

MADE
IN
GERMANY

G6

COMBIVERT G6



High Performance Inverter
0.75 ... 30 kW



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.

Equipped with new 32-bit microcontrollers, proven features of previous KEB frequency inverters have been specifically enhanced and further developed in the devices.

- The basic version of the operating v/Hz - and the SMM-control method (sensorless motor management) uses conventional tasks with asynchronous drives for output frequencies up to 800 Hz
- Highest demands on torque and speed stability meet the versions with sensorless control operation
 - G6-ASCL** (asynchronous-sensorless control) for asynchronous motors and
 - G6-SCL** (synchronous-sensorless control) synchronous motors

The two level parameter structure with basic (customer parameters) and application menu (application parameters) gives KEB COMBIVERT G6 a unique user friendly and easy handling high functionality.

Some variants are equipped with a built-in LCD text display, where the customer’s language is displayed in the user interface.

Demand-driven fan and stand-by functions reduce device loss / heat stress in the switching cabinet, ultimately increasing the overall efficiency of the system.

For a simplified maintenance, the fans are easily replaceable.

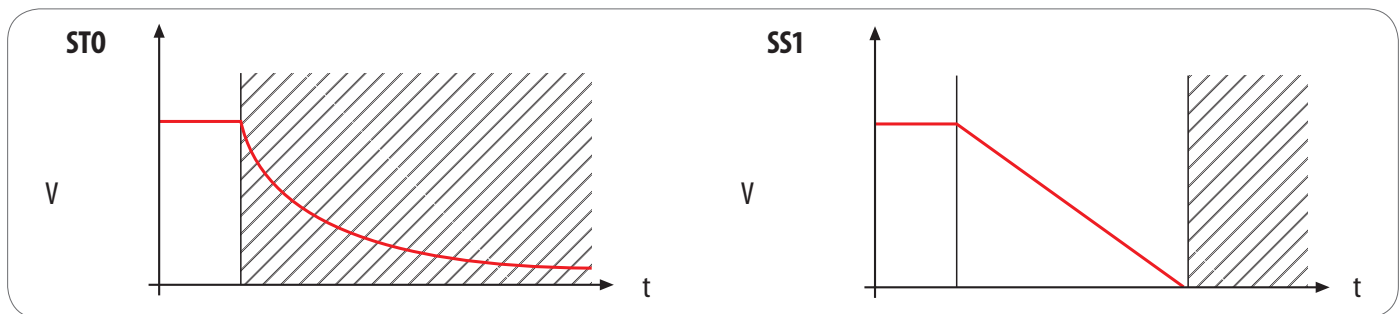
The compact design for “side by side” reduces the space required for multi-axis to a minimum.

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



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Conforming 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 - EMC technology

All sizes are equipped with an internal EMC filter ready for the installation, whose special property are the minimum leakage current (< 5 mA) against earth and motor cable lengths up to 100 m.

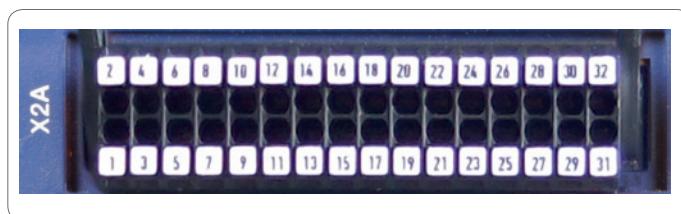


KEB COMBIVERT G6 - for serial communication

Flexible connection to the control level meets KEB COMBIVERT G6 with ON-BOARD-feldbus-options for

<p>CAN-Slave Profile DS 402 (with / without LCD-Display)</p>	<p>CAN over EtherCAT DS 402 100 MBaud (without LCD-Display)</p>	<p>Com.Specification V1.0 Device Description V1.0.1 (with / without LCD-Display)</p>	<p>(without LCD-Display)</p>	<p>(without LCD-Display)</p>
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Control unit	Analog/Digital	EtherCAT	CANopen	IO-Link	ETHERNET POWERLINK	PROFINET
internal and external 24V DC supply						✓
RS 232/485 interface, open protocol KEB DIN 66019-II						✓
analogue / digital IO (depending on control card version)						✓
STO function, 2-channel according category 3, EN ISO 13489-1, PL e / IEC EN 62061, SIL 3						✓



Digital input and outputs

- 8 Digital In
- 2 Digital Out
- 2 relays
- 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)
- (not available for EtherCAT, Profinet, Powerlink)

Quick input/output scanning

- for the 32-pole control terminal strip for dynamic start-stop applications with high and repetitious accuracy.

8 Parameter sets

- complete set programming offer extensive 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

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.

Safe Speed Monitoring with level f=0Hz

- I/O-Link-version match the certificated function SSM with level 0 Hz

No-Safety- / No-Display-Version

- on request G6 inverter versions Analog/Digital and CAN are available without safety functionality, without LCD and with keyboard.

Power stage	
1 ph. 200...240 V AC, 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.



KEB COMBIVERT G6 power supply

Thermo contact evaluation

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



KEB COMBIVERT G6 motor side

Fully dimensioned

- with high overload characteristic for acceleration and deceleration, primarily configured for load profiles with constant torque.
- true intermediate circuit capacity for absorbing pulse energy and robust behaviour against fluctuations of net.
- internal DC choke optional for size 16 - 18, E-housing.

prepared for worldwide use

- approbation UL/cUL
- configured for mains input voltages from 200 V to 240 V, or 380 V to max. 480 V, 50/60 Hz, tolerance +10/-20%
- DC-supply with precharging in series (housing A-C).
- protective coating of the circuit boards



KEB COMBIVERT G6
Safety-version with Display

Data table – Mechanics

Available in 4 different mechanical sizes, **KEB COMBIVERT G6** are covering the power range from 0.75 kW to 30 kW designed for cabinet or machine frame installation.

Devices with Flat Rear* and push-through are size depending variations to optimize the heat transfer.

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

KEB COMBIVERT G6 type code

Size		Type		Design			Variant							
X	X	G	6	X	X	X	–	X	X	X	X			
07 ... 19		C	D	E	F	G	H	0	3	A	9	5	1 ph. 230 V	3 ph. 400 V
													8 kHz - 180 % I _N	4 kHz - 180 % I _N
													4 kHz - 150 % I _N	
													without display	with LCD display
													2 SCL	3 SCL/LCD display
													4 ASCL	5 ASCL/LCD display
													0 Air cooling	1 Flat Rear



KEB COMBIVERT G6 housing E - Flat Rear

ordering examples

nominal power	1.5 kW	4 kW
fieldbus	without	EtherCAT
safety	with	without
LCD-Display	with	not available

part No.	09G6CDA-3910	12G6F3B-3900
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Size	230 V		400 V												
	07	09	07	09	10	12	13	13	14	15	16	17	18	19	
input rating U_N [V]	230 V		400 / 480 V*												
mains phases	1		3												
mains frequency [Hz]	50/60 ±2 %		50/60 ±2 %												
housing size	A		A			B			C			E			
output power rating [kVA]	1.6	2.8	1.8	2.8	4	6.6	8.3	11	17	23	29	35	42		
max. motor power rating [kW]	0.75	1.5	0.75	1.5	2.2	4	5.5	7.5	11	15	18.5	22	30		
output rated current * [A]	4	7	2.6	4.1	5.8	9.5	12	16.5	24	33	42	50	60		
max. short-time limit current (60 sec.) [A]	7.2	12.6	4.7	7.2	10.4	17.1	21.6	29.7	36	49.5	63	75	90		
OC release current [A]	8.6	15.1	5.6	8.9	12.5	20.6	25.9	35.6	43.2	59	75	90	108		
input rated current [A]	8	14	3.6	6	8	13	17	23	31	43	55	65	66		
max. admissible mains fuse (gG) [A]	20	20	16	16	16	20	25	25	35	50	63	80	80		
rated switching frequency [kHz]	4	4	8	4	4	4	4	8	4	4	4	4	4		
max. switching frequency [kHz]	8	8	8	8	8	8	8	8	8	8	8	8	8		
power loss at nominal operation approx. [W]	90	100	40	50	65	92	124	210	220	285	448	569	687		
input voltage range U_{in} [V]	180...264 ±0%		380...480 (305...528 ±0%)												
network configurations	TN, TT		TN, TT, IT												
output voltage [V]	3 x 0 ... U_{in}														
output frequency [Hz]	0 ... 400 (fs = 4 kHz) / 0 ... 800 (fs = 8 kHz)														
max. motor cable length (screened EN 61800-3)															
limit class C1 (low-capacity / standard line) [m]	30		50 / 25												
limit class C2 (low-capacity / standard line) [m]	50		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	railway EN 50155, German. Lloyd Part 7-3														
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 G6M is highly integrated in a die-cast housing and offers all performances for decentralized installations with a direct mounting of the power electronics at the location of the terminal box of KEB geared motors.

Power settings

- 0.75 and 1.5 kW - **230 V**
- 0.75 1.5 and 2.2 kW - **400 V**

Mechanics

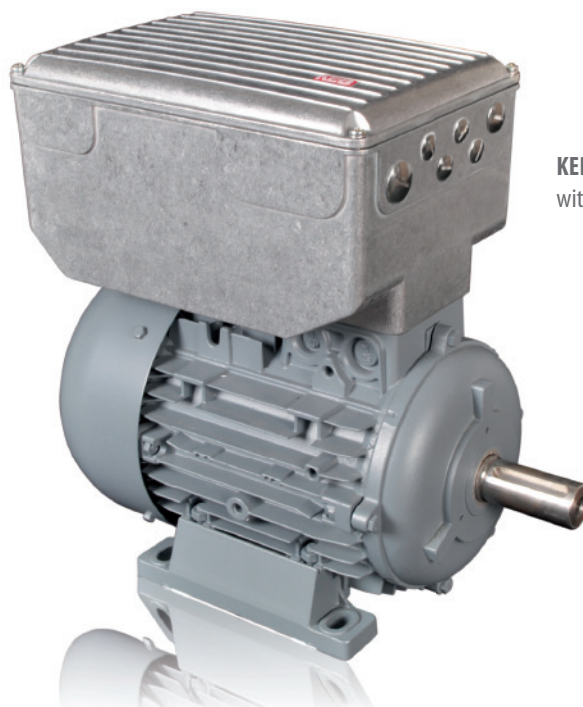
- dimensions Width x Height x Depth
 186 x 148 x 270 mm
- weight 4 kg
- protection IP54

Motor mounting for DM series

- Sizes 63 / 71 / 80 / 90 / 100 / 112



KEB COMBIVERT G6M
with cable entrances



KEB COMBIVERT G6M
with fittings

optimally combined with the gear variants



Helical worm gear



Helical gear



Helical bevel gear



Shaft mounted helical gear

Food production

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

Packaging technology

- fast set value processing with ± 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 elevator motors

Wood machining equipment

- operation of spindle drives
- conveyor systems, stacker
- Tool adjustment

Textile equipment

- PID controllers for process control
- protective coating

Escalators

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

Medical technology

- flexible fieldbus interfaces



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.



The software tool for comfortable and functional PC operation is 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

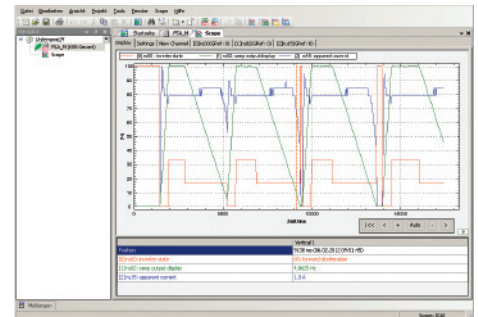
Device editor

- parallel access to multiple devices
- complete data backup and copy function
- 16 channel oscilloscope
- creating of parameter lists
- commissioning supports

The online tool is available free of charge at www.keb.de at any time or as a DVD against a nominal fee with part no. CDSW010-0100

Accessories:

- KEB USB adapter (on D-Sub 9) - HSP5 / DIN 66019 II, part no. 0058060-0020
- service data line 2.8 m, D-Sub 9/D-Sub 9 - DIN 66019 II, part no. 0058025-001D



Parameter	Value
r001 inverter data	40 Power of inverter
r002 set motor supply	11.0000 V
r003 set motor supply	11.0000 V
r004 actual frequency	11.0000 Hz
r005 actual frequency	11.0000 Hz
r006 actual frequency	11.0000 Hz
r007 actual frequency	11.0000 Hz
r008 actual DC voltage	18.0000 V
r009 actual DC voltage	11.0000 V
r010 inverter speed	0.0000
r011 actual velocity	0.0000
r012 actual velocity	0.0000
r013 actual current	0.00
r014 actual current	0.00
r015 actual DC current	0.00
r016 actual DC current	0.00
r017 output voltage	0.00 V
r018 output voltage	0.00 V
r019 output voltage	0.00 V
r020 output voltage	0.00 V
r021 output voltage	0.00 V
r022 output voltage	0.00 V
r023 output voltage	0.00 V
r024 output voltage	0.00 V
r025 output voltage	0.00 V
r026 output voltage	0.00 V
r027 output voltage	0.00 V
r028 output voltage	0.00 V
r029 output voltage	0.00 V
r030 output voltage	0.00 V
r031 output voltage	0.00 V
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r042 output voltage	0.00 V
r043 output voltage	0.00 V
r044 output voltage	0.00 V
r045 output voltage	0.00 V
r046 output voltage	0.00 V
r047 output voltage	0.00 V
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r082 output voltage	0.00 V
r083 output voltage	0.00 V
r084 output voltage	0.00 V
r085 output voltage	0.00 V
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r091 output voltage	0.00 V
r092 output voltage	0.00 V
r093 output voltage	0.00 V
r094 output voltage	0.00 V
r095 output voltage	0.00 V
r096 output voltage	0.00 V
r097 output voltage	0.00 V
r098 output voltage	0.00 V
r099 output voltage	0.00 V
r100 output voltage	0.00 V

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. 0058060-0110, wire-based communication with the COMBIVERT G6, PC connection via USB interface
- **Wireless version**
part no. 0058060-0010, with the additional features
 - SD card reader
 - Lithium-Ion battery and
 - wireless transmission in combination with the
- **Wireless Device Adapter**, part no. 0058060-0030, for HSP5 and RS232 protocol DIN 66019 II.

In addition to the serial interface and the internal flash memory, these units offers an SD card reader to transfer data , such as for parameter settings.

The required connection cables are included in the set.



KEB Portable-Operator

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

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

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

KEB COMBIVERT		book style side mount- / footprint version			
Part-no.	R [Ω]	P _D [W]	width [mm]	height [mm]	depth [mm]
10G6A90-4300	160	200	90	220	31
13G6B90-4300	110	250	90	285	31
15G6C90-4300	56	300	120	295	31
17G6E90-4300	25	300	170	345	31
19G6E90-4300	15	300	170	345	31
KEB COMBIVERT		external braking resistors			
Part-no.	[Ω]	[W]	[mm]	[mm]	[mm]
13BR100-6110	110	350	80	400	26
14BR100-6853	85	410	80	400	26
15BR110-6563	56	620	63	370	96
16BR110-6423	42	820	63	470	96
17BR110-6303	30	1200	90	470	96

Mains chokes are used to optimize the voltage supply in equipment and plants.

Voltage and power peaks, e.g. at rigid networks or the addition of large power consumers, can damage the input circuit of the devices.

In addition, mains chokes reduce the mains pollution and extend the lifetime of intermediate circuit capacitors.

Harmonic filters significantly attenuate the network distortion of the input rectifier and ensure that increasing global requirements regarding compliance with harmonics can be matched.

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 waveform.

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



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