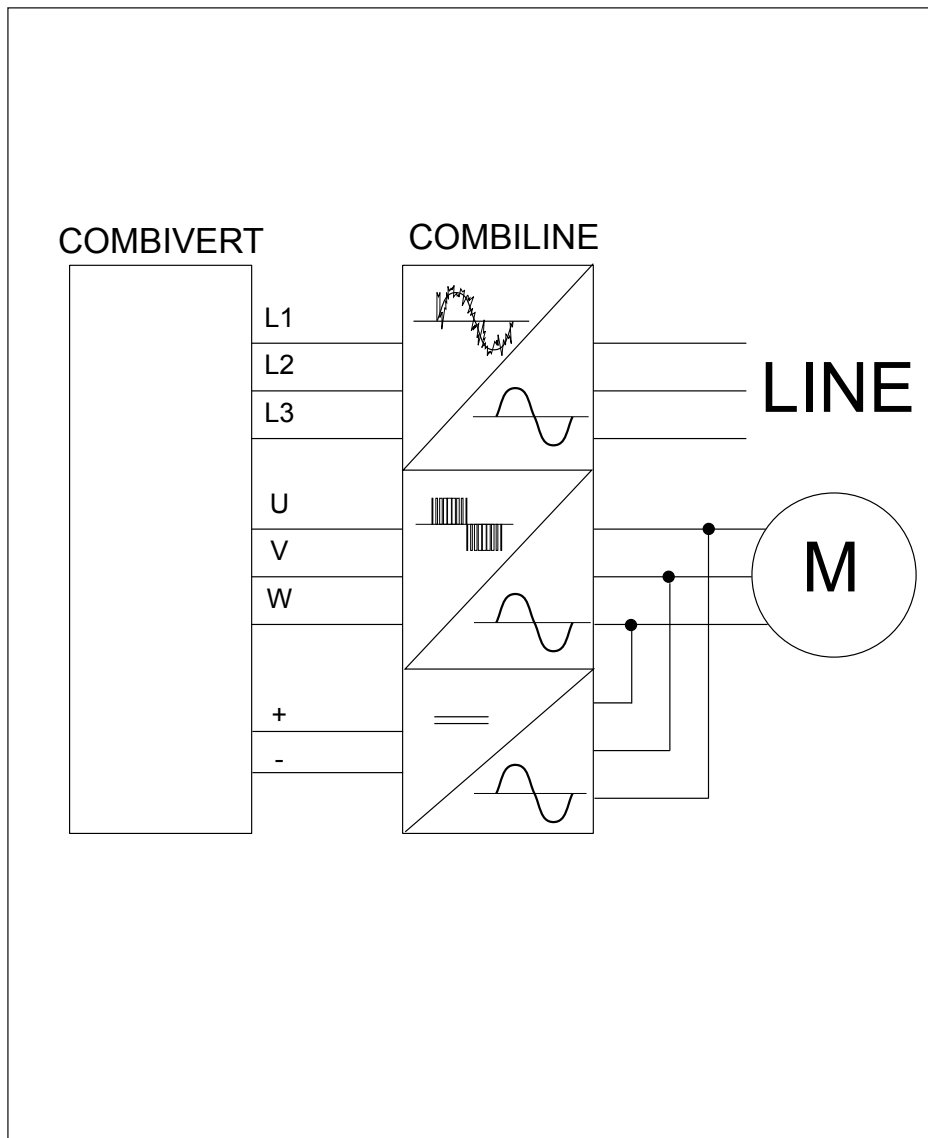


# COMBIVERT



**GB** INSTRUCTION MANUAL

I/O-filter

Mat.No.	Rev.
16E4EEG-K310	1A

**KEB**



## 1. Safety

### 1.1 About this Instruction Manual

Prior to performing any work on the unit the user must familiarize himself with the unit. This includes especially the knowledge and observance of the **safety and warning directions**. The pictographs used in this instruction manual have following meaning:



**Danger** Refers to danger of life by electric current.



**Warning** Refers to possible danger of injury or life.



**Note** Refers to tips and additional information.

### 1.2 Validity

The information contained in the technical documentation, as well as any user-specific advice in spoken and written and through tests, are made to best of our knowledge and information about the application. However, they are considered for information only without responsibility. This also applies to any violation of industrial property rights of a third-party.

Inspection of our units in view of their suitability for the intended use must be done generally by the user. Inspections are particularly necessary, if changes are executed, which serve for the further development or adaption of our products to the applications (hardware, software or download lists). Inspections must be repeated completely, even if only parts of hardware, software or download lists are modified.



**Controlling by the user** Application and use of our units in the target products is outside of our control and therefore lies exclusively in the area of responsibility of the user.



**Use under special conditions** The used semiconductors and components of KEB are developed and dimensioned for the use in industrial products. If the KEB COMBIVERT is used in machines, which work under exceptional conditions or if essential functions, life-supporting measures or an extraordinary safety step must be fulfilled, the necessary reliability and security must be ensured by the machine builder.

### 1.3 Qualification

All operations serving transport, installation and commissioning as well as maintenance are to be carried out by skilled technical personnel (observe IEC 364 or CENELEC HD 384 or DIN VDE 0100 and national accident prevention rules!). According to this manual qualified staff means those who are able to recognise and judge the possible dangers based on their technical training and experience and those with knowledge of the relevant standards and who are familiar with the field of power transmission (VDE 0100, VDE 0160 (EN 50178), VDE 0113 (EN 60204) as well as the appropriate regulations for your area.



**Danger by high voltage** KEB electronics components contain dangerous voltages which can cause death or serious injury. In operation, drive converters, depending on their degree of protection, may have live, uninsulated, and possibly also moving and hot surfaces. Care should be taken to ensure correct and safe operation to minimise risk to personnel and equipment.



**Attention** The filter is destroyed when the intermediate circuit is disconnected (terminals +, -).

# I/O-filter

## 1.4 Specified Application

I/O-filters combine a line-side HF-filter and a motor-side dv/dt-filter in one compact unit. The compact mechanical installation with pre-wired lines permits a space-saving installation with inverters of the COMBIVERT F5 series as submounted version as well as side-mounted version (generally).

The part of the input filter which is dimensioned with high damping at low leakage current reduces the cable-based disturbances to limit value B. A passive output dv/dt-filter with choke serves for a limitation of the dv/dt at the output. I/O-filters are designed for operation with long motor lines and they protect connected motors against inadmissible high voltage rise as well as inadmissible high peak voltages. By this way they protect the lifetime of the winding isolation of the motor. This is especially reasonable in case of re-designs, i.e. operation of old motors at frequency inverters.

## 1.5 Conformity

The I/O-filter meets the requirements of the Low-Voltage-Directive 2006/95/EG as well as the requirements in accordance with the EMC directive 2004/108/EG.

## 1.6 Product description

Unit type:	IO-filter
Series:	E4
Version:	Sub-mounted for F5 housing size G
Other features:	Listing: CE f = 0.15...30 MHz

## 2. Technical data

### 2.1 General

Part Number		16E4T60-1071
Type of protection	–	IP20
Climatic category	3K3	extended to $T_{max} = 45^{\circ}C$
Weight	[kg]	4,0
Interference grade according to EN 61800-3		C1 (to 50 m)

### 2.2 Input filter

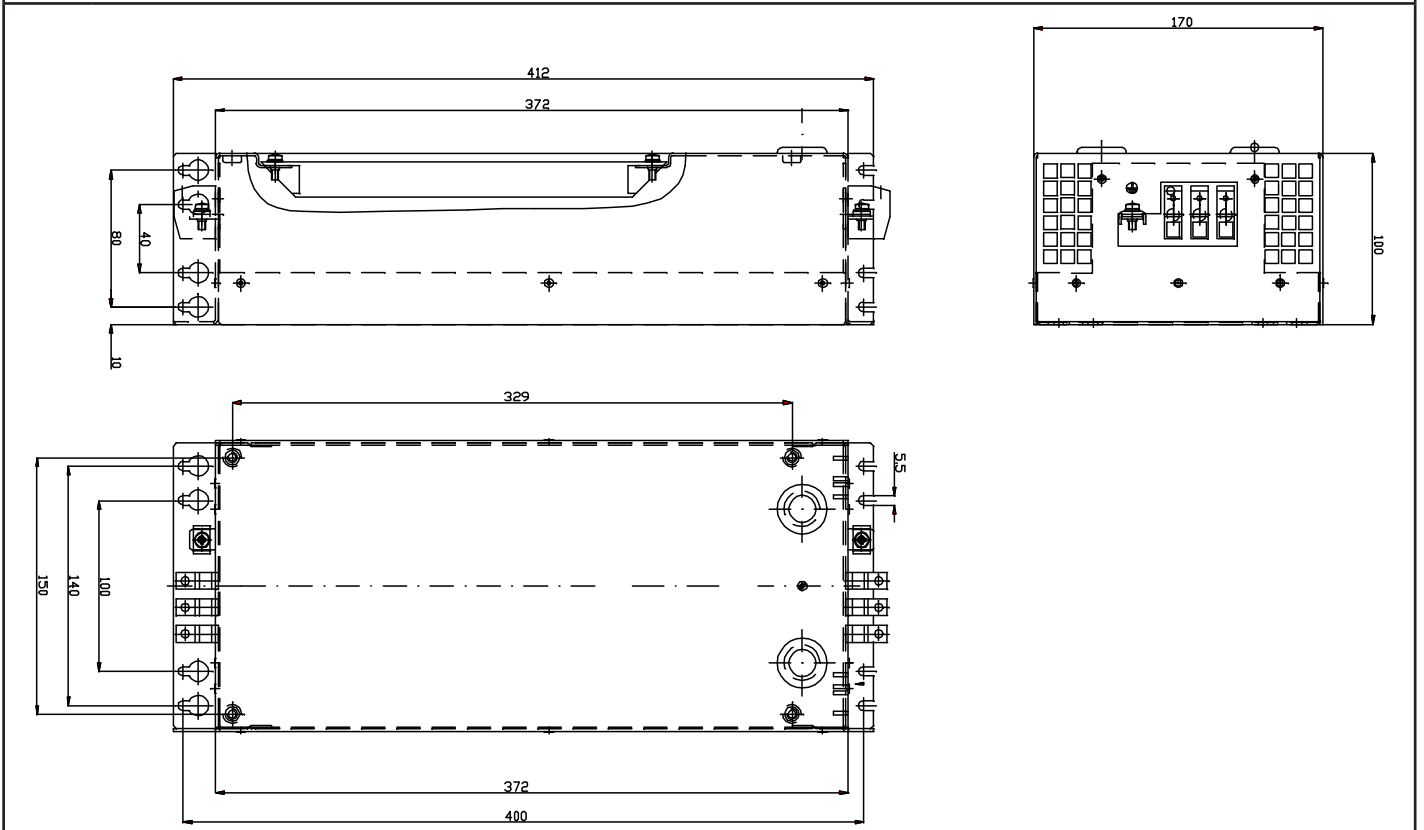
Input rated voltage	[VAC]	3 x 400/480 $\pm$ 10 %
Mains frequency	[Hz]	50/60 $\pm$ 2
Input rated current $I_E$ at $T_{max}$	[A]	40
Power loss at $I_E$	[W]	21
Leakage current (normal condition/50Hz)	[mA]	25
Maximum leakage current (one phase to PE)	[mA]	100

### 2.3 Output filter

Input rated voltage	[VAC]	3 x 400/480 $\pm$ 10 %
DASM rated power	[ kW ]	18,5
Maximum output frequency	[Hz]	400
Output rated current $I_A$ at $T_{max}$	[A]	33
Maximum inverter switching frequency	[kHz]	4
Maximum motor line length (shielded)	[m]	50
Maximum rate of voltage rise (du/dt)	[V/ $\mu$ s]	500
Power loss at $I_A$ and $f_N$	[W]	40
Voltage drop at $I_A$ , $f_N$	[V]	15

## 2.4 Dimensions

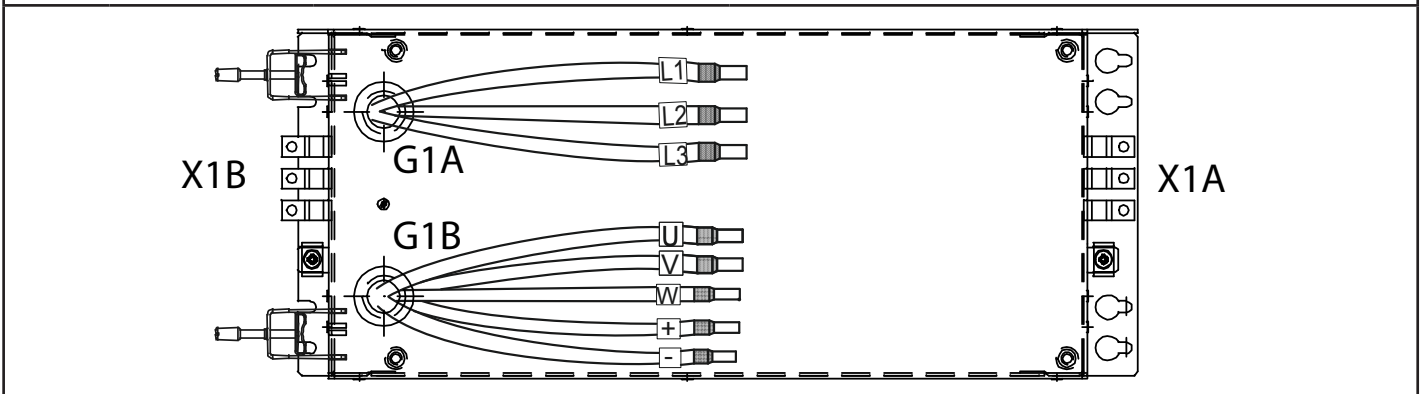
Picture 2.4 dimensions 16E4T60-1071



Mounting material for the installation of the KEB COMBIVERT in housing G onto the filter:  
4 pieces M6x16 (9905071-616K)

## 2.5 Description of the connections

Picture 2.5 connections 16E4T60-1071



Terminals / cable	Description	Connection
X1A PE, L1, L2, L3	HF-filter input	Mains supply
G1A L1, L2, L3	HF-filter output	Connection at the mains input of the inverter
G1B U, V, W	du/dt-filter input	Connection at the motor output of the inverter
X1B PE, U, V, W	du/dt-filter output	Motor connection
X1C ++, --		Connection at the inverter DC link

# I/O-filter

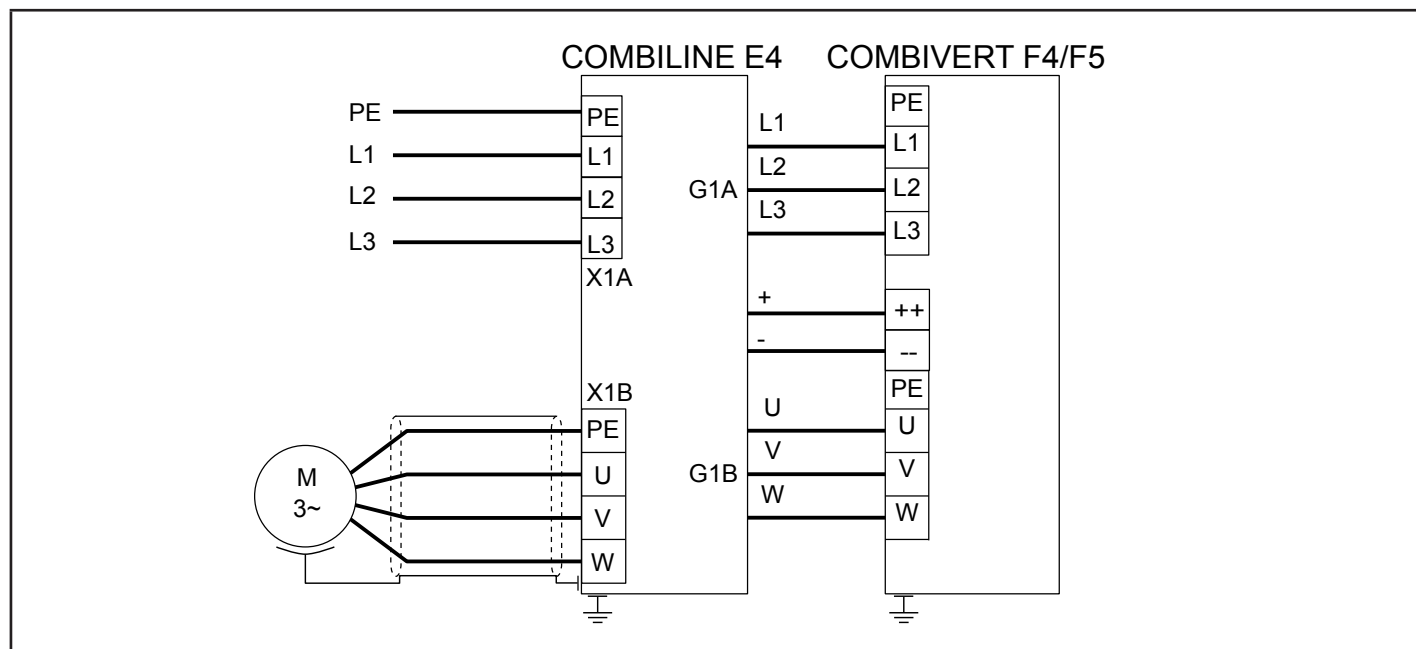
## 2.5.1 Permissible cable cross-sections of the connection terminals

Terminals	permissible cross-section flexible with wire-end ferrule				Tightening torque	
	mm <sup>2</sup>		AWG/MCM		Nm	lb inch
	min	max	min	max		
X1A	1,5	10	16	6	4	35,4
X1B	0,5	10	20	6	1,8	16

## 2.5.2 Description of the connection cable

Cable	Description	Color	Core cross-section	
			mm <sup>2</sup>	AWG/MCM
G1A	L1	black	6	10
	L2			
	L3			
G1B	U			
	V			
	W			
X1C	++	red	4	12
	--	blue		

## 2.6 Connection of the filter







## KEB Automation KG

Südstraße 38 • D-32683 Barntrup  
fon: +49 5263 401-0 • fax: +49 5263 401-116  
net: [www.keb.de](http://www.keb.de) • mail: [info@keb.de](mailto:info@keb.de)

## KEB worldwide...

Ritzstraße 8 • A-4614 Marchtrenk  
fon: +43 7243 53586-0 • fax: +43 7243 53586-21  
net: [www.keb.at](http://www.keb.at) • mail: [info@keb.at](mailto:info@keb.at)

**KEB Antriebstechnik**  
Herenveld 2 • B-9500 Geraadsbergen  
fon: +32 5443 7860 • fax: +32 5443 7898  
mail: [vb.belgien@keb.de](mailto:vb.belgien@keb.de)

### KEB Power Transmission Technology (Shanghai) Co.,Ltd.

No. 435 Qianpu Road, Chedun Town, Songjiang District,  
CHN-Shanghai 201611, P.R. CHINA  
fon: +86 21 37746688 • fax: +86 21 37746600  
net: [www.keb.cn](http://www.keb.cn) • mail: [info@keb.cn](mailto:info@keb.cn)

**KEB Antriebstechnik Austria GmbH**  
Organizační složka  
K. Weise 1675/5 • CZ-370 04 České Budějovice  
fon: +420 387 699 111 • fax: +420 387 699 119  
net: [www.keb.cz](http://www.keb.cz) • mail: [info.keb@seznam.cz](mailto:info.keb@seznam.cz)

**KEB Antriebstechnik GmbH**  
Wildbacher Str. 5 • D-08289 Schneeberg  
fon: +49 3772 67-0 • fax: +49 3772 67-281  
mail: [info@keb-drive.de](mailto:info@keb-drive.de)

**KEB España**  
C/ Mitjer, Nave 8 - Pol. Ind. LA MASIA  
E-08798 Sant Cugat Sesgarrigues (Barcelona)  
fon: +34 93 897 0268 • fax: +34 93 899 2035  
mail: [vb.espana@keb.de](mailto:vb.espana@keb.de)

**Société Française KEB**  
Z.I. de la Croix St. Nicolas • 14, rue Gustave Eiffel  
F-94510 LA QUEUE EN BRIE  
fon: +33 1 49620101 • fax: +33 1 45767495  
net: [www.keb.fr](http://www.keb.fr) • mail: [info@keb.fr](mailto:info@keb.fr)

### KEB (UK) Ltd.

6 Chieftain Business Park, Morris Close  
Park Farm, Wellingborough GB-Northants, NN8 6 XF  
fon: +44 1933 402220 • fax: +44 1933 400724  
net: [www.keb-uk.co.uk](http://www.keb-uk.co.uk) • mail: [info@keb-uk.co.uk](mailto:info@keb-uk.co.uk)

### KEB Italia S.r.l.

Via Newton, 2 • I-20019 Settimo Milanese (Milano)  
fon: +39 02 3353531  
net: [www.keb.it](http://www.keb.it) • mail: [kebitalia@keb.it](mailto:kebitalia@keb.it)

### KEB Japan Ltd.

15-16, 2-Chome, Takanawa Minato-ku  
J-Tokyo 108-0074  
fon: +81 33 445-8515 • fax: +81 33 445-8215  
mail: [info@keb.jp](mailto:info@keb.jp)

### KEB Korea Seoul

Room 1709, 415 Missy 2000  
725 Su Seo Dong, Gang Nam Gu  
ROK-135-757 Seoul/South Korea  
fon: +82 2 6253 6771 • fax: +82 2 6253 6770  
mail:

### KEB RUS Ltd.

Lesnaya Str. House 30, Dzerzhinsky (MO)  
RUS-140091 Moscow region  
fon: +7 495 550 8367 • fax: +7 495 632 0217  
net: [www.keb.ru](http://www.keb.ru) • mail: [info@keb.ru](mailto:info@keb.ru)

### KEB Sverige

Box 265 (Bergavägen 19)  
S-43093 Hälsö  
fon: +46 31 961520 • fax: +46 31 961124  
mail: [vb.schweden@keb.de](mailto:vb.schweden@keb.de)

### KEB America, Inc.

5100 Valley Industrial Blvd. South  
USA-Shakopee, MN 55379  
fon: +1 952 224-1400 • fax: +1 952 224-1499  
\*net: [www.kebamerica.com](http://www.kebamerica.com) • mail: [iinf@kebamerica.com](mailto:iinf@kebamerica.com)

More and newest addresses at <http://www.keb.de>

© KEB	
Mat.No.	16E4EEG-K310
Rev.	1A
Date	10/2016