



Instructions for use

COMBILINE E6

Installation HF Filter Back mount for F6 Housing 7

Translation of the original manual

Document 20344395 EN 02

Imprint

KEB Automation KG
Suedstraße 38, D-32683 Bartrup
Germany
Tel: +49 5263 401-0 • Fax: +49 5263 401-116
E-Mail: info@keb.de • URL: <https://www.keb-automation.com>

ma_dr_e6-hf-filter-geh7-20344395_en
Version 02 • Edition 10/04/2024

Table of Contents

1	Introduction	7
1.1	Markings.....	7
1.1.1	Warnings.....	7
1.1.2	Information notes	7
1.1.3	Symbols and markers	8
1.2	Laws and guidelines.....	8
1.3	Warranty and liability.....	8
1.4	Support.....	8
1.5	Copyright.....	9
1.6	Validity of this manual	9
1.7	Target group.....	9
2	General Safety Instructions.....	10
2.1	Installation	10
2.2	Electrical installation.....	10
2.3	Start-up and operation	11
3	Product description	12
3.1	Intendend use	12
3.2	Unintended use	12
3.3	Part code.....	12
3.4	Functional description	13
3.4.1	IT mains filter	13
4	Technical data	14
4.1	Operating conditions	14
4.1.1	Climatic ambient conditions	14
4.1.2	Mechanical ambient conditions.....	14
4.1.3	Chemical/mechanical active substances	14
4.1.4	Electrical operating conditions	15
4.2	Electrical data.....	15
4.2.1	NHF combinations	15
4.2.2	Fuse protection according to	15
4.2.3	Fuse protection according to UL Class J	16
4.2.4	Fuse protection according to UL type gR / aR.....	16
4.2.5	Interference suppression level.....	16
4.2.6	Insertion loss.....	17
5	Assembly	18
5.1	Assembly instructions	18
5.1.1	EMC notes on assembly.....	18
5.2	Mounting the filter/drive controller.....	19
5.3	Mounting direction.....	19
5.4	Minimum installation distances filter with drive controller.....	20
5.5	Assembly NHF combination.....	21
5.6	Dimensions and weights	22
5.7	Fixing material.....	22
6	Electrical connection	23

6.1	Connection instructions.....	23
6.2	Mains connection	23
6.3	Connection description.....	24
6.3.1	Ring crimp connector	24
6.3.2	Earth connection screw	24
7	Maintenance, service and disposal	25
7.1	Maintenance.....	25
7.2	Service	25
7.3	Disposal	26
8	Certification	27
8.1	EU Declaration of Conformity E4, E5, E6	28
8.2	UK Declaration of Conformity E4, E5, E6	30
8.3	UL certification	31
9	Annex	32
9.1	Measurement diagrams	32
9.2	Informative values for the use of RCDs	32
10	Revision history	33
	Glossary	34
	Index	36

List of Figures

Fig. 1	Schematic diagram HF mains filter for IT, TN and TT systems	13
Fig. 2	Insertion loss 27E6T60-1150	17
Fig. 3	Permitted mounting orientation	19
Fig. 4	Mounting distances	20
Fig. 5	Installation distance between HF filter and mains choke	21
Fig. 6	Dimensions 27E6T60-1150.....	22
Fig. 7	Connection 3ph choke filter drive controller	23
Fig. 8	Connection 27E6T60-1150	24
Fig. 9	27E6T60-1150 Interference voltage measurement C2	32

List of Tables

Tab. 1	Technical data.....	15
Tab. 2	NHF combinations.....	15
Tab. 3	Fuse protection according to IEC.....	15
Tab. 4	Fuse protection according to UL Class J	16
Tab. 5	Fuse protection according to UL type gR / aR	16
Tab. 6	Interference suppression level 27E6T60-1150	16
Tab. 7	Description ring crimp connector.....	24
Tab. 8	Description earth connection screw	24
Tab. 9	Informative values with RCD Doepke 4B NK	32
Tab. 10	Informative values with RCD Doepke 4B SK	32

1 Introduction

The described devices, accessories, hardware and/or software are products of KEB Automation KG. The enclosed documents correspond to conditions valid at printing. Misprint, mistakes and technical changes reserved.

1.1 Markings

1.1.1 Warnings

Certain operations can cause hazards during the installation, operation or thereafter. There is safety information in the documentation in front of these operations.

Warnings contain signal words for the severity of the hazard, the type and/or source of the hazard, the consequence of non-compliance and the measures to avoid or reduce the hazard.

 **DANGER**



Type and/or source of the hazard.

Leads to death or serious bodily injury if not observed.

- a) Measures to avoid the hazard.
- b) Can be supplemented by an additional danger sign or pictogram.

 **WARNING**



Type and/or source of the hazard.

May cause death or serious injury if not observed.

- a) Measures to avoid the hazard.
- b) Can be supplemented by an additional danger sign or pictogram.

 **CAUTION**



Type and/or source of the hazard.

May cause bodily injury if not observed.

- a) Measures to avoid the hazard.
- b) Can be supplemented by an additional danger sign or pictogram.

NOTICE



Type and/or source of the hazard.

Can cause damage to property if not observed.

- a) Measures to avoid the hazard.
- b) Can be supplemented by an additional danger sign or pictogram.

1.1.2 Information notes



Indicates to the user a special condition, prerequisite, scope or simplification.



This is a reference to further documentation. The barcode is for smartphones, the following link is for online users or for typing.

 <https://www.keb-automation.com/search>





Notes on conformity for use in the North American or Canadian market.

1.1.3 Symbols and markers

✓	Condition
a)	Action step
⇒	Result or intermediate result
(≡▶ Reference ▶ 8])	Reference to a chapter, table or picture with page reference
ru21	Parameter name or parameter index
(🌐▶)	Hyperlink
<Strg>	Control code
COMBIVERT	Lexicon entry

1.2 Laws and guidelines

KEB Automation KG confirms with the CE mark and the EU declaration of conformity that our device complies with the essential safety requirements.

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

1.3 Warranty and liability

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



Here you will find our general sales conditions.

(🌐▶ <https://www.keb-automation.com/terms-conditions>)



Further agreements or specifications require a written confirmation.

1.4 Support

Through multiple applications, not every possible case has been taken into account. If you require further information or if problems occur which are not treated detailed in the documentation, you can request the necessary information via the local KEB Automation KG agency.

The use of our units in the target products is beyond of our control and therefore exclusively the responsibility of the customer.

The information contained in the technical documentation, as well as any support provided verbally, written or through testing, is made to the best of our knowledge and information regarding intended use of KEB products. However, due to technical changes, any information provided is considered non-binding and is subject to change. This also applies to any violation of industrial property rights of a third-party.

Selection of KEB units in view of their suitability for the intended use must be done by the user.

Tests can only be carried out within the scope of 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.

1.5 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 Automation KG and remain valid in its entirety.

Other wordmarks and/or logos are trademarks (™) or registered trademarks (®) of their respective owners.

1.6 Validity of this manual

These instructions for use are valid for the units specified in the product description. It can be supplemented by corresponding options or special designs. It contains:

- Safety instructions to be observed
- Information on intended use
- Description of the device
- Technical Data
- Installation
- Connection
- Operation
- Maintenance, service and disposal

1.7 Target group

The instructions for use 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 IEC 60364.
- Knowledge of national safety regulations (e. g. DGUV Regulation 3).

2 General Safety Instructions

The products are developed and built according to the state of the art and recognized safety rules. Nevertheless, their use may create dangers to life and limb of the user or third parties or damage to the machine 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. Non-observance 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!

- a) Read the instructions for use.
- b) Observe the safety and warning instructions.
- c) Ask if something is unclear.

2.1 Installation

DANGER



Explosion hazard due to sparking!

- a) Do not operate the unit in a potentially explosive environment.

CAUTION



Design-related edges and heavy weight

Contusions and bruises

- a) Never stand under suspended loads.
- b) Wear safety shoes.
- c) Secure product accordingly when using lifting tools.

NOTICE

Malfunction due to heat accumulation

- a) The installation of liquid-cooled drive controllers with back mount braking resistors is not permitted on back mount filters.

2.2 Electrical installation

DANGER



Electrical voltage at terminals and in the device!

Danger to life due to electric shock !

- ✓ For any work on the device
 - a) Switch off the supply voltage.
 - b) Secure it against switching on.
 - c) Wait until all drives has been stopped in order that no regenerative energy can be generated.
 - d) Await capacitor discharge time (min. 5 minutes). Measure DC voltage at the terminals.
 - e) Never bridge upstream protective devices. Also not for test purposes.

2.3 Start-up and operation

⚠ CAUTION

High temperatures at the unit!**Burning of the skin**

- a) Cover hot surfaces safe-to-touch.
 - b) If necessary, attach warning signs on the system.
 - c) Before any working let the unit cool down.
 - d) Check the temperature before touching any parts.
-

3 Product description

The EMC filters of the product series **COMBILINE** serve to comply with normative limit values of high-frequency, conducted interference voltages at the mains input of the drive controllers.

The filters consist of an LC network that has a particularly high attenuation in the entire frequency range. This reduces the effective leakage current of the drive system.

Device type	HF filter
Series	COMBILINE E6
Design	Back mounted
Suitable for	COMBIVERT F6

The **COMBILINE E6** filters are characterised by the following features:

- Designed for interference suppression of individual devices.
- They can be used on TN, TT and IT systems.
- Wide rated voltage range.
- High saturation strength, designed for shielded motor cable lengths up to 100 m.
- Increasing the interference immunity of the drive controllers.
- Compact design of the drive system due to back mount filter.

3.1 Intendend use

The filters of the **COMBILINE** product series are only suitable for use in conjunction with drive converters. They are intended for installation in electrical systems or machines.

Technical data and information for connection conditions shall be taken from the type plate and from the instruction manual and must be strictly observed.

3.2 Unintended use

Operation of our products outside the limits specified in the technical data leads to the loss of any liability claims and specified approvals/acceptances.

3.3 Part code

1. and 2. digit	Device size
12...33	Input current 12...840 A
3. and 4. digit	Series
E6	COMBILINE E6
5.-7. digit	Version
T60	Complete filter including housing
8. digit	Design / voltage class
1	Back mount filter / 3-phase / 400 V
3	Side mount filter / 3-phase
4	4-conductor filter
5	NHF filter / 3-phase / 400 V
7	DC filter
9. digit	Limit class
0	C1

1	C2
2	C3
A	C2
B	C1
10. digit	Mains form
0	TN, TT
5	IT, TN, TT
11. digit	Version
0	Sequential numbering

3.4 Functional description

3.4.1 IT mains filter

3.4.1.1 Schematic diagram HF mains filter for IT, TN and TT systems

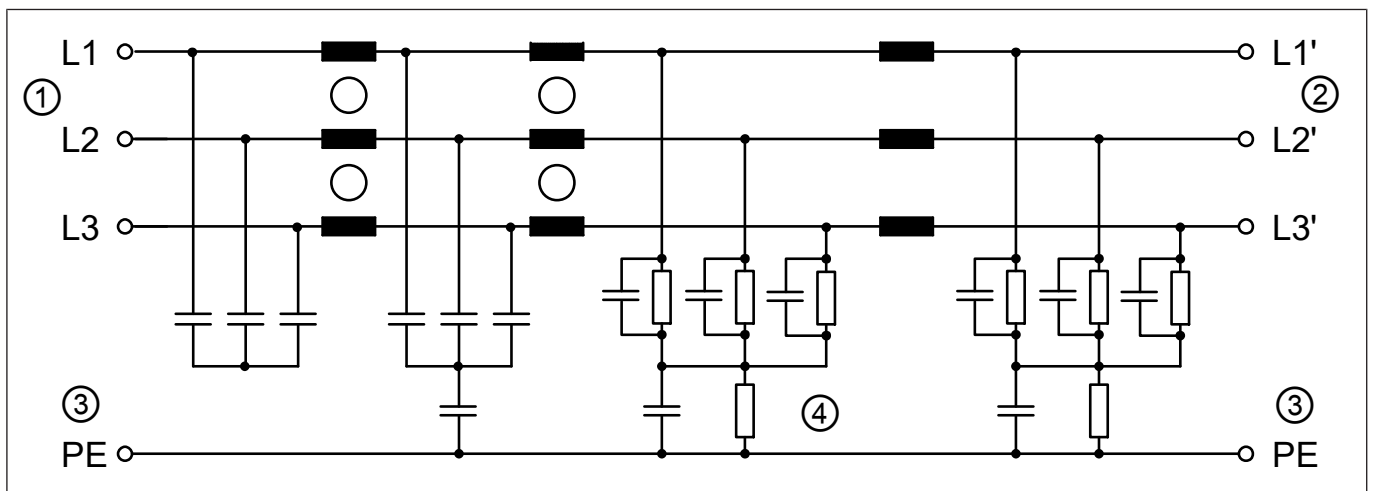


Fig. 1: Schematic diagram HF mains filter for IT, TN and TT systems

① Mains input (L1, L2, L3)

② Mains output (L1', L2', L3')

③ Protective earth (PE)

③ Protective earth (PE)

④ Insulation resistance to earth typ. 16 MΩ

3.4.1.2 Use at the IT system

The rated voltage between a phase conductor and the earth potential (or the star point in the IT system) must not exceed 300 V, USA UL: 480 / 277 V.

A short-term disconnection must be ensured when using an IT system.

4 Technical data

4.1 Operating conditions

4.1.1 Climatic ambient conditions

Storage	Standard	Class	Notes
Ambient temperature	EN 60721-3-1	1K4	-25...55 °C
Relative humidity	EN 60721-3-1	1K3	5...95 % (without condensation)
Storage height	-	-	Max. 3000 m above NHN
Transportation	Standard	Class	Notes
Ambient temperature	EN 60721-3-2	2K3	-25...70 °C
Relative humidity	EN 60721-3-2	2K3	95 % at 40 °C (without condensation)
Operation	Standard	Class	Notes
Ambient temperature	EN 60721-3-3	3K3	5...40 °C (extended to -10...45 °C)
Relative humidity	EN 60721-3-3	3K3	5...85 % (without condensation)
Site altitude	-	-	Max. 2000 m above NHN From 1000 m, a power reduction of 1 % per 100 m must be taken into account.

4.1.2 Mechanical ambient conditions

Storage	Standard	Class	Notes
Vibration limits	EN 60721-3-1	1M1	Vibration amplitude 0.3 mm (2...9 Hz) Acceleration amplitude 1 m/s ² (9...200 Hz)
Shock limit values	EN 60721-3-1	1M1	40 m/s ² ; 22 ms
Transportation	Standard	Class	Notes
Vibration limits	EN 60721-3-2	2M1	Vibration amplitude 3.5 mm (2...9 Hz) Acceleration amplitude 10 m/s ² (9...200 Hz)
Shock limit values	EN 60721-3-2	2M1	100 m/s ² ; 11 ms
Operation	Standard	Class	Notes
Vibration limits	EN 60721-3-3	3M4	Vibration amplitude 3.0 mm (2...9 Hz) Acceleration amplitude 10 m/s ² (9...200 Hz)
Vibration limits	EN 61800-5-1	-	Vibration amplitude 0.0075 mm (2...57 Hz) Acceleration amplitude 10 m/s ² (57...150 Hz)
Shock limit values	EN 60721-3-3	3M4	100 m/s ² ; 11 ms

4.1.3 Chemical/mechanical active substances

Storage	Standard	Class	Notes
Contamination gases	EN 60721-3-1	1C2	-
Contamination solids	EN 60721-3-1	1S2	-
Transportation	Standard	Class	Notes
Contamination gases	EN 60721-3-2	2C2	-
Contamination solids	EN 60721-3-2	2S2	-
Operation	Standard	Class	Notes
Contamination gases	EN 60721-3-3	3C2	-
Contamination solids	EN 60721-3-3	3S2	-

4.1.4 Electrical operating conditions

4.1.4.1 Device classification

Requirement	Standard	Class	Notes
Overvoltage category	EN 61800-5-1	III	-
Pollution degree	EN 60664-1	2	Non-conductive pollution, occasional condensation when PDS is out of operation.

4.2 Electrical data

	27E6T60-1150
Rated input voltage	400 V
Rated input voltage (UL)	480/277 V
Input voltage range	0...528 V
Peak input voltage	550 V für max. 1 min/h
Mains phases	3
Mains frequency	50/60 Hz ±2 Hz
Mains form	TN, TT, IT
Leakage current according to EN 60939-1: 2010 (Annex A9)	6,4 mA @ 400 V; 7,7 mA @ 480 V
Rated input current	315 A
Rated input current (UL)	269 A
Overload (60s)	150 %
Power dissipation	50 W
Construction and protection class	IP00
Suitable KEB housing size	F6 / 7

Tab. 1: Technical data

4.2.1 NHF combinations

NOTICE! If smaller chokes are used due to the design, the choke must be designed for the current.

HF filter	Mains choke xxZ1B04-1007		
	25	26	27
27E6T60-1150	x	x	x

Tab. 2: NHF combinations

4.2.2 Fuse protection according to

The following table shows the maximum fuse size of type gG with a 1:1 dimension and an input voltage of 400 V. In case of other dimension, the values are to be designed for the current and the SCCR rating of the downstream drive controller.

	SCCR 30kA	SCCR 100kA
27E6T60-1150	355 A	-

Tab. 3: Fuse protection according to IEC

4.2.3 Fuse protection according to UL Class J



The following table shows the maximum fuse size of type Class J with a 1:1 dimension and an input voltage of 480 V. In case of other dimension, the values are to be designed for the current and the SCCR rating of the downstream drive controller.

	SCCR 5kA	SCCR 10kA	SCCR 18kA
27E6T60-1150	-	-	350 A

Tab. 4: Fuse protection according to UL Class J

4.2.4 Fuse protection according to UL type gR / aR



The following table shows the maximum fuse size of type gR / aR with a 1:1 dimension and an input voltage of 480 V. In case of other dimension, the values are to be designed for the current and the SCCR rating of the downstream drive controller. The marks approved for UL are depending on the connected drive controller and are described there accordingly.

	SCCR 30kA	SCCR 100kA
27E6T60-1150	-	400 A

Tab. 5: Fuse protection according to UL type gR / aR

4.2.5 Interference suppression level

To comply with the required limit class the specified motor cable length must not be exceeded, depending on the switching frequency.

Filters	27E6T60-1150		
Interference voltage (limit class EN 61800-3)	C2		
Rated switching frequency	2 kHz	4 kHz	8 kHz
Maximum motor cable length (low capacitance)	100 m	50 m	30 m

Tab. 6: Interference suppression level 27E6T60-1150

4.2.6 Insertion loss

Measurement results of insertion loss in accordance with EN 55017.

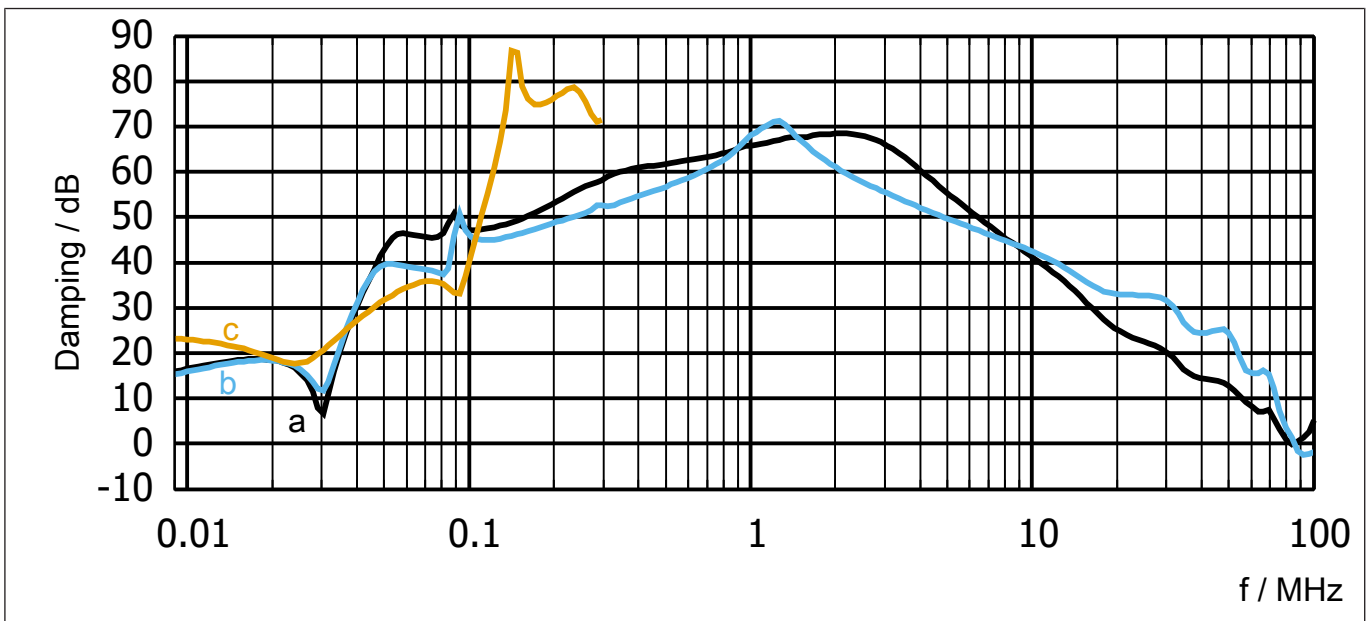


Fig. 2: Insertion loss 27E6T60-1150

a Asymmetrical insertion loss (common mode)

b Unsymmetrical insertion loss (differential mode)

c Symmetrical insertion loss (0.1Ω/100Ω system)

5 Assembly

5.1 Assembly instructions

⚠ WARNING



Holding lugs designed for own weight only!

- ✓ Too much weight can cause the lugs to tear out
- a) Only transport filters on their own using the holding lugs.

To prevent damage to the product, the following instructions must be observed:

- Make sure that no components are bent and/or insulation distances are changed.
- In case of mechanical defects, the product must not be put into operation. Compliance with applied standards is no longer guaranteed.
- No moisture or mist may penetrate the product.
- The penetration of dust must be avoided. When installing in a dust-tight housing, ensure sufficient heat dissipation.
- (⇒ ► [Minimum installation distances filter with drive controller \[► 20\]](#)) to surrounding elements.
- Do not cover ventilation openings.
- Install the product in accordance with the specified construction and protection degree.
- Make sure that no small parts (drilling chips, screws, etc.) fall into the product during assembly and wiring. This also applies to mechanical components, which can lose small parts during operation.

During assembly [Mechanische Umweltbedingungen](#) are only observed under the following conditions:

- Use fixing material with the described quality.
- Observe tightening torques

see also

- 📖 Mechanical ambient conditions [► 14]

5.1.1 EMC notes on assembly

90% of the interferences caused by EMC can be prevented by the following measures:

- a) The contact surface of the filter on the mounting plate must be electrically conductive.
 - b) The contact surface between the drive controller and the filter must be free of impurities in order to have a low-resistance, large-area transition here as well.
 - c) Use the optionally available shield connection bracket.
 - d) The motor shield must be placed over a large area on the shield connection bracket of the drive controller.
- ⇒ Electromagnetic interference can now be dissipated over a large area via the mass.



Electromagnetic compatibility:

(🌐 ► https://www.keb.de/fileadmin/media/Techinfo/dr/tn/ti_dr_tn-emc-00011_en.pdf)



5.2 Mounting the filter/drive controller

- Prepare drill holes
- Screw the filter onto the mounting plate.
- Tighten the screws to the specified torque.
- Connect the filter on the mains side (as it is more accessible).
- Screw in the fastening screws for the drive controller until the drive controller can be hooked in.
- Hook in the drive controller.
- Tighten the screws to the specified torque.
- Connect the output cable to the drive controller.

5.3 Mounting direction

NOTICE! Malfunctions due to heat accumulation with incorrect mounting direction

- a) Mount the device only in the permitted mounting orientation.

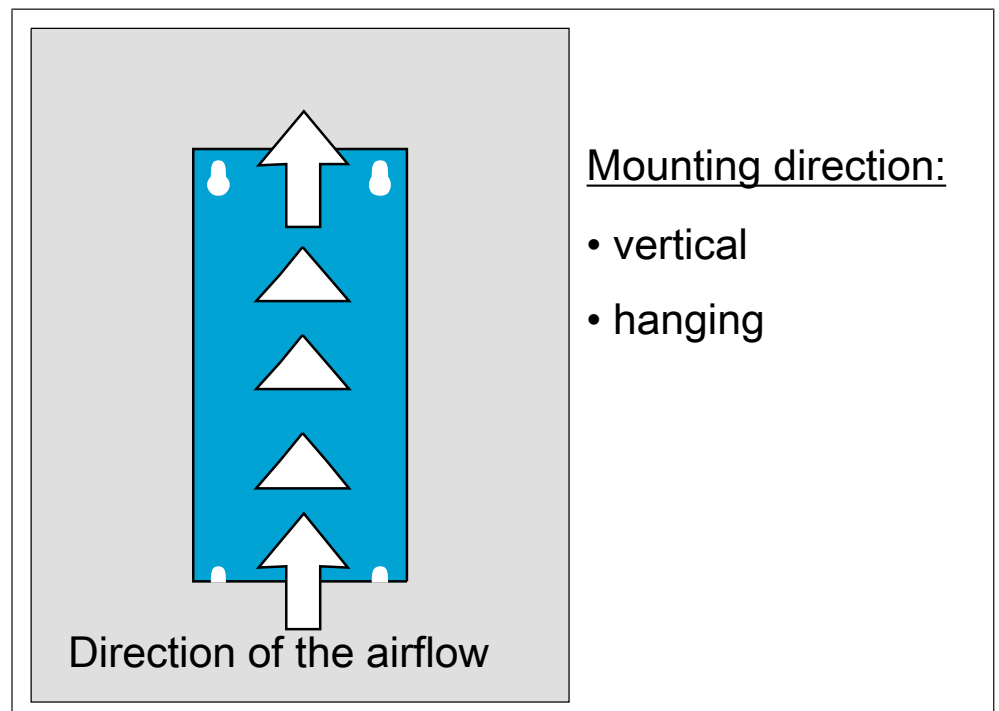


Fig. 3: Permitted mounting orientation

5.4 Minimum installation distances filter with drive controller

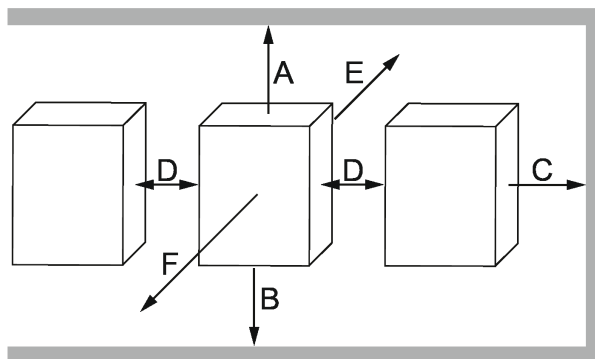


Fig. 4: Mounting distances

Dimension	Distance	
A	150 mm	6 inch
B	100 mm	4 inch
C	30 mm	1.2 inch
D	0 mm	0 inch
E	0 mm	0 inch
F ¹⁾	50 mm	2 inch
1) Distance between front of drive unit and control cabinet door.		

Distances for combination of HF filter and choke see (⇒ [Assembly NHF combination](#) ▶ 21).

5.5 Assembly NHF combination

When HF filter and mains choke are connected together to form an NHF combination.

- Installation of the mains choke above the filter.
- Distance 150 mm (see drawing)

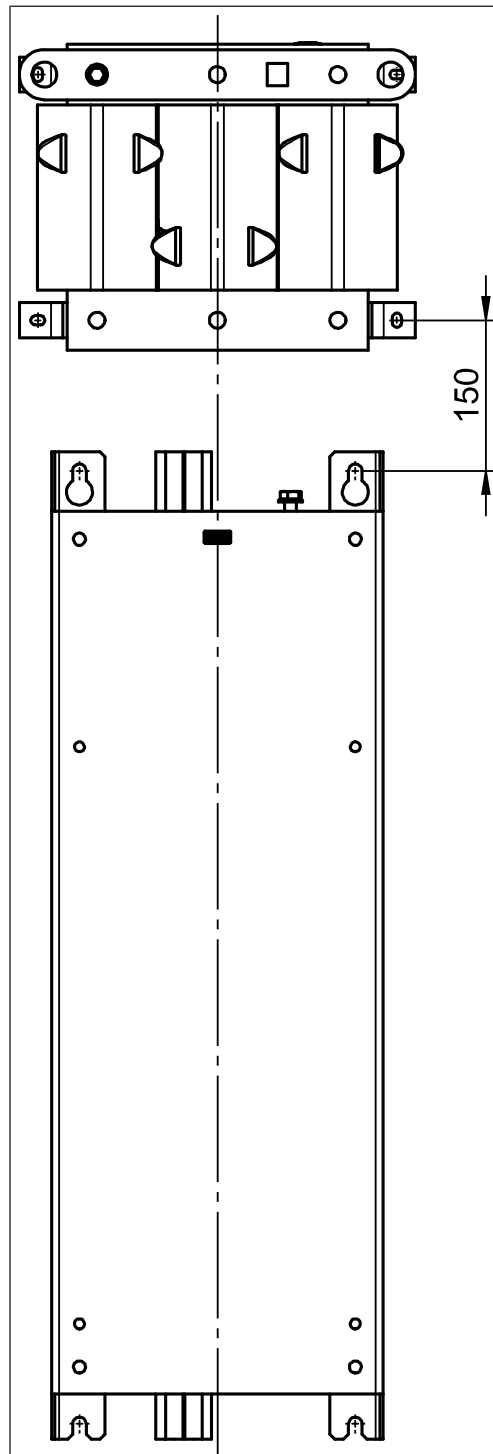


Fig. 5: Installation distance between HF filter and mains choke

5.6 Dimensions and weights

Unless otherwise indicated, all length specifications in the following chapter are in mm.

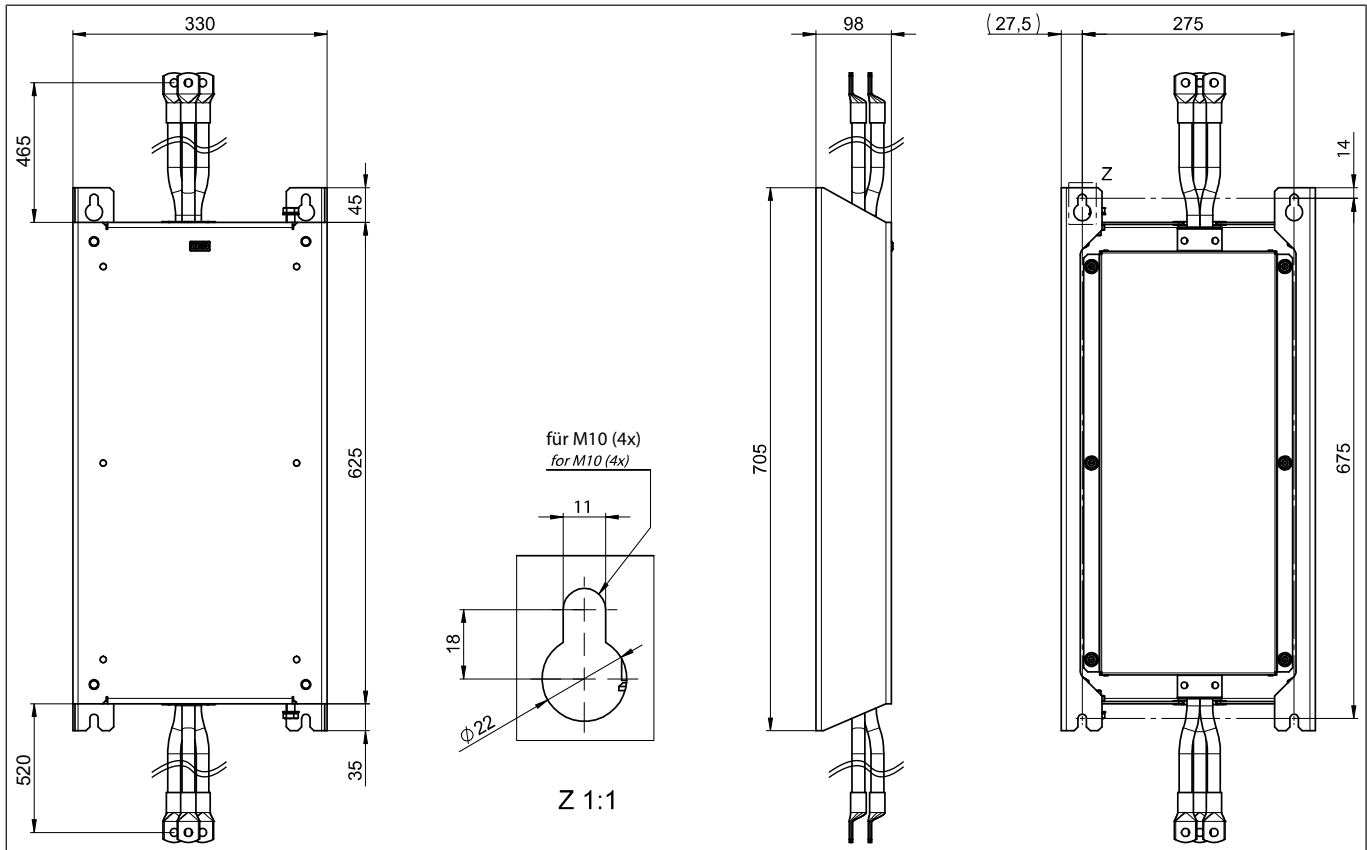


Fig. 6: Dimensions 27E6T60-1150

Material number	Weight
27E6T60-1150	28.2 kg

5.7 Fixing material

Filters	Quantity	Fixing material	Tightening torque	Suitable for
27E6T60-1150	4 pcs	Hexagon head screw ISO 4017 M10 - 8.8 Washer ISO 7090-10-200 HV	50 Nm 440 lbin	Filter on switch cab- inet
	4 pcs (included in delivery)	Hexagonal Locking Tooth Screw M10x20 - 8.8 Washer ISO 7090-10-200 HV	50 Nm 440 lbin	COMBIVERT F6 housing 7 on filter

6 Electrical connection

6.1 Connection instructions

The electrical installation shall be carried out in accordance with the relevant requirements.

With existing or newly wired circuits the person installing the units or machines must ensure the EN requirements are met.

To prevent malfunctions during operation, please pay attention to the following instructions:

- 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.
- Only use accessories approved for the product.
- The cables between the filter and the drive controller and between the choke and the filter must not be extended.
- The protective earth (PE) of the drive controller cannot/must not be done via the filter. The protective earth must be connected separately directly to the drive controller.



The assembly kits for connection listed below must be used for conformity with UL.

Part number	Locking screw with nut	Quantity	Tightening torque
00E6V80-0002	M10 x 25	6	23 Nm / 203 lbin

After connection:

- Check all device connections for tight fit to avoid contact resistances and sparking.
- Replace all required covers.

6.2 Mains connection

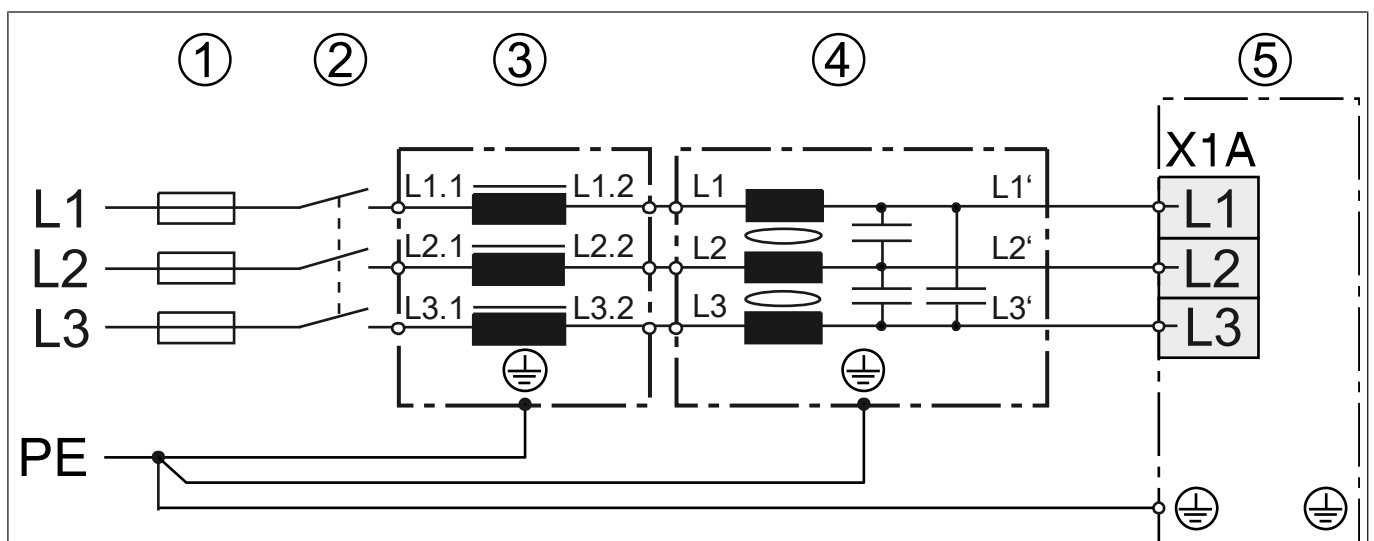


Fig. 7: Connection 3ph choke filter drive controller

1 Mains fuses	2 Mains contactor
3 Mains choke	
4 HF filter	5 Drive controller

6.3 Connection description

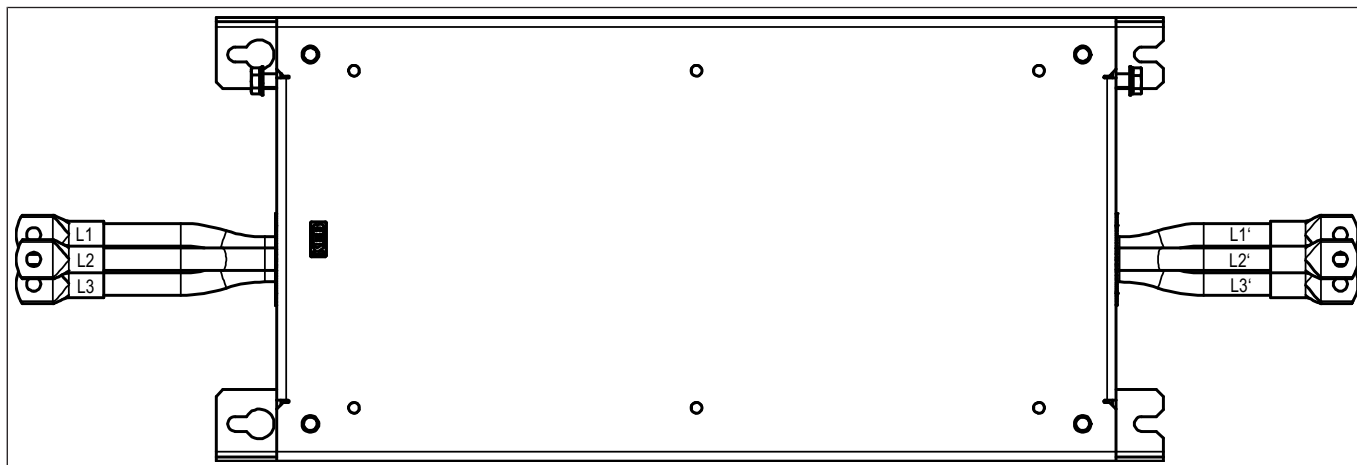


Fig. 8: Connection 27E6T60-1150

Filter	Function	Name	Reference
27E6T60-1150	Mains input	L1, L2, L3	(⇒▶ 0090809-1038 [▶ 24])
	Drive controller	L1', L2', L3'	(⇒▶ 0090809-1038 [▶ 24])
	Protective earth	PE	(⇒▶ 9927006-130Z [▶ 24])

NOTICE! Secure the cables between the filter and the drive controller with a cable tie so that they do not press against the cover of the adjacent terminals.

6.3.1 Ring crimp connector

If crimp connectors of different sizes are screwed together, a washer that is at least the size of the crimp connector lug must be used on the larger crimp connector in order to ensure surface pressure.

	Bor hole
0090809-1038	M10

Tab. 7: Description ring crimp connector

6.3.2 Earth connection screw

	9927006-130Z
Thread	M10
Max. terminal tightening torque Nm	35 Nm
Max. terminal tightening torque lbin	310 lbin

Tab. 8: Description earth connection screw

7 Maintenance, service and disposal

DANGER



Electrical voltage at terminals and in the device!

Danger to life due to electric shock !

- ✓ For any work on the device
 - a) Switch off the supply voltage.
 - b) Secure it against switching on.
 - c) Wait until all drives has been stopped in order that no regenerative energy can be generated.
 - d) Await capacitor discharge time (min. 5 minutes). Measure DC voltage at the terminals.
 - e) Never bridge upstream protective devices. Also not for test purposes.

7.1 Maintenance

The following maintenance work must be carried out as required, but at least once a year, by authorised and instructed personnel.

- Check the system for loose screws and plugs and tighten if necessary.
- Remove dirt and dust deposits from the devices.
- Checking or cleaning ventilation inlets and outlets. Pay particular attention to cooling fins and protective grilles of fans (if available).
- Check or clean the exhaust air filter and the supply air filter of the control cabinet.
- If available, check the function of the fans of the device. If there are audible vibrations or squeaking, replace the fans.

7.2 Service

In case of malfunction, unusual noises or smells inform a person in charge!

In case of failure, please contact the machine manufacturer. He can supply an appropriate original unit or an approved successor item or arrange for maintenance.

CAUTION

Unauthorized exchange, repair and modifications

Malfunctions and failures of connected devices or the machine

- a) When replacing, only replace with original filter.
- b) Carefully replace the shielding in particular.

Technical support and repairs

KEB offers wide-ranging, complete after-sales technical support. The staff who deal with this handle questions on the entire range of products skilfully, quickly, and efficiently.

You can phone our staff in the service department, and they will give you complete, prompt advice on how to resolve your problems.

Telephone: +49 (0) 5263 401-0

Fax: +49 (0) 5263 401-116

E-Mail:  combicontrol@keb.de

E-Mail:  service@keb.de

7.3 Disposal

Electronic devices of KEB Automation KG are intended for professional, commercial processing (so-called B2B devices).

Manufacturers of B2B devices are obliged to take back and recycle devices manufactured after 14.08.2018. In principle, these devices may not be left at public or communal recycling or collection points.



Unless otherwise agreed between the customer and KEB or unless there is a deviating mandatory legal regulation, KEB products labelled in this way can be returned. Company and keyword for the return point can be found in the list below.

Shipping costs are at the expense of the customer. The devices are then professionally recycled and disposed of.



The entry numbers are listed country-specifically in the following table. KEB addresses can be found on our website.

Withdrawal by	WEEE registration no.	Keyword
Germany		
KEB Automation KG	EAR: DE12653519	Keyword: "Withdrawal WEEE"
France		
RÉCYLUM – Recycle point	ADEME: FR021806	Mots clés "KEB DEEE"
Italy		
COBAT	AEE: (IT) 19030000011216	Parola chiave "Ritiro RAEE"
Austria		
KEB Automation GmbH	ERA: 51976	Keyword: "Withdrawal WEEE"
Spain		
KEB Automation KG	RII-AEE: 7427	Palabra clave "Retirada RAEE"
Czech republic		
KEB Automation KG	RETELA: 09281/20-ECZ	Klíčové slovo "Zpětný odběr OEEZ"
Slovakia		
KEB Automation KG	ASEKOL: RV22EEZ0000421	Kľúčové slovo: "Spätňý odber OEEZ"

The packaging must be sent for paper and cardboard recycling.

8 Certification

see also

-  EU Declaration of Conformity E4, E5, E6 [▶ 28]
-  UK Declaration of Conformity E4, E5, E6 [▶ 30]

8.1 EU Declaration of Conformity E4, E5, E6

EU DECLARATION OF CONFORMITY



Document No. / month.year: ce_dr_rns-e4-e5-e6-j_en.docx / 11.2022

Manufacturer: KEB Automation KG
Südstraße 38
32683 BARNTRUP
Germany

Product type: EMC - Filter - series yy**E4 or E5 or E6**xxx - xxxx
size yy = 03 bis 32
x = any number or letter for different versions
Voltage category 230 / 400 / 690 V ac

This declaration of conformity is issued under the sole responsibility of KEB Automation KG.

The above given product is in accordance with the following directives of the European Union

Number: **Low voltage : 2014 / 35 / EU**
Text: Directive on the approximation of the laws of the Member States relating to all electrical equipment that has a voltage rating between 50V and 1000V AC or 75V and 1500V DC.

Number: **Hazardous Substances: 2011 / 65 / EEC (incl. 2015 / 863 / EU)**
Text: Directive on the approximation of the laws of the Member States relating on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Responsible: KEB Automation KG
Südstraße 38
32683 BARNTRUP

Place, date Bartrup, 23. November 2022

Issued by:

i. A. W. Hovestadt / Conformance Officer

W. Wiele / Technical Manager

This declaration certifies the conformity with the named directives, but does not contain any assurance of quality.

The safety instructions, described in the instruction manual are to be followed.

EU DECLARATION OF CONFORMITY



ANNEX

Document-Nr. / Month.year: ce_dr_rns-e4-e5-e6-j_en.docx / 11.2022

Product type: EMC - Filter - series yy**E4 or E5 or E6**xxx - xxxx
 size yy = 03 bis 32
 x = any number or letter for different versions
 Voltage category 230 / 400 / 690 V ac

The conformity of the above given product to the

European Directive 2014/35/EU (for electrical equipment designed for use within certain voltage limits) is given by complete approval / testing to the following European harmonized standards:

EN - standard

EN 61800-5-1: 2017 Adjustable speed electrical power drive systems – part 5-1: Safety requirements - Electrical, thermal and energy

Informative:

EN 60939 – 1: 2010 Passive filter units for electromagnetic interference suppression – Part 1: Generic specification

EN 60939 – 2: 2005 Passive filter units for electromagnetic interference suppression – Part 1: Sectional specification: Passive filter units for which safety tests are appropriate - Test methods and general requirements

EN 60938 – 1: 2007 + A1 Fixed inductors for electromagnetic interference suppression – Part 1: Generic specification

EN 60938 – 2: 2007 + A1 Fixed inductors for electromagnetic interference suppression – Part 2: Sectional specification

European Directive 2011/65/EU with changes of 2015/863/EU (for restrictions of the use for certain hazardous substances in electrical and electronic equipment) is given by qualification of components and manufacturing process within the ISO 9001 QM system. The necessary information and declarations are documented and memorized.

EN 63000: 2018 Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

The above given product was developed, manufactured and tested within an internal quality management system. This ISO 9001 QM system was approved by:

Notified body: TÜV - CERT
 Adress: Zertifizierungsstelle des RWTÜV
 Steubenstrasse 53
 D - 45138 Essen

No. of approval 041 004 500
 Dated: 20.10.1994
 Valid until: December 2024

8.2 UK Declaration of Conformity E4, E5, E6



Supplier's UKCA declaration of conformity	in accordance with EN ISO/IEC 17050-1
DoC number:	ce_dr_uk-rns-e4-e6-a_en.xlsx
Manufacturer's name and address:	KEB Automation KG Südstrasse 38, D 32683 Barntrup, Germany
Authorised representative name and address:	KEB(UK) Ltd 5 Morris Cl, Park Farm Industrial Estate, Wellingborough NN8 6XF, UK
Declares under sole responsibility that the product as originally delivered	
Product Name:	KEB Combivert (Accessories EMC-Filters)
Model Number:	yyE4xxx-xxxx, yyE5xxx-xxxx, yyE6xxx-xxxx with yy=05 to 32 and x = 0...9 or A...Z
voltage category	230 / 400V
complies with the following statutory requirements and carries the UKCA marking accordingly:	and are conform with the following designated standards:
Electrical Equipment (Safety) Regulations 2016 No.1101 [as amended]	EN 61800-5-1-: 2007 + A1: 2017 EN 61800 - 5 - 1: 2017
Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 No.3032 [as amended]	EN IEC 63000: 2018
Barntrup, 18 th July 2022 Signed for and on behalf of: <i>W. Hovestadt</i>	 <i>W. Wiele</i>
i.A. W. Hovestadt / Conformance Officer	W. Wiele / Technical Manager

8.3 UL certification



An acceptance according to UL is marked on the nameplate by the adjacent logo.

To be conform according to UL for use on the North American and Canadian Market the following additionally instructions must be observed (original text of the UL-File):

- Only for use in WYE 480V/277V supply sources.
- Identification for which Inverters (Cat. Nos.) the Filters are intended for, according to (⇒► [technical data](#) [► 15]).
- Use 75°C Copper Conductors Only
- Use in a (⇒► [Pollution Degree 2 environment](#) [► 15])
- Use the (⇒► [assembly kits](#) [► 23]) for connecting

WARNING – The opening of the branch circuit protective device may be an indication that a fault current has been interrupted. To reduce the risk of fire or electrical shock, current-carrying parts and other components of the controller should be examined and replaced if damaged.

AVERTISSEMENT – LE DÉCLENCHEMENT DU DISPOSITIF DE PROTECTION DU CIRCUIT DE DÉRIVATION PEUT ÊTRE DÛ 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.

9 Annex

9.1 Measurement diagrams

Interference voltage measurement limit value C2 according to EN 61800-3.

Specifications:

Motor cable length	50 m
Output frequency	5 Hz
Switching frequency	4 kHz

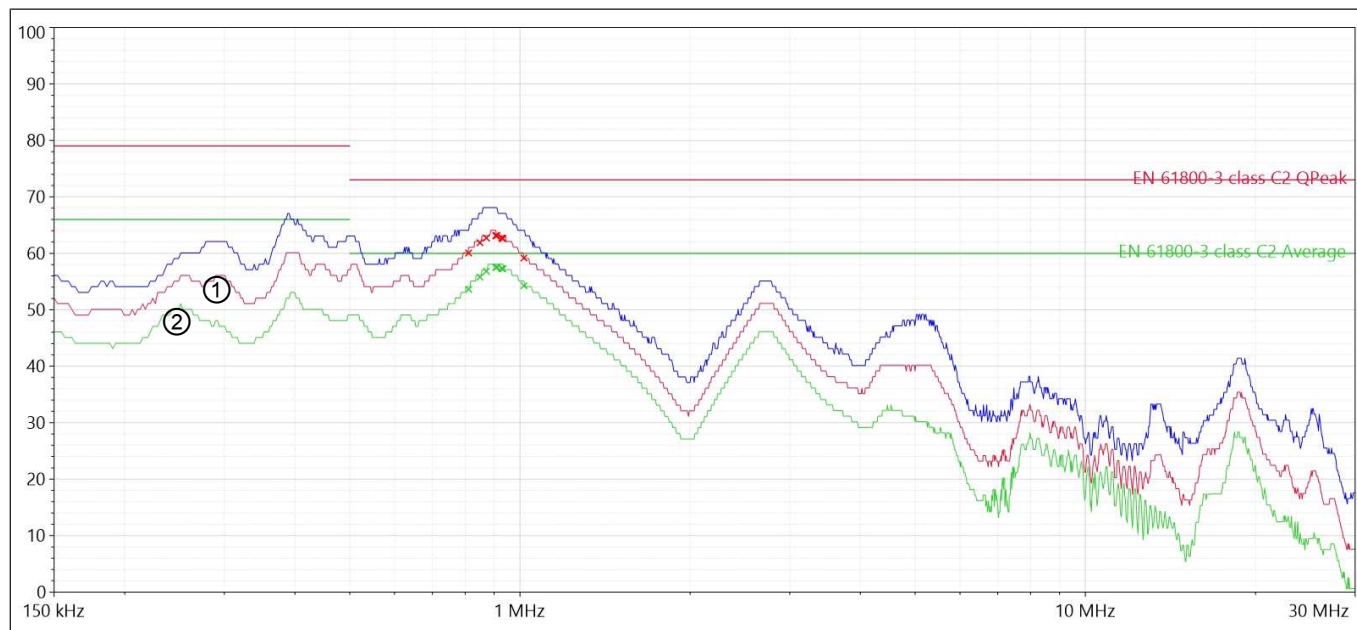


Fig. 9: 27E6T60-1150 Interference voltage measurement C2

1 QPeak

2 Average

9.2 Informative values for the use of RCDs

Filter	Switching frequency drive controller	RCD Doepke DFS 4B NK			
		30 mA	100 mA	300 mA	500 mA
Tripping current					
27E6T60-1150	4 kHz	100 %	99 %	99 %	-

Tab. 9: Informative values with RCD Doepke 4B NK

Filter	Switching frequency drive controller	RCD Doepke DFS 4B SK			
		30 mA	100 mA	300 mA	500 mA
Tripping current					
27E6T60-1150	2 kHz	30 %	15 %	15 %	15 %

Tab. 10: Informative values with RCD Doepke 4B SK

10 Revision history

Edition	Version	Note
2023-05	00	Series version
2024-01	01	Voltage specification changed to 480/277V.
2024-04	02	Assembly kits for connection added. Connection cable length corrected.

Glossary

Application

The application is the intended use of the KEB product.

Back mount filter

Sub-mounted filters are mounted behind the drive converter. The fixing points are arranged so that the associated drive converters can be screwed on directly.

COMBILINE

COMBILINE designates the product line of filter technology at KEB.

COMBIVERT

Proper name for a KEB Drive Controller.

Customer

The customer has purchased a product from KEB and integrates the KEB product into his product (customer product) or resells the KEB product (reseller).

EN 55017

Methods of measurement of the suppression characteristics of passive EMC filtering devices (CISPR 17:2011); German version EN 55017:2011

EN 60664-1

Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests.

EN 60721-3-1

Classification of environmental conditions - Part 3-1: Classification of groups of environmental parameters and their severities - Main section: Long-term storage (IEC 60721-3-1)

EN 60721-3-2

Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities Main section 2: Transportation and Handling (IEC 60721-3-2)

EN 60721-3-3

Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities Main section 3: Stationary use at weatherprotected locations (IEC 60721-3-3)

EN 61800-3

Adjustable speed electrical power drive systems. Part 3: EMC requirements and specific test methods (VDE 0160-103, IEC 61800-3)

EN 61800-5-1

Adjustable speed electrical power drive systems. Part 5-1: Safety requirements - Electrical, thermal and energy requirements (VDE 0160-105-1, IEC 61800-5-1)

Fuse Class J

Class J fuses have UL approval for use in branch circuit protection and in the feeder circuit.

Fuse type aR

Partial range fuse: short-circuit protection for semiconductor devices (ultrafast). Overload protection must be realised otherwise.

Fuse type gG

Full-range fuse: Standard type general application, mainly used for cable and line protection (medium-blow).

Fuse type gR

Full range fuse for semiconductor devices (ultrafast).

NHN

Standard altitude zero; related to the established height definition in Germany (DHHN2016). The international data usually deviate from this by only a few cm to dm, so that the value is given can be taken from the regionally applicable definition.

PDS

Power drive system incl. motor and measuring probe

RCD

Residual current circuit breaker; formerly also FI circuit breaker

SCCR

The Short Circuit Current Rating indicates the maximum short circuit current that the device can withstand.

Index

I

Insertion loss	17
----------------	----

L

Limit class	16
-------------	----

M

Maintenance work	25
Motor cable length	16
Mounting orientation	19

N

NHF-Kombination	21
-----------------	----

P

Packaging	26
Product features	12
Protective earth	23

R

Return point	26
--------------	----

S

Sicherung	
IEC	15
UL Class J	16
UL Type gR/aR	16

T

Technical data	15
----------------	----

U

UL	31
----	----

W

Weight	22
--------	----



MORE KEB PARTNERS WORLDWIDE:
www.keb-automation.com/contact





Automation with Drive

www.keb-automation.com

KEB Automation KG • Suedstraße 38 • D-32683 Barntrup • Tel: +49 5263 401-0 • E-Mail: info@keb.de