

# R6

## COMBIVERT R6

MADE  
IN  
GERMANY



**Supply and Regen Systems**  
... 900 kW



# KEB COMBIVERT R6 - Philosophy

The kinetic energy of electric drives can be a valuable energy potential. Historically, that kinetic energy was eliminated through friction and/or a mechanical or electric braking device.

Regenerative loads are becoming more common due to increased usage of dynamic and distributed high efficiency AC-drives and servo systems.

These same frequency inverters and servo controllers offer the possibility of converting the kinetic energy of the mechanical system into stored energy in the DC-circuit. Typically the excess energy is dissipated in a braking resistor as heat. However in combination with a regenerative unit, it is possible to feed back the energy into the main line power supply.

This is particularly useful in all applications where prolonged or continuous downward motion occurs or heat dissipation to the surrounding environment is not wanted.



# R6

## COMBIVERT R6

2

**Energy saving by using line regen -**

**an environmental contribution that pays off!**



Contents	Page
Philosophy	2
Appication examples	3
Block diagrams	3
System characteristics	4
Voltage- / current chart	5
<b>Technical data</b>	<b>6</b>
Type of connection / accessories	7
Addresses	8

## Passenger lifts and freight elevators

- replacement of traditional braking resistors
- reduced fire hazard of the system
- return of investment through energy savings possible within 2 years of operating time

## Feed into the mains

- For industrial mains with commutation choke (block-shaped) or with harmonic filter (sinusoidal) according to EN 12015 and EN 61000-3-12 for power plants (sizes 15/19, THDi < 12 %)
  - combustion machines in CHPs
  - small wind turbines
  - biogas plants
  - hydropower plants

## Theatre technology

- no waste heat of resistors
- high energy efficiency of the system
- low-noise braking operation

## Eccentric Loads

- increased efficiency of variable speed drives with changing motor and regenerative load cycles

## Lifting and conveying / storage retrieval systems

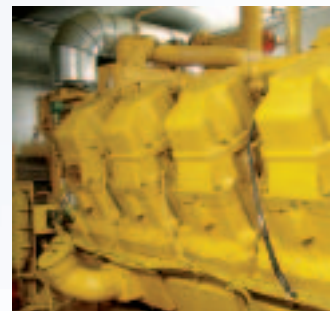
- DC-interconnected operation of multiple drives, support energy sharing and return of peak energy into the main line power supply
- no heat source mounted on the transport systems

## Test benches and test systems

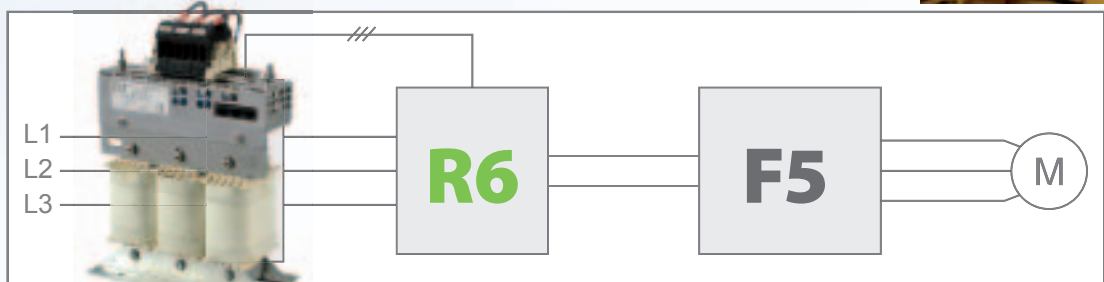
- continuous energy recovery
- parallel operation for higher power ratings
- deceleration of large centrifugal masses

## Centrifuges

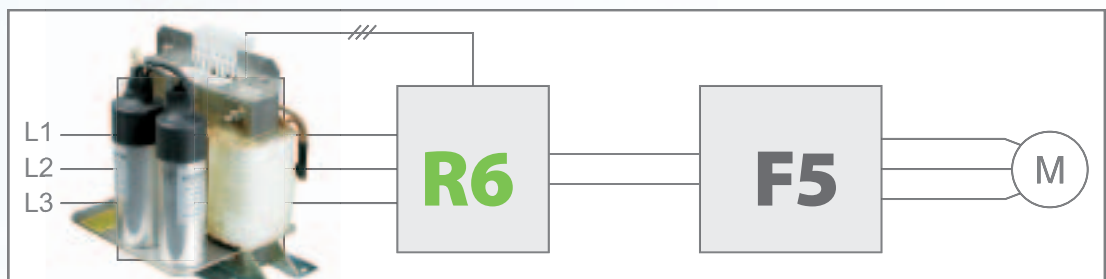
- regenerative deceleration of high kinetic energy
- increased productivity through short acceleration and deceleration times



## Block diagram with commutation choke



## Block diagram with harmonic filter

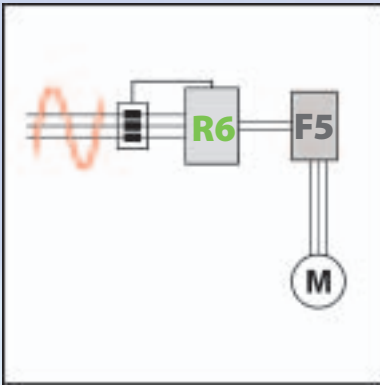


In combination with **KEB COMBILINE** harmonic filters, the **R6-units** create a sinusoidal return current as well as current draw from the main line power supply.

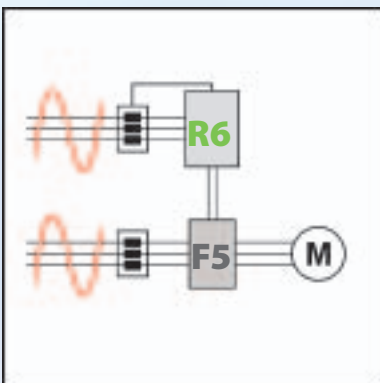
# KEB COMBIVERT R6 - System characteristics

According to the application the units can be operated with cost-efficient commutation choke for block-shaped currents or with harmonic filter with sinusoidal input and regenerative current. The system power is scaleable up to 900 kW by parallel use of multiple units.

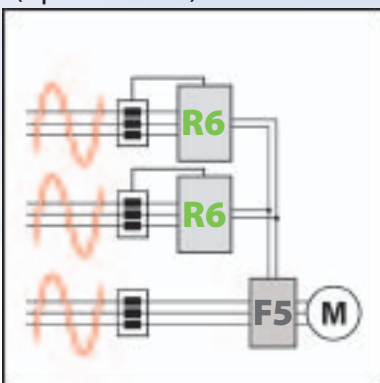
## Feed-in / DC - FI



## AC feed-in parallel



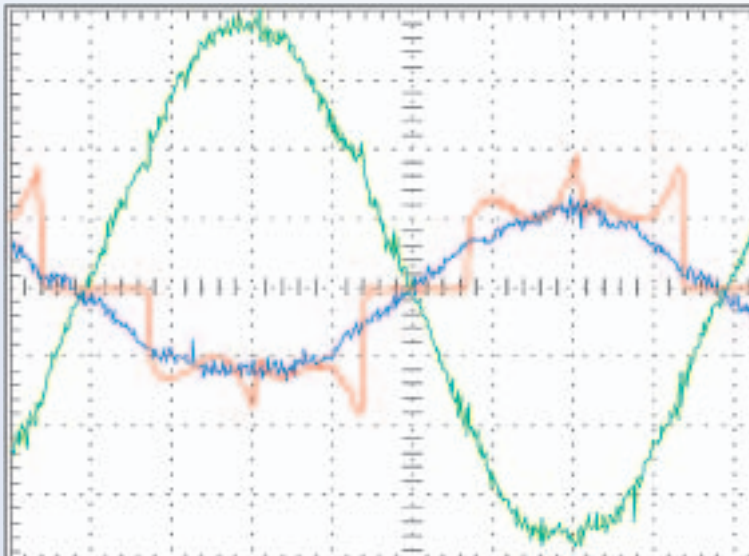
## AC feed-in modular (up to 3 units)



- scalable power for DC networks of inverters and servo controllers
- integrated pre-charge unit for DC-interconnection
- complete systems:  
regen unit + commutation choke or  
harmonic filter + EMC filter, EN 618003-, class C1 - C3
- optimal use of the kinetic energy due to high efficiency
- display of current energy demand, regen power, energy meter for feed-in and energy return as well as the net consumption (kWh) gives a general overview on the efficiency of the system
- compact, modular and lightweight design offers optimal system integration or retrofitting in existing factories
- universal design supports all popular supply voltages from 200 V ... 500 V AC (size 15 and 19), 50/60 Hz and/or 380 V ... 500 V AC (size 25 and 29), 50/60 Hz
- integrated DC fuses in sizes 15 and 19 reduce external wiring / installation costs
- digital control and serial connection into the control system by ...

### Bus systems of the 1st and 2nd generation:





Voltage

Current with line choke

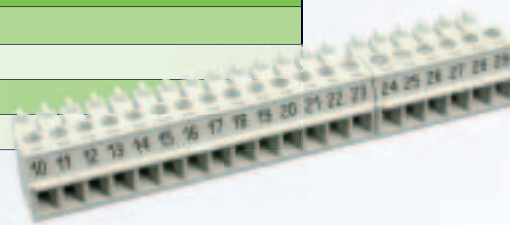
Current with harmonic filter



For the integration into the control system, the **KEB COMBIVERT R6** has a serial communication interface and free programmable analog/digital in- and outputs.

### Free programmable inputs / outputs

4 x	digital in
2 x	digital out
2 x	Relais out
1 x	Analog out



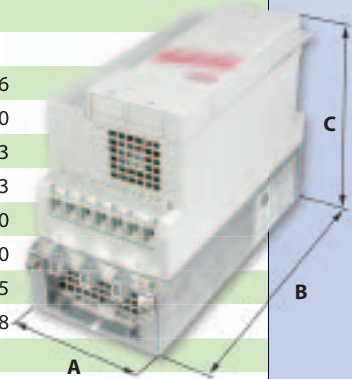
Easy handling is ensured through the factory-provided short menu (CP-Parameters). More customized adjustments are possible in the application level.

The universal PC tool **KEB COMBIVIS** offers an user friendly programming and monitoring platform for an easy start-up, diagnosis or maintenance. The download is free-of-charge at [www.keb.de](http://www.keb.de). Easy connection of the complete system for remote maintenance via bus system.



# KEB COMBIVERT R6 - Technical data

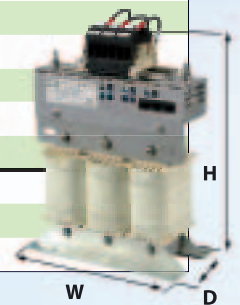
Supply- and regenerative units						
Part-No.		15.R6.S1E-900A	19.R6.S1E-900A	19.R6.S1E-910A	25.R6.S1R-900A	29.R6.S1P-910D
Housing size		E			R	P
Phases		3				
Rated voltage	[V]	400 (230)			400	
Mains voltage	[V]	180...550± 0 %			305 ... 528 ± 0 %	
Mains frequency	[Hz]	50 / 60 ± 2				
<b>Regeneration</b>						
Rated output power	[kVA]	18 (10.5)	45 (26)		153	346
Rated active power	[kW]	17 (10)	42 (23)		140	330
Max. output power	[kVA]	27 (15.5)	67.5 (39)	81 (46.6)	230	433
Max. active power	[kW]	25.5 (15)	63 (34.5)	75 (42)	210	413
Regenerative active current	[A]	26	65		221	500
Regenerative DC current	[A <sub>DC</sub> ]	32	80		270	590
Overload current (E.OL) 60 s	[A]	39	97.5	117 [10s]	331	625
Max. regenerative DC current	[A <sub>DC</sub> ]	48	120	144 [10s]	405	738
<b>Supply</b>						
Rated input power	[kVA]	18 (10.5)	48.5 (28)		153	336
Rated active power	[kW]	16 (10)	44.5 (25,5)		135	310
Max. input power	[kVA]	27 (15.5)	72.5 (42)	87 (50) [10s]	230	420
Max. active power	[kW]	24 (14.5)	67 (38)	80 (46) [10s]	202	388
Rated supply current	[A]	26	70		221	485
DC supply current	[A <sub>DC</sub> ]	32	87		270	590
Overload current (E.OL) 60 s	[A]	39	105	126 [10s]	331	606
Max. DC supply current 60 s	[A <sub>DC</sub> ]	48	130	156 [10s]	405	738
Overload limit	[%]	160	160	200	160	160
DC fuse internal		option		-	-	-
Dimensions (W x H x D)	[mm]	130 x 290 x 208			340 x 520 x 357	340 x 960 x 453
Weight	[kg]	5.6	5.6		25	97.5



\* The values in brackets apply to the operation on 230 V power supply.

## Main line commutation

Block-shaped feed-back	with / without synchronization	Commutation choke	size	15	19	19	25	29	
				Rated current	[A]	26	70	65	221
		Overload	[%]	150	150	215	150	125	
Single operation	Parallel operation	Master	Part-No.	15.Z1.B05-1001	19.Z1.B05-1000	19.Z1.B05-xxxx	25.Z1.B04-1000	29.Z1.B04-1000	
			Dimensions (W x H x D)	[mm]	178 x 100 x 258	243 x 115 x 290	291 x 200 x 325	316 x 222 x 234	412 x 250 x 315
			Weight	[kg]	11.5	13.8	25	25	49
			Synchronization		internal	internal	internal	00.R6.940-2409	00.R6.940-2409
Parallel operation	Parallel operation	Slave	Part-No.	15.Z1.B05-1003	19.Z1.B05-1003	19.Z1.B05-xxxx	25.Z1.B04-1000	29.Z1.B04-1000	
			W x H x D	[mm]	178 x 95 x 178	243 x 115 x 233	291 x 200 x 325	316 x 222 x 234	412 x 250 x 315
			Weight	[kg]	10.8	13.1	25	25	49

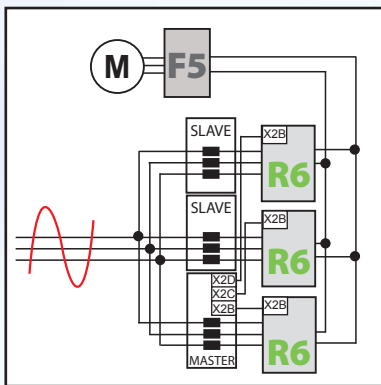
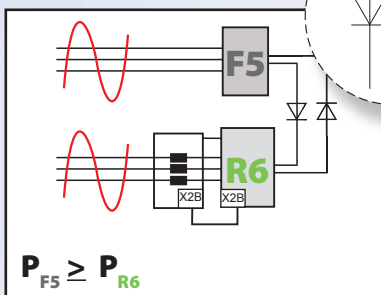
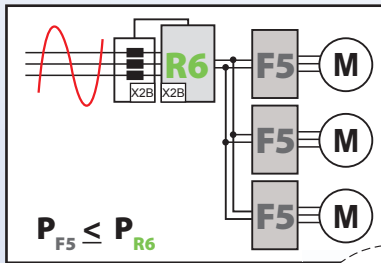


Sinusoidal feed-back	with / without synchronization	Harmonic filters THD*	size	15	19	25	29	
				Rated current	[A]	25.2	63	221
		Overload	[%]	150	150	150	150	
Single operation	Parallel operation	Master	Part-No.	15.Z1.C04-1002	19.Z1.C04-1002	25.Z1.C04-1000	29.Z1.C04-1000	
			Dimensions (W x H x D)	[mm]	291 x 208 x 285	352 x 355 x 335	552 x 550 x 520	660 x 670 x 650
			Weight	[kg]	26.4	62	244	513
			Synchronization		internal	internal	00.R6.940-2409	00.R6.940-2409
Parallel operation	Parallel operation	Slave	Part-No.	15.Z1.C04-1000	19.Z1.C04-1000	25.Z1.C04-1000	29.Z1.C04-1000	
			W x H x D	[mm]	291 x 214 x 257	352 x 307 x 326	552 x 550 x 520	660 x 670 x 650
			Weight	[kg]	25.5	61	244	513



\* Low powers on request

The **KEB COMBIVERT R6** regenerative units are designed for the supply and energy return from one or several parallel motor drive controls. Based on the input and regen power the R6 units can be installed in parallel.

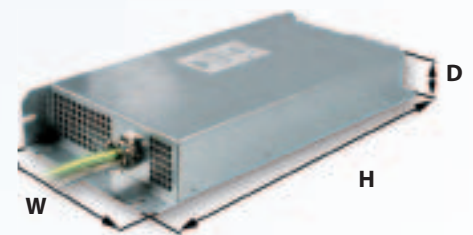


For that purpose the connected drive controls are supplied via a DC bus connection. The braking energy returned to the DC bus is fed back into the main line power supply.

For applications having smaller requirements for energy return, the supply of the regenerative unit and the drive controller is done in parallel. We recommend the use of decoupling diodes to route the current flow appropriately.

Size	15.R6.	19.R6.	25.R6.	29.R6.
Diode	00.90.147	00.90.147	00.90.147	00.90.147
Part.-No.	-3500	-4101	-6009	-6009

When the power of more than one unit is required but not as much as the next larger size, the units may be operated with up to 3 units connected in parallel. The “master” synchronization signal of the main line power supply (X2B) is connected in parallel to all regenerative units.



## EMC-Filter

EMC Filter	Size	15	19	25	29
Part.-No.		15.E4.T60-1001	19.R6.T60-1001	25.E4.T60-1001	30.E4.T60-1001
Dimensions (W x H x D)	[mm]	132 x 352 x 50	198 x 422 x 65	110 x 630 x 240	250 x 640 x 130
Weight	[kg]	2	6	16	14
Installation		sub mounted / external filter		external filter	

## Accessory:

For compliance with a good EMC-environment, a ferrite ring shall be installed over the DC bus connection at each motor drive. The following ferrites are available based on the wire cross section:

Ferrite	Core size [mm]	Internal diameter [mm]
00.90.396-2621	R42/26/18	24.9
00.90.390-5421	R56/32/18	29.5
00.90.395-3820	R63/38/25	36.0
00.90.395-5222	R87/54/30	54.5
00.90.395-5520	R102/66/15	64.5

# 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)**

## SUBSIDIARIES

### AUSTRIA

KEB Antriebstechnik  
Austria GmbH  
Ritzstraße 8  
A - 4614 Marchtrenk  
Tel.: +43 (0)7243 53586-0  
Fax: +43 (0)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 (0)21 37746688  
Fax: +86 (0)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 (0)3772 67-0  
Fax: +49 (0)3772 67-281  
E-Mail: [info@keb-combidrive.de](mailto:info@keb-combidrive.de)

### FRANCE

Société Française KEB  
Z.I. de la Croix St. Nicolas  
14, rue Gustave Eiffel  
F - 94510 LA QUEUE EN BRIE  
Tel.: +33 (0)149620101  
Fax: +33 (0)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 (0)1933 402220  
Fax: +44 (0)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.  
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 (0)33 445-8515  
Fax: +81 (0)33 445-8215  
E-Mail: [info@keb.jp](mailto:info@keb.jp)  
Internet: [www.keb.jp](http://www.keb.jp)

### RUSSIA

KEB RUS Ltd.  
Lesnaya str, house 30  
Dzerzhinsky (MO)  
RUS - 140091 Moscow region  
Tel.: +7 (0)495 6320217  
Fax: +7 (0)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@kebamerica.com](mailto:info@kebamerica.com)  
Internet: [www.kebamerica.com](http://www.kebamerica.com)

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

### Further partner in...

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

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

