

## USING THE QUICK GUIDE

- Serves for safe handling with the KEB drive converter.
- Provides information on handling, assembly and installation.
- Remains for later use at the drive converter.
- Does **not** replace the electronically provided instructions for use.

This instruction manual is determined exclusively for electrical personnel. Electrical personnel for the purpose of this instruction manual must have the following qualifications:

- Knowledge and understanding of the safety instructions.
- Skills for installation and assembly.
- Understanding of the function in the used machine.
- Detection of hazards and risks of the electrical drive technology.
- Knowledge of *IEC 60364-5-54*.
- Knowledge of national safety regulations.

## SAFETY INSTRUCTIONS

### ⚠ DANGER Interventions by unauthorized personnel!



#### Danger to life by electric shock and malfunction!

- Modification or repair is only permitted by KEB authorized personnel..

### Attention

#### Getting more documentation

#### Hazards and risks through ignorance.



- Open the KEB homepage at [www.keb-automation.com](http://www.keb-automation.com).
- By entering the material number in the search field, you will get the corresponding parts of the instructions for use.
- Read the instructions for use carefully!
- Observe the safety and warning instructions!
- If you have any questions, please contact [service@keb.de!](mailto:service@keb.de)

## TRANSPORT

The transport must be carried out by instructed persons, observing the following instructions.

### ⚠ CAUTION

#### Maximum design edges and high weight!

#### Contusions and bruises!

- Never stand under suspended loads.
- Wear safety shoes.
- Secure drive converter accordingly when using lifting gear.

### Attention

#### Behaviour in case of transport damage

- When receiving goods, check the device for transport damage such as deformations or loose parts.
- In case of damage, contact the carrier immediately.
- Do not operate the device in case of transport damage!

## STORAGE

Do not store drive converters

- in the environment of aggressive and/or conductive liquids or gases.
- at places with direct sunlight.
- outside the specified environmental conditions.

## UNPACKING AND CHECKING

- Make sure that no components are bent and/or isolation distances are changed.
- The device must not be put into operation in case of mechanical defects. There is no compliance with applicable safety standards any more.



The electrolytic capacitors of the DC link must be reformed if the drive converter was stored or out of operation for more than one year. See [www.keb-automation.com/search](http://www.keb-automation.com/search) with search term „electrolytic capacitors“.

## INSTALLATION



#### Drive converters contain electrostatic sensitive components.

- Avoid contact.
- Wear ESD-protective clothing.

- Do not allow moisture or mist to penetrate the unit. Mount the drive converter according to the required degree of protection.
- Make sure that no small parts fall into the device during assembly and wiring (drilling chips, screws etc.). This also applies to mechanical components, which can lose small parts during operation.
- The device is intended for the use in a pollution degree 2 environment.
- Maximum surrounding temperature 45°C
- Maximum pressure for liquid-cooled drive converters 10 bar (145 psi) at +5...+40°C.
- UL/CSA: For push-through versions, the part of tends to "NEMA Type 1".
- UL/CSA: Use only 75°C copper cables for UL-compliant connections for all power connections!
- CSA: For installations according to the Canadian National Standard C22.2 No. 274-13 overvoltage category III.

## INSTALLATION / ELECTRICAL CONNECTION

### ⚠ DANGER

#### Voltage at the terminals and in the device!



#### Danger to life by electric shock!

- Never work under voltage on the open device or touch exposed parts.
- For any work on the unit switch off the supply voltage and secure it against switching on.
- Wait until the drive has stopped in order that no regenerative energy can be generated.
- Wait until the DC link capacitors are discharged (5 minutes). Verify by measuring the DC voltage at the terminals.
- If personal protection is required, install suitable protective devices for drive converters.
- Never bridge upstream protective devices (also not for test purposes).
- Connect the protective earth conductor properly to drive converter and motor.
- Leakage current higher than 3,5 mA: The minimum cross-section of the protective earth conductor must comply with local safety regulations for protective earth conductors for equipment with high leakage current. Install all required covers and protective devices for operation.
- Residual current: This product can cause a DC current in the protective earth conductor. When a residual current device (RCD) or a residual current monitor (RCM) is used for the protection of direct or indirect contact, only a RCD or RCM of Type B is permitted for this product on the power supply side.

For a trouble-free and safe operation, please pay attention to the following instructions:

- Check for reliable fit of the device connections in order to minimize contact resistance and avoid sparking.
- Connection of the drive converter is only permissible on symmetrical networks with a maximum line voltage (L1, L2, L3) with respect to earth (N/PE) of maximum 300V. USA UL: 480/277V. An isolating transformer must be used for supply networks which exceed this value. In case of non-compliance the control is not longer considered as "safe separate circuit".
- Within systems or machines the person installing electrical wiring must ensure that on existing or new wired safe ELV circuits the EN requirement for safe insulation is still met!
- For drive converters that are not isolated from the supply circuit (in accordance with *EN 61800-5-1*) all control lines must be included in other protective measures (e.g. double insulation or shielded, earthed and insulated).
- Installations with additional safety or protective measures in accordance with their requirements have to be checked. When using drive converters, to be in accordance with the given applications notes or recommendation when using these.

## START-UP AND OPERATION

### ⚠ WARNING

#### Function of the drive converter determines the machine manufacturer!



#### Hazards caused by unintentional behavior of the drive!

- The documentation of the machine manufacturer is required for the start-up and operation of the product.
- Check especially during initial start-up or replacement of the drive converter if parameterization is compatible to application.
- The drive converter must not be started until it is determined that the installation complies with the machine directive; *EN 60204-1* must be observed.



#### For devices with FS logo on the name plate, the corresponding KEB safety manual must be observed!

During the UL evaluation, only electrical safety and risk of fire aspects were investigated.. Functional safety aspects were not evaluated.



See [www.keb-automation.com/search](http://www.keb-automation.com/search) with search term „safety manual“.

### ⚠ WARNING

#### Triggering of overcurrent protection devices

#### Risk of fire or electric shock!



- Triggering of an overcurrent protection device will be a hint for an overload or short circuit. Triggering a RCD may be caused by a leakage current.
- In order to reduce the risk of fire or electric shock, live parts and other components of the controller should be checked and replaced in case of damage.
- If the contacts of an overload relay are burned, the complete relay must be replaced.

## MAINTENANCE

### ⚠ DANGER

#### Unauthorized exchange, repair and modifications!



#### Unpredictable malfunctions!

- The function of the drive converter is dependent on its parameterization. Never replace without knowledge of the application.
- Modification or repair is permitted only by KEB Automation KG authorized personnel.
- Only use original manufacturer parts.

The following maintenance work has to be carried out when required, but at least once a year by authorized and trained personnel.

- Clean drive converter from dirt and dust deposits. Pay attention especially to cooling fins and protective grid of the fans.
- Check the function of the fans of the drive converter. The fans must be replaced in case of audible vibrations or squeak.
- Make a visual test of the cooling circuit for leaks and corrosion at liquid-cooled drive converters.
- In case of malfunction, unusual noises or smells inform a person in charge!
- In case of failure, please contact the machine manufacturer. Only the machine manufacturer knows the parameterisation of the used drive converter and can provide an appropriate replacement or induce the maintenance.

## DISPOSAL

- For professional disposal, follow the instructions in the instructions for use

## MEASUREMENTS

Mounting position	Minimum distances	Dimension	Dimension in mm
		A	150
B	100		
C	30		
D	0		
X 1)	50		

1) Distance to front operating elements in the cabinet door.

## PROTECTION

### Attention

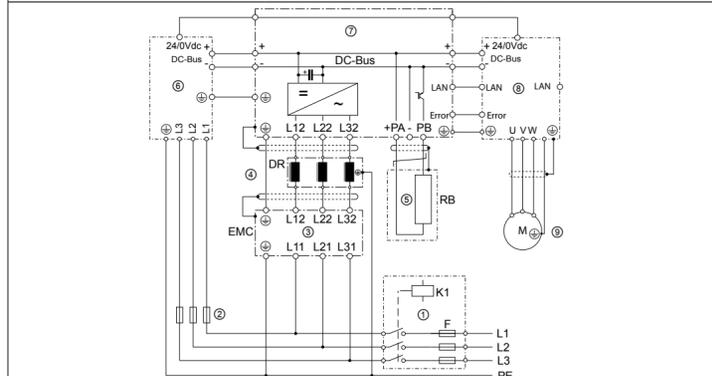
#### Important: UL/CSA Branch Circuit Protection

COMBIVERT Unit size	Input voltage		Max. fuse size	
	IEC	UL	IEC	UL
<b>rectifier module</b>			<b>gL/gG</b>	<b>„J“</b>
19H6 C/S	AC 3ph 400V	AC 3ph 480V	50A	60A
20H6 C/S			63A	80A
21H6 C/S			80A	100A
24H6 G/W			200A	200A
25H6 G/W			250A	250A
27H6 G/W			315A	300A
28H6 G/W			400A	400A
<b>Active Front End module (AIC)</b>			<b>gR/aR</b>	-
14H6 C/S	AC 3ph 400V	AC 3ph 480V	25A	-
19H6 E/U			80A	-
21H6 E/U			125A	-
24H6 G			250A	-
26H6 G			350A	-
<b>24V power supply module</b>			<b>gL/gG</b>	-
H6 B/P	AC 3ph 400V	AC 3ph 480V	10A	-

- Suitable for use on the mains, which can not supply more than 18 kA RMS (effective value). 480 V maximum, if protected by class J fuses or by semiconductor fuses. The rated voltage of the external fuse must be at least equal to the input voltage of the drives.

## WIRING

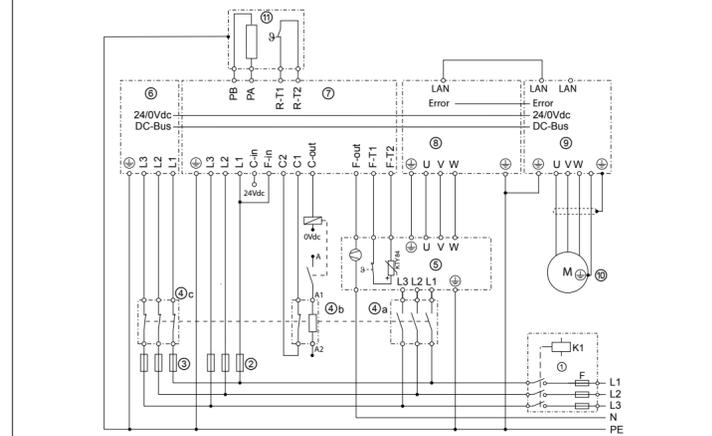
### Connection with rectifier module



1: Mains fuse and mains contactor	4: Mains choke (option)	7: Rectifier module
2: Fuses for 24V	5: Braking resistor	8: DC connection module
3: Filter (option)	6: 24V power supply module	9: Motor 3-phase

## WIRING

### Connection with AFE and charging module



1: Mains fuse and Mains contactor	5: LCL filter	9: Axis module
2: Fuses for charging module	6: 24V power supply module	10: Motor 3-phase
3: Fuses for 24V	7: Charging module	11: Braking resistor
4: Contactor with auxiliary contact	8: Active Front End module (AIC)	

No. from Table 2	Terminal strip(s)						
	X1A	X1B	X1C	X1D	X1E/F	X2A-D	PE
<b>Housing</b>							
<b>24V power supply module</b>							
H6 B/P	SK4	KS1 1)	BS1	BS2	-	PK1	KS2
<b>rectifier module</b>							
H6 C/S	SK6	SK5	BS1	BS2	-	PK1	KS3
H6 G/W	KB5	KB5	BS1	BS2	-	PK1	KB5
<b>charging module</b>							
H6 B/P	SK4	SK5	BS1	BS2	PK2	PK1	KB3
<b>Active Front End module (AIC)</b>							
H6 C/S	SK4	SK3	BS1	BS2	-	PK1	KS2
H6 E/U	SK7	-	BS1	BS2	-	PK1	KB4
H6 G/W	KB5	-	BS1	BS2	-	PK1	KB4
<b>Axis module</b>							
H6 B/P	SK4	SK3	BS1	BS2	-	PK1	KS2
H6 C/S	SK4/SK6	SK3	BS1	BS2	-	PK1	KS2
H6 E/U	SK7	SK3	BS1	BS2	-	PK1	KB4
H6 G/W	KB5	SK3	BS1	BS2	-	PK1	KB4
<b>DC connection module</b>							
H6 B/P	SK8	KS1 1)	BS1	BS2	KS1 1)	-	KB3
<b>DC clamp</b>							
-	KS4	-	-	BS2	-	-	-

Table 1: Assignment of terminals to terminal numbers

1) Optional equipment variant

No. from Table 1	Mounting type	Permissible cross-section		Tightening torque	
		mm <sup>2</sup> with wire end ferrule	AWG without wire end ferrule	Nm	lb inch
PK1	Push-in clamp	0,14...1,5 1)	-	-	-
PK2	Push-in clamp	0,2...2,5	24...12	-	-
SK3	Screw clamp	0,25...1,5	28...16	0,25	2,2
SK4	Screw clamp	0,2...6	24...10	0,7	6,2
SK5	Screw clamp	0,5...16	20...4	2	18
SK6	Screw clamp	10...25	10...2	4	36
SK7	Screw clamp	35...95	4...0	15	132
SK8	Screw clamp	10...50	6...1/0	6	53
KS1	M3 Screw for cable lug	-	-	1,4	12
KS2	M4 Screw for cable lug	-	-	1,3	11,5
KS3	M5 Screw for cable lug	-	-	2	18
KS4	M6 Screw for cable lug	-	-	5	44
BS1	M3 screw for 24V bypass	-	-	0,5	4,5
BS2	M4 screw for DC bypass	-	-	3	26
KB1	M5 Bolt for cable lug	-	-	2	18
KB2	M6 Bolt for cable lug	-	-	5	44
KB3	M8 Bolt for cable lug	-	-	4,5	40
KB4	M8 Bolt for cable lug	-	-	12	106
KB5	M10 Bolt for cable lug	-	-	25	220

Table 2: Assignment of terminal number to cross-section and tightening torque

- Cable cross-sections and fuses must be dimensioned according to the design of the machine manufacturer. Specified minimum / maximum values may not be fallen below / exceeded.

#### 1) Malfunctions caused by loose cable connections and to short wireend ferrules!

- Use wire-end ferrules according to [table 3 Wire-end ferrules and stripping length](#).
- Strip cable according to [table 3 Wire-end ferrules and stripping length](#).



# COMBIVERT H6

QUICK START GUIDE

Translation of the original manual  
H6 Series Housing B-W  
Document 20162227 EN 02  
Mat.No. 00H6N1M-0000

## WIRING

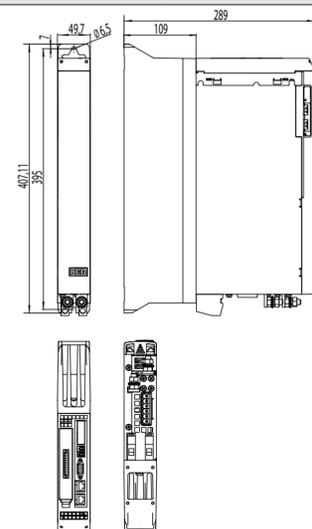
Cross-section	Wire-end ferrule	Metal sleeve length	Stripping length
0,50 mm <sup>2</sup>	with plastic collars	10 mm	12 mm
0,75 mm <sup>2</sup>		12 mm	14 mm
1,00 mm <sup>2</sup>		12 mm	15 mm
1,50 mm <sup>2</sup>	without plastic collars (DIN 46228-1)	10 mm	10 mm
0,14...1,5 mm <sup>2</sup> single- or finewire	without wire-end ferrule	-	10...15 mm

Table 3: Wire-end ferrules and stripping length

## HOUSING DIMENSIONS

### HOUSING P

#### Housing P air heat sink

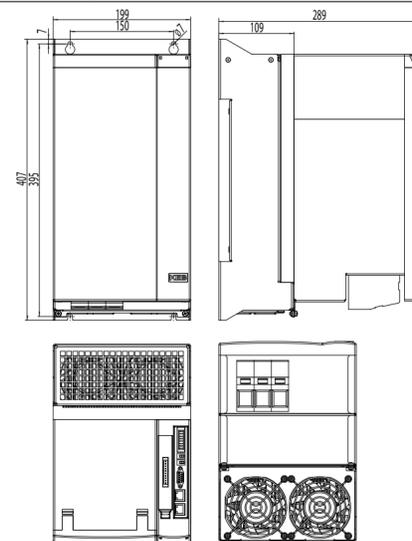


Dimensions in mm

Weight: 5,5kg

### HOUSING U

#### Housing U air heat sink

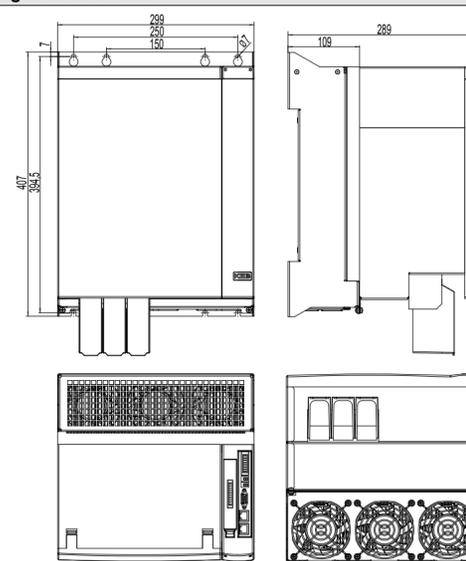


Dimensions in mm

Weight: 17 kg

## HOUSING W

### Housing W air heat sink

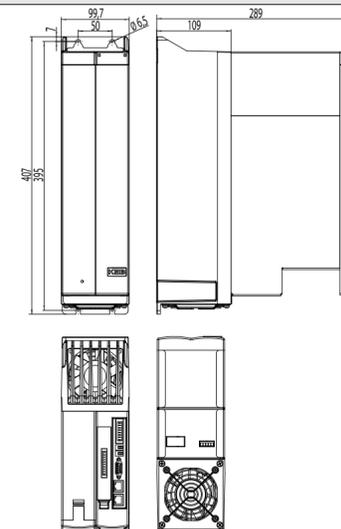


Dimensions in mm

Weight: 28 kg

### HOUSING S

#### Housing S air heat sink

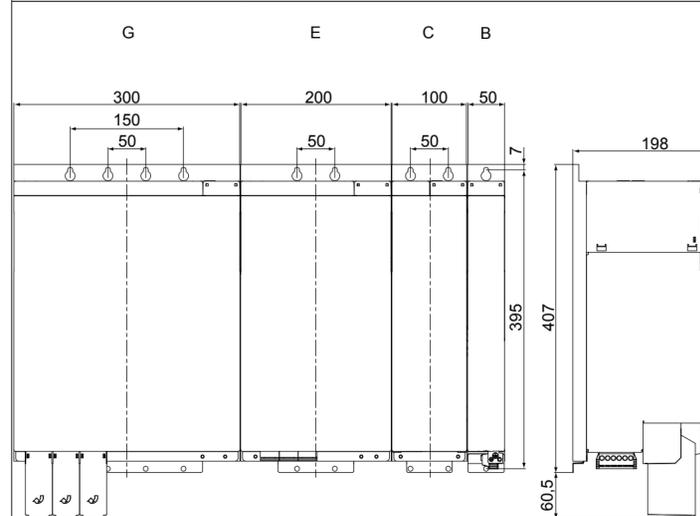


Dimensions in mm

Weight: 10,5kg

### HOUSING B-G

#### Housing B-G flat rear



Dimensions in mm

Weight: 3,8kg (B), 7,5kg (C), 12,5kg (E), 22kg (G)



The housing dimensions of other model variants can be found in the instruction manual of the corresponding housing size.

## UL COMPLIANCE

### Attention UL certification

Only devices with UL logo on the name plate are certified.



For compliance with UL for use on the North American and Canadian Market, the following additional information must be observed (English original text):

### BRANCH CIRCUIT PROTECTION

- ▶ Integral solid state short circuit protection does not provide branch circuit protection.
- ▶ Branch circuit protection must be provided in accordance with the Manufacturer Instructions, National Electrical Code and any additional local codes.
- ▶ CSA: For Canada: Branch circuit protection must be provided in accordance with the Canadian Electrical Code, Part I.

### ⚠ WARNING

▶ THE OPENING OF THE BRANCH-CIRCUIT PROTECTIVE DEVICE MAY BE AN INDICATION THAT A FAULT HAS BEEN INTERRUPTED. TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, CURRENT-CARRYING PARTS AND OTHER COMPONENTS OF THE CONTROLLER SHOULD BE EXAMINED AND REPLACED IF DAMAGED. IF BURNOUT OF THE CURRENT ELEMENT OF AN OVERLOAD RELAY OCCURS, THE COMPLETE OVERLOAD RELAY MUST BE REPLACED.

### ⚠ AVERTISSEMENT

▶ LE DÉCLENCHEMENT DU DISPOSITIF DE PROTECTION DU CIRCUIT DE DÉRIVATION PEUT ÊTRE DÙ À UNE COUPURE QUI RÉSULTE D'UN COURANT DE DÉFAUT. POUR LIMITER LE RISQUE D'INCENDIE OU DE CHOC ÉLECTRIQUE, EXAMINER LES PIÈCES PORTEUSES DE COURANT ET LES AUTRES ÉLÉMENTS DU CONTRÔLEUR ET LES REMPLACER S'ILS SONT ENDOMMAGÉS. EN CAS DE GRILLAGE DE L'ÉLÉMENT TRAVERSÉ PAR LE COURANT DANS UN RELAIS DE SURCHARGE, LE RELAIS TOUT ENTIER DOIT ÊTRE REMPLACÉ.

### GROUNDING SYSTEM

- ▶ Only for use in non-corner grounded type WYE source not exceeding 277 V phase to ground.

## INSTRUCTIONS FOR USE



- ▶ Open the KEB homepage at [www.keb-automation.com](http://www.keb-automation.com).
- ▶ By entering the material number in the search field, you will get the corresponding parts of the instructions for use.
- ▶ Read the instructions for use carefully!

KEB Online	<a href="http://www.keb-automation.com">www.keb-automation.com</a>	KR	다른 언어도 사용할 수 있습니다.
BG	Други налични езици.	HR	Ostali dostupni jezici.
CN	其他语言可用。	HU	Más elérhető nyelvek.
CZ	Jiné jazyky k dispozici.	LV	Citas pieejamās valodas.
DK	Andre sprog til rådighed.	LT	Kitos kalbos.
DE	Weiteren Sprachen verfügbar.	MT	Lingwi oħra disponibbli.
EN	Other languages available.	NL	Andere talen beschikbaar.
EE	Muud keeled on saadaval.	PL	Inne dostępne języki.
ES	Otros idiomas disponibles.	PT	Outros idiomas disponíveis.
FI	Muut kielet saatavilla.	RO	Alte limbi disponibile.
FR	Autres langues disponibles.	RU	Доступны другие языки.
GR	Άλλες διαθέσιμες γλώσσες.	SE	Andra språk finns tillgängliga.
IE	Teangacha eile ar fáil.	SK	Iné jazyky sú k dispozícii.
IT	Altre lingue disponibili.	SI	Drugi jeziki so na voljo.
JP	他の言語も利用できます。	TR	Mevcut diğer diller.