

**KEB**



# COMBIVERT F5

MODULAR DRIVE 0.37 ... 900 kW

EN

# FREQUENCY INVERTER F5



COMBIVERT **F5** are frequency inverters and servo systems in the power range from 0.37 to 900 kW. They provide a modular program for the mechanical engineering, that meet the different requirements in flexibility with the aim of

- **OPTIMAL USE OF RESOURCES AND MATERIALS AND**
- **MINIMUM EXPENSE IN DESIGN AND EASY IMPLEMENTATION OF APPLICATION SOLUTIONS**

Simple handling and multipurpose features were often contradictory. The CP mode ensures user-friendly handling via a programmable menu. In the subordinate application level COMBIVERT F5 is the world's first drive generation to have a fully programmable user surface, which is equipped with a plain text operator guidance in 6 languages.

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**OPEN-LOOP SYSTEMS**

**BASIC** 0.37 ... 15 kW  
**COMPACT** 0.37 ... 90 kW

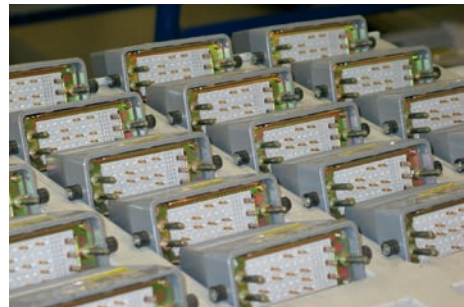
Compact units with 230 V and 400 V connection in functional and economical orientation and universal features create the ideal platform for the design of high-quality machines and systems.



**CLOSED-LOOP SYSTEMS**

**MULTI** 0.75 ... 900 kW

Closed-loop drives of voltage classes 230 V, 400 V and 690 V for asynchronous and synchronous servo motors with feedback devices.

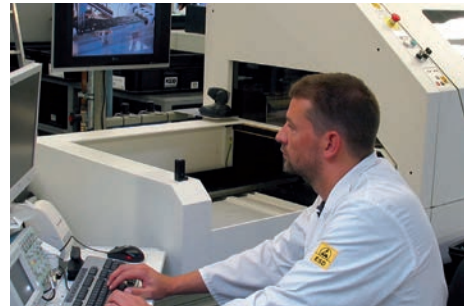


**APPLICATION**

Customized equipment solutions tailored to operating conditions and requirements.

Examples are the software versions

- **ASCL**, encoder-less field orientation for asynchronous motors
- **SCL** for closed-loop performance without a feedback device for synchronous motors
- Versions with special adapted hardware and software



DeviceNet

MODBUS

EtherNet  
TCP/IP

EtherCAT

ETHERNET  
POWERLINK

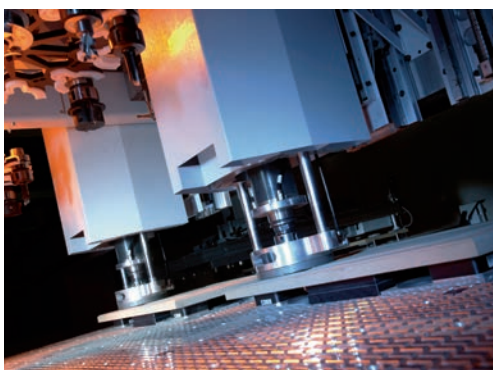
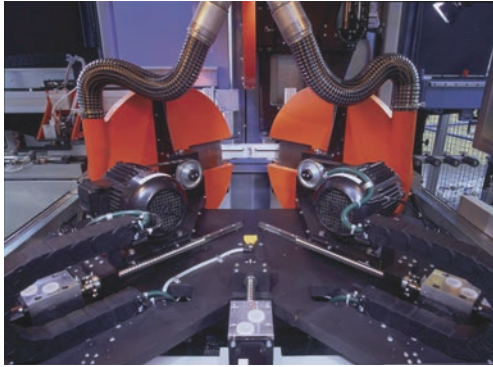
EtherNet/IP

CANopen

KEB-HSP 5 /  
DIN 66019-II



### FREQUENCY INVERTERS FROM SIMPLE TO SOPHISTICATED – IN OPEN-LOOP TASKS THROUGHOUT THE ENGINEERING SECTOR ...



- Connection 1-/3-phase 230 V and 3-phase 400 V, choice of AC or DC supply in one unit
- Optimized KEB-SMM control algorithm (sensorless motor management)
- 17 pluggable control terminals, PNP-logic
- Analog input 0...±10 V / 0...±20 mA, 4...20 mA (housing D, E)
- Programmable analog output 0 ... ±10 V
- 5 programmable digital inputs
- 2 programmable relay outputs
- 4 programmable software inputs/outputs
- 8 free-to-program parameter sets including S-curves, ramp stop, power-off-function, DC-braking, PID controller, electronic motor protection, brake control, internal timer, counter input and energy saving function
- Output frequencies up to 800 Hz – optional up to 1600 Hz, output voltage control, adjustable switching frequencies up to 16 kHz
- Controlled positioning to end position/counter pulse
- High-dynamic scanning of the control terminals and the serial interface in 2 ms
- + / - DC-link connection, internal braking chopper GTR7, motor-PTC-evaluation
- Integrated filter to EN 55011/C1 (option: B-, D-, E-housing)

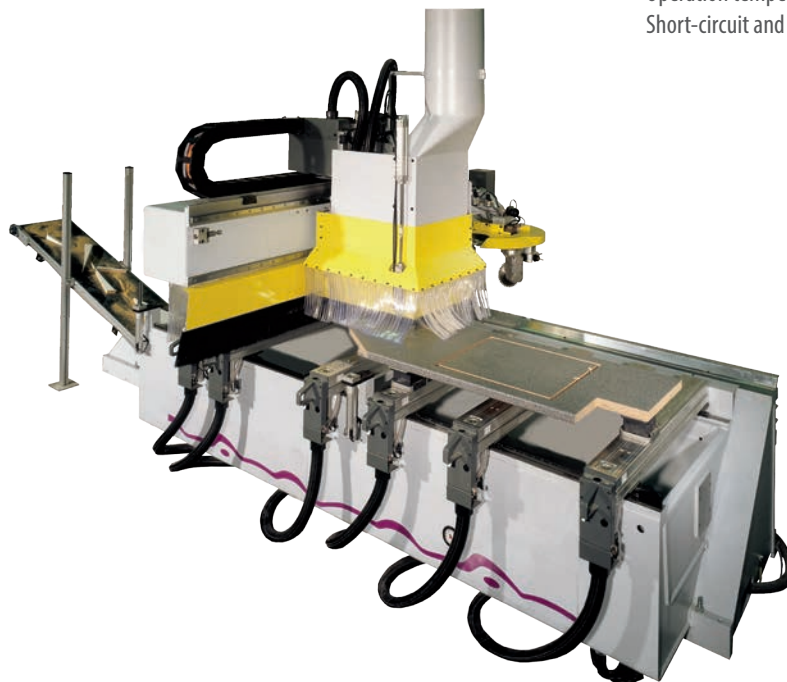
	$P_N$ [kW]	Housing	$I_N$ [A]	$I_{max}$ [A]	$f_{sN/max}$ [kHz]	EMC		Part no
<b>1-/3-PH 230 V (180 ... 260 V)</b>	0.37	A*	2.3	5	4/8	C1	●	05F5B3A-090A
	0.75	A*	4	8.6	8	C1	●	07F5B3A-0A0A
	1.5	B	7	15.1	16	C1	◆	09F5B1B-2B0A
	2.2	B	10	21.6	8/16	C1	◆	10F5B1B-2A0A
	4	D**	16.5	35.6	8/16	C1	◆	12F5B1D-1A0A
	5.5	E**	24	43	8/16	C1	◆	13F5B1E-160A
	7.5	E**	33	59	4/16	C1	◆	14F5B1E-150A
<b>3-PH 400 V (305 ... 500 V)</b>	0.37	A	1.3	2.8	4	C1	●	05F5B3A-390A
	0.75	A	2.6	5.6	4	C1	●	07F5B3A-390A
	1.5	A	4.1	8.9	4	C1	●	09F5B3A-390A
	2.2	B	5.8	12.5	8/16	C1	◆	10F5B1B-3A0A
	4	B	9.5	21	4	C1	◆	12F5B1B-350A
	5.5	D	12	25.9	4/16	C1	◆	13F5B1D-390A
	7.5	D	16.5	35.6	2/16	C1	◆	14F5B1D-380A
	11	E	24	43	4/16	C1	◆	15F5B1E-350A
	15	E	33	59	2	C1	◆	16F5B1E-340A

- internal
- \* 1-phase 230 V AC

- ◆ footprint (option)
- \*\* 3-phase 230 V AC

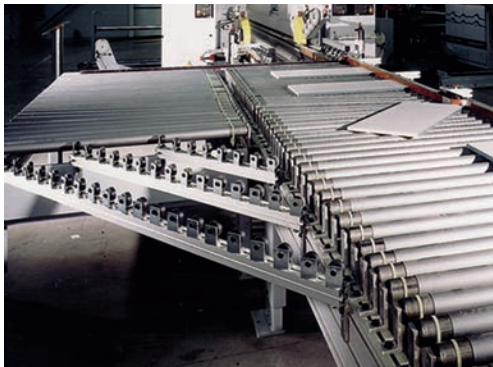
**GENERALLY:**

Product standard	EN 61800-2, -5-1
Emitted interference	EN 61800-3
	EN 61000-6-1 ... 4
Enclosure	IP 20 / VBG 4
Storage temperature	-25 ... 70 °C
Operation temperature	-10 ... 45 °C
Short-circuit and earth fault monitoring	



## F5 COMPACT

### MORE THAN JUST AN INVERTER... HIGH TECHNOLOGY FOR OPEN-LOOP DRIVE SYSTEMS



- Wide power range for 230 V and 400 V connection
- Either AC or DC connection
- Optimal characteristics at the motor shaft in different application areas with KEB-SMM (sensorless motor management)
- 29 plug-in control terminals, PNP- / NPN logic switchable
- 2 analogue inputs 0 ...  $\pm 10$  V, 0 ...  $\pm 20$  mA, 4 ... 20 mA
- 2 programmable analogue outputs 0 ...  $\pm 10$  V
- 8 programmable digital inputs
- Programmable outputs: 2 x relay, 2 x transistor
- 4 programmable software inputs/outputs
- 8 free-to-program parameter sets including S-curves, ramp stop, power-off-function, DC-braking, PID controller, electronic motor protection, brake control, internal timer, counter input and energy saving function
- Output frequencies up to 800 Hz – optional up to 1600 Hz, output voltage control, adjustable switching frequencies up to 16 kHz
- Controlled positioning to end position/counter pulse
- High-dynamic scanning of the control terminals and the serial interface in 2 ms
- + / - DC-link connection, internal braking chopper GTR7, motor-PTC-evaluation
- Integrated filter to EN 55011/C1 (option: B-, D-, E-housing)

**3-PH. 230 V (180 ... 260 V)**

$P_N$ [kW]	Housing	$I_N$ [A]	$I_{max}$ [A]	$f_{sN/max}$ [kHz]	EMC	Part no.
0.37	B*	2.3	5	16	C1 ♦	05F5C1B-2B0A
0.75	B*	4	8.6	16	C1 ♦	07F5C1B-2B0A
1.5	B*	7	15.1	16	C1 ♦	09F5C1B-2B0A
2.2	B*	10	21.6	8/16	C1 ♦	10F5C1B-2A0A
4	D	16.5	35.6	8/16	C1 ♦	12F5C1D-1A0A
5.5	E	24	43	8/16	C1 ♦	13F5C1E-160A
7.5	E	33	59	4/16	C1 ♦	14F5C1E-150A
11	G	48	103	4/16	C1 ♦	15F5C1G-190F
15	H	66	142	16	C1 ♦	16F5C0H-1B0F
18.5	H	84	181	4/16	C1 ♦	17F5C0H-190F
22	R	100	180	8	C1 ●	18F5C0R-760A
30	R	115	206	8	C1 ●	19F5C0R-760A
37	R	145	261	8	C1 ▲	20F5C0R-760A
45	R	180	324	8	C1 ▲	21F5C0R-760A

**3-PH. 400 V (305 ... 528 V)**

$P_N$ [kW]	Housing	$I_N$ [A]	$I_{max}$ [A]	$f_{sN/max}$ [kHz]	EMC	Part no.
0.37	B	1.3	2.8	16	C1 ♦	05F5C1B-3B0A
0.75	B	2.6	5.6	16	C1 ♦	07F5C1B-3B0A
1.5	B	4.1	8.9	8/16	C1 ♦	09F5C1B-3A0A
2.2	B	5.8	12.5	8/16	C1 ♦	10F5C1B-3A0A
4	B	9.5	21	4	C1 ♦	12F5C1B-350A
5.5	D	12	25.9	4/16	C1 ♦	13F5C1D-390A
7.5	D	16.5	35.6	2/16	C1 ♦	14F5C1D-380A
11	E	24	43	4/16	C1 ♦	15F5C1E-350A
15	E	33	59	2/16	C1 ♦	16F5C1E-340A
18.5	G	42	75	4/16	C1 ♦	17F5C1G-350A
22	G	50	90	2/8	C1 ♦	18F5C1G-340F
30	H	60	108	4/16	C1 ♦	19F5C0H-350F
37	H	75	135	2/8	C1 ♦	20F5C0H-340F
45	R	90	162	4/16	C1 ●	21F5C0R-950A
55	R	115	207	4/16	C1 ●	22F5C0R-950A
75 ★	R	150	270	2/8	C1 ●	23F5C0R-940A
90 ★	R	180	324	2/8	C1 ▲	24F5C0R-940A

**GENERALLY:**

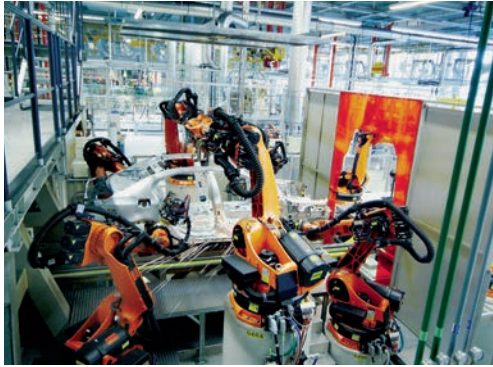
Product standard EN 61800-2, -5 – 1  
 Emitted interference EN 61800-3  
 EN 61000-6 -1 ... 4  
 Enclosure IP 20 / VBG 4  
 Storage temperature -25 ... 70 °C  
 Operation temperature -10 ... 45 °C  
 Short-circuit and earth fault monitoring

- internal (option)                      \* 1-/3-phase 230 V AC
- ♦ footprint (option)                    ▲ book-style (option)
- ★ mains choke generally required (page 26)



# F5 MULTI

## OPEN-LOOP AND CLOSED-LOOP DRIVE CONTROLLER FOR SYNCHRONOUS AND ASYNCHRONOUS MOTOR...



The frequency inverter COMBIVERT F5 Multi is equipped with all functions and characteristics of the COMBIVERT F5 Compact series and furthermore especially prepared for closed-loop operation.

Very flexible because of plug-in feedback cards

- Resolver
- Incremental encoder, initiator
- Sin/Cos encoder
- Absolute encoder
- Hiperface®, EnDat®
- BISS or Tacho

and usable in the operation modes

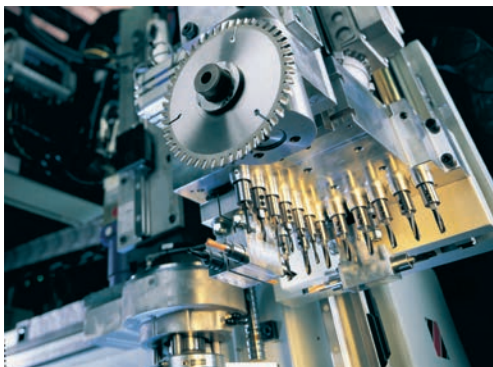
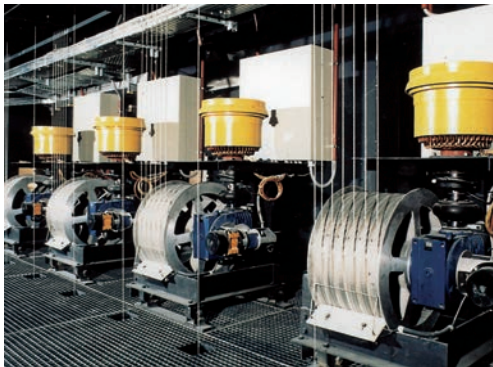
### KEB-SMM (SENSORLESS MOTOR MANAGEMENT) F5-G FIELD-ORIENTED CONTROL F5-M SYNCHRONOUS MOTOR CONTROL F5-S

Decentralized automation in the drive actuator with standard functions relieves superior control systems and create clear, compact programs.

- Speed and torque control
- Position control
- Synchronous speed control, electronic gear

or customer-specific solutions such as

- Cam switch
- Rotary table positioning
- Register function
- Contouring control
- Single-axis positioning



### CONTROL TERMINAL HOUSING A





**3-PH. 230 V (180 ... 260 V)**

$P_N$ [kW]	housing	$I_N$ [A]	$I_{max}$ [A]	$f_{sN/max}$ [kHz]	EMC	part no.
0.37	A*	2.3	4.1	4/8	C1 ♦	05F5A1A-2E2F
0.75	A* D*	4	7.2	8/16 16	C1 ♦	07F5A1A-2E2F 07F5A1D-2B_A
1.5	D*	7	12.6	16	C1 ♦	09F5A1D-2B_A
2.2	D*	10	18	16	C1 ♦	10F5A1D-2B_A
4	D	16.5	29.7	8/16	C1 ♦	12F5A1D-1A_A
5.5	E	24	36	8/16	C1 ♦	13F5A1E-16_A
7.5	E	33	49.5	4/16	C1 ♦	14F5A1E-15_A
11	G	48	86	8/16	C1 ♦	15F5A1G-19_F
15	H	66	99	16	C1 ♦	16F5A1H-1B_F
18.5	H	84	151	4/16	C1 ♦	17F5A1H-19_F
22	R	100	150	8/16	C1 ●	18F5A1R-76_A
30	R	115	172	8/16	C1 ●	19F5A1R-76_A
37	R	145	217	8/16	C1 ▲	20F5A1R-76_A
45	R	180	270	8/16	C1 ▲	21F5A1R-76_A

- internal (option)
- \* 0.37 ... 2.2 kW = 1-/3-phase 230 V
- ♦ footprint (option)
- ▲ book-style (option)
- ★ mains choke generally required (page 26)
- \*\* module units 2 x P / 3 x P generally with output choke (page 26)

**GENERALLY:**

Product standard EN 61800-2, -5 – 1  
 Emitted interference EN 61800-3  
 EN 61000-6-1 ... 4  
 Enclosure IP 20 / VBG 4  
 Storage temperature -25 ... 70 °C  
 Operation temperature -10 ... 45 °C  
 from 90 kW -10 ... 40 °C  
 Short-circuit and earth fault monitoring

Selection and dimensioning of the synchronous and asynchronous control motors occurs according to rated-, standstill- and peak current.

**3-PH. 400 V (305 ... 528 V)**

$P_N$ [kW]	housing	$I_N$ [A]	$I_{max}$ [A]	$f_{sN/max}$ [kHz]	EMC	part no.
0.75	A D	2.6	4.7	8/16	C1 ♦	07F5A1A-3E2F 07F5A1D-3B_A
1.5	A D	4.1	7.4	8/4 8/16	C1 ♦	09F5A1A-3D2F 09F5A1D-3A_A
2.2	D	5.8	10.4	4/16	C1 ♦	10F5A1D-3A_A
4	D	9.5	17	8/16	C1 ♦	12F5A1D-3A_A
5.5	D	12	21.6	4/16	C1 ♦	13F5A1D-39_A
7.5	D	16.5	29.7	2/16	C1 ♦	14F5A1D-38_A
11	E	24	36	4/16	C1 ♦	15F5A1E-35_A
15	E	33	49.5	2/16	C1 ♦	16F5A1E-34_A
18.5	G	42	63	4/16	C1 ♦	17F5A1G-35_A
22	G	50	75	2/8	C1 ♦	18F5A1G-34_F
30	H	60	90	4/16	C1 ♦	19F5A1H-35_F
37	H	75	112	2/8	C1 ♦	20F5A1H-34_F
45	R	90	135	4/16	C1 ●	21F5A1R-95_A
55	R	115	172	4/16	C1 ●	22F5A1R-95_A
75 ★	R	150	225	2/12	C1 ●	23F5A1R-94_A
90 ★	R	180	270	2/8	C1 ▲	24F5A1R-94_A
110 ★	U	210	263	4/8	C2/C1 ▲	25F5A1U-91_A
132 ★	U	250	313	4/8	C2/C1 ▲	26F5A1U-91_A
160 ★	U	300	375	2/8	C2/C1 ▲	27F5A1U-90_A
200 ★	P	370	463	2/4	C2 ▲	28F5A1P-90_A
250 ★	P	460	575	2/4	C2 ▲	29F5A1P-90_D
315 ★	W	570	713	2/4	C2 ▲	30F5A1W-A0_A
355 ★	W	630	787	2/4	C2 ▲	31F5A1W-A0_D
400 ★	W	710	887	2/4	C2 ▲	32F5A1W-A0_D
450 ★	2 x P**	800	1000	2/4	C2 ▲	33F5A1P-90_D
500 ★	2 x P**	890	1112	2/4	C2 ▲	34F5A1P-90_D
560 ★	2 x P**	1000	1250	2/4	C2 ▲	35F5A1P-90_D
630 ★	3 x P**	1150	1438	2/4	C2 ▲	36F5A1P-90_D
710 ★	3 x P**	1330	1663	2/4	C2 ▲	37F5A1P-90_D
800 ★	3 x P**	1450	1813	2/4	C2 ▲	38F5A1P-90_H

**CONTROL TERMINAL HOUSING D ... W**



## PROVEN CHARACTERISTICS FOR THE USE IN THE UPPER POWER RANGE

	$P_N$ [kW]	housing	$I_N$ [A]	$I_{max}$ [A]	$f_{sl/max}$ [kHz]	inverter part no.	EMC filter ▲ part no.	mains choke part no.	motor choke part no.
3-PH. 660/690 V (600 ... 760 V)	200 ★	1 x P	225	281	2/4	28F5A1P-B0_A	1 x 30E5T60-8001	1x 28Z1B06-1000	1 x 29Z1A04-1001
	250 ★	1 x P	280	350	2/4	29F5A1P-B0_D	1 x 30E5T60-8001	1x 29Z1B06-1000	1 x 29Z1A04-1001
	315 ★	1 x P	345	438	2/4	30F5A1P-B0_A	1 x 30E5T60-8001	1x 30Z1B06-1000	1 x 29Z1A04-1001
	400 ★	2 x P**	430	538	2/4	32F5A1P-B0_A	2 x 30E5T60-8001	2x 28Z1B06-1000	2 x 29Z1A04-1001
	450 ★	2 x P**	500	613	2/4	33F5A1P-B0_D	2 x 30E5T60-8001	2x 29Z1B06-1000	2 x 29Z1A04-1001
	500 ★	2 x P**	550	688	2/4	34F5A1P-B0_D	2 x 30E5T60-8001	2x 30Z1B06-1000	2 x 29Z1A04-1001
	560 ★	2 x P**	620	763	2/4	35F5A1P-B0_D	2 x 30E5T60-8001	2x 30Z1B06-1000	2 x 29Z1A04-1001
	630 ★	3 x P**	710	875	2/4	36F5A1P-B0_A	3 x 30E5T60-8001	3x 29Z1B06-1000	3 x 29Z1A04-1001
	710 ★	3 x P**	820	1013	2/4	37F5A1P-B0_D	3 x 30E5T60-8001	3x 30Z1B06-1000	3 x 29Z1A04-1001
	800 ★	3 x P**	900	1100	2/4	38F5A1P-B0_D	3 x 30E5T60-8001	3x 30Z1B06-1000	3 x 29Z1A04-1001
	900 ★	3 x P**	1015	1250	2/4	39F5A1P-B0_H	3 x 30E5T60-8001	3x 30Z1B06-1000	3 x 29Z1A04-1001

\*\* module units 2 x P / 3 x P generally with output choke (page 26)

★ mains choke generally required (page 26)

▲ book-style (option)

All units correspond to the 400 V type with regard to the technical functions and are universally suitable for the open-loop and closed-loop operation of asynchronous and synchronous motors. Upon request the units are available for rated voltages of 3-phase 500 V AC and 3-phase 600 V AC.

### GENERALLY:

Product standard EN 61800-2, -5 – 1  
 Emitted interference EN 61800-3  
 EN 61000-6-1 ... 4

Enclosure IP 20 / VBG 4  
 Storage temperature -25 ... 70 °C  
 Operation temperature -10 ... 40 °C  
 Short-circuit and earth fault monitoring



## SAFETY IN DRIVE SYSTEMS

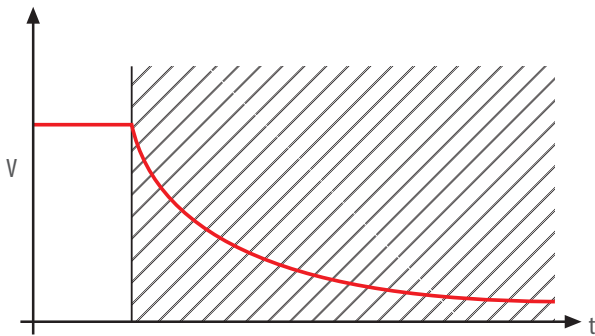
The requirements of the safety regulations for manufacturers of machines must be carried out according to the implementation of new safety requirements of ISO 13849 and EN 62061.

The new hardware design COMBIVERT F5-K is available for open-loop and closed-loop applications in the housings D-E-G-H-R-U-P-W. Function STO is met with the internal 2-channel optocoupler locking (no torque at the motor shaft, stop category 0 of EN 60204-1).

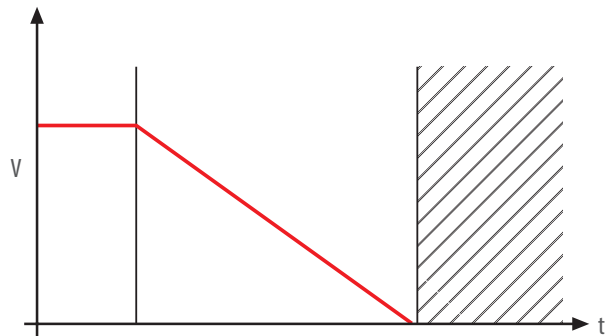
Function SS1 can be met in the wiring with external safety time-delay relay, when the drive within an adjusted time is decelerated and set to STO (stop category 1 of EN 60204-1).

COMBIVERT F5-K meets the requirements of PL-e in accordance with ISO 13849 and SIL 3 according to IEC 62061.

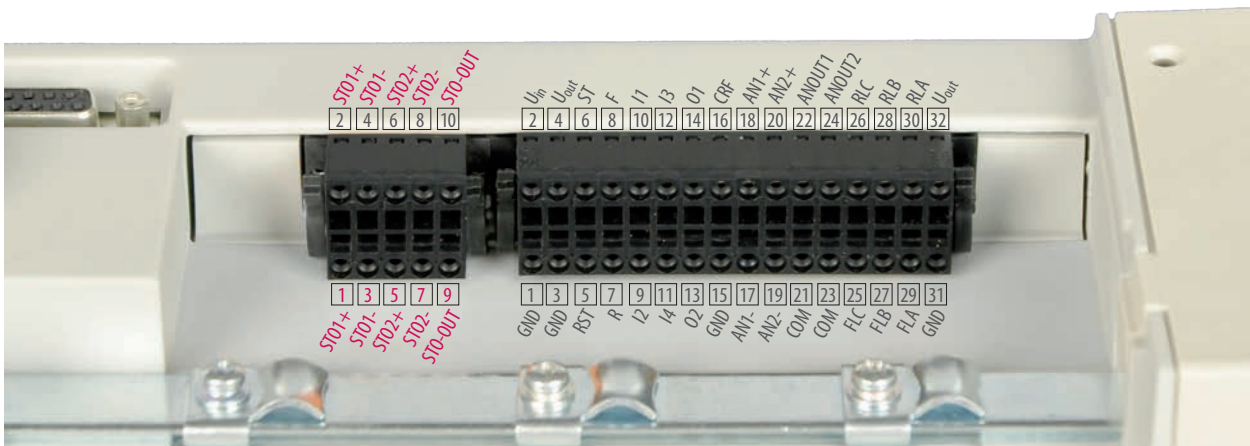
**STO**



**SS1**



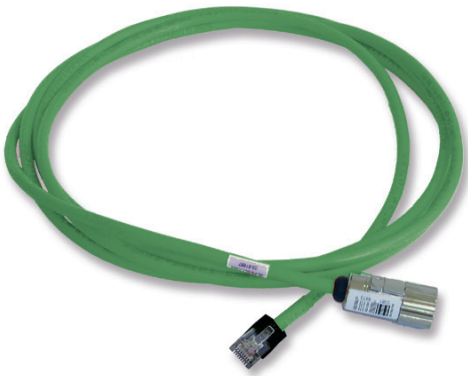
The adapted wiring of the control terminals occurs on a separate 10-pole plug-in connector. The 32-pole control terminal of the analog and digital inputs/outputs corresponds to the assignment of the inverter series COMBIVERT G6 – the open loop drive with STO function.



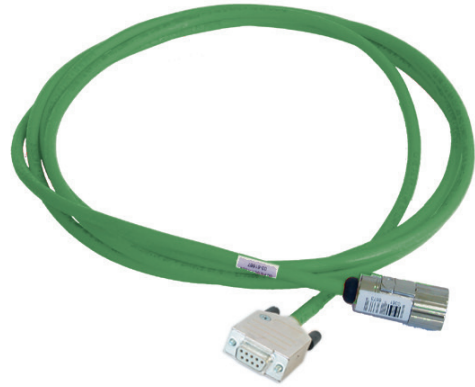
### ENCODER SYSTEMS FLEXIBLY SUPPORTED

COMBIVERT F5 Multi operates all closed-loop tasks with a broad range of feedback cards for different encoder systems. The installation is done factory made according to the customer request (page 9/10 - 10th place part no.) or can be executed as re-fitting with the KEB Encoder Kits.

Factory-made Installation Part-code	Channel 1		Channel 2			KEB Encoder Kit	
	Encoder type	Connection	Encoder type	Mode	Connection	D, E Housing	G,H,R,U,W,P Housing
D	TTL	D-Sub 15-pole	TTL	Output	D-Sub 9-pole	1MF5K81-DZ19	2MF5K81-DZ19
G	TTL	D-Sub 15-pole	TTL	Input	D-Sub 9-pole	1MF5K81-GZ18	2MF5K81-GZ18
-	TTL	Terminal strip	TTL	Output	Terminal strip	1MF5K81-BZ05	2MF5K81-BZ05
-	TTL	Terminal strip	TTL	Input	Terminal strip	1MF5K81-BZ04	2MF5K81-BZ04
4	TTL	D-Sub 15-pole	SSI	Input	D-Sub 9-pole	1MF5K81-4Z15	2MF5K81-4Z15
A	TTL	D-Sub 15-pole	Initiator	Input	Terminal strip	1MF5K81-AZ07	2MF5K81-AZ07
7	TTL	D-Sub 15-pole	Tacho	Input	D-Sub 9-pole	-	2MF5K81-7Z09
E	Resolver	D-Sub 15-pole	TTL	Output	D-Sub 9-pole	1MF5K81-EZ29	2MF5K81-EZ29
H	Resolver	D-Sub 15-pole	TTL	Input	D-Sub 9-pole	1MF5K81-HZ28	2MF5K81-HZ28
5	Resolver	D-Sub 15-pole	SSI	Input	D-Sub 9-pole	1MF5K81-5Z25	2MF5K81-5Z25
X	HTL	Terminal strip	TTL	Output	Terminal strip	1MF5K81-XZ09	2MF5K81-XZ09
W	HTL	Terminal strip	TTL	Input	Terminal strip	1MF5K81-WZ08	2MF5K81-WZ08
J	HTL	D-Sub 15-pole	TTL	Output	D-Sub 9-pole	1MF5K81-JZ17	2MF5K81-JZ17
K	HTL	D-Sub 15-pole	TTL	Input	D-Sub 9-pole	1MF5K81-KZ16	2MF5K81-KZ16
S	HTL without inverse	Terminal strip	TTL	Output	D-Sub 9-pole	1MF5K81-SZ19	2MF5K81-SZ19
T	HTL without inverse	Terminal strip	TTL	Input	D-Sub 9-pole	1MF5K81-TZ18	2MF5K81-TZ18
8	HTL without inverse	Terminal strip	HTL	Output	Terminal strip	1MF5K81-8Z09	2MF5K81-8Z09
-	HTL without inverse	Terminal strip	none	-	-	1MF5K8G-6Z07	2MF5K8G-6Z07
L	HTL without inverse	D-Sub 15-pole	SSI	Input	D-Sub 9-pole	1MF5K81-LZ17	-
M	SIN/COS	D-Sub 15-pole	TTL	Output	D-Sub 9-pole	1MF5K8G-MZ56	2MF5K8G-MZ36
N	SIN/COS	D-Sub 15-pole	TTL	Input	D-Sub 9-pole	1MF5K8G-NZ55	2MF5K8G-NZ35
1	SIN/COS	D-Sub 15-pole	SSI	Input	D-Sub 9-pole	1MF5K8G-1Z51	2MF5K8G-1Z31
V	SSI-SIN/COS	D-Sub 15-pole	TTL	Output	D-Sub 9-pole	1MF5K8G-VZ47	2MF5K8G-VZ37
U	SSI-SIN/COS	D-Sub 15-pole	TTL	Input	D-Sub 9-pole	1MF5K8G-UZ44	2MF5K8G-UZ34
P	ENDAT	D-Sub 15-pole	TTL	Output	D-Sub 9-pole	1MF5K8G-PZ43	2MF5K8G-PZ33
Q	ENDAT	D-Sub 15-pole	TTL	Input	D-Sub 9-pole	1MF5K8G-QZ42	2MF5K8G-QZ32
3	ENDAT	D-Sub 15-pole	SSI	Input	D-Sub 9-pole	1MF5K8G-3Z40	2MF5K8G-3Z30
-	ENDAT2.2 & BISS	Terminal strip	TTL	Output	Terminal strip	1MF5K8G-9Z09	2MF5K8G-9Z09
F	HIPERFACE	D-Sub 15-pole	TTL	Output	D-Sub 9-pole	1MF5K8G-FZ49	2MF5K8G-FZ39
I	HIPERFACE	D-Sub 15-pole	TTL	Input	D-Sub 9-pole	1MF5K8G-IZ48	2MF5K8G-IZ38
9	UVW	D-Sub 15-pole	TTL	Output	D-Sub 9-pole	1MF5K8G-9Z07	-
Z	UVW	D-Sub 15-pole	TTL	Input	D-Sub 9-pole	1MF5K8G-ZZ08	2MF5K8G-ZZ08
C	UVW	Terminal strip	HTL without inverse	Output	Terminal strip	-	2MF5K8G-CZ09



Encoder cable for housing size A



Encoder cable for housing size D-E-G-H-R-U-P-W

### ENCODER CABLE FOR HOUSING SIZE A

CABLE TYPE	INVERTER PLUG	ENCODER PLUG	LENGTH [m]	PART NO. ( __ length in [m])
Resolver	RJ45 male	12-pole	2 ... 40	00F50C1-00 __
TTL	RJ45 male	12-pole	2 ... 10	00F50C1-30 __
Adapter	RJ45 male	D-Sub 15-pole female	0.05	00F50C0-0008
Adapter	RJ45 male	D-Sub 9-pole female	0.05	00F50C0-0009
Master-Slave	RJ45 male	RJ45 male	0.5	00F50C1-20P5

### ENCODER CABLE FOR HOUSING SIZE D-E-G-H-R-U-P-W

CABLE TYPE	INVERTER PLUG	ENCODER PLUG	LENGTH [m]	PART NO. ( __ length in [m])
Resolver	D-Sub 15-pole	12-pole	2 ... 30	00F50C1-10 __
TTL	D-Sub 15-pole	12-pole	2 ... 30	00F4109-00 __
TTL (channel 2)	D-Sub 9-pole	12-pole	2 ... 30	00F4209-00 __
Hiperface	D-Sub 15-pole	12-pole	2 ... 30	00S4809-00 __
EnDat	D-Sub 15-pole	17-pole	2 ... 30	00F50C1-40 __
TTL (no KEB motor)	D-Sub 15-pole	Free connecting cable	2 ... 30	00F4P09-00 __
TTL (channel 2) (no KEB motor)	D-Sub 9-pole	Free connecting cable	2 ... 30	00F4D09-00 __
Master-Slave	D-Sub 9-pole male	D-Sub 9-pole male	1	00F4509-0001

Further lengths on request

## ASYNCHRONOUS DRIVE TECHNOLOGY OF THE TOP CLASS

COMBIVERT F5-H (ASCL) and with internal safety F5-L is the result of long lasting model optimization of encoder-less field orientation and offers as result best speed and torque characteristics with asynchronous motors without encoder feedback.

# ASCL

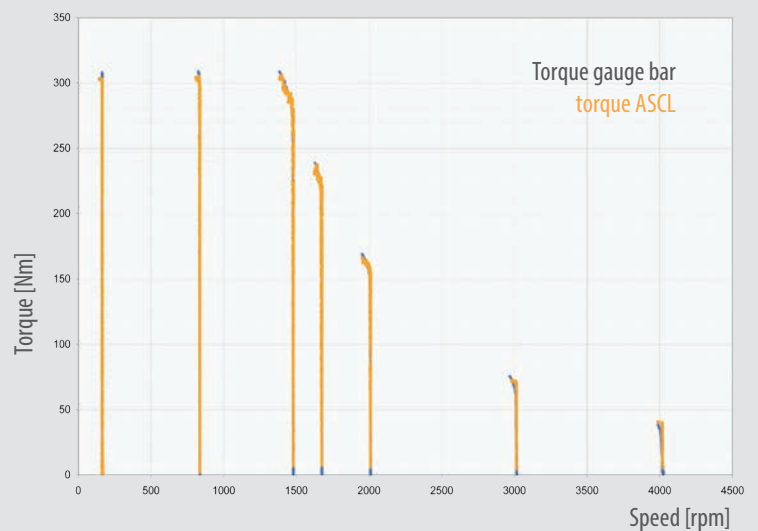
### PROPERTIES

- High speed stability
- Load step response like closed-loop systems
- Torque accuracy typically < 3 % MN
- Display values with correction adjustment in the system „on the fly“
- Operation with output filters
- Low installation costs in case of loss of encoder cable, encoder and encoder interface
- Optimized efficiency in partial load range
- Automatic adaption of the motor
  - Calibration routine of stator- and rotor resistance, main- and leakage inductance and dead time characteristic
  - Thermal calculation in the motor model
- Controller integration → symmetrical optimum
  - Simplifies the Ki/Kp calibration of the exterior closed circuit (speed)
  - Only one parameter for drive optimization
  - Speed preset
- Exact torque display by
  - Determination of torque-offsets and elimination in the display

### POTENTIAL APPLICATIONS

- Extruder main drives
- Crusher drives / shredder
- Centrifuges
- Test bench / test systems
- Stirring and mixer units
- Meat cutter and mincer
- Mixing plants
- Heat pumps
- Hydraulic pumps
- Generators
- Machine tools for wood, plastic, metal, ...

### TORQUE CHARACTERISTIC



## OPERATION OF SYNCHRONOUS MOTORS WITHOUT ENCODER FEEDBACK

The optimization of efficiency, available space and increasing dynamic forces the use of synchronous motors, which can be operated by F5-E (SCL) and F5-P (safety version) now without rotor position feedback in all applications without positioning tasks.

The calculated control method of the software has no effect through external disturbances and leads to high smoothness. Mechanically stressed motors, high frequency special machines or high-volume torque motors are operated more functional and safe with elimination of the encoder system.

### PROPERTIES

- Standstill position detection (calibration without rotation)
- Operation with output filters
- Low installation costs in case of loss of encoder line, encoder and encoder interface
- High dynamic / non-slip rotation
- Reduced installation space / lower weight
- High efficiency / high availability

### POTENTIAL APPLICATIONS

- Driven tools in working stations
- Synchronous process chain in textile machines
- Hybrid drives
- Diesel electric drives in conveyor systems, container or heavy duty vehicles
- Electric drives in boats, yachts and vehicles
- Synchronous extruder
- Injection moulding technology / blow moulding technology
- High frequency pump drives in compressors, screws and vacuum pumps

# SCL

### DYNAMIC RESPONSE BEHAVIOR OF A LOAD



Frequency inverters F5 COMBIVERT are in a modular system and available in the following versions

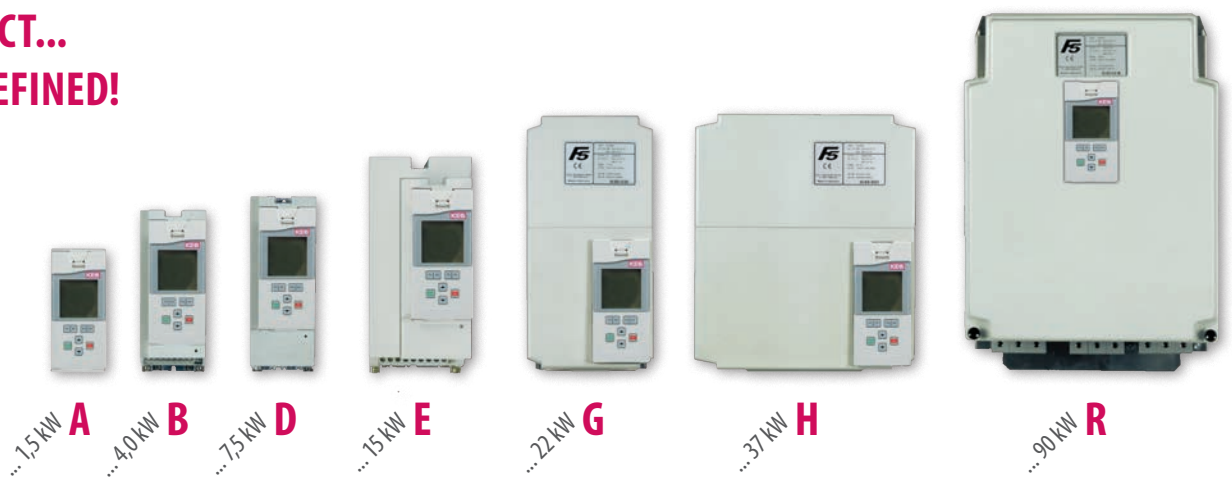
- Chassis unit of protection class IP 20 – universal mounting in the control cabinet
- Chassis unit with factory mounted interference filter – unit-internal interference suppression
- Chassis unit with factory mounted braking resistor – absorb pulse energy without additional required space, also available in combination with Interference filter
- Customer version **FLAT-REAR - (FR)** – direct thermal connection with cooling surfaces
- Customer version **LIQUID COOLED - (LC)** liquid cooling
- Customer version **EXTERNAL HEAT - (EH)** – through-mounted heat sink for the thermal separation of the power unit

For customer-specific series-applications KEB provides complete solutions in the control cabinet installation in protection class IP 54.



Applied mounting points in a grid allow the use of prepared mounting plates.

**COMPACT...  
NEW DEFINED!**





HOUSING	INSTALLATION VERSION IP20 W X H X D (MM)			AVAILABLE CUSTOMER VERSIONS		
	Unit	With EMC filter	With resistor	FR	LC	EH
A	76 x 191 x 144	76 x 191 x 144 76 x 216 x 184		-	-	-
B	90 x 220 x 160	90 x 249 x 200	90 x 220 x 190	•	-	•
D	90 x 250 x 181	90 x 285 x 221	90 x 250 x 211	•	-	•
E	130 x 290 x 208	132 x 352 x 258	130 x 290 x 238	•	•	•
G	170 x 340 x 255	181 x 415 x 311	170 x 340 x 280	•	•	•
H	297 x 340 x 255	300 x 445 x 321		•	•	•
R	340 x 520 x 355	340 x 520 x 355* 110 x 478 x 115		•	•	•
U	340 x 800 x 355	110 x 598 x 240		-	•	•
P	340 x 960 x 454	260 x 386 x 115		-	•	•
W	670 x 940 x 368	260 x 386 x 115 260 x 386 x 135		-	•	-

\* up to size 23.F5

■ external unit

• customer version upon request



		<b>BASIC</b>	<b>COMPACT</b>	<b>MULTI</b>		<b>SCL</b>		<b>ASCL</b>	
<b>CONTROLBOARD</b>		B	C	A	A / K	E / P	H / L		
<b>INVERTER HOUSING</b>		ABDE	BDEGHR	A	DEGHRUWP	A	DEGHRUWP	DEGHRUWP	
Operating mode	open-loop	•	•	•	•	-	-	•	
	closed-loop	-	-	•	•	•	•	•	
	encoder-less closed-loop	-	-	-	-	•	•	•	
	AC servo mode	-	-	•	•	•	•	•	
	flux vector mode	-	-	•	•	•	•	•	
	encoder-less vector mode (KEB SMM - sensor less motor management)	•	•	•	•	-	-	•	
	standard v/f mode	•	•	•	•	-	-	•	
Controlboard	voltage supply	intern	intern	extern	intern	extern	intern	intern	
	internal voltage supply	24 V DC	24 V DC	-	24 V DC	-	24 V DC	24 V DC	
	24 V DC supply external	no	yes	yes	yes	yes	yes	yes	
	I/O scan time	2 ms	2 ms	1 ms	1 ms	1 ms	1 ms	1 ms	
	number of terminals	17	29	17	29	17	29	29	
	pluggable control terminals	yes	yes	yes	yes	yes	yes	yes	
digital	number	5	8	5	8	5	8	8	
	specification	PNP	PNP/NPN	PNP	PNP/NPN *	PNP	PNP/NPN *	PNP/NPN *	
	adjustable	-	•	-	•	-	•	•	
		13...30 V DC							
INPUT	analogue	number	1	2	1	2	1	2	2
		specification	0 ... ± 10 V	•	•	•	•	•	•
		0 ... ± 20 mA / 4 ... 20 mA	-	•	-	•	-	•	•
		potential-free	(single-ended)	•	•	•	•	•	•
		resolution	11 bit	12 bit	11 bit	12 bit	11 bit	12 bit	12 bit
		fast scan time	no	250 ms	250 ms	250 ms	250 ms	250 ms	250 ms
		sample and hold mode	yes	yes	yes	yes	yes	yes	yes
OUTPUT	digital	number	0	2	2	2	2	2	
		specification	-	•	•	•	•	•	•
		specification open-collector (50 mA total)	-	•	•	•	•	•	•
	relay	number	2	2	1	2	1	2	2
		specification	•	•	•	•	•	•	•
		specification potential-free (30 VDC / 1 A)	•	•	•	•	•	•	•
analogue	number	1	2	1	2	1	2	2	
	specification	0 ... 10 V; ± 10 V	•	•	•	•	•	•	
	resolution	(5 mA)	2x (5 mA)	(5 mA)	2x (5 mA)	(5 mA)	2x (5 mA)	2x (5 mA)	
		11 bit	11 bit	11 bit	11 bit	11 bit	11 bit	11 bit	
ENCODER FEEDBACK		-	-	standard	option card	standard	option card	option card	
	2 encoder inputs	-	-	•	•	•	•	•	
	positioning to second encoder	-	-	•	•	•	•	•	
	encoder emulation TTL output	-	-	•	•	•	•	•	
	analogue encoder	-	-	resolver	resolver	resolver	resolver	resolver	
					Sin/Cos		Sin/Cos	Sin/Cos	
					UVW encoder		UVW encoder	UVW encoder	
					tacho generator		tacho generator	tacho generator	
	digital encoder	-	-	TTL	TTL	TTL	TTL	TTL	
					HTL		HTL	HTL	
					initiator		initiator	initiator	
	serial encoder	-	-	-	BiSS	-	BiSS	BiSS	
	(single- und multi-turn)				EnDat		EnDat	EnDat	
					Hiperface		Hiperface	Hiperface	
				SSI		SSI	SSI		
				SSI-Sin/Cos		SSI-Sin/Cos	SSI-Sin/Cos		

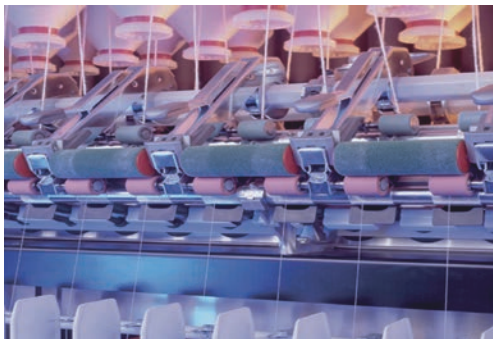
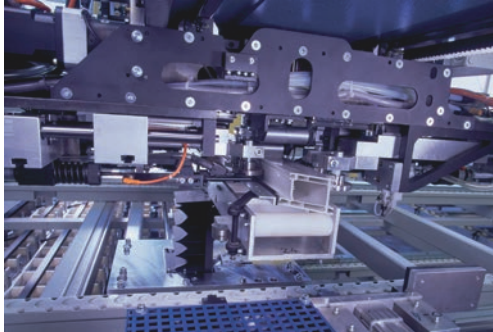
• included

\* not for K / L / P

	BASIC	COMPACT	MULTI		SCL		ASCL
	B ABDE	C BDEGHR	A A	A / K DEGHRUWP	E / P A	DEGHRUWP	H / L DEGHRUWP
<b>CONTROL BOARD</b>							
<b>INVERTER HOUSING</b>							
<b>SPEED MODE</b>	Hz	Hz	Hz, rpm	Hz, rpm	rpm	rpm	Hz, rpm
separate S-curve ACC/DEC	•	•	•	•	•	•	•
separate lower/upper S-curve times	-	-	•	•	•	•	•
sep. acceleration time for counter clockwise-/clockwise rotation	•	•	•	•	•	•	•
sep. deceleration time for counter clockwise-/clockwise rotation	•	•	•	•	•	•	•
ogive function	-	-	•	•	•	•	•
speed search (aligning the motor)	•	•	•	•	•	•	•
fast analogue input	•	•	•	•	•	•	•
2 analogue inputs with prog. function	-	•	-	•	-	•	•
fixed speed / fixed frequency	4	4	4	4	4	4	4
fixed speed / fixed frequency with set-programming	16	32	16	32	16	32	32
<b>POSITIONING MODE</b>							
simple repeatable positioning without encoder	•	•	-	-	-	-	-
positioning via motor encoder	-	-	•	•	-	-	-
positioning via external encoder	-	-	•	•	-	-	-
position value resolution	-	-	32 bit	32 bit	-	-	-
internally storable positions	-	-	32	32	-	-	-
analogue setpoint setting for target position	-	-	•	•	-	-	-
different reference routines	-	-	•	•	-	-	-
limit switch protection	-	-	•	•	-	-	-
relative-/absolute positioning	-	-	•	•	-	-	-
interruption in the positioning	-	-	•	•	-	-	-
rotary table positioning	-	-	•	•	-	-	-
rotary table positioning with shortest path	-	-	•	•	-	-	-
contouring with bus	-	-	•	•	-	-	-
synchronisation mode	-	-	•	•	-	-	-
positional synchronisation	-	-	•	•	-	-	-
speed synchronisation	-	-	•	•	-	-	-
programmable gearshifts	-	-	8	8	-	-	-
gearshift via analog input	-	-	•	•	-	-	-
angle adjustment	-	-	•	•	-	-	-
synchronisation with constant distance or ramp	-	-	•	•	-	-	-
torque mode	-	-	•	•	•	•	•
adjustable torque for all operating conditions	-	-	•	•	•	•	•
adjustable torque for ACC/DEC	-	-	•	•	•	•	•
adjustable torque for motor/regen operation	-	-	•	•	•	•	•
analogue torque setting	-	-	•	•	•	•	•
fast analog torque setting	-	-	250 µs	250 µs	250 µs	250 µs	250 µs
acceleration at torque limit	-	-	•	•	•	•	•
<b>FUNCTIONS</b>							
PID process control	•	•	•	•	•	•	•
automatic motor identification	-	-	•	•	•	•	•
automatic rotor position detection in standstill	-	-	•	•	•	•	-
torque precontrol	-	-	•	•	•	•	•
brake control / handling	•	•	•	•	•	•	•
power off / braking without mains voltage	•	•	•	•	•	•	•
programmable restart-starting conditions	-	-	•	•	•	•	•
programmable timer/counter (sec/h/inc)	2	2	2	2	2	2	2
max. input frequency of the counter	250 Hz	250 Hz	500 Hz	500 Hz	500 Hz	500 Hz	500 Hz

• included

**UNIFIED DRIVE PLATFORM...**



Based on the modular sub-assembly of the COMBIVERT F5 series KEB develops in close collaboration with the OEM user adapted drive systems for series machines.

**WITH LONG EXPERIENCES IN TASKS OF THE**

- Packaging industry
- Textile industry
- Plastic industry
- Printing-/paper industry
- Woodworking
- Storage and transport technology
- Lift industry

we integrate customer specific software modules or modified hardware for our customers, e. g. as

- State-machine, i. e. complete functional sequences are stored in the inverter
- Adaption to special serial protocols
- Industry-specific software e. g. spindle drives
- Flexible cooling systems for air and water
- Complete switchgear systems



*FR (Flat Rear)*



*EH (External Heat)*



*LC (Liquid Cooled)*

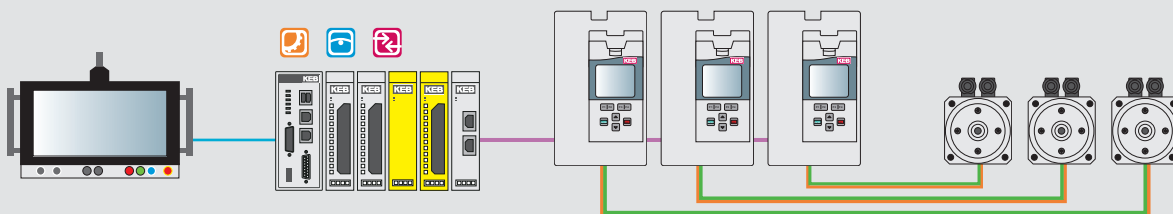
## DRIVE BASED AUTOMATION

COMBICONTROL C6 is the new line of motion control solution, focussed to high dynamic drive orientated applications and scalable and tailored for dedicated tasks in OEM machines and systems.

The embedded or IPC based control platform utilizes state of the art user free programmable IEC 61131-3 software with the latest solution and utilities offered by the CoDeSys V3 core in the .net based software tool COMBIVIS studio 6.

The embedded drive control in combination with COMBIVERT F5 Multi operates directly 4 or 8 standard drives in a synchronous real-time clock of 1 ms, which can be used for high priority traction controls.

Higher number of axis supports the IPC range and real time Ethernet with EtherCAT communication.



HMI

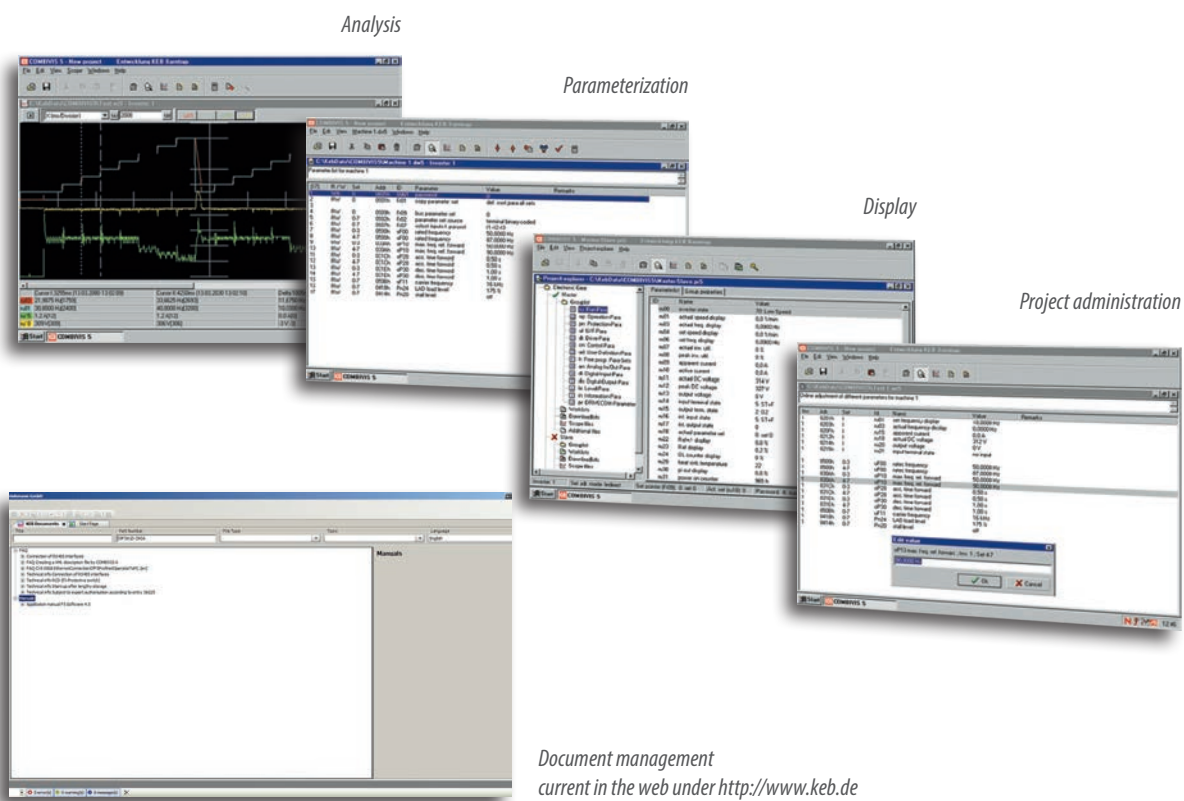
CONTROL

DRIVES

MOTORS

UNIVERSAL PC SOFTWARE FOR ALL COMBIVERT F5 UNITS

- Complete management of unit settings
- Display and adjustment of all parameters in up to 8 sets
- Display of physical values and monitoring of operating data
- Configuration of a customer-specific default setting in the „CP-level“
- Analysis/monitoring of the communication between drive and control parallel to the field bus operation



Document management  
current in the web under <http://www.keb.de>

ACCESSORIES:

COMBIVIS interface cable RS 232 / part no. **0058025-001D**  
in combination with interface operator **00F5060-2000**

or alternatively

KEB-USB-Serial-Converter **0058060-0040** +  
HSP5 adapter **00F50C0-0020** (0.4 m)  
for connections to the diagnostic / service interface.



### PLAINTEXT OPERATION

LCD operator, part no. **00F5060-K000** equipped with 6-language plaintext display and menu-controlled keyboard operation as plug-in module for all COMBIVERT F5 units.

The memory function allows storing and loading of complete parameter settings by calling the settings from the internal flash or plug-in SD- / MMC memory card.



Digital operator, part no. **00F5060-1100** display and keyboard operation, plug-in module, prepared in connection with the ready-made HSP5 operator **00F5060-9000** + cable **00F50C0-2030** (3 m) / **-2100** (10 m) for external use as remote operator.



# OPERATION AND DISPLAY

## SERIAL COMMUNICATION



Profibus operator, part no. **00F5060-3000 / -3100**  
slave connection up to 12,5 MBaud,  
IN/OUT connection D-Sub 9-pole,  
service interface for HSP5 adapter



InterBus operator, part no. **00F5060-4000 / 4001**  
InterBus-remote bus  
IN/OUT connection D-Sub 9-pole,  
service interface for HSP5 adapter



CAN operator, part no. **00F5060-5010 / -5110**  
CANopen profile DS 301 (DS 402),  
IN/OUT connection D-Sub 9-pole  
service interface for HSP5 adapter  
(upon request: version with plug-in terminal strip)

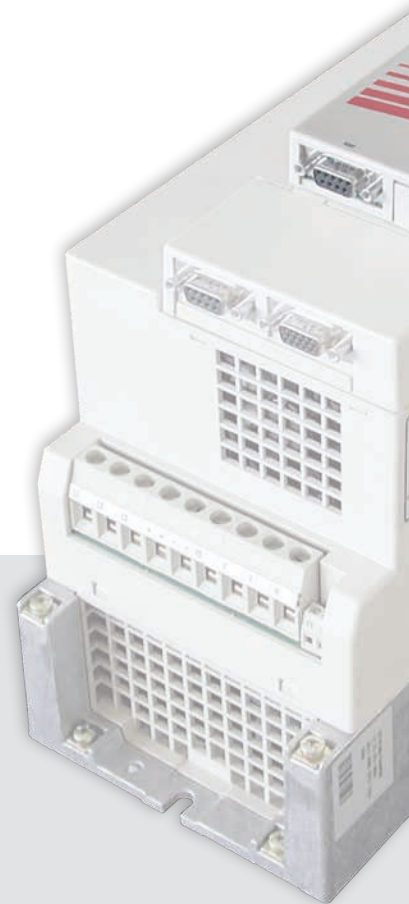


DeviceNet operator, part no. **00F5060-7000**  
IN/OUT connection open entry,  
service interface for HSP5 adapter



MODBUS operator, part no. **00F5060-A000**  
D-Sub 9-pole (female) connection  
service interface for HSP5 adapter

Interface operator, part no. **00F5060-2000 /-2100**  
universal open KEB protocol for PC and PLC connection  
RS 232/485 connection D-Sub 9-pole.







## ETHERNET-BASED SOLUTIONS

Ethernet operator, part no. **00F5060-8000**  
 IEEE 802.3 10Base-T (10 Mbaud)  
 2 x RJ45 connection  
 service interface for HSP5 adapter



EtherCAT operator, part no. **00F5060-F00A**  
 2 x RJ45 connection  
 service interface for HSP5 adapter



Powerlink operator, part no. **00F5060-H000**  
 2 x RJ45 connection  
 service interface for HSP5 adapter



Profinet operator, part no. **00F5060-L100**  
 2 x RJ45 connection  
 service interface for HSP5 adapter



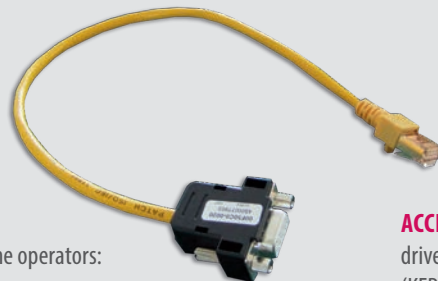
EtherNet/IP operator, part no. **00F5060-M100**  
 2 x RJ45 connection  
 service interface for HSP5 adapter



### ACCESSORIES

for the HSP5 service interface of the operators:  
 HSP5 adapter,  
 part no. **00F50C0-0020**

KEB-USB-Serial-Converter  
 part no. **0058060-0040**



### ACCESSORY

driver software for Windows...  
 (KEB in the download section under software „KEB Drive“)

supports the PC connection for the protocols  
 KEB DIN 66019-II, KEB-HSP5, InterBus and TCP/IP

**KEB-HSP 5 /  
 DIN 66019-II**

# FILTER AND CHOKES TECHNOLOGY

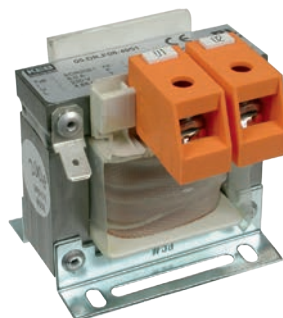
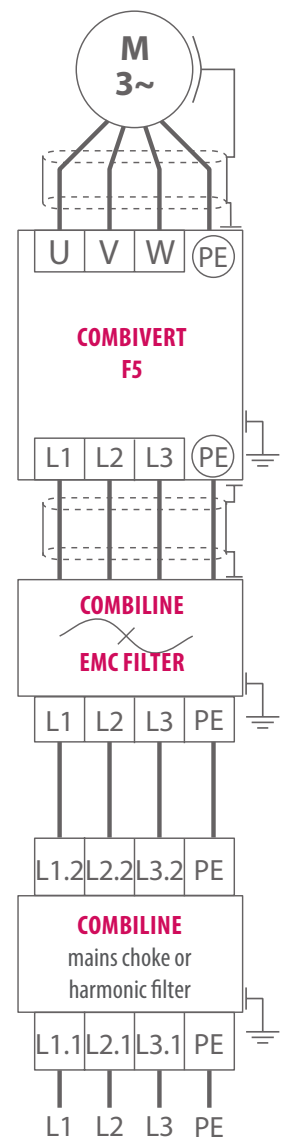
## STABLE OPERATION IN INDUSTRIAL ENVIRONMENTS

An EMC-compliant assembly with efficient control cabinet and suppression system is the basis for safe operation of machinery and equipment. The current and voltage limiting **COMBILINE** modules are optimally designed to meet the requirements of the COMBIVERT F5 inverter series and support the use through

- Mains EMC filters – reduce the cable-fed emission to the required limits IEC 61800 ... - C1/C2. Further variants offer small leakage currents or the operation of special line form.
- Mains choke – reduce the input current draw and the system perturbation.
- Output choke and -filters – reduce the voltage and current load of the motor winding.
- Input/output filters – space-saving combination, consistently adapted and optimized to the drive controller.
- Sine-wave filters – protection of the motor winding against voltage peaks, use of long motor lines and reduction of shielded motor cables.
- Harmonic filters - reduce the system perturbation from low frequency interferences from B6-rectifier supplied devices. These harmonic filters are the new innovative solution, which can be designed already in the electrical switching station in the planning phase (simple like a mains choke) and they enable compliance with many international standards.

## EMC SERVICE

is another offer of KEB and means mobile assistance on site, advice in the planning phase and analysis of existing systems. Our contribution in the design of real systems solutions.



	Pn [kW]	Housing	EMC filter	Mains choke	Harmonic filter THD (i) ≤ 8 % / ≤ 15 %	Motor choke ≤ 100 Hz	Sine-wave filter ≤ 100 Hz
<b>230 V CLASS</b>	0.37	A	07U5B0A-1000* 1)	05Z1B02-1000*			
	0.75	A	07U5B0A-1000* 1)	07Z1B02-1000*			
	0.75	B	07U5B0B-1010*	07Z1B02-1000*			
	1.5	B	10U5B0B-1000*	09Z1B02-1000*			
	2.2	B	10U5B0B-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				
<b>400 V CLASS</b>	0.37	A	Basic internal, Multi footprint	05Z1B04-1000	09Z1C04-1000 / 1001	05Z1F04-1010	05Z1G04-1000
	0.37	B	10U5B0B-3000	05Z1B04-1000	09Z1C04-1000 / 1001	05Z1F04-1010	07Z1G04-1000
	0.75	A	Basic internal, Multi footprint	07Z1B04-1000	09Z1C04-1000 / 1001	07Z1F04-1010	07Z1G04-1000
	0.75	B	10U5B0B-3000	07Z1B04-1000	09Z1C04-1000 / 1001	07Z1F04-1010	07Z1G04-1000
	1.5	A	Basic internal, Multi footprint	07Z1B04-1000	09Z1C04-1000 / 1001	07Z1F04-1010	09Z1G04-1000
	1.5	B	10U5B0B-3000	07Z1B04-1000	09Z1C04-1000 / 1001	07Z1F04-1010	09Z1G04-1000
	2.2	B	10U5B0B-3000	10Z1B04-1000	12Z1C04-1000 / 1001	10Z1F04-1010	10Z1G04-1000
	4	B	12U5B0B-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	23Z1F04-1010	22Z1G04-1000
	75 ★	R	23U5B0R-3000	23Z1B04-1000	23Z1C04-1000	24Z1F04-1010	23Z1G04-1000
	90 ★	U	25U5B0U-3000	24Z1B04-1000	24Z1C04-1000	25Z1F04-1010	24Z1G04-1000
	110 ★	U	25U5B0U-3000	25Z1B04-1000	25Z1C04-1000	26Z1F04-1010	25Z1G04-1000
	132 ★	U	27U5B0U-3000	26Z1B04-1000	26Z1C04-1000	27Z1F04-1010	26Z1G04-1000
	160 ★	U	27U5B0U-3000	27Z1B04-1000	27Z1C04-1000	28Z1F04-1010	27Z1G04-1000
	200 ★	P	28U5A0W-3000	28Z1B04-1000	28Z1C04-1000	29Z1F04-1010	28Z1G04-1000
	250 ★	P	30U5A0W-3000	29Z1B04-1000	29Z1C04-1000	30Z1F04-1010	29Z1G04-1000
	315 ★	W	30U5A0W-3000	2 x 27Z1B04-1000	2 x 27Z1C04-1000	30Z1B22-4430	30Z1G04-1000
	355 ★	W	32U5A0W-3000	2 x 28Z1B04-1000	2 x 27Z1C04-1000	31Z1A04-1000	
400 ★	W	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 30Z1B04-1000	3 x 29Z1C04-1000	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		

UPON REQUEST

UPON REQUEST

\* 1-phase 230 V AC; 3-phase filter and chokes upon request

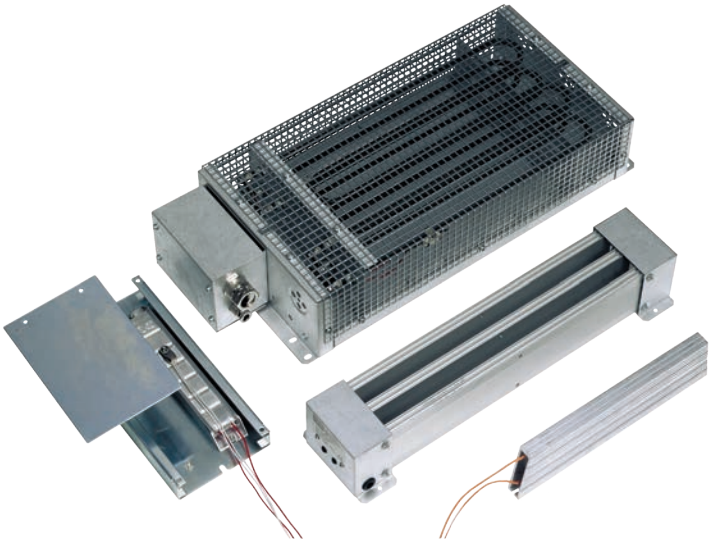
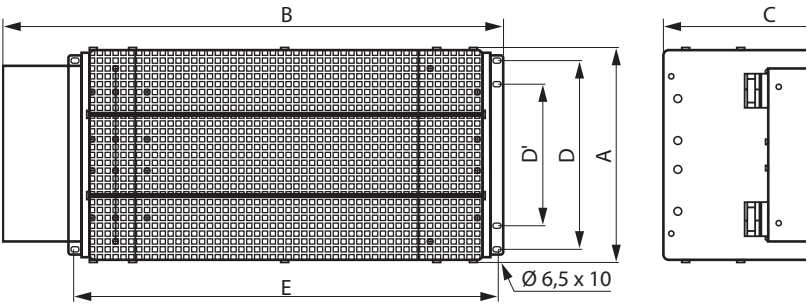
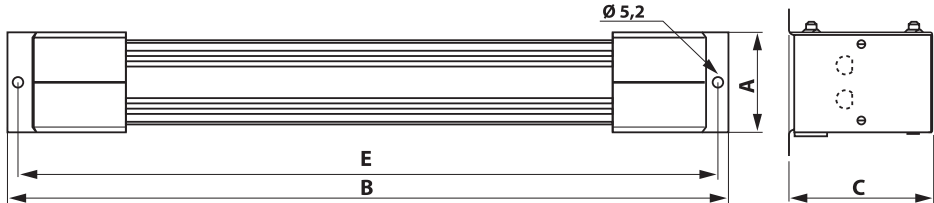
★ mains choke generally required

<sup>1)</sup> F5 Multi

# BRAKING RESISTORS AND LINE REGEN SYSTEM

## ENERGY ABSORPTION

KEB braking resistors – supplied with thermal monitoring as standard for the absorption of generated energy. Quiet braking available in compact sub-mounted modules or universal side-mounted units to absorb pulse energy.



Using the feedback units COMBIVERT R6 (for block-shaped currents) and COMBIVERT F5-AFE (for sinusoidal-shaped current) regenerative energy in the power range up to 900 KW is fed back into the grid.

		EXTERNAL BRAKING RESISTORS										
	Part no.	R	P <sub>D</sub>	P <sub>6</sub>	P <sub>25</sub>	P <sub>40</sub>	A	B	C	D/D'	E	
		[Ω]	[W]	[W]	[W]	[W]	[mm]	[mm]	[mm]	[mm]	[mm]	
230 V-CLASS	07BR100-1180	180	44	800	300	180	40	165	26	-	145	
	09BR100-1100	100	82	1500	500	300	40	240	26	-	225	
	10BR100-1683	68	120	2200	800	500	40	300	26	-	285	
	12BR100-1333	33	250	4200	1300	750	80	300	28	-	285	
	13BR100-1273	27	300	5100	1500	900	80	400	28	-	385	
	14BR100-1203	20	410	6900	1800	1100	80	400	28	-	385	
	15BR110-1133	13	630	10000	3200	1800	63	370	96	-	355	
	16BR110-1103	10	780	14000	3600	2200	63	470	96	-	455	
	17BR110-1073	7	1200	22000	5400	3100	90	470	96	50	455	
400 V-CLASS	07BR100-6620	620	56	900	300	180	40	165	26	-	145	
	09BR100-6390	390	90	1500	500	300	40	240	26	-	225	
	10BR100-6270	270	130	2100	800	500	40	300	26	-	285	
	12BR100-6150	150	230	3850	1300	750	80	300	28	-	285	
	13BR100-6110	110	350	5000	1500	900	80	400	28	-	385	
	14BR100-6853	85	410	6900	1800	1100	80	400	28	-	385	
	15BR110-6563	56	620	10000	3200	1800	63	370	96	-	355	
	16BR110-6423	42	820	14000	3600	2200	63	470	96	-	455	
	17BR110-6303	30	1200	19000	5400	3100	90	470	96	50	455	
	18BR226-6203	20	1700	29000	7500	4500	270	625	116	240/176	526	
	19BR226-6152	15	2300	38000	10000	6000	270	625	116	240/176	526	
	20BR226-6123	12	2900	48000	12500	7500	270	625	223	240/176	526	
	21BR226-6103	10	3000	53000	15000	9000	270	625	223	240/176	526	
	22BR226-6866	8,6	4000	68000	17500	10000	270	625	273	240/176	526	
	23BR226-6676	6,7	5200	86000	22000	12500	270	625	273	240/176	526	
	24BR226-6506	5	6900	115000	30000	18000	270	625	223	240/176	526	2
	25BR226-6436	4,3	8100	135000	35000	20000	270	625	273	240/176	526	2
	26BR226-6386	3,8	9200	154000	40000	22500	270	625	273	240/176	526	2
	27BR226-6336	3,3	10000	173000	45000	25000	270	625	273	240/176	526	2
	28BR226-6226	2,2	15000	260000	67000	37000	270	625	273	240/176	526	3
	29BR226-6176	1,7	20000	340000	90000	50000	270	625	273	240/176	526	4
30BR226-6136	1,3	26000	440000	112000	62000	270	625	273	240/176	526	5	

OHM-A

OHM-B

required modules

P<sub>D</sub> continuous rating  
 P<sub>6</sub> pulse rating with 6 sec. ON-time and period of 120 sec.  
 P<sub>25</sub> pulse rating with 25 sec. ON-time and period of 120 sec.  
 P<sub>40</sub> pulse rating with 40 sec. ON-time and period of 120 sec.

# MOTOR & GEARBOX TECHNOLOGY



## OPTIMALLY HARMONIZED

- Synchronous motors with nominal torque up to 100 Nm and
- Asynchronous motors with nominal power up to 160 kW

convert the output signals of the drive controller COMBIVERT F5 in rotation. KEB provides efficient series of motors for inverter operation depending on the physical requirements of the application, mechanical housings, inertia ratio motor/machine and/or overload characteristic.

If desired you get complete systems consisting of frequency inverter/servo controller and motor. The initial setting is available worldwide via web based motor configurator (**KEB DRIVE**).

Detailed information on features, performance and technical data available in the KEB MOTORS catalogue.



Industrial gear motors ensure the optimisation of speed and torque. With the COMBIGEAR program, a fully modular system is available in

- Helical inline-
- Helical shaft mounted-
- Helical bevel-
- Helical worm gear

Key features of the range are the finely graduated ratios, compact constructions and robust cast iron housings. Tuned to the COMBIVERT F5 inverter, these units are ideal for complete system solutions up to 55 kW.

High dynamics combined with minimal backlash are the main requirements for servo applications. KEB synchronous motors in combination with powerful planetary gears or the gearboxes from the COMBIGEAR range fulfil these requirements to give a cost effective solution. With **KEB DRIVE**, an efficient product configurator is available for the selection of the optimal variant for your applications.

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