EH

SSD DRIVES

Suppression aids

Product Manual

07-09-04-02-E-V1605.doc

Further descriptions, that relate to this document:

UL: 07-01-05-06 	635 Product manual
UL: 07-01-08-02 	631 Product manual
UL: 07-02-08-03 	637 Product manual
UL: 07-02-09-01 	637+ Product manual
UL:07-02-10-01 	637f Product manual

Made in Germany, 2005

CONTENTS

The most important thing first

Thanks for your confidence choosing our product.

These operating instructions present themselves as an overview of the technical data and features.

Please read the operating instructions before operating the product.

If you have any questions, please contact your nearest SSD Drives representative.
Improper application of the product in combination with dangerous voltage can lead to injuries.
In addition, damage can also occur to motors or other products.
Therefore please observe our safety precautions strictly.

Safety precautions

We assume that, as an expert, you are familiar with the relevant safety regulations, especially in accordance with VDE 0100, VDE 0113,VDE 0160, EN 50178, the accident prevention regulations of the employers liability insurance company and the DIN regulations and that you are able to use and apply them.
As well, relevant European Directives must be observed.

Depending on the kind of application, additional regulations e.g. UL, DIN are subject to be observed.
If our products are operated in connection with components from other manufacturers, their operating instructions are also subject to be observed strictly.

1 WHY FILTERS?

In order to apply SSD Drives components in conformity with CE norms.

1.1 Legal regulations, general

Diverse legal regulations are in force for the user of high-frequency devices
(here **SSD Drives servo drives**).
Here the VDE Norm 0875-part 3 (interference radiation) defines a limit value curve in the frequency range from 150 kHz to 30 MHz which must not be exceeded !
As from 1.1.1996 the German laws and norms in force are replaced by an Europe-Norm (**EN**) defining requirements for interference emissions and immunity to interference.

1.2 Operational and functional dependability of systems

The use of servo drives in few cases can cause interference problems of the further electronic of system due to the produced interference spectrum.

In order to rule this out from the beginning on, interference must be suppressed.

The operational dependability and the problem free total function of a system is to be taken into account with these filter guidelines.

1.3 Résumé

It is due to substantial studies in EMC measuring laboratories that the following
can be recorded as résumé:

1.) It is only with shield and filter measures that the corresponding norms and legal regulations can be fulfilled.

2.) For an optimal effect **motor cables** must be grounded on both ends and must be screwed together with the grounded rear wall of the control cabinet via cable clamps or ground buses.
We recommend using the SSD Drives cables: **KMB**

3.) **Resolver cables** must be grounded one-sided, on the drive end, and extensively in order to have an optimal effect. We recommend using the SSD Drives cables: **KIR**

4.) **SSD Drives line filters** should be used for the line-sided interference suppression.
We recommend using the power line filters: **LNF B and LNF E (1phase)**
These products are CE certified and UL conform.
The filter is to be placed to the servo drive so close as possible

5.) Due to capacitive feedbacks also the
24V DC supply of the device is affected by considerable interferences.
We recommend especially by using the analog drives the control-voltage-line filter:
SNFT 24

6.) In order to reduce EMC-radiation in the drive background,
we recommend using toroidal ferrite core: **FR**

7.) **Extensive grounding of the filters.**

The SSD Drives devices are **CE-conform** with the mentioned suppression aids.

2 General

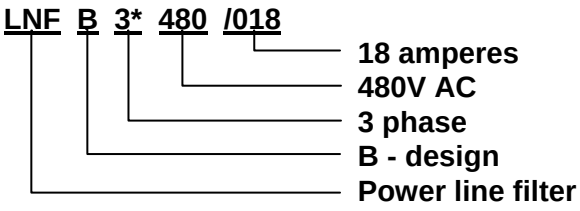
2.1 Type code

	standard				
marking	**a**	**b**	**c**	**d**	**e**
Type:	**LNF**	**X**	X*	XXX	/XXX

marking	description			
a	**LNF**	=	Power line filter	
b	**B**	**=**	B - design	(3 phase)
	E	**=**	E – design	(1 phase)
	S	=	S - design	(1 phase)
c			Power supply:	
	1	=	1 phase	
	3	=	3 phase	
d			Power supply voltage:	
	230	=	230V AC	
	440	=	440V AC	
	480	=	bis 480V AC (+ 5% tolerance)	
e			continuous current:	
	008	=	8 amperes	
	...			
	082	=	82 amperes	

2.2 Typical example

A typical example of an order corresponding to the type code would be:

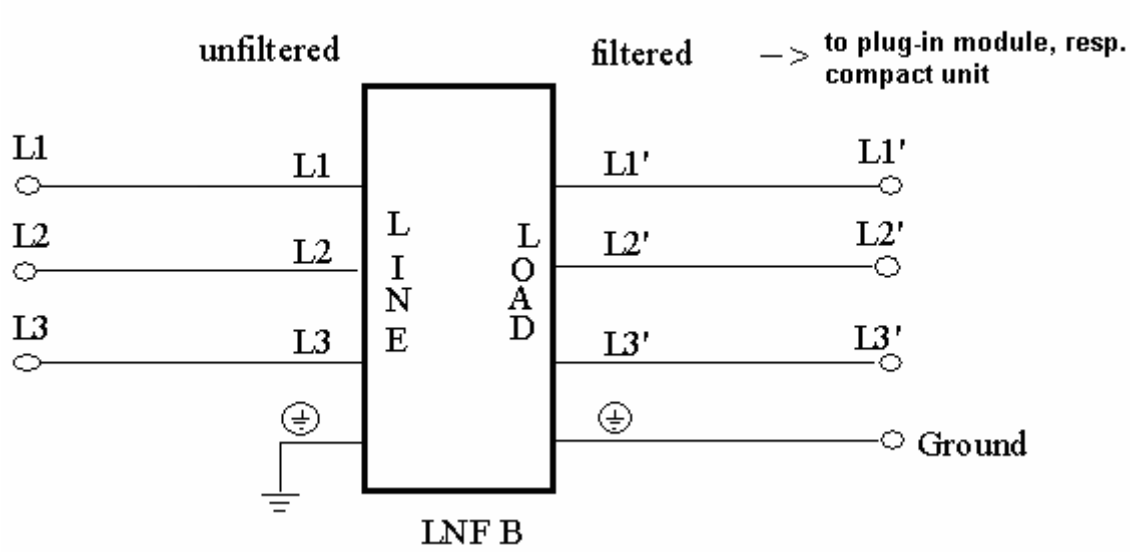


3 Line filters for three-phase power supply

3.1 Line filters LNF B 3phase, to 480 V AC

3.1.1 Connection principle

3 * 480V AC



3.1.2 Filter selection: series LNF B

For the three-phase line feed (up to 480V AC) the following types of filters by **SSD Drives** are at your disposal.

type of filter	continuous current	power loss	leakance current	maximum supply voltage
-	(A)	(W)	(mA)	(V AC)
LNF B 3 * 480 / 008	8	4	33	480
LNF B 3 * 480 / 018	18	6	33	480
LNF B 3 * 480 / 033	33	12	33	480
LNF B 3 * 480 / 046	46	20	33	480
LNF B 3 * 480 / 060	60	26	33	480
LNF B 3 * 480 / 082	82	32	33	480

Line filters for three-phase power supply

Line filters LNF B 3phase, to 480 V AC

3.1.3 Selection criterion

A three-phase line filter, type LNF B, must be used for the SSD Drives-1-axis-**compact** servo drive system and for the SSD Drives-servo drive system in the **rack** with three-phase line feed.

As selection criterion serves the required effective constant current of the power supply unit

In order for ease the selection, here a table showing the relation of the filters to the respective SSD Drives line plug-in modules NE B and compact drives.

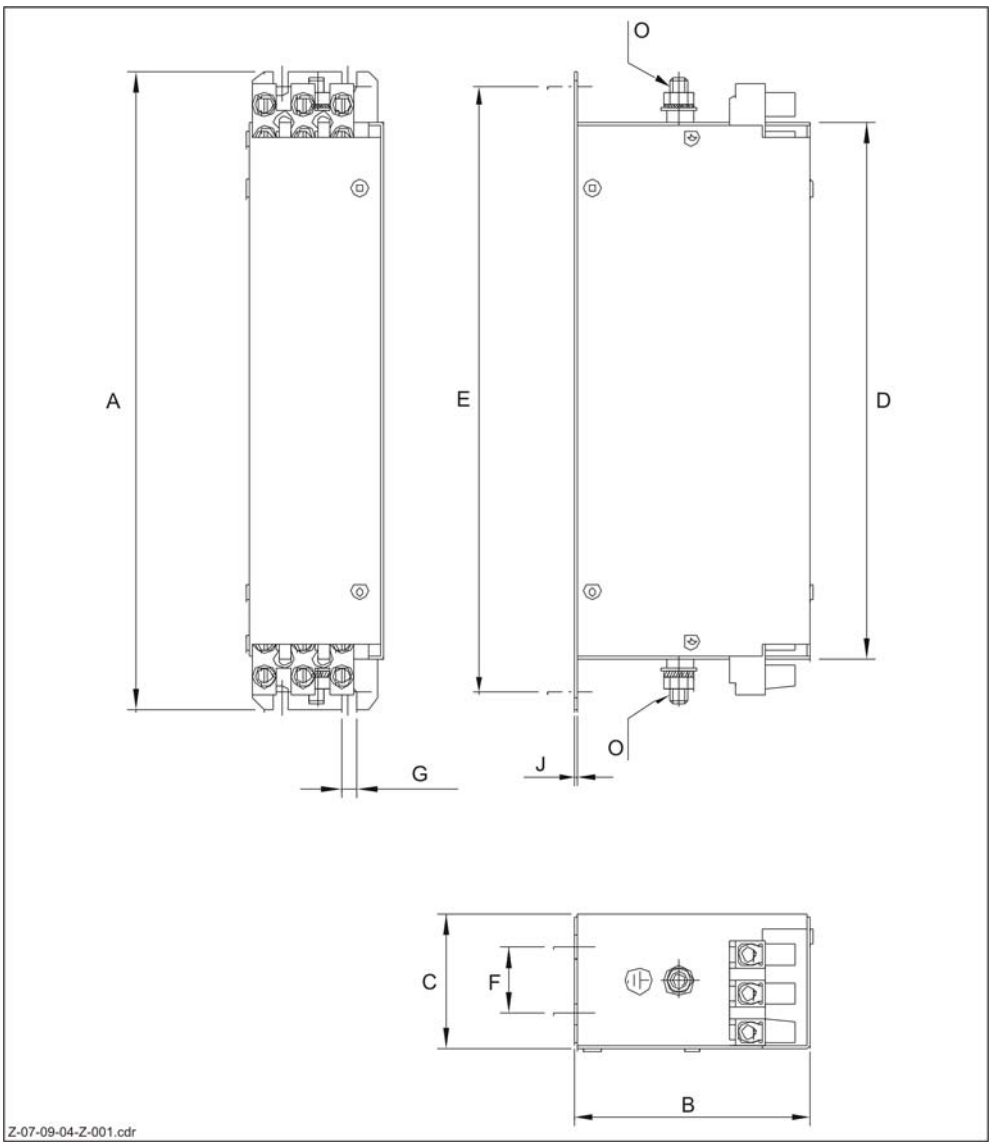
type of filter	SSD Drives - line plug-in modules		1 axis compact drive	
	continuous current	type:	635-compact type:	637'Serie - compact type:
(-)	(A_{eff})	(-)	(-)	(-)
LNF B 3 * 480/008	15	NE x 15..-3	635/K DER 01 .. 07.A3	637x/K D6R 02 - 06
LNF B 3 * 480/018	17	NE x 17..-3/..-6/..-7	635/K DER 10.A3	637x/K D6R 10 u. 16
LNF B 3 * 480/033	30	NE x 17..-3/..-6/..-7(ventilated)	-	637x/K D6R 22 u. 30
LNF B 3 * 480/046	40	NE x 40..-3/..-6/..-7	-	-
LNF B 3 * 480/060	75	NE x 40..-3/..-6/..-7(ventilated)	-	-
LNF B 3 * 480/082	75	NE x 40..-3/..-6/..-7(ventilated)	-	-

A general point about mains filter sizing:
With regard to the established constant rms current, the next larger filter should always be used!

Line filters for three-phase power supply

Line filters LNF B 3phase, to 480 V AC

3.1.4 Dimension sketch



dimension	type : LNF B 3 * 480					
	/008	/018	/033	/046	/060	/082
A	190	250	270	310	250	270
B	70	70	85	85	90	135
C	40	45	50	50	85	80
D	160	220	240	280	220	240
E	180	235	255	295	235	255
F	20	25	30	30	60	60
G	4,5	5,4	5,4	5,4	5,4	6,5
J	1	1	1	1	1	1,5
O	M5	M5	M6	M6	M6	M6

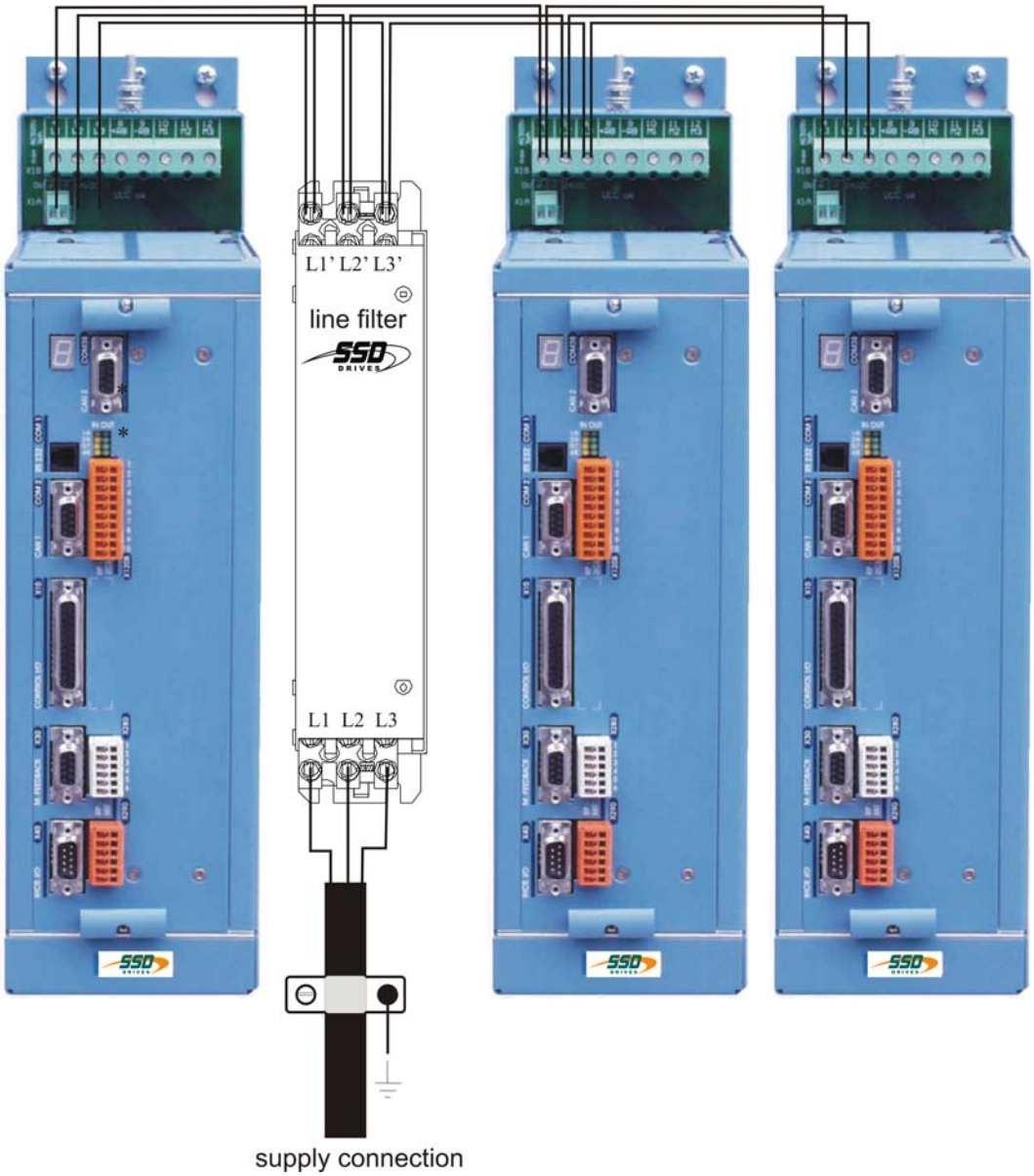
All dimensions in "mm"

Line filters for three-phase power supply

Line filters LNF B 3phase, to 480 V AC

3.1.5 Application example
Filter LNF B for 3 axes

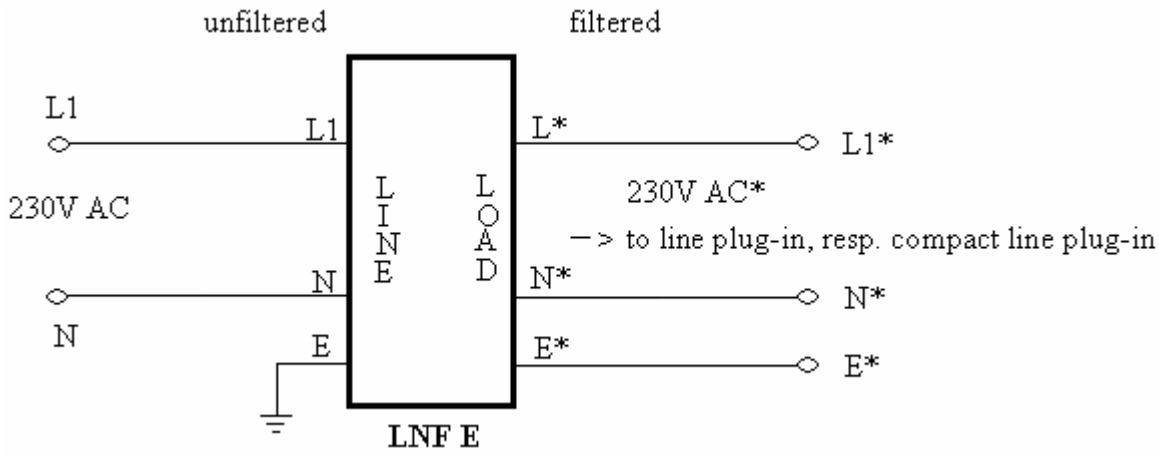
(Servo drive 637/K D6R, 637+/K D6R resp. **637f/K D6R**)



4 Line filter for one-phase power supply 230V AC

4.1 Low – cost filter LNF E

4.1.1 Connection principle



4.1.2 Filter selection: series LNF E

The following filter models by **SSD Drives** for the one-phase line feed.
(230V AC) are available:

type of filter	continuous current	power loss	leakance current	maximum supply voltage
-	(A)	(W)	(mA)	(V AC)
LNF E 1 * 230/012	12	5	9,4	250

Line filter for <u>one-phase</u> power supply 230V AC

Low – cost filter LNF E

4.1.3 Selection criterion

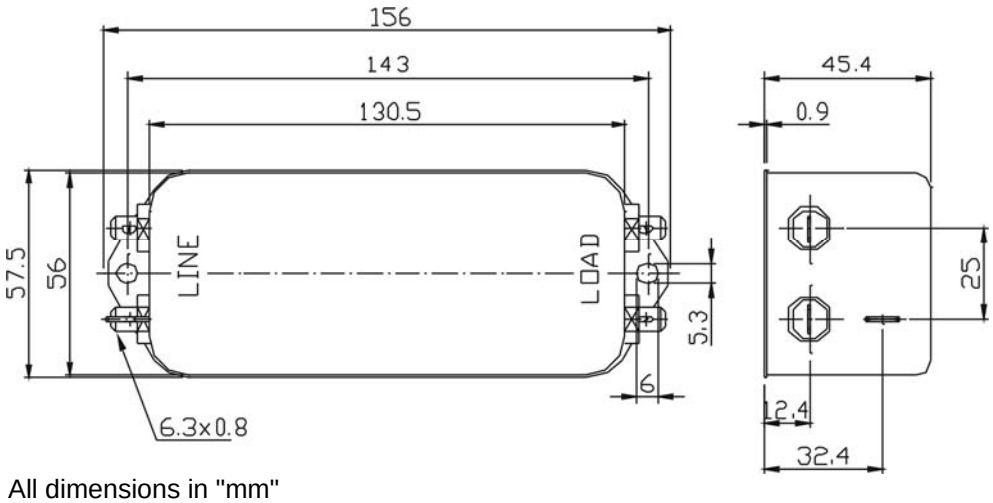
A one-phase line filter, type LNF E,
must be used for the SSD Drives-1-axis-**compact** servo drive system and for the
SSD Drives servo drive system in the **rack** with one-phase line feed.

The required effective constant current of the power supply unit serves as selection criterion.

In the following the relation of the filter typ to the line plug-in module and compact drives is represented:

type of filter	SSD Drives - line plug-in modules		1 axis compact drive	
	continuous current	type:	635-compact type:	637'Serie - compact type:
(-)	(A_{eff})	(-)	(-)	(-)
LNF E 1 * 230/012	15	NE x 15..-3	635/K DER 01 .. 07.A3	-
LNF E 1 * 230/012	17	NE x 17..-3/..-6/..-7	635/K DER 01 .. 07.A3	637x/K D6R 02 - 06.Sx-3

4.1.4 Dimension sketch line filter; <u>one-phase</u>, LNF E 1 * 230 / 012

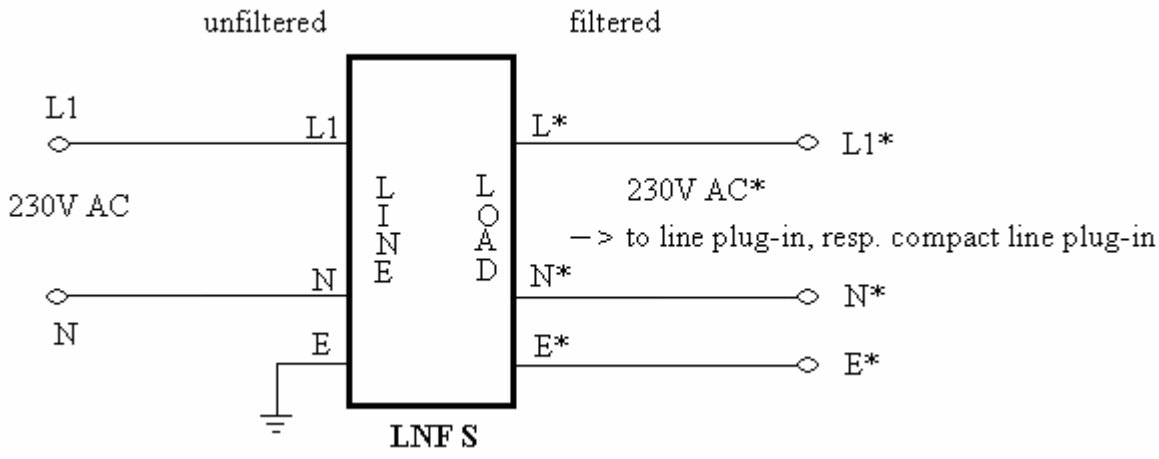


All dimensions in "mm"

Line filter for one-phase power supply 230V AC

4.2 Filter LNF S

4.2.1 Connection principle



4.2.2 Filter selection: series LNF S

The following filter types by **SSD Drives** for the one-phase line feed.
(230V AC) are available:

type of filter	continuous current	power loss	leakance current	maximum supply voltage
-	(A)	(W)	(mA)	(V)
LNF S 1 * 230/012	12	-	9,8	250

Line filter for one-phase power supply 230V AC

Filter LNF S

4.2.3 Selection criterion

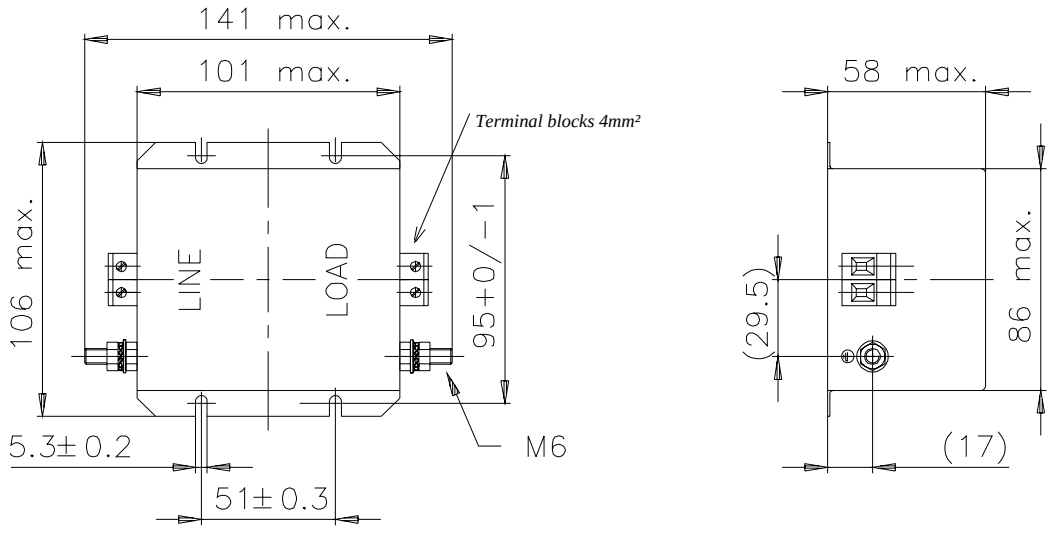
A one-phase line filter, type LNF S,
must be used for the SSD Drives-1-axis-**compact** servo drive system and for the SSD Drives-servo drive system in the **rack** with one-phase line feed.

The required effective constant current of the power supply unit serves as selection criterion.

In the following the relation of the filter model to the line plug-in module and compact drives is represented:

type of filter	SSD Drives - line plug-in modules		1 axis compact drive	
	continuous current	type:	635-compact type:	637'Serie - compact type:
(-)	(A_{eff})	(-)	(-)	(-)
LNF S 1 * 230/012	15	NE x 15..-3	635/K DER 01 .. 07.A3	-
LNF S 1 * 230/012	17	NE x 17..-3	635/K DER 01 .. 07.A3	637x/K D6R 02 - 06.Sx-3

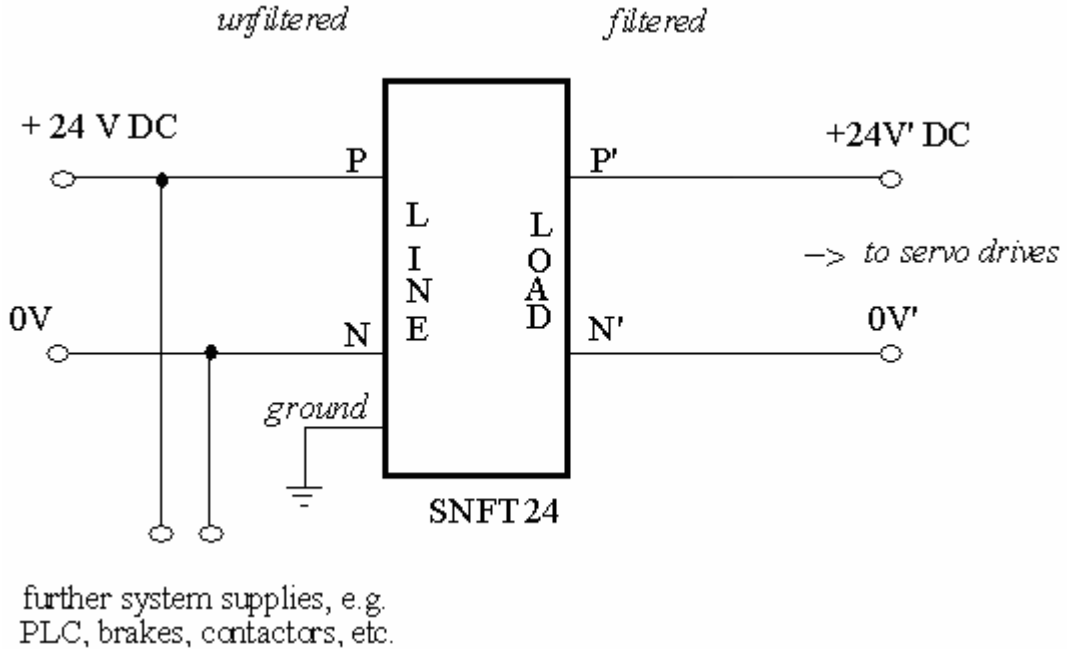
4.2.4 Dimension sketch line filter; one-phase, LNF S 1 * 230 / 012



All dimensions in "mm"

5 Control voltage line filter for supply of 24V devices

5.1 Connection principle



5.2 Filter selection: Series SNFT 24

The following filter model by **SSD Drives** for the 24V DC line feed is available: **SNFT 24/10**

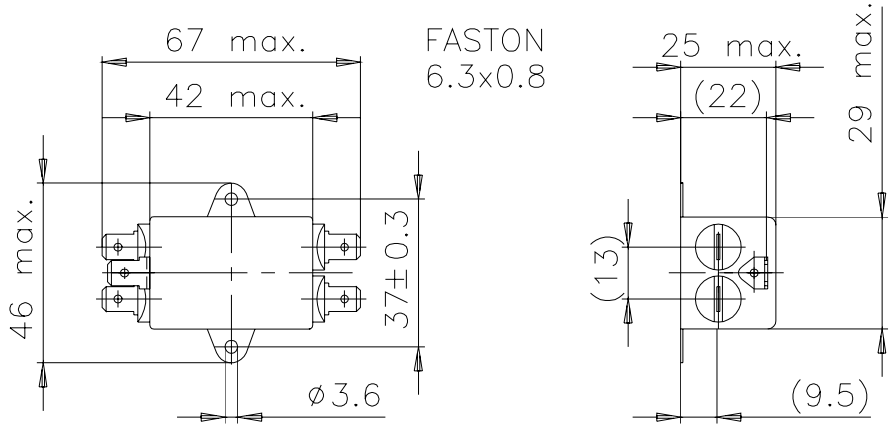
type of filter	continuous current	power loss	leakance current	maximum supply voltage
-	(A)	(W)	(mA)	(V)
SNFT 24/10	10	-	-	30

5.3 Criterion

The filters can be used with the digital drives of series 630.

A **SNFT 24/10** can be used for the single device (e.g. compact version).
For the rack system up to 9 servo drives (19 inch standard rack)
can be suppressed with the filter SNFT 24/10!

5.4 Dimension sketch for SNFT 24/10



All dimensions in "mm"

6 Toroidal ferrite cores

6.1 Criterions for the use

In order to reduce EMC-radiation in the drive background, we recommend using toroidal ferrite cores.

The follwing filters were selected according to some machine tests.
Optimal applications can only be guaranteed in connection with special tests on the respective machine.

a) **Type: FR 3.V2:**

Use with all 3 U power unit modules and drive modules.
Servo drive 631 and 635

b) **Type: FR 6.V2:**

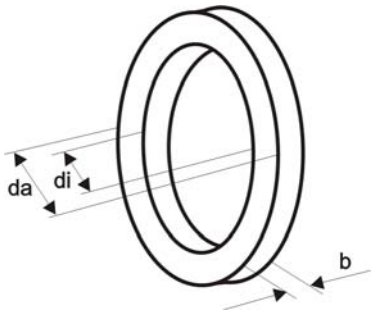
Use with 6 U power unit and 6 U drives, a toroidal ferrite core for all 3 motor phases.
Servo drive 637' series

A toroidal ferrite core should be used generally with the drives of series 630
from a motor cable length ≥ 15m per motor connection.

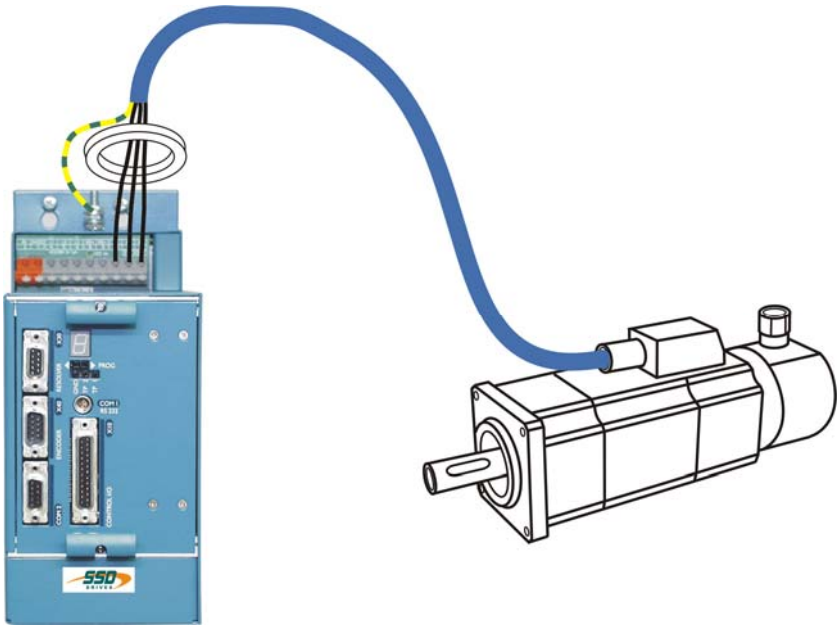
6.2 Dimensions

type	dimension		
	da	di	b
FR 3.V2	26	14,5	15,0
FR 6.V2	45	23,0	22,8

All dimensions in "mm"



6.3 Application example, drive / motor



7 Notes

8 Modification

Version	Modification	Chapter	Date	Name	Comment
V12.18EH99	re-worked	all	06.05.1999	K. Stadler	
V13.40EH00	re-worked new chapter	2.1.4 2.1.5	05.10.2000	N.Dreilich	changed view Application of 3 - axes
V14.51DL00	Correction	2.1.4	20.12.2000	N.Dreilich	
V1501	Type to the model Filter LNF B and E Separation German / English	2 3/4 all	21.02.2001	N.Dreilich	complemented complemented
V1605	Cut down to actual products SSD - Drives	-	12.01.2005	N. Dreilich	Logos

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