AMKASYN
Device Description
Upstream Mains Choke ALNV

Version: 2020/02
Part no.: 203425
Translation of the "Original Dokumentation"

Imprint

Name: PDK_203425_AMKASYN_Vorschaltdrossel

Version:

Version	Change	Initials
2020/02	• Technical data: Maximum current representation updated	STL

Prev. Version: 2019/04

Product version:

Product	Firmware version (AMK part no.)	Hardware version (AMK part no.)
ALNV 15-SI	-	1.02 (203106)
ALNV 45-SI-100		1.01 (204676)
ALNV 60-SI		1.00 (204282)
ALNV 150-SI		1.00 (204677)
ALNV 30-S		1.01 (202556)
ALNV 30-S		1.00 (205862)
ALNV 90-S		1.00 (204328)
ALNV 180-S		1.00 (202558)
ALNV 180-S		1.00 (204678)

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 For your safety

1.1 Design of safety information

Any safety information is configured as follows:

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

1.2 Classes 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.

1.3 Used safety symbols

Safety symbol	Meaning
	Warning of a danger!
	Warning against dangerous electrical voltage!
	Warning against crushing hazard!
	Warning against hot surface!

1.4 General safety instructions

- The electricity, mechanical movements and high temperatures in electrical drive systems present hazards that can result in fatal injuries and material damage. These hazards are present while starting up and operating the unit, and also during servicing or maintenance work.
- Personnel must have read and understood the safety instructions before installing and operating the unit. In the documentation included with the product, the usage warnings pertain to direct hazards and must therefore be followed directly when operating or handling the unit by the operator.
- Compliance with all of the instructions given in the documentation included with the product will ensure safe and fault-free operation of the unit and is a prerequisite for asserting warranty claims.
- AMK Arnold Müller GmbH & Co. KG shall not be held liable for any damages ensuing from using the unit in a manner contrary to the intended use, from faulty installation or from using the unit beyond the specified operating characteristics and conditions.
- Do not start the system in which the AMK products are installed (begin of intended use) until you can determine that all relevant standards, laws and directives have been complied with.

1.5 Intended use

The upstream mains chokes of the ALNV type series have been designed for installation in a closed, well-sized switch cabinet, which provides protection against direct contact acc. to EN 50178.

1.6 Requirements for the personnel and their qualification

Any work performed on AMK products should be carried out only by trained and authorised technicians.

Technicians must:

- Carry out mechanical and electrical work which are described in this documentation, e. g. when mounting and connecting devices
- Regard any documentation that accompanies the products, in order to work safely and without fault with the products
- Know about the potential hazards and realise them
- Be familiar with the basic functions and interrelationships of the system
- Be familiar with the controller principles to put the system into operation
- Have knowledge and the authority to switch electrical circuits and devices on and off, to earth and mark them
- Regard specifically local safety requirements

1.7 Safety rules

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 Product overview

2.1 Product description

The switch-on components mains choke, mains filter and upstream mains choke limit the interferences that electrical devices transfer into the public mains. Conversely, they improve the electromagnetic compatibilities of the devices in the face of interferences from the electricity network.

The upstream mains choke reduces the induced distortion on the mains in the 8 kHz range.

It is necessary that the AMK upstream mains chokes (ALNV) are switched up-stream for compact power supplys of the KES type.

2.2 Product name and ordering data

Product name	Order number
ALNV 15-SI	O841
ALNV 45-SI-100	O951
ALNV 60-SI	O894
ALNV 150-SI	O944
ALNV 30-S	O828
ALNV 30-S	O950
ALNV 90-S	O890
ALNV 180-S	O827
ALNV 180-S	O959

2.3 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.

2.4 Type code

ALNV	xx	-x	
	15	-SI	Nominal current 15 A, pulse operation
	45	-SI	Nominal current 45 A, pulse operation
	60	-SI	Nominal current 60 A, pulse operation
	150	-SI	Nominal current 150 A, pulse operation
	30	-S	Nominal current 30 A
	90	-S	Nominal current 90 A
	180	-S	Nominal current 180 A

2.5 Technical data

Designation	ALNV 15-SI	ALNV 45-SI-100	ALNV 60-SI	ALNV 150-SI
Nominal voltage U_N	3 x 500 VAC, 50 / 60 Hz			
Nominal current I_N	3 x 15 A	3 x 45 A	3 x 60 A	3 x 150 A
Maximum current [amplitude]	85 A for 10 s ($4 \times I_N \times \sqrt{2}$)	255 A for 10 s ($4 \times I_N \times \sqrt{2}$)	425 A for 10 s ($5 \times I_N \times \sqrt{2}$)	680 A für 10 s ($3{,}2 \times I_N \times \sqrt{2}$)
Inductance/Line	0.3 mH	0.1 mH	0.1 mH	0.05 mH
Power loss	28 W	60 W	138 W	170 W
Protection class	IP 00			
Weight	2 kg	4.1 kg	8.6 kg	20 kg
Dimensions	See ' ALNV 15-SI' on page 11.	See 'ALNV 30-SI, ALNV 45-SI-100, ALNV 60-SI, ALNV 90-S' on page 12.	See 'ALNV 30-SI, ALNV 45-SI-100, ALNV 60-SI, ALNV 90-S' on page 12.	See 'ALNV 150-SI' on page 13.
AMK part no.	O841	O951	O984	O944

Designation	ALNV 30-S	ALNV 30-S	ALNV 90-S	ALNV 180-S	ALNV 180-S
Nominal voltage U_N	3 x 500 VAC, 50 / 60 Hz				
Nominal current I_N	3 x 30 A	3 x 30 A	3 x 90 A	3 x 180 A	3 x 180 A
Maximum current [amplitude]	85 A for 10 s ($2 \times I_N \times \sqrt{2}$)	85 A for 10 s ($2 \times I_N \times \sqrt{2}$)	255 A for 10 s ($2 \times I_N \times \sqrt{2}$)	425 A for 10 s ($1{,}66 \times I_N \times \sqrt{2}$)	425 A for 10 s ($1{,}66 \times I_N \times \sqrt{2}$)
Inductance/Line	0.3 mH	0.1 mH	0.1 mH	0.1 mH	0.1 mH
Power loss	43 W	n/a	n/a	n/a	n/a
Protection class	IP 00				
Weight	3 kg	1.7 kg	8 kg	21.5 kg	18.5 kg
Dimensions	See 'ALNV 30-SI, ALNV 45-SI-100, ALNV 60-SI, ALNV 90-S' on page 12.			See 'ALNV 180-S' on page 14.	
AMK part no.	O950 [1]	O828 [1]	O890	O827 [2]	O959 [2]

1) The devices are different in dimensions and mounting hole
   Dimensions: See 'ALNV 30-SI, ALNV 45-SI-100, ALNV 60-SI, ALNV 90-S' on page 12.
   Detail of mounting hole: See 'Detail of mounting hole' on page 10.

2) The devices are different in dimensions and mounting hole
   Dimensions: See 'ALNV 180-S' on page 14.
   Detail of mounting hole: See 'Detail of mounting hole' on page 10.

3 Transport, storing, environment, maintenance, disposal

3.1 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.

3.2 Transport

- Transport the device in its original packaging and use shock-absorbing padding.
- Protect the device against condensation and prevent sudden changes in temperature and humidity.

3.3 Storing

- Store the device in its original packaging.
- Store the device in a clean and dry location where it is protected against weather conditions.
- 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.

3.4 Environmental conditions

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.

Storage/Shipping temperature:	- 25 °C to +75 °C
Ambient temperature in operation:	+5 °C to +40 °C
Relative humidity:	5 % to 85 %, without condensation
Installation altitude:	≤ 1000 m above sea level.

3.5 Maintenance

- The device does not require any maintenance.

3.6 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

4 Assembly

4.1 Avoiding material damage

NOTICE	
Material Damage!	**Electronic components could be destroyed through static discharge!** Therefore touching of the electrical connections (e. g. signal and power supply cable) must be avoided. Otherwise you can be damaged the components when touching by static discharge. **Steps to prevent:** • Avoid touching electrical connections and contacts. • During handling the electronic component discharge yourself by touching PE. • Pay attention to the ESD-notes (electrostatic discharge).

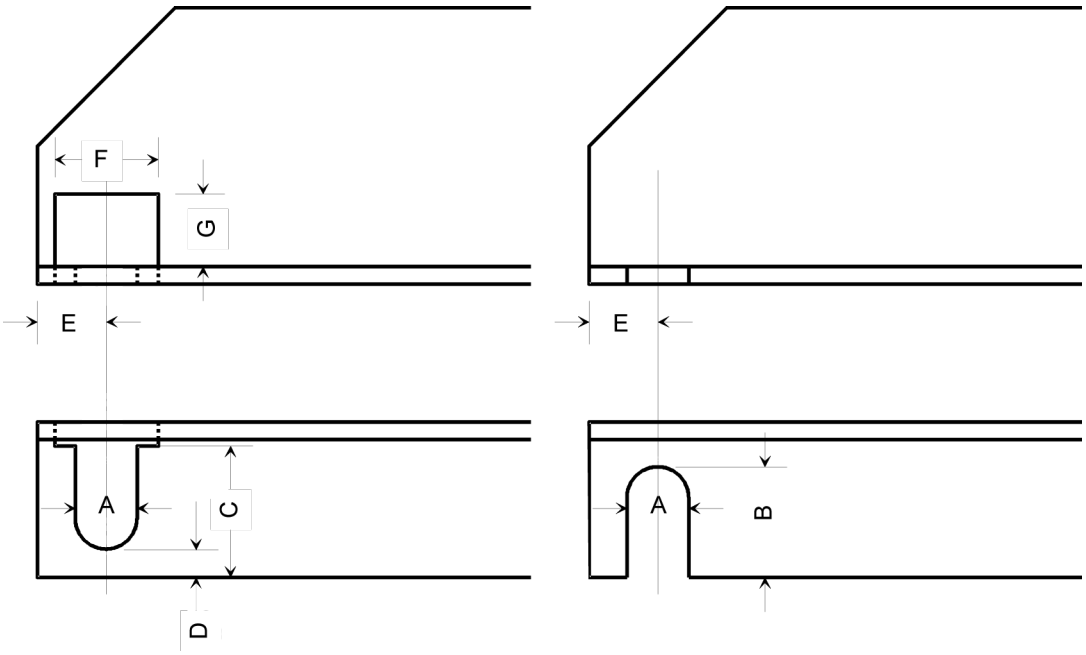
NOTICE	
Material Damage!	**Short circuit due to penetrating foreign objects or water** Foreign objects such as metal shavings, screws, etc. cause short circuits. In particular it needs to be prevented that water, e.g. condensation water, seeps in through the cooling units. A temporary forming of dew 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.

4.2 Mounting in switch cabinet

The upstream mains choke is intended for assembly on the mounting plate or the floor of the switch cabinet.

4.2.1 Detail of mounting hole

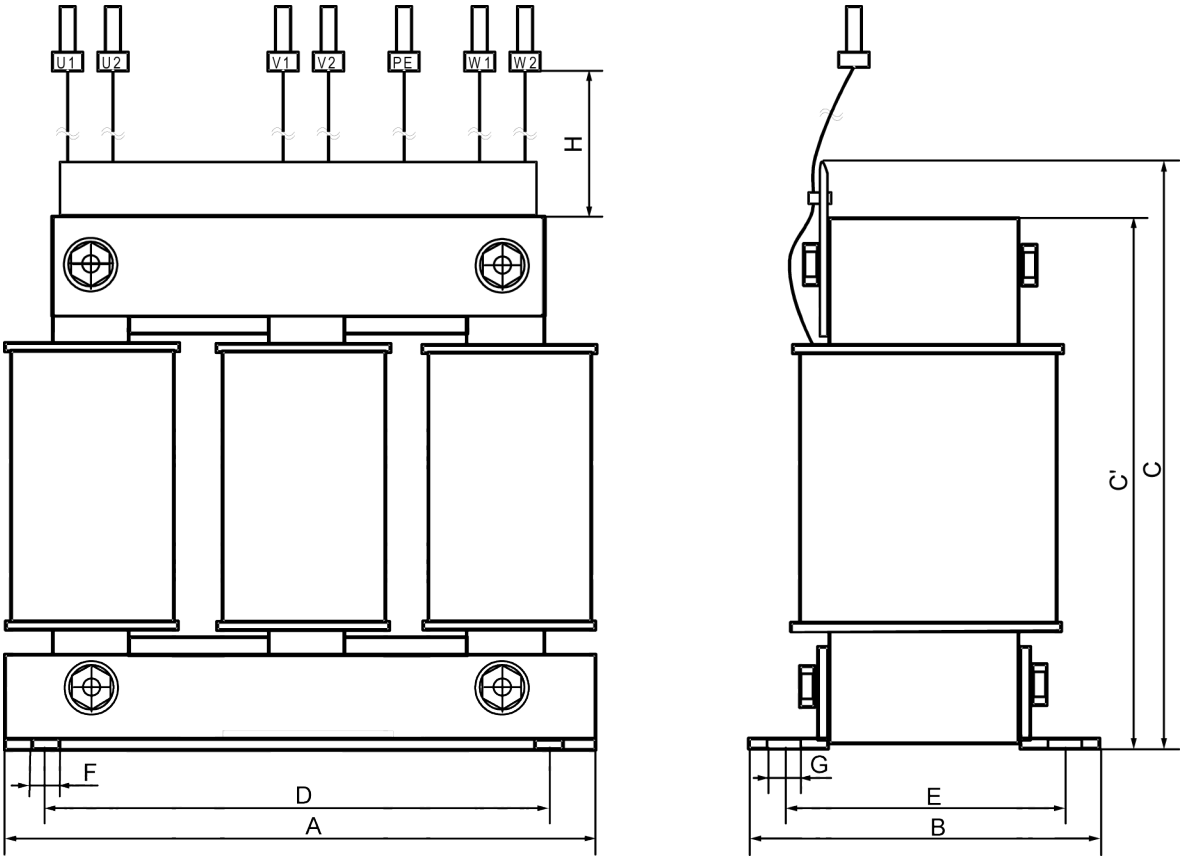
In order to simplify the mounting of the chokes especially on vertical mounting plates, some chokes are constructed with open mounting grooves.



Dimension / mm	ALNV 30-S	ALNV 90-S	ALNV 180-S	ALNV 45-SI-100	ALNV 60-SI	ALNV 150-SI
A	7.0	9.0	9.0	9.0	9.0	9.0
B	12.0	16.0	16.0	16.0	16.0	16.0
C	19.0	19.0	19.0	19.0	19.0	57.5
D	6.0	4.0	4.0	4.0	4.0	5.0
E	10.0	10.0	10.0	10.0	10.0	11.5
F	13.0	15.0	15.0	15.0	15.0	15.0
G	9.5	10.5	10.5	10.5	10.5	10.5
AMK part no.	O950	O890	O959	O951	O894	O944

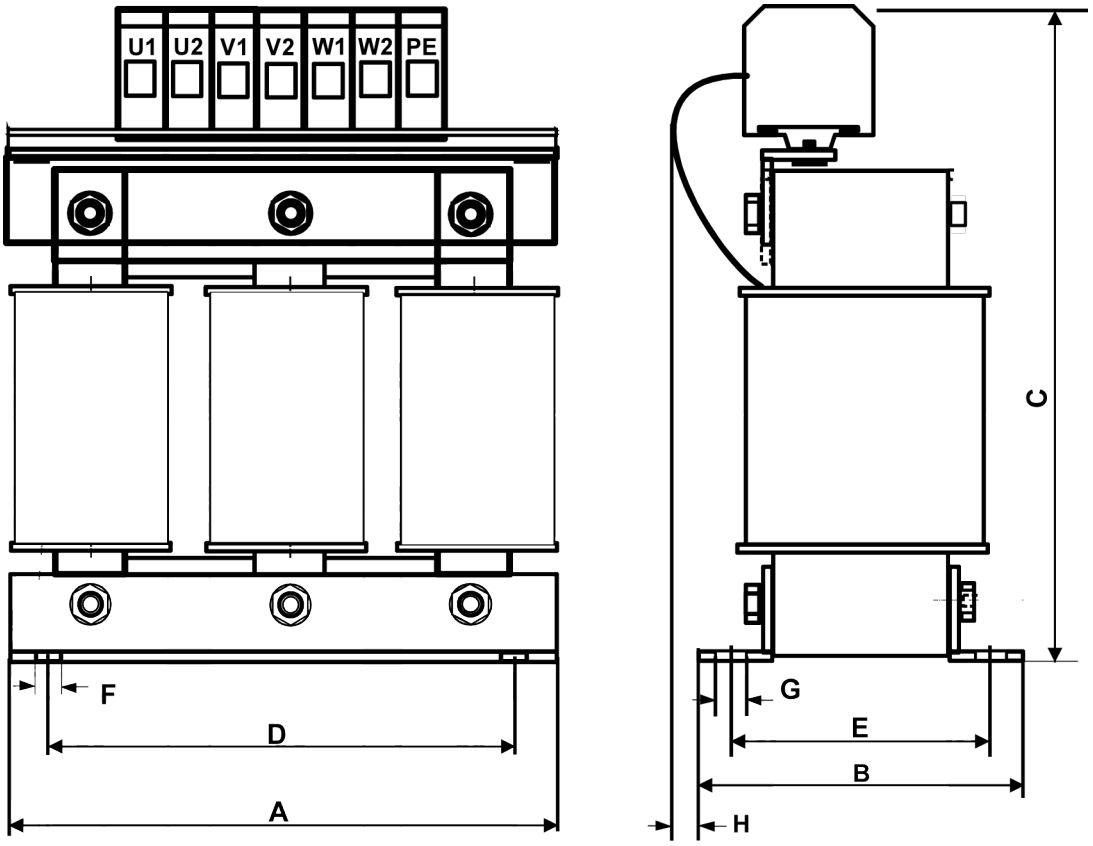
4.3 Views and dimensions

4.3.1 ALNV 15-SI



Dimension	ALNV 15-SI
A	95 ±2
B	66 ±2
C	100 ±10
C'	90 ±5
D	63 ±1
E	50 ±1
F	5.8
G	11
H	400 ±5
AMK part no.	O841

4.3.2 ALNV 30-SI, ALNV 45-SI-100, ALNV 60-SI, ALNV 90-S

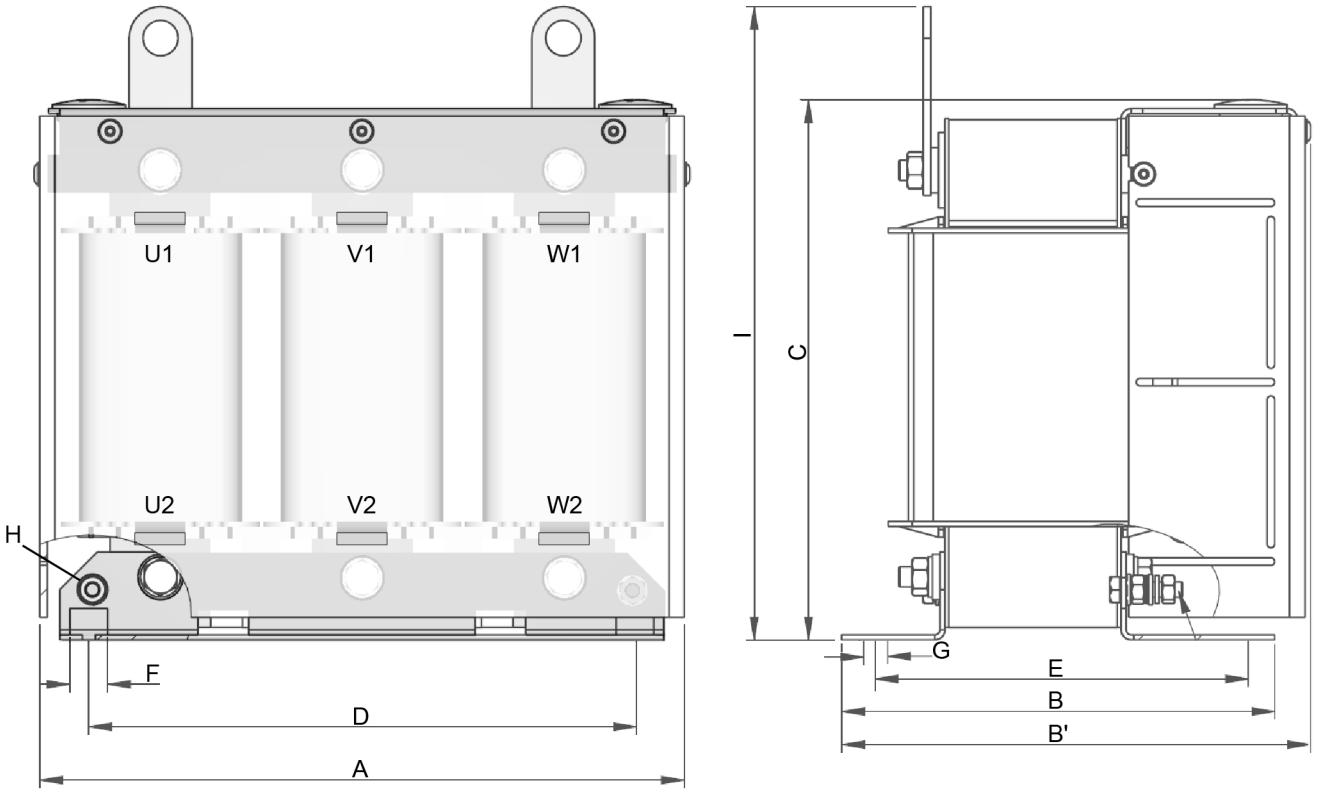


The position of the terminal blocks can vary.

Dimension	ALNV 30-S	ALNV 30-S	ALNV 90-S	ALNV 45-SI-100	ALNV 60-SI
A	155 ±2	95 ±2	205 ±2	175 ±2	205 ±2
B	75 ±2	66 ±2	84 ±2	76 ±2	94 ±2
C	151 ±10	140 ±10	230 ±10	208 ±3	230 ±10
D	135 ±1	63 ±1	185 ±1	155 ±1	185 ±1
E	56.7 ±1	50 ±1	65 ±1	54 ±3	67 ±1
F	7.0 *)	5.8	9.0 *)	9.0 *)	9.0 *)
G	12.0 *)	11	16.0 *)	16.0 *)	16.0 *)
H	0	0	0	28 ±3	0
AMK part no.	O950	O828	O890	O951	O894

*) See 'Detail of mounting hole' on page 10.

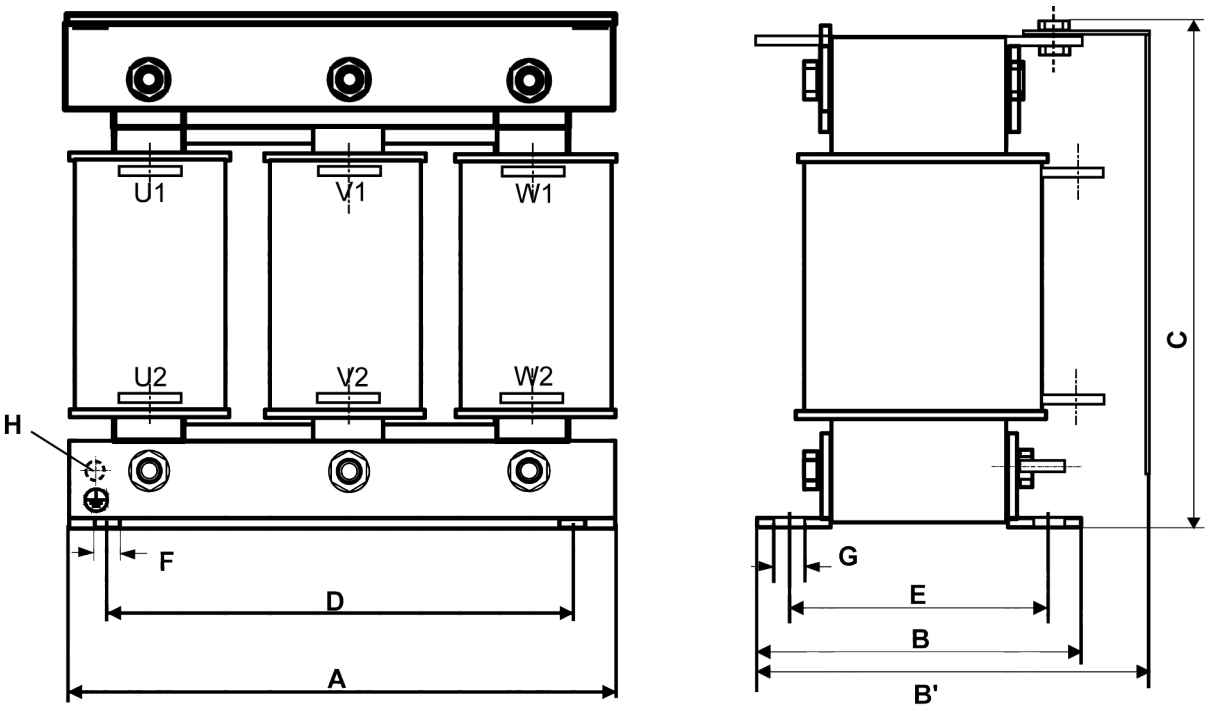
4.3.3 ALNV 150-SI



Dimension	ALNV 150-SI
A	256
B	172 ±2
B'	187 ±4
C	214 ±3
D	217
E	151 ±2
F	15*)
G	16*)
H	M6 (PE)
I	252 ±3
AMK part no.	O944

*) See 'Detail of mounting hole' on page 10.

4.3.4 ALNV 180-S



Dimension	ALNV 180-S	ALNV 180-S
A	240 ±2	280 ±2
B	107 ±2	99 ±2
B'	168.5	164.5
C	220 ±10	220 ±10
D	185 ±1	260 ±1
E	85 ±1	79 ±1
F	10	9.0 *)
G	18	16.0 *)
H	M8 (PE)	M6 (PE)
AMK part no.	O827	O959

*) See 'Detail of mounting hole' on page 10.

4.4 Tightening torque

The following table list the tightening torques for the mechanical fastening of the upstream mains chokes on the mounting plate or the floor of the switch cabinet.

	ALNV 15-SI	ALNV 45-SI-100	ALNV 60-SI	ALNV 150-SI
Diameter	M5	M8	M8	M8
Tightening torque / Nm	5.5	23	23	23
AMK part no.	O841	O951	O894	O944

	ALNV 30-S	ALNV 30-S	ALNV 90-S	ALNV 180-S	ALNV 180-S
Diameter	M6	M5	M8	M10	M8
Tightening torque / Nm	9.6	5.5	23	46	23
AMK part no.	O950	O828	O890	O827	O959

5 Electrical connections

5.1 For Your safety

⚠ DANGER	
	**Danger to life from touching electrical connections!** Electrical terminals and connectors carry voltages that may cause death or serious injury upon contact. **Steps to prevent:** • Prior to any work on the device: Observe the 5 safety rules. • Measure the terminal voltages. There may be no voltage present. • Plug and pull connections only when there is no voltage. • For devices that are connected to a DC bus, or generate it yourself, you need to consider the discharge times of the dc bus capacitors mentioned in the converter documentation • Before commencing work, the connections must be isolated from the voltage supply at both ends! (both ends mean: AC and DC bus supply side)

5.2 Avoiding material damage

NOTICE	
Material Damage!	**Electronic components could be destroyed through static discharge!** Therefore touching of the electrical connections (e. g. signal and power supply cable) must be avoided. Otherwise you can be damaged the components when touching by static discharge. **Steps to prevent:** • Avoid touching electrical connections and contacts. • During handling the electronic component discharge yourself by touching PE. • Pay attention to the ESD-notes (electrostatic discharge).

NOTICE	
Material Damage!	**Observe the tightening torques.** Note the tightening torques specified in the documentation for screw connections and screw terminals, otherwise the conductivity and the security of the connection are not ensured.

5.3 Connections

5.3.1 PE connection

⚠DANGER

Danger to life from electrical shock!

In the event of an interruption to the PE connection, avoid touching the casing because life-threatening levels of voltage may be present!

Steps to prevent:

- EN 50178 requires that the devices be firmly connected on the power side.
- The PE conductor must have a cross-section of at least 10 mm^2 or must have a second PE connection with a cross-section at least equal to the mains feeder (cf. EN 61800-5-1).

Cross-section AC wire	Cross-section PE wire
≤ 10 mm^2	= 10 mm^2
10 ... 16 mm^2	= Cross-section AC wire
16 ... 35 mm^2	= 16 mm^2
≥ 35 mm2	≈ 1/2 x Cross-section AC wire

Description:

ALNV 15-SI contains strands with crimp contacts for connection to a terminal block.

ALNV 30-S (part no. 205862) the PE connection is attached with a screw.

On the ALNV 45-SI-100, ALNV 60-SI, ALNV 30-S and ALNV 90-S, the PE connection is constructed as a screw terminal.

The PE connection is constructed as a screw bolt on the casing of the ALNV 150-SI and ALNV 180-S

Connection:

Module	ALNV 15-SI	ALNV 45-SI-100	ALNV 60-SI	ALNV 150-SI
Recommended cable type	-	1-wire, unshielded	1-wire, unshielded	1-wire, unshielded
Cable assembly	-	Wire end ferrule with plastic sheath	Wire end ferrule with plastic sheath	Ring cable lug
Wire cross-section / mm^2 / AWG	10 mm^2 AWG 7	25 mm^2 AWG 3	25 mm^2 AWG 3	35 mm^2 AWG 1/0
Earth connection	-	-	-	M6 x 25
Tightening torque	-	Depends on used terminal type	Depends on used terminal type	9.6 Nm
AMK part no.	O841	O951	O894	O944

Module	ALNV 30-S	ALNV 30-S	ALNV 90-S	ALNV 180-S	ALNV 180-S
Recommended cable type	1-wire, unshielded	1-wire, unshielded	1-wire, unshielded	1-wire, unshielded	1-wire, unshielded
Cable assembly	Ring cable lug	Wire end ferrule with plastic sheath	Wire end ferrule with plastic sheath	Ring cable lug	Ring cable lug
Wire cross-section / mm^2 / AWG	10 mm^2 AWG 7	10 mm^2 AWG 7	16 mm^2 AWG 5	50 mm^2 AWG 1/0	50 mm^2 AWG 1/0
Earth connection	M4	-	-	M8 x 30	M6 x 30
Tightening torque	2.8 Nm	Depends on used terminal type		23 Nm	9.6 Nm
AMK part no.	O950	O828	O890	O827	O959

5.3.2 [X01] Mains supply

⚠ DANGER	
	**Lethal electrical hazard when touching electrical connections!** The connections carry voltages that may cause death or serious injury upon contact. The connections themselves are not protected against contact. **Steps to prevent:** • The connections need to be secured by a cover against being touched.

Description:

Mains-side connection

Technical data:

- Mains voltage: 3 x 500 V, 50/60 Hz (symmetric three-phase power supply)

Version:

	Type	Pins
ALNV 15-SI	Strands with crimp contacts	3
ALNV 45-SI-100	Screw terminal	3
ALNV 60-SI	Screw terminal	3
ALNV 150-SI	Copper tab	3
ALNV 30-S	Screw terminal	3
ALNV 90-S	Screw terminal	3
ALNV 180-S	Copper tab	3

Assignment:

Designation	Connection
U1	Mains-side connection line phase L1
V1	Mains-side connection line phase L2
W1	Mains-side connection line phase L3

Connection:

Module	ALNV 15-SI	ALNV 45-SI-100	ALNV 60-SI	ALNV 150-SI
Recommended cable type	-	3-wire, unshielded	3-wire, unshielded	1-wire, unshielded
Cable assembly	-	Wire end ferrule with plastic sheath	Wire end ferrule with plastic sheath	Ring cable lug
Shield connection	If available, attach on both sides			
Wire cross-section / mm² / AWG	4 mm² AWG 11	25 mm² AWG 3	50 mm² AWG 1/0	70 mm² AWG 1/0 max. 70 °C
Copper tab: Borehole for	-	-	-	M8
Tightening torque	-	Depends on used terminal type	Depends on used terminal type	23 Nm

Module	ALNV 30-S	ALNV 90-S	ALNV 180-S
Recommended cable type	3-wire, unshielded		1-wire, unshielded
Cable assembly	Wire end ferrule with plastic sheath		Ring cable lug
Shield connection			
Wire cross-section / mm² / AWG	10 mm² AWG 7	35 mm² AWG 2	95 mm² AWG 4/0
Copper tab: Borehole for	-	-	M8
Tightening torque	Depends on used terminal type		23 Nm

Note	
	When using pin cable lug: See 'Terminal connection technology' on page 20. The connection tabs of the upstream mains choke ALNV 150-SI and ALNV 180-S need to be secured by a cover against being touched.

5.3.3 [X02] Load connection

⚠ DANGER

Lethal electrical hazard when touching electrical connections!

The connections carry voltages that may cause death or serious injury upon contact. The connections themselves are not protected against contact.

Steps to prevent:

- The connections need to be secured by a cover against being touched.

Description:

Load-side connection

Technical data:

- Mains voltage: 3 x 500 V, 50/60 Hz (symmetric three-phase power supply)

Version:

	Type	Pins
ALNV 15-SI	Strands with crimp contacts	3
ALNV 45-SI-100	Screw terminal	3
ALNV 60-SI	Screw terminal	3
ALNV 150-SI	Copper tab	3
ALNV 30-S	Screw terminal	3
ALNV 90-S	Screw terminal	3
ALNV 180-S	Copper tab	3

Assignment:

Designation	Connection
U2	Load-side connection load phase L1
V2	Load-side connection load phase L2
W2	Load-side connection load phase L3

Connection:

Module	ALNV 15-SI	ALNV 45-SI-100	ALNV 60-SI	ALNV 150-SI
Recommended cable type	-	3-wire, unshielded	3-wire, unshielded	1-wire, unshielded
Cable assembly	-	Wire end ferrule with plastic sheath	Wire end ferrule with plastic sheath	Ring cable lug
Shield connection	If available, attach on both sides			
Wire cross-section / mm^2 / AWG	4 mm^2 AWG 11	25 mm^2 AWG 3	50 mm^2 AWG 1/0	70 mm^2 AWG 1/0 max. 70 °C
Copper tab: Borehole for	-	-	-	M8
Tightening torque	-	Depends on used terminal type	Depends on used terminal type	23 Nm

Module	ALNV 30-S	ALNV 90-S	ALNV 180-S
Recommended cable type	3-wire, unshielded		1-wire, unshielded
Cable assembly	Wire end ferrule with plastic sheath		Ring cable lug
Shield connection			
Wire cross-section / mm^2 / AWG	10 mm^2 AWG 7	35 mm^2 AWG 2	95 mm^2 AWG 4/0
Copper tab: Borehole for	-	-	M8
Tightening torque	Depends on used terminal type		23 Nm

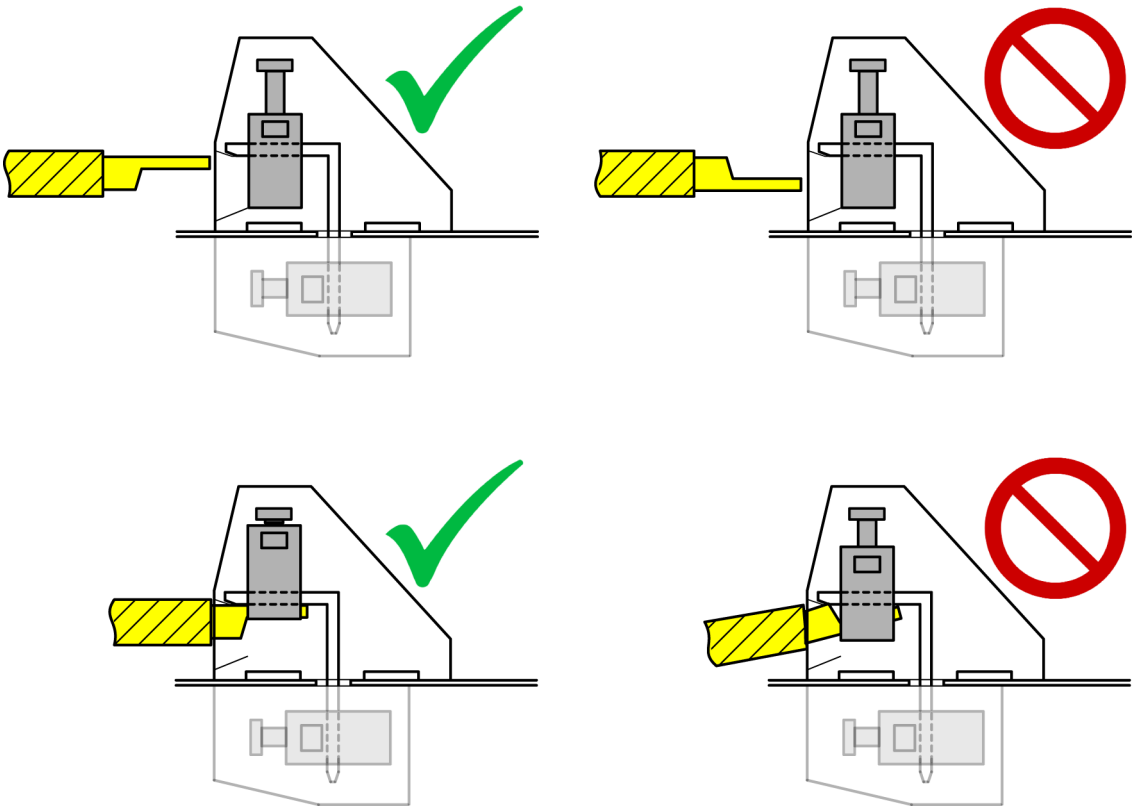
Note	
	When using pin cable lug: See 'Terminal connection technology' on page 20. The connection tabs of the upstream mains choke ALNV 150-SI and ALNV 180-S need to be secured by a cover against being touched.

5.3.4 Terminal connection technology

When using pin cable lugs please note!

Connection	Description	Device
[X01]	Mains Supply	ALNV 30-S / ALNV 45-SI-100 / ALNV 60-SI / ALNV 90-S
[X02]	Load Connection	ALNV 30-S / ALNV 45-SI-100 / ALNV 60-SI / ALNV 90-S

Based on example: HDFKV terminal



6 Operation

6.1 For Your safety

⚠ WARNING	
	**Risk of burns when touching hot surfaces!** The casing temperature, for example of the line filter, the choke or the brake resistor, can be more than 70 °C during and even after operation. Contact causes burns. **Steps to prevent:** • Make sure that the surfaces have cooled down before you touch. • Wear protective clothing such as gloves if hot parts need to be touched. • Fit a warning sign with warning hot surface. • Do not mount any flammable objects near the device.

Your opinion is important!

With our documentation we want to offer you the highest quality support in handling the AMK 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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Thank you for your assistance.
Your AMK documentation team

1. How would you rate the layout of our AMK 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:

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

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