

Instruction handbook

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be in motion **be in motion**

The logo for BAUMÜLLER features a red Greek letter Omega (Ω) above the brand name "BAUMÜLLER" in a bold, black, sans-serif font. The logo is centered on a horizontal line of vertical bars of varying heights, resembling a barcode or a technical drawing element.

Mains filters
BFN - 3 - 1 - ...

Filters for
mains applications

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Read the Instruction handbook before starting!

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1

GENERAL INFORMATION

1.1 Information on this Handbook

This Handbook provides important information on handling the device. A prerequisite for safe work is compliance with all specified safety notes and procedural instructions.

Additionally, the valid accident prevention regulations and general safety regulations applicable to the scope of application the device must be complied with.

Read this Handbook, particularly the safety notes chapter, completely before beginning any work on the device. This Instruction handbook is part of the product and must be kept accessible to personnel at all times in the immediate vicinity of the device.

1.2 Key to symbols

Warning notes

Warning notes are identified as symbols in this Handbook. The notes are introduced by signal words that express the extent of the danger.

It is imperative that these notes be complied with and are conscientiously regarded in order to prevent accidents, personal injury and material damage.



DANGER!

...points out an immediately dangerous situation that will lead to severe injuries or death if not avoided.



WARNING!

...points out a potentially dangerous situation that could lead to severe injuries or death if not avoided.



ATTENTION!

...points out a potentially dangerous situation that could lead to minor or slight injuries if not avoided.



NOTICE!

...points out a potentially dangerous situation that could lead to material damage if not avoided.

Recommendations



NOTE!

...highlights useful tips and recommendations, as well as information for efficient and problem-free use.

1.3 Limitation of liability

All specifications and notes in these Instruction Handbook were compiled taking into account the applicable standards and regulations, the State of the Art and our knowledge and experience of many years.

The manufacturer assumes no liability for damages due to:

- Noncompliance with the Instruction Handbook
- Usage for other than the intended purpose
- Usage by untrained personnel

The actual scope of delivery can vary in case of optional equipment, laying claim to additional order options, or on account of the latest technical changes to the explanations and representations described herein.

The user bears the responsibility for performing service and initial operation in accordance with the safety regulations of the applicable standards and all other relevant governmental or local regulations concerning the dimensioning and protection of conductors, grounding, disconnectors, overcurrent protection, etc.

The person who carried out the mounting or installation is liable for any damage incurred when assembling or connecting the device.

1.4 Copyright protection

The Instruction Handbook must be treated confidentially. It is to be used exclusively by personnel who work with the device. The consignment of the operating instructions to third persons without the written permission of the manufacturer is prohibited.

**NOTE!**

The specific contents, text, drawings, images and other representations are copyrighted and subject to industrial property rights. Any prohibited usage is punishable by law.

1.5 Other applicable documents

Components of other manufacturers are integrated into the device. For these purchased parts a risk analysis has been performed by the respective manufacturers. The compliance of the design construction with the applicable European and national regulations has been declared for the components by the respective manufacturers.

1.6 Spare parts



WARNING!

False or flawed spare parts can lead to damage, malfunction or complete failure, thus endangering safety.

Therefore:

- Only use original spare parts of the manufacturer.

Procure spare parts through an authorized dealer or directly from the manufacturer.

See also [▶Spare Parts and Part Numbers◀](#) on page 59.

1.7 Disposal

Insofar as no take-back or disposal agreement has been made, please disassemble units correctly and properly recycle the constituent parts.

See [▶Disposal◀](#) on page 63.

1.8 Guarantee provisions

The guarantee provisions are stated in a separate document of the sales documents.

The devices described herein may only be operated in accordance with the stipulated methods, procedures and conditions. Anything else not presented here, including the operation of devices in mounted positions, is not permitted and must be cleared with the plant on a case-by-case basis. If the devices are operated in any other manner than as described within these Instruction Handbook, then all guarantee and warranty rights are rendered null and void.

1.9 Customer service

Our customer service is available to provide you with technical information.

Info on the responsible contact persons is available at all times via telephone, fax, e-mail or the internet.

1.10 Used terms

The terms „Device“ or „**BFN**“ are used for the Baumüller product „Mains filters“.

2

SAFETY

This section provides an overview of all of the important safety aspects for optimum protection of personnel as well as for the safe and problem-free operation.

2.1 Contents of Instruction handbook

Each person who is tasked with performing work on or with the device must have read and understood the operating instructions before working with the device. This also applies if the person involved with this kind of device or a similar one, or has been trained by the manufacturer.

2.2 Changes and modifications to the device

In order to prevent hazards and to ensure optimum performance, no changes, additions or modifications may be undertaken on the device that have not been explicitly approved by the manufacturer.

2.3 Proper usage

A device of the series **BFN** limits the electrical interferences of the Baumüller converter in the power supply.



WARNING!

Danger by Inappropriate Use!

Any use that goes beyond the intended purpose and/or any non-compliant use of the device can cause dangerous situations.

Therefore:

- Observe all specifications of the Instruction Handbook.
- When configuring, ensure that the device is always operated within its specifications.
- The device may only be operated in a technically flawless condition.

2.4 Responsibility of the operator

The device will be used in commercial areas. Thus, the proprietor of the device is subject to the legal work safety regulations.

Along with the notes on work safety in these operating instructions, the safety, accident prevention and environmental protection regulations valid for the area of application of this device must be complied with. Whereby:

- The proprietor must inform himself about the applicable work health and safety regulations and ascertain, in a risk analysis, any additional hazards that could arise from the special working conditions in the use area of the device. These must then be implemented in the form of operating instruction for operation of the device.
- These operating instructions must be kept accessible to personnel working with the device at all times in the immediate vicinity of the device.
- The specifications of the operating instructions must be adhered to completely and without exception!
- The device may only be operated in a technically faultless and operationally safe condition

2.5 Personnel training



WARNING!

Risk of injury due to insufficient qualifications!

Improper handling can lead to significant personal injury and material damage.

Therefore:

- Certain activities can only be performed by the persons stated in the respective chapters of these Instruction Handbook.

In this Instruction Handbook the following qualifications are stipulated for various areas of activity:

Operating personnel

- The drive system may only be operated by persons who have been specially trained, familiarized and authorized.
- Troubleshooting, maintenance, cleaning, maintenance and replacement may only be performed by trained or familiarized personnel. These persons must be familiar with the operating instructions and act accordingly.
- Commissioning and training may only be performed by qualified personnel.

Qualified personnel

- Electrical engineers authorized by Baumüller Nürnberg GmbH, and qualified electricians of the customer or a third party who have learned to install and maintain Baumüller drive systems and are authorized to ground and identify electrical power circuits and devices in accordance with the safety engineering standards of the company.
- Qualified personnel have had occupational training or instruction in accordance with the respective locally applicable safety engineering standards for the upkeep and use of appropriate safety equipment.

2.6 Personal protective equipment

The wearing of personal protective equipment is required when working in order to minimize health and safety risks.

- The protective equipment necessary for each respective type of work shall always be worn during work.
- The personal safety signs presented in each working area must be observed!



Protective work clothing

must be snug-fitting work clothes, with low tearing resistance, narrow sleeves and with no extending parts. Wear hair net.

No rings or necklaces.



Hard hat

Protects against objects falling down and flying around objects.



Safety shoes

Protects against heavy objects falling down.



Protective gloves

Protects hands against friction, abrasion, puncturing or more severe injuries, as well as contact with hot objects.

Wear for special work.



Protection eye wear

Protect the eyes against flying around objects and splashing liquids.

2.7 Special hazards

In the following section, the remaining marginal risks will be stated that have been identified as a result of the risk analysis.

Observe the safety notes listed here and the warning notes in the further chapters of this manual to reduce health risks and dangerous situations.

Electrical current



DANGER!

Risk of fatal injury from electrical current!

There is an immediate risk of fatal injury if live electrical parts are contacted. Damage to the insulation or individual components can be life-threatening.

Therefore:

- Switch off the power supply immediately in case of damage to the power supply insulation.
- Only allow work on the electrical system to be performed by qualified personnel.
- Switch off the current when any kind of work is being performed on the electrical system and ensure safety before switching on again.
- The device must be operated in a control cabinet. The control cabinet must protect against direct contact. It must conform to the EN 61800-5-1, chapter 4.2.3.3.

Danger from residual energy



DANGER!

Risk of fatal injury from electrical current!

Stored electric charge.

Discharge time of the drive system = discharge time of the device with the longest DC-link discharging time.

Therefore:

- Consider discharge time of the capacitor and do not contact energized parts
- The instructions on the device must be observed.

2.8 Fire fighting



DANGER!

Risk of fatal injury from electrical current!

Electricity when using a conductive fire fighting appliance.

Therefore:

- Use the following fire fighting device:



ABC powder / CO₂

2.9 Safety equipment



WARNING!

Risk of fatal injury due to non-functional safety equipment!

Safety equipment provides for the highest level of safety in a facility. Even if safety equipment makes work processes more awkward, under no circumstances may they be circumvented. Safety can only be ensured by intact safety equipment.

Therefore:

- Before starting to work, check whether the safety equipment is in good working order and properly installed.

2.10 Behavior in case of danger or accidents

Preventive measures

- Always be prepared for accidents or fire!
- Keep first-aid equipment (e.g. first-aid kits, blankets, etc.) and fire extinguishers handy.
- Acquaint personnel with accident alarm, first aid and rescue equipment

And if something does happen: respond properly

- Stop operation of the device immediately with an EMERGENCY Stop.
- Initiate first aid measures.
- Evacuate persons from the danger zone
- Notify the responsible persons at the scene of operations.
- Alarm medical personnel and/or the fire department.
- Keep access routes clear for rescue vehicles.

2.11 Signs and labels

The following symbols and information signs are located in the working area. They refer to the immediate vicinity in which they are affixed.



WARNING!

Risk of injury due to illegible symbols!

Over the course of time, stickers and symbols on the device can become dirty or otherwise unrecognizable.

Therefore:

- Maintain all safety, warning and operating labels on the device in easily readable condition.



Electrical voltage

Only qualified personnel may work in the marked workspace.

Unauthorized persons may not touch the marked working materials.



DANGER!

Risk of injury due to hot surface!

The surfaces of the device can heat up to temperatures of $> 70^{\circ}\text{C}$!

Therefore:

- Wear protective gloves



TECHNICAL DATA

3.1 Operating conditions

3.1.1 System types

There is a differential structure of current supply systems and it is distinguished between three basic types, referring to their grounding, which is accordant to DIN VDE0100 part 300 and accordingly to IEC 60364:

- In a TN-system one point is directly grounded (signal ground). The cabinet of the electrical installation is connected via protective conductors and accordingly PE-conductors with this point.
- In a TT-system a point is directly grounded (signal ground). The cabinet of the electric installation is connected to ground connections, which, however, are separated from the signal ground.
- In an IT-system there is no direct connection between active conductors (L1, L2, L3, N) and grounded parts (PE). The cabinets of the electrical installation are grounded. The separation is reached, by the use of an isolating transformer or with the use of an independent current source (generator, battery).

If there is an adequate low-impedance grounding within the TN- or the TT-system, then a line-side fuse is activated. A high-impedance grounding does not activate the fuse, so that the ground currents (error current) can be potentially dangerous. For this reason, circuit breakers are used for the error current monitoring.

At a short-circuit to ground, no ground current can flow and the line-side fuses cannot be activated, by which the operation can be kept up. Only a second short-circuit to ground at another phase would cause a current error, which can trigger a fuse. In order to detect the first short-circuit to ground an insulation monitor and for the second short-circuit to ground, a current error monitoring, are necessary.

Supported system types



NOTICE!

The operation of the mains filters **BFN** is possible with **IT-** and **TN/TT-**systems.

3.1 Operating conditions

3.1.2 Requirements to the energy supply: power supply

Power supply system (see ▶ System types ◀ from page 15)	BFN 3-1-XXXX-X01	Industrial system with high- or low-impedance star point (TN-system or TT-system)
	BFN 3-1-XXXX-X02	Industrial system with no star point or a high- impedance star point (IT-system) Industrial system with a direct or low impedance grounded junction of phases (grounded delta wye)
Rated input supply voltage/frequency (U_{AC})		3 x 400 V 50/60 Hz 3 x 480 V 50/60 Hz
Absolute input supply voltage (U_{AC})		max. 3 x 528 V / 50/60 Hz
Absolute frequency maximum		63 Hz
Harmonic frequencies (mains voltage) EN 61800-3, chapter 5.2.2.1, table 2		$THD_U \leq 10 \%$
Mains voltage asymmetry EN 61000-2-4, table 1		max. 3 %
Commutation notches EN 61800-3, chapter 5.2.2.1, table 2		Notch depth < 40%, area < 250% x degree
Voltage drops EN 61000-2-1		10 % to 100 %
Voltage changes/fluctuation EN 61000-2-1		+/-10 % +10 % to -15 % for ≤ 1 min

3.1.3 Required environmental conditions

Transport temperature range	-25 °C to +85 °C
Storage temperature range	- 25 °C to +85 °C
Operational temperature range	-25 °C to +85 °C (rated temperature: 50 °C, see ▶Electrical data◀ from page 28)

3.2 Dimensions

3.2 Dimensions



NOTE!

Dimensions in mm.

3.2.1 Baumüller filters for TN/TT-systems

BFN 3-1-0007-001
BFN 3-1-0016-001
BFN 3-1-0030-001
BFN 3-1-0042-001
BFN 3-1-0056-001
BFN 3-1-0075-001
BFN 3-1-0100-001
BFN 3-1-0130-001
BFN 3-1-0180-001

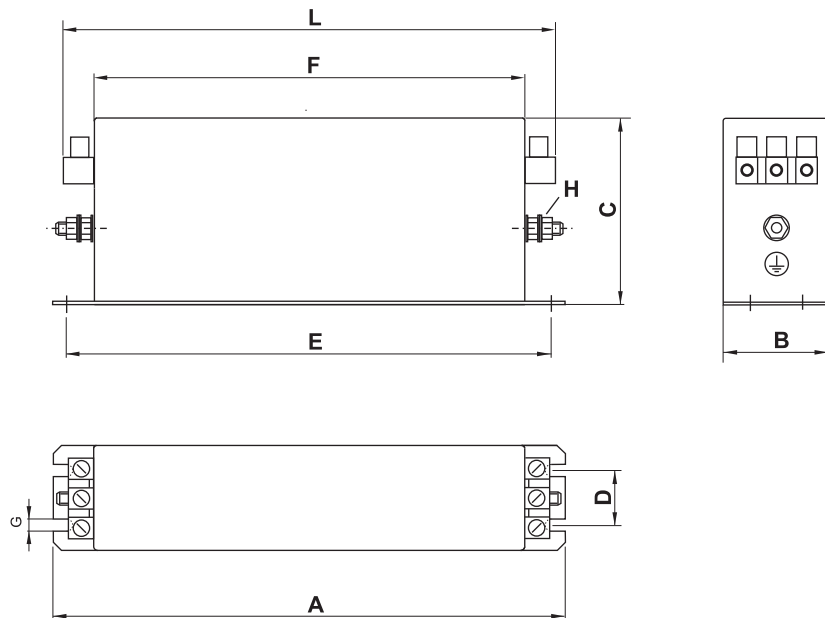


Figure 1: Dimensions filters TN/TT-systems

Type	A	B	C	D	E	F	L	G	H PE-connection	Connection (mm ²) flex./rigid
BFN 3-1-0007-001	190	40	70	20	180	160	185	5,4	M5	4/6
BFN 3-1-0016-001	250	50	70	25	235	220	245	5,4	M5	4/6
BFN 3-1-0030-001	270	50	85	30	255	240	265	5,4	M5	10/16
BFN 3-1-0042-001	310	50	85	30	295	280	305	5,4	M5	10/16
BFN 3-1-0056-001	250	85	90	60	235	220	258	5,4	M6	16/25
BFN 3-1-0075-001	270	80	135	60	255	240	278	6,5	M6	25/35
BFN 3-1-0100-001	270	90	150	65	255	240	326	6,5	M10	50/50
BFN 3-1-0130-001	270	90	150	65	255	240	326	6,5	M10	50/50
BFN 3-1-0180-001	380	130	180	102	365	350	455	6,5	M10	95/95

BFN 3-1-0250-001
 BFN 3-1-0320-001
 BFN 3-1-0400-001
 BFN 3-1-0600-001

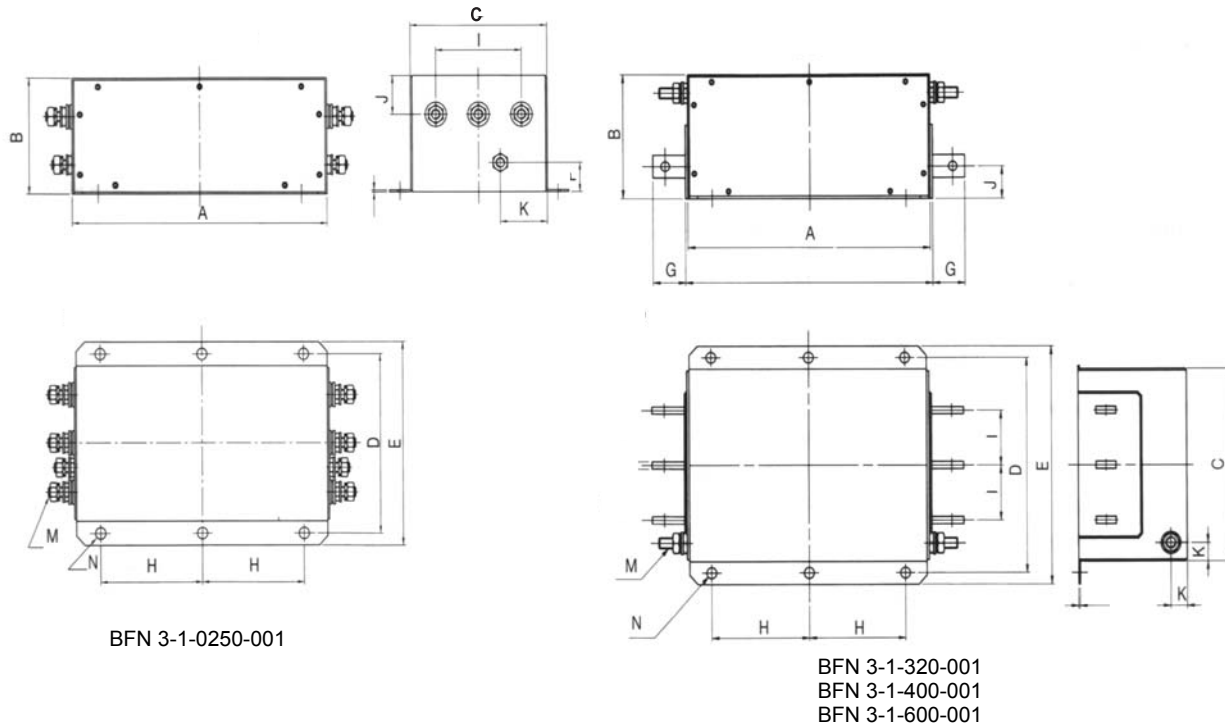


Figure 2: Dimensions filters TN/TT-systems

Type	A	B	C	D	E	G	H	I	J	K	M	N	Connection
BFN 3-1-0250-001	300	125	180	205	230		120	110	40	62	M10	∅12	Bolt M10
BFN 3-1-0320-001	300	115	210	235	260	40	120	60	35	20	M12	∅12	Rail with hole ∅11 PE: Bolt M12
BFN 3-1-0400-001	300	115	210	235	260	40	120	60	35	20	M12	∅12	Rail with hole ∅11 PE: Bolt M12
BFN 3-1-0600-001	300	135	210	235	260	40	120	60	35	20	M12	∅12	Rail with hole ∅11 PE: Bolt M12

3.2 Dimensions

BFN 3-1-0320-101
 BFN 3-1-0400-101
 BFN 3-1-0600-101

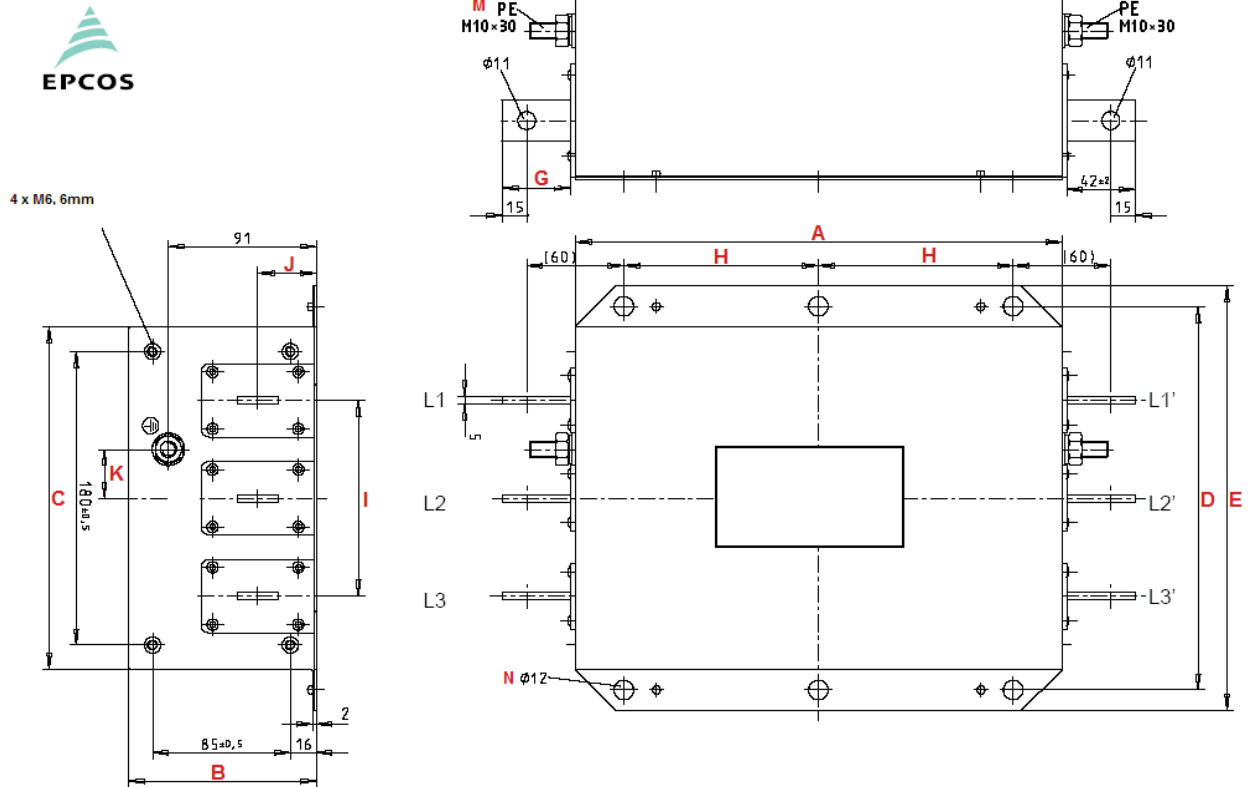


Figure 3: Dimensions filters TN/TT-systems

Type	A	B	C	D	E	G	H	I	J	K	M	N	Connection
BFN 3-1-0320-101	300	116	210	235	260	42	120	120	36	30	M10	Ø12	Rail with hole Ø11 PE: Bolt M10
BFN 3-1-0400-101	300	116	210	235	260	42	120	120	36	30	M10	Ø12	Rail with hole Ø11 PE: Bolt M10
BFN 3-1-0600-101	300	116	210	235	260	42	145	120	36	30	M10	Ø12	Rail with hole Ø11 PE: Bolt M10

BFN 3-1-1000-101

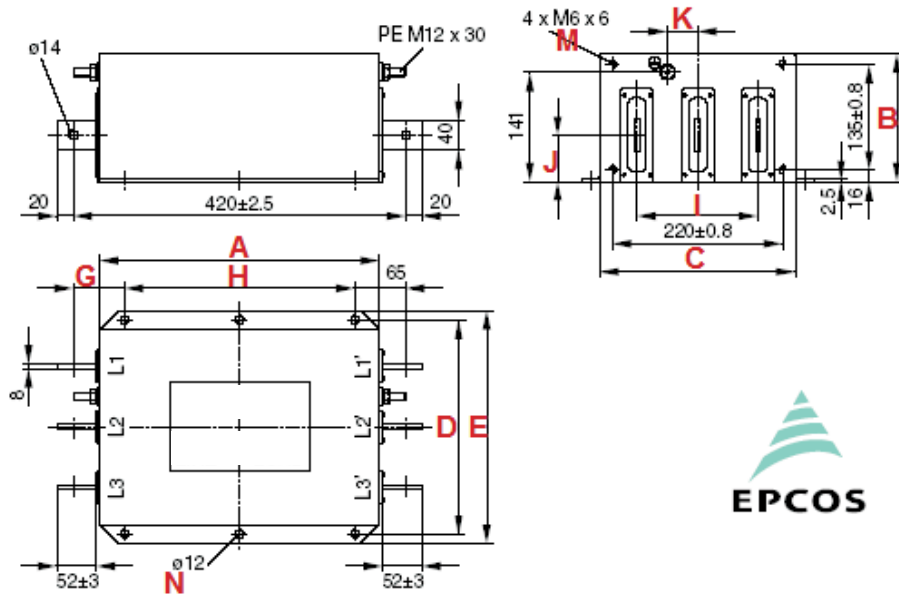


Figure 4: Dimensions filters TN/TT-systems

Type	A	B	C	D	E	G	H	I	J	K	M	N	Connection
BFN 3-1-1000-101	350	166	250	275	300	65	290	160	61	40	M12	Ø12	Rail with hole Ø14 PE: M12

3.2 Dimensions

3.2.2 Filters for active mains inverter

EPCOS

B84143A0150R410



NOTE!

Only for active mains inverter BM5174

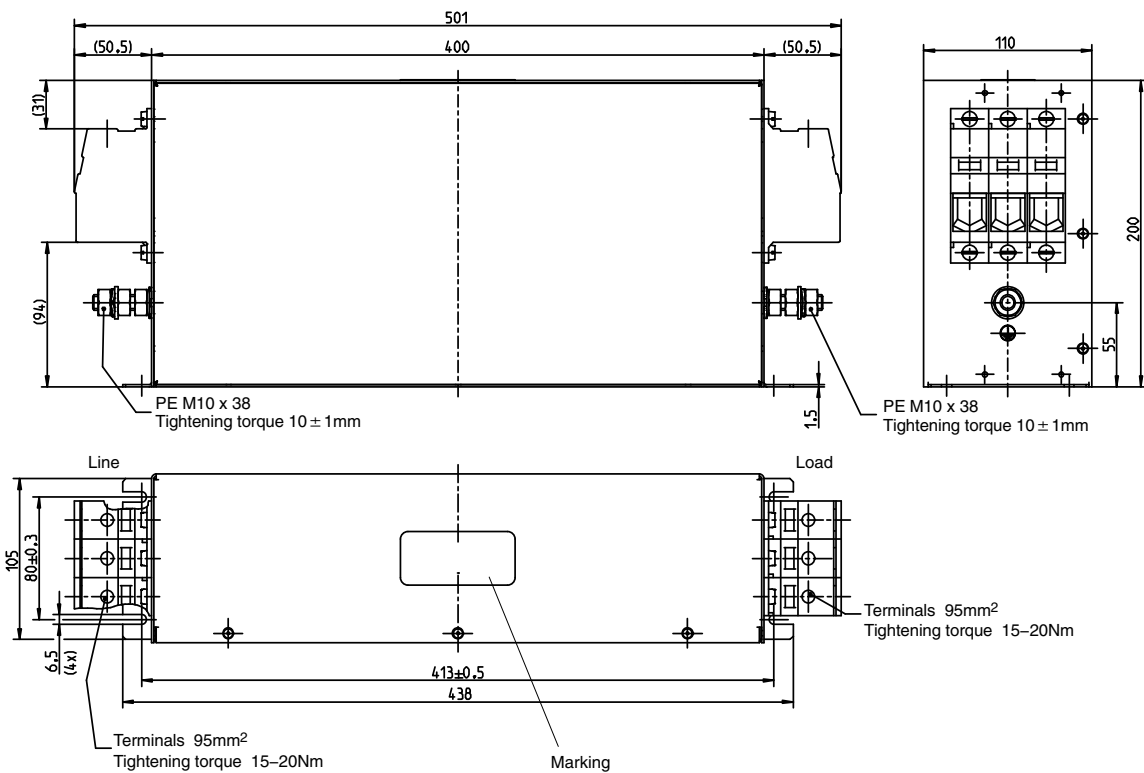


Figure 5: Dimensions filters TN/TT-systems EPCOS for BM5174

Type	Connection
EPCOS B84143A0150R410	Terminals: 95 mm ² PE: Bolt M10

Schaffner
 FN 3120H-80-35
 FN 3120H-150-40



NOTE!

FN 3120H-80-35 for active mains inverter BM4135,
 FN 3120H-150-40 for active mains inverter BM4145

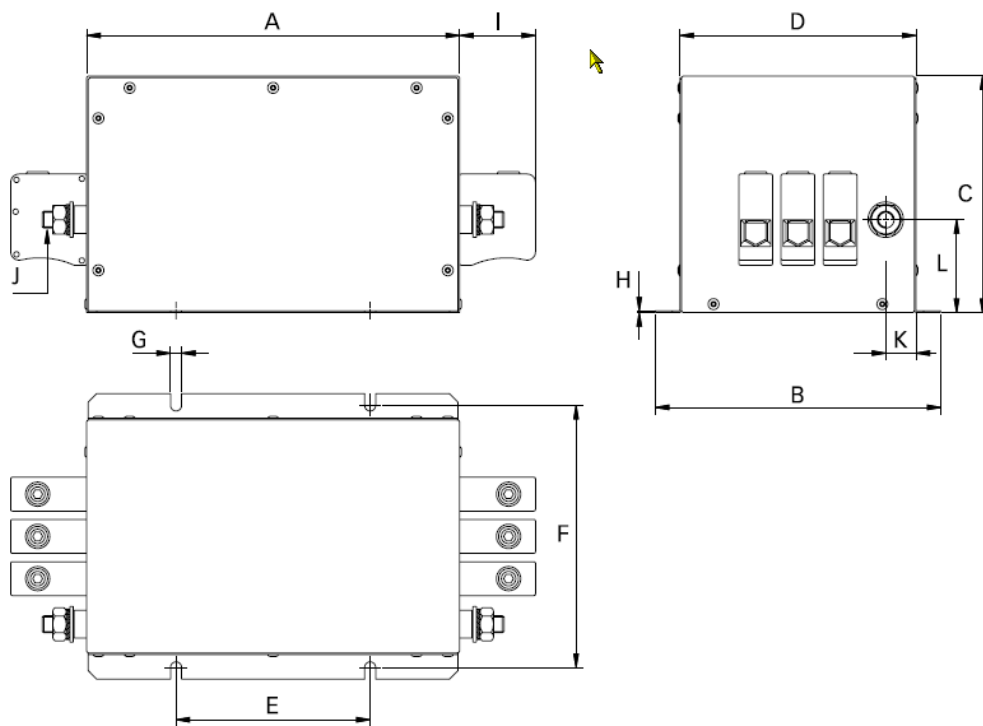


Figure 6: Dimensions filters TN/TT-system Schaffner for BM4135, BM4145

Type	A	B	C	D	E	F	G	H	I	J	K	L
FN 3120H-80-35	221	169	140	140	115	155	6.5	1	45	M10	18	55
FN 3120H-150-40	221	169	140	140	115	155	6.5	1	51	M10	13	62

3.2 Dimensions

Schaffner
FN 3100-300-99



NOTE!

FN 3100-300-99 for active mains inverter BM4163.

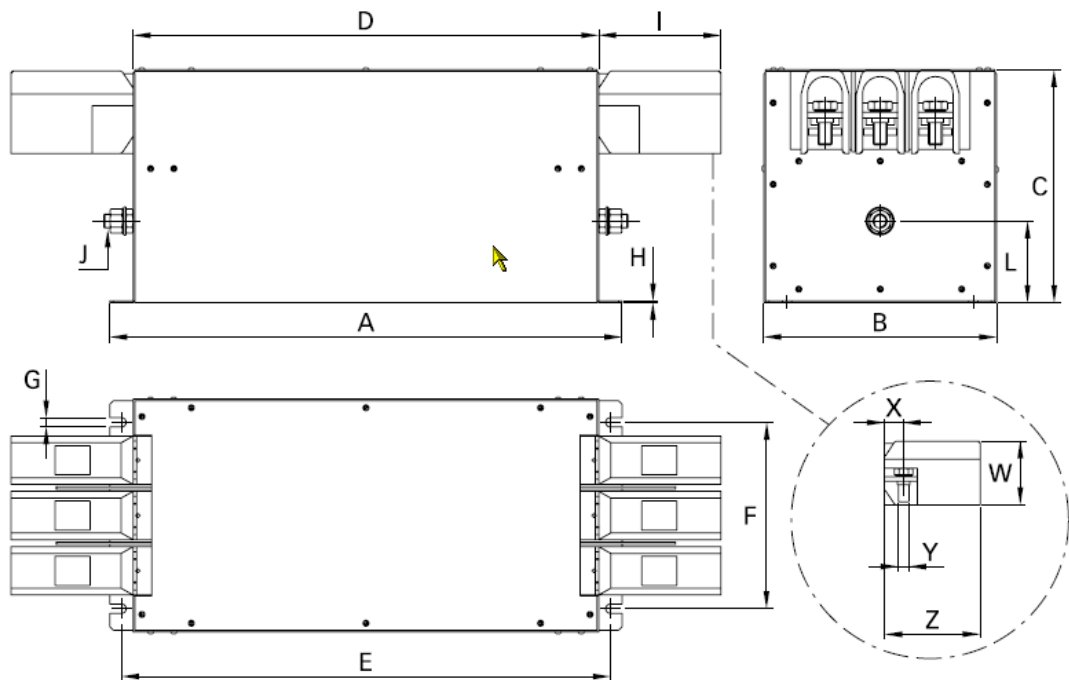


Figure 7: Dimensions filters TN/TT-system Schaffner for BM4163

Type	A	B	C	D	E	F	G	H	I	J	L
FN 3100-300-99	440	200	200	400	420	160	8	1.5	105	M12	70

Type	W	X	Y	Z
FN 3100-300-99	71.5	22	M12	105

3.2.3 Filters for IT-systems

- BFN 3-1-0150-002**
- BFN 3-1-0250-002**
- BFN 3-1-0320-002**
- BFN 3-1-0400-002**
- BFN 3-1-0600-002**

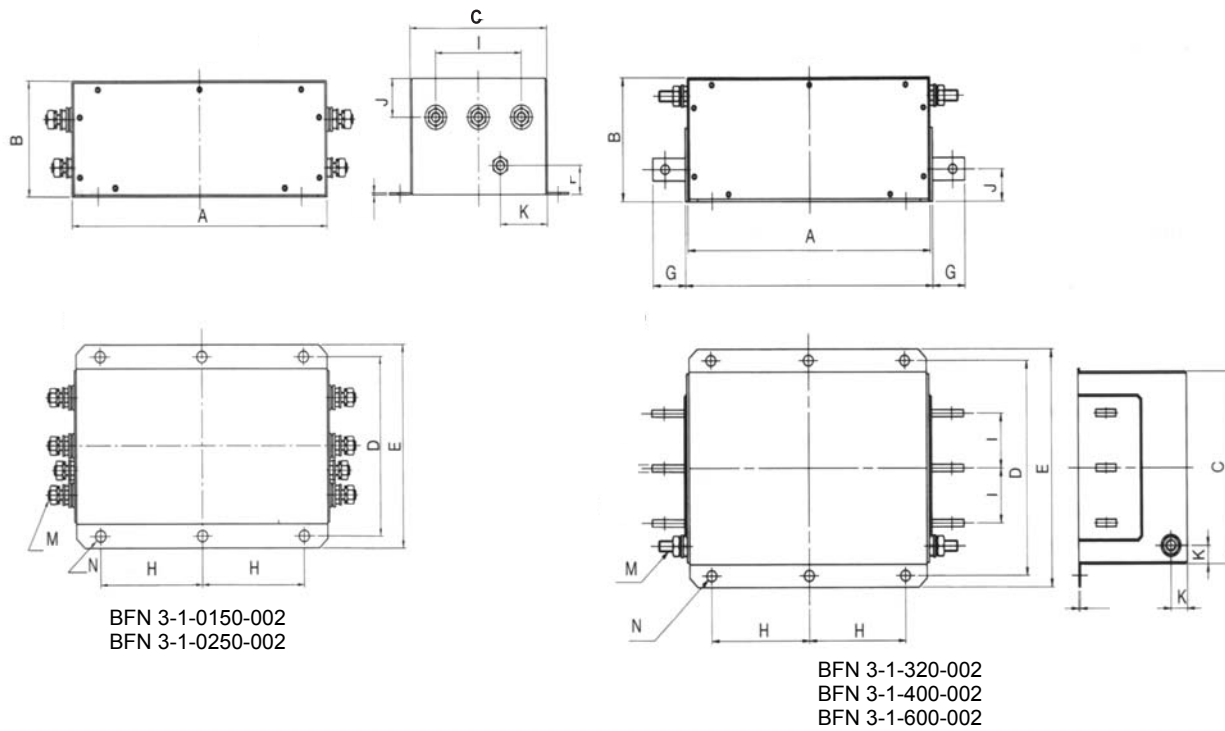


Abbildung 8: Dimensions filters IT-systems

Type	A	B	C	D	E	G	H	I	J	K	M	N	Anschluss
BFN 3-1-0150-002	300	120	160	185	210		120			55	M10	Ø12	Bolt M10
BFN 3-1-0250-002	300	125	180	205	230		120	110	40	62	M10	Ø12	Bolt M10
BFN 3-1-0320-002	300	115	210	235	260	40	120	60	35	20	M12	Ø12	Rail with hole Ø11 PE: Bolt M12
BFN 3-1-0400-002	300	115	210	235	260	40	120	60	35	20	M12	Ø12	Rail with hole Ø11 PE: Bolt M12
BFN 3-1-0600-002	300	135	210	235	260	40	120	60	35	20	M12	Ø12	Rail with hole Ø11 PE: Bolt M12

3.2 Dimensions

BFN 3-1-0320-102
 BFN 3-1-0400-102
 BFN 3-1-0600-102

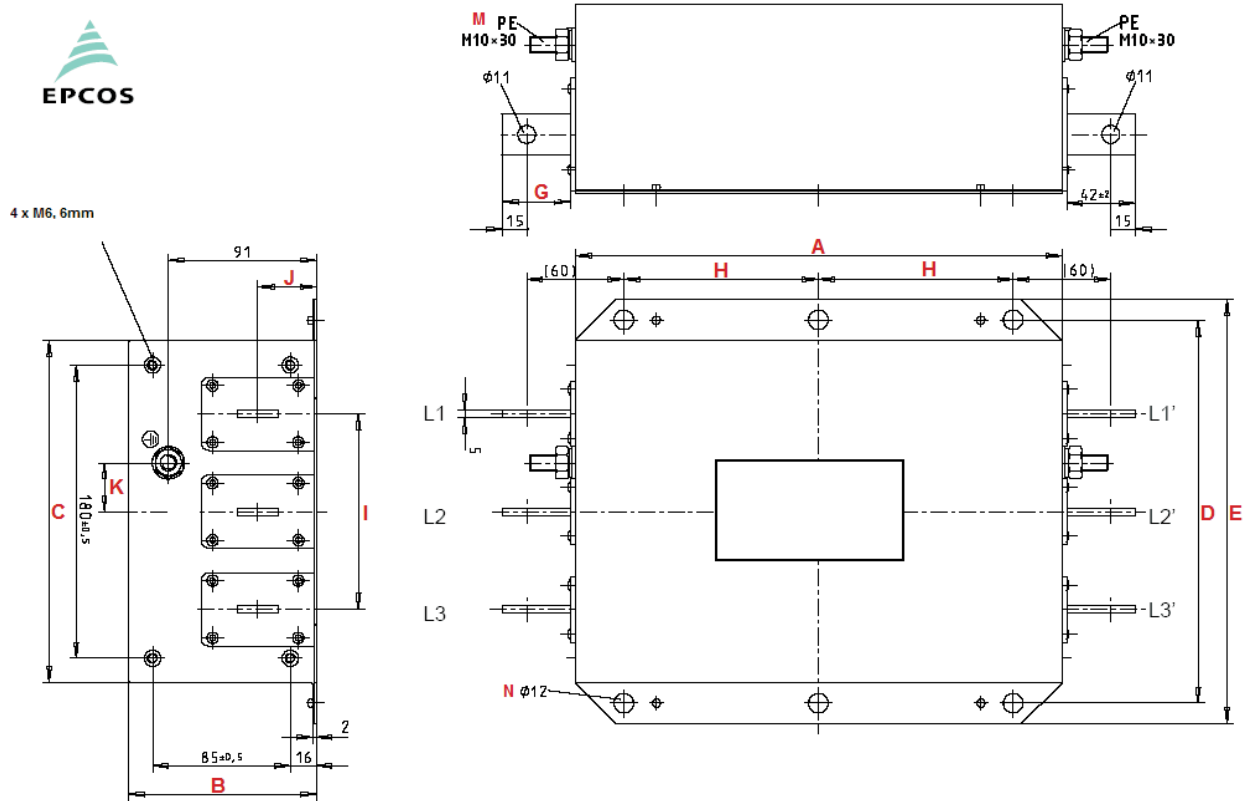


Figure 9: Dimensions filters IT-systems EPCOS

Type	A	B	C	D	E	G	H	I	J	K	M	N	Connection
BFN 3-1-0320-102	300	116	210	235	260	42	120	120	36	30	M10	Ø12	Rail with hole Ø11 PE: Bolt M10
BFN 3-1-0400-102	300	116	210	235	260	42	120	120	36	30	M10	Ø12	Rail with hole Ø11 PE: Bolt M10
BFN 3-1-0600-102	300	116	210	235	260	42	145	120	36	30	M10	Ø12	Rail with hole Ø11 PE: Bolt M10

3.3 Weight

TN/TT-System	IT-System	Weight
BFN 3-1-0007-001		0.6 kg
BFN 3-1-0016-001		1.0 kg
BFN 3-1-0030-001		1.3 kg
BFN 3-1-0042-001		1.6 kg
BFN 3-1-0056-001		1.9 kg
BFN 3-1-0075-001		2.6 kg
BFN 3-1-0100-001		4.0 kg
BFN 3-1-0130-001		4.2 kg
BFN 3-1-0180-001		6.0 kg
EPCOS B84143A0150R410 ¹⁾		13.5 kg
Schaffner FN 3120H-80-35 ¹⁾		5.0 kg
Schaffner FN 3120H-150-40 ¹⁾		6.3 kg
Schaffner FN 3100-300-99 ¹⁾		11.8 kg
	BFN 3-1-0150-002	6.0 kg
BFN 3-1-0250-001	BFN 3-1-0250-002	15 kg
BFN 3-1-0320-001	BFN 3-1-0320-002	21 kg
BFN 3-1-0400-001	BFN 3-1-0400-002	21 kg
BFN 3-1-0600-001	BFN 3-1-0600-002	22 kg
BFN 3-1-0320-101	BFN 3-1-0320-102	7.2 kg
BFN 3-1-0400-101	BFN 3-1-0400-102	7.5 kg
BFN 3-1-0600-101	BFN 3-1-0600-102	7.8 kg
BFN 3-1-1000-101	BFN 3-1-1000-102	18.5 kg

¹⁾ Mains filters only for active mains inverter

3.4 Electrical data



DANGER!

Danger to life due to high discharge current!

Therefore:

- The cross-section of the protective conductor must be at least 10 mm² (EN 61800-5-1 chap. 4.3.5.5.2).



NOTE!

Rated current of used filters must be greater or the same with the RMS values of the actual mains current (actual mains current = RMS value of the mains current during the total cycle time of the drive). The RMS value is calculated at short-time operation (S3) as follows:

$$I_{\text{eff}} = \sqrt{\frac{1}{T} \int_0^T i^2 dt}$$

3.4.1 Filters for TN/TT-systems

BFN 3-1-... -001	0007	0016	0030	0042	0056	0075	0100	0130	0180
Max. supply voltage	3 x 480 V _{AC} +10 %, 50/60 Hz								
Rated current (at T _B = 50 °C)	7 A	16 A	30 A	42 A	56 A	75 A	100 A	130 A	180 A
Peak current (at T _B = 50 °C)	1.5 x I _N for < 1 min à hour								
Current derating	$I = I_{\text{rated}} \cdot \sqrt{85 - \frac{\vartheta_{\text{environment}}}{35^{\circ}\text{C}}}$								
Test voltage	Cable - Cable: 2125 V _{DC} / 2 s Cable - Cabinet: 2125 V _{DC} / 2 s								
Connection	L1/L2/L3: safe-to-touch screw contact PE-Connection: Bolt M5 / M6 / M10								
Maximum connection cross-section	4 mm ²	4 mm ²	10 mm ²	10 mm ²	16 mm ²	25 mm ²	50 mm ²	50 mm ²	50 mm ²
Power loss (typical)	4 W	8 W	12 W	15 W	18 W	24 W	24 W	30 W	35 W
Protection class	IP 20								

EPCOS	B84143A0150R410 for active mains inverter BM5174
Max. supply voltage	3 x 480 V _{AC} +10 %, 50/60 Hz
Rated current (at T _B = 50 °C)	150 A
Peak current (at T _B = 50 °C)	1.5 x I _N for < 3 min per hour 2,5 x I _N for < 30 s per hour
Test voltage	Cable - Cable: 2240 V _{DC} / 2 s Cable - Cabinet: 2720 V _{DC} / 2 s
Connection	L1/L2/L3: safe-to-touch screw contact PE: Bolt M10
Maximum connection cross-section	95 mm ²
Protection class	IP 20

3.4 Electrical data

Schaffner	FN 3120H-80-35 for active mains inverter BM4135	FN 3120H-150-40 for active mains inverter BM4145	FN 3100-300-99 for active mains inverter BM4163
Max. supply voltage	3 x 480 V _{AC} +10 %, 50/60 Hz	3 x 480 V _{AC} +10 %, 50/60 Hz	3 x 480 V _{AC} +10 %, 50/60 Hz
Rated current (at T _B = 50 °C)	80 A	150 A	300 A
Peak current (at T _B = 50 °C)	1.5 x I _N for < 1 min per hour	1.5 x I _N for < 1 min per hour	1.5 x I _N for < 1 min per hour
Test voltage	Cable - Cable: 2250 V _{DC} / 2 s Cable - Cabinet: 2750 V _{DC} / 2 s		
Connection	L1/L2/L3: safe-to-touch screw contact PE: Bolt M10	L1/L2/L3: safe-to-touch screw contact PE: Bolt M10	L1/L2/L3: safe-to-touch screw contact PE: Bolt M12
Maximum connection cross-section	50 mm ²	95 mm ²	150 mm ²
Protection class	IP 20	IP 20	IP 20

BFN 3-1-... -001	0250	0320	0400	0600
Max. supply voltage	3 x 480 V _{AC} +10 %, 50/60 Hz			
Rated current (at T _B = 50 °C)	250 A	320 A	400 A	600 A
Peak current (at T _B = 50 °C)	4 x I _N at switch-on 1,5 x I _N for < 1 min / once per hour			
Test voltage	Cable - Cable: 2150 V _{DC} / 2 s Cable - Cabinet: 2700 V _{DC} / 2 s			
Connection	Bolt M10	rail with hole Ø 11mm PE: Bolt M12		
Power loss (typical)	60 W	40 W	50 W	65 W
Protection class	IP 00			

BFN 3-1-... -101	0320	0400	0600	1000
Max. supply voltage	3 x 480 V _{AC} +10 %, 50/60 Hz			
Rated current (at T _B = 50 °C)	250 A	400 A	600 A	1000 A
Peak current (at T _B = 50 °C)	1.5 x I _N for < 3 min per hour or 2.5 x I _N for 30 s per hour			
Test voltage	Cable - Cable: 2280 V _{DC} / 2 s Cable - Cabinet: 2690 V _{DC} / 2 s			
Connection	Rail with hole Ø 11mm PE: Bolt M10			Rail with hole Ø 14mm PE: Bolt M12
Power loss (typical)	31 W	48 W	84 W	
Protection class	IP 00			

3.4 Electrical data

3.4.2 Filters for IT-systems

BFN 3-1-... -002	150	0250	0320	0400	0600
Max. power supply	3 x 480 V _{AC} +10 %, 50/60 Hz				
Rated current (at T _B = 50 °C)	150 A	250 A	320 A	400 A	600 A
Peak current (at T _B = 50 °C)	4 x I _N at switch-on 1.5 x I _N for < 1 min / once per hour				
Test voltage	Cable - Cable: 2150 V _{DC} / 2 s Cable - Cabinet: 2700 V _{DC} / 2 s				
Connection	Bolt M10	Rail with hole ∅ 11mm PE: Bolt M12		Rail with hole ∅ 11mm PE: Bolt M12	Rail with hole ∅ 11mm PE: Bolt M12
Power loss (typical)	30 W	60 W	40 W	50 W	65 W
Protection class	IP 00				

BFN 3-1-... -102	0320	0400	0600
Max. power supply	3 x 480 V _{AC} +10 %, 50/60 Hz		
Rated current (at T _B = 50 °C)	250 A	400 A	600 A
Peak current (at T _B = 50 °C)	1.5 x I _N for < 3 min per hour or 2.5 x I _N for 30 s per hour		
Test voltage	Cable - Cable: 2280 V _{DC} / 2 s Cable - Cabinet: 2690 V _{DC} / 2 s		
Connection	Rail with hole ∅ 11mm PE: Bolt M10		
Power loss (typical)	31 W	48 W	84 W
Protection class	IP 00		

DESCRIPTION OF THE DEVICES

In this chapter the basic structure of the devices **Filter for mains applications BFN** and of the type codes on the devices.

No filters are required for the operation of the power converter.



NOTICE!

- The mains filters may not be used as a motor filter at the converter output.
- Mains filters BFN-3-1-XXX-XXX may not be used with active mains inverters. For this converter type special filters are available, refer to [►Filters for active mains inverter◄](#) from page 22.

TN-TT-systems
see [►System types◄](#) on page 15

In order to comply with the limit values of the EMC-standards, the use of Baumüller mains filters BFN-3-1-XXX-**X01** is required.



NOTICE!

Baumüller mains filters BFN-3-1-XXX-**X01** can be used in

- Grounded industrial systems of hard or low impedance

they can not be used in

- Grounded industrial systems of insulated and high impedance.
- Grounded wye-supply systems

In order to allow the compliance with the limit values for the conducted interferences („external“ second environment - EN 61800-3, table 9) in low-impedance grounded low-voltage systems use Baumüller mains filters combined with Baumüller converters, Baumüller motor cables and Baumüller motors. If all installation- and EMC-notes of this Handbook are complied with, it is assumed that the interference-suppressed drive accords to the protection requirements of the EMC-Directive 2014/30/EU.

IT-systems

[▶System types◀](#) on page 15

The use of mains filters in IT-systems is less effective and no EMC limits are defined.

„The use of EMC-filters in an insulated or a grounded industrial distribution system of high impedance can cause a safety risk. No limit values can be defined at IT-systems, which are used for complex industrial systems.“ (EN 61800-3, chapter 6.3.2.3, b).



NOTE!

An error case (motor ground connection) can lead to overload and perhaps destruction of the mains filters.

The use of mains filters BFN-3-1-XXX-**X02** is possible, but it is not recommended to apply mains filters in IT-systems. The transient emissions can exceed the limits of category C3.

4.1 General information

Mains filters are combinations of capacitors, chokes, resistors and voltage limiters, which reduce the electromagnetic influence of environment. The power direction is bidirectional, i. e. the outgoing cable-guided faults from the converter are reduced, but also the interference resistance of the drive against supply faults, as they appear with lightning strokes, fuse blow or simple switching operations, is improved at the same time.

The mains filters of the series BFN ... were developed for the BAUMÜLLER-power electronics referring to its attenuation behavior. Its application enables the compliance with the limitation values which are required for the branch of industry (second environment) of the EMC product standard for variable-speed electrical power drive systems **EN 61800-3** as well as the „Generic Standards“ **EN 61000-6-4**.

When using the filter series BFN ... in the combination with Baumüller converters, Baumüller-motor cables and Baumüller motors and under consideration of the installation- and mounting notes in this Instruction Handbook and in the Instruction Handbook of the power converter, the protection requirements of the European EMC Directive and of the EMC Act (EMVG) are fulfilled.



NOTE!

The emission of radio interferences is to a high level dependent of the wiring, the volume expansion and the arrangement of the components in the installation. This is why the ensuring of the EMC according to the legal regulations only is possible with the completed installation and therefore is in the responsibility range of the manufacturer of the installation or of the operating company.



NOTE!

Components of the Baumüller Nürnberg GmbH are intended for installation in commercially available control cabinets.

There are several reasons to operate the components and devices in commercial control cabinets. Particularly the following is ensured:

- The required contact protection is ensured.
- The thermal environmental conditions (temperatures, relative humidity, cleanliness of the coolants, ...), described in the technical data of the components and the devices, are ensured.
- The mechanical environmental conditions described in the technical data of the components and the devices (variations, vibrations, ...), are ensured.
- The notes meeting the EMC-configuration and the EMC-structure (shielding concept, laying principles, implementations,...) described in the technical data of the components and devices can be implemented.

4.1 General information

4.1.1 Functional description

The resulting impedance of the parts used in the filters leads to an optimum mismatch between the mains- and the load impedance. Now the interference-current can return to its interference source. The dropping harmonic voltages at the impedance of the system can be reduced substantially between the frequency range 150 kHz ... 30 MHz .



WARNING!

Filters cause high discharge currents and are incompatible, if they have RCDs. The notes of EN 50178 must be considered when configuring. Due to the high discharge currents the cross-section of the ground conductors at the filter must be at least 10 mm² (EN 50178, chapter 5.3.2.1). The grounding conductor must be connected to the filter before commissioning.



NOTE!

In order to return the interference current with low impedance to its interference source, mounting must be made on a conductive mounting plate (mounting of the mains filter and of the power converter, which must be cleared and of the bonded face-to-face contacting of the motor cable screen). The use of unvarnished mounting plates provides the best results.

4.1.2 Block diagram filters for mains applications (simplified)

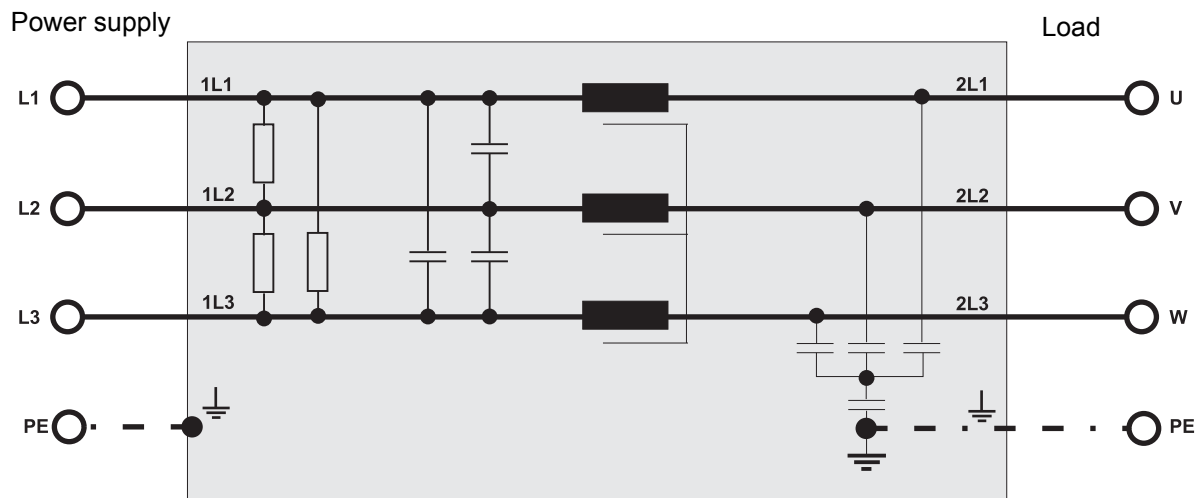


Figure 10: Block diagram

4.2 Type plate

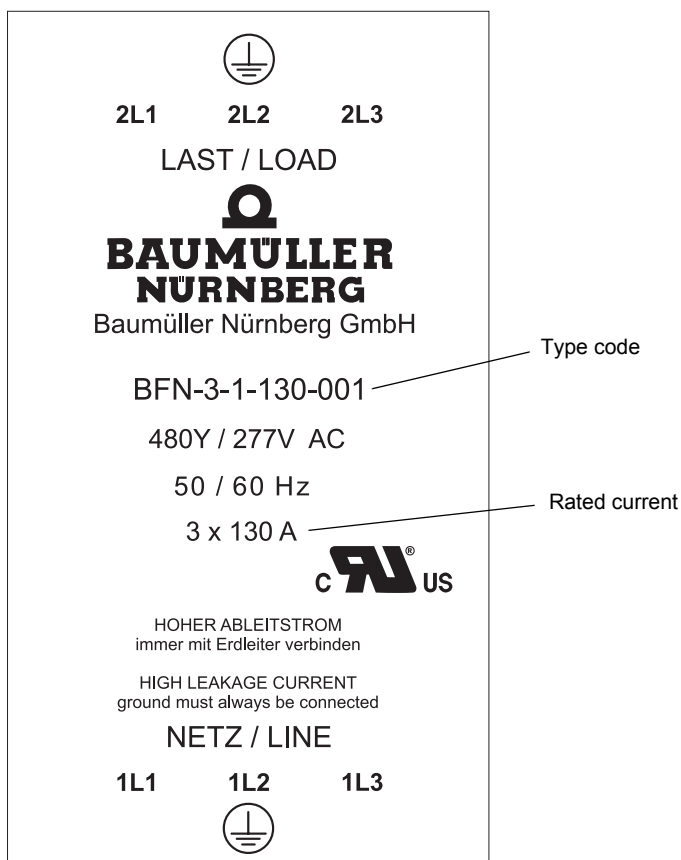


Figure 11: Type plate

4.3 Type code

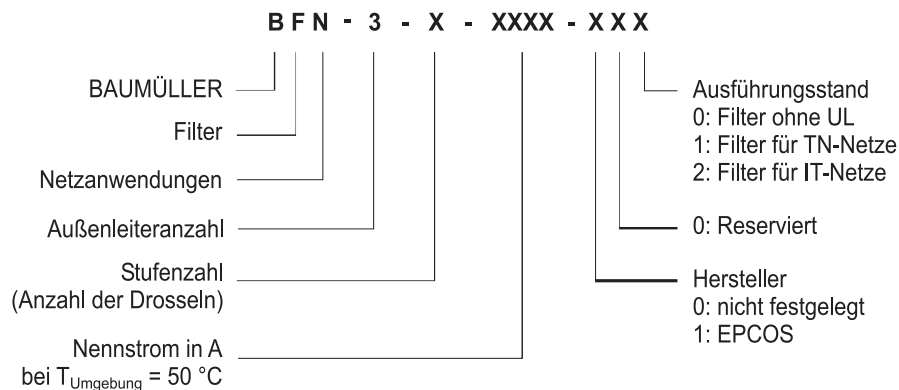


Figure 12: Type code

TRANSPORT AND PACKAGING

5.1 Safety notes for transport

**NOTICE!****Damage due to unauthorized transport!**

Transport handled by untrained personnel can lead to a substantial amount of material damage.

Therefore:

- The unloading of the packages upon delivery as well as the in-house transport should only be done by trained personnel.
- Contact Baumüller Nürnberg GmbH sales office if necessary.

**WARNING!****Danger of physical impact!**

Secure devices against falling down.

Therefore:

- Take suitable measures, such as supports, hoists, straps, etc., to ensure that device cannot fall down.
- Use appropriate means of transport.

5.2 What to observe at transport

The device is packed at the manufacturer's plant for the first transport. If the device is transported onwards, ensure that the following conditions are met throughout the complete procedure of the transport:

- Temperature range - 25 °C to + 85 °C

5.3 Transport inspection

Upon receiving the delivered goods, immediately examine them for completeness and transport damage.

If there is externally distinguishable transport damage, proceed as follows:

- Do not accept the delivery or conditionally accept it with reservations.
- Note the extent of the damage on the transport documents or on the delivery note of the shipping agent.

Immediately file a complaint with the freight carrier. Have the complaint confirmed in writing and immediately contact the responsible representative of Baumüller Nürnberg GmbH.



NOTE!

If there are distinguishable transport damages the device may not be commissioned!

5.4 Unpacking

After having received the packaged device:

- Avoid forceful transport agitation and hard jolts, e.g. when putting an item down.

If no transport damage is visible:

- Open the packaging of the device.
- Verify the delivery scope based on the delivery note.

File a claim with the responsible Baumüller representative if the delivery is incomplete.



NOTE!

Claim each individual deficiency as soon as it has been detected. Damage claims can only be validly asserted within the claim registration period.

5.5 Disposal

The packaging consists of cardboard, plastic, metal parts, corrugated cardboard and/or wood.

- When disposing the packaging, comply with the national regulations valid at the use area.

MOUNTING

Mounting comprises the following steps:

- 1 Prepare mounting
(drilling holes, see, [►Dimensions◄](#) from page 18)
- 2 Mount device
(attachment see [►Mounting instruction◄](#) on page 43)

6.1 Safety notes

**WARNING!****Danger as a result of faulty mounting!**

The mounting requires qualified personnel with adequate experience. Faulty mounting can lead to life-threatening situations or substantial material damage.

Therefore:

- Only allow mounting to be performed by employees of the manufacturer or by other qualified personnel.

**WARNING!****Danger of mechanical impact!**

Secure devices against falling down.

Therefore:

- Take suitable measures to ensure that device cannot fall down.
- Use appropriate means of transport.

6.2 Prepare mounting

Based on the configuration documents and the drilling templates (see [►Dimensions◄](#) from page 18), the deviations of the cutout sections and the positions of the attachment drill holes can be determined.



NOTE!

The following notes must be considered for thermal safety:

- Air supply must be provided.
- Additional heat source may not be near the filters. The temperature range specified in the technical data must be complied with.



HINWEIS!

- Ensure that the screws are firmly fit.
- Mounting surface must be conductive.
- Mount the power converter, the appropriate mains filters and the bonded face-to-face screen contacts of the motor cable to the same reference surface. The connection cable must be as short as possible. The connection cable must be screened at lengths > 30 cm. The screen must be grounded on both sides.
- The input- and output cables of the filters must spatially be divided (at least 30 cm)
- Connect the filter cabinet bonded face-to-face to ground.
- The mains filters BFN ... can be used for global clearance of the installation. In this case it must be placed directly at the mains supply position on the same mounting place as the converters, which are to be cleared. The connection cable between the converter and the filter must be screened (grounded on both sides).



NOTICE!

Property damage due to conductive contamination.

Therefore:

- When performing installation work of any kind, it must be ensured that no foreign material (e.g. drill shavings, copper strands, etc.) gets into the device as a result.
- If possible, the drilling holes must be made before mounting the device and the configuring of the cables must be made outside the control cabinet. If this is not possible, the device must be appropriately covered.
Remove this covering again prior to starting operation without fail!

**CAUTION!****Eye injury due to catapulting particles.**

Metal particles are catapulted when making the drill holes and the cutout sections.

Therefore:



Wear protective eye wear!

- Prepare drill holes.

6.3 Mounting instruction

Carry out mounting as follows:

- 1 Provide suitable transport/lifting equipment as required.
- 2 Keep suitable fastening components available.
- 3 Mount device.

7

INSTALLATION

This chapter describes the electrical installation of the device. The mechanical mounting is described in [►Mounting◄](#) from page 41

The technical preconditions must be complied with before installation:

- 1 Check the requirements to the power supply.
- 2 Check the requirements to the cables and the availability of the accordant cables.
- 3 Check the properties of the connections and the configuration of the cables.

7.1 Safety notes



NOTE!

Installation must be made by employees of the manufacturer or by other qualified personnel.

Qualified personnel are persons who – on account of their occupational training, experience, instruction and knowledge of relevant standards and stipulations, accident prevention regulations and operating conditions – are authorized by the persons responsible for the safety of the facilities, to perform the respective activities that are necessary. Qualified personnel must recognize and prevent potential risks. The qualifications necessary for working with the device for example are:

- Occupational training or instruction, and the authorization to commission, ground and mark electrical power circuits and devices in accordance with the standards of the safety engineering.
- Occupational training or instruction, in accordance with the standards of work safety, for the care and use of appropriate safety equipment.



DANGER

Danger to life from electrical current!

During operation and after operation of this filter, the parts carry dangerous voltage.



DANGER!

Danger to life from electrical current!

Connection cross-section grounding conductor at least 10 mm² (EN 50178, chapter 5.3.2.1).

Danger from residual energy



DANGER!

Danger to life from electrical current!

Stored electrical charge.

Therefore:

- Observe the discharge time of the capacitors and do not touch parts under tension.
- Observe the notes on the connected devices.

7.2 Demands on the electrical mains

For all important data, see [►Requirements for power supply / mains supply◄](#) from page 26.

The devices must be operated in industrial environment C2/C3.

The destruction of the device can cause personal injury



DANGER!

Risk of fatal injury from electrical current!

If the requirements for the electrical mains are not complied, the device can be damaged or destroyed. Thereby persons can be greatly endangered.

Therefore:

- Prior to installation, ensure that the requirements are met by the electrical mains.

Supported mains types



NOTE!

The operation of the mains filters **BFN** is at **IT**- and **TN/TT**-systems possible.

BFN 3-1-XXXX-X01 must be operated at industrial systems with a grounded star point (**TN**-system or **TT**-system) with hard or low impedance.

BFN 3-1-XXXX-X02 must be operated at industrial systems with a star point, which is not grounded or with a star point, with high impedance (**IT**-system)

7.3 Demands on the connection cable

- Take into account IEC/EN 60204-1, chapter 13 when selecting the cable.
- The grounding conductor cross-section of the cable must be compliant with IEC/EN 60204-1, section 5.2, tab. 1.
- A fixed connection for the grounding conductor is mandatorily required for operation of the device.
- Use copper cable approved for a minimum of 60 °C (drives < 3 x 100 A) or 75 °C (drives ≥ 3 x 100 A), if UL 508C is observed.

7.4 Grounding conductor connection and RCD-compatibility

Due to the operating principle discharge current $>3.5 \text{ mA}_{\text{AC}}$ or $>10 \text{ mA}_{\text{DC}}$ can flow over the protective devices. Therefore a stationary grounding conductor connection according to EN 61800-5-1 is required (see notes for the installation in the Instruction Handbook of the converter).

Parasitic capacitances in the filter, power unit, motor cable and motor winding cause discharge current of 100 mA and greater.

Therefore power converter can be incompatible with the RCD!

Observe the safety notes in the EN 50178.

7.5 System requirements with regard to EMC-stability



NOTE!

The emission of radio interferences is highly dependent of the wiring, the spatial expansion and the assignment of the components in the system. Therefore the electromagnetic compatibility compliant to the regulations can be assured at the assembled system only. Therefore the system manufacturer or the operating company is responsible for assuring EMC.

7.5.1 General information about converters

In converters of the Baumüller Nürnberg GmbH semiconductors are used. These can minimize power loss by quick switching. Therefore a compact size of the devices is possible. The semiconductor generates electromagnetic waves due to this quick switching. Special preconditions must be observed to avoid electromagnetic influences by switching procedures.

The following causes are the reason for interferences in the drive system:

- Capacitive discharge currents. Here is a great rate of rise of voltages when switching semiconductors.
- Great currents and rate of rise of voltages in the motor cables. The interference energy which is bounded into magnetic fields reaches frequencies of a few hertz to about 30 MHz. Due to the great rate of rise of voltages additional electromagnetic fields with frequencies to about 600 MHz occur.
- Great cycle rates and quick logic circuits (electromagnetic field with frequencies of 16 MHz to 1 GHz).
- System perturbation and harmonics. Here commutation procedures and non sinusoidal mains loads occur. This particularly occurs at line-commutated converters (100 Hz to 20 kHz).

EMC is decisively dependent of the assembly of the individual parts and components in the control cabinet. The system can be configured compliant to the latest EMC-knowledge described in the following. This way the statutory regulations can be complied with.

7.5.2 Measures taken to assure EMC

The following configuration notes must be considered to assure EMC.

Cabling

- All connected cables must be screened in order to suppress interfering radiation outside the power converter. If the screening attenuation of the control cabinet is high enough (see limit values of the interference emission complying with EMVG for your system) and if the EMC-compatibility in the internal space is ensured (this can be assumed if the configuration notes of this chapter are complied with), the control cables can be mounted unscreened.

Consider the information submitted in [▶Screening◀](#) on page 52.

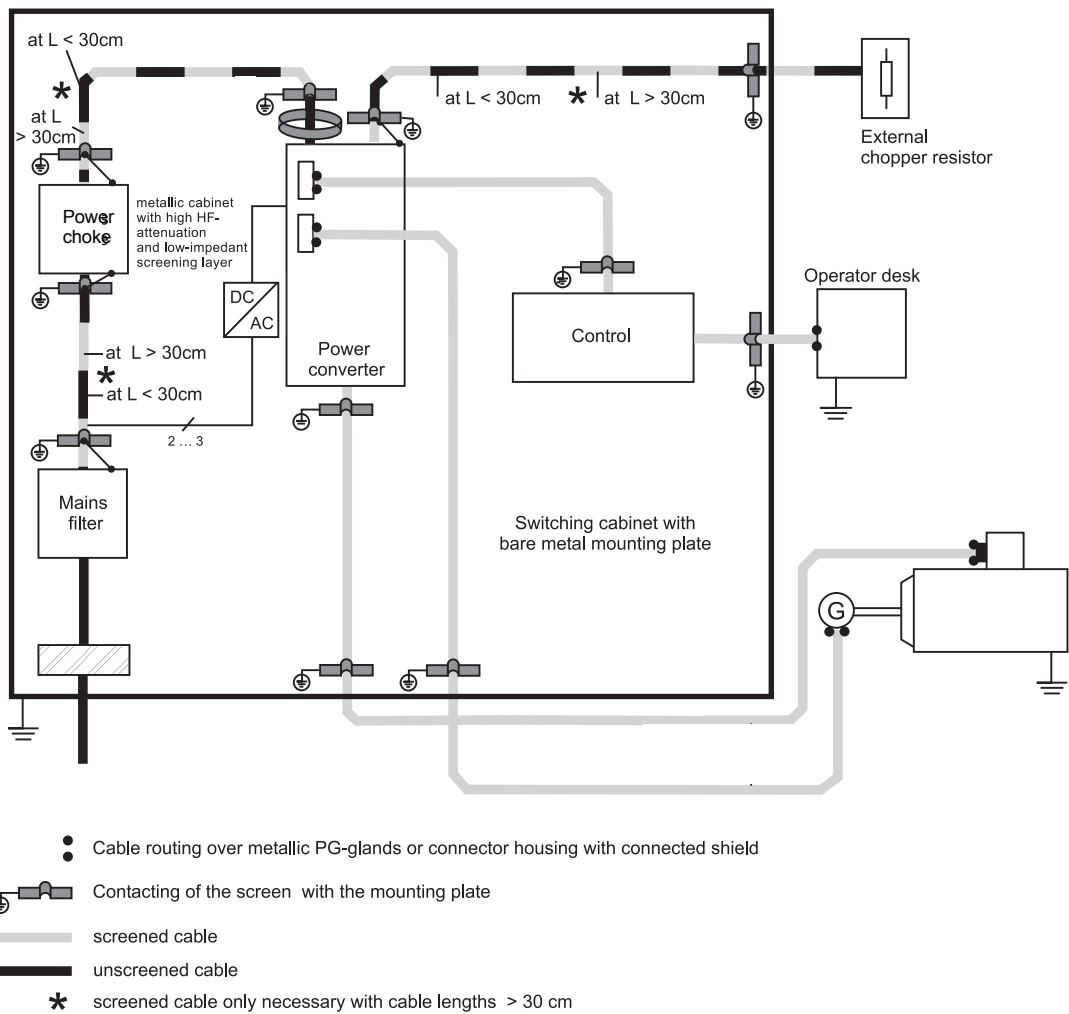


Figure 13: Cabling power unit

7.5 System requirements with regard to EMC-stability

- Mains filters recommended by Baumüller should be used.
- Observe the correct sequence of the components:
Mains - fuse - mains filters - power choke (dependent of power converter) - power converter - motor
- If Baumüller motor cables and - components are used only, the compliance with the permitted limit value of the interference immunity and of the interfering radiation can be assumed.
- The maximum length of the motor cable is limited. The length is dependent of the cross-section of the cable (for example 100 m at 1.5 mm², 30 m at 35 mm²). The maximum length should be reduced by the factor 1/n, if n-parallel-connected motor cables are used.
- The screened motor cable between the power converter and the motor must be one piece. The cable may not be interrupted by terminals, contactors, fuses etc.
- The smallest possible effective height is reached, if the cable is installed bonded face-to-face on the surface of grounded switching device panels

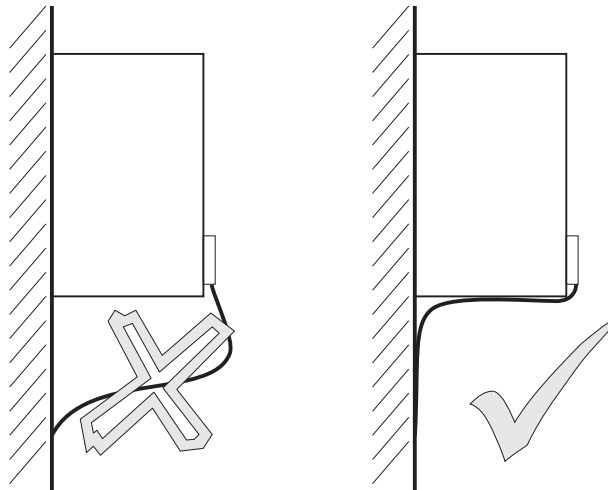


Figure 14: Cable installation - effective height

- The cables shall be installed as near as possible to the conductors of the grounded system. Herewith effective loop area for the magnetic coupling is reduced.

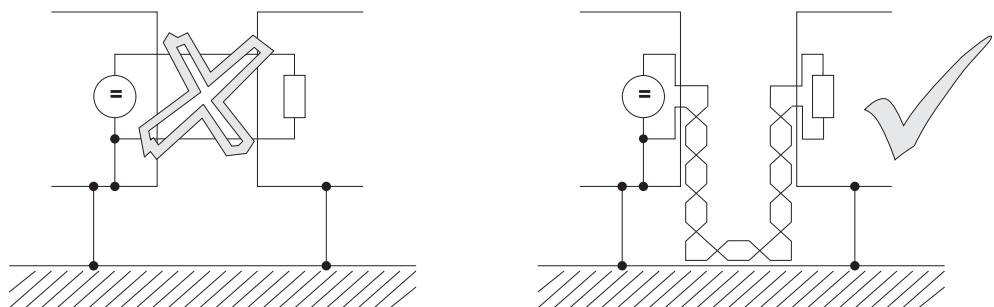


Figure 15: Cable installation - loop area

- A minimum distance of 20 cm should be kept between the conductors at a parallel installation of signal- and control cables and the power cables.
- The distance between cables with very high interference potential and with cables on the mains side of the mains filters should be at least 30 cm.
- Try to cross cables with different EMC-categories in a 90°-angle.
- The conductors of each core pair must be twisted at symmetric signal transmission (for example differential amplifier inputs for the speed value). The core pairs must be twisted with the other core pairs.
- Ground connection converter/ground plate should be as short as possible (< 30 cm). It must be finely stranded. Use great cross-sections (recommended > 10 mm).
- Connect the PE-connection on the load-side of the filter with low impedance to the mounting plate. A zinc-plated sheet metal bracket or a HF-ground band would be perfect.
- There should be a distance of at least 20 cm to the power converter and its wirings for parts, which cause interferences (for example contactors, transformers, chokes) and for susceptible parts (for example μ Ps, bus systems).
- Avoid reserve loops at long cables.
- Ground reserve cables at both ends (additional screening effect, avoid capacitively coupled, dangerous accessible voltages).

Grounding

- In order to reduce the influence of high-frequency interferences, which were generated when operating the power converter, the basic star-grounding does not comply to EMC. A reference surface is required to connect the devices large-surfaced with the potential to ground (for example a metallic bright mounting plate and cabinet parts)
- Mount the power converter with its mains filters and the bonded face-to-face screen contactor of the motor cable to the same reference surface.
- All grounding conductors and screens should be led directly above ground, so that no ground loops occur.
- Ground the controller-reference potential of the power converter. Connect with a great cross-section and a short cable (< 30 cm).
- Remove insulating layers (varnish, adhesive) from the ground connections. Use serrated washers (DIN 6798) to reach the surface. This way a durable conductive contact is achieved. . In order to prevent corrosion of ground connection, select suitable metal pairs (observe electrolytic series of metals). Keep the conductive electrolytics from the connection by using a protective coating (for example grease)
- The screens must be bonded at both ends face-to-face and well conductive to ground. This way the effects of magnetic or highly-frequent interference fields can be attenuated. The receiver should be connected isolated, the transmitter should be connected capacitive, if problems with ground loops occur (for example double grounding of set value cable screening).
- When leading external cable screens through walls, contact the different EMC-ranges separated from one another.
Cables, which are led through walls of screening cabinets without special precautions (for example filtering), can influence the screening effect of these cabinets. Therefore, also connect the cable screenings with well conductivity at the cabinet's outlet with the screening wall.

The distance from the last screening contact point to the cabinet's outlet must be very short.

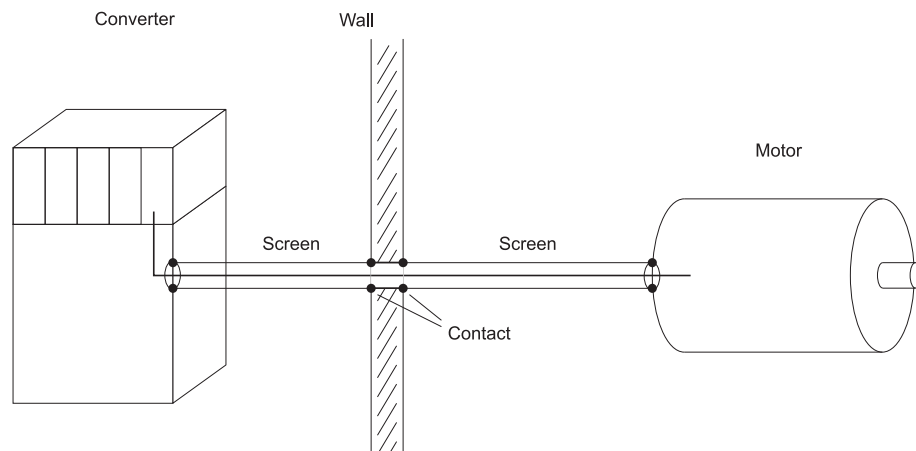


Figure 16: Cable installation - cabinet outlet

Screening

- The cable screen is effective at magnetic fields, if the screen is connected to ground on both ends.
- A screening effect at electric fields is already existing, if the screen is connected only single-sided to ground.
- Fields with high frequencies always are electromagnetic fields. Thereby it does not matter, if it is an electric or a magnetic field. Here screening must be made on both sides.

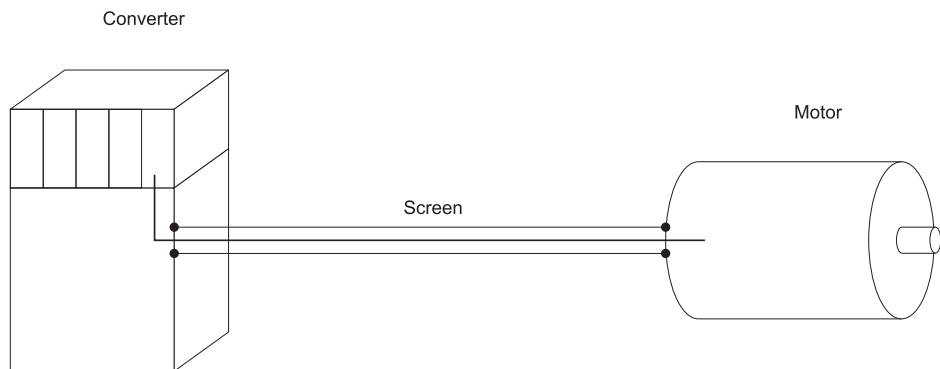


Figure 17: Cable installation - apply screen

- Applying the screen to ground on both sides achieves that the cable remains in the screening „system cabinet“.
- The both-sided grounding of cable screenings nearly excludes an influence due to ground loops (potential differences on the ground system).
- The HF-connection of a screen with ground can also take place capacitively. This avoids low-frequent errors due to ground loops. Screening cables which pass different EMC ranges, may not be opened at the terminals, because the screening attenuation otherwise decreases highly. They must, lead to the next module without interruption.

- The screen connection must be made with a large surface area and low impedance. Cable tails with a length of only 3 cm (1 cm wire = 10 nH) reduce the screening effect with errors in the MHz range up to 30 dB!

**NOTE**

The braided screen must have a coverage of at least 85 %.
The following lines possess an especially high interference potential:

- Motor cable
- Cable to external chopper resistors
- Cable between mains filter and power choke
- Cable between power choke and converter

Available screening terminals see [►Screening terminals◄](#) on page 61.

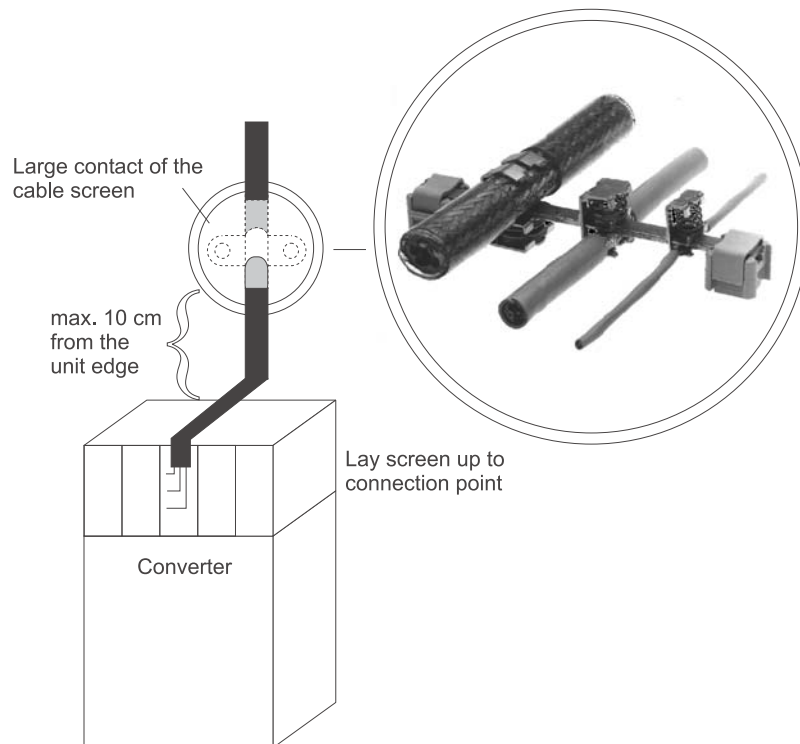


Figure 18: Proposal for a screening connection

7.6 Procedure of the installation



DANGER!

Danger to life due to electrical current!

Energized parts are dangerous to life.

Therefore:

- The device, the mounting range and the parts, which are to be mounted (for example supply cables) must be off circuit during complete mounting
- The cross-section of the grounding conductor must be greater than 10 mm²

- ▶ Install all cables compliant with EMC.
- ▶ Connect cables (see ▶[Connection diagram](#)◀ on page 55).
(Pay attention to permitted torques!)



NOTE!

Installation notes:

- Don't connect mains filters in parallel.
- Don't connect mains filters of the same type in series - the attenuation characteristics will not be approved.
- Connect the PE-terminal on the load-side of the filter with low impedance to the mounting board. Ideal is a zinc plated L-bracket or with a HF-earth strap.
- Suppress each drive individually from interferences. In case you have to suppress all of the drives from interferences together, do not interrupt any of the screens between converter and the mains filter. This means the screened lines are not interrupted by fuses, contactors or others, except with eventual necessary power chokes.

7.7 Connection diagram

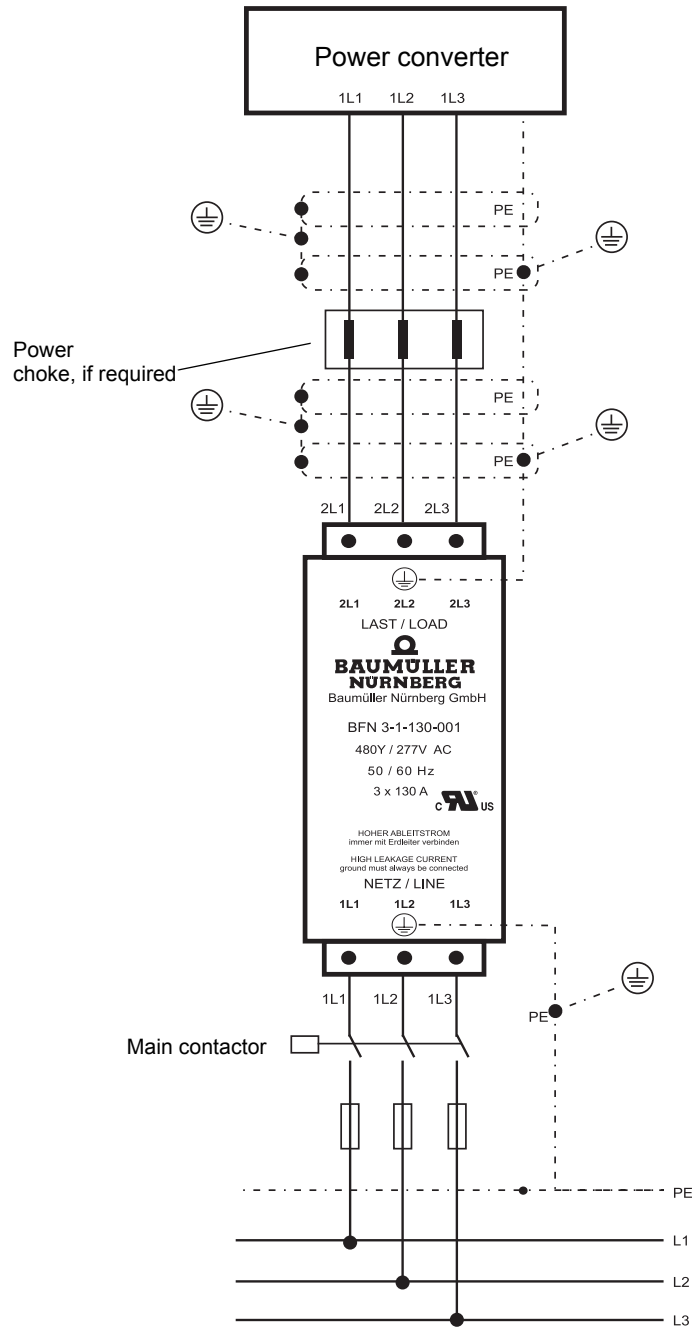


Figure 19: Filter connection

Connection notes

1L1, 1L2, 1L3, PE
2L1, 2L2, 2L3,

Cross-section system connection compliant to EN 60204-1
Installation of cables see EMC-notes.

MAINTENANCE

8.1 Safety notes

Basic information

**DANGER!****Risk of fatal injury from electrical current!**

Inevitably, when operating this electrical device, certain parts of it are energized with hazardous voltage.

Therefore:

- Pay heed to areas on the device that could be dangerous during the maintenance.
- Pay heed to areas that could still be electrically energized after operation.

**WARNING!****Risk of injury due to improperly performed maintenance work!**

Improper maintenance can lead to severe personal injury and material damage.

Therefore:

- Before beginning work, make sure that there is enough space for mounting.
- Make sure that the mounting area is kept clean and orderly. Parts and tools that are loosely stacked or lying around are a potential accident source.

8.2 Environmental conditions

The device is maintenance-free, if the specified environmental conditions are complied with. Information referring to the environmental conditions see [►Required environmental conditions◄](#) on page 17.

8.3 Repairs

In case of device damage, please inform your sales office or:

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Internet: www.baumueller.com

SPARE PARTS AND PART NUMBERS

In this chapter the spare-/accessory parts for the devices of the series Mains Filters are listed. In case you have questions and suggestions according the accessories, do not hesitate to contact our product management.

9.1 Mains filters

For mains invert-
er/compact units

$I_{\text{rated AC 50 °C}}$	TN/TT-system	Part No.
7 A	BFN-3-1-0007-001	314277
16 A	BFN 3-1-0016-001	314278
30 A	BFN 3-1-0030-001	314279
42 A	BFN 3-1-0042-001	314280
56 A	BFN 3-1-0056-001	314281
75 A	BFN 3-1-0075-001	314282
100 A	BFN 3-1-0100-001	314283
130 A	BFN 3-1-0130-001	314284
180 A	BFN 3-1-0180-001	314285
250 A	BFN 3-1-0250-001	373891
320 A	BFN 3-1-0320-001 ¹⁾	439384
	BFN 3-1-0320-101	373896
400 A	BFN 3-1-0400-001 ¹⁾	439385
	BFN 3-1-0400-101	373900
600 A	BFN 3-1-0600-001 ¹⁾	373901
	BFN 3-1-0600-101	419997
1000 A	BFN 3-1-1000-101	423683

¹⁾ available on request

9.1 Mains filters

For
active mains
inverter

$I_{\text{rated AC 50 °C}}$	TN/TT-system	Part No.
150 A	EPCOS B84143A0150R410 for BM5174	437618
55 A	Schaffner FN 3120H-80-35 for BM4135	417872
125 A	Schaffner FN 3120H-150-40 for BM4145	416405
300 A	Schaffner FN 3100-300-99 for BM4163	418234

For mains invert-
er/compact units

$I_{\text{rated AC 50 °C}}$	IT-system	Part No.
150 A	BFN-3-1 - 0150 - 002	433177
250 A	BFN-3-1 - 250 - 002	373620
320 A	BFN-3-1 - 320 - 002	373894
	BFN-3-1 - 320 - 102 ¹⁾	439386
400 A	BFN-3-1 - 400 - 002	373898
	BFN-3-1 - 400 - 102 ¹⁾	439387
600 A	BFN-3-1 - 600 - 002	373902
	BFN-3-1 - 600 - 102	439388

¹⁾ available on request

9.2 Screening terminals

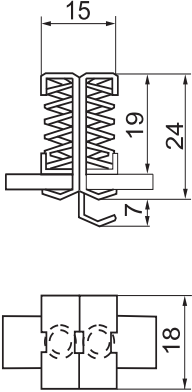
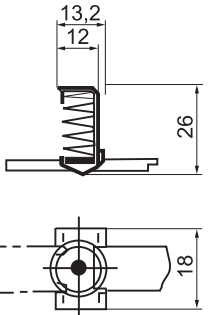
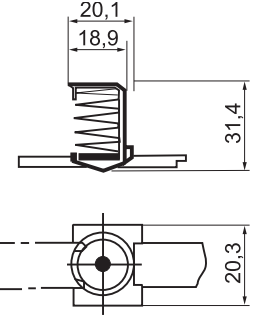
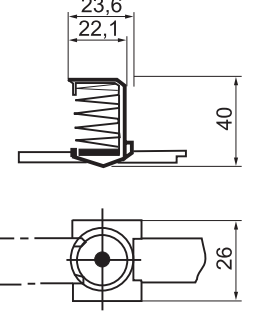
	Cable diameter \varnothing (mm)	Part No.
	2 x 2 - 6 mm	226752
	3 - 8 mm	226741
	4 - 13.5 mm	226745
	10 - 20 mm	226749

Abbildung 20: Screening terminals for grounding

10

DISPOSAL



NOTE!

Baumüller products are not subject to the scope of application of the EU's Waste Electrical and Electronic Equipment Directive (WEEE, 2002/96/EC). Hence, Baumüller is not obligated to bear any costs for taking back and disposing of old devices.



NOTICE!

Avoid polluting the environment as a result of improper disposal.

Therefore:

- Only dispose in compliance with the health and safety regulations.
- Take heed of any special local regulations. If you are unable to directly ensure safe disposal yourself, commission a suitable disposal contractor.
- In the event of a fire, hazardous substances could possibly be generated or released.
- Do not expose electronic components to high temperatures.
- Beryllium oxide is used as inner insulation, for example for various power semiconductors. The beryllium dust that is generated upon opening is injurious to the health.
Do not open electronic components.
- Dispose of capacitors, semiconductor modules and electronic scrap as special waste.



WARNING!

Danger due to faulty disassembly!

Demounting and disposal requires qualified personnel with adequate experience.

Therefore:

- Only allow disassembly and disposal to be performed by qualified personnel

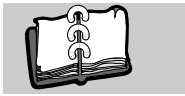
10.1 Disposal facilities/authorities

Ensure that the disposal is handled in compliance with the disposal policies of your company, as well as with all national regulations of the responsible disposal facilities and authorities. In case of doubt, consult the bureau of commerce or environmental protection authority responsible for your company.



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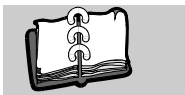


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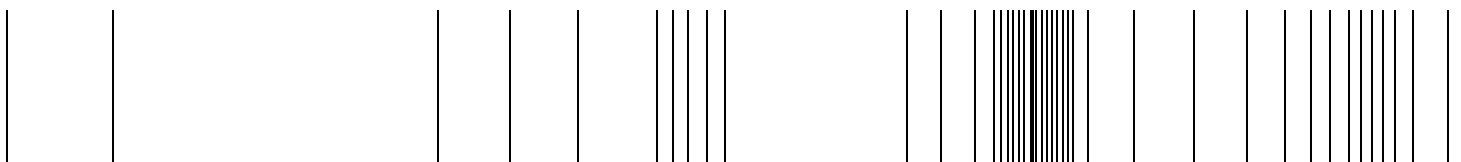
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Overview of Revisions

Version	Edition	Changes
5.09010.01	03-Dec-2012	First edition
5.09010.02	20-Apr-.2017	Revision
5.09010.03	1-Mar-2018	Revision
5.09010.04	28-Nov-2019	Revision

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