



# COMBIVERT ACCESSOIRES

INSTRUCTIONS FOR USE | INSTALLATION H6 DC CONNECTION MODULE

Translation of the original manual  
Document 20186874 EN 02



# Preface

The hardware and software described in this document are products of KEB. The information contained in this document is valid at the time of publishing. KEB reserves the right to update this document in response to misprints, mistakes or technical changes.

## Signal words and symbols

Certain procedures within this document can cause safety hazards during the installation or operation of the device. Refer to the safety warnings in this document when performing these procedures. Safety signs are also located on the device where applicable. A safety warning is marked by one of the following warning signs:

<b>DANGER</b>	Dangerous situation, which will cause death or serious injury if this safety warning is ignored.
<b>WARNING</b>	Dangerous situation, which may cause death or serious injury if this safety warning is ignored.
<b>CAUTION</b>	Dangerous situation, which may cause minor injury if this safety warning is ignored.
<b>NOTICE</b>	Situation, which can cause damage to property if this safety warning is ignored.

### RESTRICTION

Used when the following statements depend on certain conditions or are only valid for certain ranges of values.



Used for informational messages or recommended procedures.

## More symbols

- ▶ This arrow starts an action step.
- / - Enumerations are marked with dots or indents.
- => Cross reference to another chapter or another page.



Note to further documentation.  
[www.keb.de/service/downloads](http://www.keb.de/service/downloads)



## Laws and guidelines

KEB Automation KG confirms with the EC declaration of conformity and the CE mark on the device nameplate that it complies with the essential safety requirements.

The EC declaration of conformity can be downloaded on demand via our website.

## Warranty and liability

The warranty and liability on design, material or workmanship for the acquired device is given in the general sales conditions.



Here you will find our general sales conditions.  
[www.keb.de/terms-and-conditions](http://www.keb.de/terms-and-conditions)



Further agreements or specifications require a written confirmation.

## Support

Although multiple applications are referenced, not every case has been taking into account. If you require further information or if problems occur which are not referenced in the documentation, you can request the necessary information via the local KEB agency.

**The use of our units in the target products is outside of our control and therefore lies exclusively in the area of responsibility of the customer.**

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 intended use. However, they are regarded as being only informal and changes are expressly reserved, in particular due to technical changes. This also applies to any violation of industrial property rights of a third-party. Selection of our units in view of their suitability for the intended use must be done generally by the user.

**Tests can only be done within the intended end use of the product (application) by the customer. They must be repeated, even if only parts of hardware, software or the unit adjustment are modified.**

## Copyright

The customer may use the instructions for use as well as further documents or parts from it for internal purposes. Copyrights are with KEB and remain valid in its entirety.

This KEB product or parts thereof may contain third-party software, including free and/or open source software. If applicable, the license terms of this software are contained in the instructions for use. The instructions for use are already available to you, can be downloaded free of charge from the KEB website or can be requested from the respective KEB contact person.

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# 1 Basic Safety Instructions

The COMBIVERT is designed and constructed in accordance with state-of-the-art technology and the recognized safety rules and regulations. However, the use of such devices may cause functional hazards for life and limb of the user or third parties, or damages to the system and other material property.

The following safety instructions have been created by the manufacturer for the area of electric drive technology. They can be supplemented by local, country- or application-specific safety instructions. This list is not exhaustive. Violation of the safety instructions by the customer, user or other third party leads to the loss of all resulting claims against the manufacturer.

## NOTICE



### Hazards and risks through ignorance.

- ▶ Read the instructions for use !
- ▶ Observe the safety and warning instructions !
- ▶ If anything is unclear, please contact KEB Automation KG !

## 1.1 Target group

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.
- Start-up and operation of the product.
- Understanding of the function in the used machine.
- Detection of hazards and risks of the electrical drive technology.
- Knowledge of *DIN IEC 60364-5-54*.
- Knowledge of national safety regulations.

## 1.1 Validity of this manual

This part of the instructions for use describes the DC connection module for the COMBIVERT H6. This instructions for use

- contains only supplementary safety instructions.
- is only valid in conjunction with the instructions for use [Installation COMBIVERT H6](#).

## 2 Product Description

The DC connection module connects the DC bus to the connection terminals. This means that COMBIVERT of other series or devices from other manufacturers can be integrated into the DC-bus connection. The DC wiring can be flexibly extended with a second DC connection module. The output at the terminals can be protected and monitored by internal fuses.

### 2.1 Intended use

The DC connection module is used exclusively to separate / expand a COMBIVERT H6 DC-bus connection. It is intended for installation in electrical systems or machines.

The DC connection module is available in different versions. The technical data and information on connection conditions can be found on the nameplate and in the instructions for use and must be observed.

The components used at KEB Automation KG are developed and designed for the use in industrial products.

#### **Restriction**

If the product 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.

### 2.2 Unintended use

The operation of other electric consumers is prohibited and can lead to the destruction of the unit. The operation of our products outside the indicated limit values of the technical data leads to the loss of any liability claims.



### 2.3 Type code

<b>x x</b>	<b>H6</b>	<b>x</b>	<b>x</b>	<b>x-x</b>	<b>x</b>	<b>x</b>	<b>x</b>
						Reserved	0: Reserved
						Reserved	0: Reserved
						Software configuration	0: No software (base unit) 1-9: Standard
						Hardware configuration	1: Standard 2: With external 24V connection
						Housing	Flat rear heatsink
							B: 50 mm
							Air heat sink
						P: 50 mm	
						Accessory type	1: DC connection module
						Product group	M: Accessories
						Series	COMBIVERT H6 multi-axis drive system
						Unit size	00: Without DC fuses
							20: With DC fuses

*Table 1: Type code*

### 3 Technical Data

Device size		00	20
Housing		B/P	
Input/output data			
Voltage range	$U_{dc} / V$	452...840	
Rated current (CSA)	1) $I_{dc} / A$	150	75
Maximum current <60s	2) $I_{dc\_max} / A$	300	135
Permissible fuse type aR	$I / A$	—	125
Other data			
Power dissipation interior (DC fuses optional)	$P_{D\_int} / W$	—	18
External supply (optional)	$U_{ext\_dc} / V$	24 ( $\pm 10\%$ )	
	1) $I_{ext\_dc} / A$	19	
Fuse monitoring (optional)	$U_{Fo\_ac} / V$	250	
	$I_{Fo\_ac} / A$	2	
	$U_{Fo\_dc} / V$	24	
	$I_{Fo\_dc} / A$	0.4	

Table 2: Technical Data

- 1) The customer is responsible for limiting the current and fusing the connection lines. For the 24V connection, the microfuse F1 may also have to be adjusted to a smaller value.
- 2) An alternating load influences the ageing of the DC fuses. This must be taken into account by the customer when designing the system. In the event of a fault, replacement must be carried out by KEB Service. When designing, ensure that the overload is < 60 s and the recovery time > 240 s at  $0.7 \cdot I_N$ . In addition to short-circuit protection, this also provides protection against overload.
- 3) At least 20 V/30 mA.



#### Short-circuit-capacity

According to the requirements from EN 60439-1 and EN 61800-5-1 the following applies for the connection to mains: The devices are suitable for use on mains with an unaffected symmetrical short-circuit current of max. 30 kA rms using the listed fuse protection measures of the rectifier module (=> [Installation COMBIVERT H6](#)).

### 3.1 DC-fusing

**NOTICE**

**High energy consumption at DC-bus connection !**

**Fire risk in case of earth or short circuit !**

► Ensure fire protection by semiconductor fuses.

The fire protection is realized with two semiconductor fuses (in +/- branch) and offers partly also device protection. The semiconductor fuses must be connected downstream at the DC connection module if they are not available internally. If fuses are available internally, they always have the maximum capacity. If lower fuses are required, they must be additionally connected downstream at the DC connection module. The customer is responsible for line and overload protection.

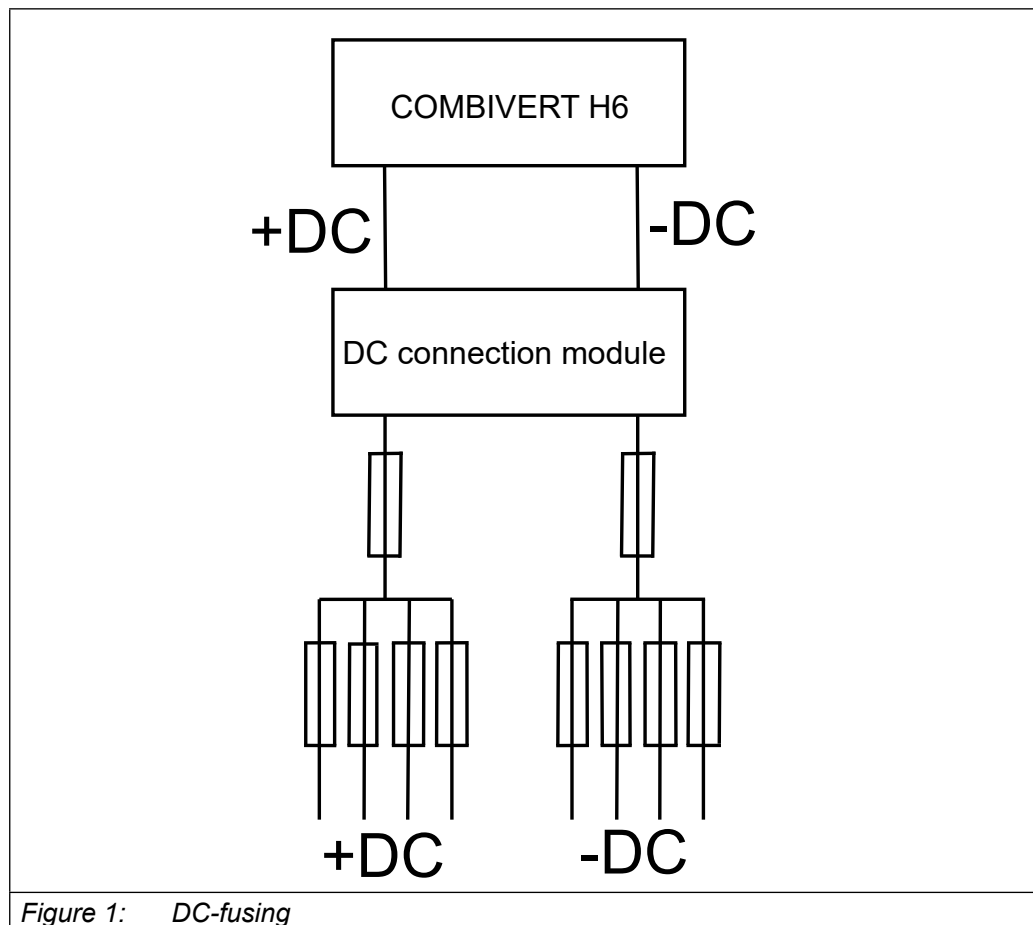


Figure 1: DC-fusing

## 4 Mechanical Installation

### 4.1 Control cabinet installation

Mounting distances	Dimension	Distance in mm	Distance in inch
	A	150	6
	B <sup>1)</sup>	100	4
	C	30	1.2
	D	0	0
	E	0	0
	F <sup>2)</sup>	50	2
	<sup>1)</sup> Minimum distance for cooling. <sup>2)</sup> Distance to preceding elements in the control cabinet door.		

#### NOTICE

#### Observe alignment of the devices during assembly!

The DC connection between the modules is made via metal bridges. To ensure perfect installation, the horizontal and vertical displacement between the devices must be kept to a minimum.

#### NOTICE

#### Fire risk!

Due to the heat generated by the DC fuses, the DC connection module must always have a vertical position!

#### ⚠ CAUTION



#### High temperatures on the side walls!

#### Burning of the skin!

► If in case of structural measures a direct contact cannot be avoided, a warning notice "hot surface" must be mounted at the machine.

For control cabinets with interior ventilation, the suction of foreign bodies must be prevented by appropriate filters.

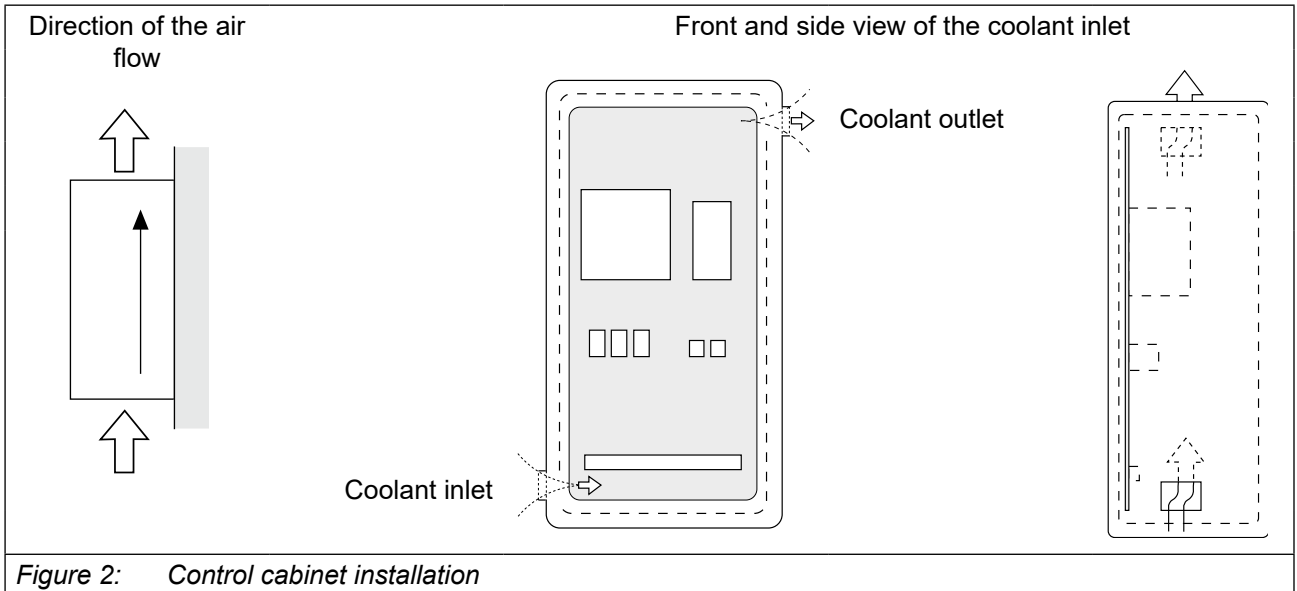
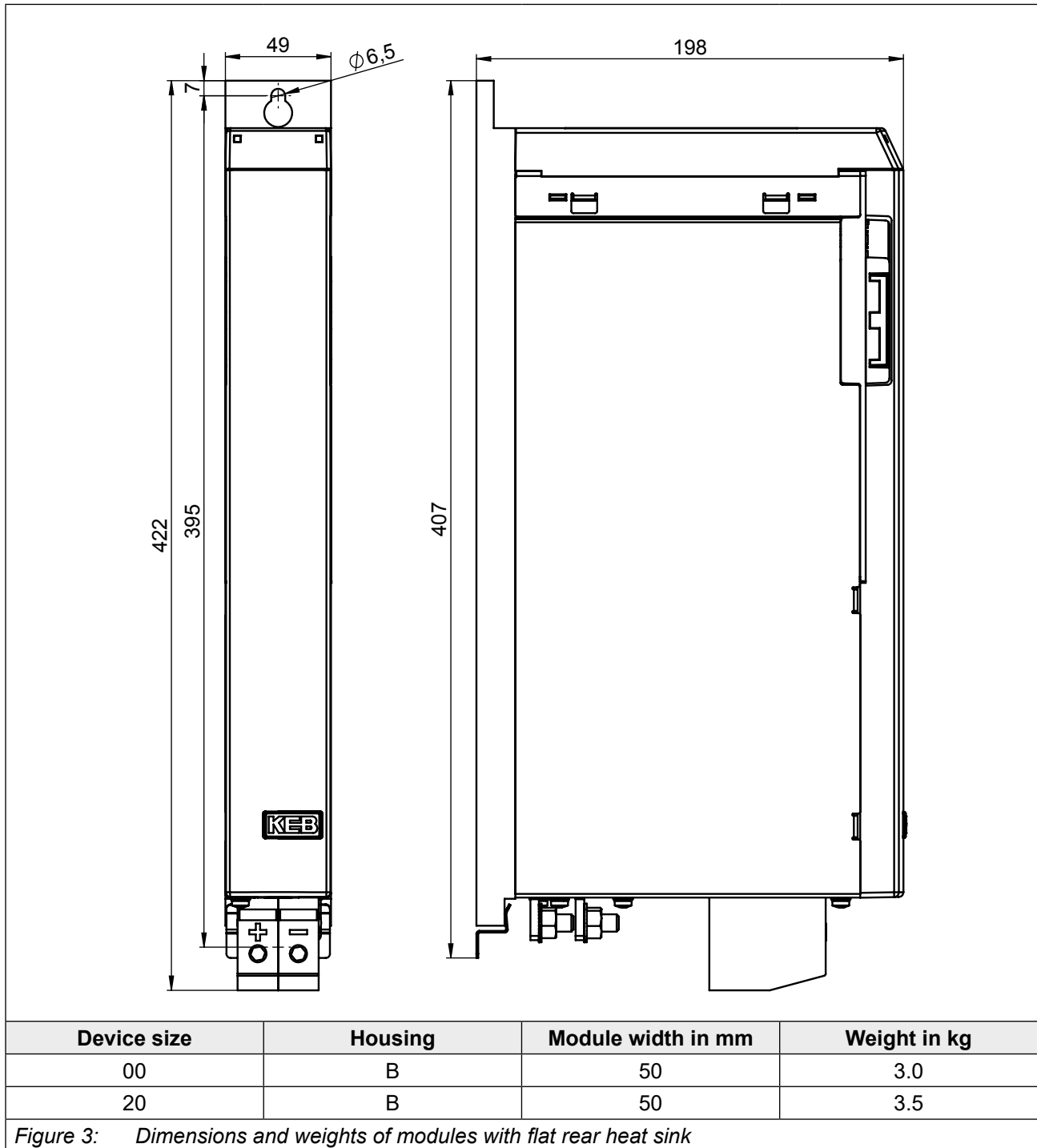


Figure 2: Control cabinet installation

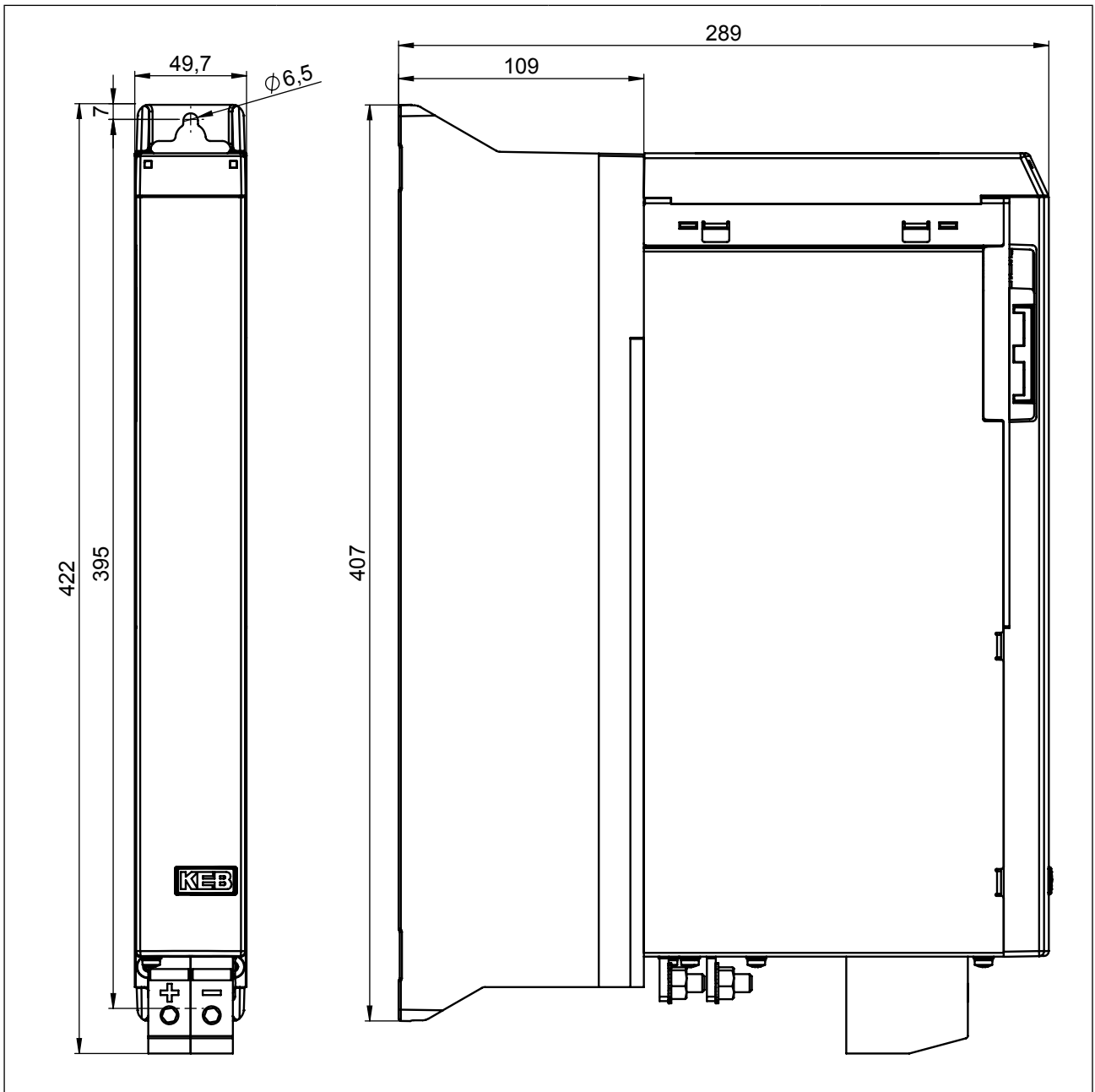
## 5 Dimensions

### 5.1 Dimensions and weights

#### 5.1.1 Modules with flat rear heat sink



5.1.2 Modules with air heat sink



Device size	Housing	Module width in mm	Weight in kg
00	P	50	4.5
20	P	50	5.0

Figure 4: Dimensions and weights of the modules with air heat sink

**5.2 Structure of the DC connection module**





Front view		Remove the front cover			Front without cover	
		<ul style="list-style-type: none"> <li>• Press the centre of the bottom side of the cover with your thumb.</li> <li>• Lift the cover slightly at the bottom.</li> <li>• Pull out the cover downwards.</li> </ul>				
		<p><b>Removing the cover from the DC bus</b></p>				
		<p><b>⚠ DANGER</b></p>				
		<p><b>Danger to life due to electric shock !</b></p> <p>► Ensure that there is no voltage from the DC bus.</p>				
		<ul style="list-style-type: none"> <li>• Compress lug of the cover and remove forward.</li> </ul>				
Description	Terminal	Connections of the front side		Terminal	Description	
+24V bus	X1C.1			X1C.3	+24V bus	
0V	X1C.2			X1C.4	0V	
DC bus +	X1D.1			X1D.3	DC bus +	
DC bus -	X1D.2			X1D.4	DC bus -	
24V 0V (optional)	X1B			F1	Microfuse (optional) 5x20 mm, T 20A	
Fuse monitoring Fo.1/2 (optional)	X1E			—	Cable fixing (strain relief)	
				—	Snap-in for front cover	
					Connection for protective earth (Accessories)	

Figure 5: Connections of the front side



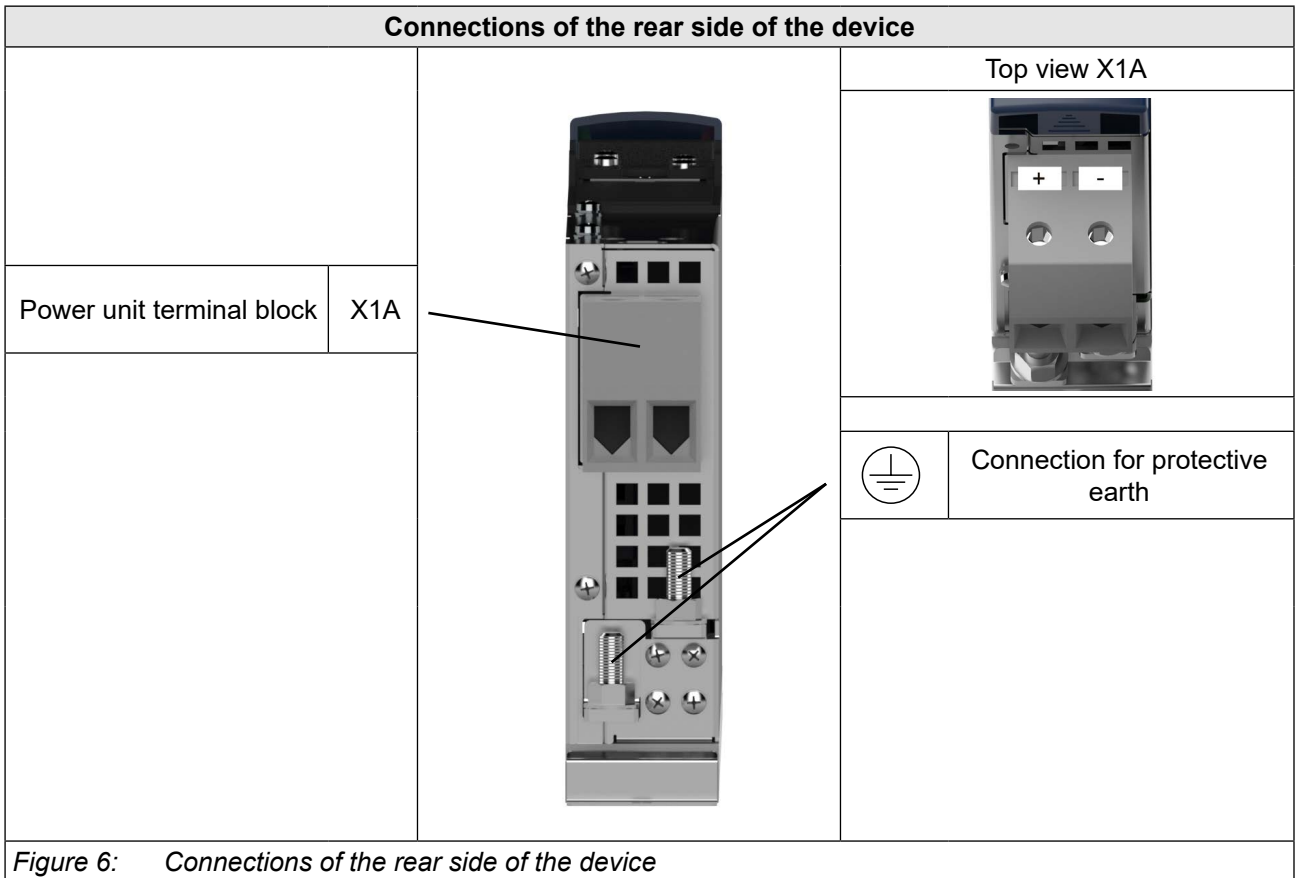
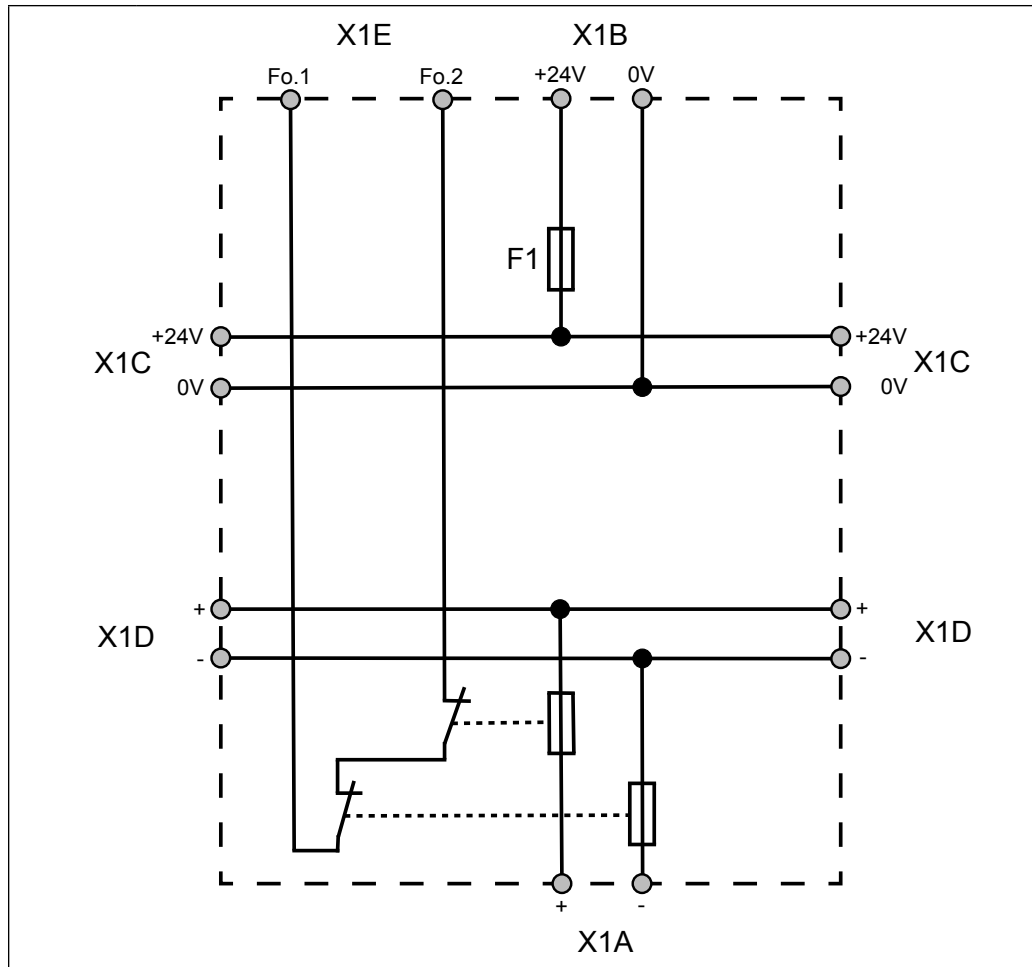


Figure 6: Connections of the rear side of the device

5.2.1 Internal wiring with options (schematic diagram)

Internal wiring of a 20H6M1x-2100. DC connection module with DC fuse, monitoring and additional 24V terminal connection.



Legend	
X1A	DC connection
X1B	24V connection (optional)
X1C	24V bus
X1D	DC bus
X1E	Fuse monitoring (optional)

Figure 7: Internal wiring with options (schematic diagram)

## 6 Electrical Connection

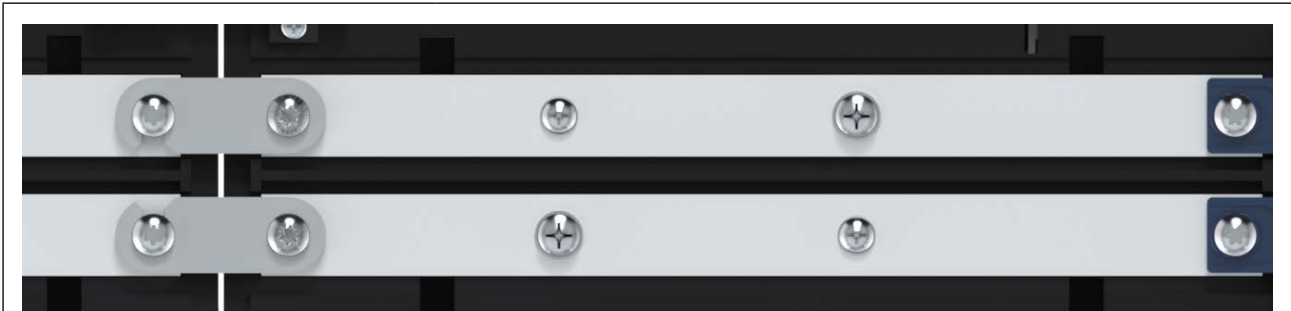
### 6.1 Connection of the DC bus X1D

The tinned copper bars connect the DC bus of the different H6 devices. Pre-charging, power supply and regeneration (if required) are carried out by the Active Infeed Converter module or the rectifier module. The 24 V rectifier module provides the 24 V voltage. The DC connection module can be mounted on the left, right or between two COMBIVERT H6 devices. The electrical connection is made with metal bridges => „Figure 8: Connection of the DC bus“. A plastic cap must be installed at both ends of the H6 system as protection against accidental contact.

**⚠ DANGER**

**Dangerous voltage!**

- ▶ The voltage on the DC bus during operation can be up to DC 840V!



Bridges for the connection of the DC bus between the units	Upper rail = DC+ Lower rail = DC-	Place plastic cap as protection against accidental contact at the end of the system
Torx oval-head screw M4 x 10	Required tool Torx screw driver TX20	Tightening torque 3.0Nm (bridge) 1.1...1.2Nm (plastic cap)

Figure 8: Connection of the DC bus



Attach the cover for the DC bus again after the installation.

### 6.2 Connection of the 24 V bus X1C

The 24 V bus supplies the control and the driver part of the H6 modules. Generally this voltage is provided by the COMBIVERT H6 rectifier module. If no 24 V rectifier module is installed, an external voltage supply can optionally be connected via the DC connection module.

**NOTICE**

**Damage to the devices!**

Parallel connection of 24 V rectifier modules is not permitted.


	The bridge for the connection of the 24V bus is attached to the devices and fixed with a screw.	
	Cross-head screw M3x 10	Tightening torque 0.5 Nm

Figure 9: Connection of the 24V bus

**NOTICE**

**Tilting or breaking the plug contacts !**

- ▶ Mount jumpers with special care.

**6.3 Connection terminals X1A, X1B, X1E and PE**

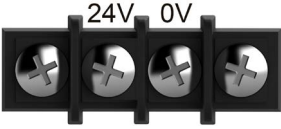
X1B	Name	Function	Connection	Tightening torque
	24V	Connection for 24 V supply (optional)	Crimp connector: Fork shape < 8 mm	1.3 Nm 12 lb inch
	0V		Cross-section: ≤ 6 mm <sup>2</sup>	

Figure 10: Connection for 24 V supply

**NOTICE**

**Damage to the devices !**

Parallel connection of 24 V rectifier modules is not permitted.


X1E	Name	Function	Connection	Tightening torque
	Fo.1	Connection for fuse monitoring (optional)	Crimp connector: Fork shape < 8 mm	1.3 Nm 12 lb inch
	Fo.2		Cross-section: ≤ 6 mm <sup>2</sup>	

Figure 11: Connection for fuse monitoring

X1A	Name	Function	Connection	Tightening torque
	+	Connection for DC connection	10...50 mm <sup>2</sup> AWG 6-1/0	6...8 Nm 53-70 lb inch
	-			

Figure 12: Connection for DC connection

PE	Name	Function	Connection	Tightening torque
		Connection for protective earth	M8	4.5 Nm 40 lb inch

Figure 13: Connection for protective earth



- ▶ Control / data lines (low-voltage level < 48 V) must be routed separately from supply and motor cables.
- ▶ The maximum permissible DC cable length is 5 m.
- ▶ A strain relief must be installed by the customer for the DC cables, which also ensures the shielding.
- ▶ The DC cables must be made with copper or tinned copper braiding.

## 6.4 Accessories

### 6.4.1 Earthing plate (optional)

For the optional connection of the protective earth.

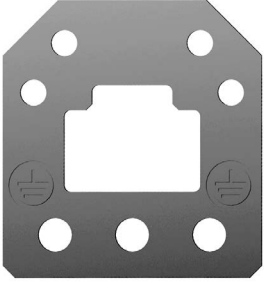
Earthing plate	Required number	Part number
	1	B0H6T82-2001

Figure 14: Optional earthing plate

#### 6.4.1.1 Combined earthing plates

The optional earthing plate can be used to connect the protective earth of the individual devices. The connection is made with the same metal bridges that are used to connect the DC bus.

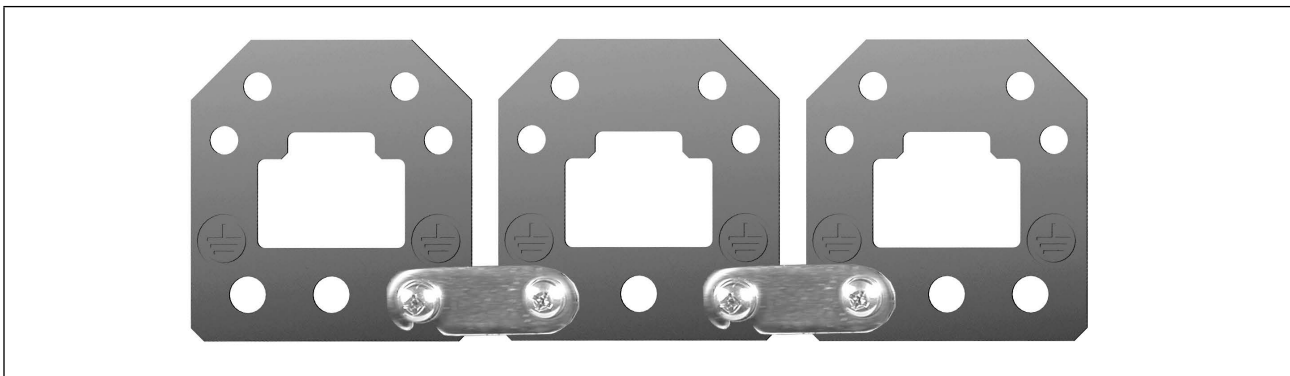


Figure 15: Combined earthing plates

### NOTICE

#### Overload!

- ▶ Use earthing plate only up to a connected load of 80 kVA.
- ▶ Max. 70 metal bridges (devices) permitted for the connection of the protective earth.

## 7 Certification

### 7.1 CE-Marking

The DC connection modules have been designed and manufactured in accordance with the regulations of the Low-Voltage Directive 2006/95/EC.

## 8 Revision History

Version	Date	Description
00	2018-11	Manual newly created. Pre-series version
01	2018-12	Extended by technical data for backup monitoring. Pre-series version
02	2021-10	Editorial changes. Series version



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