]	8	8	8	8	8	16	8	8	8	8	8	8
power loss at nominal operation [W]	40	50	65	92	124	210	220	285	448	569	687	762
input voltage range $U_{in}$ [V]	380 ... 480 (305 ... 528 ± 0)											
network configurations	TN, TT, IT											
output voltage [V]	3 x 0 ... $U_{in}$											
output frequency [Hz]	0 ... 400 ( $f_s = 4$ kHz) / 0 ... 800 ( $f_s = 8$ kHz)											
<b>max. motor line length</b> (screened EN 61800-3)												
limit class C1 (low-capacity / standard line) [m]	50 / 25											
limit class C2 (low-capacity / standard line) [m]	100 / 50											
leakage current [mA]	< 5											
protection type [EN60529]	IP 20 / VBG4											
operating temperature [°C]	-10 ... 45 (55 with derating)											
storage temperature [°C]	-25 ... 70											
climate category in operation [EN 60721-3-3]	3K3											
environment [IEC 664-1]	rate of pollution 2											
vibration / shock as per ...	EN 60721-3-3											
Internal braking transistor GTR7	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
intermediate circuit connection	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
motor PTC evaluation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
motor KTY evaluation									✓	✓	✓	✓

\* Rated Voltage 480 V:  $I_{nom} = 0,86 \times$  output rated current

# Decentralized high protection degree - **Motor mounted inverter**

The G6-M highly integrated in a die-cast housing offers all performances for decentralized installations with a direct mounting of the power electronics on the motor terminal box.

## Nominal power

- 0.75, 1.5 and 2.2 kW - 400 V

## Dimensions

- W x H x D  
186 x 148 x 270 mm
- Weight 4 kg
- Protection type IP65

## Motor mounting for

- BG 63 / 71 / 80 / 90 / 100



KEB COMBIVERT G6-M  
with cable entrances



KEB COMBIVERT G6-M



Helical worm-



Gear



## Food production

- high breakaway torque during start-up
- exact torque during process

## Packaging technology

- fast set value processing at  $\pm 10$  V
- controlled positioning compensates dead times

## Conveyor and storage technology

- long motor lines up to 100 m
- robust mechanics

## Cranes, lifting devices

- high dynamics during acceleration
- internal braking transistor

## Compressors

- output frequency up to 800 Hz
- PID controllers for process control

## Elevators

- high starting torque
- consistent torque with change of loads
- suitable for modern three-phase motors and conventional elevating devices

## Wood machining equipment

- operation of spindle drives
- conveyor systems, finishers

## Textile equipment

- PID controllers for process control

## Medical technology

- flexible fieldbus interfaces

## Escalators

- energy savings in stand-by mode
- high starting torque, constant speed

In addition, **KEB COMBIVERT G6** can also be adapted to customer-specific applications beyond the described scope.

The existing platform has been prepared for additional variations, e.g. for special fieldbus protocols, operation of special motors or the expansion of software functions.



Helical-  
variants

Helical bevel-

Shaft mounted helical

# KEB COMBIVIS 6 - Software

The software tool for comfortable and functional PC operation based on .net-technology. **KEB COMBIVIS 6** integrates the complete structure for administration, start-up, diagnostics and optimization of all drive tasks into one program.

## Project management of the machine

- automatic and manual device search

## Device editor

- parallel access to multiple devices
- complete data backup and copy function
- 16 channel oscilloscope
- create a list of parameters
- commissioning supports

The online tool is available free of charge at [www.keb.de](http://www.keb.de) or as a DVD against a nominal fee with part no. CD.SW.010-0100.

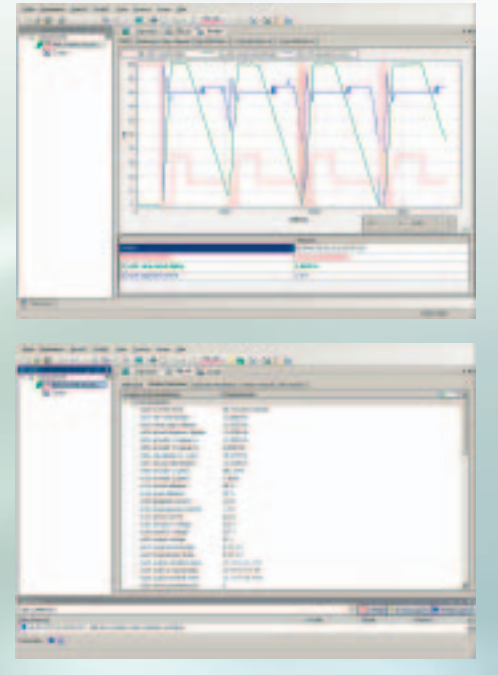
## Accessories:

- **USB adapter** (on D-Sub 9) - HSP5 / DIN 66019 II, part no. 00.58.060-0020
- **service data line** 2.8 m, D-Sub 9/D-Sub 9 - DIN 66019 II, part no. 00.58.025-001D

As an alternative to PC operation, the **KEB Portable-Operator** is available in two designs for operating devices without integrated LCD displays:

- **Basic version (without battery)**  
part no. 00.58.060-0110, wire-based communication, PC connection via USB interface
- **Wireless version**  
part no. 00.58.060-0010, with the additional features
  - SD card reader
  - Lithium-Ion battery and
  - wireless transmission in combination with the
- **Wireless Device Adapter**, part no. 00.58.060-0030, for HSP5 and RS232 protocol DIN 66019 II.

For production areas that do not use PCs, the unit provides a serial interface and extensive internal flash memory as well as an SD card reader (wireless version) for data transmission purposes. Prepared parameter settings can therefore quickly be imported into the various devices.



KEB Portable-Operator

**Braking resistors** can be connected to the series clamps of the GTR7 brake transistor, and ensure that energy peaks are absorbed and discharged.

To protect against overheating and fire hazards, the brake resistors feature thermal monitoring, which can be integrated into the external circuit.

These compact submountable versions require only a bit more mounting depth. They are intrinsically safe; without additional temperature sensors.

KEB COMBIVERT		external braking resistor			
Part-no.	R [Ω]	P <sub>D</sub> [W]	width [mm]	height [mm]	depth [mm]
07.BR.100-6620	620	56	40	165	24
09.BR.100-6390	390	90	40	240	24
10.BR.100-6270	270	130	40	300	24
12.BR.100-6150	150	230	80	300	26
13.BR.100-6110	110	350	80	400	26
14.BR.100-6853	85	410	80	400	26
15.BR.110-6563	56	620	63	370	96
16.BR.110-6423	42	820	63	470	96
17.BR.110-6303	30	1200	90	470	96

KEB COMBIVERT		book style side mount- / footprint version			
Part-no.	[Ω]	[W]	[mm]	[mm]	[mm]
10.G6.A90-4300	160	200/40	90	220	31
13.G6.B90-4300	110	250/60	90	285	31
15.G6.C90-4300	56	300/90	120	295	31
19.G6.E90-4300	15	300/120	170	345	31

**Mains chokes** are used to optimize the voltage supply in equipment and plants. Voltage and power peaks, e.g. with hard networks or the addition of large power consumers can damage the input circuit of the devices. In addition, mains chokes reduce the reaction into the network and extend the life of intermediate circuit capacitors.

**Harmonic filters** significantly dampen the network distortion of the rectifier switch and ensure that increasing global requirements regarding compliance with harmonic loading can be met.

Universal **sine-wave filters** for maximum output frequencies of up to 800 Hz are available for motors with special requirements for voltage rise or current types.

Full details and specifications are described in the catalog **KEB COMBILINE**



# Headquarters

**Karl E. Brinkmann GmbH**  
Försterweg 36 - 38  
D-32683 Barntrup  
Internet: [www.keb.de](http://www.keb.de)

Tel.: + 49 (0) 5263 401-0  
Fax: + 49 (0) 5263 401-116  
E-mail: [info@keb.de](mailto:info@keb.de)

## COMPANIES

### AUSTRIA

KEB Antriebstechnik  
Austria GmbH  
Ritzstraße 8  
A - 4614 Marchtrenk  
Tel: +43 7243 53586-0  
Fax: +43 7243 53586-21  
E-mail: [info@keb.at](mailto:info@keb.at)  
Internet: [www.keb.at](http://www.keb.at)

### CHINA

KEB Power Transmission  
Technology (Shanghai) Co. Ltd.  
No. 435 QianPu Road  
Songjiang East Industrial Zone  
CN-201611 Shanghai, PR. China  
Tel: +86 21 37746688  
Fax: +86 21 37746600  
E-mail: [info@keb.cn](mailto:info@keb.cn)  
Internet: [www.keb.cn](http://www.keb.cn)

### GERMANY

KEB Antriebstechnik GmbH  
Wildbacher Straße 5  
D-08289 Schneeberg  
Tel: +49 3772 67-0  
Fax: +49 3772 67-281  
E-mail: [info@keb-drive.de](mailto:info@keb-drive.de)

### FRANCE

Société Française KEB  
Z.I. de la Croix St. Nicolas  
14, rue Gustave Eiffel  
F - 94510 LA QUEUE EN BRIE  
Tel: +33 149620101  
Fax: +33 145767495  
E-mail: [info@keb.fr](mailto:info@keb.fr)  
Internet: [www.keb.fr](http://www.keb.fr)

### GREAT BRITAIN

KEB (UK) Ltd.  
6 Chieftain Business Park,  
Morris Close  
Park Farm, Wellingborough  
GB - Northants, NN8 6 XF  
Tel: +44 1933 402220  
Fax: +44 1933 400724  
E-mail: [info@keb-uk.co.uk](mailto:info@keb-uk.co.uk)  
Internet: [www.keb-uk.co.uk](http://www.keb-uk.co.uk)

### ITALY

KEB Italia S.r.l. Unipersonale  
Via Newton, 2  
I - 20019 Settimo Milanese (Milano)  
Tel: +39 02 33535311  
Fax: +39 02 33500790  
E-mail: [info@keb.it](mailto:info@keb.it)  
Internet: [www.keb.it](http://www.keb.it)

### JAPAN

KEB - Japan Ltd.  
15 - 16, 2 - Chome  
Takanawa Minato-ku  
J - Tokyo 108 - 0074  
Tel: +81 33 445-8515  
Fax: +81 33 445-8215  
E-mail: [info@keb.jp](mailto:info@keb.jp)  
Internet: [www.keb.jp](http://www.keb.jp)

### RUSSIA

KEB CIS ZAO  
Lesnaya str, house 30  
Dzerzhinsky (MO)  
RUS - 140091 Moscow region  
Tel: +7 495 6320217  
Fax: +7 495 6320217  
E-Mail: [info@keb.ru](mailto:info@keb.ru)  
Internet: [www.keb.ru](http://www.keb.ru)

### USA

KEB America, Inc  
5100 Valley Industrial Blvd. South  
USA - Shakopee, MN 55379  
Tel: +1 952 2241400  
Fax: +1 952 2241499  
E-mail: [info@kebameric.com](mailto:info@kebameric.com)  
Internet: [www.kebameric.com](http://www.kebameric.com)

**Representative offices in** Belgium • Brazil • Korea • Sweden • Spain

### Further partners for ...

Australia • Belgium • Brazil • Bulgaria • Czech Republic • Denmark • Egypt • Greece • Hungary • India • Indonesia • Iran • Israel • Malaysia • Morocco • Netherlands • New Zealand • Pakistan • Poland • Portugal • Romania • Singapore • Slovakia • South Africa • Spain • Sweden • Switzerland • Taiwan • Thailand • Tunisia • Turkey • Uzbekistan

... under [www.keb.de/en/contact/keb-worldwide.html](http://www.keb.de/en/contact/keb-worldwide.html)



© KEB 00.00.000-51G6 / 04-2012 • Subject to technical alterations!

