AMKASYN KEKW
Product description
Cold Plate with Fan
KW-LK110 / -LK250 / -LK400 / -LK500

Version: 2022/50
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Translation of the "Original Dokumentation"

AMKmotion
MEMBER OF THE ARBURG FAMILY

Imprint

Name: PDK_202393_KW-LKxxx

Version:

Version	Changes	Initials
2022/50	• AMKmotion design	LeS

Prev. Version: 2019/38

Product Version:

Product	Firmware Version (Part no.)	Hardware Version (Part no.)
KW-LK110	-	1.01 (46762)
KW-LK250	-	1.04 (46760)
KW-LK400	-	1.05 (46761)
KW-LK500	-	1.04 (46985)

Reservation: We reserve the right to modify the content of the documentation as well as the delivery options for the product.

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For fast and reliable troubleshooting, you can help us by informing our Customer Service about the following:

- Type plate data for each unit
- Software version
- Device configuration and application
- Type of fault/problem and suspected cause
- Diagnostic messages (error messages)

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Content

1 About this documentation

1.1 Structure of this document

Topic	Chapter	Chapter number
Validity, use and the propose of the documentation	Imprint	-
	About this documentation	1
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Information for planning and projecting personnel	Product overview	3
	Environmental conditions	4
	Derating	7
	Dimensional drawings	9
Practice information for startup, operating or maintenance personnel	Assembly	6
	Operations	8
	Disposal	5
Abbreviations and terms will be explained	Glossary	-

1.2 Keeping this document

This document must permanently be available and readable at the place where the product is in use. If the product is used at another place or changed the owner, the document must be passed on.

1.3 Target group

Any person that is qualified and intends to work with this product must read, understand and follow this document:

- Transportation and storage
- Unpacking and installation
- Projecting
- Connection
- Testing and maintenance
- Service and repair
- Decommissioning and disposal
- Replacement

1.4 Purpose

This document is addressed to any person who handles the product. It gives information about the following topics:

- Safety messages which are absolutely necessary to take care of during handling the product
- Product identification
- Projecting, planning and dimensioning of the application
- Environmental conditions for storage, transportation and operation
- Assembly
- Electrical connections
- Maintenance
- Repair
- Decommissioning and disposal
- Technical data

1.5 Display conventions

Display	Meaning
	This symbol points to parts of the text to which particular attention should be paid!

Display	Meaning
'Names'	Names are represented with apostrophes e. g. parameters, variables, etc.
See 'chapter name' on page x	Executable cross-reference in electronic output media

1.6 Appendant documents

Device descriptions

AMK part-no.	Title
28932	Servo drives KE/KW

2 For your safety

2.1 Basic notes for your safety

- At electrical drive systems, hazards are present in principle that can result in death or fatal injuries:
  - Electrical hazard (e. g. electric shock due to touch on electrical connections)
  - Mechanical hazard (e. g. crush, retract due to the rotation of the motor shaft)
  - Thermal hazard (e. g. burns due to touch on hot surfaces)
- These hazards are present while starting up and operating the unit, and also during servicing or maintenance work.
- Safety instructions in the documentation and on the product warn about the hazards.
- Personnel must have read and understood the safety instructions before installing and operating the product. In the documentation about the product the usage warnings pertain to direct hazards and must therefore be followed directly when operating or handling the product by the operator.
- AMKmotion products must be kept in their original order, that means it is not allowed to do a significant constructional change on hardware side and software is not allowed to be decompiled and change the source code.
- Damaged or faulty products are not allowed to be integrated or put into operation.
- Do not start the system in which the AMKmotion products are installed (begin of intended use) until you can determine that all relevant standards, laws, and directives have been complied with, e. g. low voltage directive, EMC directive, and the machinery directive, and possible further product standards. The plant manufacturer is responsible for the compliance with the laws, directives, and standards.
- The devices must be installed, electrically connected and operated as shown in the device description documentation. The technical data and the required environmental conditions must be observed at all times.

2.2 Safety rules for handling electrical systems

In particular on drive systems, the instructions pertaining to safety and the following five safety rules have to be kept in the specified sequence:

1. Switch off electrical circuits (also electronic and auxiliary circuits).
2. Secure against being switched on again.
3. Determine that there is no voltage.
4. Ground and short circuit.
5. Cover or close off neighboring parts that are under voltage.

Reverse the measures taken in reverse order after completing the work.

2.3 Presenting safety messages

Any safety information is configured as follows:

⚠ SIGNAL WORD	
	**Type and source of risk** Consequence(s) of non-observance **Steps to prevent:** • ...

2.4 Class of hazard

Safety and warning messages are graduated into classes of hazard (according to ANSI Z535). The class of hazard defines the potential risk of harm and is described by a single word, if the safety information is ignored. The signal word is followed by a safety alert symbol (ISO 3864, DIN EN ISO 7010). In accordance with ANSI Z535, the following signal words are used to define the class of hazard.

Safety alert symbol and signal word	Class of hazard and its meaning
⚠ DANGER	DANGER indicates a hazardous situation which, if not avoided, **will** result in death or serious injury
⚠ WARNING	WARNING indicates a hazardous situation which, if not avoided, **could** result in death or serious injury
⚠ CAUTION	CAUTION, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, **could** result in minor or moderate injury
NOTICE	NOTICE is used to address preventions to avoid material damage, but not related to personal injury.

2.5 Safety alert symbols used

Safety symbol	Meaning
	Warning against crushing!

2.6 Intended use

The KW-LKxxx air cooling systems are designed for the installation in a switch cabinet. The KE/KW modules are mounted on the air cooling systems in order to deduct the heat accumulated in operation. When using an air cooling system, its maximum removable power and the module-specific power reduction (derating) must be taken into account.

2.7 Requirements for the personnel and their qualification

Only authorized and qualified personnel may work on and with the AMKmotion drive systems.

Specialised personnel must:

- Perform mechanical and electrical work that is described in this documentation, such as mounting and connecting
- Observe all information in the documentation accompanying the product in order to work with the product safely and in an error-free manner
- Understand and know hazards that occur when handling the product
- Know connections and functions of the system
- Be familiar with the control concept in order to operate the drive system
- Be authorized to switch circuits and devices on and off, ground and label them
- Observe local specific safety requirements

2.8 CE mark

AMKmotion products have been constructed using the "State of the Art" and are safe to operate. AMKmotion issues an EU declaration of conformity for each of its products in which the standards and guidelines relevant for the product are listed. AMKmotion also designates the products with the CE mark which signifies conformity to the standards. Since these standards are listed in the Official Journal of the EU, it can be assumed through their application that the product meets the basic safety and health requirements of the harmonization regulation, the so-called presumption of conformity applies.

2.9 Warranty

- All information in the documents accompanying the product must be complied with for a safe and trouble-free operation.
- The assertion of warranty claims is excluded if the information in the documents is not observed completely.
- Hardware and firmware may not be modified except by personnel authorized by AMKmotion and after consultation with AMKmotion.
- The company AMKmotion GmbH + Co KG is not liable for damages from unintended use, incorrect installation or operation, exceeding rated values and non-observance with the environmental conditions.

3 Product overview

3.1 Product description

For systems for which liquid cooling is not available or cannot be used, air-cooled cold plates (KW-LKxxx air cooling systems) are on offer. With their help, the power loss of the power electronics of the KE/KW modules is dissipated.

The air cooling system consists of a finned heat sink on which the base of the axial cooler is mounted. The heat is dissipated in the air, which is blown along the cooling fins by a fan.

The power loss of the control electronics is not dissipated through the cold plate. The heat created in the cabinet must be removed with the switch cabinet cooling.

3.2 Ordering data

3.2.1 Cold plates

Product Name	Part No.
KW-LK110	O745
KW-LK250	O743
KW-LK400	O744
KW-LK500	O802

3.2.2 Accessories

Product Name	Part No.
Slot nut	18139
KE/KW fastening set (20 slot nuts + 20 screws M6 x 20)	49994

3.2.3 Fan modules

Product Name	Part No.
Fan module for KW-LK250	O882
Fan module for KW-LK400	O883
Fan module for KW-LK500	O884

3.3 Delivery

- Please check whether the delivered parts correspond with the delivery note. If the delivery is incomplete, please contact your nearest AMK representative.
- Check the components for signs of transport damage after their arrival. Do not install and operate any damaged components.
- If there is any transport damage, immediately inform the delivering freight carrier and inform your AMK representative.

3.3.1 Scope of delivery

KW-LKxxx cold plate with fan, without fastening material.

The fastening set, which consists of 20 slot nuts and 20 cylinder screws, can be ordered separately.

3.4 Technical data

Cold plate	KW-LK110	KW-LK250	KW-LK400	KW-LK500
AMK part no.	O745	O743	O744	O802
Maximum removable power	120 W	600 W	900 W	1200 W
Ambient temperature	0 ... 40°C	0 ... 40°C	0 ... 40°C	0 ... 40°C
Fan voltage (red +,blue -)[1)]	24 VDC ± 10%	24 VDC ± 10%	24 VDC ± 10%	24 VDC ± 10%
Fan flow	0.3 A	0.75 A	1.0 A	1.5 A
Cable length	300 mm	300 mm	300 mm	300 mm
Protection class	IP 20 [2)]	IP 20	IP 20	IP 20
Dimensions (B x T x H)	108 x 46 x 418 mm	260 x 85 x 465 mm	410 x 85 x 465 mm	510 x 85 x 465 mm
Cooling surface (B x H)	105 x 320 mm	250 x 320 mm	400 x 320 mm	500 x 320 mm
Effective width in case of through-hole mounting	--	220 mm	370 mm	470 mm
Weight	about 2 kg	about 10 kg	about 16 kg	about 19 kg

1) 24 VDC must be supplied externally

2) Mounted on mounting plate in the switch cabinet (Siehe 'Mounting KW-LK110' auf Seite 13.)

4 Environmental conditions

Ambient conditions apply according to EN 50178, table 7 and EN 61800-2, chapter 4.1.2

4.1 Transport and storing

- Transport and store the device in its original packaging and use shock-absorbing padding.
- Store the device in a clean and dry location where it is protected against weather conditions.
- Transport and storing temperature: -25 °C up to +75 °C
- Protect the device against condensation and prevent sudden changes in temperature and humidity.
- Protect the device against salt fog, industrial fumes, corroding liquids, vermin and mildew.
- Storing conditions acc. to EN61800-2 for up to 1 year and a maximum height of 2000 m above NHN

4.2 Operations

- Ambient temperature in operation: +5 °C to +40 °C
- Relative humidity: 5% to 85 %, non-condensing
- Installation altitude: ≤ 1000 m above NHN.
  If installed at altitudes of 1000 m up to max. 2000 m above NHN, the nominal data has to be lowered by 1 % per 100 m.
- Shock resistance acc. to EN 60068-2-27: 15 g for 11 ms
- Vibration resistance acc. to EN 60068-2-6: 1 g at 10 - 150 Hz

5 Disposal

Clarify with your local waste disposal company which materials and chemicals need to be separated and how to dispose of them. Observe the local regulations for disposal.

Examples of materials to be disposed of separately:

Components

- Electronic scrap, e. g., encoder electronics
- Iron scrap
- Aluminium
- Non-ferrous metal, e. g., motor windings
- Insulating materials

Chemicals

- Oils (disposal as hazardous waste, in acc. with the pertinent legislation; in Germany, the Waste Oil Ordinance (AltölV) applies)
- Grease
- Solvents
- Paint residue
- Coolant

6 Assembly

6.1 For Your safety

⚠ DANGER	
	**Risk of injury from crushing, cutting and hitting.** When transporting and mounting sharp-edged and / or heavy components, there is a risk of crushing, cutting and bruising of the persons involved. Suspended loads can fall down and people suffer fatal injuries. **Steps to prevent:** • Utilize suitable assembly and transport equipment, such as hoists and carriages. • Wear protective clothing, e.g. safety gloves and boots, during the assembly. • Use only appropriate tools during the assembly. • Make sure that there are no persons or body parts located under suspended loads during the transport or assembly. • Prevent catching and crushing by mechanical devices.

6.2 Mounting of the cold plates

6.2.1 Mounting KW-LK110

The KW-LK110 air cooling system must be mounted directly on the mounting plate in the switch cabinet.

It is fastened with 4 M4 x 8 screws.

Only 2 KE/KW modules with a width of 55 mm each may be mounted on a KW-LK110.

The heat loss remains in the switch cabinet because the heat sink is located in the interior of the switch cabinet. Ensure that the interior temperature of the switch cabinet is kept below 40 °C with suitable measures for the cooling of the switch cabinet (e.g. cooling unit, switch cabinet ventilation). In order to ensure sufficient air circulation, free space of > 100 mm must be maintained on top of and below the modules (air-intake/air exhaust side).

Ensure that the air intake temperature is below 40 °C even in the top row during the assembly of several air cold plates on top of each other.

6.2.2 Mounting KW-LK250, KW-LK400 and KW-LK500

2 assembly options exist for the KW-LK250, KW-LK400 and KW-LK500 air cooling systems:

In the switch cabinet directly on the mounting plate

Fastening: 4 screws M6 x 10 (KW-LK250) or with 6 screws M6 x 10 (KW-LK400 and KW-LK500).

The heat loss remains in the switch cabinet because the heat sink is located in the interior of the switch cabinet. Ensure that the interior temperature of the switch cabinet is kept below 40 °C with suitable measures for the cooling of the switch cabinet (e.g. cooling unit, switch cabinet ventilation). In order to ensure sufficient air circulation, free space of > 100 mm must be maintained on top of and below the modules (air-intake/air exhaust side).

Ensure that the air intake temperature is below 40 °C even in the top row during the assembly of several air cold plates on top of each other. The cooling plates can be placed seamlessly next to each other on the sides.

Assembly with through-hole technology

The cold plate is mounted in a cut-out in the rear wall of the switch cabinet. Fastening with 10 screws M6 x 10 (KW-LK250), 12 screws M6 x 10 (KW-LK400) or 14 screws M6 x 10 (KW-LK500).

The heat sink is located outside of the switch cabinet, the modules mounted on the cold plate extend into the interior of the switch cabinet. The heat loss of the power levels is released outside of the switch cabinet.

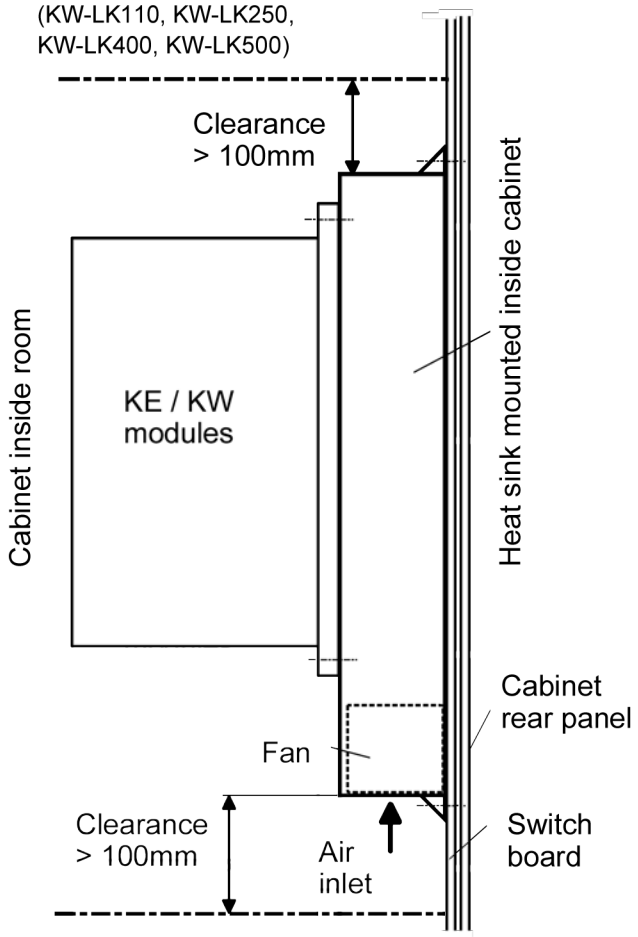
Ensure that the air intake temperature is below 40 °C even in the top row during the assembly of several air cold plates on top of each other.

If the air cold plates mounted in a row next to each other, the bearing capacity of the rear wall must be taken into account when planning the switch cabinet: The minimum distance between two segments amounts to 30 mm, but the links must have a sufficient rigidity in order to absorb the exerted forces without deformation.

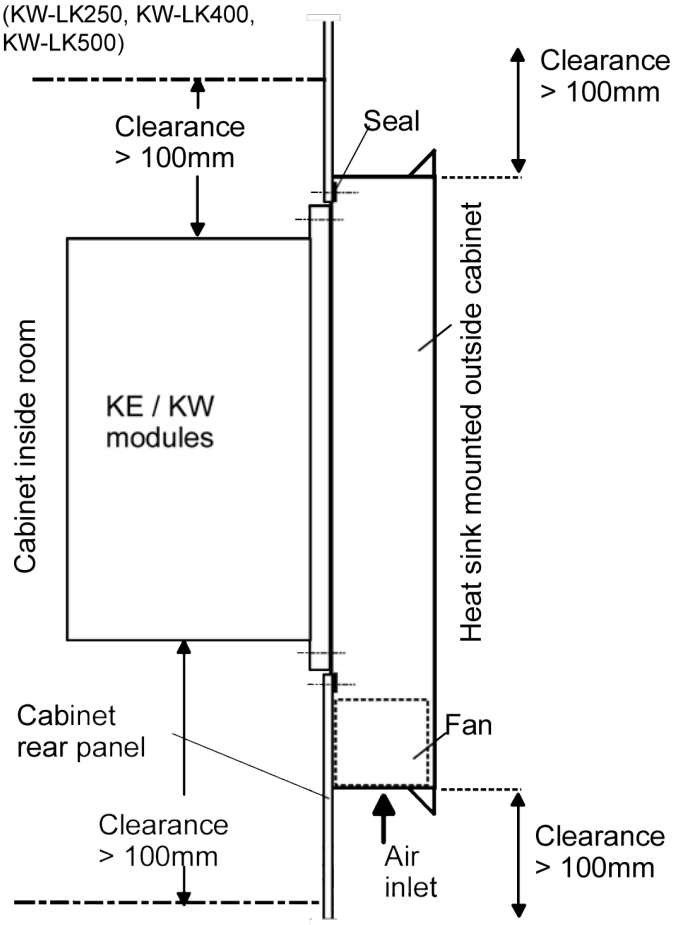
The seal between the rear wall of the switch cabinet and the heat sink must be executed by the user according to the protection class requirement of the switch cabinet.

Assembly with through-hole technology, the holding clamps must be removed.

Installation on mounting plate

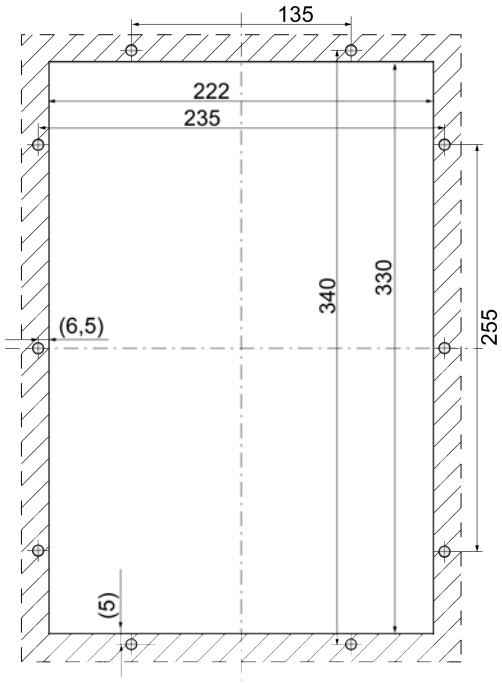


Through-hole assembly

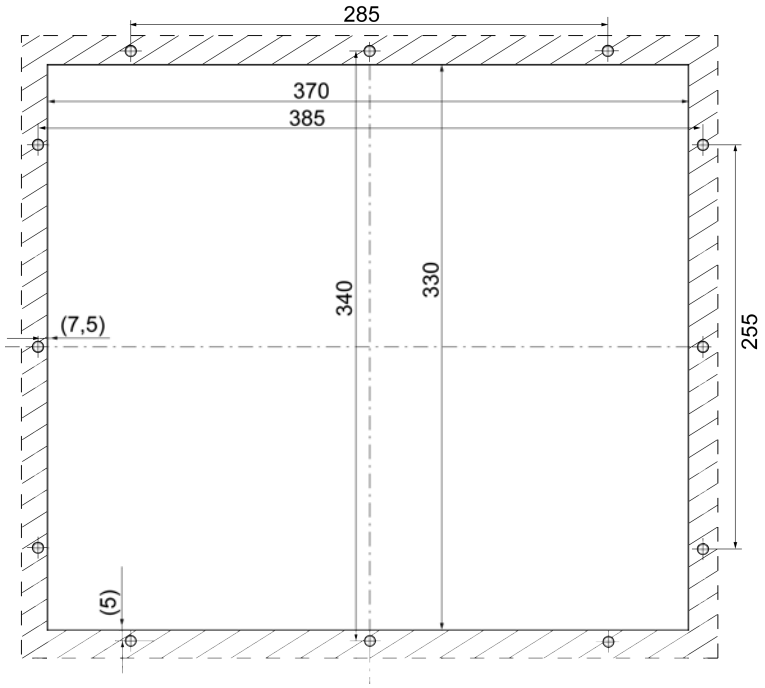


Cabinet cut-outs for through-hole assembly:

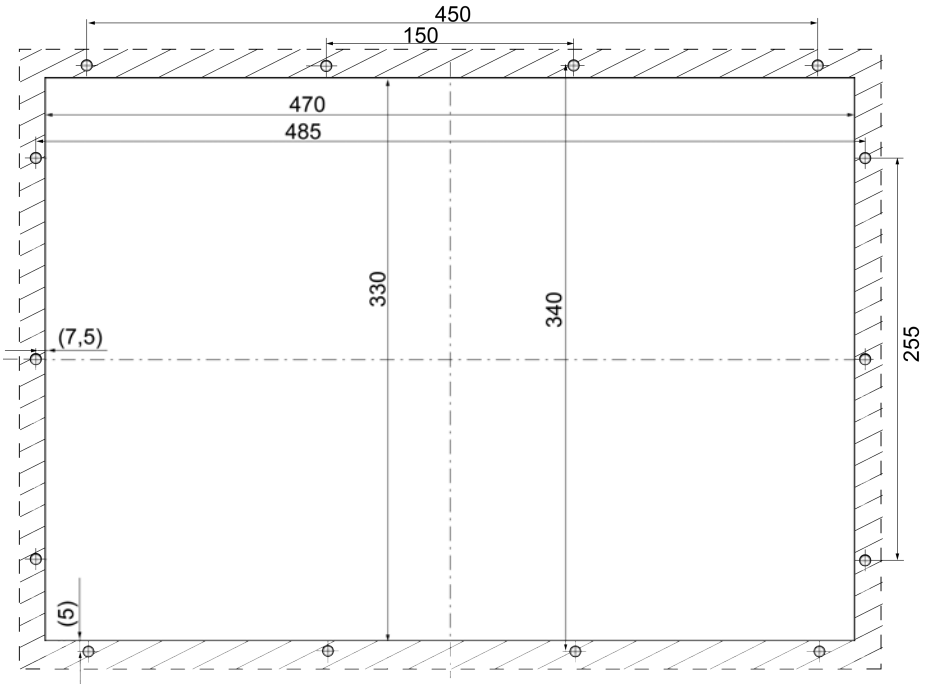
KW-LK250



KW-LK400



KW_LK500

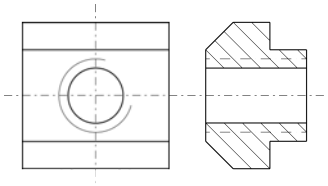


6.3 Mounting of the KE/KW modules

The KE/KW modules are mounted directly on the cold plate without heat transfer paste.

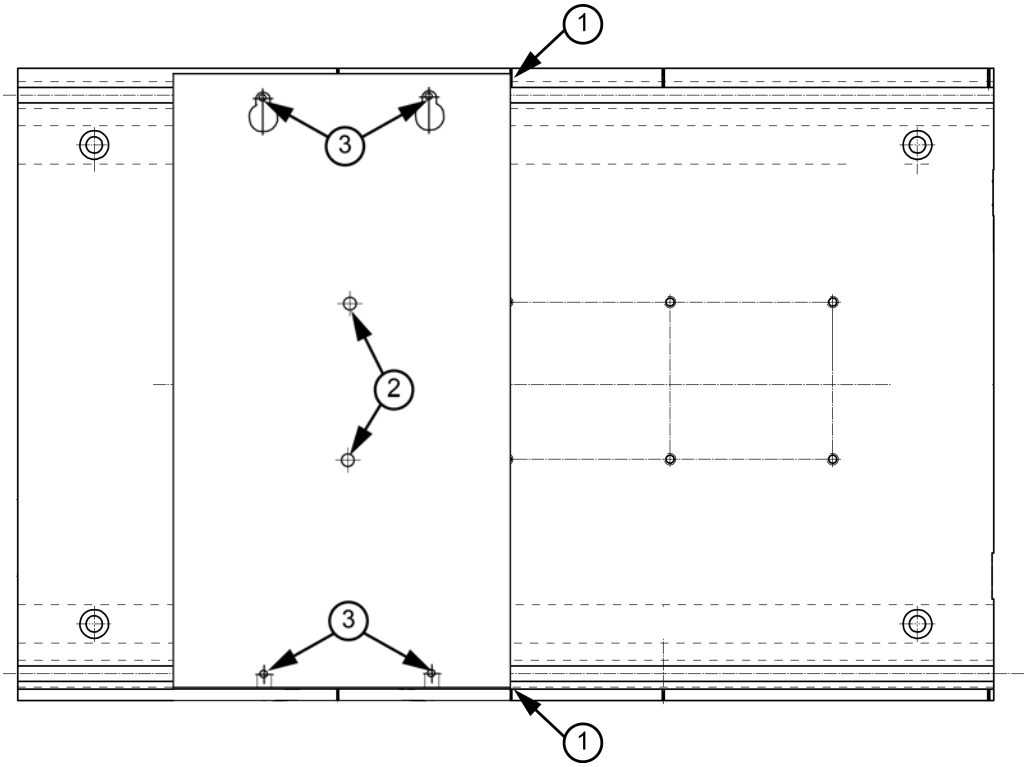
Note the following during assembly:

- The protective cardboard on the bearing face of the modules needs to be removed.
- Both the assembly surface of the cold plate as well as the bearing faces of the modules must be clean and scratch-free.
- The bearing faces of the KE and KW modules are arched by 0.3 mm so that a fully covered surface between module and cold plate is ensured after assembly.
- The cold plates have one T-slot on top and bottom, respectively, according to DIN 508 for the fastening of the KE/KW modules. The required number of slot nuts must be inserted into the slot through the mounting hole. The slot nuts have an M6 internal thread M6 x 20 fastening screws.



The fastening set for the assembly of the KE/KW modules, which consists of 20 slot nuts and 20 cylinder screws, can be ordered separately (AMK part no. 49994)

- The slot nuts are aligned according to the module position and width. Markings that identify the module position are located on the upper and lower edges of the cold plates (1).
- Threaded bores for the assembly of KE and KW modules with centre screw connections (170 mm / 255 mm / 425 mm width) are located in the cold plate.
- If available, the **centre screws** (2) must be tightened first during assembly: Tightening torque 5 Nm (Tool: Allen size 4).
- Afterwards, the fastening screws (3) of the modules are tightened: Tightening torque 8 Nm (Tool: Allen size 5).



- The **KW-LK110** cold plate does not contain threaded bores for centre screw connections. It is suitable solely for the use of use of KE/KW module with a width of 55 mm.

- On the **KW-LK110** cold plate, the modules are mounted directly on the heat sink with M6 x 20 screws.
- The **KW-LK250 / 400 / 500** cold plates have one T-slot on top and bottom, respectively, according to DIN 508 for the fastening of the KE/KW modules.

7 Derating

For some modules of the KE/KW drive system , a derating factor need to be considered when the modules are operated with air cooling systems. The following derating factors reduces the rated current and also the rated power specified for the devices at rated voltage. The rated data can be found in the chapter technical data of the documentation PDK_028932_KEKW_Hardware.

The derating increases in case of KES operation or with higher DC bus voltage, i.e. the derating factor decreases further.

The derating factors depend on the revision level of the air cooling system and improved if the firmware of the converter works with the temperature model. (See tables following.)

The power losses are based on the operating point:

KW, KWD, KWZ:	$U_{DC\ bus}$ = 540 VDC, U_{Motor} = 3 x 350 VAC, f_{PWM} = 8 kHz
KE:	$U_{power\ supply}$ = 3 x 400 VAC, U_Z = 540 VDC
KES:	$U_{power\ supply}$ = 3 x 400 VAC, U_Z = 720 VDC, f_{PWM} = 8 kHz

Example:

An inverter with rated data 20 kW output power and 33 A output current has a derating of 0.8 for air cooling.

The valid output power with air cooling is:

20 kW x 0.8 = 16 kW

At rated output voltage the valid current is 33 A x 0.8 = 26.4 A.

For compact power supplies and compact inverters with a module width of 425 mm, cold plates KW-CP680 (AMK part no. O708), KW-CP510 (AMK part no. O706) respectively KW-CP510R (AMK part no. O707) must be exclusively used with a **revision from 2.03 on**!

7.1 Derating for KE and KW modules without temperature model

7.1.1 KW-LK110

Two modules with a width of 55 mm each can be mounted on a KW-LK110 air cooling system.

Module	KEN 5	KEN 10		KW 2	KW 3	KW 5	KW 8
T_U = 30 °C	100 %	100%		100%	100%	87%	62%
T_U = 40 °C	100 %	100%		100%	100%	63%	46%

Module	KWD 1	KWD 2	KWD 5		KWZ 1	KWZ 2	KWZ 5
T_U = 30 °C	100%	100%	53%		100%	100%	53%
T_U = 40 °C	100%	100%	40%		100%	100%	40%

T_U Ambient temperature

7.1.2 KW-LK250 / KW-LK400

Module	KE 10		KE 20		KE 40		KE 60 [1)]		KE 120 [1)]	
HW revision of the cold plate	1.00	≥1.01	1.00	≥1.01	1.00	≥1.01	1.00	≥1.01	1.00	≥1.01
T_U = 30 °C	100%	100%	100%	100%	100%	100%	100%	100%	On request	
T_U = 40 °C	100%	100%	100%	100%	100%	100%	100%	100%		

Module	KEN 5		KEN 10		KEN 60 [1] (KE 60-S4)		KEN 120 [1]	
HW revision of the cold plate	1.00	≥1.01	1.00	≥1.01	1.00	≥1.01	1.00	≥1.01
T_U = 30 °C	100%	100%	100%	100%	100%	100%	On request	
T_U = 40 °C	100%	100%	100%	100%	100%	100%		

Module	KES 20		KES 40		KES 60		KES 120	
HW revision of the cold plate	1.00	≥1.01	1.00	≥1.01	1.00	≥1.01	1.00	≥1.01
T_U = 30 °C	65%	80%	On request		On request		On request	
T_U = 40 °C	46%	57%						

Module	KW 2		KW 3		KW 5		KW 8		KW 10		KW 20	
HW revision of the cold plate	1.00	≥1.01	1.00	≥1.01	1.00	≥1.01	1.00	≥1.01	1.00	≥1.01	1.00	≥1.01
T_U = 30 °C	100%	100%	100%	100%	100%	100%	85%	100%	93%	100%	65%	80%
T_U = 40 °C	100%	100%	100%	100%	78%	100%	60%	88%	62%	76%	46%	57%

Module	KW 40		KW 60 [1]		KW 100 [1]	
HW revision of the cold plate	1.00	≥1.01	1.00	≥1.01	1.00	≥1.01
T_U = 30 °C	57%	73%	47%	58%	On request	
T_U = 40 °C	41%	52%	33%	41%		

Module	KWD 1		KWD 2		KWD 5			KWZ 1		KWZ 2		KWZ 5	
HW revision of the cold plate	1.00	≥1.01	1.00	≥1.01	1.00	≥1.01		1.00	≥1.01	1.00	≥1.01	1.00	≥1.01
T_U = 30 °C	100%	100%	100%	100%	72%	100%		100%	100%	100%	100%	72%	100%
T_U = 40 °C	100%	100%	100%	100%	52%	72%		100%	100%	100%	100%	52%	72%

T_U Ambient temperature

1) max. 1 device per KW-LK400 (rev. ≥1.01)

7.1.3 KW-LK500

Module	KE 10	KE 20	KE 40	KE 60 [1]	KE 120 [1]
T_U = 30 °C	100%	100%	100%	100%	On request
T_U = 40 °C	100%	100%	100%	100%	

Module	KEN 5	KEN 10	KEN 60 [1] (KE 60-S4)	KEN 120 [1]
T_U = 30 °C	100%	100%	100%	On request
T_U = 40 °C	100%	100%	100%	

Module	KES 20	KES 40	KES 60 1)	KES 120 1)
T_U = 30 °C	82%	On request	On request	On request
T_U = 40 °C	59%			

Module	KW 2	KW 3	KW 5	KW 8	KW 10	KW 20
T_U = 30 °C	100%	100%	100%	100%	100%	82%
T_U = 40 °C	100%	100%	100%	91%	78%	59%

Module	KW 40	KW 60 1)	KW 100 1)
T_U = 30 °C	75%	60%	On request
T_U = 40 °C	54%	43%	

Module	KWD 1	KWD 2	KWD 5		KWZ 1	KWZ 2	KWZ 5
T_U = 30 °C	100%	100%	100%		100%	100%	100%
T_U = 40 °C	100%	100%	75%		100%	100%	75%

T_U Ambient temperature

1) max 2 devices per KW-LK500 (rev. ≥1.00)

Example:

A KW 8 may be operated at a maximum of 85% of its nominal data in case of an ambient temperature of 30 °C and when mounted on a KW-LK250 revision 1.00.

7.2 Derating for KW modules with temperature model

The derating values for the air cooling of the KW modules improve with the introduction of the temperature model on the software side.

7.2.1 Prerequisites

- Hardware revision of the air cooling systems

Module	Revision
KW-LK110	not possible
KW-LK250	≥1.01
KW-LK400	≥1.01
KW-LK500	≥1.00

- Hardware revision of the KW modules
(KE xx modules are generally operated without temperature model; Siehe Derating for KE and KW modules without temperature model auf Seite 18..)

Module	Revision		Module	Revision		Module	Revision
KW 2	≥3.23		KW 3	≥3.23		KW 5	≥3.21
KW 8	≥3.22		KW 10	≥3.21		KW 20	≥3.21
KW 40	≥3.21		KW 60	≥3.21		KW 100	≥4.02
KWD 1	≥3.23		KWD 2	≥3.23		KWD 5	≥3.22
KWZ 1	--		KWZ 2	--		KWZ 5	--

- controller cards and firmware versions

Controller card	Firmware	Parameterisation
KW-R27	≥ AE-R26 V2.12 2018/40 (207284)	ID32901; Bit 9 = 1: temperature model active ID32901; Bit 12 = 1: air cooling
KW-R26	≥ AE-R26 V2.01 2014/11 (205091)	ID32901; Bit 9 = 1: temperature model active ID32901; Bit 12 = 1: air cooling
KW-R25	≥ AE-R25 V2.02 2014/23 (205217)	ID32901; Bit 9 = 1: temperature model active ID32901; Bit 12 = 1: air cooling
KW-R24-R	≥ AE-R24 V2.11 2016/46 (206643)	ID32901; Bit 9 = 1: temperature model active ID32901; Bit 12 = 1: air cooling
KW-R24	≥ AE-R24 V2.02 2014/23 (205216)	ID32901; Bit 9 = 1: temperature model active ID32901; Bit 12 = 1: air cooling
KW-R17	≥ AE-R05/R06 V1.05 2010/32 (203194)	ID32901; Bit 9 = 1: temperature model active ID32901; Bit 12 = 1: air cooling
KW-R16	≥ AE-R05/R06 V1.05 2010/32 (203194)	ID32901; Bit 9 = 1: temperature model active ID32901; Bit 12 = 1: air cooling
KW-R07	≥ AE-R05/R06 V1.05 2010/32 (203194)	ID32901; Bit 9 = 1: temperature model active ID32901; Bit 12 = 1: air cooling
KW-R06	≥ AE-R05/06 2010/32 203194	ID32901; Bit 9 = 1: temperature model active ID32901; Bit 12 = 1: air cooling
KW-R05	≥ AE-R05/06 2010/32 203194	ID32901; Bit 9 = 1: temperature model active ID32901; Bit 12 = 1: air cooling
KW-R03 KW-R04	≥ AE-R03 V3.20 2011/26 (203044)	ID32901; Bit 9 = 1: temperature model active ID32901; Bit 12 = 1: air cooling Restrictives: • Minimum cycle time 1 ms • No application of option cards ◦ KW-PLC2 ◦ KW-EC1 ◦ KW-SC1 ◦ KW-SC2
KW-R03P	not possible	

7.2.2 Derating factors

Module	KW 2	KW 3	KW 5	KW 8	KW 10	KW 20
T_U = 30 °C	100%	100%	100%	100%	100%	100%
T_U = 40 °C	100%	100%	100%	100%	100%	80%

Module	KW 40	KW 60 [1)]	KW 100 [1)]
T_U = 30 °C	100%	74%	On request
T_U = 40 °C	90%	60%	

Module	KWD 1	KWD 2	KWD 5		KWZ 1	KWZ 2	KWZ 5
T_U = 30 °C	100%	100%	100%		KWZ x cannot be operated with temperature model. Siehe Derating for KE and KW modules without temperature model auf Seite 18.		
T_U = 40 °C	100%	100%	100%				

T_U Ambient temperature

1) max. 1 device per KW-LK400 (rev. ≥1.01)
max 2 devices per KW-LK500 (rev. ≥1.00)

Example:

A KW 20 with activated temperature model may be operated with a maximum of 80% of its nominal data in case of an ambient temperature of 40 °C.

8 Operation

8.1 Avoiding material damage

NOTICE	
Material Damage!	**Short circuit due to penetrating foreign objects or water** Foreign objects such as metal shavings, screws, etc. cause short circuits. In particular it needs to be prevented that water, e.g. condensation water, seeps in through the cooling units. A temporary forming of dew may only occur as long as the devices are out of operation. **Steps to prevent:** • The modules need to be protected against penetrating foreign objects or water. • When applying mains voltage, no dew may be present any longer.

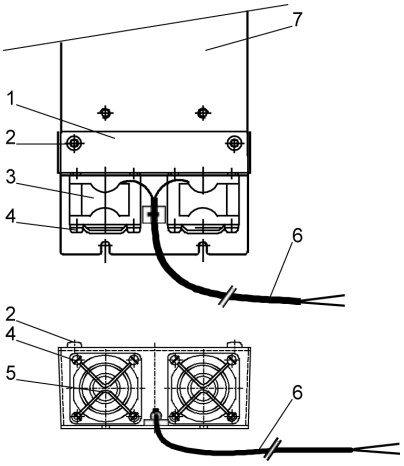
NOTICE	
Material Damage!	**Material damage due to impure air!** If the fed-in air contains moisture, electrically conductive dust, fibres, gases, vapours ... short circuits can occur. **Steps to prevent:** • Use dehumidifiers and filters

8.2 Maintenance

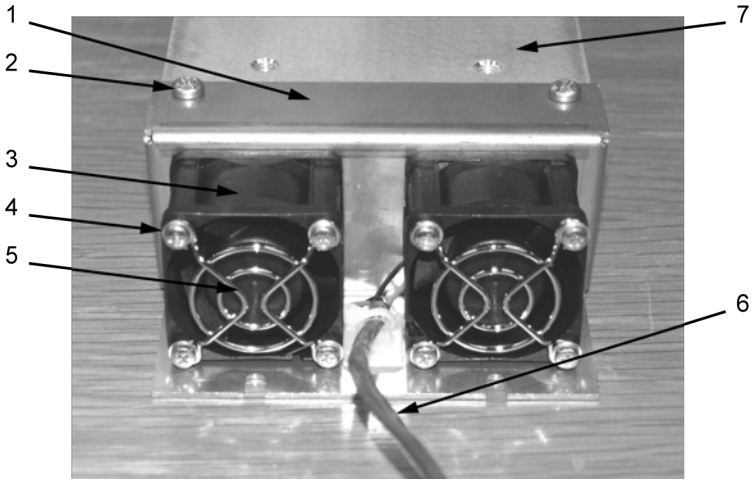
The KW-LKxxx air cooling systems are maintenance-free.

The cooling fins must be cleaned regularly in order to ensure optimal heat distribution, especially in case of through-hole assembly.

8.3 Fan replacement KW-LK110

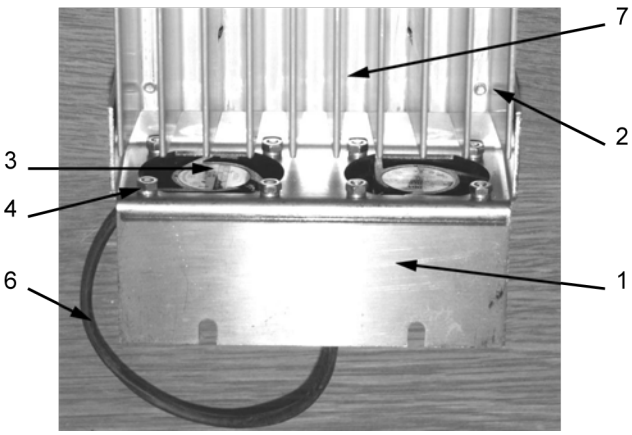


View from below



1 Fan mounting
2 Taptite II
3 Fan
4 Linear screw M3 x 35
5 Protective grid
6 Heat-shrinkable sleeve
7 Heat sink

View from the rear



Spare parts

Drawing position	Module name	Qty.	AMK part no.
3	Fan 40 x 40 x 28 mm, 24 VDC	2	200756
5	Protective grid D 31.4 mm	2	29835

Tools

Module name	Size
Screwdriver	Torx 20
Phillips-head screwdriver	PH 2
Wrench	5.5 mm
Heat gun	

Assembly material

Drawing position	Module name	Qty.	AMK part no.
2	Taptite II CM4 x 8 D7500	2	20176
4	Linear screw M3 x 35	8	24916
	Washer D125A 3.2 ST A2E	8	717
	Hexagon nut D934-8 M3 A2E	8	2066
	Spring washer D7980 3 A2E	8	1481

Expendables

Drawing position	Module name	Qty.	AMK part no.
6	Heat-shrinkable sleeve D 4.8/2.4	250 mm	21949
	Cable tie 92 x 2.4 x 1.0 mm	1	4052
	Wire end ferrules E1,00-8 ISO	2	20200

Disassembly

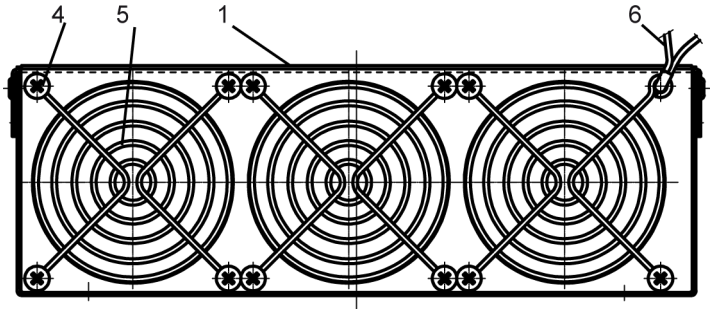
1. Disconnect cooler supply 24 VDC
2. Disconnect fan mounting (1) (2 x Taptite II (2))
3. Remove cable ties
4. Remove heat-shrinkable sleeve (6)
5. Remove wire end ferrules
6. Loosen 4 screws M3 x 35 (4)
7. Remove protective grid (5)
8. Disconnect fan (3)

Assembly

1. Mount fan (3) on the fan mounting (1)
   Mount protective grid (5)
   Insert 4 screws M3 x 35(4) with washer, screw on hexagon nuts with spring washer
   => order: Screw head / washer / grid /fan / mounting / spring washer / nut
2. Fit heat-shrinkable sleeve (6) onto all 4 strands, shrink fit with heat gun
3. Fit strands with wire end ferrules in pairs (red/red, black/black)
4. Using cable tie, fasten the strands on the cable tie base. Include heat-shrinkable sleeve
5. Screw tight fan mounting (1) on the heat sink (7)
6. Connect fan supply 24 VDC

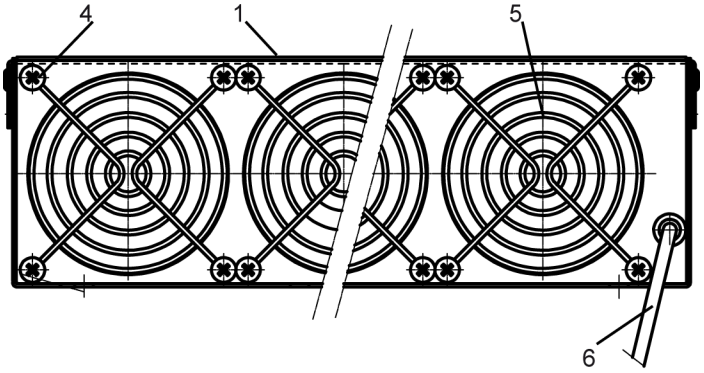
8.4 Fan replacement KW-LK250 / -LK400 / -LK500

KW-LK250 fan group - view from below



1 Mounting plate
4 Sheet metal screw
5 Protective grid
6 Supply line

KW-LK400 / -LK500 fan group - view from below



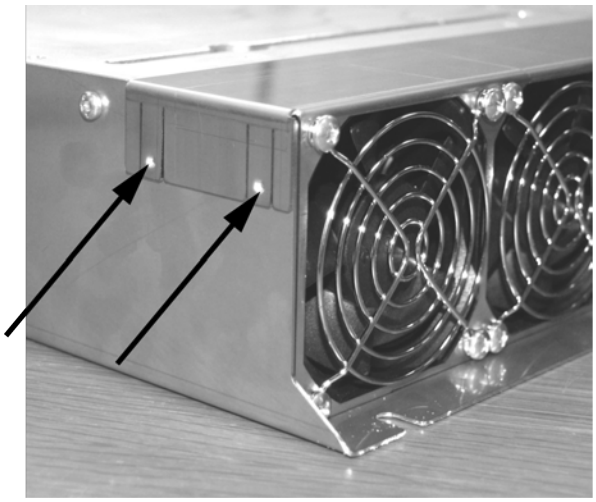
1 Mounting plate
4 Sheet metal screw
5 Protective grid
6 Supply line

Spare parts

Siehe 'Fan modules' auf Seite 10.

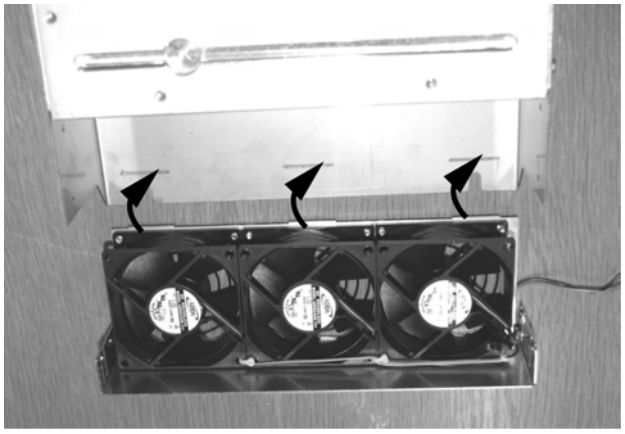
Disassembly

1. Disconnect supply lines of the fans.
2. 

   Remove holding clamps with cylinder screws M6 x 10
3. 

   Using a slotted screwdriver, slightly lift the brackets right and left on the cold plate.
   Tilt the entire fan module forward / downward and remove.

Assembly

1. 

Attach the fan module on the mounting plate of the cold plate.

When doing so, ensure that the nozzles of the fan plate are fitted in the cutout openings of the cold plate.

Tilt the fan module upwards and snap into place left and right.

2. 

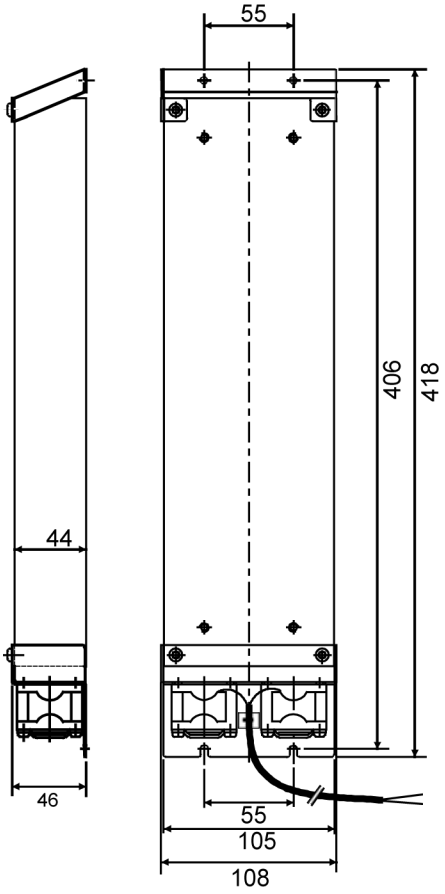
Mount holding clamps with cylinder screws M6 x 10

3. Re-connect supply lines.

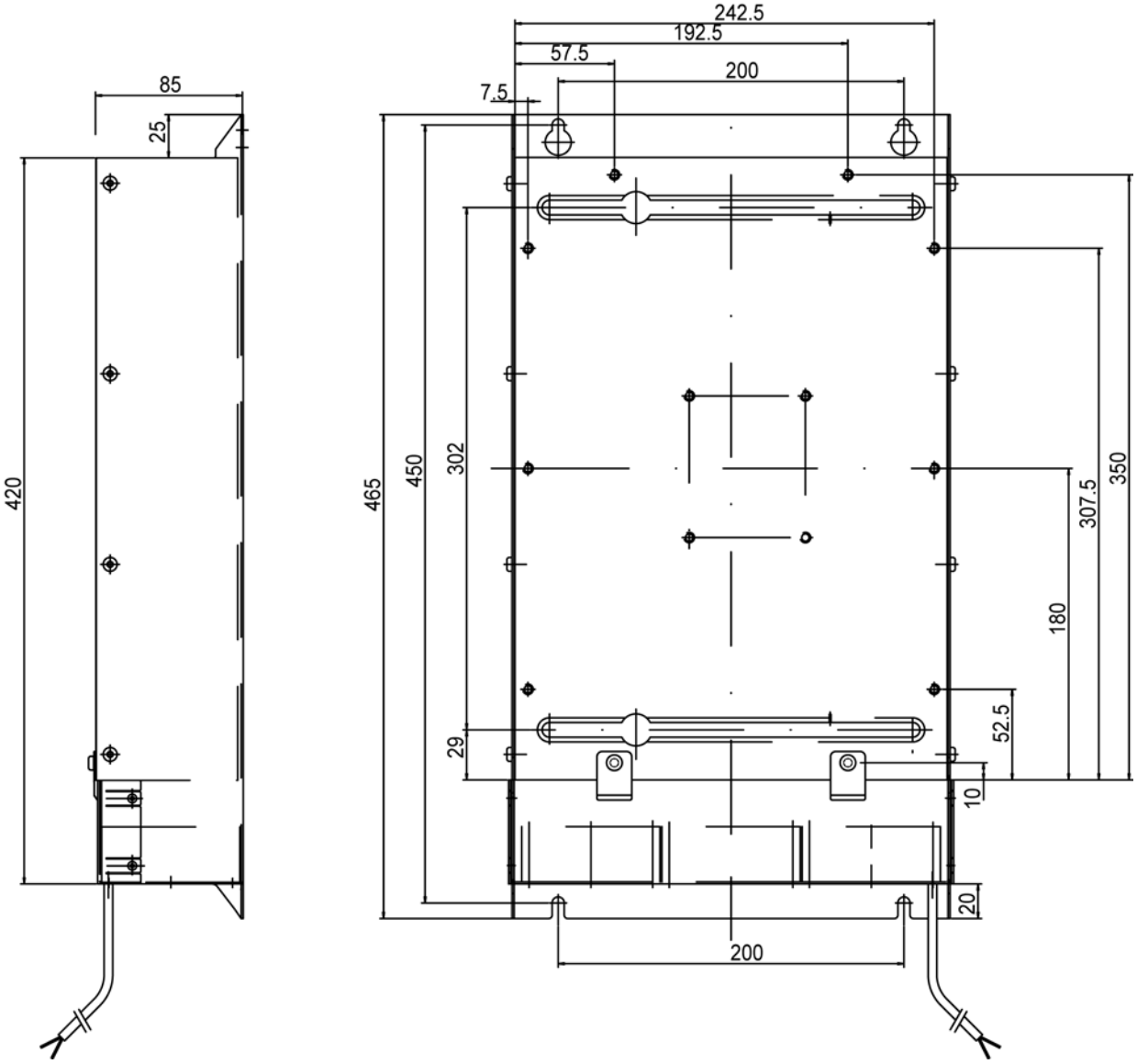
Assembly with through-hole technology, the holding clamps are not used.

9 Dimensional drawings

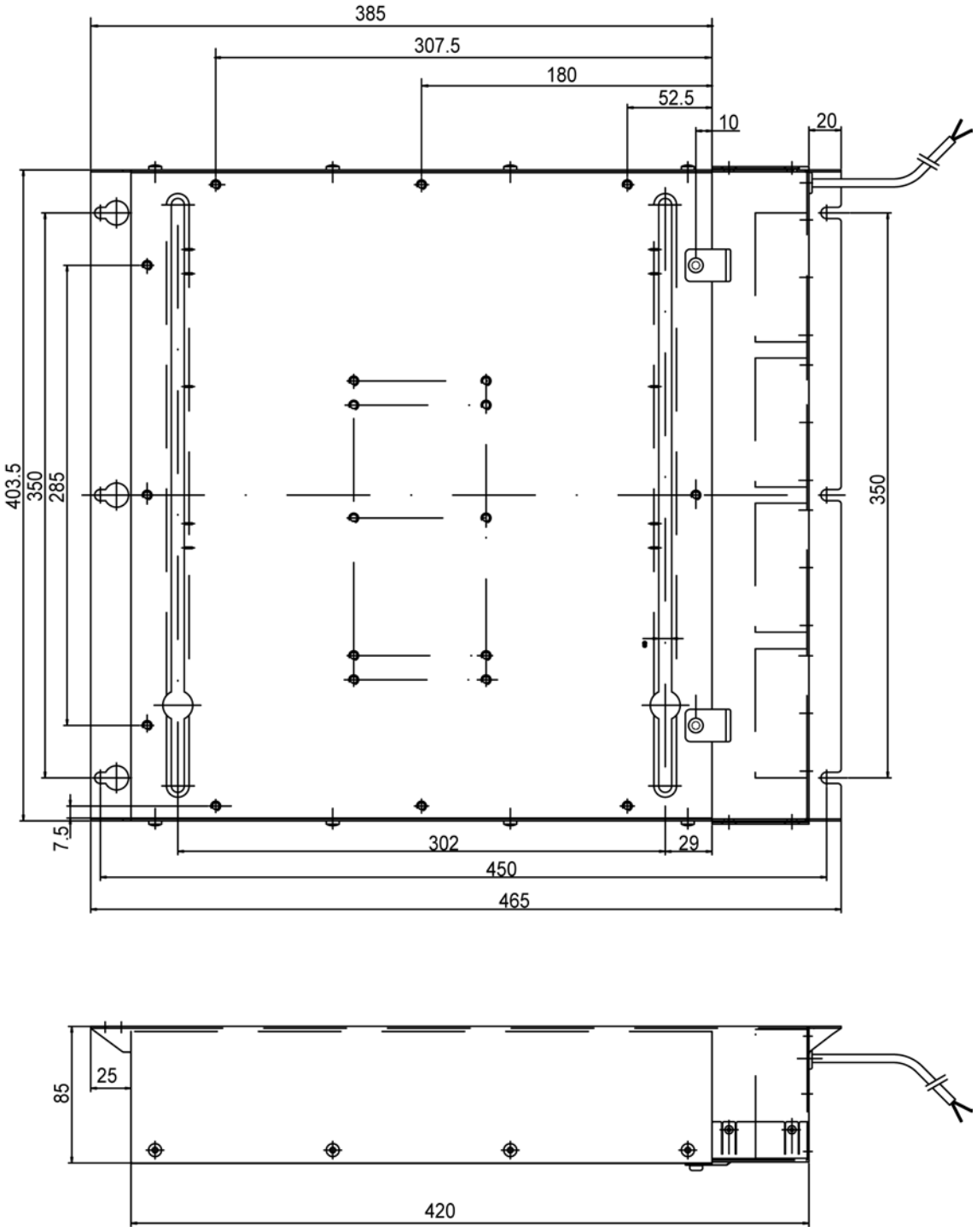
9.1 KW-LK110



9.2 KW-LK250

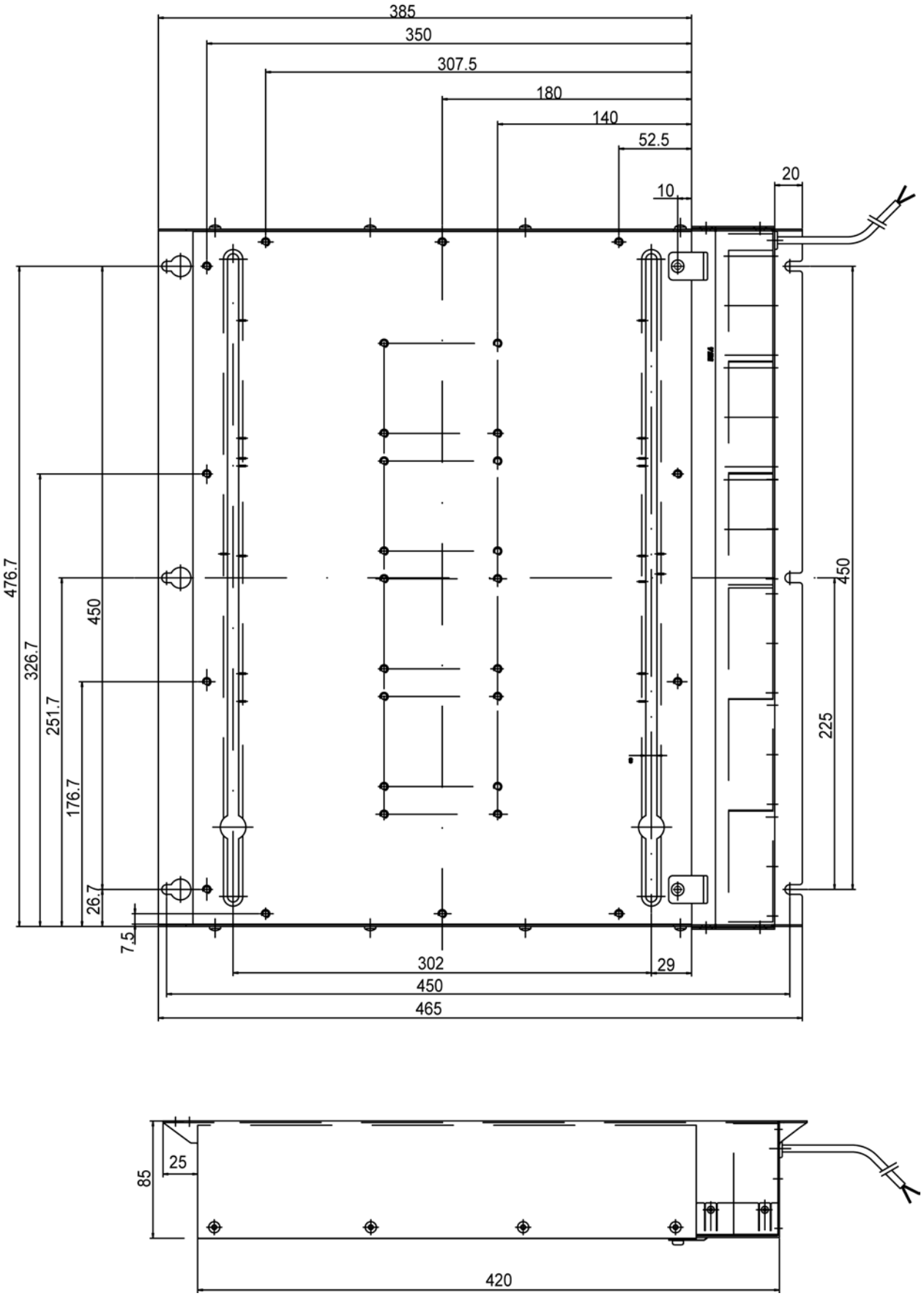

242.5
192.5
57.5
200
7.5
85
25
420
465
450
302
307.5
350
180
52.5
29
10
20
200

9.3 KW-LK400



(cross-wise image alignment)

9.4 KW-LK500



(cross-wise image alignment)

Glossary

D

DO
Digital output

DI
Digital input

E

EMV
Electromagnetic compatibility

EMC
Electromagnetic compatibility

EnDat 2.1
Motor encoder interface protocol of the company Heidenhain

EnDat 2.2
Motor encoder interface protocol of the company Heidenhain

I

ID
Parameter identification numbers acc. to SERCOS Standard

I-encoder
Incremental encoder, optical encoder with sine and cosine track and zero pulse

K

KW-Rxx
AMKASYN controller card for installation into compact inverter

KWD
AMKASYN compact double inverter to control two motors

KES
AMKASYN compact power supply with sinusoidal voltage and current

KE/KW
Modular AMK drive system (contains compact power supply KE, compact inverter KW with controller card and applicable option card)

KE
AMKASYN compact power supply with recovery

KW
AMKASYN compact inverter

KWZ
AMKASYN compact two-axes inverter to control two motors

M

Modulo
Modulo processing of position setpoint and actual values

N

NHN
Heights measured above the base height levelReference plane for heights over the sea level for Germany since 1992. The reference plane is located in Germany on the church in Wallenhorst.

NK
Cam switch

P

PDK_xxxxxx_abcdefgh
Product documentation; xxxxxx - AMK part no. , abcdefgh - name

Q

QBR
Acknowledgment motor holding brake

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With our documentation we want to offer you the highest quality support in handling the AMKmotion products.
That is why we are now working on optimizing our documentation.
Your comments or suggestions are always of interest to us.
We would be grateful if you take a bit of time and answer our questions. Please return a copy of this page to us.

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or
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Thank you for your assistance.
Your AMKmotion documentation team

1. How would you rate the layout of our AMKmotion documentation?

   (1) very good (2) good (3) satisfactory (4) less than satisfactory (5) poor

2. Is the content structured well?

   (1) very good (2) good (3) moderate (4) hardly (5) not at all

3. How easy is it to understand the documentation?

   (1) very easy (2) easy (3) moderately easy (4) difficult (5) extremely difficult

4. Did you miss any topics in the documentation?

   (1) no (2) if yes, which ones:

5. How would you rate the overall service at AMKmotion?

   (1) very good (2) good (3) satisfactory (4) less than satisfactory (5) poor

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