

SIEMENS

SINAMICS

SINAMICS G120P

Line filter for PM330 Power Modules

Operating Instructions

Edition

04/2014

Answers for industry.

SIEMENS

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SINAMICS G120P Line filter

Operating Instructions

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Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

 DANGER
indicates that death or severe personal injury will result if proper precautions are not taken.
 WARNING
indicates that death or severe personal injury may result if proper precautions are not taken.
 CAUTION
indicates that minor personal injury can result if proper precautions are not taken.
NOTICE
indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

 WARNING
Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Safety information

1.1 Warnings

 WARNING
Danger to life if the fundamental safety instructions and remaining risks are not carefully observed
Non-compliance with the fundamental safety instructions and residual risks stated in Chapter 1 of the Installation Manual for PM330 Power Modules can result in accidents with severe injuries or death.
• Adhere to the fundamental safety instructions. • When assessing the risk, take into account residual risks.

Note

Use of copper cables for a UL-approved system

For a UL-approved system use 60/75°C copper conductors only.

Preconditions

The persons responsible for the safety of the plant or system must ensure that the following conditions are met:

- Basic planning work for the system and all work relating to transportation, assembly, installation, commissioning, maintenance and repairs is carried out by qualified personnel and checked by responsible, suitably skilled personnel.
- The Operating Instructions and machine documentation are always available.
- The technical specifications regarding the applicable installation, connection, environmental, and operating conditions are always observed.
- The plant-specific assembly and safety guidelines are observed and personal protection equipment is used.
- Unqualified personnel are forbidden from using these machines and working near them.

These Operating Instructions are intended for qualified personnel and only contain information and notes relating to the intended purpose of the machines.

The Operating Instructions and machine documentation are written in different languages as specified in the delivery contracts.

Note

Support by SIEMENS service centers

We recommend engaging the support and services of your local Siemens service center for all planning, installation, commissioning and maintenance work.

1.2 Components that can be destroyed by electrostatic discharge (ESD)

CAUTION

Components sensitive to electrostatic charge

The board contains components that can be destroyed by electrostatic discharge. These components can be easily destroyed if not handled properly. If you do have to use electronic boards, however, please observe the following:

- You should only touch electronic boards if absolutely necessary.
- When you touch boards, however, your body must be electrically discharged beforehand.
- Boards must not come into contact with highly insulating materials (such as plastic parts, insulated desktops, articles of clothing manufactured from man-made fibers).
- Boards must only be placed on conductive surfaces.
- Boards and components should only be stored and transported in conductive packaging (such as metalized plastic boxes or metal containers).
- If the packaging material is not conductive, the boards must be wrapped with a conductive packaging material (such as conductive foam rubber or household aluminum foil).

The necessary ESD protective measures are clearly illustrated in the following diagram:

- a = conductive floor surface
- b = ESD table
- c = ESD shoes
- d = ESD overall
- e = ESD wristband
- f = cabinet ground connection
- g = contact with conductive flooring

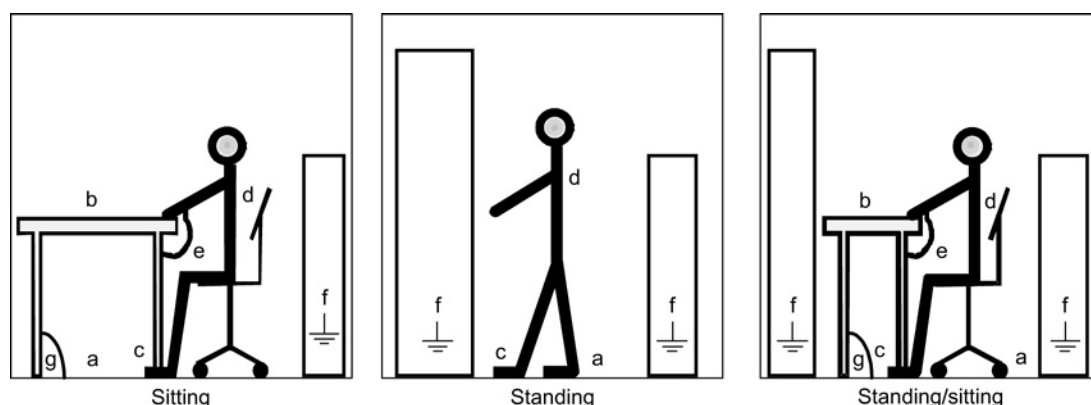


Figure 1-1 ESD protective measures

1.2 Components that can be destroyed by electrostatic discharge (ESD)

General

Description

The line filters limit the conducted interference emitted by the converter units to permissible values.

To reduce emissions, the Power Modules are equipped as standard with a line filter in accordance with the limit values defined in category C3 (environment 2). The additional line filters described here can be fitted for use in environment 1 (category C2).

In conjunction with line reactors, line filters limit the conducted interference emitted by the Power Modules to the limit values defined in product standard EN 61800-3. Provided that the system has been set up in accordance with the EMC installation guidelines, the limit values at the installation location will be in accordance with the requirements for environment 1.



CAUTION

Risk of burns due to high surface temperatures of the line filter

The line filter can become very hot. You can get seriously burnt when touching the surface.

- Mount the line filter so that contact is not possible. If this is not possible, attach a clearly visible and understandable warning notice at hazardous positions.
- To prevent adjacent components from suffering damage due to these high temperatures, maintain a clearance of 100 mm on all sides of the line filter.

NOTICE**Line filter damage by connecting to impermissible line supplies**

The line filters are only suitable for direct connection to TN or TT systems with grounded neutral point. Line filters are designed for connection to systems with a continuous level to voltage harmonics in accordance with EN 61000-2-4, Class 3. Connection of the line filter to other systems may result in damage.

- Only connect the line filter to TN or TT systems with grounded neutral point and a continuous level to voltage harmonics in accordance with EN 61000-2-4, Class 3.

NOTICE**Line filter damage due to interchanged connections**

The line filter will be damaged if the input and output connections are interchanged.

- Connect the incoming line cable to LINE/NETZ L1, L2, L3.
- Connect the outgoing cable to the line reactor to LOAD/LAST L1', L2', L3'.

**WARNING****Risk of fire through overheating if there are insufficient ventilation clearances**

Inadequate ventilation clearances cause overheating with a risk for personnel through smoke development and fire. Damage can still occur on the line filter.

- For this reason, maintain the 100 mm clearances above and below the line filter.

**WARNING****Danger to life due to high leakage currents caused by an interrupted external protective conductor**

The drive components conduct a high leakage current via the protective conductor. Touching conductive parts when the protective conductor is interrupted can result in death or serious injury.

- Ensure that the external protective conductor satisfies at least one of the following conditions:
 - It has been laid so that it is protected against mechanical damage. ¹⁾
 - If it is a single conductor, it has a cross-section of at least 10 mm² Cu.
 - If it is a conductor of a multi-conductor cable, it has a cross-section of at least 2.5 mm² Cu.
 - It has a second protective conductor in parallel with the same cross-section.
 - It complies with the local regulations for equipment with increased leakage current.
- ¹⁾ Cables laid within control cabinets or closed machine housings are considered to be adequately protected against mechanical damage.

 CAUTION**Fire hazard due to overheating when the total length of the power cables is exceeded**

Overheating and fire can result when the total length of the motor cables is exceeded.

- Ensure that the total length of the motor cables does not exceed 100 m.

NOTICE**Destruction or damage to additional loads as a result of undesirable line harmonics**

Line harmonics can occur if line filters that differ from those listed in this Manual are used. These can disturb or damage other loads connected to the line supply.

- Only use line filters that are listed in this document.

NOTICE**Destruction or damage to components by incorrectly connecting the line filter**

When incorrectly connecting the line filter, these components can be destroyed or damaged.

- Only connect the Power Module to the SINAMICS line filter via the associated line reactor.
- Connect additional loads upstream of the SINAMICS line filter (if required, via a separate line filter).

NOTICE**Damage to the line filter through overheating when operated on the system without active operation of the inverter**

Connection of the line filter to the supply system with no active inverter operation can lead to overload and damage to the line filter through overheating.

- Only connect the line filter to the supply system if the inverter is active.
- Ensure that there is adequate cooling for the line filter.

Note**Disconnect the line filter for a high-voltage test**

If a high-voltage test is conducted with alternating voltage in the system, the existing line filters must be disconnected in order to obtain accurate measurements.

The connection clip to the interference suppression capacitor in the Power Module must also be removed for a high-voltage test with direct voltage.

Assignment of line filter and Power Module

Table 2- 1 Assignment of line filter and Power Module

Power Module	Unit rating of the Power Module	Suitable line filter
Line voltage 380 – 480 V 3 AC		
6SL3310-1PE33-0AA0	160 kW	6SL3000-0BE33-1AA0
6SL3310-1PE33-7AA0	200 kW	6SL3000-0BE33-1AA0
6SL3310-1PE34-6AA0	250 kW	6SL3000-0BE35-0AA0
6SL3310-1PE35-8AA0	315 kW	6SL3760-0MR00-0AA0
6SL3310-1PE36-6AA0	355 kW	6SL3760-0MR00-0AA0
6SL3310-1PE37-4AA0	400 kW	6SL3760-0MR00-0AA0

Mechanical installation

When the line filter is installed in a cabinet, it must be positioned directly beside the Power Module.

The line reactor must be positioned between the line filter and Power Module. Cabling must be kept as short as possible.

To prevent interference being injected into the interference-suppressed line cable (this can, in some cases, nullify the effects of the line filter), the line cable to the line filter must be routed separately from other cables.

The housing of the Power Module and line filter must be connected with low resistance for high-frequency interference currents. This can be achieved by installing the Power Module and line filter on the same mounting plate. The Power Module and line filter must be connected to the mounting plate with the greatest possible surface area. The best solution here is to use a metallic, bare, oil-free mounting plate (e.g., made of stainless steel or galvanized sheet-steel) because the entire contact surface establishes the electrical contact.

If a painted mounting plate is used, the screw positions for the Power Module and line filter must free of paint to ensure electrical contact with the mounting plate.

The motor must always be connected using a shielded cable for the purposes of complying with the limit values of the first environment (category C2) according to EN 61800-3. The shield must be applied to the motor and Power Module with the greatest possible surface area.

The ground wire for the motor must be fed directly back to the Power Module.

Dimension drawing

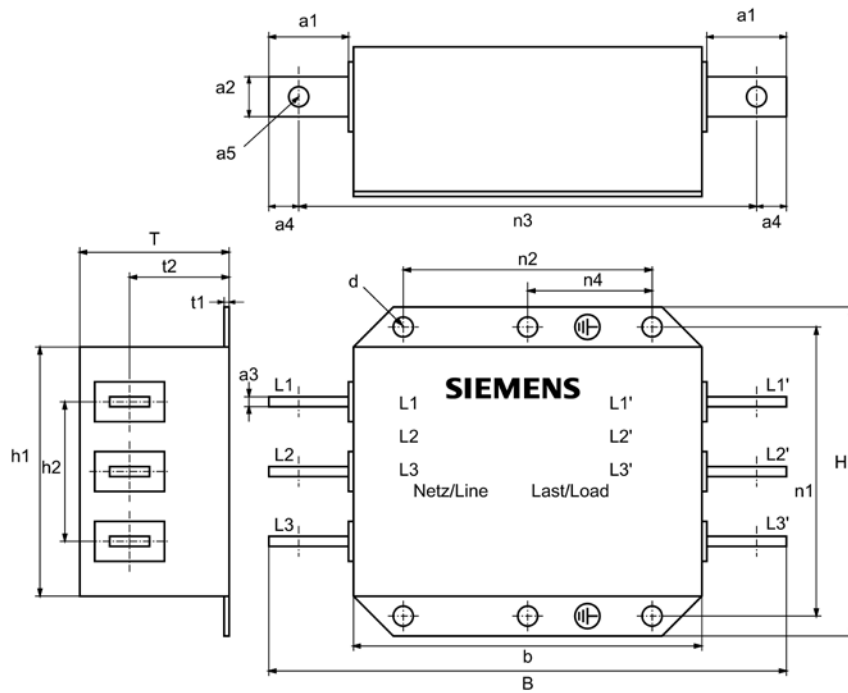


Figure 3-1 Dimension drawing, line filter

Table 3- 1 Dimensions of the line filter (all data in mm)

	6SL3000-0BE33-1AA0	6SL3000-0BE35-0AA0	6SL3760-0MR00-0AA0	
W	360	390	425	
H	240	265	265	
D	116	140	148	
a1	40	40	49.5	
a2	25	30	50	
a3	5	8	10	
a4	15	15	20	
a5	11	11	14	
b	270	310	315	
h1	200	215	215	
h2	100	120	142	
t1	2	2.5	2.5	
t2	78.2	90	94	
n1 ¹⁾	220	240	240	
n2 ¹⁾	210	250	255	
n3	330	370	385	
n4	-	-	127.5	
d	9	12	12	
¹⁾ Lengths n1 and n2 correspond to the distance between holes				

Electrical installation

Connection

When connecting the line filter and line reactor, you must take into account the following conditions to ensure that they function correctly:

- Use shielded control cables. The shield must be connected at both ends.
- With analog control cables, connecting the shield at both ends can result in coupled-in noise. To prevent this, the shield must only be connected at one end on the Power Module.
- Control cables must be routed separately from power cables. Power cables are motor cables or connecting cables from the DC link of the Power Module (terminals DCP/DCN) to other components (e.g., Braking Module). In particular, you must ensure that control cables and power cables are not routed in parallel in a joint cable raceway, even if all the cables are shielded.
- You must use shielded motor cables. The shield for the motor cable must be attached to the shield plate and motor housing.
- The ground wire for the motor must be fed directly back to the Power Module.

Connection overview

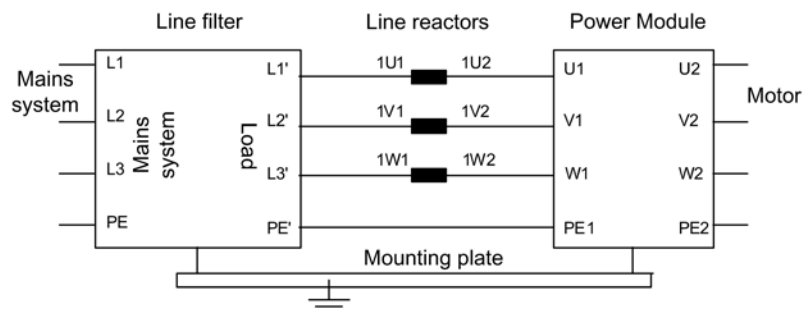


Figure 4-1 Connecting the line filter, line reactor, and Power Module

Tightening torques for screw connections

The following tightening torques apply when tightening connections of operating current-conducting parts (busbars), non-operating current-conducting parts (ground connections, ground terminal connections), and general steel threaded connections.

Table 4- 1 Tightening torques for screw connections

Thread	Ground connections, protective conductor connections, steel threaded connections (fault current-conducting)	Plastic, busbars (operating current-conducting)
M8	25 Nm	13 Nm
M10	50 Nm	25 Nm
M12	88 Nm	50 Nm

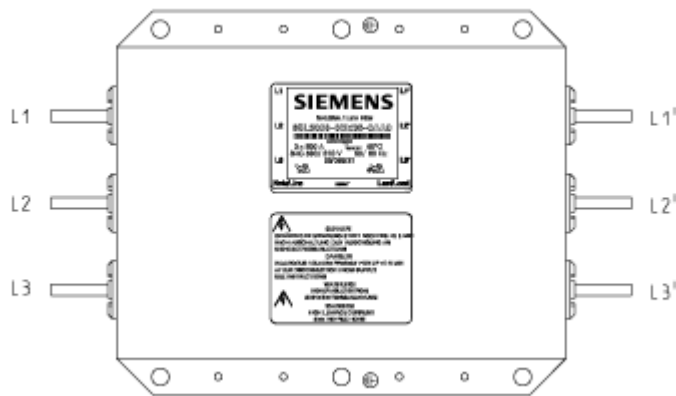


Figure 4-2 Connection overview of the line filter

Technical specifications

General technical data

Table 5- 1 General technical data

Line frequency	47 ... 63 Hz
Product standard	EN 61800-5-1
Overload capacity	1.60 x I _R for 3 s followed by 1.36 x I _R for 60 s followed by 1.00 x I _R for 240 s

Specific technical data

Table 5- 2 Technical data of line filter 380 V – 480 V 3 AC

Order number		6SL3000-0BE33-1AA0	6SL3000-0BE35-0AA0	6SL3760-0MR00-0AA0	
Rated voltage	V	380 V 3 AC –10% to 480 V 3 AC +10% (-15% < 1 min)			
Rated current I _R	A	400	600	400	
Power loss	kW	0.042	0.06	0.042	
Line/load connection		M10 connecting lugs	M10 connecting lugs	M10 connecting lugs	
PE connection		M8	M10	M8	
Degree of protection		IP00	IP00	IP00	
Dimensions					
Width	mm	360	390	425	
Height	mm	240	265	265	
Depth	mm	116	140	148	
Weight	kg	12.7	19.9	25	

Further information

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