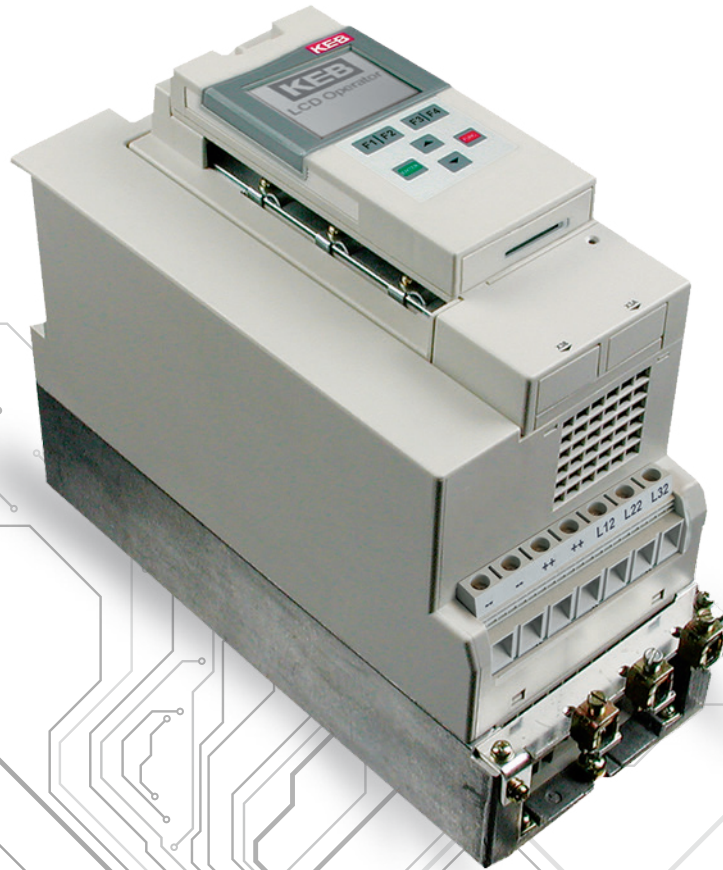




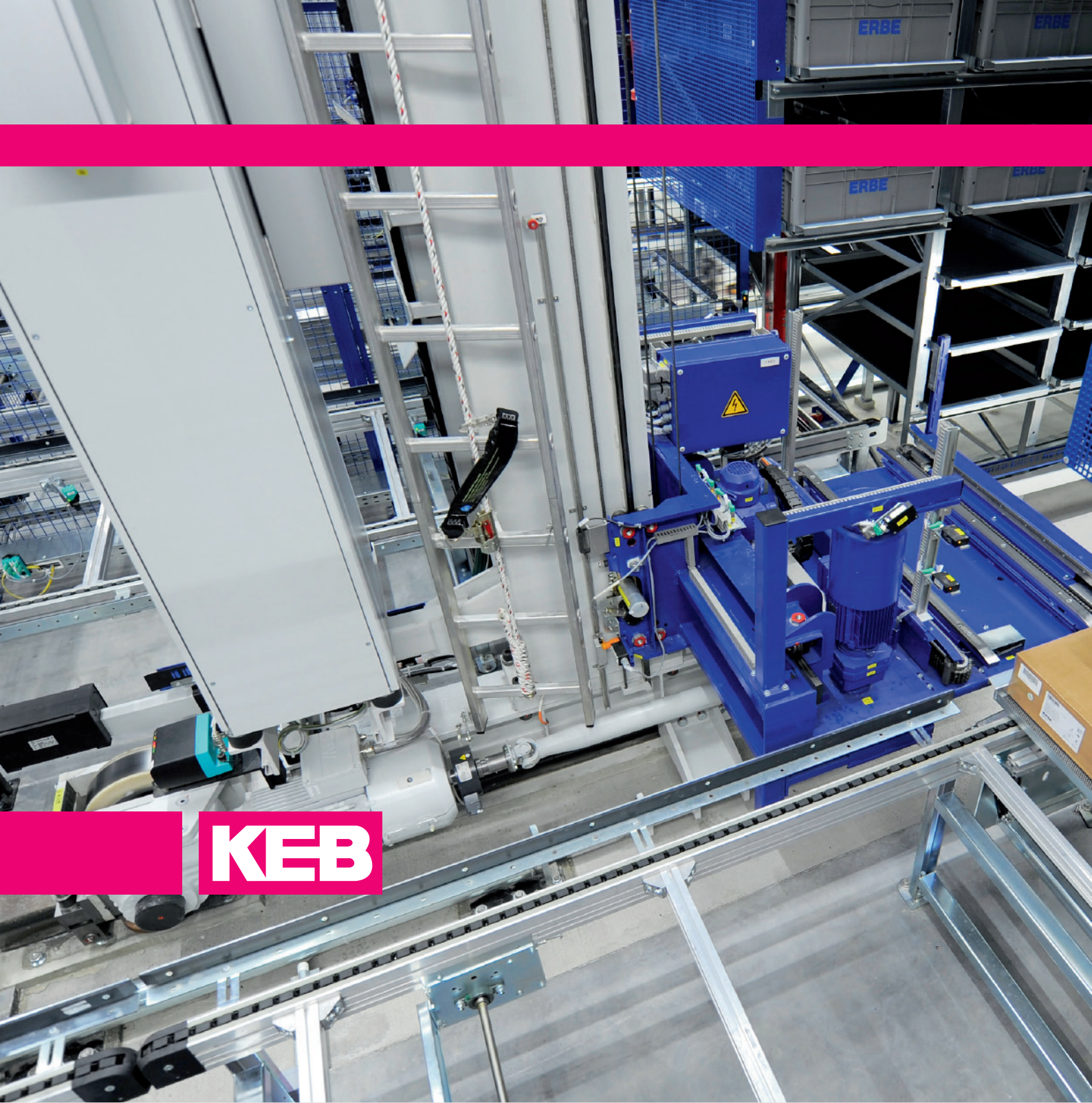
CronaTech



# COMBIVERT R6

LINE REGEN SYSTEMS UP TO 1000 KVA

V - 1.1 EN



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## PHILOSOPHY

Traditionally excess kinetic energy was dissipated through friction or a braking device (mechanical or electrical), most commonly a braking resistor. This unused energy now has a valuable potential. Using a regenerative unit the generated energy can be feedback in the DC circuit through the drive or it's possible to feed it back onto the mains power supply line.

COMBIVERT R6 regen units are able to supply and feedback energy of a single inverter or a common DC-link of several drive controllers. The system can also be designed to match the required power by the cascading of several units.

## COMBIVERT R6



## SAVING ENERGY THROUGH REGENERATION - AN ENVIRONMENTAL CONTRIBUTION THAT PAYS OFF!

### PASSENGER AND FREIGHT ELEVATORS

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

### CONNECTION OF GENERATORS TO UTILITY SYSTEM

- power quality standards (e.g.: IEEE-519 / THDi < 8 %) can be met with harmonic filters
  - combustion engines
  - wind energy plants
  - hydropower plants

### ECCENTRIC LOADS

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

### THEATRE TECHNOLOGY

- no heating of resistors
- energy optimization
- low-noise braking operation

### LIFTING AND CONVEYOR / STORAGE RETRIEVAL SYSTEMS

- DC-interconnected operation of multiple drives support energy sharing
- return of peak energy into the mains line power supply
- no additional heat sources

### TEST BENCHES AND TEST SYSTEMS

- permanent regeneration of energy
- can be cascaded for large loads

### CENTRIFUGES

- regenerative braking of high centrifugal masses
- utilization of kinetic energy
- increased productivity due to short start-up and run-down times



## BENEFITS

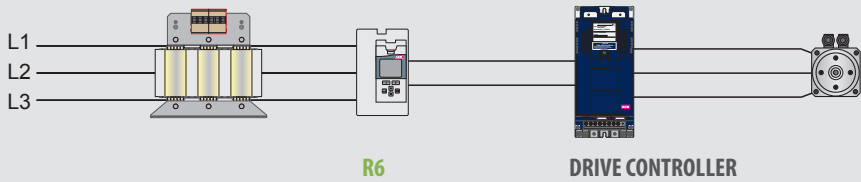
- Easy replacement for braking resistors
- Usable for all common supply voltages of 180 ... 528 V AC, 50/60 Hz
- Compatible with all typical DC - powered drive controller
- Integrated pre-charging circuit
- Compact and lightweight devices
- Wide power range up to 1.000 kVA
- Cascadable power parts
- Optional choke or harmonic filter
- Reduced fire risk in sensitive areas
- Reduced cooling requirements of the environment
- Energy meter for the validated savings
- freely configurable inputs and outputs
- Various field bus interfaces available by operator

# COMBIVERT R6 -FUNCTIONALITY



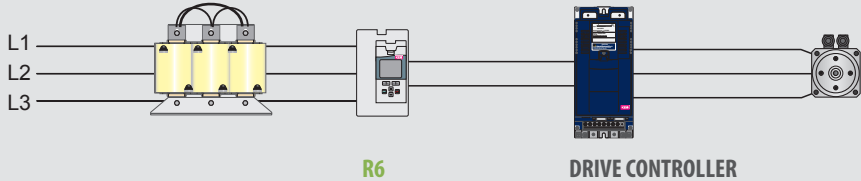
## SIMPLIFIED DIAGRAM

### WITH COMMUTATION CHOKE



With COMBILINE harmonic filters the R6 - System generates sinusoidal current at the mains line power supply.

### WITH HARMONIC FILTER



The COMBIVERT R6 can regenerate energy from drive controllers back onto the mains power supply line. This can be from a single drive controller or from a common DC-link of several inverters.

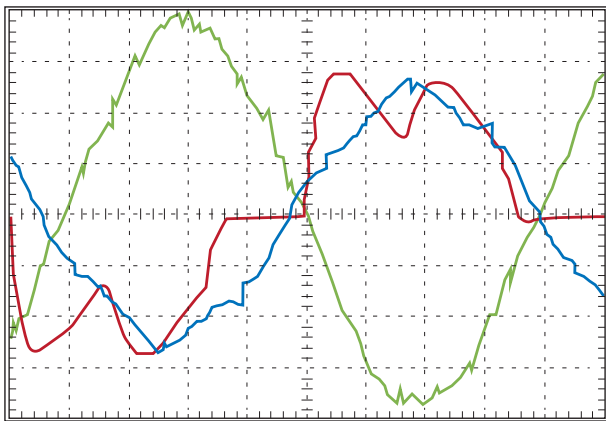
In supply mode the COMBIVERT R6 pre-charges the DC-link and acts like a typical B6 rectifier. The DC-link voltage corresponds to the rectified AC supply voltage.

When the energy fed into the DC-link by one or several drives in a deceleration or braking operation the regen unit will feed this excess energy back to the mains power supply line enabling access to this energy by other consumers on the grid

Depending on the system design either standard chokes or harmonic filters can be used to improve the THDi (lower harmonics).

With standard COMBILINE mains chokes all industrial requirements are fulfilled (block shaped regeneration). Using the COMBILINE harmonic filters will result in nearby sinusoidal current waveform for supplying and regenerating energy (THDi typ. < 8%)

## VOLTAGE / CURRENT DIAGRAM FOR REGENERATIVE OPERATION WITH R6-NCM



*Voltage*  
*Current with harmonic filter*  
*Current with mains filter*

Next to the established control version R6-S the modulation scheme was improved with the “**Natural Current Modulation**”. This new R6-NCM technology is available with the new control Type, called “N-version”

The **Natural Current Modulation** principle emulates the current waveform of a typical B6 rectifier system also in regeneration mode. This results in a much smoother commutation and an additional synchronization module (as used with R6-S) is no longer required.



### THE ESSENTIALLY ADVANTAGES OF R6-NCM

- Reduced noise level in regen mode
- Improved current waveforms (reduced THDi values)
- Standard mains chokes and patented harmonic filters of the KEB COMBILINE Z1 series can be used
- No additional synchronization unit needed

**Supply and Regenerative Systems**

ARTICLE CODE	15R6_1E-900A	19R6_1E-900A	19R6_1E-910A	25R6S3R-900A	29R6S1P-910D
Control version	N / S	N / S	N / S	S	S
Housing size	E			R	P
Phases	3				
Rated voltage [V]	400			400	
Mains voltage range [V]	180 ... 550 +0 %			305 ... 528 +0 %	
Mains frequency [Hz]	50 / 60				

**REGENERATIVE OPERATION**

Output rated power [kVA]	18	45	153	346	
Rated active power [kW]	17	42	140	330	
Max. power output [kVA]	27	67.5	81	230	433
Max. active power [kW]	25.5	63	75	210	413
Regenerative rated current [A]	26	65	221	500	
Regenerative DC current [A <sub>DC</sub> ]	32	80	270	590	
Over load current (E.O.L) 60 s [A]	39	97.5	117 [10 s]	331	625
Max. regenerative DC current 60 s [A <sub>DC</sub> ]	48	120	144 [10 s]	405	738

**POWER SUPPLY OPERATION**

Input rated power [kVA]	18	48.5	153	336	
Rated active power [kW]	16	44.5	135	310	
Max. input power [kVA]	27	72.5	87 [10 s]	230	420
Max. active power [kW]	24	67	80 [10 s]	202	388
Rated supply current [A]	26	70	221	485	
DC supply current [ADC]	32	87	270	590	
Over load current (E.O.L) 60 s [A]	39	105	126 [10 s]	331	606
Max. DC supply current 60 s [A <sub>DC</sub> ]	48	130	156 [10 s]	405	738
Overload disconnection [%]	160	160	200	160	160
DC-fuse internal	optional		-	internal	-
Dimensions (A x B x C) [mm]	130 x 290 x 208			340 x 520 x 357	340 x 960 x 453
Weight [kg]	5.6			25	97.5

**Assignment of filters and chokes / hamonic filter**

	SIZE	15R6	19R6	19R6	25R6	29R6
COMBIVERT R6-N	max. over load	160 %	160 %	200 %	160 %	160 %
	EMC filter	16E6T60-3000	20E6T60-3000	20E6T60-3000	25E4T60-1001	30E4T60-1001
	Choke	15Z1B04-1000	19Z1B04-1000	20Z1B04-1000	25Z1B04-1000	29Z1B04-1000
	Harmonic filter *	15Z1C04-1000	19Z1C04-1000	19Z1C04-1000	25Z1C04-1000	29Z1C04-1000
COMBIVERT R6-S	EMC filter	15E4T60-1001	19R6T60-1001		25E4T60-1001	30E4T60-1001
	Choke	15Z1B05-1000	19Z1B05-1000	19Z1B05-1011	25Z1B04-1000	29Z1B04-1000
	Harmonic filter *	15Z1C04-1002	19Z1C04-1002		25Z1C04-1000	29Z1C04-1000
	Synchronisation unit	integrated			00R6940-2407	00R6940-2407
	Synchronisation cable	00F50C3-4010				

\* Different Types for 60 Hz mains on request

## KEB WORLDWIDE

**Austria** | KEB Antriebstechnik Austria GmbH  
Ritzstraße 8 4614 Marchtrenk Austria  
Tel: +43 7243 53586-0 Fax: +43 7243 53586-21  
E-Mail: info@keb.at Internet: www.keb.at

**Belgium** | KEB Automation KG  
Herenveld 2 9500 Geraardsbergen Belgium  
Tel: +32 544 37860 Fax: +32 544 37898  
E-Mail: vb.belgien@keb.de Internet: www.keb.de

**Brazil** | KEB South America – Regional Manager  
Rua Dr. Omar Pacheco Souza Riberio, 70  
BR-CEP 13569-430 Portal do Sol, São Carlos Brazil  
Tel: +55 16 31161294 E-Mail: roberto.arias@keb.de

**France** | Société Française KEB SASU  
Z.I. de la Croix St. Nicolas 14, rue Gustave Eiffel  
94510 La Queue en Brie France  
Tel: +33 149620101 Fax: +33 145767495  
E-Mail: info@keb.fr Internet: www.keb.fr

**Germany | Headquarters**  
KEB Automation KG  
Südstraße 38 32683 Barntrup Germany  
Telefon +49 5263 401-0 Fax +49 5263 401-116  
E-Mail: info@keb.de Internet: www.keb.de

**Germany | Geared Motors**  
KEB Antriebstechnik GmbH  
Wildbacher Straße 5 08289 Schneeberg Germany  
Telefon +49 3772 67-0 Fax +49 3772 67-281  
E-Mail: info@keb-drive.de Internet: www.keb-drive.de

**Italy** | KEB Italia S.r.l. Unipersonale  
Via Newton, 2 20019 Settimo Milanese (Milano) Italia  
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  
Tokyo 108 - 0074 Japan  
Tel: +81 33 445-8515 Fax: +81 33 445-8215  
E-Mail: info@keb.jp Internet: www.keb.jp

**P. R. China** | KEB Power Transmission Technology (Shanghai) Co. Ltd.  
No. 435 QianPu Road Chedun Town Songjiang District  
201611 Shanghai P. R. China  
Tel: +86 21 37746688 Fax: +86 21 37746600  
E-Mail: info@keb.cn Internet: www.keb.cn

**Republic of Korea** | KEB Automation KG  
Room 1709, 415 Missy 2000 725 Su Seo Dong  
Gangnam Gu 135- 757 Seoul Republic of Korea  
Tel: +82 2 6253 6771 Fax: +82 2 6253 6770  
E-Mail: vb.korea@keb.de Internet: www.keb.de

**Russian Federation** | KEB RUS Ltd.  
Lesnaya str, house 30 Dzerzhinsky MO  
140091 Moscow region Russian Federation  
Tel: +7 495 6320217 Fax: +7 495 6320217  
E-Mail: info@keb.ru Internet: www.keb.ru

**Spain** | KEB Automation KG  
c / Mitjer, Nave 8 - Pol. Ind. LA MASIA  
08798 Sant Cugat Sesgarrigues (Barcelona) Spain  
Tel: +34 93 8970268 Fax: +34 93 8992035  
E-Mail: vb.espana@keb.de Internet: www.keb.de

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

**United States** | KEB America, Inc.  
5100 Valley Industrial Blvd. South  
Shakopee, MN 55379 United States  
Tel: +1 952 2241400 Fax: +1 952 2241499  
E-Mail: info@kebameric.com Internet: www.kebameric.com



## KEB PARTNER WORLDWIDE:

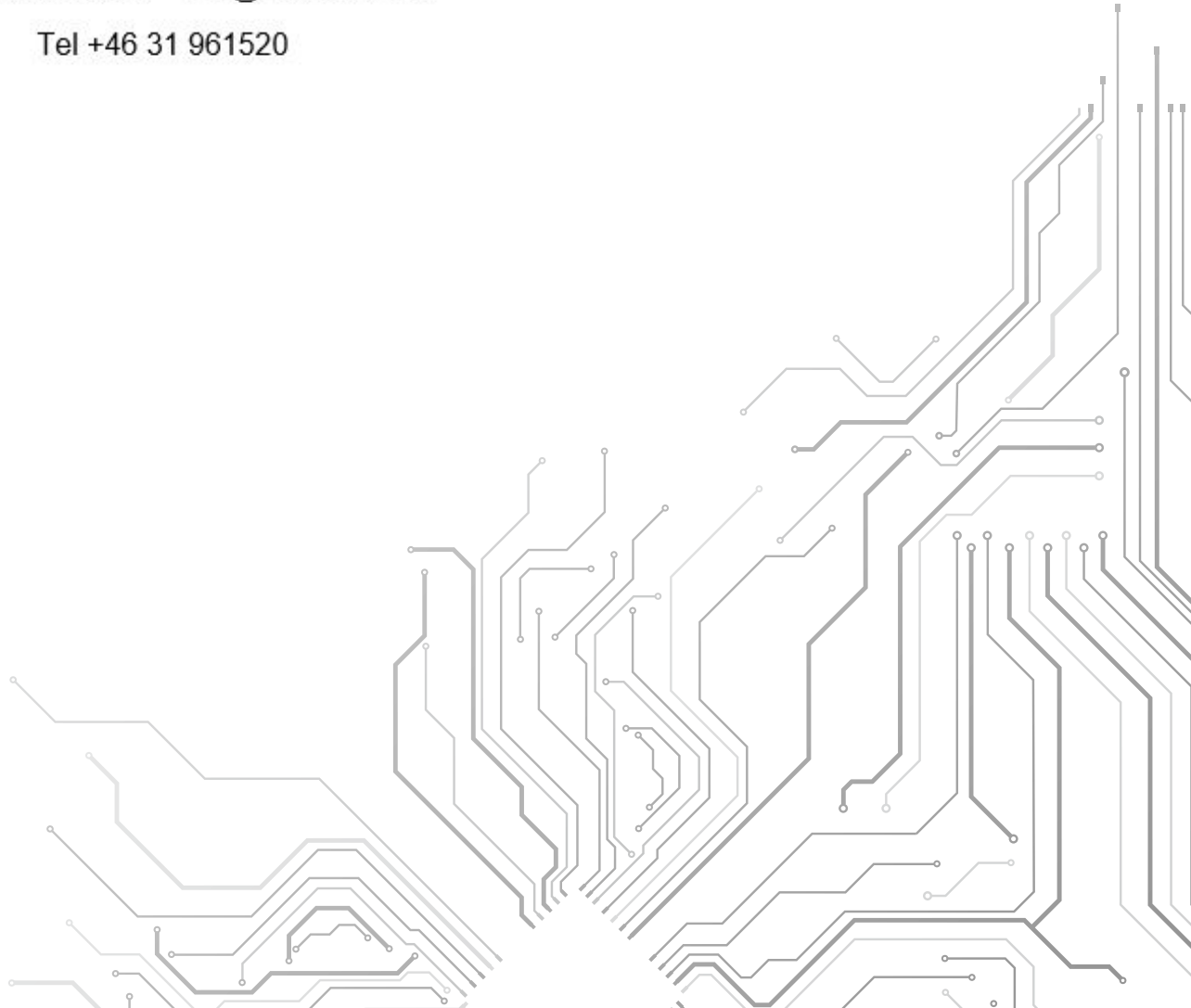
.. [www.keb.de/contact/contact-worldwide](http://www.keb.de/contact/contact-worldwide)



**CronaTech Drives AB**

[www.cronatech.se](http://www.cronatech.se) [info@cronatech.se](mailto:info@cronatech.se)

Tel +46 31 961520



**Automation with Drive**

**[www.keb.de](http://www.keb.de)**

KEB Automation KG Suedstrasse 38 32683 Barntrop Germany Tel. +49 5263 401-0 E-Mail: [info@keb.de](mailto:info@keb.de)