

MADE
IN
GERMANY

F6

COMBIVERT F6-K

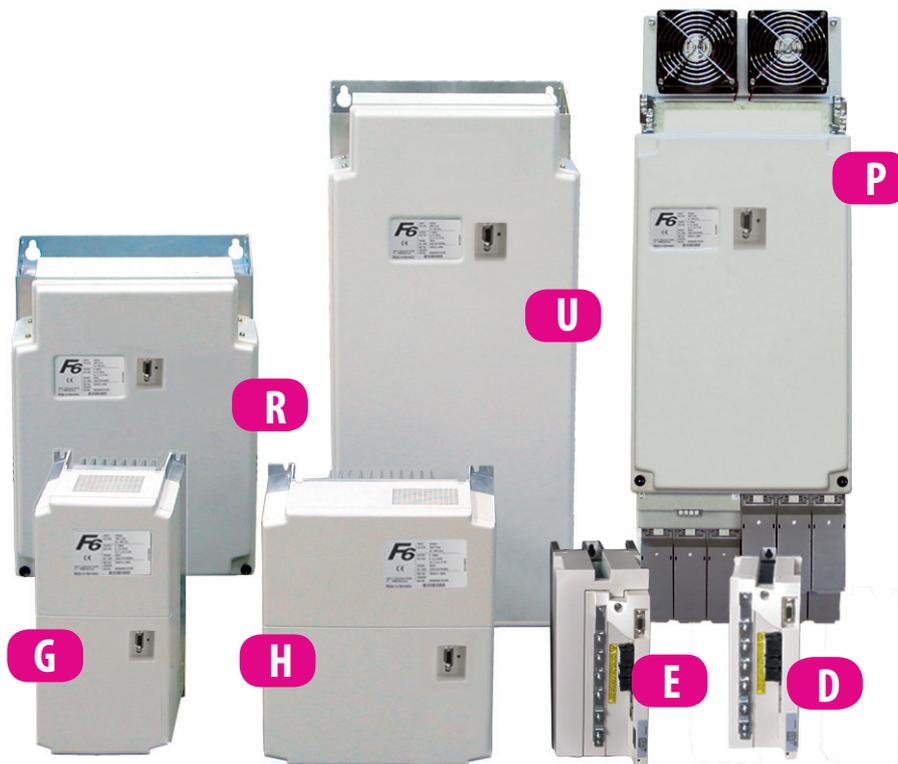


Single axis drives
1.5 ... 900 kW



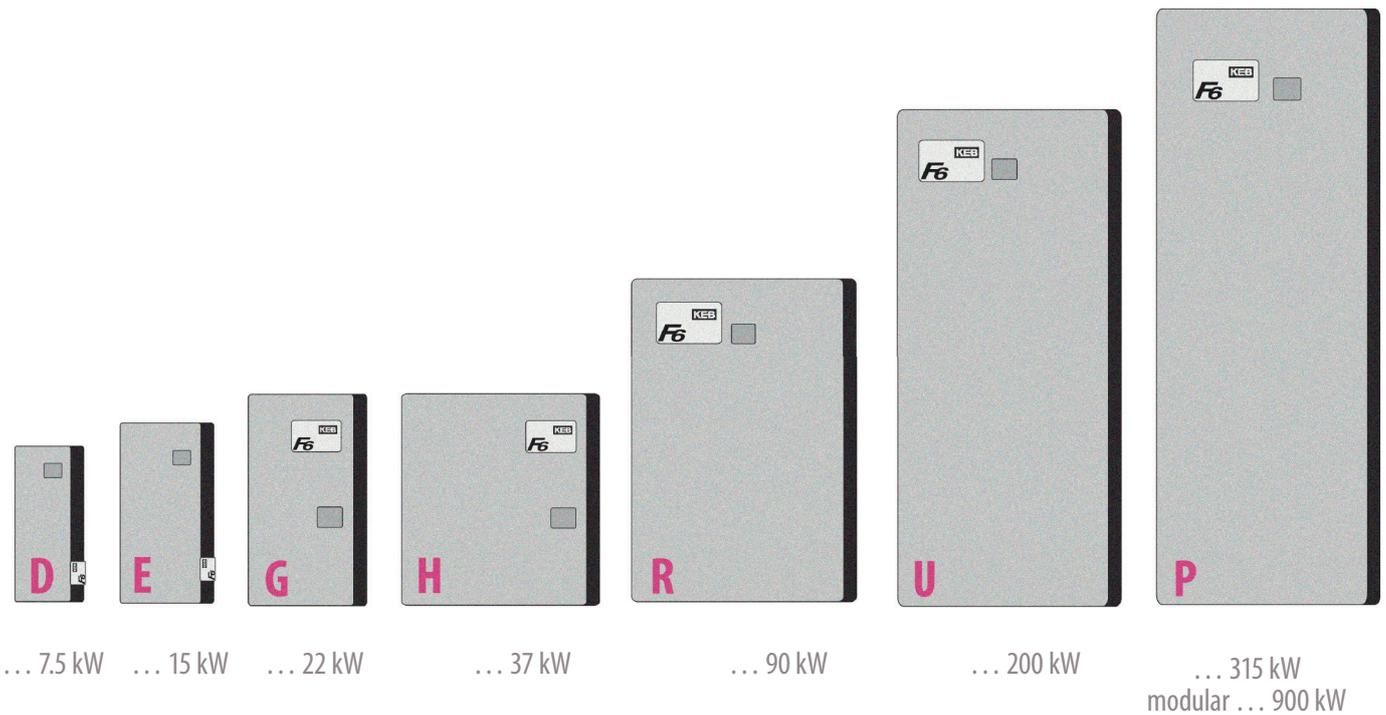
KEB COMBIVERT F6-K - Single Axis Drives

KEB COMBIVERT F6-K is a network ready inverter range, offering excellent regulated control. It is available in seven housing sizes. All inverters have integrated STO safety function to ISO 13849 Performance Level e / IEC 62061- SIL 3 as a two-channel solution. The range also benefits from programmable control modes, and multi-function Feedback card.



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The device features a particularly compact design and has been optimised for the use of individual machine axes and equipment. **KEB COMBIVERT F6-K** covers the power ranges 1.5 kW to 900 kW



230 V

1.5 kW ...	2,2 kW	-	1/3 Phase	200 ... 240 V AC
1.5 kW ...	45 kW	-	3 Phase	200 ... 240 V AC

400 V

1.5 kW ...	800 kW	-	3 Phase	400 ... 480 V AC
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690 V

200 kW ...	900 kW	-	3 Phase	600 ... 690 V AC
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KEB COMBIVERT F6-K frequency inverters that follows the principle

ONE FOR ALL

capable of functioning as a closed-Loop drive without a separate feedback device in the following operating modes

- ASCL - Sensorless control of asynchronous motors (induction/squirrel cage)
(Asynchronous Sensorless Closed Loop)
- SCL - Sensorless control of synchronous motors permanent magnet
(Sensorless Closed Loop)

Including an universal feedback card, the **KEB COMBIVERT F6-K** adds:

- FOR - field-oriented control of asynchronous motors with encoder feedback,

closed loop servo motors and open loop operations with enhanced features.
All operating modes are selectable by software.



Hence the **KEB COMBIVERT F6-K** services all current and conventional motor designs i. e.

- Three-phase asynchronous
- Three-phase synchronous
- IPM (Interior-Permanent-Magnet)
- Spindle drives
- Torque motors, direct drives
- Reluctance
- Linear
- High-frequency drives

With the design principle

EVERYTHING ON BOARD

the **KEB COMBIVERT F6-K** have traditional analog and digital I/Os on the control card:

- 3 x analog IN
- 8 x digital IN
- 4 x digital OUT

Communication to higher level controls can be achieved with:

- EtherCAT (2 x RJ 45)
 - the KEB standard bus for real-time applications based on Ethernet hardware

or optionally the protocol standard

- VARAN
- CAN interface (pluggable terminals)
 - CiA 402 profile (IEC 61800-7-201)
 - Cyclic synchronous modes (position, velocity und torque), Profile position mode, Velocity mode, Homing Mode

EtherCAT®



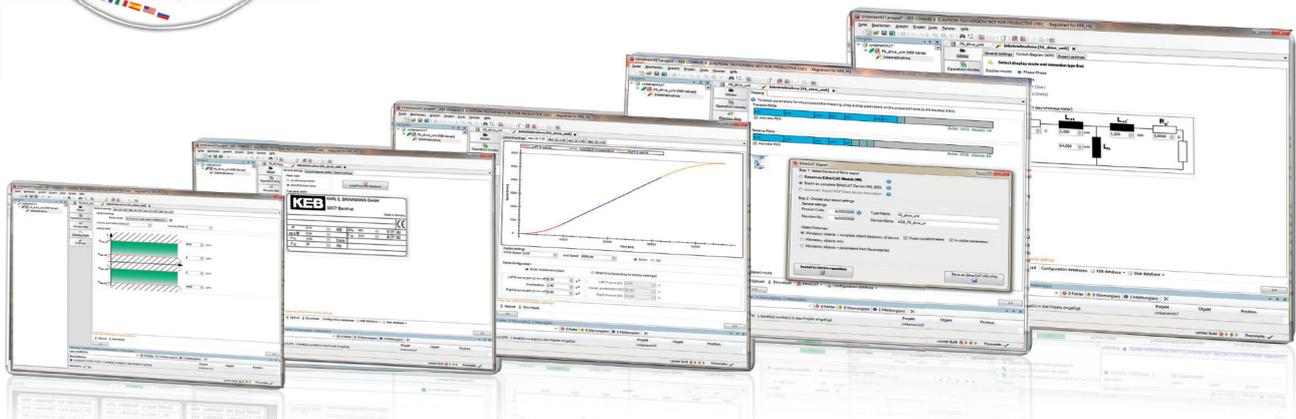
CANopen®

Everything related to **start-up, service, diagnostics or PC operation**, as well as an external display connection is supported by the

- RS 232/485 interface (D-Sub 9-connector).



The **KEB COMBIVIS 6** software package is the high-performance tool for PC supported commissioning. Settings and functional adjustments are simplified with user-friendly WIZARD functions, e.g. for adding process data or adjusting motor data.



Control units

A new generation of high-performance 32-bit micro controller provides universal internal and external control functions such as

- speed control
- torque control
- internal positioning module
- position mode
- external supply 24 V DC
- motor adaptation with standstill position detection
- switching frequencies up to 16 kHz
- current control grid 125 μ s
- speed controller 250 μ s
- bus cycle < 1 ms
- digital input scan: 250 μ s
- analog input scan: 250 μ s
- analog input modes: 0 ... +/-10 V
0 ... +/- 20 mA, 4 ... +/- 20 mA

The 2-channel STO safety function and all analog and digital I/Os, including the CAN interface, as pluggable connections.

Power unit

State-of-the-art IGBT semiconductor technology forms the basis for low-loss motor control and the implementation of highly dynamic motion profiles.

KEB COMBIVERT F6-K contains

- the brake transistor GTR 7
- motor temperature monitoring PTC, frame size D and E
- motor temperature monitoring KTY / PTC, frame size D and E
- output phase monitoring
- DC-bus connection
- protection against phase loss
- electronic motor protection
- ground fault and short-circuit monitoring

and features a robust design for ambient temperatures of up to 45° C or 55° C with de-rating

Depending on the power component,

- output frequencies up to 1600 Hz
- operation with sinus filter is supported.

Universal feedback interface

The **KEB COMBIVERT F6-K** provides excellent flexibility for control tasks. The control card contains two input channels that support the following sensor types:

- Resolver
- Incremental TTL encoder
- BISS
- SSI
- SinCos
- Endat 2.1 and 2.2
- Hiperface

Preassembled cables, suitable for stationary or flexible applications, make installation easy, and minimise wiring faults.



Technical data 230 V AC

power [kW]	frame size	I_N [A]	I_{max} [A]	$f_{sn/max}$ [kHz]	KEB part-no.	
1.5	D	7	12.4	16	09F6K1D-2BMA	200 ... 240 V AC - 1/3 Phase
2.2	D	10	18	16	10F6K1D-2BMA	
4	D	16.5	29.7	8/16	12F6K1D-1AMA	200 ... 240 V AC - 3 Phase + / - 10 %
5.5	E	24	36	8/16	13F6K1E-16MA	
7.5	E	33	49.5	4/16	14F6K1E-15MA	
11	G	48	86	8/16	15F6K1G-19MA	
15	H	66	99	16	16F6K1H-1BMA	
18.5	H	84	151	8/16	17F6K1H-19MA	
22	R	100	150	8/16	18F6K1R-76MA	
30	R	115	172	8/16	19F6K1R-76MA	
37	R	145	217	8/16	20F6K1R-76MA	
45	R	180	270	8/16	21F6K1R-76MA	

230 V

Technical data 400 V AC

power [kW]	frame size	I _n [A]	I _{max} [A]	f _{sn/max} [kHz]	KEB part-no.
1.5	D	4.1	7.4	8/16	09F6K1D-3AMA
2.2	D	5.8	10.4	16	10F6K1D-3BMA
4	D	9.5	17	8/16	12F6K1D-3AMA
5.5	D	12	21.6	4/16	13F6K1D-39MA
7.5	D	16.5	29.7	2/16	14F6K1D-38MA
11	E	24	36	4/16	15F6K1E-35MA
15	E	33	49.5	2/16	16F6K1E-34MA
18.5	G	42	63	4/16	17F6K1G-35MA
22	G	50	75	2/16	18F6K1G-34MA
30	H	60	90	4/16	19F6K1H-35MA
37	H	75	112	2/4	20F6K1H-34MA
45	R	90	135	4/16	21F6K1R-95MA
55	R	115	172	4/16	22F6K1R-95MA
75 ★	R	150	225	2/12	23F6K1R-94MA
90 ★	R	180	270	2/8	24F6K1R-94MA
110 ★	U	210	263	4/8	25F6K1U-91MA
132 ★	U	250	313	4/8	26F6K1U-91MA
160 ★	U	300	375	2/8	27F6K1U-90MA
200 ★	U *	370	463	2/4	28F6K1U-Y0MH
200 ★	P	370	463	2/4	28F6K1P-90MD
250 ★	P	460	575	2/4	29F6K1P-90MD
315 ★	P *	570	713	2/4	30F6K1P-Y0MH
355 ★	2 x P	630	787	2/4	31F6K1P-90MD
400 ★	2 x P	710	887	2/4	32F6K1P-90MD
450 ★	2 x P	800	1000	2/4	33F6K1P-90MD
500 ★	2 x P	890	1112	2/4	34F6K1P-90MD
560 ★	2 x P	1000	1250	2/4	35F6K1P-90MD
630 ★	3 x P	1150	1437	2/4	36F6K1P-90MD
710 ★	3 x P	1330	1663	2/4	37F6K1P-90MD
800 ★	3 x P *	1450	1813	2/4	38F6K1P-Y0MH

400 ... 480 V AC
+ / - 10 %

400 V

★ operation with mains line choke xxZ1B04-1000 (see page 11)

* with push through water cooling

The following applies to all panel mount units: 230 V, 400 V and 690 V

- protection type IP 20 / VBG 4
- operation temperature -10 ... 45° C / 55° C
- storage temperature -25 ... 70° C

Technical data 690 V AC

power [kW]	frame size	I _n [A]	I _{max} [A]	f _{sn/max} [kHz]	KEB part-no.	choke ★	<p>600 ... 690 V AC +/- 10 %</p> <p>690 V</p>
200 ★	P	225	281	2/4	28F6K1P-B0MD	29	
250 ★	P	280	350	2/4	29F6K1P-B0MD	29	
315 ★	P *	345	438	2/4	30F6K1P-X0MH	30	
400 ★	2 x P	430	538	2/4	32F6K1P-B0MD**	2 x 28	
450 ★	2 x P	500	613	2/4	33F6K1P-B0MD**	2 x 29	
500 ★	2 x P	550	688	2/4	34F6K1P-B0MD**	2 x 30	
560 ★	2 x P	620	763	2/4	35F6K1P-B0MD**	2 x 30	
630 ★	3 x P	710	875	2/4	36F6K1P-B0MD**	3 x 29	
710 ★	3 x P	820	1013	2/4	37F6K1P-B0MD**	3 x 30	
800 ★	3 x P	900	1100	2/4	38F6K1P-B0MD**	3 x 30	
900 ★	3 x P *	1015	1250	2/4	39F6K1P-X0MH**	3 x 30	

★ operation with mains line choke __Z1B06-1000

* with push through water cooling

** per module - output choke 29Z1A04-1001

Mechanical data for panel mount units

frame size	D	E	G	H	R	U	P
width	90	130	170	300	342	342	340
height	250	290	340	340	520	800	960
depth	181	208	255	255	355	355	454
with filter							
width	90	132	181	300	340	-	-
height	285	352	415	445	520	-	-
depth	221	258	311	321	355	-	-

Mechanical options

cooling	D	E	G	H	R	U	P
through-mount version Air	-	●	●	●	●	●	●
flat Rear	●	●	●	●	-	-	-
water cooling panel mount version	-	-	●	●	●	●	●
water cooling through-mount version	-	-	-	-	●	●	●

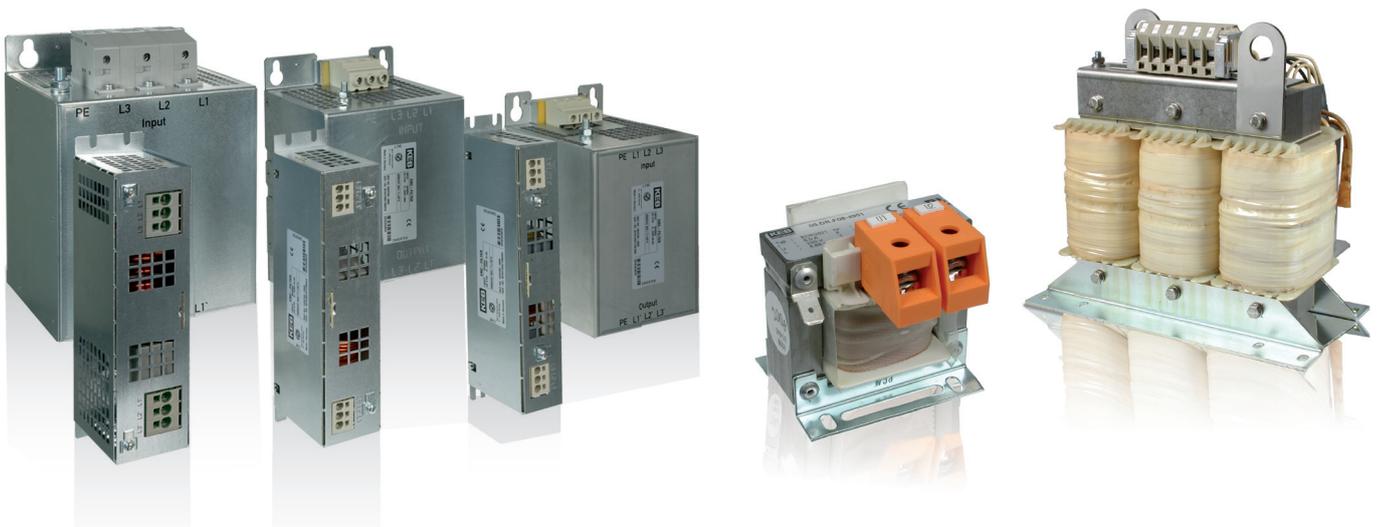
Stable operation under industrial environments

For safe and compliant equipment, the **KEB COMBIVERT F6-K** range is supported by the KEB COMBILINE range, comprising of:

- **EMC filters**
limits grid-bound emissions in accordance with IEC 61800-3 Class C1/C2.
- **Mains chokes**
reduce current spikes, voltage notching and noise feedback between mains and inverters.
- **Output chokes and filters**
reduce the voltage and current load on motor windings.
- **Sinus filters**
protects motor windings against voltage peaks associated with the use of long motor cables, allows the use of unscreened cable.
- **Harmonic filters**
ensures compliance with many international standards.

EMC - Service

KEB offers mobile direct on-site assistance, advisory services during the planning phase, and the analysis of existing equipment. We work with your Engineers to the design of real system EMC solutions.



	Power [kW]	frame size	EMC filters	Mains line choke	Harmonic filter	Motor choke	Sinus filter
230 V-class	1.5	D	10U5B0D-1000*	09Z1B02-1000*			
	2.2	D	10U5B0D-1000*	10Z1B02-1000*			
	4	D	12U5B0D-2000	12Z1B03-1000			
	5.5	E	13U5B0E-2000	13Z1B03-1000			
	7.5	E	14U5B0E-2000	14Z1B03-1000			
	11	G	15U5B0G-2000	15Z1B03-1000			
	15	H	16U5B0H-2000	16Z1B03-1000			
400 V-class	1.5	D	10U5B0D-3000	07Z1B04-1000	09Z1C04-1000 / 1001 *	07Z1F04-1010	09Z1G04-1000
	2.2	D	10U5B0D-3000	10Z1B04-1000	12Z1C04-1000 / 1001 *	10Z1F04-1010	10Z1G04-1000
	4	D	12U5B0D-3000	12Z1B04-1000	12Z1C04-1000 / 1001 *	12Z1F04-1010	12Z1G04-1000
	5.5	D	13U5B0D-3000	13Z1B04-1000	13Z1C04-1000 / 1001 *	13Z1F04-1010	13Z1G04-1000
	7.5	D	14U5B0D-3000	14Z1B04-1000	14Z1C04-1000 / 1001 *	14Z1F04-1010	14Z1G04-1000
	11	E	15U5B0E-3000	15Z1B04-1000	15Z1C04-1000 / 1001 *	15Z1F04-1010	15Z1G04-1000
	15	E	16U5B0E-3000	16Z1B04-1000	16Z1C04-1000 / 1001 *	16Z1F04-1010	16Z1G04-1000
	18.5	G	17U5B0G-3000	17Z1B04-1000	17Z1C04-1000 / 1001 *	17Z1F04-1010	17Z1G04-1000
	22	G	18U5B0G-3000	18Z1B04-1000	18Z1C04-1000 / 1001 *	18Z1F04-1010	18Z1G04-1000
	30	H	19U5B0H-3000	19Z1B04-1000	19Z1C04-1000 / 1001 *	19Z1F04-1010	19Z1G04-1000
	37	H	20U5B0H-3000	20Z1B04-1000	20Z1C04-1000	20Z1F04-1010	20Z1G04-1000
	45	R	23U5B0R-3000	21Z1B04-1000	21Z1C04-1000	21Z1F04-1010	21Z1G04-1000
	55	R	23U5B0R-3000	22Z1B04-1000	22Z1C04-1000	22Z1F04-1010	22Z1G04-1000
	75 ★	R	23U5B0R-3000	23Z1B04-1000	23Z1C04-1000	23Z1F04-1010	23Z1G04-1000
	90 ★	U	25U5B0U-3000	24Z1B04-1000	24Z1C04-1000	24Z1F04-1010	24Z1G04-1000
	110 ★	U	25U5B0U-3000	25Z1B04-1000	25Z1C04-1000	25Z1F04-1010	25Z1G04-1000
	132 ★	U	27U5B0U-3000	26Z1B04-1000	26Z1C04-1000	26Z1F04-1010	26Z1G04-1000
	160 ★	U	27U5B0U-3000	27Z1B04-1000	27Z1C04-1000	27Z1F04-1010	27Z1G04-1000
	200 ★	U / P	28U5A0W-3000	28Z1B04-1000	28Z1C04-1000	28Z1F04-1010	28Z1G04-1000
	250 ★	P	30U5A0W-3000	29Z1B04-1000	29Z1C04-1000	229Z1F04-1010	29Z1G04-1000
	315 ★	P	30U5A0W-3000	30Z1B04-1000	30Z1C04-1000	30Z1B22-4430	30Z1G04-1000
355 ★	2 x P	32U5A0W-3000	2 x 28Z1B04-1000	2 x 27Z1C04-1000	2 x 29Z1A04-1001		
400 ★	2 x P	32U5A0W-3000	2 x 28Z1B04-1000	2 x 28Z1C04-1000	2 x 29Z1A04-1001		
450 ★	2 x P	2 x 28U5A0W-3000	2 x 28Z1B04-1000	2 x 28Z1C04-1000	2 x 29Z1A04-1001		
500 ★	2 x P	2 x 30U5A0W-3000	2 x 29Z1B04-1000	2 x 29Z1C04-1000	2 x 29Z1A04-1001		
560 ★	2 x P	2 x 30U5A0W-3000	2 x 28Z1B04-1000	2 x 28Z1C04-1000	2 x 29Z1A04-1001		
630 ★	3 x P	3 x 30U5A0W-3000	3 x 28Z1B04-1000	3 x 28Z1C04-1000	3 x 29Z1A04-1001		
710 ★	3 x P	3 x 30U5A0W-3000	3 x 29Z1B04-1000	3 x 29Z1C04-1000	3 x 29Z1A04-1001		
800 ★	3 x P	3 x 30U5A0W-3000	3 x 29Z1B04-1000	3 x 29Z1C04-1000	3 x 29Z1A04-1001		

* single phase 230 V AC; 3-phase filters and chokes on request

★ generally operated with mains line choke

* THD(i) = 8 % / 15 %

Headquarters

KEB - Karl E. Brinkmann GmbH

Försterweg 36 - 38 • D - 32683 Barntrup
Telefon +49 5263 401-0 • Telefax 401-116
Internet: www.keb.de • E-Mail: info@keb.de



KEB Antriebstechnik GmbH • Getriebemotorenwerk
Wildbacher Straße 5 • D - 08289 Schneeberg
Telefon +49 3772 67-0 • Telefax 67-281
Internet: www.keb-drive.de • E-Mail: info@keb-drive.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
Internet: 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
Internet: www.keb.cn

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
Internet: www.keb.fr

GREAT BRITAIN

KEB (UK) Ltd.
Morris Close
Park Farm, Industrial Estate,
Wellingborough
GB - Northants, NN8 6 XF
Tel: +44 1933 402220
Fax: +44 1933 400724
E-mail: info@keb-uk.co.uk
Internet: www.keb-uk.co.uk

ITALY

KEB Italia S.r.l. Unipersonale
Via Newton, 2
I - 20019 Settimo Milanese (Milano)
Tel: +39 02 3353531
Fax: +39 02 33500790
E-mail: info@keb.it
Internet: 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
Internet: www.keb.jp

RUSSIA

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

Representative offices

- Belgium
- Brazil
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