Catalogue LV 60 · 2007

sidac

Reactors
and Filters

SIEMENS

Related catalogues

Low-Voltage Controls and Distribution
SIRIUS · SENTRON · SIVACON
Order No.
Catalogue
E86060-K1002-A101-A5-7600 — LV 1
Technical Information
E86060-T1002-A101-A5-7600 — LV 1 T

Industrial Communication — IK PI
Industrial Communication for Automation and Drives
Order No.:
E86060-K6710-A101-B5-7600

PROFINET/Industrial Ethernet• Industrial Mobile Communicaton • PROFIBUS to IEC 61158/EN 50170 • SIMATIC ET 200 distributed I/Os • AS-Interface to EN 50295/IEC 61158 • Remote operation with SINAUT Telecontrol • Routers • ECOFAST system

SICUBE — LV 50
System Cubicles and Cubicle Air-Conditioning
Order No.:
E86060-K1920-A101-A3-7600

System cubicles • Cubicle modifications • Cubicle expansion • Accessories • Special cubicles • Cubicle solutions in practice • Cubicle air-conditioning • Special colors

SIDAC — LV 60
Reactors and Filters
Order No.:
E86060-K2803-A101-A4-7600

Commutating reactors for converters • Mains reactors for frequency converters • Iron-core output reactors • Ferrite output reactors • Iron-core smoothing reactors • Smoothing air-core reactors • Filter reactors • Application-specific reactors • Radio interference suppression filters • dv/dt filters • Sinewave filters

SIVACON 8PS — LV 70
Busway systems
CD-K, BD01, BD2
up to 1250 A
Order No.:
E86060-K1870-A101-A2-7600

Busway systems, Overview • CD-K system (25 A to 40 A) • BD01 system (40 A to 160 A) • BD2 system (160 A to 1250 A)

Automation & Drives — CA 01
The A&D Offline Mall
CD-ROM:
E86060-D4001-A110-C5-7600
DVD:
E86060-D4001-A510-C5-7600

All Automation and Drives products, including those in the catalogues listed above.

A&D Mall
Internet:
http://www.siemens.com/automation/mall

All Automation and Drives products, including those in the catalogues listed above.

Catalogue PDF
Internet:
http://www.automation.siemens.com/cd

All Catalogues of the Low-Voltage Controls available as downloadable PDF.

Contents

Systems • Controls: Contactors and contactor assemblies, solid-state switching devices • Protection equipment • Load feeders, motor starters and soft starters • Monitoring and control devices • Detecting devices • Commanding and signaling devices • Transformers • Power supplies • ALPHA FIX terminal blocks • Planning and configuration with SIRIUS • SIVACON busway and cubicle systems • SENTRON switching and protection devices for power distribution: Air circuit-breakers, molded case circuit-breakers, switch disconnectors • Planning, design and management with SIMARIS • BETA modular installation devices

Registered trademarks

Further information about low-voltage controls is available on the Internet at:
http://www.siemens.com/lowvoltage

Technical Assistance

Expert technical assistance for Low-voltage controls and electrical installation.

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Fax: +49 (9 11) 8 95-59 07
E-Mail: technical-assistance@siemens.com

SIDAC
Reactors and Filters

Catalogue
LV 60 · 2007

Supersedes:
Catalogue LV 60 · 2005

The products contained in this catalogue are also included in the Offline Mall CA 01
Order No.:
E86060-D4001-A110-C5-7600 (CD-ROM)
E86060-D4001-A510-C5-7600 (DVD)

Please contact your local Siemens office

The products and systems contained in this catalogue are all manufactured according to a TÜV-certified quality management system (TÜV = German Technical Inspectorate) to DIN EN ISO 9001 (certificate registration no. 12 100 16950 TMS). The TÜV certificate is recognised in all IQ Net countries.

SIEMENS

Explanations

Delivery Times (DT)

► Preferred type
A 2 working days
B 1 week
C 3 weeks
D 6 weeks
X On request

Preferred types are device types that are immediately available ex warehouse, i.e. are dispatched within 24 hours.

Normal order quantities of products are generally delivered within the specified delivery times on receipt of your order at our office.

However, actual delivery times may vary under certain circumstances.

The delivery times apply ex ramp at Siemens AG (products that are ready to dispatch). The transit times depend on the destination and type of shipping. Standard delivery time within Germany is 1 day.

We are constantly optimising our delivery times; the delivery times specified here are as of 10/2006. You can find up-to-the minute information on our delivery services at http://www.siemens.com/automation/mall.

Price unit (PU)

The price unit stipulates the number of items, sets or meters are received for the specified price and weight.

Packaging size (PS)

The packaging size specifies the number of, e.g. items, sets or meters contained in the outer packaging.

It is only possible to order the quantity contained in a packaging size or a multiple thereof!

For information on multi-unit and recyclable packaging see Annexe.

Price group (PG)

Each product is assigned to a price group.

Weight

The specified weight in kg refers to the price unit (PU) .

Metal surcharges

Surcharges for copper (Cu) and silver (Ag) will be added to the product prices.

Dimensions

All dimensions are in mm.

Standards

DIN EN 61558 (IEC 61558), DIN VDE 0532

The German standard DIN EN 61558 with VDE classification VDE 0570 represents the German version of the international standard

IEC 61558 (Safety of power transformers, power supply units and similar), and since 1st August 2003 partially supersedes the old standard VDE 0550 and fully supersedes VDE 0551. These amendments saw a considerable tightening of the production and test conditions for reactors.

Changes brought about by amendments to the standard

Reactors for general use are now made with increased creepages and clearances, and higher test voltages.

Furthermore, all reactors must include references to the protective elements that protect them against short-circuits and overloads.

Designation of the rated current according to EN 61558: I_{Ln}

and specification of the maximum permissible continuous thermal current I_{thmax}

These amendments to the standard, and the accompanying changes to the product, have made it necessary to add a suffix to the order no. Please refer to the conversion list "Old Order No. - New Order No." in the Annexe for the new number.

Introduction

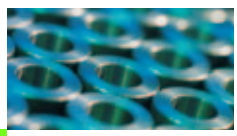
Siemens Automation and Drives. Welcome

More than 60,000 people aiming for the same goal: increasing your competitiveness. That's Siemens Automation and Drives.

We offer you a comprehensive portfolio for sustained success in your sector, whether you're talking automation engineering, drives or electrical installation systems. Totally Integrated Automation (TIA) and Totally Integrated Power (TIP) form the core of our offering. TIA and TIP are the basis of our integrated range of products and systems for the manufacturing and process industries as well as building automation. This portfolio is rounded off by innovative services over the entire life cycle of your plants.

Learn for yourself the potential our products and systems offer. And discover how you can permanently increase your productivity with us.

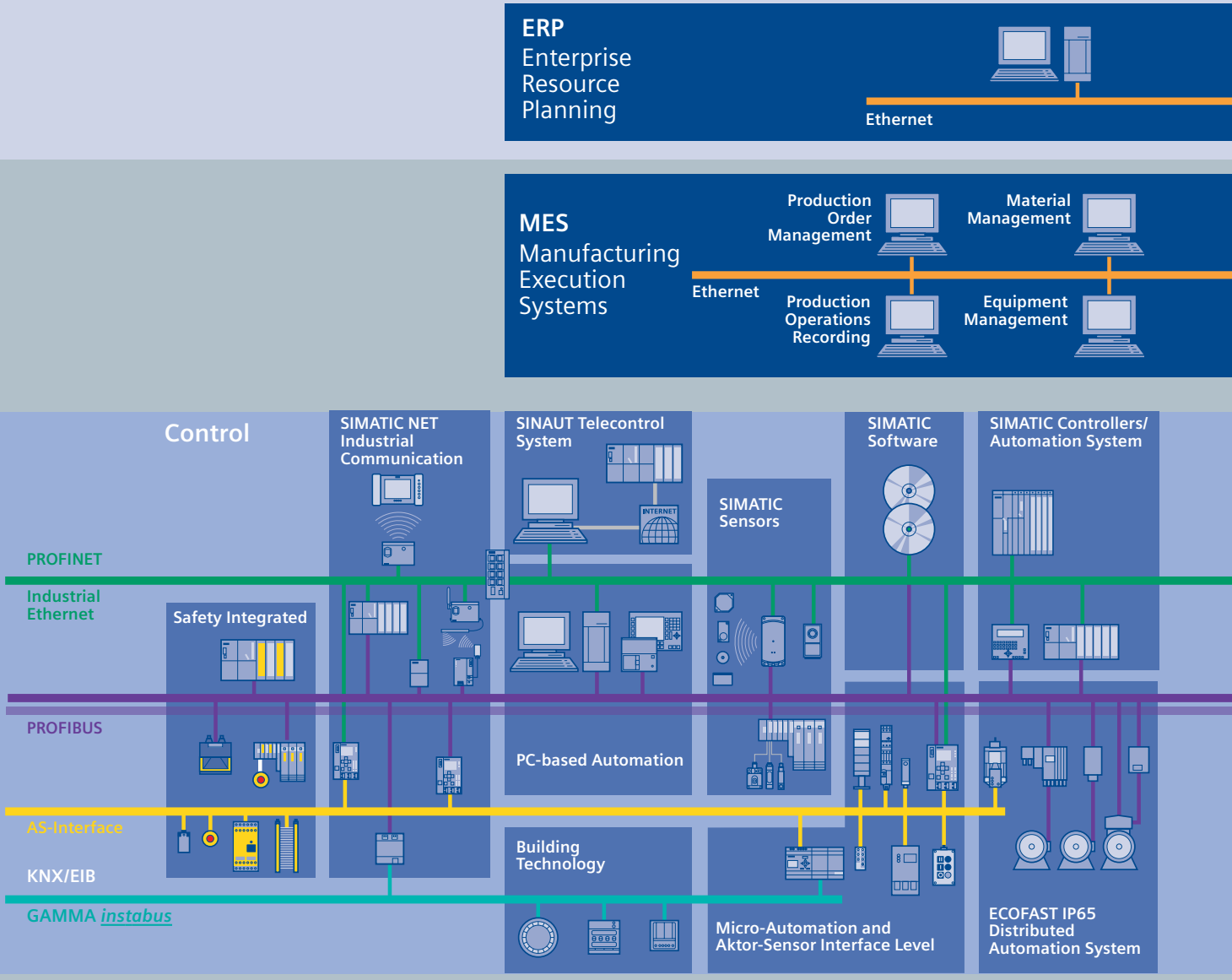
Your regional Siemens contact can provide more information. He or she will be glad to help.



Sharpen your competitive edge. Totally Integrated Automation

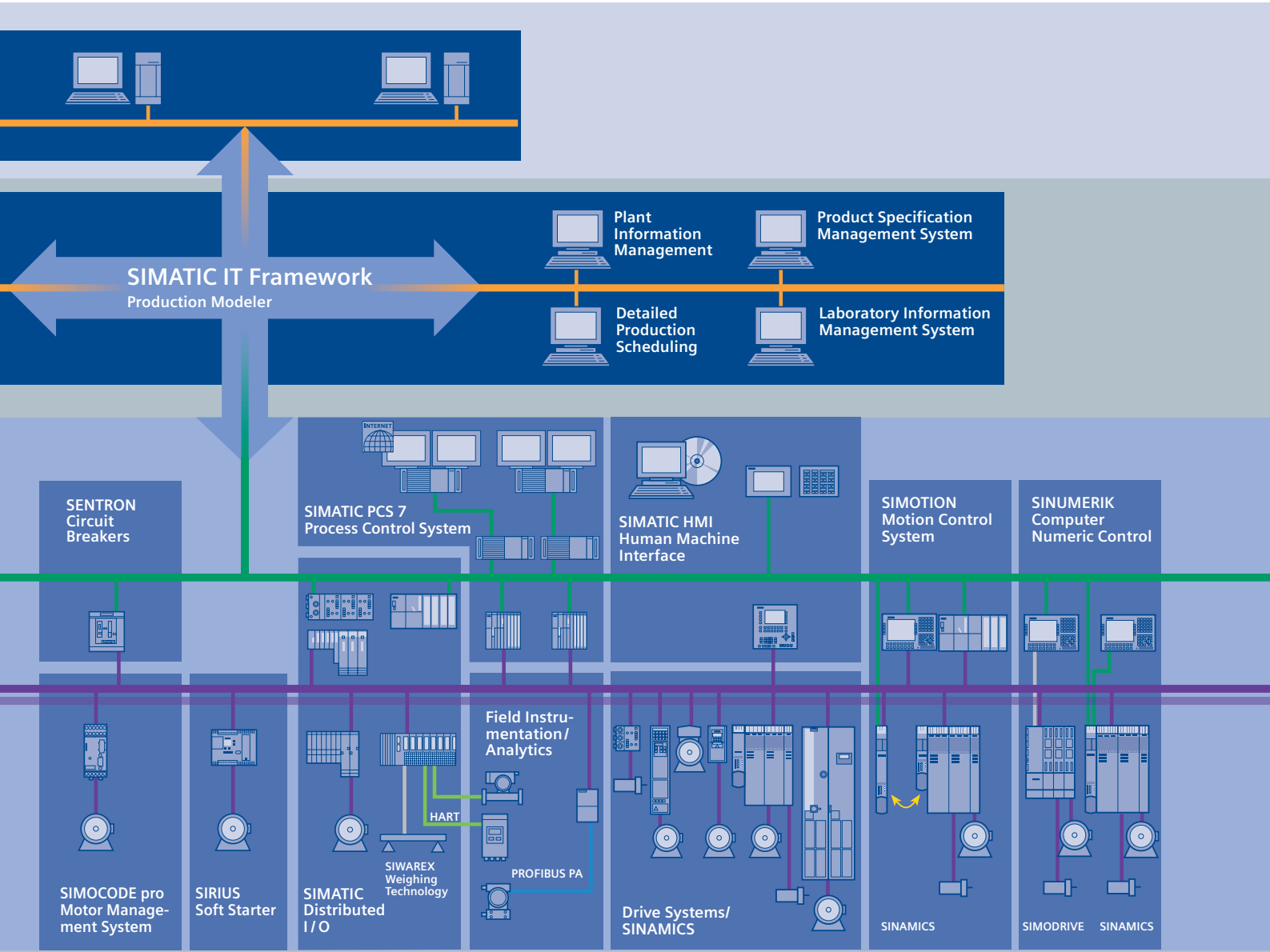
With Totally Integrated Automation (TIA), Siemens is the only manufacturer to offer an integrated range of products and systems for automation in all sectors - from incoming goods to outgoing goods, from the field level through the production control level to connection with the corporate management level.

On the basis of TIA, we implement solutions that are perfectly tailored to your specific requirements and are characterised by a unique level of integration. This integration not only ensures significant reductions in interface costs but also guarantees the highest level of transparency across all levels.



It goes without saying that you profit from Totally Integrated Automation during the entire life cycle of your plants - from the first planning steps, through operation, right up to modernisation. Consistent integration in the further development of our products and systems guarantees a high degree of investment security here.

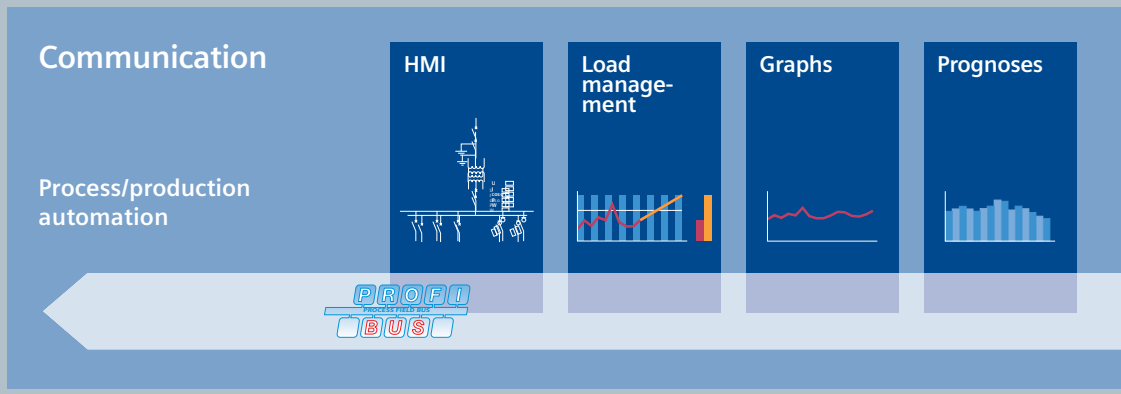
Totally Integrated Automation makes a crucial contribution towards optimising everything that happens in the plant and thus creates the conditions for a significant increase in productivity.

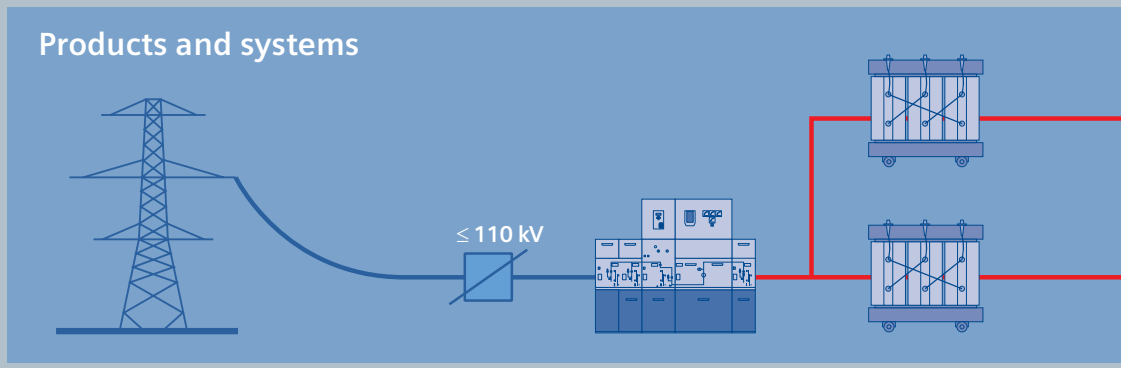


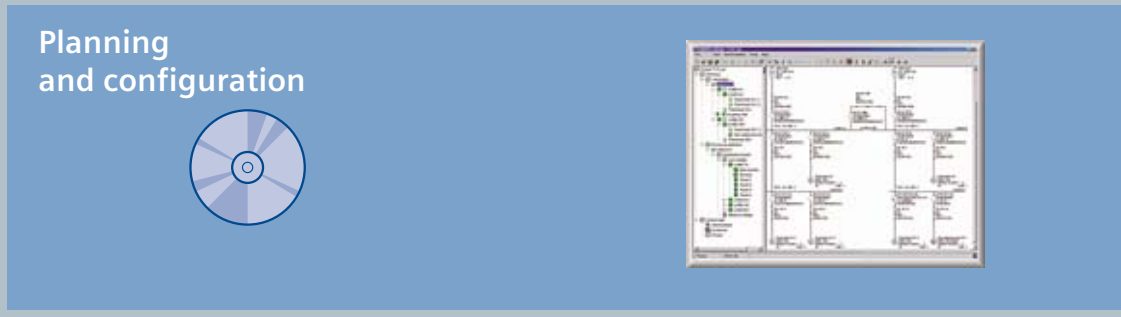
Integrated energy distribution from a single source. Totally Integrated Power

Totally Integrated Power (TIP) brings together all the components of electrical energy distribution into an integrated whole. Thus TIP provides the answer to growing market demands in the planning, construction and use of utility buildings and industrial buildings.

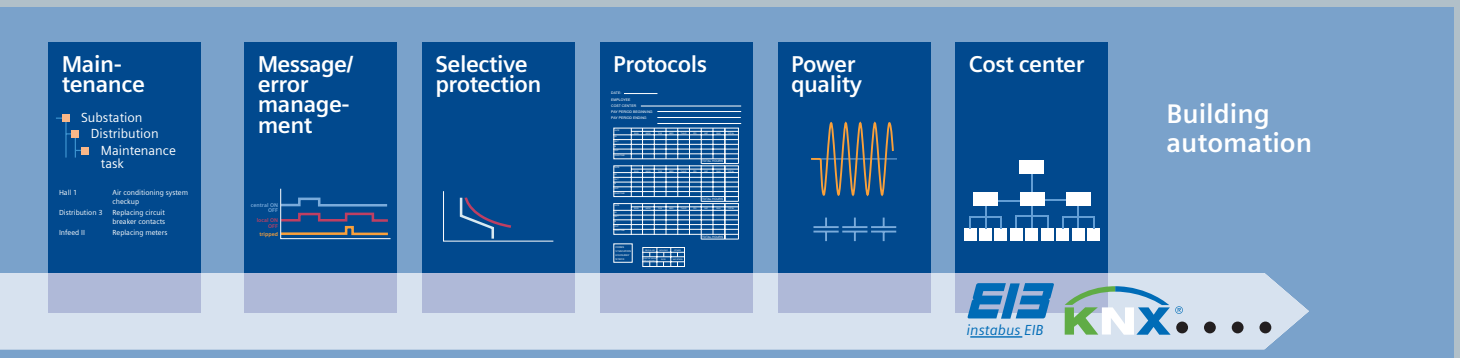
On the basis of TIP, we offer integrated solutions for energy distribution, from medium voltage to the power outlet. Totally Integrated Power is based here on integration in planning and configuring as well as on perfectly matched products and systems.

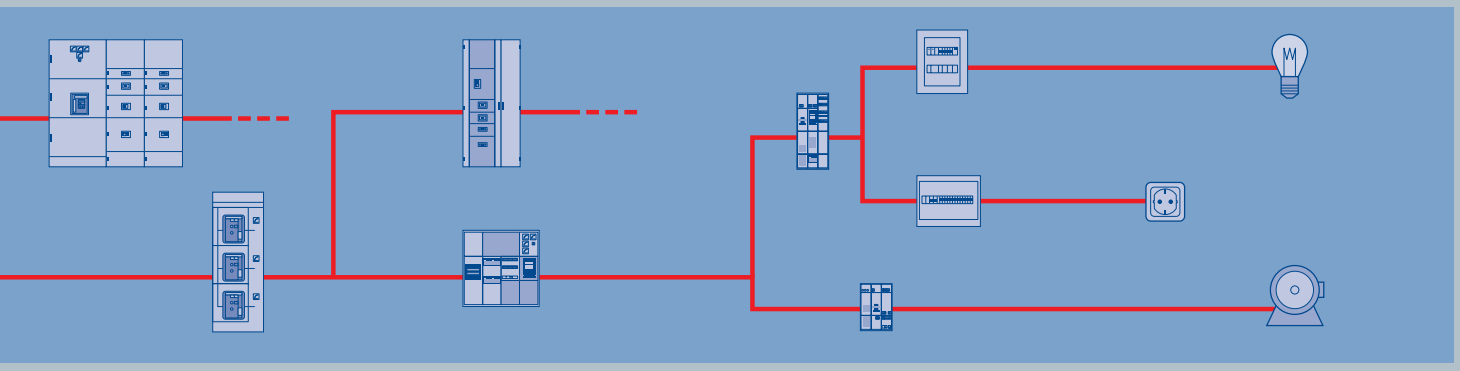


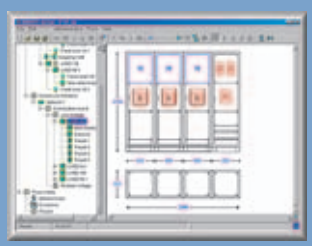


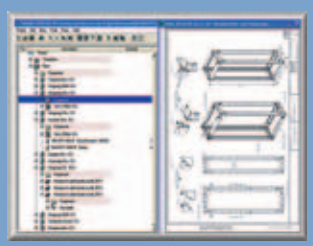


Totally Integrated Power offers communication and software modules for connecting the energy distribution systems to industrial automation and building automation. This enables the implementation of significant savings potential.









Low-Voltage Controls and Distribution. The basis for progressive solutions.

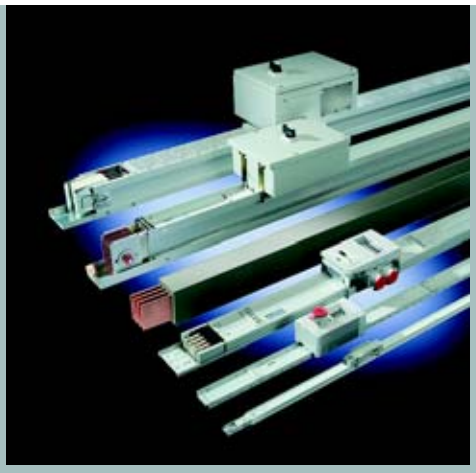
Extremely high demands are made on modern low-voltage controls and distribution: users want cost-effective solutions that are easy to integrate in control cabinets, distribution boards and distributed systems and can communicate perfectly with each other. Siemens has the answer: SIRIUS industrial controls and low-voltage power distribution with SIVACON, SENTRON and SIMARIS.

SIRIUS industrial controls

The SIRIUS range has everything you need for switching, protecting and starting loads. Products for monitoring, control, detection, commanding, signaling and power supply round off the spectrum of industrial controls. Combined with Totally Integrated Automation, Safety Integrated and ECOFAST, our product portfolio can be bundled to create optimised systems. All in all, Siemens provides innovative controls with modern features, such as integrated communication and safety technology that work to your advantage: The basis for ground-breaking integrated solutions.

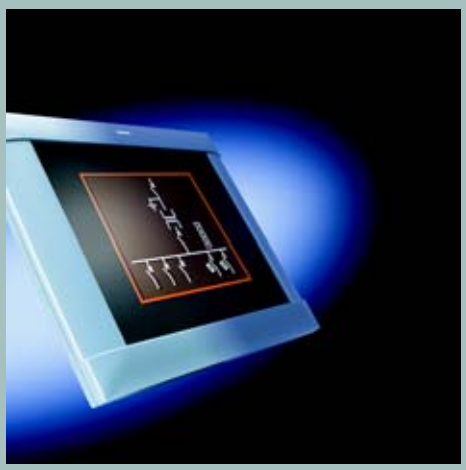
SIRIUS Safety Integrated product range

SIRIUS modular system



SIVACON 8PS busbar trunking systems

SENTRON switching devices



Software for power distribution

Low-voltage power distribution with SIVACON, SENTRON and SIMARIS

Non-residental buildings and industrial plants have one thing in common: without electricity, everything comes to a halt. The availability, safety and cost effectiveness of the power distribution system is of utmost importance – from the medium voltage supply point through to the socket outlet. And only integrated solutions can ensure maximum efficiency for planning, configuration and operation.

The concept is called Totally Integrated Power from Siemens. Total integration in planning and configuration creates synergies and saves costs. Perfectly interacting products and systems provide efficient engineering and reliable operation. In the field of low-voltage power distribution, the following product ranges are available:

SIVACON: From flexible busbar trunking systems through to safe power distribution boards and motor control centers.

SENTRON: From well-proven switch disconnectors through to intelligent circuit-breakers.

Software for power distribution: Anything for dimensioning, configuring, visualization and controlling of your power distribution.

SIDAC Reactors and Filters
Power Quality

It is common knowledge that faults in the power supply can be extremely costly. Liberalisation of the power market and a growing proportion of non-linear consumers have led in the last few years to an increase in supply problems. Consumers such as automation systems or data-processing installations are highly sensitive to radio interference voltages or deviations in the system voltage due to sinusoidal curves.

The availability of such systems and installations is enhanced by reactors and filters which are optimally adapted to the given requirements. SIDAC reactors and filters are used in all industries to reduce harmonics and to increase the availability of plants and equipment.

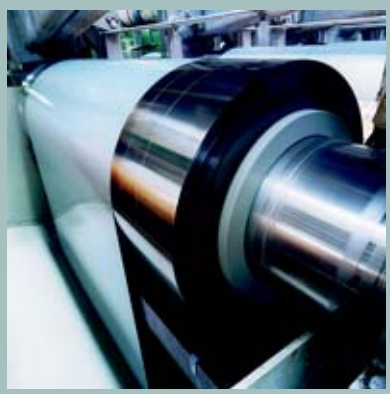
Transportation

Infrastructure

Power Factor Correctness

Renewable Energy

Industry



General Mechanical Engineering

Overview of the product range

SIDAC reactors	SIDAC filters
• Commutation reactors for converters	• Radio interference suppression filters
• Mains reactors for frequency converters	• dv/dt filters for frequency converters
• Output reactors for frequency converters	• Sinewave filters for frequency converters
• Smoothing reactors for DC drives	
• Filter reactors for reactive-power compensation systems	

The advantages at a glance

Large performance range	Reactor performance: 0.1 ... 2000 kVA, Currents: up to 1640 A, Filter performance: for drives with up to 900 kW drive power
Voltage ranges	1 AC 200 ... 400 V, 3 AC 380 ... 750 V, up to max. 3.6 kV customer-specific
Reliable operation	Rated voltage higher than operational/reference voltages
Variants and sizes	Extensive delivery range, suitable for standard applications
Assignment	Components can easily be integrated in systems
Service	Short delivery times, also for spare parts, thanks to world-wide logistic network
Approvals	Worldwide use of components thanks to UL
Maintenance	Extremly long life, minimum maintenance
Design	Fast commissioning, short set-up times, simple connection
Mounting	Simple screw fixing
Connection	Screw terminals, pluggable screw terminals, flat-type terminal
Reliable operation	Long-term, world-wide availability of spare parts
Environment	Environment-friendly production and materials, low power loss

4EM
1 AC commutating reactors

4EP
3 AC mains reactors

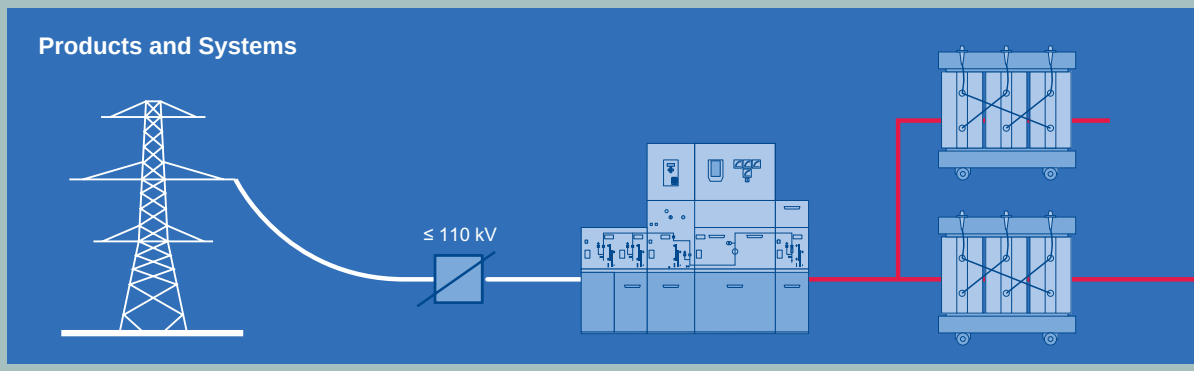
4EF15 1
3 AC radio interference suppression filters

4EF11
3 AC sinewave filters

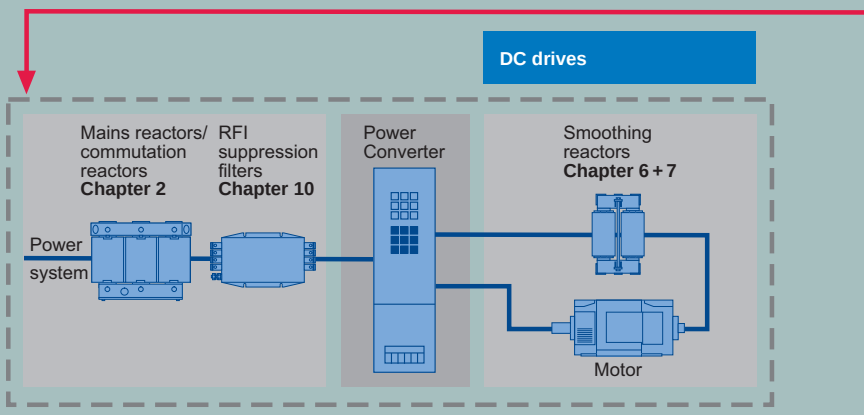
Power Quality

Ensures the availability of plants and electrical equipment in households, offices, industry and trade.

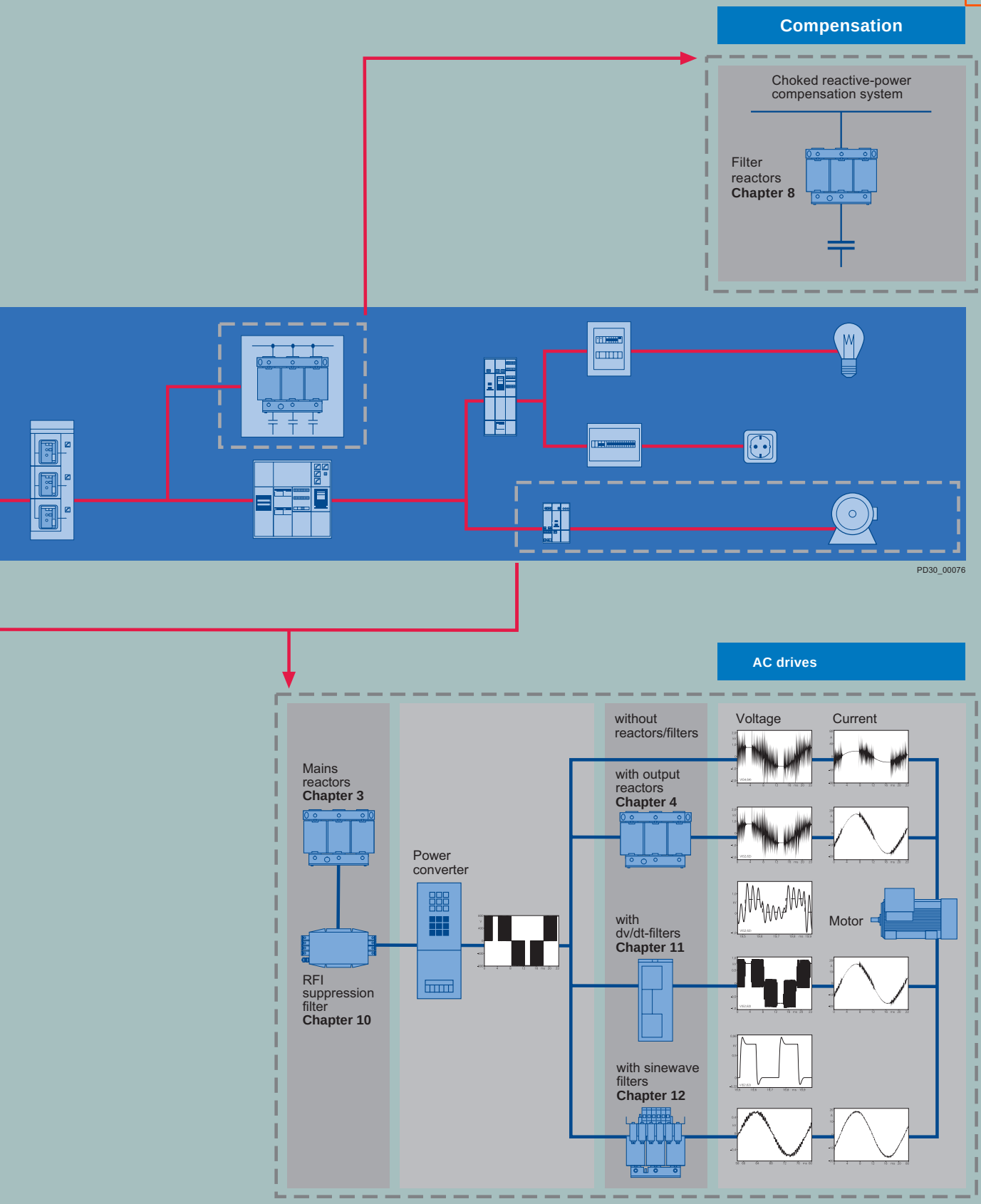
SIDAC reactors and filters are power quality components which are designed for applications on AC drives, DC drives and reactive-power compensation systems and optimised to guarantee a maximum of interference immunity.



PD30_00075



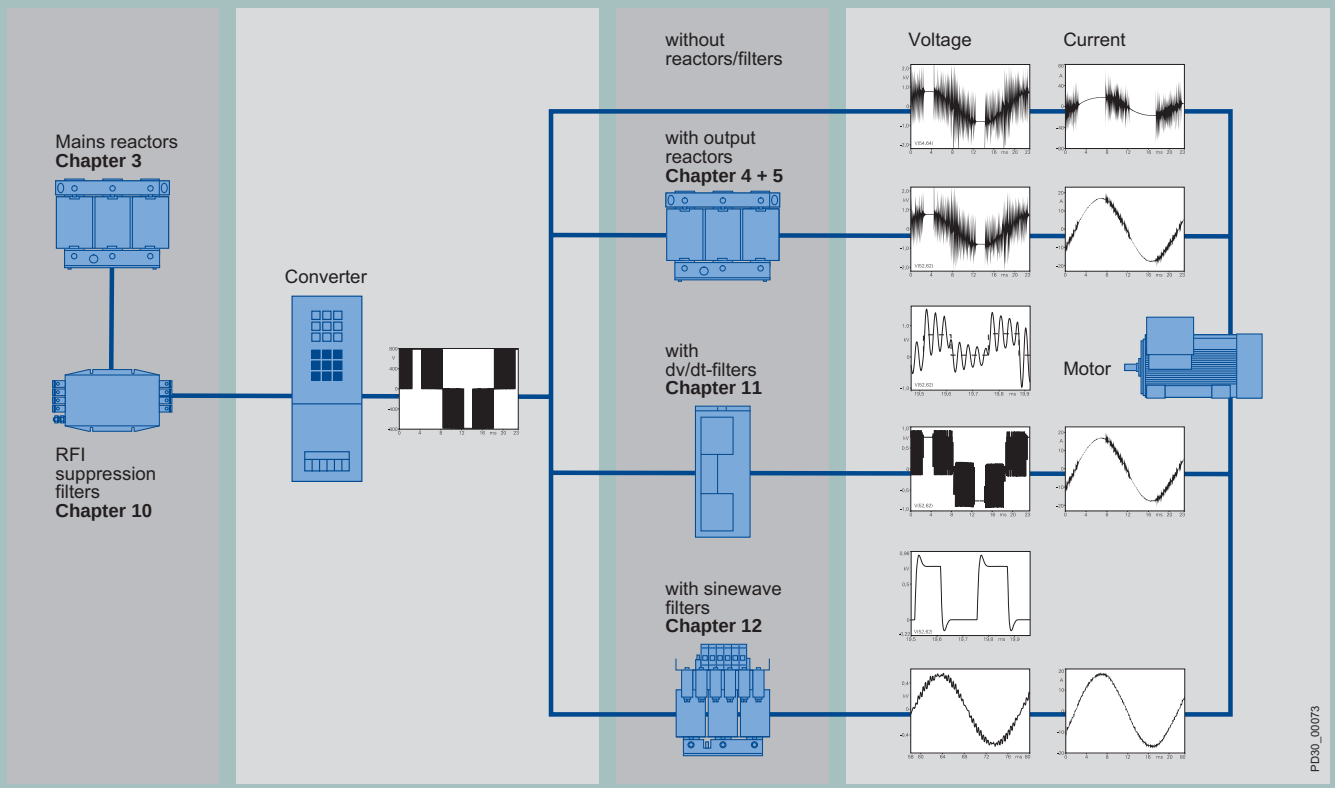
Selection tables with technical specifications for the products can be found in the catalogue chapters mentioned.
For configuration notes, see chapter 15.


Compensation
Choked reactive-power compensation system
Filter reactors
Chapter 8
PD30_00076
AC drives
Mains reactors
Chapter 3
RFI suppression filter
Chapter 10
Power converter
without reactors/filters
with output reactors
Chapter 4
with dv/dt-filters
Chapter 11
with sinewave filters
Chapter 12
Voltage
Current
Motor

Smooth operation from network to motor: SIDAC reactors and filters for AC drives

In any industry or application where frequency converters are used, such as: electrical and mechanical engineering, process industry, fans, conveyor belts or hoisting gear, SIDAC reactors and filters are essential components. They reduce line harmonics as well as the effects of the converter supply to the motor.

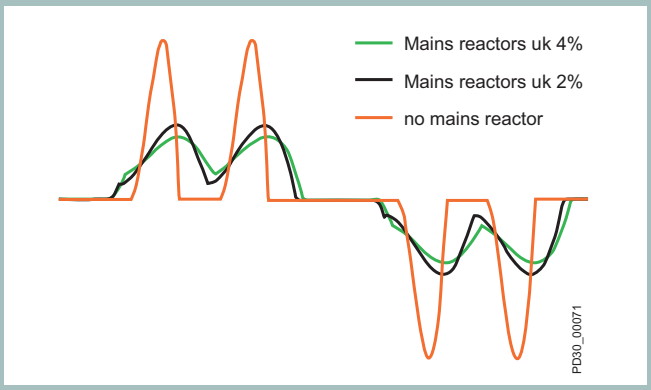
They protect and take care of the converter, thus ensuring the trouble-free operation of machinery and systems. Suitable devices and typical applications are outlined in the following overview.



Selection tables with technical specifications and the assignment of the components to the frequency converter power can be found in the catalogue chapters mentioned.
For configuration notes, see chapter 15.

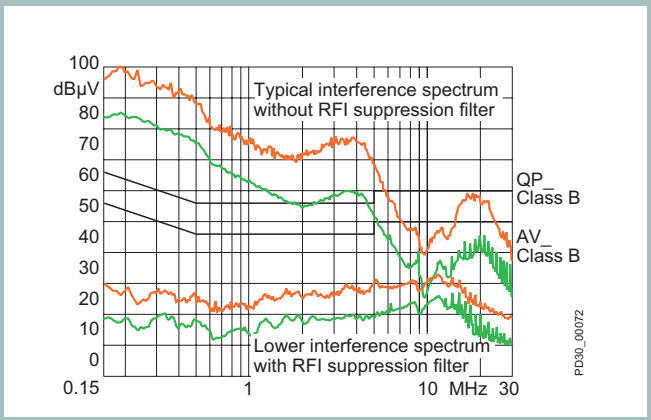
Reducing harmonic currents reliably: SIDAC mains reactors

The right choice for every network and application: SIDAC mains reactors. For all standard applications, we offer reactors with a uk 2%-related voltage drop. For networks with very low line impedances, we can provide reactors featuring uk 4%. The inductance of SIDAC mains reactors is characterised by a high linearity, preventing troublesome DC link fluctuations as a result of load changes. Rated voltages of the mains reactors are at least 40% higher than the operational voltage.



Frequency converter screening: SIDAC RFI suppression filters

When interference from individual frequency converters needs to be reduced, SIDAC RFI suppression filters are indispensable. They can be easily assigned to frequency converter classes. They reduce radio interference voltages to the required values, thus ensuring that equipment in the vicinity is not affected by radio waves. In conjunction with SIDAC mains reactors, they provide an optimum screening of frequency converters.



Masters in minimising charging current peaks: SIDAC output reactors

SIDAC output reactors outstandingly reduce charging current peaks generated by a clock signal and the line capacitance. In practice: with unshielded lines, motor cable lengths are up to 300 m and with shielded lines, the max. cable length is 200 m. Owing to a rated voltage of 500 V + 5 %, SIDAC output reactors can be used with almost any common power network in Europe and North America.

Safe motor protection: SIDAC dv/dt filters

SIDAC dv/dt filters are often used with frequency converters in the chemical industry. They maintain voltage rise ratios of < 500 V/µs and provide reliable motor protection by cutting voltage peaks to a defined value. Their rated voltage of 500 V + 10 % and permissible clock frequency of 4 kHz make them suitable for the greatest variety of applications. With unshielded lines, the max. permissible motor cable length is 300 m, with shielded lines, it is 200 m.

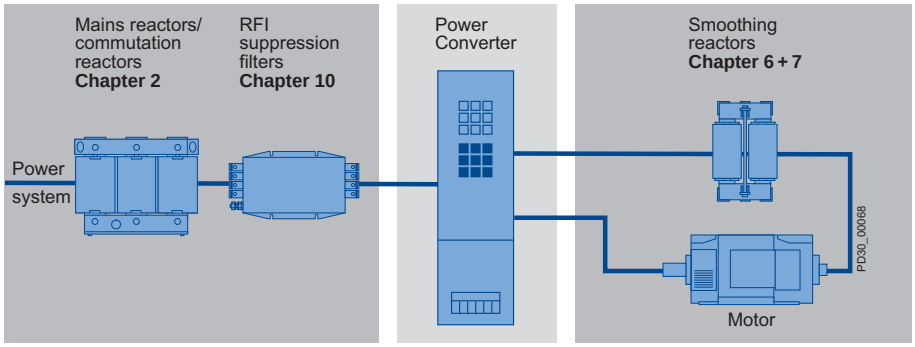
Shaping voltages in sine waves: SIDAC sinewave filters

If a motor is to be supplied with an almost sinusoidal-like voltage, as is typical for the chemical industry or some household applications, SIDAC sinewave filters should be used. They maintain voltage rise ratios of < 500 V/µs. They are excellent in noisesensitive areas of application, since they reduce magnetic motor noise. With a rated voltage of 500 V + 10 % and a permissible clock frequency of 8 kHz, they are suitable for many applications. Long motor cables can, of course, be used here, too: the maximum lengths are 300 m for unshielded cables and 200 m for shielded cables.

Proven technology for an increased availability: SIDAC reactors and filters for DC drives

Depending on the field of application, DC drives can provide a cost-effective alternative to AC drives using frequency converters.

In these cases, SIDAC reactors and filters make a remarkable contribution by significantly increasing the operating safety and availability of power converter systems.

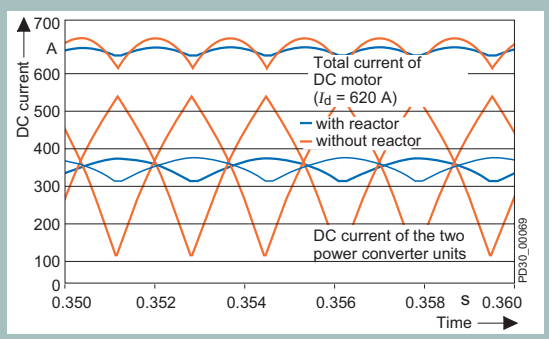


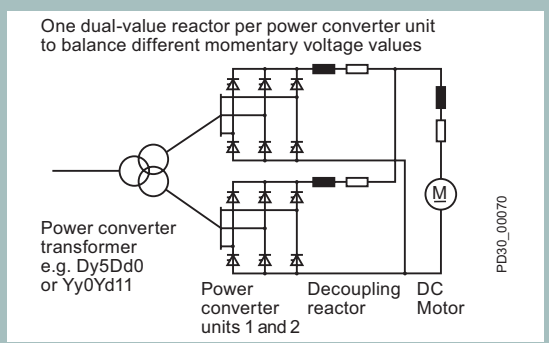
System perturbations under control: SIDAC mains/commutating reactors and SIDAC RFI suppression filters

Whether frequency converters or DC converter drives are used, their system perturbations are similar. This is why the same components are used at the line side as for AC drives: Mains and commutating reactors as well as RFI suppression filters. With large DC drives in particular, a sufficiently high inductance will be ensured - a requirement that is easily met by SIDAC - reactors and filters with top-standard criteria such as robust design and high availability.

Reliable reduction of current ripples: SIDAC smoothing reactors

DC drives are typically used as main drives for printing machines, rolling mill or coiling drives as well as traction and hoisting gear drives in the crane and elevator industry. SIDAC smoothing reactors reliably reduce current ripples in the motor circuit. Reactor models are available from the kW to the MW range. Upon request, we will rate and determine the required component parameters for you. You would certainly benefit from our long-term experience about sizing and rating drive components.





Smoothing reactors for decoupling on a printing machine: SIDAC in use

In the application example on the left, a 12-pulse DC main drive of a printing machine, smoothing reactors are used as decoupling reactors. The reactors reduce the current ripples of the converter units and thus the harmonic stress of the DC motor. This is a clear advantage in terms of motor service life. Using reactors for decoupling the two power converters enables two 6-pulse rectifier sets to be operated in parallel, creating a 12-pulse phase effect at the primary side of the system transformer. In short: SIDAC reactors make a remarkable contribution to reducing system harmonics and improving system conditions.

Selection tables with technical specifications and the assignment of the components to the motor power can be found in the catalogue chapters mentioned.
For configuration notes, see chapter 15.

Save and stable network conditions: SIDAC filter reactors

In our networks, more and more consumers causing harmonics are using inductive loads. As a result, the harmonic load and THD-V (Total Harmonic Distortion - Voltage) of the network are rising.

This increases the electricity costs, maximises transmission losses and adds to the load of transmission and distribution systems.

But there is a customer friendly solution: compensation close to the consumer. The use of filter reactors prevents capacitors connected in the network from resonating with the network inductances at an undefined level.

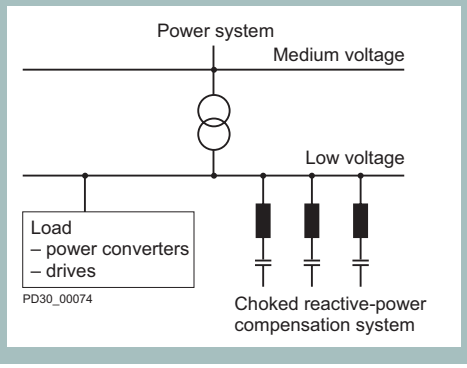
The filter reactors are tuned to a defined series resonant frequency with the capacitors, with an applied audio frequency ripple control.

High safety in extreme applications

Filter reactors in reactive-power compensation systems are connected to the network in combination with capacitors. Depending on the level of choking, capacitors and filters form a series resonant circuit with a defined resonant frequency:
p = 5.67 % with f_{res} = 210 Hz/p = 7 % with f_{res} = 189 Hz/p = 14 % with f_{res} = 134 Hz.
A high harmonic load has already been taken into account for the rated current. In addition, SIDAC filter reactors permit continuous overloading, which may be 5 % above the harmonic level. This ensures the safety for applications under extreme conditions. An integrated temperature monitoring system reliably signals any overload. In addition, the high linearity of the inductance provides precise tuning of the filter circuit even when short-time surge loads are applied, during start-up.

Constant inductance under any condition

Filter reactors are interconnected with capacitors to form filter banks with a defined reactive power in kvar. SIDAC filter reactors are available in the customary sizes of 5 to100 kvar. They are characterised by a high degree of overloading capability, which increases the operational safety of the network under conditions of varying harmonic contents. Depending on the level of choking, the linearity of the inductance remains constant up to 1.8 times the nominal current. This ensures that the filter circuit remains tuned to the resonant frequency even when excessive currents are applied. Not even high inrush currents can saturate SIDAC filter reactors. The inductance remains constant and undefined detuning of the filter circuit is prevented.



Selection aids

Which problem needs to be solved?
With the comprehensive range of SIDAC reactor and filter components, a solution can always be found!

SIDAC reactors AC drive systems	Output reactors	Commutation/ mains reactors	Output reactors with integrated radio interference suppression filters	Commutating reactors with integrated radio interference suppression filters	Link reactors	Sintered metal reactors
Reduction of load current peaks, output/input circuit	++	++	++	++	- -	++
Reduction of voltage gradient dv/dt at the motor terminals	+	- -	+	- -	- -	- -
Reduction of EMC problems between outer conductors (output/input)	- -	+	++	++	- -	++
Reduction of EMC problems between outer conductors and earth (output/input)	- -	+	++	++	- -	+
Use of unshielded motor cable also possible	+	- -	+	- -	- -	- -
Reduction of commutation notches and limiting of the rate of current rise in the input circuit	- -	++	- -	++	+	++
Reduction of commutation reactive power	- -	++	- -	++	+	++
Attenuation of radio interference voltages and reduction of high frequency circuit feedback	+	+	++	++	- -	++
Reduction of mains-borne electromagnetic emission and its influence	+	+	++	++	- -	+

SIDAC filters	dv/dt filters	Sinewave filters	Sine-wave radiated noise filters	Radio interference suppression filters	Output reactors with integrated radio interference suppression filters	Commutating reactors with integrated radio interference suppression filters
Reduction of load current peaks output/input circuit	++	++	++	+	++	++
Reduction of voltage gradient dv/dt at the motor terminals	++	++	++	- -	+	- -
Limiting of overvoltage due to line reflection	++	++	++	- -	- -	- -
Generation of sinusoidal motor terminal voltage and currents	- -	++	++	- -	- -	- -
Reduction of stray losses in the motor	- -	++	++	- -	- -	- -
Reduction of motor noise	- -	++	++	- -	- -	- -
Reduction of EMC problems between outer conductors (output/input)	- -	++	++	++	++	++
Reduction of EMC problems between outer conductors and earth (output/input)	- -	- -	++	++	++	++
Use of unshielded motor cable also possible	+	+	++	- -	+	- -
Reduction of commutation notches and limiting of the rate of current rise in the input circuit	- -	- -	- -	+	- -	++
Reduction of commutation reactive power	- -	- -	- -	- -	- -	++
Attenuation of radio interference voltages and reduction of high frequency circuit feedback	+	+	+	++	++	++
Reduction of mains-borne electromagnetic emission and its influence	++	++	++	++	++	++

SIDAC
Commutation Reactors for Converters

2

2

Single-phase reactors

Application

Single-phase commutation reactor for converters

Single-phase 4EM commutation reactors for converters are used with two-pulse bridge converters as line reactors in the line-side supply cable. Alternating current flows through them.

They are used to limit line-side voltage drops during commutation of the converter. The reactor also limits the rate of voltage rise dv/dt at the thyristors used by limiting the rate of current rise di/dt.

There are different reactor series.

- u_D ~ 2% with the following supply voltage:
  230 V AC
- u_D ~ 4% with the following supply voltage:
  230 V AC, 400 V

The data is valid for mains frequency f = 50 Hz

Technical specifications

Recommended supply voltage U_N **Rated alternating current I_{Ln}** **Maximum continuous thermal current I_{thmax}** **Peak current I_{Lmax}** **Permissible continuous direct current with downstream two-pulse bridge converter (I_{dn}= I_{thmax} · 1.0)** **Inductance per phase** **Core losses P_{Fe} at f = 50 Hz** **Winding losses P_W** **Weight**	See "Selection and ordering data" table
Degree of protection	IP00 according to DIN VDE 0470-1/EN 60529
Rating of creepage distances and clearances	Degree of soiling 2 according to DIN VDE 0110
Rated voltage for insulation (for site altitudes up to 2000 m above sea level)	690 V AC at U_N ≤ 500 V for 4EM with terminals 600 V AC at U_N ≤ 500 V for 4EM according to UL
Permissible ambient temperature during operation	Type 4EM: -25°C to +70°C
Deviation of the permissible alternating current from the rated alternating current I_{Ln} at coolant temperatures ≠ +40°C	See "Configuration notes"
Temperature classes	t_a 40°C/B
Site altitude	≤ 1000 m above sea level
Deviation of the permissible alternating current from the rated alternating current I_{Ln} at site altitudes >1000 m above sea level	See "Configuration notes"
Standards/approvals	The reactors comply with EN 61558-2-20 The reactors are UL recognised under Guide No. XQNX2 and File No. E103902, as well as cUL approved under Guide No. XQNX8 File No. E103902 (applies to reactors with U_N ≤ 600 V according to UL)
Storage temperature	-25°C to +55°C
Transport temperature	-25°C to +70°C
Permissible humidity rating	Humidity 5% to 95% occasional condensation permissible

Selection and ordering data

Overview

$I_{thmax} = I_{Lmax}$

4EM

Maximum continuous thermal current	Rated current	Maximum continuous direct current [1]	Reference voltage drop of reactor u_D for I_{thmax} and U_N, f = 50 Hz		
I_{thmax}	I_{Ln}	I_{dn}	Order No.	Order No.	Order No.
A	A	A			
			u_D = 2% 230 V AC	**u_D = 4% 230 V AC**	**u_D = 4% 400 V AC**
5	4.5	6.1	–	4EM46 05-4CB00	–
6.3	5.67	7.7	–	4EM46 05-6CB00	–
8	7.2	9.8	–	4EM47 00-0CB00	4EM48 07-1CB00
10	9.0	12.2	4EM46 05-8CB00	4EM48 00-3CB00	4EM49 11-7CB00
11.2	10.1	13.7	4EM46 00-8CB00	4EM48 07-4CB00	4EM49 11-8CB00
12.5	11.3	15.3	4EM46 06-0CB00	4EM48 07-5CB00	4EM49 12-0CB00
14	12.6	17.1	4EM47 04-2CB00	4EM48 07-6CB00	4EM49 12-1CB00
15	13.5	18.3	–	4EM49 00-5CB00	4EM50 00-2CB00
16	14.4	19.5	4EM47 00-5CB00	–	–
18	16.2	22	4EM47 04-3CB00	4EM49 12-2CB00	4EM50 05-6CB00
20	18.0	24.4	4EM47 00-8CB00	4EM49 12-3CB00	4EM50 05-7CB00
22	19.8	26.8	4EM48 01-8CB00	–	–
22.4	20.2	27.3	–	4EM49 12-4CB00	4EM50 05-8CB00
24	19.8	29.3	–	–	4EM51 00-2CB00
25	22.5	31	4EM48 07-8CB00	4EM49 12-5CB00	–
26	23.4	32	–	4EM50 00-3CB00	–
28	25.2	34	4EM48 08-0CB00	–	4EM61 00-2CB00
31.5	28.4	39	4EM48 00-8CB00	4EM50 06-0CB00	4EM61 00-3CB00
33	29.7	40	4EM49 03-2CB00	4EM50 03-2CB00	–
35.5	32.0	43	4EM49 12-6CB00	4EM50 06-1CB00	4EM52 12-8CB00
40	36.0	49	4EM49 12-7CB00	4EM51 07-7CB00	4EM52 00-1CB00
45	40.5	55	4EM49 12-8CB00	4EM51 11-1CB00	4EM62 00-3CB00
50	45.0	61	4EM50 01-1CB00	4EM61 00-4CB00	4EM53 16-6CB00

[1] For downstream two-pulse bridge converters:
Reactors with higher rated currents on request

2

Single-phase reactors

$I_{thmax} = I_{Lmax}$

4EM

Maximum continuous thermal current	Rated current[1]	Maximum continuous direct current[2]	Inductance	Core losses	Winding losses	Connections[3] T = Terminal F = Flat termination	DT	Order No.	Al weight per PU approx.	Cu weight per PU approx.	Total weight per PU approx.
I_{thmax} A	I_{Ln} A	I_{dn} A	L_x mH	P_{FE} W	P_W W				kg	kg	kg
1 AC 230 V 50 Hz, u_D ~ 4.4 V 2% reference voltage drop for I_{thmax} and U_N											
10	9	12.2	1.4	6.1	8.3	T	C	**4EM46 05-8CB00**	–	0.050	0.470
11.2	10.1	13.7	1.25	8.9	7.1	T	B	**4EM46 00-8CB00**	–	0.080	0.500
12.5	11.3	15.3	1.12	6	6.9	T	C	**4EM46 06-0CB00**	–	0.090	0.510
14	12.6	17.1	1	8.7	8.2	T	▶	**4EM47 04-2CB00**	–	0.090	0.600
16	14.4	19.5	0.875	11	8.2	T	▶	**4EM47 00-5CB00**	–	0.120	0.680
18	16.2	22	0.778	8.1	8.9	T	C	**4EM47 04-3CB00**	–	0.170	0.700
20	18	24.4	0.637	11	8.6	T	B	**4EM47 00-8CB00**	–	0.160	0.700
22	19.8	26.8	0.622	11.3	10.6	T	C	**4EM48 01-8CB00**	–	0.110	1.030
25	22.5	31	0.56	7.9	12.9	T	C	**4EM48 07-8CB00**	–	0.120	1.040
28	25.2	34	0.5	7.9	12.9	T	C	**4EM48 08-0CB00**	–	0.150	1.080
31.5	28.4	38	0.404	11.3	11.4	T	B	**4EM48 00-8CB00**	–	0.180	1.110
33	29.7	40	0.424	20.4	12.1	T	B	**4EM49 03-2CB00**	–	0.150	1.840
35.5	32	43	0.395	14	14.6	T	C	**4EM49 12-6CB00**	–	0.160	1.800
40	36	49	0.35	14.4	14.6	T	C	**4EM49 12-7CB00**	–	0.180	1.900
45	40.5	55	0.311	14.4	14.6	T	C	**4EM49 12-8CB00**	–	0.210	1.900
50	45	61	0.28	27.9	13.2	T	C	**4EM50 01-1CB00**	–	0.240	2.600
1 AC 230 V 50 Hz, u_D ~ 8.8 V 4% reference voltage drop for I_{thmax} and U_N											
5	4.5	6.1	5.6	6.1	6.5	T	▶	**4EM46 05-4CB00**	–	0.050	0.470
6.3	5.7	7.7	4.45	6.1	8.3	T	▶	**4EM46 05-6CB00**	–	0.080	0.500
8	7.2	9.8	3.5	11	7.2	T	▶	**4EM47 00-0CB00**	–	0.140	0.700
10	9	12.2	2.8	6.1	6.4	T	C	**4EM48 00-3CB00**	–	0.130	1.100
11.2	10	13.7	2.5	7.6	12	T	▶	**4EM48 07-4CB00**	–	0.090	1.000
12.5	11.3	15.3	2.24	7.6	13	T	C	**4EM48 07-5CB00**	–	0.130	1.100
14	12.6	17.1	2	7.8	12.9	T	▶	**4EM48 07-6CB00**	–	0.160	1.100
15	13.5	18.3	1.87	20.4	12.1	T	▶	**4EM49 00-5CB00**	–	0.130	1.800
18	16.2	22	1.56	14.4	14	T	C	**4EM49 12-2CB00**	–	0.130	1.800
20	18	24.4	1.4	14.4	14.6	T	C	**4EM49 12-3CB00**	–	0.190	1.900
22.4	20.2	27.3	1.24	14.4	11.1	T	C	**4EM49 12-4CB00**	–	0.270	2.000
25	22.5	31	1.12	14.4	11.1	T	B	**4EM49 12-5CB00**	–	0.270	2.000
26	23.4	32	1.08	27.9	14.4	T	▶	**4EM50 00-3CB00**	–	0.190	2.500
31.5	28.4	38	0.889	19.7	18	T	C	**4EM50 06-0CB00**	–	0.270	2.600
33	29.7	40	0.772	27.9	13.6	T	C	**4EM50 03-2CB00**	–	0.360	2.700
35.5	32	43	0.789	19.7	18	T	B	**4EM50 06-1CB00**	–	0.410	2.700
40	36	49	0.7	26	18	T	B	**4EM51 07-7CB00**	–	0.470	3.500
45	40.5	55	0.622	26	18	T	C	**4EM51 11-1CB00**	–	0.530	3.600
50	45	61	0.56	32	18	T	C	**4EM61 00-4CB00**	–	0.520	4.300
1 AC 400 V 50 Hz, u_D ~ 15.2 V 4% reference voltage drop for I_{thmax} and U_N											
8	7.2	9.8	6.05	7.8	9.9	T	▶	**4EM48 07-1CB00**	–	0.150	1.100
10	9	12.2	4.84	14.4	10.7	T	▶	**4EM49 11-7CB00**	–	0.100	1.800
11.2	10.1	13.7	4.32	14.4	14.6	T	C	**4EM49 11-8CB00**	–	0.140	1.800
12.5	11.3	15.3	3.87	14.4	14.6	T	▶	**4EM49 12-0CB00**	–	0.180	1.900
14	12.6	17.1	3.46	14.4	14.6	T	▶	**4EM49 12-1CB00**	–	0.230	1.900
15	13.5	18.3	3.23	27.9	13.4	T	▶	**4EM50 00-2CB00**	–	0.340	2.700
18	16.2	22	2.69	19.7	18	T	C	**4EM50 05-6CB00**	–	0.300	2.600
20	18	24.4	2.42	19.7	18	T	C	**4EM50 05-7CB00**	–	0.380	2.700
22.4	20.2	27.3	2.15	19.7	18	T	▶	**4EM50 05-8CB00**	–	0.500	2.800
24	21.6	29.3	2.02	33.7	19.8	T	▶	**4EM51 00-2CB00**	–	0.430	3.500
28	25.2	34	1.73	31.8	12.6	T	C	**4EM61 00-2CB00**	–	0.480	4.200
31.5	28.4	38	1.54	32	22	T	▶	**4EM61 00-3CB00**	–	0.750	4.500
35.5	32	43	1.36	36	22	T	C	**4EM52 12-8CB00**	–	0.730	5.000
40	36	49	1.21	33.7	19.8	T	▶	**4EM52 00-1CB00**	–	0.870	5.100
45	40.5	55	1.08	47.4	20.1	T	C	**4EM62 00-3CB00**	–	1.030	6.900
50	45	61	0.968	52	28	T	C	**4EM53 16-6CB00**	–	1.280	7.400

Package sizes for reactors; 1 item, i.e. 1 item or a multiple thereof can be ordered.

[1] I_{Ln} (60 Hz) = 0.9 x I_{Ln} (50 Hz)

[2] For downstream two-pulse bridge converters: Reactors with higher rated currents on request

[3] For terminal covers offering protection against accidental contact with flat terminations: see "Accessories"

Application

Three-phase commutation reactors for converters

Commutation reactors for converters are used for B6 and B6C connections of converter assemblies in the line-side supply cable. They are used to limit line-side voltage drops during commutation of the converter. The reactor also limits the rate of voltage rise dv/dt at the thyristors used by limiting the rate of current rise di/dt.

Commutation reactors can also be used for decoupling converter sets operating in parallel.

There are different reactor series.

- I_{thmax} = 0.8 · I_{Lmax} ("80% reactors") with u_D ~ 4% for the following supply voltages:
  3 AC 400 V, 3 AC 500 V, 3 AC 690 V, 3 AC 750 V
- I_{thmax}=I_{Lmax} ("100% reactors") with u_D~ 2% for the following supply voltages:
  3 AC 400 V, 3 AC 690 V, 3 AC 830 V
  and with u_D~ 4% for the following supply voltages:
  3 AC 400 V, 3 AC 500 V, 3 AC 690 V, 3 AC 750 V

The data is valid for line frequency f = 50 Hz.

Technical specifications

Recommended supply voltage U_N **Rated alternating current I_{Ln}** **Maximum continuous thermal current I_{thmax}** **Peak current I_{Lmax}** **Maximum continuous direct current with downstream six-pulse bridge converter (I_{dn}= I_{thmax} · 1.225)** **Inductance per phase** **Core losses P_{Fe} at f = 50 Hz** **Winding losses P_W** **Weight**	See "Selection and ordering data" table
Degree of protection	IP00 according to DIN VDE 0470-1/EN 60529
Rating of creepage distances and clearances	Degree of soiling 2 according to DIN VDE 0110
Rated voltage for insulation (for site altitudes up to 2000 m above sea level)	690 V AC at U_N ≤ 500 V for 4EP with terminals 1000 V AC at U_N ≤ 830 V for 4EP, 4EU24 to 4EU43 with flat terminations
Permissible ambient temperature during operation	Type 4EP: -25°C to +70°C Type 4EU: -25°C to +80°C
Deviation of the permissible alternating current from rated alternating current I_{Ln} at coolant temperatures ≠ +40°C	See "Configuration notes"
Temperature classes	Type 4EP: t_a 40°C/B Type 4EU: t_a 40°C/H (utilisation according to F for applications according to EN 61558) Type 4EU: temperature class H (for applications according to UL)
Site altitude	≤ 1000 m above sea level
Deviation of the permissible alternating current from rated alternating current I_{Ln} at site altitudes >1000 m above sea level	See "Configuration notes"
Operation with varying load	Rating on request
Operation at 60 Hz	I_{Ln} (60 Hz) = 0.9 · I_{Ln} (50 Hz)
Standards/approvals	The reactors comply with EN 61558-2-20 (type 4EU45 to 4EU51: DIN VDE 0532) The reactors are UL recognised under Guide No. XQNX2 and File No. E103902, as well as cUL approved under Guide No. XQNX8 File No. E103902 (applies to reactors with U_N ≤ 600 V according to UL)
Storage temperature	-25°C to +55°C
Transport temperature	-25°C to +70°C
Permissible humidity rating	Humidity 5% to 95% occasional condensation permissible

2

Three-phase reactors

Selection and ordering data

CE cULus [1]

Overview

$I_{thmax} = I_{Lmax}$

4EP

4EU

Max. continuous thermal current [3]	Rated current	Max. continuous direct current [2]	Reference voltage drop of reactor u_D = 2% for I_{thmax} and U_N		
I_{thmax}	I_{Ln}	I_{dn}	Order No.	Order No.	Order No.
A	A	A			
			3 AC 400 V 50 Hz	**3 AC 690 V 50 Hz**	**3 AC 830 V 50 Hz**
25	23	31	**4EP36 00-2DS00**	–	–
28	25	34	**4EP36 00-3DS00**	–	–
31.5	28	38	**4EP36 00-4DS00**	–	–
35.5	32	43	**4EP36 00-5DS00**	–	–
40	36	49	**4EP36 00-6DS00**	–	–
45	41	55	**4EP37 00-4DS00**	–	–
50	45	61	**4EP37 00-5DS00**	–	–
56	50	68	**4EP37 00-6DS00**	–	–
63	57	77	**4EP37 00-7DS00**	–	–
71	64	87	**4EP38 00-8DS00**	–	–
80	72	98	**4EP38 01-0DS00**	–	–
91	82	111	**4EP38 01-1DS00**	–	–
100	90	122	**4EP39 01-0DS00**	–	–
1230	1107	1501	–	**4EU43 21-0BC00-0A**	**4EU43 21-0BE00-0A**
1560	1404	1903	–	–	**4EU45 21-0AN00** [3]
1640	1476	2001	–	**4EU43 21-0BD00-0A**	–

[1] All reactors with $U_N \leq 600$ V according to UL

[2] For downstream six-pulse bridge converters: Reactors with higher rated currents on request

[3] Reactors according to VDE 0532: I_{thmax} = rated current

$I_{thmax} = I_{Lmax}$

CE cULus [1]

4EP

4EU

4EU

Max. continuous thermal current [4]	Rated current	Max. continuous direct current [3]	Reference voltage drop of reactor u_D = 4% for I_{thmax} and U_N			
I_{thmax} A	I_{Ln} A	I_{dn} A	Order No.	Order No.	Order No.	Order No.
			3 AC 400 V 50 Hz	**3 AC 500 V 50 Hz**	**3 AC 690 V 50 Hz**	**3 AC 750 V 50 Hz**
16	14	20	**4EP36 00-7DS00**	**4EP36 01-2DS00**	–	–
18	16	22	**4EP36 00-8DS00**	**4EP37 01-2DS00**	–	–
20	18	24	**4EP36 01-0DS00**	**4EP37 01-3DS00**	–	–
22.4	20	27	**4EP37 00-8DS00**	**4EP37 01-4DS00**	–	–
25	23	31	**4EP37 01-0DS00**	**4EP37 00-1DS00**	–	–
28	25	34	**4EP37 01-1DS00**	**4EP38 01-4DS00**	–	–
31.5	28	38	**4EP37 00-0DS00**	**4EP38 00-1DS00**	–	–
35.5	32	43	**4EP38 01-2DS00**	–	–	–
40	36	49	**4EP38 00-0DS00**	**4EP39 00-1DS00**	–	–
45	41	55	**4EP38 01-3DS00**	**4EP39 01-3DS00**	–	–
50	45	61	**4EP39 00-0DS00**	**4EP40 00-2DS00**	–	–
56	50	68	**4EP39 01-2DS00**	**4EP40 02-0DS00**	–	–
63	57	77	**4EP40 00-0DS00**	**4EP40 02-1DS00**	–	–
71	64	87	**4EP40 01-8DS00**	**4EP40 02-2DS00**	–	–
80	72	98	**4EP40 00-1DS00**	**4EU24 22-2AA00-0AA0**	–	–
91	82	111	**4EP40 02-3DS00**	**4EU24 22-3AA00-0AA0**	–	–
100	90	122	**4EU24 22-0AA00-0AA0**	**4EU25 22-3AA00-0AA0**	–	–
112	101	137	**4EU24 22-1AA00-0AA0**	**4EU25 22-4AA00-0AA0**	–	–
125	113	153	**4EU25 22-0AA00-0AA0**	**4EU25 22-5AA00-0AA0**	–	–
140	126	171	**4EU25 22-1AA00-0AA0**	**4EU25 22-6AA00-0AA0**	–	–
160	144	195	**4EU25 22-2AA00-0AA0**	**4EU27 22-5AA00-0AA0**	–	–
180	162	220	**4EU27 22-0AA00-0AA0**	**4EU27 22-6AA00-0AA0**	–	–
200	180	244	**4EU27 22-1AA00-0AA0**	**4EU27 22-7AA00-0AA0**	**4EU30 22-7AA00-0AA0**	**4EU30 22-5CA00-0AA0**
224	202	273	**4EU27 22-2AA00-0AA0**	**4EU27 22-8AA00-0AA0**	**4EU30 22-8AA00-0AA0**	**4EU30 22-6CA00-0AA0**
250	225	305	**4EU27 22-3AA00-0AA0**	**4EU30 22-4AA00-0AA0**	**4EU30 22-0BA00-0AA0**	**4EU36 22-5BA00-0AA0**
280	252	342	**4EU27 22-4AA00-0AA0**	**4EU30 22-5AA00-0AA0**	**4EU36 22-1BA00-0AA0**	**4EU36 22-6BA00-0AA0**
315	284	384	**4EU30 22-0AA00-0AA0**	**4EU30 22-6AA00-0AA0**	**4EU36 22-2BA00-0AA0**	**4EU36 22-7BA00-0AA0**
355	320	433	**4EU30 22-1AA00-0AA0**	**4EU36 22-5AA00-0AA0**	**4EU36 22-3BA00-0AA0**	**4EU36 22-8BA00-0AA0**
400	360	488	**4EU30 22-2AA00-0AA0**	**4EU36 22-6AA00-0AA0**	**4EU36 22-4BA00-0AA0**	**4EU39 21-8AA00-0A**
450	405	549	**4EU30 22-3AA00-0AA0**	**4EU36 22-7AA00-0AA0**	**4EU39 21-5AA00-0A**	**4EU39 21-0BA00-0A**
500	450	610	**4EU36 22-0AA00-0AA0**	**4EU36 22-8AA00-0AA0**	**4EU39 21-6AA00-0A**	**4EU39 21-1BA00-0A**
560	504	683	**4EU36 22-1AA00-0AA0**	**4EU36 22-0BA00-0AA0**	**4EU39 21-7AA00-0A**	**4EU43 21-2BA00-0A**
630	567	769	**4EU36 22-2AA00-0AA0**	**4EU39 21-2AA00-0A**	**4EU43 21-8AA00-0A**	**4EU43 21-3BA00-0A**
710	639	866	**4EU36 22-3AA00-1BA0**	**4EU39 21-3AA00-0A**	**4EU43 21-0BA00-0A**	**4EU43 21-4BA00-0A**
800	720	976	**4EU36 22-4AA00-1BA0**	**4EU39 21-4AA00-0A**	**4EU43 21-1BA00-0A**	**4EU45 21-2AA00** [4]
910	819	1110	**4EU39 21-0AA00-0A**	**4EU43 21-4AA00-0A**	**4EU45 21-0AA00** [4]	**4EU45 21-3AA00** [4]
1000	900	1220	**4EU39 21-1AA00-0A**	**4EU43 21-5AA00-0A**	**4EU45 21-1AA00** [4]	**4EU45 21-4AA00** [4]
1230	1107	1501	–	–	**4EU47 21-0AX00** [4]	–
1300	1170	1586	**4EU43 21-0BB00-0A**	**4EU45 21-0AM00** [4] [2]	–	–
1640	1476	2001	**4EU45 21-0AL00** [4]	**4EU50 21-0AA00** [4] [2]	**4EU51 21-0AA00** [4]	–

[1] All reactors with $U_N \leq 600$ V according to UL

[2] Reference voltage drop of reactor $u_D \sim 4\%$ for I_{Ln} and U_N = 575 V

[3] For downstream six-pulse bridge converters: Reactors with higher rated currents on request

[4] Reactors according to VDE 0532: I_{thmax} = rated current

2

Three-phase reactors

$I_{thmax} = 0.8 \cdot I_{Lmax}$

CE cULus [1]

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Max. continuous thermal current [5]	Rated current	Peak current [4]	Max. continuous direct current [3]	Reference voltage drop of reactor u_D = 4% for I_{thmax} and U_N			
I_{thmax} A	I_{Ln} A	I_{Lmax} A	I_{dn} A	Order No.	Order No.	Order No.	Order No.
				3 AC 400 V 50 Hz	**3 AC 500 V 50 Hz**	**3 AC 690 V 50 Hz**	**3 AC 750 V 50 Hz**
16	14	20	20	**4EP36 01-3DS00**	**4EP36 01-8DS00**	–	–
18	16	23	22	**4EP36 01-4DS00**	**4EP36 02-0DS00**	–	–
20	18	25	24	**4EP36 01-5DS00**	**4EP37 02-0DS00**	–	–
22.4	20	28	27	–	**4EP37 02-1DS00**	–	–
25	23	31.3	31	**4EP37 01-5DS00**	**4EP37 02-2DS00**	–	–
28	25	35	34	**4EP37 01-6DS00**	**4EP38 01-7DS00**	–	–
31.5	28	39	38	**4EP37 01-7DS00**	**4EP38 01-8DS00**	–	–
35.5	32	44	43	**4EP37 01-8DS00**	**4EP38 02-0DS00**	–	–
40	36	50	49	**4EP38 00-2DS00**	**4EP38 00-4DS00**	–	–
45	41	56	55	**4EP38 01-6DS00**	**4EP39 01-5DS00**	–	–
50	45	63	61	**4EP38 00-3DS00**	**4EP39 00-3DS00**	–	–
56	50	70	68	**4EP39 01-4DS00**	**4EP40 03-1DS00**	–	–
63	57	79	77	**4EP39 00-2DS00**	**4EP40 00-4DS00**	–	–
71	64	89	87	**4EP40 02-7DS00**	**4EP40 03-2DS00**	–	–
80	72	100	98	**4EP40 00-3DS00**	**4EU24 22-8AA00-0AA0**	–	–
91	82	114	111	**4EP40 02-8DS00**	**4EU24 22-0BA00-0AA0**	–	–
100	90	125	122	**4EP40 03-0DS00**	**4EU25 22-6BA00-0AA0**	–	–
112	101	140	137	**4EU24 22-6AA00-0AA0**	**4EU25 22-7BA00-0AA0**	–	–
125	113	156	153	**4EU24 22-7AA00-0AA0**	**4EU25 22-8BA00-0AA0**	–	–
140	126	175	171	**4EU25 22-2BA00-0AA0**	**4EU25 22-0CA00-0AA0**	–	–
160	144	200	195	**4EU25 22-3BA00-0AA0**	**4EU27 22-0CA00-0AA0**	–	–
180	162	225	220	**4EU25 22-4BA00-0AA0**	**4EU27 22-1CA00-0AA0**	–	–
200	180	250	244	**4EU25 22-5BA00-0AA0**	**4EU27 22-2CA00-0AA0**	**4EU27 22-0DA00-1BA0**	–
224	202	280	273	**4EU27 22-5BA00-0AA0**	**4EU27 22-3CA00-0AA0**	**4EU30 22-8BA00-0AA0**	–
250	225	313	305	**4EU27 22-6BA00-0AA0**	**4EU27 22-4CA00-0AA0**	**4EU30 22-0CA00-0AA0**	**4EU30 22-2CA00-0AA0**
280	252	350	342	**4EU27 22-7BA00-0AA0**	**4EU30 22-5BA00-0AA0**	**4EU30 22-1CA00-0AA0**	**4EU36 22-5DA00-0AA0**
315	284	394	384	**4EU27 22-8BA00-0AA0**	**4EU30 22-6BA00-0AA0**	**4EU36 22-0DA00-0AA0**	**4EU36 22-6DA00-0AA0**
355	320	444	433	**4EU30 22-1BA00-0AA0**	**4EU30 22-7BA00-0AA0**	**4EU36 22-1DA00-0AA0**	**4EU36 22-7DA00-0AA0**
400	360	500	488	**4EU30 22-2BA00-0AA0**	**4EU36 22-4CA00-0AA0**	**4EU36 22-2DA00-0AA0**	**4EU36 22-8DA00-1BA0**
450	405	563	549	**4EU30 22-3BA00-0AA0**	**4EU36 22-5CA00-0AA0**	**4EU36 22-3DA00-0AA0**	**4EU36 22-0EA00-1BA0**
500	450	625	610	**4EU30 22-4BA00-0AA0**	**4EU36 22-6CA00-0AA0**	**4EU36 22-4DA00-0AA0**	**4EU39 21-1CA00-0A**
560	504	700	683	**4EU36 22-0CA00-0AA0**	**4EU36 22-7CA00-0AA0**	**4EU39 21-8BA00-0A**	**4EU39 21-2CA00-0A**
630	567	788	769	**4EU36 22-1CA00-0AA0**	**4EU36 22-8CA00-1BA0**	**4EU39 21-0CA00-0A**	**4EU43 21-4DA00-0A**
710	639	888	866	**4EU36 22-2CA00-1BA0**	**4EU39 21-6BA00-0A**	**4EU43 21-0DA00-0A**	**4EU43 21-5DA00-0A**
800	720	1000	976	**4EU36 22-3CA00-1BA0**	**4EU39 21-7BA00-0A**	**4EU43 21-1DA00-0A**	**4EU43 21-6DA00-0A**
910	819	1138	1110	**4EU39 21-2BA00-0A**	**4EU43 21-4CA00-0A**	**4EU43 21-2DA00-0A**	**4EU45 21-4BA00**
980	882	1225	1196	–	–	**4EU43 21-0AY00-0A**	–
1000	900	1250	1220	**4EU39 21-3BA00-0A**	**4EU43 21-5CA00-0A**	**4EU43 21-3DA00-0A**	**4EU45 21-5BA00** [5]
1040	936	1300	1269	**4EU39 21-0AL00-0A**	**4EU43 21-0AX00-0A** [2]	–	–
1310	1179	1638	1598	**4EU43 21-0AW00-0A**	**4EU45 21-0AK00** [5] [2]	**4EU45 21-0AP00** [5]	–

[1] All reactors with $U_N \leq 600$ V according to UL

[2] Reference voltage drop of reactor $u_D \sim 4\%$ for I_{Ln} and U_N = 575 V

[3] For downstream six-pulse bridge converters: Reactors with higher rated currents on request

[4] Load with I_{max} permissible, occasional or periodic, if the effective current does not exceed the value I_{thmax}

[5] Reactors according to VDE 0532: I_{thmax} = rated current

$I_{thmax} = I_{Lmax}$

4EP

Max. motor rated output up to U_{dc} [1]	Maximum continuous direct current [2]	Max. continuous thermal current	Rated current [3]	Inductance	Core losses	Winding losses	Connections [4] T = Terminal F = Flat termination	DT	Order No.	Al weight per PU approx.	Cu weight per PU approx.	Total weight per PU approx.
P_{Motor}	I_{dn}	I_{thmax}	I_{Ln}	L_x	P_{FE}	P_W						
kW	A	A	A	mH	W	W				kg	kg	kg
3 AC 400 V 50 Hz, u_D ~ 4.4 V 2% reference voltage drop for I_{thmax} and U_N												
485 V												
14.7	31	25	23	0.56	8.3	39	T	C	**4EP36 00-2DS00**	–	0.360	2.200
16.5	34	28	25	0.5	8.7	39	T	C	**4EP36 00-3DS00**	–	0.300	2.200
18.5	38	31.5	28	0.445	8.8	39	T	C	**4EP36 00-4DS00**	–	0.410	2.300
20.9	43	35.5	32	0.395	9	39	T	C	**4EP36 00-5DS00**	–	0.600	2.500
23.5	49	40	36	0.35	9.3	39	T	C	**4EP36 00-6DS00**	–	0.700	2.600
26.5	55	45	41	0.311	12	49	T	C	**4EP37 00-4DS00**	–	0.620	3.100
29.4	61	50	45	0.28	12	50	T	▶	**4EP37 00-5DS00**	–	0.900	3.400
32.9	68	56	50	0.25	12	50	T	C	**4EP37 00-6DS00**	–	1.110	3.600
37.1	77	63	57	0.222	13	50	T	B	**4EP37 00-7DS00**	–	1.110	3.600
41.8	87	71	64	0.197	18.5	59	F	C	**4EP38 00-8DS00**	–	0.850	4.700
47.1	98	80	72	0.175	17.8	53	F	C	**4EP38 01-0DS00**	–	1.220	5.100
53.5	111	91	82	0.154	18	53	F	C	**4EP38 01-1DS00**	–	1.690	5.600
58.8	122	100	90	0.14	22	71	F	C	**4EP39 01-0DS00**	–	1.490	6.100

Package sizes for reactors; 1 item, i.e. 1 item or a multiple thereof can be ordered.

1) Rated direct voltage of the converter

2) For downstream six-pulse bridge converters: Reactors with higher rated currents on request

3) I_{Ln} (60 Hz) = 0.9 x I_{Ln} (50 Hz)

4) For terminal covers offering protection against accidental contact with flat terminations: see "Accessories"

2

Three-phase reactors

$I_{thmax} = I_{Lmax}$

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Max. motor rated output up to U_{dc} [1]	Maximum continuous direct current [2]	Max. continuous thermal current	Rated current [3]	Inductance	Core losses	Winding losses	Connections [4] T = Terminal F = Flat termination	DT	Order No.	Al weight per PU approx.	Cu weight per PU approx.	Total weight per PU approx.
P_{Motor}	I_{dn}	I_{thmax}	I_{Ln}	L_x	P_{FE}	P_W						
kW	A	A	A	mH	W	W				kg	kg	kg
3 AC 400 V 50 Hz, u_D ~ 8.8 V 4% reference voltage drop for I_{thmax} and U_N												
485 V												
9.4	20	16	14	1.75	8.8	39	T	C	**4EP36 00-7DS00**	–	0.450	2.300
10.6	22	18	16	1.56	9.1	39	T	C	**4EP36 00-8DS00**	–	0.590	2.500
11.8	24	20	18	1.4	9.3	39	T	C	**4EP36 01-0DS00**	–	0.610	2.500
13.2	27	22.4	20	1.24	12	49	T	C	**4EP37 00-8DS00**	–	0.700	3.200
14.7	31	25	23	1.12	10	52	T	C	**4EP37 01-0DS00**	–	0.870	3.400
16.5	34	28	25	1	12	49	T	C	**4EP37 01-1DS00**	–	1.020	3.500
18.5	38	31.5	28	0.889	11.8	53	T	▶	**4EP37 00-0DS00**	–	1.290	3.800
20.9	43	35.5	32	0.789	18	53	T	C	**4EP38 01-2DS00**	–	0.880	4.800
23.5	49	40	36	0.7	19	53	T	▶	**4EP38 00-0DS00**	–	1.130	5.100
26.5	55	45	41	0.622	19.5	53	T	C	**4EP38 01-3DS00**	–	1.620	5.600
29.4	61	50	45	0.56	21	65	T	C	**4EP39 00-0DS00**	–	1.770	6.100
32.9	68	56	50	0.5	21.6	67	F	C	**4EP39 01-2DS00**	–	2.300	6.600
37.1	77	63	57	0.445	33	71	F	C	**4EP40 00-0DS00**	–	1.280	8.400
41.8	87	71	64	0.395	32.1	75	F	C	**4EP40 01-8DS00**	–	1.760	8.900
47.1	98	80	72	0.35	33	71	F	▶	**4EP40 00-1DS00**	–	2.510	9.700
53.5	111	91	82	0.308	35.8	73	F	C	**4EP40 02-3DS00**	–	2.680	9.800
58.8	122	100	90	0.28	39	120	F	▶	**4EU24 22-0AA00-0AA0**	1.700	–	10.800
65.9	137	112	101	0.25	38	120	F	▶	**4EU24 22-1AA00-0AA0**	2.100	–	11.200
73.5	153	125	113	0.224	64	131	F	C	**4EU25 22-0AA00-0AA0**	1.200	–	15.900
82.4	171	140	126	0.2	64	131	F	C	**4EU25 22-1AA00-0AA0**	1.700	–	16.400
94.1	195	160	144	0.175	64	131	F	▶	**4EU25 22-2AA00-0AA0**	2.200	–	16.900
106	220	180	162	0.156	85	167	F	C	**4EU27 22-0AA00-0AA0**	1.500	–	24.100
118	244	200	180	0.14	85	167	F	C	**4EU27 22-1AA00-0AA0**	1.900	–	24.600
132	273	224	202	0.124	90	176	F	C	**4EU27 22-2AA00-0AA0**	2.700	–	25.400
147	305	250	225	0.112	90	167	F	C	**4EU27 22-3AA00-0AA0**	3.400	–	26.200
165	342	280	252	0.1	88	167	F	C	**4EU27 22-4AA00-0AA0**	4.500	–	27.400
185	384	315	284	0.0869	143	220	F	C	**4EU30 22-0AA00-0AA0**	2.500	–	33.700
209	433	355	320	0.0771	143	220	F	C	**4EU30 22-1AA00-0AA0**	2.900	–	34.200
235	488	400	360	0.0684	143	220	F	C	**4EU30 22-2AA00-0AA0**	4.900	–	36.400
265	549	450	405	0.0608	143	220	F	C	**4EU30 22-3AA00-0AA0**	6.400	–	38.100
294	610	500	450	0.0535	170	280	F	C	**4EU36 22-0AA00-0AA0**	3.700	–	48.700
329	683	560	504	0.0477	187	280	F	C	**4EU36 22-1AA00-0AA0**	4.900	–	50.000
371	769	630	567	0.0424	187	280	F	C	**4EU36 22-2AA00-0AA0**	6.500	–	52.000
418	866	710	639	0.0377	195	280	F	C	**4EU36 22-3AA00-1BA0**	–	15.800	61.800
471	976	800	720	0.0334	187	280	F	C	**4EU36 22-4AA00-1BA0**	–	21.200	68.000
535	1110	910	819	0.0297	277	358	F	C	**4EU39 21-0AA00-0A**	–	14.300	74.500
588	1220	1000	900	0.0271	277	360	F	C	**4EU39 21-1AA00-0A**	–	18.800	79.300
765	1586	1300	1170	0.0225	270	670	F	C	**4EU43 21-0BB00-0A**	–	23.100	110.000
956	2001	1640 [5]	1640	0.0179	435	700	F	D	**4EU45 21-0AL00**	–	30.000	146.000

Package sizes for reactors; 1 item, i.e. 1 item or a multiple thereof can be ordered.

[1] Rated direct voltage of the converter

[2] For downstream six-pulse bridge converters: Reactors with higher rated currents on request

[3] I_{Ln} (60 Hz) = 0.9 x I_{Ln} (50 Hz)

[4] For terminal covers offering protection against accidental contact with flat terminations: see "Accessories"

[5] Reactors according to VDE 0532: I_{thmax} = rated current

$I_{thmax} = I_{Lmax}$

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Max. motor rated output up to U_{dc} [1]	Maximum continuous direct current [2]	Max. continuous thermal current	Rated current [3]	Inductance	Core losses	Winding losses	Connections [4] T = Terminal F = Flat termination	DT	Order No.	Al weight per PU approx.	Cu weight per PU approx.	Total weight per PU approx.
P_{Motor}	I_{dn}	I_{thmax}	I_{Ln}	L_x	P_{FE}	P_W						
kW	A	A	A	mH	W	W				kg	kg	kg
3 AC 500 V 50 Hz, u_D ~ 11.5 V 4% reference voltage drop for I_{thmax} and U_N												
600 V												
11.8	20	16	14	2.29	9.3	39	T	C	**4EP36 01-2DS00**	–	0.750	2.700
13.2	22	18	16	2.03	12	55	T	C	**4EP37 01-2DS00**	–	0.720	3.200
14.7	24	20	18	1.83	12	50	T	C	**4EP37 01-3DS00**	–	0.920	3.400
16.5	27	22.4	20	1.63	11	49	T	C	**4EP37 01-4DS00**	–	1.530	4.100
18.4	31	25	23	1.46	13	55	T	C	**4EP37 00-1DS00**	–	1.300	3.800
20.6	34	28	25	1.31	14	53	T	C	**4EP38 01-4DS00**	–	1.020	5.000
23.2	38	31.5	28	1.16	22	59	T	C	**4EP38 00-1DS00**	–	1.120	5.100
26.1	43	35.5	32	1.03	20	59	T	C	**4EP38 01-5DS00**	–	1.550	5.500
29.4	49	40	36	0.915	22	70	T	C	**4EP39 00-1DS00**	–	1.630	5.900
33.1	55	45	41	0.81	22	70	T	C	**4EP39 01-3DS00**	–	2.550	6.900
36.8	61	50	45	0.732	33	80	T	C	**4EP40 00-2DS00**	–	1.380	8.500
41.2	68	56	50	0.654	36	73	T	C	**4EP40 02-0DS00**	–	1.800	8.900
46.3	77	63	57	0.581	35	80	T	►	**4EP40 02-1DS00**	–	2.240	9.400
52.2	87	71	64	0.516	34	80	T	C	**4EP40 02-2DS00**	–	3.750	11.000
58.8	98	80	72	0.458	41	120	F	C	**4EU24 22-2AA00-0AA0**	1.900	–	11.000
66.9	111	91	82	0.402	41	120	F	C	**4EU24 22-3AA00-0AA0**	2.400	–	11.500
73.5	122	100	90	0.366	68	131	F	C	**4EU25 22-3AA00-0AA0**	1.400	–	16.000
82.4	137	112	101	0.327	68	131	F	C	**4EU25 22-4AA00-0AA0**	1.700	–	16.300
91.9	153	125	113	0.293	68	131	F	C	**4EU25 22-5AA00-0AA0**	2.300	–	17.000
103	171	140	126	0.261	68	131	F	C	**4EU25 22-6AA00-0AA0**	2.900	–	17.800
118	195	160	144	0.229	85	167	F	C	**4EU27 22-5AA00-0AA0**	2.200	–	24.900
132	220	180	162	0.2	85	174	F	C	**4EU27 22-6AA00-0AA0**	3.500	–	26.300
147	244	200	180	0.183	105	160	F	C	**4EU27 22-7AA00-0AA0**	3.500	–	26.300
165	273	224	202	0.163	95	167	F	C	**4EU27 22-8AA00-0AA0**	4.400	–	27.400
184	305	250	225	0.146	148	220	F	C	**4EU30 22-4AA00-0AA0**	2.800	–	34.000
206	342	280	252	0.131	143	210	F	C	**4EU30 22-5AA00-0AA0**	4.000	–	35.400
232	384	315	284	0.116	144	220	F	C	**4EU30 22-6AA00-0AA0**	5.400	–	36.900
261	433	355	320	0.103	190	280	F	C	**4EU36 22-5AA00-0AA0**	3.900	–	48.900
294	488	400	360	0.0915	212	280	F	C	**4EU36 22-6AA00-0AA0**	4.900	–	50.100
331	549	450	405	0.0813	220	300	F	C	**4EU36 22-7AA00-0AA0**	8.800	–	51.000
368	610	500	450	0.0732	200	280	F	C	**4EU36 22-8AA00-0AA0**	9.200	–	54.900
412	683	560	504	0.0654	187	280	F	C	**4EU36 22-0BA00-0AA0**	10.900	–	56.800
463	769	630	567	0.0556	220	380	F	C	**4EU39 21-2AA00-0A**	–	10.900	71.000
522	866	710	639	0.0493	231	380	F	C	**4EU39 21-3AA00-0A**	–	20.500	81.200
588	976	800	720	0.0438	261	370	F	C	**4EU39 21-4AA00-0A**	–	18.300	78.000
669	1110	910	819	0.0392	365	459	F	C	**4EU43 21-4AA00-0A**	–	14.900	107.000
735	1220	1000	900	0.0357	365	480	F	C	**4EU43 21-5AA00-0A**	–	18.300	110.000

Package sizes for reactors; 1 item, i.e. 1 item or a multiple thereof can be ordered.

[1] Rated direct voltage of the converter

[2] For downstream six-pulse bridge converters: Reactors with higher rated currents on request

[3] I_{Ln} (60 Hz) = 0.9 x I_{Ln} (50 Hz)

[4] For terminal covers offering protection against accidental contact with flat terminations: see "Accessories"

2

Three-phase reactors

$I_{thmax} = I_{Lmax}$

CE cULus [5]

4EU

4EU

Max. motor rated output up to U_{dc} [1]	Maximum continuous direct current [2]	Max. continuous thermal current	Rated current [3]	Inductance	Core losses	Winding losses	Connections [4] T = Terminal F = Flat termination	DT	Order No.	Al weight per PU approx.	Cu weight per PU approx.	Total weight per PU approx.
P_{Motor}	I_{dn}	I_{thmax}	I_{Ln}	L_x	P_{FE}	P_W						
kW	A	A	A	mH	W	W				kg	kg	kg
3 AC 575 V 50 Hz, u_D ~ 13.0 V 4% reference voltage drop for I_{thmax} and U_N												
690 V												
1099	1586	1300 [6]	1300	0.0316	404	700	F	D	**4EU45 21-0AM00**	–	33.000	152.000
1387	2001	1640 [6]	1640	0.0258	402	1300	F	D	**4EU50 21-0AA00**	–	52.800	190.000
3 AC 690 V 50 Hz, u_D ~ 7.8 V 2% reference voltage drop for I_{thmax} and U_N												
830 V												
1248	1501	1230	1107	0.0202	350	660	F	C	**4EU43 21-0BC00-0A**	–	14.300	99.000
1664	2001	1640	1476	0.0151	325	670	F	C	**4EU43 21-0BD00-0A**	–	20.700	108.000
3 AC 690 V 50 Hz, u_D ~ 15.0 V 4% reference voltage drop for I_{thmax} and U_N												
830 V												
203	250	200	180	0.242	132	210	F	C	**4EU30 22-7AA00-0AA0**	4.000	–	35.400
227	280	224	201.6	0.215	160	220	F	C	**4EU30 22-8AA00-0AA0**	6.200	–	35.000
254	313	250	225	0.194	148	210	F	C	**4EU30 22-0BA00-0AA0**	6.300	–	38.000
284	350	280	252	0.173	220	300	F	C	**4EU36 22-1BA00-0AA0**	5.900	–	48.000
320	394	315	283.5	0.154	220	300	F	C	**4EU36 22-2BA00-0AA0**	6.900	–	49.000
360	444	355	319.5	0.136	210	280	F	C	**4EU36 22-3BA00-0AA0**	7.000	–	52.500
406	500	400	360	0.121	200	280	F	C	**4EU36 22-4BA00-0AA0**	10.200	–	56.000
457	563	450	405	0.105	277	378	F	C	**4EU39 21-5AA00-0A**	–	10.400	70.000
507	625	500	450	0.0942	223	378	F	C	**4EU39 21-6AA00-0A**	–	13.200	73.300
568	700	560	504	0.0841	220	375	F	C	**4EU39 21-7AA00-0A**	–	17.400	78.000
639	788	630	567	0.0768	325	480	F	C	**4EU43 21-8AA00-0A**	–	15.000	106.000
720	888	710	639	0.0681	331	480	F	C	**4EU43 21-0BA00-0A**	–	21.500	113.000
812	1000	800	720	0.0605	300	480	F	C	**4EU43 21-1BA00-0A**	–	28.000	123.000
923	1138	910 [6]	910	0.0532	356	500	F	D	**4EU45 21-0AA00**	–	31.200	148.000
1015	1250	1000 [6]	1000	0.0484	350	500	F	D	**4EU45 21-1AA00**	–	34.600	156.000
1248	1538	1230 [6]	1230	0.0411	450	733	F	D	**4EU47 21-0AX00**	–	28.800	185.000
1664	2050	1640 [6]	1640	0.031	520	1300	F	D	**4EU51 21-0AA00**	–	56.100	210.000

Package sizes for reactors; 1 item, i.e. 1 item or a multiple thereof can be ordered.

1) Rated direct voltage of the converter

2) For downstream six-pulse bridge converters: Reactors with higher rated currents on request

3) I_{Ln} (60 Hz) = 0.9 x I_{Ln} (50 Hz)

4) For terminal covers offering protection against accidental contact with flat terminations: see "Accessories"

5) All reactors with $U_N \leq 600$ V according to UL

6) Reactors according to VDE 0532: I_{thmax} = rated current

$I_{thmax} = I_{Lmax}$

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4EU

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Max. motor rated output up to U_{dc} 1)	Maximum continuous direct current 2)	Max. continuous thermal current	Rated current 3)	Inductance	Core losses	Winding losses	Connections 4) T = Terminal F = Flat termination	DT	Order No.	Al weight per PU approx.	Cu weight per PU approx.	Total weight per PU approx.
P_{Motor}	I_{dn}	I_{thmax}	I_{Ln}	L_x	P_{FE}	P_W						
kW	A	A	A	mH	W	W				kg	kg	kg
3 AC 750 V 50 Hz, u_D ~ 17.3 V 4% reference voltage drop for I_{thmax} and U_N												
900 V												
221	244	200	180	0.275	160	220	F	C	**4EU30 22-5CA00-0AA0**	6.200	–	35.000
247	273	224	202	0.245	160	220	F	C	**4EU30 22-6CA00-0AA0**	8.100	–	37.000
276	305	250	225	0.22	220	300	F	C	**4EU36 22-5BA00-0AA0**	5.900	–	48.000
309	342	280	252	0.197	210	300	F	C	**4EU36 22-6BA00-0AA0**	7.400	–	50.000
347	384	315	283	0.175	210	301	F	C	**4EU36 22-7BA00-0AA0**	9.100	–	51.000
392	433	355	319	0.155	210	300	F	C	**4EU36 22-8BA00-0AA0**	13.200	–	55.000
441	488	400	360	0.138	288	394	F	C	**4EU39 21-8AA00-0A**	–	11.000	70.800
496	549	450	405	0.122	288	394	F	C	**4EU39 21-0BA00-0A**	–	14.500	74.000
551	610	500	450	0.11	277	360	F	C	**4EU39 21-1BA00-0A**	–	25.100	86.200
618	683	560	504	0.0983	313	474	F	C	**4EU43 21-2BA00-0A**	–	16.200	108.000
695	769	630	567	0.087	315	460	F	C	**4EU43 21-3BA00-0A**	–	22.500	115.000
783	866	710	639	0.0776	283	488	F	C	**4EU43 21-4BA00-0A**	–	28.600	122.000
882	976	800 6)	800	0.0688	404	500	F	D	**4EU45 21-2AA00**	–	24.500	142.000
1004	1110	910 6)	910	0.0605	404	500	F	D	**4EU45 21-3AA00**	–	32.000	149.000
1103	1220	1000 6)	1000	0.0551	404	500	F	D	**4EU45 21-4AA00**	–	40.000	157.000
3 AC 830 V 50 Hz, u_D ~ 9.6 V 2% reference voltage drop for I_{thmax} and U_N												
1000 V												
1501	1501	1230	1107	0.0248	325	670	F	C	**4EU43 21-0BE00-0A**	–	23.100	110.000
1904	1903	1560 6)	1560	0.0196	404	700	F	D	**4EU45 21-0AN00**	–	25.300	142.000

Package sizes for reactors; 1 item, i.e. 1 item or a multiple thereof can be ordered.

1) Rated direct voltage of the converter

2) For downstream six-pulse bridge converters: Reactors with higher rated currents on request

3) I_{Ln} (60 Hz) = 0.9 x I_{Ln} (50 Hz)

4) For terminal covers offering protection against accidental contact with flat terminations: see "Accessories"

5) All reactors with $U_N \leq 600$ V according to UL

6) Reactors according to VDE 0532: I_{thmax} = rated current

2

Three-phase reactors

$I_{thmax} = 0.8 \cdot I_{Lmax}$

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Max. motor rated output up to U_{dc} [1]	Maximum continuous direct current [2]	Max. continuous thermal current	Rated current [3]	Peak current [4]	Inductance	Core losses	Winding losses	Connections [5] T = Terminal F = Flat termination	DT	Order No.	Al weight per PU approx.	Cu weight per PU approx.	Total weight per PU approx.
P_{Motor}	I_{dn}	I_{thmax}	I_{Ln}	I_{Lmax}	L_x	P_{FE}	P_W						
kW	A	A	A	A	mH	W	W				kg	kg	kg
3 AC 400 V 50 Hz, u_D ~ 8.8 V 4% reference voltage drop for I_{thmax} and U_N													
485 V													
9.4	20	16	14	20	1.4	6.7	39	T	▶	**4EP36 01-3DS00**	–	0.470	2.400
10.6	22	18	16	23	1.24	7	39	T	C	**4EP36 01-4DS00**	–	0.480	2.400
11.8	24	20	18	25	1.12	7	39	T	▶	**4EP36 01-5DS00**	–	0.610	2.500
14.7	31	25	23	31	0.889	9	53	T	B	**4EP37 01-5DS00**	–	0.740	3.200
16.5	34	28	25	35	0.789	9	53	T	▶	**4EP37 01-6DS00**	–	0.970	3.500
18.5	38	31.5	28	39	0.7	9	55	T	C	**4EP37 01-7DS00**	–	1.240	3.800
20.9	43	35.5	32	44	0.622	9	55	T	▶	**4EP37 01-8DS00**	–	1.710	4.200
23.5	49	40	36	50	0.56	14.5	60	T	▶	**4EP38 00-2DS00**	–	0.710	4.700
26.5	55	45	41	56	0.5	16.5	58	T	C	**4EP38 01-6DS00**	–	1.330	5.300
29.4	61	50	45	63	0.445	14.5	55	T	▶	**4EP38 00-3DS00**	–	1.400	5.400
32.9	68	56	50	70	0.395	15.7	70	F	▶	**4EP39 01-4DS00**	–	2.070	6.500
37.1	77	63	57	79	0.35	19.1	70	F	▶	**4EP39 00-2DS00**	–	2.190	6.800
41.8	87	71	64	89	0.308	24.9	80	F	B	**4EP40 02-7DS00**	–	1.700	8.800
47.1	98	80	72	100	0.28	26.2	80	F	▶	**4EP40 00-3DS00**	–	1.910	9.000
53.5	111	91	82	114	0.25	24	80	F	▶	**4EP40 02-8DS00**	–	2.150	9.600
58.8	122	100	90	125	0.224	30	80	F	▶	**4EP40 03-0DS00**	–	2.950	10.400
65.9	137	112	101	140	0.193	28	122	F	C	**4EU24 22-6AA00-0AA0**	2.100	–	11.200
73.5	153	125	113	156	0.169	30	122	F	▶	**4EU24 22-7AA00-0AA0**	2.600	–	11.700
82.4	171	140	126	175	0.149	55	135	F	▶	**4EU25 22-2BA00-0AA0**	1.100	–	15.700
94.1	195	160	144	200	0.134	52	135	F	▶	**4EU25 22-3BA00-0AA0**	1.500	–	17.200
106	220	180	162	225	0.119	52	135	F	▶	**4EU25 22-4BA00-0AA0**	2.200	–	16.900
118	244	200	180	250	0.107	52	135	F	▶	**4EU25 22-5BA00-0AA0**	2.800	–	17.700
132	273	224	202	280	0.0955	75	174	F	C	**4EU27 22-5BA00-0AA0**	1.900	–	24.500
147	305	250	225	313	0.0849	75	174	F	▶	**4EU27 22-6BA00-0AA0**	2.300	–	25.000
165	342	280	252	350	0.0753	74	174	F	▶	**4EU27 22-7BA00-0AA0**	2.900	–	25.700
185	384	315	284	394	0.0668	75	174	F	▶	**4EU27 22-8BA00-0AA0**	4.100	–	27.000
209	433	355	320	444	0.0622	102	220	F	C	**4EU30 22-1BA00-0AA0**	1.100	–	34.500
235	488	400	360	500	0.056	102	220	F	▶	**4EU30 22-2BA00-0AA0**	4.100	–	35.500
265	549	450	405	563	0.05	92	220	F	C	**4EU30 22-3BA00-0AA0**	6.400	–	38.100
294	610	500	450	625	0.0445	92	220	F	▶	**4EU30 22-4BA00-0AA0**	7.000	–	38.700
329	683	560	504	700	0.0377	140	293	F	▶	**4EU36 22-0CA00-0AA0**	4.700	–	49.800
371	769	630	567	788	0.0334	140	293	F	▶	**4EU36 22-1CA00-0AA0**	6.200	–	51.600
418	866	710	639	888	0.0294	150	293	F	C	**4EU36 22-2CA00-1BA0**	–	14.100	60.000
471	976	800	720	1000	0.0267	140	293	F	▶	**4EU36 22-3CA00-1BA0**	–	20.400	66.700
535	1110	910	819	1138	0.025	220	380	F	C	**4EU39 21-2BA00-0A**	–	14.500	74.700
588	1220	1000	900	1250	0.0224	216	380	F	C	**4EU39 21-3BA00-0A**	–	18.400	78.800
612	1269	1040	936	1300	0.0225	210	535	F	D	**4EU39 21-0AL00-0A**	–	13.000	72.900
771	1598	1310	1179	1638	0.0179	325	680	F	D	**4EU43 21-0AW00-0A**	–	23.100	110.000

Package sizes for reactors; 1 item, i.e. 1 item or a multiple thereof can be ordered.

1) Rated direct voltage of the converter

2) For downstream six-pulse bridge converters: Reactors with higher rated currents on request

3) I_{Ln} (60 Hz) = 0.9 x I_{Ln} (50 Hz)

4) Load with I_{Lmax} permissible, occasional or periodic, if the effective current does not exceed the value I_{thmax}.

5) For terminal covers offering protection against accidental contact with flat terminations: see "Accessories"

$I_{thmax} = 0.8 \cdot I_{Lmax}$

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Max. motor rated output up to U_{dc} [1]	Maximum continuous direct current [2]	Max. continuous thermal current	Rated current [3]	Peak current [4]	Inductance	Core losses	Winding losses	Connections [5] T = Terminal F = Flat termination	DT	Order No.	Al weight per PU approx.	Cu weight per PU approx.	Total weight per PU approx.
P_{Motor}	I_{dn}	I_{thmax}	I_{Ln}	I_{Lmax}	L_x	P_{FE}	P_W						
kW	A	A	A	A	mH	W	W				kg	kg	kg
3 AC 500 V 50 Hz, u_D ~ 11.5 V 4% reference voltage drop for I_{thmax} and U_N													
600 V													
11.8	20	16	14	20	1.83	8	37	T	▶	**4EP36 01-8DS00**	–	0.730	2.700
13.2	22	18	16	23	1.63	7	37	T	C	**4EP36 02-0DS00**	–	0.900	2.800
14.7	24	20	18	25	1.46	9	55	T	C	**4EP37 02-0DS00**	–	0.750	3.200
16.5	27	22.4	20	28	1.31	9	52.6	T	C	**4EP37 02-1DS00**	–	0.980	3.500
18.4	31	25	23	31	1.16	8	47	T	C	**4EP37 02-2DS00**	–	1.580	4.100
20.6	34	28	25	35	1.03	14	52.8	T	C	**4EP38 01-7DS00**	–	0.870	4.800
23.2	38	31.5	28	39	0.915	14	59	T	C	**4EP38 01-8DS00**	–	1.240	5.200
26.1	43	35.5	32	44	0.813	15	69	T	C	**4EP38 02-0DS00**	–	1.640	5.600
29.4	49	40	36	50	0.732	15	60	T	C	**4EP38 00-4DS00**	–	1.520	5.500
33.1	55	45	41	56	0.654	17	70	T	C	**4EP39 01-5DS00**	–	2.480	6.900
36.8	61	50	45	63	0.566	17	65	T	▶	**4EP39 00-3DS00**	–	2.260	6.600
41.2	68	56	50	71	0.516	25	80	F	C	**4EP40 03-1DS00**	–	1.790	9.000
46.3	77	63	57	79	0.458	25	80	F	C	**4EP40 00-4DS00**	–	2.300	9.400
52.2	87	71	64	89	0.402	26	80	F	C	**4EP40 03-2DS00**	–	2.870	10.100
58.8	98	80	72	100	0.36	42	120	F	C	**4EU24 22-8AA00-0AA0**	1.800	–	10.900
66.9	111	91	82	114	0.327	32	122	F	C	**4EU24 22-0BA00-0AA0**	2.300	–	11.400
73.5	122	100	90	125	0.293	52	135	F	C	**4EU25 22-6BA00-0AA0**	1.400	–	16.000
82.4	137	112	101	140	0.261	52	135	F	C	**4EU25 22-7BA00-0AA0**	1.700	–	16.300
91.9	153	125	113	156	0.229	52	135	F	C	**4EU25 22-8BA00-0AA0**	1.800	–	16.500
103	171	140	126	175	0.203	52	135	F	C	**4EU25 22-0CA00-0AA0**	2.400	–	17.100
118	195	160	144	200	0.175	74	174	F	▶	**4EU27 22-0CA00-0AA0**	1.400	–	24.000
132	220	180	162	225	0.156	76	174	F	C	**4EU27 22-1CA00-0AA0**	1.900	–	24.600
147	244	200	180	250	0.14	78	174	F	C	**4EU27 22-2CA00-0AA0**	2.500	–	25.200
165	273	224	202	280	0.125	80	174	F	C	**4EU27 22-3CA00-0AA0**	3.300	–	26.100
184	305	250	225	313	0.111	80	174	F	C	**4EU27 22-4CA00-0AA0**	4.200	–	27.100
206	342	280	252	350	0.0986	110	220	F	C	**4EU30 22-5BA00-0AA0**	2.900	–	34.200
232	384	315	284	394	0.0875	110	220	F	▶	**4EU30 22-6BA00-0AA0**	3.800	–	35.100
261	433	355	320	444	0.0778	117	220	F	C	**4EU30 22-7BA00-0AA0**	4.600	–	36.100
294	488	400	360	500	0.07	182	293	F	▶	**4EU36 22-4CA00-0AA0**	3.300	–	48.300
331	549	450	405	563	0.0625	171	293	F	C	**4EU36 22-5CA00-0AA0**	4.200	–	49.000
368	610	500	450	625	0.0556	160	293	F	▶	**4EU36 22-6CA00-0AA0**	5.700	–	51.000
412	683	560	504	700	0.0493	160	293	F	C	**4EU36 22-7CA00-0AA0**	7.700	–	53.200
463	769	630	567	788	0.0438	190	280	F	C	**4EU36 22-8CA00-1BA0**	–	19.400	65.700
522	866	710	639	888	0.0392	210	378	F	C	**4EU39 21-6BA00-0A**	–	12.800	72.800
588	976	800	720	1000	0.0357	230	375	F	C	**4EU39 21-7BA00-0A**	–	18.500	78.900
669	1110	910	819	1138	0.0327	300	480	F	C	**4EU43 21-4CA00-0A**	–	14.200	106.000
735	1220	1000	900	1250	0.0293	274	480	F	C	**4EU43 21-5CA00-0A**	–	16.700	108.000

Package sizes for reactors; 1 item, i.e. 1 item or a multiple thereof can be ordered.

[1] Rated direct voltage of the converter

[2] For downstream six-pulse bridge converters: Reactors with higher rated currents on request

[3] I_{Ln} (60 Hz) = 0.9 x I_{Ln} (50 Hz)

[4] Load with I_{Lmax} permissible, occasional or periodic, if the effective current does not exceed the value I_{thmax}.

[5] For terminal covers offering protection against accidental contact with flat terminations: see "Accessories"

2

Three-phase reactors

$I_{thmax} = 0.8 \cdot I_{Lmax}$

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Max. motor rated output up to U_{dc} 1)	Maximum continuous direct current 2)	Max. continuous thermal current	Rated current 3)	Peak current 4)	Inductance	Core losses	Winding losses	Connections 5) T = Terminal F = Flat termination	DT	Order No.	Al weight per PU approx.	Cu weight per PU approx.	Total weight per PU approx.
P_{Motor}	I_{dn}	I_{thmax}	I_{Ln}	I_{Lmax}	L_x	P_{FE}	P_W						
kW	A	A	A	A	mH	W	W				kg	kg	kg
3 AC 575 V 50 Hz, u_D ~ 12.6 V 4% reference voltage drop for I_{thmax} and U_N													
690 V													
879	1270	1040 7)	936	1300	0.0309	325	681	F	C	**4EU43 21-0AX00-0A**	–	14.000	101.000
1108	1600	1310 7)	1310	1638	0.0245	404	700	F	D	**4EU45 21-0AK00**	–	18.700	135.000
3 AC 690 V 50 Hz, u_D ~ 15.0 V 4% reference voltage drop for I_{thmax} and U_N													
830 V													
203	244	200	180	250	0.194	90	190	F	C	**4EU27 22-0DA00-1BA0**	–	11.300	34.700
227	273	224	202	280	0.165	110	220	F	C	**4EU30 22-8BA00-0AA0**	4.900	–	36.400
254	305	250	225	313	0.147	130	240	F	C	**4EU30 22-0CA00-0AA0**	5.300	–	35.000
284	342	280	252	350	0.13	102	220	F	C	**4EU30 22-1CA00-0AA0**	7.000	–	38.700
320	384	315	284	394	0.115	180	320	F	C	**4EU36 22-0DA00-0AA0**	5.900	–	49.000
360	433	355	320	444	0.103	180	320	F	C	**4EU36 22-1DA00-0AA0**	7.200	–	49.000
406	488	400	360	500	0.0923	171	293	F	C	**4EU36 22-2DA00-0AA0**	7.000	–	52.000
457	549	450	405	563	0.0824	180	320	F	C	**4EU36 22-3DA00-0AA0**	12.100	–	54.000
507	610	500	450	625	0.0733	180	390	F	C	**4EU36 22-4DA00-0AA0**	9.500	–	52.000
568	683	560	504	700	0.0681	220	375	F	C	**4EU39 21-8BA00-0A**	–	17.200	78.000
639	769	630	567	788	0.0605	176	388	F	C	**4EU39 21-0CA00-0A**	–	21.100	81.900
720	866	710	639	888	0.0532	330	470	F	C	**4EU43 21-0DA00-0A**	–	12.800	104.000
812	976	800	720	1000	0.0484	300	460	F	C	**4EU43 21-1DA00-0A**	–	16.000	103.000
923	1110	910	819	1138	0.0432	280	448	F	C	**4EU43 21-2DA00-0A**	–	27.700	115.000
994	1196	980	882	1225	0.0411	325	680	F	C	**4EU43 21-0AY00-0A**	–	23.100	110.000
1015	1220	1000	900	1250	0.0387	318	473	F	C	**4EU43 21-3DA00-0A**	–	29.300	124.000
1329	1598	1310 7)	1310	1638	0.0309	400	700	F	D	**4EU45 21-0AP00**	–	33.000	152.000
3 AC 750 V 50 Hz, u_D ~ 17.3 V 4% reference voltage drop for I_{thmax} and U_N													
900 V													
276	305	250	225	313	0.175	130	240	F	C	**4EU30 22-2CA00-0AA0**	6.600	–	36.000
309	342	280	252	350	0.155	180	320	F	C	**4EU36 22-5DA00-0AA0**	6.800	–	49.000
347	384	315	284	394	0.138	180	320	F	C	**4EU36 22-6DA00-0AA0**	9.000	–	51.000
392	433	355	320	444	0.122	180	320	F	C	**4EU36 22-7DA00-0AA0**	9.200	–	51.000
441	488	400	360	500	0.11	180	320	F	C	**4EU36 22-8DA00-1BA0**	–	19.200	62.000
496	549	450	405	563	0.0983	170	293	F	C	**4EU36 22-0EA00-1BA0**	–	22.300	68.700
551	610	500	450	625	0.0874	218	380	F	C	**4EU39 21-1CA00-0A**	–	18.200	78.900
618	683	560	504	700	0.0776	240	380	F	C	**4EU39 21-2CA00-0A**	–	17.600	78.100
695	769	630	567	788	0.0688	300	480	F	C	**4EU43 21-4DA00-0A**	–	15.100	106.000
783	866	710	639	888	0.0605	321	472	F	C	**4EU43 21-5DA00-0A**	–	19.500	111.000
882	976	800	720	1000	0.0551	285	480	F	C	**4EU43 21-6DA00-0A**	–	26.200	118.000
1004	1110	910 7)	910	1138	0.0469	404	520	F	D	**4EU45 21-4BA00**	–	20.000	137.000
1103	1220	1000 7)	1000	1250	0.042	404	488	F	D	**4EU45 21-5BA00**	–	21.800	141.000

Package sizes for reactors; 1 item, i.e. 1 item or a multiple thereof can be ordered.

1) Rated direct voltage of the converter

2) For downstream six-pulse bridge converters: Reactors with higher rated currents on request

3) I_{Ln} (60 Hz) = 0.9 x I_{Ln} (50 Hz)

4) Load with I_{Lmax} permissible, occasional or periodic, if the effective current does not exceed the value I_{thmax}.

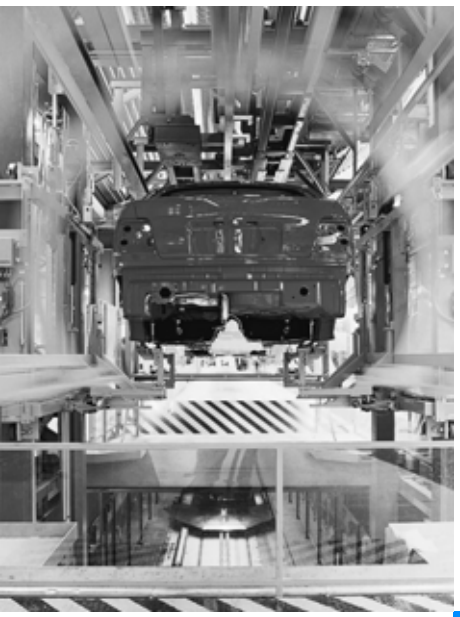
5) For terminal covers offering protection against accidental contact with flat terminations: see "Accessories"

6) All reactors with $U_N \leq 600$ V according to UL

7) Reactors according to VDE 0532: I_{thmax} = rated current

SIDAC
Mains Reactors
for Frequency Converters

3



Three-phase reactors

Application

Mains reactors for frequency converters

Three-phase mains reactors for frequency converters are used in the line-side supply cable. Alternating currents flow through them with the mains frequency as the fundamental component.

The reactors limit the circuit feedback that occurs in the form of harmonics. They also reduce the alternating currents and their frequencies caused by the switching of the input rectifier in the DC link capacitors.

Two reactor series are available:

- Reactors with a reference voltage drop u_D of ~ 2% for the operation of converters without power recovery.
- Reactors with a reference voltage drop u_D of ~ 4% for operation with converters in combination with autotransformers with power recovery and for operation in systems with a u_K power supply of < 1%.

Technical specifications

Recommended supply voltage U_N **Rated alternating current I_{Ln}** **Maximum continuous thermal current I_{thmax}** **Voltage drop Δu per phase** **Inductance per phase mH** **Core losses P_{Fe} at f = 50 Hz** **Winding losses P_W** **Weight**	See "Selection and ordering data" table	
Degree of protection	IP00 according to DIN VDE 0470-1/EN 60529	
Rating of creepage distances and clearances	Degree of soiling 2 according to DIN VDE 0110	
Rated voltage for insulation (for site altitudes up to 2000 m above sea level)	4EP with terminals: 4EP with flat termination and 4EU24 to 4EU43 (EN 61558): 4EU45 to 4EU52 (DIN VDE 0532): with $U_N \leq 500$ V for 4EP and 4EU:	690 V AC 1000 V AC 1100 V AC 600 V AC to cULus
Permissible ambient temperature during operation	Type 4EP: -25°C to +70°C Type 4EU: -25°C to +80°C	
Deviation of the permissible alternating current from rated alternating current I_{Ln} at coolant temperatures ≠ +40°C	See "Configuration notes"	
Temperature classes	Type 4EP: t_a 40°C/B Type 4EU: t_a 40°C/H (utilisation according to F for applications according to EN 61558) Type 4EU: temperature class H (for applications according to cULus)	
Site altitude	≤ 1000 m above sea level	
Deviation of the permissible alternating current from rated alternating current I_{Ln} at site altitudes >1000 m above sea level	See "Configuration notes"	
Operation with varying load	Rating on request	
Standards/approvals	The reactors comply with EN 61558-2-20 (type 4EU45 to 4EU52: DIN VDE 0532) The reactors are UL recognised under Guide No. XQNX2 and File No. E103902, as well as cUL approved under Guide No. XQNX8 File No. E103902 (applies to reactors with $U_N \leq 600$ V according to UL)	
Storage temperature	-25°C to +55°C	
Transport temperature	-25°C to +70°C	
Permissible humidity rating	Humidity 5% to 95% occasional condensation permissible	

Selection and ordering data

CE cULus [1]

Overview

4EP

4EU

4EU

Max. continuous thermal current [2]	Rated current	Reference voltage drop of reactor u_D = 2% for I_{thmax} and U_N		
I_{thmax}	I_{Ln}	Order No.	Order No.	Order No.
A	A	**3 AC 400 V 50 Hz 3 AC 480 V 60 Hz**	**3 AC 500 V 50 Hz**	**3 AC 690 V 50 Hz**
1.5	1.4	**4EP32 00-4US00**	**–**	**–**
3	2.7	**4EP32 00-5US00**	**–**	**–**
5	4.5	**–**	**4EP32 00-2US00**	**–**
6.3	5.7	**4EP32 00-1US00**	**4EP33 00-0US00**	**–**
8	7.2	**–**	**4EP34 00-3US00**	**–**
9.1	8.2	**4EP34 00-2US00**	**–**	**–**
11.2	10.1	**4EP34 00-1US00**	**–**	**–**
12.5	11.3	**–**	**4EP36 00-8US00**	**–**
16	14.4	**4EP35 00-0US00**	**4EP36 00-2US00**	**–**
18	16.2	**4EP36 00-4US00**	**–**	**–**
22.4	20.2	**–**	**4EP36 00-3US00**	**–**
22.5	20.3	**4EP36 01-0US00**	**–**	**–**
28	25.2	**4EP36 00-5US00**	**–**	**–**
31.5	28.4	**–**	**4EP37 00-6US00**	**–**
35.5	32	**4EP37 00-2US00**	**4EP37 00-1US00**	**–**
40	36	**4EP37 00-5US00**	**–**	**–**
45	41	**4EP38 01-1US00**	**4EP38 01-2US00**	**–**
50	45	**4EP38 00-2US00**	**4EP38 00-1US00**	**–**
63	57	**4EP38 00-7US00**	**4EP39 00-1US00**	**4EP40 00-3US00**
71	64	**–**	**4EP40 00-7US00**	**–**
80	72	**4EP39 00-2US00**	**4EP40 00-1US00**	**–**
91	82	**4EP40 01-3US00**	**–**	**4EU24 52-3UA00-0AA0**
100	90	**4EP40 00-2US00**	**–**	**4EU25 52-7UA00-0AA0**
112	101	**–**	**4EP40 00-8US00**	**–**
125	113	**4EP40 00-6US00**	**–**	**4EU25 52-3UA00-0AA0**
140	126	**–**	**4EU24 52-1UA00-0AA0**	**–**
160	144	**4EU24 52-2UA00-0AA0**	**4EU25 52-2UA00-0AA0**	**4EU25 52-0UB00-0AA0**
180	162	**–**	**–**	**4EU27 52-5UA00-0AA0**
200	180	**4EU25 52-4UA00-0AA0**	**4EU25 52-6UA00-0AA0**	**–**
224	202	**4EU25 52-8UA00-0AA0**	**–**	**4EU27 52-6UA00-0AA0**
250	225	**4EU25 52-5UA00-0AA0**	**4EU27 52-2UA00-0AA0**	**–**
280	252	**4EU27 52-0UB00-0AA0**	**–**	**–**
315	284	**4EU27 52-7UA00-0AA0**	**4EU27 52-3UA00-0AA0**	**4EU30 52-3UA00-0AA0**
400	360	**4EU27 52-8UA00-0AA0**	**4EU27 52-4UA00-1BA0**	**4EU30 52-4UA00-0AA0**
450	405	**–**	**4EU30 52-2UA00-0AA0**	**–**
500	450	**4EU30 52-4UB00-0AA0**	**–**	**4EU36 52-5UA00-0AA0**
560	504	**4EU30 52-5UA00-0AA0**	**4EU30 52-5UB00-0AA0**	**4EU36 52-4UC00-0AA0**
630	567	**4EU30 52-6UA00-1BA0**	**4EU36 52-2UA00-0AA0**	**4EU36 52-6UA00-0AA0**
710	639	**–**	**4EU36 52-3UA00-0AA0**	**4EU36 52-7UA00-1BA0**
720	648	**4EU36 52-8UA00-0AA0**	**–**	**–**
910	819	**4EU36 52-0UB00-1BA0**	**4EU36 52-4UA00-1BA0**	**4EU39 51-0UA00-0A**
1000	900	**–**	**4EU36 52-2UB00-1BA0**	**4EU39 51-4UA00-0A**
1120	1008	**4EU36 52-7UC00-1BA0**	**4EU39 51-5UB00-0A**	**4EU39 51-6UB00-0A**
1250	1125	**–**	**4EU39 51-7UB00-0A**	**4EU43 51-0UB00-0A**
1400	1260	**4EU39 51-8UB00-0A**	**–**	**4EU43 51-1UB00-0A**
1600	1440	**4EU39 51-0UC00-0A**	**4EU43 51-2UB00-0A**	**4EU45 51-4UA00** [2]

[1] All reactors with $U_N \leq 600$ V according to UL
Reactors with higher rated currents on request

[2] Reactors according to VDE 0532: I_{thmax} = rated current

Three-phase reactors

Overview

CE cULus [1)]

4EP

4EU

4EU

Max. continuous thermal current [2)]	Rated current	Reference voltage drop of reactor u_D = 4% for I_{thmax} and U_N		
I_{thmax} A	I_{Ln} A	Order No.	Order No.	Order No.
		3 AC 400 V 50 Hz 3 AC 480 V 60 Hz	**3 AC 500 V 50 Hz**	**3 AC 690 V 50 Hz**
3	2.7	**4EP32 01-0US00**	–	–
6.3	5.67	**4EP35 00-4US00**	–	–
11.2	10.1	**4EP36 01-2US00**	–	–
18	16.2	**4EP37 00-7US00**	–	–
22.4	20.2	**4EP38 01-0US00**	**4EP38 00-8US00**	–
35.5	32	**4EP39 00-5US00**	**4EP40 01-0US00**	–
45	41	**4EP40 01-1US00**	**4EP40 01-2US00**	–
63	57	–	**4EU24 52-5UA00-0AA0**	–
80	72	**4EU24 52-4UA00-0AA0**	**4EU25 52-1UB00-0AA0**	–
91	82	**4EU25 52-2UB00-0AA0**	–	–
100	90	–	**4EU25 52-3UB00-0AA0**	–
125	113	–	–	**4EU27 52-4UB00-0AA0**
140	126	–	**4EU27 52-3UB00-0AA0**	–
160	144	**4EU27 52-1UB00-0AA0**	**4EU27 52-6UB00-0AA0**	–
180	162	–	–	**4EU30 52-2UB00-0AA0**
200	180	**4EU27 52-2UB00-0AA0**	**4EU30 52-0UB00-0AA0**	–
224	202	**4EU27 52-5UB00-0AA0**	–	**4EU36 52-8UB00-0AA0**
250	225	–	**4EU30 52-1UB00-0AA0**	–
280	252	**4EU30 52-7UA00-0AA0**	–	–
315	284	**4EU30 52-3UB00-0AA0**	**4EU36 52-5UB00-0AA0**	**4EU36 52-0UC00-0AA0**
355	320	**4EU30 52-8UA00-0AA0**	–	–
400	360	**4EU36 52-3UB00-0AA0**	**4EU36 52-6UB00-0AA0**	**4EU39 51-8UA00-0A**
500	450	**4EU36 52-5UC00-0AA0**	**4EU36 52-7UB00-1BA0**	**4EU39 51-0UB00-0A**
560	504	**4EU36 52-4UB00-0AA0**	**4EU39 51-3UB00-0A**	**4EU39 51-4UB00-0A**
630	567	**4EU36 52-6UC00-1BA0**	–	–
710	639	**4EU39 51-6UA00-0A**	**4EU39 51-7UA00-0A**	**4EU43 51-6UA00-0A**
910	819	**4EU39 51-1UB00-0A**	**4EU43 51-5UA00-0A**	**4EU45 51-3UA00** [2)]
1120	1008	**4EU43 51-3UB00-0A**	**4EU45 51-5UA00** [2)]	**4EU47 51-2UA00** [2)]
1250	1125	–	**4EU45 51-6UA00** [2)]	–
1500	1350	**4EU43 51-4UB00-0A**	–	–
1600	1440	**4EU43 51-5UB00-0A**	**4EU47 51-3UA00** [2)]	**4EU52 51-1UA00** [2)]

[1)] All reactors with $U_N \leq 600$ V according to UL
Reactors with higher rated currents on request

[2)] Reactors according to VDE 0532: I_{thmax} = rated current

Three-phase reactors

4EP

4EU

4EU

Typical drive power	Maximum continuous thermal current	Rated current	Inductance	Core losses [1]	Winding losses	Connections [2] T = Terminal F = Flat termination	DT	Order No.	Al weight per PU approx.	Cu weight per PU approx.	Total weight per PU approx.
P_{drive}	I_{thmax}	I_{Ln}	L_x	P_{FE}	P_W						
kW	A	A	mH	W	W				kg	kg	kg
3 AC 400 V 50 Hz, u_D ~ 4.4 V 2% reference voltage drop for I_{thmax} and U_N											
3 AC 480 V 60 Hz, u_D ~ 5.3 V 2% reference voltage drop for I_{thmax} and U_N											
400 V											
0.55	1.5	1.4	9.4	4.5	16.7	T	▶	**4EP32 00-4US00**	–	0.050	0.600
1.1	3	2.7	4.7	4.5	16.7	T	▶	**4EP32 00-5US00**	–	0.110	0.600
2.2	6.3	5.7	2.24	5.6	17	T	▶	**4EP32 00-1US00**	–	0.220	0.700
3	9.1	8.2	1.55	10	25	T	▶	**4EP34 00-2US00**	–	0.290	1.400
4	11.2	10.1	1.26	11	23	T	▶	**4EP34 00-1US00**	–	0.370	1.500
5.5	16	14.4	0.881	10	31	T	▶	**4EP35 00-0US00**	–	0.490	1.800
7.5	18	16	0.783	15	37	T	▶	**4EP36 00-4US00**	–	0.600	2.500
9	22.5	20	0.629	9	37	T	C	**4EP36 01-0US00**	–	0.620	2.500
11	28	25	0.503	8	37	T	▶	**4EP36 00-5US00**	–	0.830	2.700
15	35.5	32	0.397	10	50	T	▶	**4EP37 00-2US00**	–	0.860	3.300
18.5	40	36	0.352	11	42	T	▶	**4EP37 00-5US00**	–	1.320	3.800
20	45	41	0.313	12	57	T	C	**4EP38 01-1US00**	–	0.760	4.700
22	50	45	0.282	19	54	F-Cu	▶	**4EP38 00-2US00**	–	0.910	5.000
30	63	57	0.224	13	54	F-Cu	▶	**4EP38 00-7US00**	–	1.420	5.800
37	80	72	0.176	18	65	F-Cu	▶	**4EP39 00-2US00**	–	2.090	7.400
42	91	82	0.155	22	78	F-Cu	C	**4EP40 01-3US00**	–	1.340	7.600
45	100	90	0.141	30	73	F-Cu	▶	**4EP40 00-2US00**	–	1.880	8.200
55	125	113	0.113	24	77	F-Cu	▶	**4EP40 00-6US00**	–	2.960	9.600
75	160	144	0.088	30	123	F-Al	▶	**4EU24 52-2UA00-0AA0**	2.000	–	11.100
90	200	180	0.07	52	134	F-Al	▶	**4EU25 52-4UA00-0AA0**	1.600	–	16.300
110	224	202	0.0629	52	134	F-Al	▶	**4EU25 52-8UA00-0AA0**	2.100	–	16.900
120	250	225	0.0564	54	134	F-Al	▶	**4EU25 52-5UA00-0AA0**	2.600	–	17.400
132	280	252	0.0503	67	172	F-Al	▶	**4EU27 52-0UB00-0AA0**	2.300	–	25.000
160	315	284	0.0447	87	172	F-Al	▶	**4EU27 52-7UA00-0AA0**	1.900	–	24.500
200	400	360	0.0352	87	172	F-Al	▶	**4EU27 52-8UA00-0AA0**	3.600	–	26.400
220	500	450	0.0282	129	216	F-Al	C	**4EU30 52-4UB00-0AA0**	3.100	–	34.400
250	560	504	0.0252	115	216	F-Al	▶	**4EU30 52-5UA00-0AA0**	4.200	–	35.600
315	630	567	0.0224	110	216	F-Cu	▶	**4EU30 52-6UA00-1BA0**	–	9.800	41.400
360	720	648	0.0196	135	300	F-Al	▶	**4EU36 52-8UA00-0AA0**	5.500	–	50.800
500	910	819	0.0155	150	394	F-Cu	▶	**4EU36 52-0UB00-1BA0**	–	13.600	59.400
630	1120	1008	0.0126	135	394	F-Cu	▶	**4EU36 52-7UC00-1BA0**	–	20.900	67.200
750	1400	1260	0.0101	190	540	F-Cu	D	**4EU39 51-8UB00-0A**	–	34.000	95.700
800	1600	1440	0.0088	212	540	F-Cu	D	**4EU39 51-0UC00-0A**	–	24.600	85.600

Package sizes for reactors; 1 item, i.e. 1 item or a multiple thereof can be ordered.

[1] At f = 60 Hz: $P_{Fe60} = P_{Fe50} \cdot 1.3$

[2] For terminal covers offering protection against accidental contact with flat terminations: see "Accessories"

Three-phase reactors

4EP

4EU

4EU

Typical drive power	Max. continuous thermal current	Rated current	Inductance	Core losses [1]	Winding losses	Connections [2] T = Terminal F = Flat termination	DT	Order No.	Al weight per PU approx.	Cu weight per PU approx.	Total weight per PU approx.
P_{drive}	I_{thmax}	I_{Ln}	L_x	P_{FE}	P_W						
kW	A	A	mH	W	W				kg	kg	kg
3 AC 400 V 50 Hz, u_D ~ 8.8 V 4% reference voltage drop for I_{thmax} and U_N 3 AC 480 V 60 Hz, u_D ~ 10.6 V 4% reference voltage drop for I_{thmax} and U_N											
400 V											
1.1	3	2.7	9.73	6	14	T	C	**4EP32 01-0US00**	–	0.300	0.900
2.2	6.3	5.67	4.63	14	28	T	C	**4EP35 00-4US00**	–	0.380	1.700
4	11.2	10.1	2.6	9	35	T	C	**4EP36 01-2US00**	–	0.500	2.400
7.5	18	16	1.57	13	48	T	▶	**4EP37 00-7US00**	–	0.770	3.300
9	22.4	20	1.26	23	73	T	▶	**4EP38 01-0US00**	–	0.690	4.600
15	35.5	32	0.794	20	65	T	▶	**4EP39 00-5US00**	–	2.080	6.400
18.5	45	41	0.625	29	70	T	C	**4EP40 01-1US00**	–	2.000	9.100
37	80	72	0.352	37	123	F-Al	▶	**4EU24 52-4UA00-0AA0**	1.900	–	11.000
42	91	82	0.31	55	134	F-Al	C	**4EU25 52-2UB00-0AA0**	1.500	–	16.100
75	160	144	0.176	87	172	F-Al	▶	**4EU27 52-1UB00-0AA0**	2.200	–	24.900
90	200	180	0.141	87	172	F-Al	▶	**4EU27 52-2UB00-0AA0**	3.400	–	26.200
100	224	202	0.126	91	172	F-Al	C	**4EU27 52-5UB00-0AA0**	4.800	–	27.700
132	280	252	0.101	104	216	F-Al	▶	**4EU30 52-7UA00-0AA0**	5.000	–	36.500
145	315	284	0.0895	129	216	F-Al	C	**4EU30 52-3UB00-0AA0**	5.400	–	36.900
160	355	320	0.0794	129	216	F-Al	▶	**4EU30 52-8UA00-0AA0**	6.800	–	38.500
200	400	360	0.0704	170	394	F-Al	▶	**4EU36 52-3UB00-0AA0**	4.600	–	49.700
220	500	450	0.0564	170	287	F-Al	C	**4EU36 52-5UC00-0AA0**	9.200	–	54.900
250	560	504	0.0503	170	290	F-Al	C	**4EU36 52-4UB00-0AA0**	10.900	–	56.800
280	630	567	0.0447	170	394	F-Cu	C	**4EU36 52-6UC00-1BA0**	–	22.400	68.900
400	710	639	0.0397	190	540	F-Cu	C	**4EU39 51-6UA00-0A**	–	15.400	75.700
500	910	819	0.031	190	540	F-Cu	C	**4EU39 51-1UB00-0A**	–	19.600	80.200
630	1120	1008	0.0252	364	660	F-Cu	C	**4EU43 51-3UB00-0A**	–	18.200	110.000
750	1500	1350	0.0188	260	660	F-Cu	C	**4EU43 51-4UB00-0A**	–	38.400	132.000
800	1600	1440	0.0176	370	874	F-Cu	C	**4EU43 51-5UB00-0A**	–	43.000	137.000
3 AC 500 V 50 Hz, u_D ~ 5.7 V 2% reference voltage drop for I_{thmax} and U_N											
500 V											
2.2	5	4.5	3.68	6	12	T	▶	**4EP32 00-2US00**	–	0.230	0.700
3	6.3	5.7	2.92	7	24	T	B	**4EP33 00-0US00**	–	0.320	1.000
4	8	7.2	2.3	11	23	T	▶	**4EP34 00-3US00**	–	0.370	1.500
5.5	12.5	11.3	1.47	17	50	T	▶	**4EP36 00-8US00**	–	0.450	2.400
7.5	16	14.4	1.15	17	50	T	▶	**4EP36 00-2US00**	–	0.580	2.500
11	22.4	20.2	0.82	4	50	T	▶	**4EP36 00-3US00**	–	0.710	2.600
18.5	31.5	28.4	0.583	11	49	T	▶	**4EP37 00-6US00**	–	1.280	3.800
22	35.5	32	0.518	10	50	T	▶	**4EP37 00-1US00**	–	1.510	4.000
27	45	41	0.4	15	54	T	C	**4EP38 01-2US00**	–	1.090	5.100
30	50	45	0.368	13	52	T	▶	**4EP38 00-1US00**	–	1.480	5.500
37	63	57	0.292	14	69	F-Cu	▶	**4EP39 00-1US00**	–	1.960	7.300
45	71	64	0.259	22	78	F-Cu	B	**4EP40 00-7US00**	–	1.400	7.700
55	80	72	0.23	24	72	F-Cu	▶	**4EP40 00-1US00**	–	1.880	9.100
75	112	101	0.164	22	78	F-Cu	▶	**4EP40 00-8US00**	–	3.610	10.000
90	140	126	0.131	27	125	F-Al	▶	**4EU24 52-1UA00-0AA0**	2.400	–	11.500
110	160	144	0.115	38	140	F-Al	▶	**4EU25 52-2UA00-0AA0**	1.700	–	16.400
132	200	180	0.0919	41	140	F-Al	▶	**4EU25 52-6UA00-0AA0**	2.800	–	17.700
160	250	225	0.0735	58	179	F-Al	▶	**4EU27 52-2UA00-0AA0**	2.300	–	25.000
200	315	284	0.0583	58	179	F-Al	C	**4EU27 52-3UA00-0AA0**	4.100	–	27.000
250	400	360	0.0459	58	179	F-Cu	▶	**4EU27 52-4UA00-1BA0**	–	13.800	37.400
315	450	405	0.0408	102	220	F-Al	C	**4EU30 52-2UA00-0AA0**	3.900	–	35.000
385	560	504	0.0328	110	230	F-Al	C	**4EU30 52-5UB00-0AA0**	–	18.300	50.000
400	630	567	0.0292	150	310	F-Al	C	**4EU36 52-2UA00-0AA0**	6.800	–	49.000
450	710	639	0.0259	110	300	F-Cu	C	**4EU36 52-3UA00-0AA0**	7.400	–	52.800
630	910	819	0.0202	130	394	F-Cu	C	**4EU36 52-4UA00-1BA0**	–	22.200	68.700
685	1000	900	0.0184	150	310	F-Cu	C	**4EU36 52-2UB00-1BA0**	–	27.500	70.000
800	1120	1008	0.0164	160	385	F-Cu	C	**4EU39 51-5UB00-0A**	–	16.900	77.200
900	1250	1125	0.0147	192	540	F-Cu	C	**4EU39 51-7UB00-0A**	–	22.000	82.700
1100	1600	1440	0.0115	260	660	F-Cu	C	**4EU43 51-2UB00-0A**	–	20.600	112.000

Package sizes for reactors; 1 item, i.e. 1 item or a multiple thereof can be ordered.

[1] At f = 60 Hz: $P_{Fe60} = P_{Fe50} \cdot 1.3$

[2] For terminal covers offering protection against accidental contact with flat terminations: see "Accessories"

Three-phase reactors

4EP

4EU

4EU

Typical drive power	Maximum continuous thermal current	Rated current	Inductance	Core losses [1]	Winding losses	Connections [2] T = Terminal F = Flat termination	DT	Order No.	Al weight per PU approx.	Cu weight per PU approx.	Total weight per PU approx.
P_{drive}	I_{thmax}	I_{Ln}	L_x	P_{FE}	P_W						
kW	A	A	mH	W	W				kg	kg	kg
3 AC 500 V 50 Hz, u_D ~ 11.5 V 4% reference voltage drop for I_{thmax} and U_N											
500 V											
11	22.4	20.2	1.64	13	38	T	C	**4EP38 00-8US00**	–	1.560	5.600
22	35.5	32	1.03	23	73	T	C	**4EP40 01-0US00**	–	1.550	8.700
27	45	41	0.814	25	77	T	C	**4EP40 01-2US00**	–	2.580	9.800
37	63	57	0.583	27	125	F-Al	C	**4EU24 52-5UA00-0AA0**	2.100	–	11.200
55	80	72	0.459	42	139	F-Al	C	**4EU25 52-1UB00-0AA0**	1.400	–	16.100
65	100	90	0.368	44	139	F-Al	C	**4EU25 52-3UB00-0AA0**	2.700	–	17.500
90	140	126	0.263	68	179	F-Al	C	**4EU27 52-3UB00-0AA0**	2.500	–	25.200
100	160	144	0.23	68	179	F-Al	C	**4EU27 52-6UB00-0AA0**	3.800	–	26.600
132	200	180	0.184	87	220	F-Al	C	**4EU30 52-0UB00-0AA0**	3.500	–	34.900
160	250	225	0.147	87	220	F-Al	C	**4EU30 52-1UB00-0AA0**	6.300	–	38.000
200	315	284	0.117	135	300	F-Al	C	**4EU36 52-5UB00-0AA0**	5.100	–	50.300
250	400	360	0.0919	135	300	F-Al	C	**4EU36 52-6UB00-0AA0**	10.200	–	56.000
315	500	450	0.0735	146	300	F-Cu	C	**4EU36 52-7UB00-1BA0**	–	27.400	74.300
350	560	504	0.0656	190	540	F-Cu	C	**4EU39 51-3UB00-0A**	–	18.200	78.700
450	710	639	0.0518	192	540	F-Cu	C	**4EU39 51-7UA00-0A**	–	25.000	86.000
630	910	819	0.0404	260	670	F-Cu	C	**4EU43 51-5UA00-0A**	–	27.600	120.000
800	1120 [3]	1120	0.0328	400	700	F-Cu	D	**4EU45 51-5UA00**	–	23.800	141.000
900	1250 [3]	1250	0.0294	369	711	F-Cu	D	**4EU45 51-6UA00**	–	37.800	155.000
1100	1600 [3]	1600	0.023	445	734	F-Cu	D	**4EU47 51-3UA00**	–	33.500	184.000

Package sizes for reactors; 1 item, i.e. 1 item or a multiple thereof can be ordered.

[1] At f = 60 Hz: $P_{Fe60} = P_{Fe50} \cdot 1.3$

[2] For terminal covers offering protection against accidental contact with flat terminations: see "Accessories"

[3] Reactors according to VDE 0532: I_{thmax} = rated current

Three-phase reactors

CE cULus [3]

4EP

4EU

4EU

Typical drive power	Maximum continuous thermal current	Rated current	Inductance	Core losses [1]	Winding losses	Connections [2] T = Terminal F = Flat termination	DT	Order No.	Al weight per PU approx.	Cu weight per PU approx.	Total weight per PU approx.
P_{drive}	I_{thmax}	I_{Ln}	L_x	P_{FE}	P_W						
kW	A	A	mH	W	W				kg	kg	kg
3 AC 690 V 50 Hz, u_D ~ 7.9 V 2% reference voltage drop for I_{thmax} and U_N											
690 V											
55	63	57	0.403	23	77	F-Cu	▶	**4EP40 00-3US00**	–	2.100	9.300
75	91	82	0.279	28	125	F-Al	▶	**4EU24 52-3UA00-0AA0**	2.100	–	11.200
90	100	90	0.254	43	140	F-Al	C	**4EU25 52-7UA00-0AA0**	1.200	–	15.900
110	125	113	0.203	44	140	F-Al	▶	**4EU25 52-3UA00-0AA0**	2.100	–	16.800
132	160	144	0.159	44	140	F-Al	▶	**4EU25 52-0UB00-0AA0**	3.000	–	17.800
160	180	162	0.141	68	179	F-Al	C	**4EU27 52-5UA00-0AA0**	1.900	–	24.600
190	224	202	0.113	68	179	F-Al	▶	**4EU27 52-6UA00-0AA0**	3.300	–	26.100
250	315	284	0.0805	102	220	F-Al	C	**4EU30 52-3UA00-0AA0**	3.500	–	35.000
315	400	360	0.0634	102	220	F-Al	C	**4EU30 52-4UA00-0AA0**	5.800	–	37.400
400	500	450	0.0507	138	300	F-Al	C	**4EU36 52-5UA00-0AA0**	5.700	–	51.000
450	560	504	0.0453	138	300	F-Al	C	**4EU36 52-4UC00-0AA0**	7.700	–	53.200
500	630	567	0.0403	138	300	F-Al	C	**4EU36 52-6UA00-0AA0**	9.100	–	54.800
630	710	639	0.0357	140	409	F-Cu	C	**4EU36 52-7UA00-1BA0**	–	18.800	65.100
800	910	819	0.0279	190	384	F-Cu	C	**4EU39 51-0UA00-0A**	–	24.400	85.400
900	1000	900	0.0254	190	380	F-Cu	C	**4EU39 51-4UA00-0A**	–	25.000	68.000
1000	1120	1008	0.0226	190	540	F-Cu	C	**4EU39 51-6UB00-0A**	–	33.200	94.900
1100	1250	1125	0.0203	250	690	F-Cu	C	**4EU43 51-0UB00-0A**	–	23.100	115.000
1250	1400	1260	0.0181	250	700	F-Cu	X	**4EU43 51-1UB00-0A**	–	28.100	121.000
1500	1600 [4]	1600	0.0159	325	725	F-Cu	D	**4EU45 51-4UA00**	–	31.200	148.000
3 AC 690 V 50 Hz, u_D ~ 15.9 V 4% reference voltage drop for I_{thmax} and U_N											
690 V											
110	125	113	0.406	87	179	F-Al	C	**4EU27 52-4UB00-0AA0**	4.200	–	27.200
150	180	162	0.282	110	230	F-Al	C	**4EU30 52-2UB00-0AA0**	5.900	–	35.000
200	224	202	0.226	138	300	F-Al	C	**4EU36 52-8UB00-0AA0**	4.100	–	49.200
250	315	284	0.161	150	420	F-Al	C	**4EU36 52-0UC00-0AA0**	8.700	–	51.000
315	400	360	0.127	190	540	F-Cu	C	**4EU39 51-8UA00-0A**	–	12.800	72.700
400	500	450	0.101	198	540	F-Cu	C	**4EU39 51-0UB00-0A**	–	22.100	82.800
450	560	504	0.0906	200	540	F-Cu	C	**4EU39 51-4UB00-0A**	–	31.000	92.500
630	710	639	0.0714	243	706	F-Cu	C	**4EU43 51-6UA00-0A**	–	33.100	126.000
800	910 [4]	910	0.0557	360	718	F-Cu	D	**4EU45 51-3UA00**	–	35.600	153.000
1000	1120 [4]	1120	0.0453	370	760	F-Cu	D	**4EU47 51-2UA00**	–	41.600	195.000
1100	1250 [4]	1250	0.0406	550	1100	F-Cu	D	**4EU50 51-1UA00**	–	48.500	185.000
1500	1600 [4]	1600	0.0317	528	1340	F-Cu	D	**4EU52 51-1UA00**	–	65.000	200.000

Package sizes for reactors; 1 item, i.e. 1 item or a multiple thereof can be ordered.

[1] At f = 60 Hz: $P_{Fe60} = P_{Fe50} \cdot 1.3$

[2] For terminal covers offering protection against accidental contact with flat terminations: see "Accessories"

[3] All reactors with $U_N \leq 600$ V according to UL

[4] Reactors according to VDE 0532: I_{thmax} = rated current

SIDAC
Iron-core
Output Reactors

4

Three-phase reactors

4

Application

4EU iron-core output reactors

Output reactors are used on the load side of frequency converters and motor currents flow through them.

Output reactors compensate capacitive charge-reversal currents with long cables and, in the case of long motor cables, limit the dv/dt at the motor terminals. This enables the use of longer motor supply cables:
- 200 m shielded motor cable
- 300 m unshielded motor cable.

Use of iron-core output reactors:

- Drives with standard and trans-standard asynchronous motors and a rated motor frequency (field weakening frequency) of up to 87 Hz and a maximum frequency of 200 Hz
- Drives with reluctance motors or permanently excited synchronous motors with a maximum frequency of 120 Hz.

Technical specifications

Recommended supply voltage U_N **Rated alternating current I_{Ln}** **Inductance per phase mH** **Total power loss W** **Total weight kg**	See "Selection and ordering data" table
Frequency	Converter output frequency maximum 200 Hz Clock frequency of converter up to 8 kHz
Degree of protection	IP00 according to DIN VDE 0470-1/EN 60529
Terminal	4EP terminal, 4EU flat termination, see "Configuration notes", For terminal covers offering protection against accidental contact with flat terminations, see "Accessories"
Rating of creepage distances and clearances	Degree of soiling 2 according to DIN VDE 0110
Rated voltage for insulation (for site altitudes up to 2000 m above sea level)	Version with terminals: 690 V AC Version with flat terminations: 1000 V AC
Permissible ambient temperature during operation	0°C to +40°C
Deviation of the permissible alternating current from rated alternating current I_{Ln} at coolant temperatures ≠ +40°C	See "Configuration notes"
Temperature classes	Type 4EP t_a 40°C/F Type 4EU t_a 40°C/H
Site altitude	≤ 1000 m above sea level
Deviation of the permissible alternating current from rated alternating current I_{Ln} (at site altitudes > 1000 m above sea level)	See "Configuration notes"
Standards/approvals	The reactors comply with EN 61558-2-20 UL508: for types 4EP UL1561: for types 4EU
Dimensions	See "Configuration notes"
Storage temperature	-25°C to +55°C
Transport temperature	-25°C to +70°C
Permissible humidity rating	Humidity 5% to 95% occasional condensation permissible

Selection and ordering data

4EP

4EU

Typical drive power	Max. continuous thermal current ≤ 4 kHz [1]	Max. continuous thermal current 8 kHz	Rated current	Inductance	Core losses	Winding losses	Connections [2] T = Terminal F = Flat termination	DT	Order No.	Al weight per PU approx.	Cu weight per PU approx.	Total weight per PU approx.
P_{drive}	I_{thmax}	I_{thmax}	I_{Ln}	L_x	P_{FE}	P_W						
kW	A	A	A	mH	W	W				kg	kg	kg
3 AC 500 V ± 5% 200 Hz, maximum clock frequency up to 8 kHz												
500 V												
1.5	4	3.3	3.6	3.2	25	45	T	B	**4EP37 06-0ES01**	–	0.380	2.800
2.2	6	5.3	5.4	2.5	25	45	T	B	**4EP37 06-0FS01**	–	1.090	3.600
4	10	8.2	9	1	15	60	T	B	**4EP38 06-0BS01**	–	0.800	4.700
7.5	17.5	15.2	15.8	0.9	15.9	28.9	T	B	**4EP38 06-0CS01**	–	1.780	5.800
11	26	20	23.4	0.7	23.4	53.1	T	B	**4EP39 11-0AS01**	–	1.550	5.900
18.5	38	30.4	34.2	0.42	32.5	58.2	T	B	**4EP40 10-0RS01**	–	1.500	8.600
22	48	37	43.2	0.35	35.9	92.9	F	B	**4EU24 52-0ED00-4BA0**	–	2.090	10.700
30	60	54	54	0.25	42.6	98	F	B	**4EU24 52-0EE00-4BA0**	–	2.500	11.200
37	72	57.6	64.8	0.22	38.7	107.9	F	B	**4EU24 52-0EF00-4BA0**	–	3.340	12.000
45	90	63	81	0.19	59	105.1	F	B	**4EU25 52-0EB00-4BA0**	–	3.480	17.500
55	102	73	91.8	0.14	60.3	96.1	F	B	**4EU25 52-0EC00-4BA0**	–	3.180	17.300
75	150	80	135	0.11	88.1	121.8	F	B	**4EU25 52-0ED00-4BA0**	–	7.530	21.000

Package sizes for reactors; 1 item, i.e. 1 item or a multiple thereof can be ordered.

[1] With clock frequencies > 4 kHz, it is possible to determine the current I_{thmax}, depending on the clock frequency, using the following formula: I_{thmax} f(kHz) = i_{4kHz} - (i_{4kHz} - i_{8kHz})/4 x (8 - fclock [kHz])

[2] For terminal covers offering protection against accidental contact with flat terminations: see "Accessories"

Note:

The following generic parameters apply, which must not be exceeded:

- *Maximum motor cable length 200 m, shielded cable*
- *Maximum motor cable length 300 m, unshielded cable*
- *Maximum motor cable cross-sections for performance class:*
  - *up to 2.2 kW 1.5 mm²,*
  - *> 2.2 kW ≤ 7.5 kW/2.5 mm²*
  - *> 7.5 kW ≤ 11 kW/4 mm²*
  - *> 11 kW ≤ 22 kW/10 mm²*
  - *> 22 kW ≤ 30 kW/16 mm²*
  - *> 30 kW ≤ 37 kW/25 mm²*
  - *> 37 kW ≤ 50 kW/35 mm²*
  - *> 50 kW ≤ 75 kW/70 mm²*
- *Maximum clock frequency 8 kHz*
- *Maximum motor frequency of output reactor 200 Hz*
- *Maximum motor frequency of sinewave filter 100 Hz*
- *U_N 3 AC 500 V +5% (+10% sinewave filter)*

If these do not meet your requirements, customised solutions are available.
For further information contact:

E-mail: MD_Inquiry.aud@siemens.com

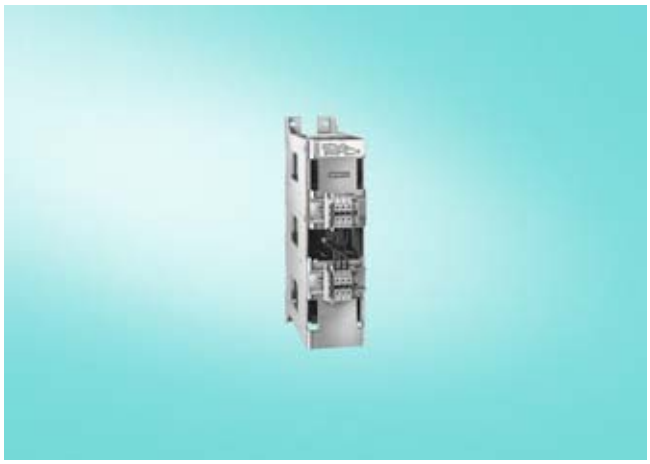
Notes

SIDAC
Ferrite Output Reactors

5

Three-phase reactors

Application



Ferrite output reactor

Due to the special material characteristics, the ferrite reactors can be operated at higher converter output frequencies of up to 600 Hz. They can be used with clock frequencies of up to 16 kHz. Output filter reactors compensate capacitive charge-reversal currents for long cables and, in the case of longer motor cable lengths, limit the dv/dt at the motor terminals.

This enables the use of longer motor supply cables.

Use of ferrite output reactors:

- Drives with asynchronous motors and a rated motor frequency (field weakening frequency) of 200 Hz and a maximum frequency of 300 Hz
- Drives with reluctance or permanently excited synchronous motors with a maximum frequency of 600 Hz.

Technical specifications

Recommended supply voltage U_N **Rated alternating current I_{Ln}** **Maximum converter output frequency** **Performance range of the drive kW** **Inductance per phase mH** **Total power loss W** **Total weight kg**	See "Selection and ordering data" table
Frequency	Converter output frequency maximum 600 Hz Clock frequency of converter ≤ 16 kHz
Degree of protection	IP00 according to DIN VDE 0470-1/EN 60529
Terminal	on request
Rating of creepage distances and clearances	Degree of soiling 2 according to DIN VDE 0110
Rated voltage for insulation (for site altitudes up to 2000 m above sea level)	Version with terminals: 690 V AC Version with flat terminations: 1000 V AC
Permissible ambient temperature during operation	0°C to +40°C
Deviation of the permissible alternating current from rated alternating current I_{Ln} at coolant temperatures ≠ +40°C	See "Configuration notes"
Temperature classes	t_a 40°C/B Natural air cooling (S) according to DIN 41751
Site altitude	≤ 1000 m above sea level
Deviation of the permissible alternating current from rated alternating current I_{Ln} (at site altitudes > 1000 m above sea level)	See "Configuration notes"
Standards/approvals	The reactors comply with VDE 0805
Dimensions	on request
Storage temperature	-25°C to +55°C
Transport temperature	-25°C to +70°C
Permissible humidity rating	Humidity 5% to 95% occasional condensation permissible

Selection and ordering data

	Max. continuous thermal current 6 kHz [1]	Max. continuous thermal current 16 kHz	Rated current	Inductance	Total losses	Connections T = Terminal F = Flat termination	DT	Order No.	Total weight per PU approx.
	I_{thmax}	I_{thmax}	I_{Ln}	L_x	P_W				
	A	A	A	mH	W				kg
3 AC 460 V 600 Hz maximum clock frequency 6 to 16 kHz									
	6.1	3.05	6.1	3.47	96	T	X	on request	8.5
	10.2	5.1	10.2	1.24	96	T	X	on request	8.5
	17.5	8.75	17.5	0.48	96	T	X	on request	8.5
	25.5	12.75	25.5	0.33	100	T	X	on request	9.5
	34	17	34	0.25	115	T	X	on request	12.0
	47	23.5	47	0.18	170	T	X	on request	16.4
	72	36	72	0.06	135	T	X	on request	14.0
	92	46	92	0.05	170	T	X	on request	16.7
	146	73	146	0.03	300	T	X	on request	23.0
	186	93	186	0.02	300	T	X	on request	31.0

[1] When operated between 6 kHz and 16 kHz, the maximum continuous thermal current I_{thmax} follows a linear interpolation.

The selection table provides an overview of our range of reactors.

If you are interested in any of our products or need further assistance, please copy the query page provided under "Specification sheets". Enter the parameters of your specific requirement profile and send it to the address provided. We will get back to you as soon as possible.

Note:

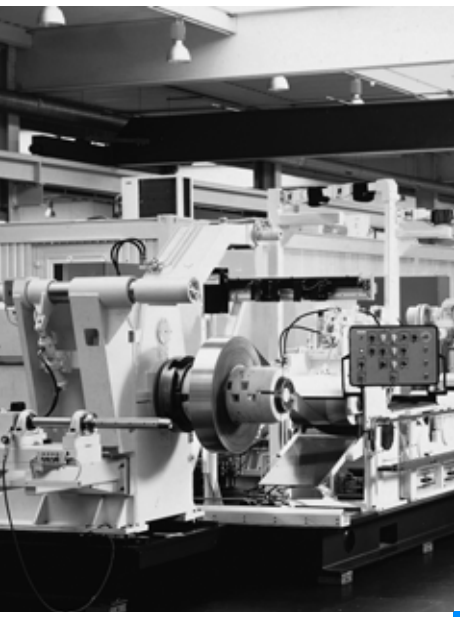
This query page is also available on our home page at http://www.siemens.com/sidac

5

Notes

SIDAC
Iron-core
Smoothing Reactors

6



Single-phase reactors

Application

4ET/4EM iron-core smoothing reactors

Smoothing reactors are used on the DC side of converter sets. Direct current flows through them.

- Iron-core smoothing reactors as series inductance for DC motors (series reactors, 4EM, 4ET series)

  Their use is necessary to achieve problem-free commutation and reduce motor losses when the DC ripple is too high for DC motors due to the converter connection used. The reactors have an almost constant inductance L up to the rated direct current I_{dn}.

- Iron-core smoothing reactors with selectable inductance and current (4EM, 4ET series)

  These reactors enable individual adaptation to the smoothing requirements of the converter-fed consumers. A reactor is selected according to the required energy content E, which is determined from the required inductance (or inductance curve through the current) and the rated direct current I_{dn}. By dimensioning the reactors accordingly, it is possible to achieve a range of different inductance curves.

Technical specifications

	Iron-core smoothing reactors as series inductance for DC motors	Iron-core smoothing reactors with selectable inductance and current	
Maximum continuous thermal current I_{thmax} **Rated direct current I_{dn}** **Inductance for I_{thmax}** **Energy content E at I_{thmax}** **Connection of the winding with type 4ET**	See "Selection and ordering data" table	See "Selection and ordering data" table	
Permissible ripple of superimposed alternating current	≤ 30%	≤ 30%	
Core losses P_{Fe}/winding losses P_W/weight	See "Selection and ordering data" table	See "Selection and ordering data" table	
Degree of protection	IP00 according to DIN VDE 0470-1 / EN 60529		
Rating of creepage distances and clearances	Degree of soiling 2 according to DIN VDE 0110		
Rated voltage for insulation (for site altitudes up to 2000 m above sea level)		according to EN	according to cULus
	Type 4EM:	690 V DC	600 V DC,
	Type 4ET with terminal:	800 V AC/DC	600 V DC,
	Type 4ET25 to 4ET45:	1000 V AC/DC	600 V DC,
	Type 4ET47 to 4ET80:	1150 V AC/DC	600 V DC (to 4ET54)
Reduction of the rated voltage for insulation (at site altitudes > 2000 m above sea level)	See "Configuration notes"		
Permissible ambient temperature during operation	Type 4EM: -25°C to +70°C Type 4ET: -25°C to +80°C		
Deviation of permissible direct current from rated direct current I_{dn} at coolant temperatures ≠ +40°C	See "Configuration notes"		
Temperature classes	Type 4EM: t_a 40°C/B Type 4ET: t_a 40°C/H (utilisation according to F for applications according to EN) Type 4ET: t_a 40°C/H (for application according to cULus)		
Site altitude	≤ 1000 m above sea level		
Deviation of permissible direct current from rated direct current I_{dn} (at site altitudes > 1000 m above sea level)	See "Configuration notes"		
Standards/approvals	The reactors comply with EN 61558-2-20 (type 4ET47 to 4ET80: DIN VDE 0532). The reactors 4EM46 to 4ET54 are UL recognised under Guide No. XQNX2 and File No. E103902, as well as cUL approved under Guide No. XQNX8 File No. E103902 (applies to reactors with U_N ≤ 600 V according to UL)		
Storage temperature	-25°C to +55°C		
Transport temperature	-25°C to +70°C		
Permissible humidity rating	Humidity 5% to 95% occasional condensation permissible		

Selection and ordering data

4EM iron-core smoothing reactors as series inductance for DC motors

	Maximum continuous thermal current	Rated direct current	Inductance	Parallel or series connection of reactor windings [1]	Energy content	Core losses	Winding losses	DT	Order No.	Cu weight per PU approx.	Total weight per PU approx.
	I_{thmax}	I_{Ln}	L_x	P = Parallel	E	P_{FE}	P_W				
	A	A	mH	S = Series	Ws	W	W			kg	kg
4EM iron-core smoothing reactors											
	1.75	1.6	250	–	0.38	0.4	20	B	**4EM49 05-6CB00**	0.210	1.900
	2.5	2.3	125	–	0.39	0.4	20	D	**4EM49 05-5CB00**	0.190	1.900
	3.5	3.2	63	–	0.39	0.4	20	D	**4EM49 05-4CB00**	0.190	1.900
	3.5	3.2	160	–	0.98	0.6	28	B	**4EM51 04-5CB00**	0.650	3.700
	5	4.5	31.5	–	0.39	0.4	20	B	**4EM49 05-3CB00**	0.190	1.900
	5	4.5	80	–	1	0.6	28	B	**4EM51 04-4CB00**	0.700	3.800
4EM	7	6.3	40	–	0.98	0.6	28	D	**4EM51 04-3CB00**	0.510	3.500
	7	6.3	100	–	2.45	1.1	47	B	**4EM53 08-4CB00**	1.460	7.600
	9.2	8.3	6.5	–	0.28	0.2	15	D	**4EM48 05-1CB00**	0.260	1.200
	10	9	8	–	0.4	0.4	20	B	**4EM49 05-7CB00**	0.190	1.900
	10	9	20	–	1	0.6	27	D	**4EM51 04-2CB00**	0.650	3.700
	10	9	50	–	2.5	1.1	47	B	**4EM53 08-3CB00**	1.450	7.600
	11	9.9	4.5	–	0.27	0.2	16	D	**4EM48 05-2CB00**	0.300	1.200
	12	10.8	7.5	–	0.54	0.4	21	C	**4EM49 08-8CB00**	0.470	2.200
	13	11.7	2.5	–	0.21	0.2	16	D	**4EM48 05-3CB00**	0.220	1.100
	14	12.6	25	–	2.45	1.1	47	▶	**4EM53 08-2CB00**	1.700	7.900
	16	14.4	6.5	–	0.83	0.5	25	D	**4EM50 04-3CB00**	0.660	3.000
	18	16.2	7.5	–	1.22	0.6	28	D	**4EM51 07-8CB00**	0.790	3.800
	18.5	16.6	3.1	–	0.53	0.4	20	C	**4EM49 10-0CB00**	0.470	2.200
	20	18	5	–	1	0.6	28	D	**4EM51 04-6CB00**	0.620	3.600
	20	18	12.5	–	2.5	1.1	47	B	**4EM53 08-1CB00**	1.590	7.800
	23.5	21.1	2.9	–	0.8	0.5	25	D	**4EM50 04-4CB00**	0.670	3.000
4ET iron-core smoothing reactors											
	10	9	80	S	4	2	105	C	**4ET25 11-0AA00-0A**	1.450	11.100
	20	18	20	P							
	14	12.6	40	S	3.9	2	105	C	**4ET25 11-1AA00-0A**	1.340	10.900
	28	25.2	10	P							
	10	9	126	S	6.3	3	137	C	**4ET27 11-0AA00-0A**	1.960	16.300
	20	18	31.5	P							
4ET	14	12.6	64	S	6.3	3	137	C	**4ET27 11-1AA00-0A**	1.980	16.300
	28	15.2	16	P							
	7	6.3	400	S	9.8	3.5	176	D	**4ET30 11-3AA00-0A**	2.970	23.500
	14	12.6	100	P							
	20	18	50	S	10	4.8	176	C	**4ET30 11-4AA00-0A**	2.940	23.500
	40	36	12.5	P							
	28	25.2	25	S	9.8	3.5	176	D	**4ET30 11-5AA00-0A**	2.940	23.500
	56	50.4	6.3	P							
	28	25.2	40	S	15.7	7	234	D	**4ET36 11-0BA00-0A**	4.250	33.300
	56	50.4	10	P							
	20	18	80	S	16	7	234	D	**4ET36 11-8AA00-0A**	4.920	34.000
	40	36	20	P							

Package sizes for reactors; 1 item, i.e. 1 item or a multiple thereof can be ordered.

[1] The 4ET reactors comprise 2 coils, which can be switched parallel or in series, depending on application. This produces two different inductance values with different current carrying capacity.

Single-phase reactors

Iron-core smoothing reactors with selectable inductance and current

CE cULus [1)]

	Energy content	Max. possible rated direct current (standard version)	Max. possible rated direct current [2)] (plus surcharge)	Losses		DT	Core section of Order No. [3)]	Weight per PU approx.
	E	I_{dn}	I_{dn}	P_{FE}	P_W			
	Ws	A	A	W	W			kg
4EM iron-core smoothing reactors								
 4EM	0.112	40	200	0.1	10.7	X	**4EM46**	0.500
	0.14	40	200	0.15	12.1	X	**4EM47**	0.600
	0.28	40	200	0.2	15.9	X	**4EM48**	1.100
	0.5	40	200	0.4	20.4	X	**4EM49**	2.000
	0.71	40	250	0.5	24.7	X	**4EM50**	2.700
	1.0	40	250	0.6	27.1	X	**4EM51**	3.500
	1.25	40	250	0.7	31	X	**4EM61**	4.300
	1.6	40	400	0.8	35	X	**4EM52**	5.100
	2.25	40	400	1	39	X	**4EM62**	7.000
	2.5	40	400	1.1	47	X	**4EM53**	7.600
	3.55	40	400	1.5	52	X	**4EM54**	10.200
	5.0	40	400	2.3	58	X	**4EM55**	13.200
	6.3	40	400	2.5	65	X	**4EM59**	15.000
	7.7	40	400	3	71	X	**4EM60**	18.000
4ET iron-core smoothing reactors								
 4ET	4.5	50	630	1.6	105	X	**4ET25**	11.200
	8.0	50	630	2.5	137	X	**4ET27**	17.400
	11.2	50	630	3.5	176	X	**4ET30**	23.700
	22.5	200	630	5.4	315	X	**4ET36**	37.000
	31.5	200	630	7.1	400	X	**4ET39**	48.000
	56	200	630	11	516	X	**4ET43**	75.000
	71	200	630	15	554	X	**4ET45**	94.000
	100	200	630	19	595	X	**4ET47**	123.000
	112	630	800	19	1080	X	**4ET51**	130.000
	125	630	800	22	1120	X	**4ET52**	143.000
	140	630	800	24	1160	X	**4ET53**	157.000
	180	630	800	30	1360	X	**4ET54**	194.000
	200	630	800	33	1400	X	**4ET55**	213.000
	250	630	800	38	1460	X	**4ET56**	252.000
	315	630	1000	48	2160	X	**4ET58**	297.000
	355	630	1000	55	2250	X	**4ET59**	331.000
	400	630	1000	62	2370	X	**4ET60**	372.000
	500	1250	1600	76	2900	X	**4ET62**	459.000
	630	1250	1600	88	3030	X	**4ET63**	538.000
	710	1250	1600	101	3200	X	**4ET64**	604.000
	910	1250	1600	116	3360	X	**4ET65**	712.000
	1250	1600	2500	185	5580	X	**4ET72**	1050.000
	1600	2000	2500	214	6080	X	**4ET74**	1240.000
	2250	2000	2500	278	6700	X	**4ET75**	1600.000
	2800	2000	2500	347	7420	X	**4ET76**	1960.000
	3550	2000	2500	407	7930	X	**4ET78**	2350.000
	4500	2000	2500	510	8700	X	**4ET79**	2890.000
	6300	2000	2500	650	9650	X	**4ET80**	3700.000

Package sizes for reactors; 1 item, i.e. 1 item or a multiple thereof can be ordered.

1) 4EM46 to 4ET54 - UL Recognised

2) Higher rated direct current I_{dn} for reduced energy content on request

3) Additional technical specifications must be specified in plain text. The type designation will be added to the Order No. on the delivery note, so that you will know the exact order number if you want to re-order any items.
For further information, see "Specification sheets", "Specification sheet for customised smoothing reactors, selectable inductance and current".
E-mail us for advice and with your queries:
MD_Inquiry.aud@siemens.com

SIDAC
Smoothing Air-core Reactors

7

Single-phase reactors

Application

Smoothing air-core reactors

4PK smoothing air-core reactors (natural air cooling, energy content *E* from 380 Ws to 1.9 kWs) are used in the DC circuit of converter units. These are primarily used to limit the current rise in the event of faults, especially in the case of through-conductions. They cause the high-speed DC circuit-breakers in the electric circuit to interrupt the rising fault current fast enough to prevent the fuses in the thyristor branches from responding.

7

Technical specifications

Rated direct current I_{dn} **Energy content *E* at I_{thmax}** **Maximum rated direct current I_{dn}** **Power loss P_{Al} for 4PK** **Weight**	See "Selection and ordering data" table
Inductance for I_{dn}	on request
Degree of protection	IP00 according to DIN VDE 0470-1/EN 60529
Rating of creepage distances and clearances	Degree of soiling 2 according to DIN VDE 0110
Rated voltage for insulation (for site altitudes up to 2000 m above sea level)	2 kV
Reduction of the rated voltage for insulation (at site altitudes > 2000 m above sea level)	See "Configuration notes"
Permissible ambient temperature during operation	-25°C to +80°C
Deviation of permissible direct current from rated direct current I_{dn} at coolant temperatures ≠ +40°C	See "Configuration notes"
Temperature classes	t_a 40°C/F
Site altitude	≤ 1000 m above sea level
Deviation of permissible direct current from rated direct current I_{dn} (at site altitudes > 1000 m above sea level)	See "Configuration notes"
Standards/approvals	The reactors comply with DIN VDE 0532
Storage temperature	–25°C to + 55°C
Transport temperature	–25°C to + 70°C
Permissible humidity rating	Humidity 5% to 95% occasional condensation permissible
Permissible short-circuit current	20 · I_{dn} for 1 s

Selection and ordering data

	Energy content (max.) for I_{dn}	Rated direct current (max. standard version)	Losses	DT	Core section of Order No.	Weight per PU approx.
	E	I_{dn}	P_{Al}			
	Ws	A	W			kg
4PK smoothing air-core reactors						
	380	1600	5500	X	on request	180.000
	940	3200	11000	X	on request	360.000
	740	1600	8200	X	on request	250.000
	1900	3200	16400	X	on request	500.000

Package sizes for reactors; 1 item, i.e. 1 item or a multiple thereof can be ordered.

A reactor is selected according to the required energy content E, which is determined from the desired inductance and rated direct current I_{dn}. Due to the design of the reactors, each has a specific maximum value for the rated direct current I_{dn} (See "Selection and ordering data" table).

The "Selection and ordering data" table provides an overview of the range of reactors.

If you are interested in any of our products or need further assistance, please copy the query page provided under "Specification sheets". Enter the parameters of your specific requirement profile and send it to the address provided.

We will get back to you as soon as possible.

Note:

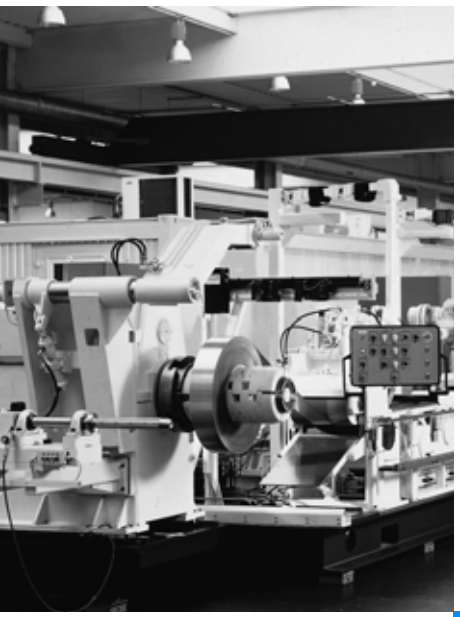
This query page is also available on our home page at http://www.siemens.com/sidac

7

Notes

SIDAC
Filter Reactors

8



Three-phase reactors

Application

Filter reactors

Nowadays, more and more harmonics-generating consumers in our networks are operated with inductive load. These include fluorescent lamps, dimmers, variable-speed drives, three-phase bridge connections and rectifiers.

This increases the harmonic loading and the total harmonic distortion of the supply system. The reactive power also increases energy costs and transmission losses, as well as the loading of transmission and distribution equipment. In combination with the feeding transformer and the mains inductance in the supply system, the capacitors required for load compensation create an oscillating circuit. This causes undefined resonance due to the harmonics which, in turn, can reinforce the harmonics.

The use of filter reactors prevents this physical effect. Taking audio-frequency remote control operation into account, the filter reactors with the capacitors are set to a defined series resonant frequency.

Technical specifications

Degree of protection	IP00 according to DIN VDE 0470-1/EN 60529
Rating of creepage distances and clearances	Degree of soiling 2 according to DIN VDE 0110
Rated voltage for insulation (for site altitudes up to 2000 m above sea level)	Version with terminals: 690 V AC Version with flat terminations: 1000 V AC All versions: 600 V AC for 4EP and 4EU according to UL
Detuning factor	5.67%, 7%, 14%
Performance range P_n	5 ... 100 kvar
Monitoring	Temperature switch is integrated, contacts are fitted on terminals.
Permissible ambient temperature during operation	Type 4EP: -25°C to +70°C Type 4EU: -25°C to +80°C
Deviation of the permissible alternating current from rated alternating current I_{Ln} at coolant temperatures ≠ +40°C	See "Configuration notes"
Temperature classes	Type 4EP: t_a 40°C/B Type 4EU: t_a 40°C/H
Site altitude	≤ 1000 m above sea level
Deviation of the permissible alternating current from rated alternating current I_{Ln} at site altitudes > 1000 m above sea level	See "Configuration notes"
Standards/approvals	The reactors comply with EN 61558-2-20 or VDE 0532. The reactors are UL recognised under Guide No. XQNX2 and File No. E103902, as well as cUL approved under Guide No. XQNX8 File No. E103902 (applies to reactors with U_N ≤ 600 V according to UL)
Storage temperatures	-25°C to +55°C
Transport temperatures	-25°C to +70°C
Permissible humidity rating	Humidity 5% to 95% occasional condensation permissible

Selection and ordering data

U_N = 3 AC 400 V 50 Hz, overload capability I_{thmax} · 1.05 [1]

	Maximum continuous thermal current	Rated current	Filter bank capacity	Required capacity for capacitors in delta connection	Inductance	Total losses	Connections [2] T = Terminal F = Flat termination	DT	Order No.	Al weight per PU approx.	Cu weight per PU approx.	Total weight per PU approx.
	I_{thmax}	I_{Ln}	Q_C	C_D	L_x	P_V						
	A	A	kvar	µF	mH	W				kg	kg	kg
Detuning factor p = 5.67%, L = constant to 1.82 · I_{thmax}, f_{RES} = 210 Hz												
	8.8	7.9	5	94	6.12	53.1	T	C	**4EP37 00-5MS00**	–	1.190	3.700
	10.9	9.8	6.2	116	4.936	62	T	C	**4EP38 00-8MS00**	–	0.900	4.600
	13.2	11.8	7.5	141	4.081	62	T	C	**4EP38 01-0MS00**	–	1.400	5.000
	17.5	15.8	10	188	3.06	64	T	C	**4EP39 00-5MS00**	–	2.400	6.400
	21.9	19.7	12.5	235	2.45	89	T	C	**4EP40 01-3MS00**	–	1.970	9.100
	26.3	23.7	15	281	2.04	89	T	C	**4EP40 01-4MS00**	–	2.920	9.300
	35.1	31.6	20	375	1.53	100	T	C	**4EP43 00-4MS00**	–	4.400	13.000
4EP	43.9	39.5	25	469	1.22	127	T	C	**4EP44 01-4MS00**	–	4.160	18.300
	52.6	47.4	30	563	1.02	164	T	C	**4EU25 32-2MA08-4CA0**	–	3.800	18.000
	70.2	63.2	40	750	0.765	221	F	C	**4EU27 32-6MA08-0AA0**	2.600	–	25.300
	87.7	78.9	50	938	0.612	235	F	C	**4EU30 32-5MA08-0AA0**	2.700	–	33.900
	105	95	60	1130	0.51	288	F	C	**4EU30 32-6MA08-0AA0**	4.200	–	35.600
4EU	175	157.9	100	1880	0.31	393	F	C	**4EU36 32-3MA08-0AA0**	6.200	–	51.500
Detuning factor p = 7%, L = constant to 1.66 · I_{thmax}, f_{RES} = 189 Hz												
	8	7.2	5	93	7.66	52	T	C	**4EP37 00-6MS00**	–	1.000	3.300
	10	9	6.2	115	6.18	52	T	C	**4EP37 00-7MS00**	–	1.600	4.000
	12.1	10.9	7.5	139	5.11	61	T	C	**4EP38 00-7MS00**	–	1.100	4.800
	16.1	14.5	10	185	3.83	73	T	C	**4EP39 00-6MS00**	–	2.000	5.900
	20.1	18.1	12.5	231	3.07	87	T	C	**4EP40 01-2MS00**	–	1.520	8.600
	24.1	21.7	15	277	2.56	87	T	C	**4EP40 01-5MS00**	–	2.100	8.800
	32.1	28.9	20	370	1.92	102	T	C	**4EP43 00-5MS00**	–	4.030	12.800
4EP	40.2	36.2	25	462	1.53	130	T	C	**4EP44 01-3MS00**	–	2.930	17.100
	48.2	43.4	30	555	1.28	120	T	C	**4EP44 01-5MS00**	–	4.300	17.000
	64.3	57.9	40	740	0.958	210	F	C	**4EU27 32-7MA08-0AA0**	2.100	–	24.700
	80.3	72.3	50	925	0.766	223	F	C	**4EU27 32-5MA08-0AA0**	3.600	–	26.500
	96.4	86.8	60	1110	0.64	271	F	C	**4EU30 32-7MA08-0AA0**	2.800	–	34.100
4EU	160.7	144.5	100	1850	0.383	368	F	C	**4EU36 32-4MA08-0AA0**	4.800	–	50.000

Package sizes for reactors; 1 item, i.e. 1 item or a multiple thereof can be ordered.

Harmonic voltages taken into account according to EN 61000-2-2 for public low-voltage power supply systems, EN 61000-2-4 for industrial lines:
110% mains overvoltage of the fundamental component
5% of U_N for 5th harmonic (250 Hz)
6% of U_N for 7th harmonic (350 Hz)
3,5% of U_N for 11th harmonic (550 Hz)
3% of U_N for 13th harmonic (650 Hz)

[1] The current I_{thmax} is the maximum continuous thermal current permitted. It applies to the aforementioned harmonic spectrum. In order to cope with a changing harmonic content, the reactor can be continuously overloaded with I_{thmax} · 1.05.

[2] For terminal covers offering protection against accidental contact with flat terminations: see "Accessories"

Three-phase reactors

U_N = 3 AC 400 V 50 Hz, overload capability I_{thmax} · 1.05 [1)]

	Maximum continuous thermal current	Rated current	Filter bank capacity	Required capacity for capacitors in delta connection	Inductance	Total losses	Connections[2)] T = Terminal F = Flat termination		DT	Order No.	Al weight per PU approx.	Cu weight per PU approx.	Total weight per PU approx.
	I_{thmax} A	I_{Ln} A	Q_C kvar	C_D µF	L_x mH	P_V W					kg	kg	kg
Detuning factor p = 14%, L = constant to 1.4 · I_{thmax}, f_{RES} = 134 Hz													
	7.7	6.9	5	86	16.6	61	T	C		**4EP38 01-1MS00**	–	1.300	5.100
	9.5	8.6	6.2	106	13.4	72	T	C		**4EP39 00-7MS00**	–	2.100	6.100
	11.5	10.4	7.5	128	11.1	87	T	C		**4EP40 01-6MS00**	–	1.300	8.100
	15.4	13.8	10	171	8.29	87	T	C		**4EP40 01-7MS00**	–	2.600	9.400
	19.2	17.3	12.5	214	6.63	100	T	C		**4EP43 00-6MS00**	–	4.000	12.000
	23.1	20.8	15	257	5.53	120	T	C		**4EP44 01-6MS00**	–	2.500	16.000
	30.8	27.7	20	342	4.14	120	T	C		**4EP44 01-7MS00**	–	5.200	18.000
4EP	38.5	34.6	25	428	3.32	210	T	C		**4EU27 32-0MB08-4CA0**	–	3.500	25.000
	46.2	41.5	30	513	2.76	210	T	C		**4EU27 32-8MA08-4CA0**	–	5.600	26.000
	61.6	55.4	40	684	2.07	269	F	C		**4EU30 32-8MA08-0AA0**	3.800	–	35.200
	76.9	69.2	50	855	1.66	337	F	C		**4EU30 32-0MB08-0AA0**	5.600	–	37.200
	92.3	83.1	60	1030	1.38	365	F	C		**4EU36 32-5MA08-0AA0**	5.800	–	51.100
4EU	153.9	138.6	100	1710	0.829	450	F	C		**4EU39 31-1MA80-0A**	–	12.200	62.000

Package sizes for reactors; 1 item, i.e. 1 item or a multiple thereof can be ordered.

Harmonic voltages taken into account according to EN 61000-2-2 for public low-voltage power supply systems, EN 61000-2-4 for industrial lines:
110% mains overvoltage of the fundamental component
5% of U_N for 5th harmonic (250 Hz)
6% of U_N for 7th harmonic (350 Hz)
3,5% of U_N for 11th harmonic (550 Hz)
3% of U_N for 13th harmonic (650 Hz)

1) The current I_{thmax} is the maximum continuous thermal current permitted. It applies to the aforementioned harmonic spectrum. In order to cope with a changing harmonic content, the reactor can be continuously overloaded with I_{thmax} · 1.05.

2) For terminal covers offering protection against accidental contact with flat terminations: see "Accessories"

SIDAC Application-specific Reactors

9

Three-phase reactors

Application

CE

Sintered metal reactor, three-phase

Sintered metal reactors for three-phase supplies comprise three mutually independent single-phase reactors. They are installed in the main supply line of converters and alternating currents at the line frequency, and the harmonics generated by the converter flow through them. Sintered metal reactors are always used where interference suppression is required from the low to high frequency range, as well as a commutation reactor. The special material characteristics of these reactors enable excellent interference suppression for frequencies up to 150 kHz.

Sintered metal reactor, single-phase

The closed design of the pot-type cores reduces radiation-linked interferences to a minimum, thus enabling non-critical installation of reactors in close proximity to electronic devices. Applications are found in the area of controlled rectifier/regenerative units that operate in high-frequency systems. Interference suppression in converter connections for uninterruptible power supplies is also cost-effective. As individual components, sintered metal reactors can be used as either input or output reactors.

9

Technical specifications

Recommended supply voltage U_N	3 AC 400 V ± 10% to 690 V +6%, –10%
Maximum converter output frequency	600 Hz
Performance range P_n	1 ... 120 kW
Frequency	Line frequency 50 ... 60 Hz ± 10%
Degree of protection	IP00 according to DIN VDE 0470-1/EN 60529
Terminal	Terminal or customised
Rating of creepage distances and clearances	Degree of soiling 1 according to DIN VDE 0110
Test voltage	2.5 kV AC
Permissible ambient temperature during operation	–25°C to +40°C, for reduced performance up to +55°C
Temperature classes	t_a 40 °C/H
Site altitude	≤ 1000 m above sea level
Standards/approvals	The reactors comply with EN 61558-2-20
Storage temperature	-25°C to +55°C
Transport temperature	-25°C to +70°C
Permissible humidity rating	Low air temperature 0°C Condensation and ice formation excluded DIN IEC 721-3-3/04.90 Class 3K5

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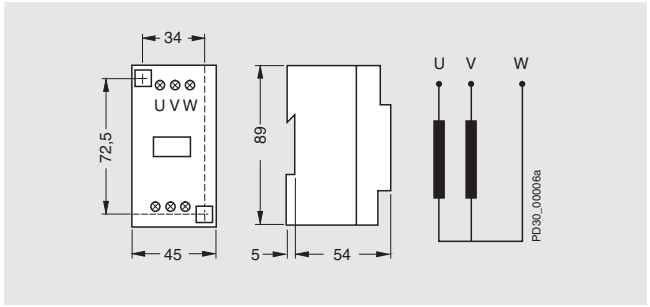
Application

Discharge reactor



Dimensional drawing and circuit diagram

Discharge reactors for compensation equipment:
Capacitor banks in p.f. compensation equipment can be connected and disconnected to and from the supply system as required. Connecting a supply system to a capacitor bank that is not fully discharged can cause mains overvoltages, which can damage connected devices. The capacitors must be discharged quickly following disconnection of a capacitor bank to allow rapid reconnection. In this case, discharge reactors offer significant advantages. The resulting losses are considerably lower when compared to the previously used discharge resistors. The ambient temperature rise is lower which has a positive effect on the service life of the phase shift capacitors.

The discharge reactors meet the requirement for permanently installed and connected discharge devices as well as the requirement for short capacitor discharge times of just a few seconds. Due to high AC resistance, power losses during operation are lower than 1.8 W and therefore negligible.

Technical specifications

Recommended supply voltage U_N	3 AC 230 to 690 V
Operating losses	< 1.8 W
No-load current	< 4.5 mA
Total weight	0.5 kg
Frequency	50 … 60 Hz
Degree of protection	IP40 according to DIN 40050
Terminal	Terminals for 0.75 mm^2 to 2 x 2 mm^2
Inductance	230 V 730 μH 400 V 710 μH 525 V 670 μH 690 V 350 μH
Discharge time	230 V less than 20 s for 50 kvar ≥ 400 V less than 20 s for 100 kvar
Permissible discharges	1 x/(1 min (100 kvar))
Temperature classes	t_a 40°C/B Natural air cooling (S) according to DIN 41751
Standards/approvals	The reactors comply with EN 61558-2-20
Dimensions	See dimensional drawing
Permissible ambient temperature during operation	-25°C to +55°C (average over 24 h)
Storage temperature	-25°C to +70°C
Installation	Inside

Order No. 4EJ99 00–0EG

Supply voltage	Capacitor bank output	Discharge time
230 V	up to 25 kvar	< 10 s
	up to 50 kvar	< 20 s
	up to 100 kvar	< 40 s
400 V to 690 V	up to 25 kvar	< 5 s
	up to 50 kvar	< 10 s
	up to 100 kvar	< 20 s

Single-phase reactors

Application

Mains reactors for frequency converters

Mains reactors for frequency converters are installed in the line-side supply cable.

The reactors limit the circuit feedback that occurs in the form of harmonics. They also limit the alternating currents with the frequencies determined by the switching of the input rectifier in the DC link capacitors.

We recommend using 2% reactors if the mains inductance of the power supply is very small. Recommended system short-circuit power to apparent drive power > 33 : 1.

All the reactors here can be customised by adapting the winding and the core air gaps.

Technical specifications

Recommended supply voltage U_N	1 AC 230 V ± 10%
Rated alternating current I_{Ln}	3.0 ... 26.0 A
Test voltage	4 kV AC live parts against casing
Reference voltage drop Δu per phase for I_{Ln} and f = 50 Hz or f = 60 Hz	2%, 4% (application and type-specific) customised design
Performance range P_n	0.75 to 11 kW, higher outputs on request
Inductance per phase mH	0.57 to 9.5 mH (application and type-specific)
Total power loss W	on request
Total weight kg	on request
Frequency	47 … 63 Hz
Degree of protection	Assembly in zinc-plated steel housing in IP20
Terminal	Line-side bushing terminals, free cable end for connection of frequency converter input, cable according to customer requirements
Rating of creepage distances and clearances	Degree of soiling 2 according to DIN VDE 0110
Rated voltage for insulation (for site altitudes up to 2000 m above sea level)	Version with terminals: 600 V AC
Permissible ambient temperature during operation	-10°C to +50°C
Deviation of the permissible alternating current from rated alternating current I_{Ln} (at coolant temperatures ≠ +40°C)	on request
Temperature classes	t_a 50°C/F (B)
Site altitude	≤ 1000 m above sea level
Deviation of the permissible alternating current from rated alternating current I_{Ln} (at site altitudes > 1000 m above sea level)	See "Configuration notes"
Standards/approvals	The reactors comply with EN 61558-2-20 Electromagnetic compatibility according to EN 61000-4-2, 3, 4 Vibration EN 60068-2-31 All reactors are built according to UL506, approval on request
Dimensions	Reactor casing with a maximum height of 50 mm for P_n ≤ 11 kW. Further dimensions by separate agreement
Storage temperature	-20°C to +70°C
Permissible humidity rating	Relative humidity at +40°C to 95% Condensation not permissible

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Application

Mains reactors for frequency converters

Mains reactors for frequency converters are installed in the line-side supply cable. Reactors limit the circuit feedback that occurs in the form of harmonics. They also limit the alternating currents with the frequencies determined by the switching of the input rectifier in the DC link capacitors.

We recommend using 2% reactors if the mains inductance of the power supply is very small. Recommended system short-circuit power to apparent drive power > 33 : 1.

All the reactors here can be customised by adapting the winding and the core air gaps.

Technical specifications

Recommended supply voltage U_N	3 AC 600 V ± 10%
Rated alternating current I_{Ln}	1.7 ... 200 A
Test voltage	4 kV AC live parts against casing
Reference voltage drop Δu per phase for I_{Ln} and f = 50 Hz or f = 60 Hz	2%, 4% (application and type-specific) customised design
Performance range of corresponding converter P_n	0.75 to 75 kW, higher outputs on request
Inductance per phase mH	0.07 mH to 11.5 mH (application-specific)
Total power loss W	on request
Total weight kg	on request
Frequency	47 … 63 Hz
Degree of protection	Assembly in zinc-plated steel housing in IP20
Terminal	Line-side bushing terminals, free cable end for connection of frequency converter input, cable according to customer requirements
Rating of creepage distances and clearances	Degree of soiling 2 according to DIN VDE 0110
Rated voltage for insulation (for site altitudes up to 2000 m above sea level)	Version with terminals: 600 V AC
Permissible ambient temperature during operation	-10°C to +50°C
Deviation of the permissible alternating current from rated alternating current I_{Ln}	on request
Temperature classes	t_a 50°C/F (B)
Site altitude	≤ 1000 m above sea level
Deviation of the permissible alternating current from rated alternating current I_{Ln} (at site altitudes > 1000 m above sea level)	See "Configuration notes"
Standards/approvals	The reactors comply with EN 61558-2-20 Electromagnetic compatibility according to EN 61000-4-2,3,4 Vibration EN 60068-2-31 All reactors are built according to UL506, approval on request
Dimensions	Reactor casing with a maximum height of 50 mm to P_n = 22 kW, Maximum height of casing 60 mm to P_n ≤ 75 kW. Further dimensions by separate agreement
Storage temperature	-20°C to +70°C
Permissible humidity rating	Relative humidity at +40°C to 95% Condensation not permissible

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DC-Link Reactors for Frequency Converters

Single-phase reactors

Application

DC-link reactors for frequency converters

DC-link reactors for frequency converters are installed after the input rectifier in the voltage link. The reactors limit the circuit feedback that occurs in the form of harmonics. They also reduce load current peaks in the DC link capacitors, which significantly reduces the load on the components in the DC link. This, in turn increases the service life of the converter.

A DC-link reactor can either be permanently integrated in the DC link of the converter during its development, or it is fitted with terminals that permit connection of an additional inductance in the DC link. If they are the right size, DC-link reactors can be a suitable alternative to three-phase mains reactors. We recommend using them if the mains inductance of the power supply is very small.

All the reactors here can be customised by adapting the winding and the core air gaps.

Technical specifications

Recommended supply voltage U_N	648 V DC ± 10%, 3 AC 480 V ± 10%
Rated alternating current I_{Ln}	4 ... 180 A
Test voltage	4 kV AC live parts against casing
Performance range of corresponding converter P_n	0.25 mH to 10 mH (application and type specific)
Inductance per phase mH	0.75 to 75 kW, higher outputs on request
Total power loss W	on request
Total weight kg	on request
Frequency	50 … 60 Hz ± 10%
Degree of protection	Assembly in zinc-plated steel housing in IP20
Terminal	Shielded cable end for connection to the voltage link input, cable according to customer requirements
Rating of creepage distances and clearances	Degree of soiling 2 according to DIN VDE 0110
Rated voltage for insulation (for site altitudes up to 2000 m above sea level)	Version with terminals: 600 V AC
Permissible ambient temperature during operation	-10°C to +50°C
Deviation of the permissible alternating current from rated alternating current I_{Ln}	on request
Temperature classes	t_a 50°C/F (B)
Site altitude	≤ 1000 m above sea level
Deviation of the permissible alternating current from rated alternating current I_{Ln} (at site altitudes > 1000 m above sea level)	See "Configuration notes"
Standards/approvals	The reactors comply with EN 61558-2-20 Electromagnetic compatibility according to EN 61000-4-2,3,4 Vibration EN 60068-2-31 All reactors are built according to UL506, approval on request
Dimensions	Reactor casing with a maximum height of 50 mm to P_n= 22 kW, Maximum height of casing 60 mm to P_n ≤ 75 kW. Further dimensions by separate agreement
Storage temperature	-20°C to +70°C
Permissible humidity rating	Relative humidity at +40°C to 95% Condensation not permissible

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Application

Output reactors for frequency converters

Output filter reactors for frequency converters are installed at the converter output. The reactors compensate capacitive charge-reversal currents in long cables and, in the case of long motor cables, limit the dv/dt at the motor terminals. The output reactors are used with standard asynchronous motors with a maximum frequency of 200 Hz – or with reluctant or permanently excited synchronous motors with a maximum frequency of 120 Hz. This supports operation with a maximum converter output frequency of f_{max} = 400 Hz. It is not possible to generalise on the maximum permissible length of the motor supply cables required for the output reactors. Guidelines for shielded and unshielded motor cables lengths required for operation with output reactors: 300 m unshielded/200 m shielded cable.

All the reactors here can be customised by adapting the winding and the core air gaps.

Technical specifications

Recommended supply voltage (converter output voltage) U_N	3 AC 480 V ± 10%
Rated alternating current I_{Ln}	3.9 ... 178 A
Test voltage	4 kV AC live parts against casing
Performance range of corresponding converter P_n	0.75 to 75 kW, higher outputs on request
Inductance per phase mH	0.029 to 2.6 mH (application-specific)
Total power loss W	on request
Total weight kg	on request
Frequency	f_{max} = 400 Hz at converter output Clock frequency ≤ 4 kHz
Degree of protection	Assembly in zinc-plated steel housing in IP20
Terminal	Bushing terminals for the connection of motor supply cable, shielded cable end for connection to frequency converter output, cable according to customer requirements
Rating of creepage distances and clearances	Degree of soiling 2 according to DIN VDE 0110
Rated voltage for insulation (for site altitudes up to 2000 m above sea level)	Version with terminals: 600 V AC
Permissible ambient temperature during operation	-10°C to +50°C
Deviation of the permissible alternating current from rated alternating current I_{Ln}	on request
Temperature classes	t_a 50°C/F
Site altitude	≤ 1000 m above sea level
Deviation of the permissible alternating current from rated alternating current I_{Ln} (at site altitudes > 1000 m above sea level)	See "Configuration notes"
Standards/approvals	The reactors comply with EN 61558-2-20 Electromagnetic compatibility according to EN 61000-4-2,3,4 Vibration EN 60068-2-31 All reactors are built according to UL506, approval on request
Dimensions	Reactor casing with a maximum height of 80 mm to P_n ≤ 75 kW. Further dimensions by separate agreement
Storage temperature	-20°C to +70°C
Permissible humidity rating	Relative humidity at +40°C to 95% Condensation not permissible

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Single- and three-phase reactors

Application

On-board network container/acceptor circuit reactor/chopper reactor

These include reactors for use in electrical railcars. These reactors are used in trams, subway trains and modern high-speed railcars. The components have been specially designed and manufactured for the harsh environmental conditions that prevail during railway operation. This includes increased requirements in terms of resistance to extreme climates, humidity and pollutants in the atmosphere.

All reactors comply with mechanical requirements with regard to permanent vibrations during railway operation.

A key feature of these reactors is their low sound emission.

- On-board network containers with transformer, reactor and change-over switch are used to supply on-board power for different infeed conditions.
- Acceptor circuit reactors are used to smooth the DC link voltage and reduce the harmonics in the DC link
- Chopper reactors limit the current gradient of the clocked chopper current and the short-circuit currents.
- Rod core reactors as a component of the line filter for overvoltage protection and to limit the line harmonics or DC link harmonic currents

Technical specifications

Rated alternating current I_{Ln}	from 450 to 3000 A
System supply voltages available	15 kV AC 16 $^{2}/_{3}$ Hz 25 kV AC 50 Hz 1.5 kV DC
Inductance per phase mH	0.3 mH to 16 mH, typical ratings 0.5 mH at 830 A with E = 139 Ws 2.0 mH at 3000 A with E = 9000 Ws 16.0 mH at 670 A with E = 3592 Ws
Total power loss W	on request
Total weight kg	on request
Frequency	Application-specific 33$^{1}/_{3}$ Hz, 50 Hz, 100 Hz, 0 – 300 Hz
Degree of protection	IP00, exposed to all weather factors
Safety class	I according to VDE 0106
Terminal	Free cable, flat copper (application-related)
Installation	Hanging, underfloor (application-related)
Cooling	CF, forced air cooling Typically 10 to 12 m/s at 40°C
Climatic conditions	Loads due to "damp heat" and "salt mist" DIN IEC 721 – 3-5 Class 5C2 (chemically active materials) DIN IEC 721 – 3-5 Class 5F2 (contaminated materials) DIN IEC 721 – 3-5 Class 5S2 (mechanically active materials)
Insulation	up to 25 kV rated voltage for clearances in air 32 mm clearances in air (minimum value) 4000 V DC insulation rated voltage for creepage distances
Permissible ambient temperature during operation	-40°C to +40°C
Temperature classes	t_a 40°C/F to t_a 65°C/F, t_a 55°C/H
Mechanical load	DIN IEC 68-2-6/06.90 Vibration, sinusoidal approx. 2 g DIN IEC 9/426/CDV Vibration wide-band noise DIN IEC 68-2-27/08.89 Shock UIC 566 Vibration and shock resistance
Standards/approvals	The reactors comply with VDE 0535, EN 60310
Dimensions	on request
Storage temperature	-40°C to +80°C

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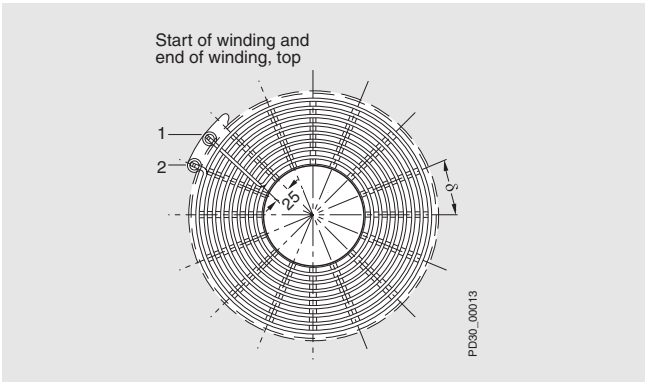
Application



Air-core reactors

Air-core reactors

These include reactors for use in electrical railcars. These reactors are used in trams, subway trains and modern high-speed railcars. The components have been specially designed and manufactured for the harsh environmental conditions that prevail during railway operation.

This includes increased requirements in terms of resistance to extreme climates, humidity and pollutants in the atmosphere. All reactors comply with mechanical requirements with regard to the permanent vibrations during railway operation.

Air-core reactors are used as mains reactors in DC drive systems to smooth the motor current.
The rates of current rise are limited in the event of faults, and through-conductions in particular. The aim is to prevent unacceptably high currents before any protective devices can be triggered.

Technical specifications

Rated alternating current I_{Ln}	up to 600 A
System supply voltages available	2.3 kV DC
Inductance per phase mH	9 mH to 17 mH, typical ratings 6 to 9 mH at 230 to 400 A with E = 230 Ws 17 mH for 500 – 800 A
Total power loss W	on request
Total weight kg	on request
Frequency	DC applications, the aforementioned currents take into account a 30% ripple of the alternating current
Degree of protection	IP00, exposed to all weather factors
Safety class	I according to VDE 0106
Terminal	Free cable, flat copper (application-related)
Installation	Hanging, underfloor (application-related)
Cooling	CF, forced air cooling Typically 10 to 12 m/s at 40°C
Climatic conditions	Load due to "damp heat" and "salt mist" DIN IEC 721 – 3-5 Class 5C2 (chemically active materials) DIN IEC 721 – 3-5 Class 5F2 (contaminated materials) DIN IEC 721 – 3-5 Class 5S2 (mechanically active materials) DIN IEC 721 – 3-5 Class 5K3 (climatic category) DIN IEC 721 – 3-5 Class 5B2 (biologically active materials)
Insulation	up to 12 kV rated voltage for clearances in air >20 mm clearances in air (minimum value) 1900 V DC insulation rated voltage for creepage distances
Permissible ambient temperature during operation	-30°C to +70°C
Temperature classes	t_a 60°C/H
Mechanical load	DIN IEC 68-2-6/06.90 Vibration sinusoidal approx. 2 *g* DIN IEC 9/426/CDV Vibration wide-band noise DIN IEC 68-2-27/08.89 Shock UIC 566 Vibration and shock resistance
Standards/approvals	The reactors comply with VDE 0535, EN60310
Dimensions	on request
Storage/transport temperature	-40°C to +70°C

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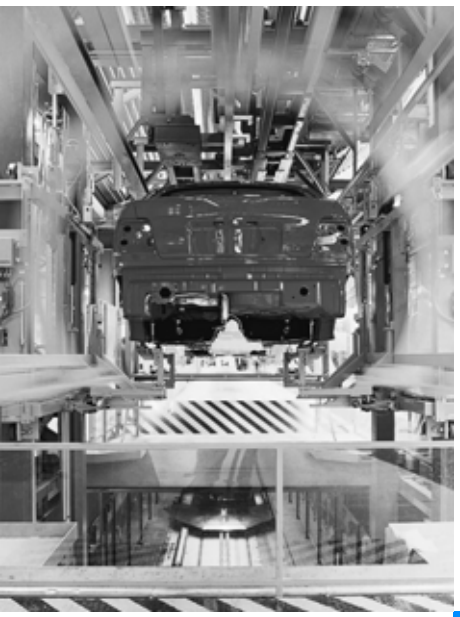
Notes

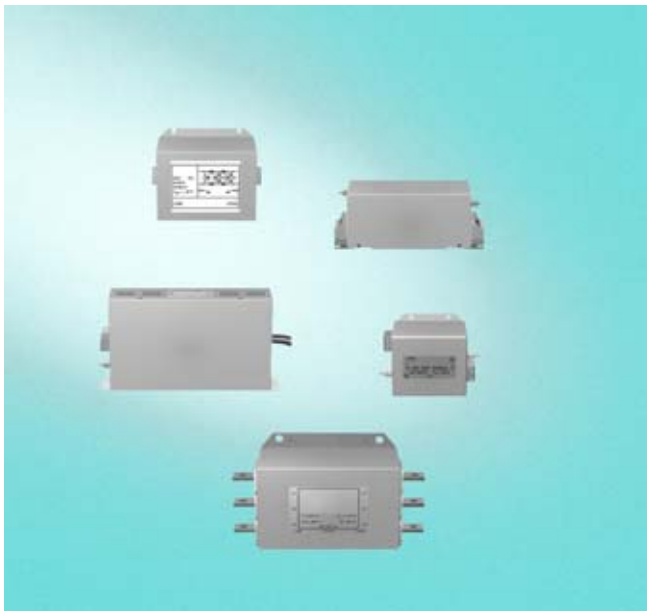
SIDAC
Radio Interference Suppression Filters

10



Single-phase filters, Three-phase filters

Application



Radio interference suppression filters

Radio interference suppression filters for frequency converters are used in line-side supply cables for the purpose of attenuating grid-bound radio interference voltages.

Using a radio interference suppression filter can achieve compliance with interference suppression level A or B according to EN 50081. It is also possible to use significantly longer motor supply cables in compliance with the limit values of EN 50081.

In order to ensure optimum filter performance, we recommend that you do not exceed a maximum motor cable length of 50 m. As well as the standard single and three-phase filters, 4-phase filters are also available on request for the interference suppression of complete control cabinets.
Customised modifications enable solutions that are optimally matched to the application. For example, using a combination filter (radio interference suppression filter and output reactor), it is possible to increase the length of the motor cable even further while still maintaining the required radio interference suppression level. Combining the radio interference suppression filter with an input reactor enables further reduction of circuit feedback.

For further advice
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Technical specifications

Recommended supply voltage U_N **Rated alternating current I_{Ln}** **Leakage current for U_N and 50 Hz** **Drive power for 2 AC 230 V / 3 AC 400 V** **DC resistance mΩ** **Degree of protection** **Weight**	See "Selection and ordering data" table
Frequency	50 Hz/60 Hz
Test voltage	1770 V DC (2240 V), 2 s phase/phase 2700 V DC, 2 s phase/casing
Permissible overload	1.5 · I_{Ln} for 3 mins. per hour or 2.5 · I_{Ln} for 30 s per hour
Rated ambient temperature	t_a 40°C
Climatic category	25/100/21 (–25°C/+100°C/21 days moisture test) for filters 4EF15 10-1AA10 ... 4EF15 10-8AA10, 4EF15 12-7AA10 the following applies: 25/85/21 (–25°C/+85°C/21 days moisture test) Test according to EN 60068-1
Standards	EN 133200
Approvals	See "Selection and ordering data" table UL1283, CSA22.2 No. 8 1986 are applied

Selection and ordering data

4EF15 10-1AA00

4EF15 10-3AA00

Typical drive power	Recommended filter class [1]	Rated current	Leakage current	DC resistance	Connection [2]	Degree of protection	Approvals			DT	Order No.	Total weight approx.
P_{drive} kW		I_{Ln} A	I_{leak} mA	R_{type} mΩ		IP	cULus	cULus	CE			kg
1 AC 250 V 50/60 Hz for converters and chassis converters												
230 V												
0.75	A [3]	10	< 8	18.0	BsRKI	20	x	x	x	C	**4EF15 10-1AA00**	0.550
2.2	A [3]	20	< 8	10.0	BsRKI	20	x	x	x	C	**4EF15 10-2AA00**	1.000
0.75	B	8	< 3.5	42.0	BsRKI	20	–	–	–	C	**4EF15 10-3AA00**	1.350
1.1	B	12	< 3.5	30.0	BsRKI	20	–	–	–	C	**4EF15 10-4AA00**	1.450
1.5	B	16	< 3.5	21.0	BsRKI	20	–	–	–	C	**4EF15 10-5AA00**	1.450
2.2	B	25	< 3.5	9.0	BsRKI	20	–	–	–	C	**4EF15 10-6AA00**	3.700

x available

– not available

[1] Recommended filters for interference suppression according to EN 55011, Class A or Class B, EN 61800-3
In individual cases, compliance with EMC regulations must be ensured by means of an application-related measurement, which must be requested and ordered separately. When selecting the filter, the ratings of the converter must be taken into account.
Always ensure correct installation of filters and additional sensible measures for compliance with the EMC Directive.

[2] BsRKI: safe-to-touch modular terminal block

[3] If a Class A radio interference suppression filter is already integrated in the converter, no further Class A radio interference suppression filters may be connected upstream. This would cause a malfunction of the converter system, which, in turn could damage components or even the converter itself.

Three-phase filters

4EF15 10

4EF15 11

4EF15 11
4EF15 12

Typical drive power	Recommended filter class [1]	Rated current	Leakage current	DC resistance	Connection [2]	Degree of protection	Approvals			DT	Order No.	Total weight approx.
P_{drive} kW		I_{Ln} A	I_{leak} mA	R_{type} mΩ		IP						kg
3 AC 520 V 50/60 Hz for converters and chassis converters [3] [4]												
480 V												
2.2	A	8	< 12	16.0	BsRKI	20	x	x	x	C	**4EF15 10-1AA10**	0.580
5.5	A	16	< 14	9.0	BsRKI	20	x	x	x	C	**4EF15 10-2AA10**	0.900
7.5	A	25	< 14	5.0	BsRKI	20	x	x	x	C	**4EF15 10-3AA10**	1.100
15	A	36	< 14	4.0	BsRKI	20	x	x	x	C	**4EF15 10-4AA10**	1.750
22	A	50	< 14	2.0	BsRKI	20	x	x	x	C	**4EF15 10-5AA10**	1.750
30	A	66	< 14	1.5	BsRKI	20	x	x	x	C	**4EF15 10-6AA10**	2.700
37	A	90	< 16	1.1	BsRKI	20	x	x	x	C	**4EF15 10-7AA10**	4.200
45	A	120	< 16	0.9	BsRKI	20	x	x	x	C	**4EF15 10-8AA10**	4.900
75	A	150	< 16	0.55	BsRKI	20	x	x	x	C	**4EF15 12-7AA10**	5.300
110	A	220 [5]	< 16	0.4	BsRKI / frE	20	x	–	–	C	**4EF15 11-0AA10**	11.500
132	A	250	< 21	0.110	F	00	x [6]	x	–	C	**4EF15 11-1AA10**	5.000
160	A	320	< 21	0.051	F	00	x [6]	x	–	C	**4EF15 11-2AA10**	7.200
200	A	400	< 21	0.048	F	00	x [6]	x	–	C	**4EF15 11-3AA10**	7.500
315	A	600	< 21	0.043	F	00	x [6]	x	–	C	**4EF15 11-4AA10**	7.800
500	A	1000	< 40	0.029	F	00	x [6]	x	–	C	**4EF15 11-5AA10**	18.500
900	A	1600	< 40	0.022	F	00	–	–	–	C	**4EF15 11-6AA10**	24.500
3 AC 480 V 50/60 Hz for converters and chassis converters												
480 V												
2.2	B	8	< 14	26.0	BsRKI / frE	20	–	–	–	C	**4EF15 11-7AA10**	1.500
5.5	B	16	< 14	13.0	BsRKI / frE	20	–	–	–	C	**4EF15 11-8AA10**	1.500
7.5	B	25	< 14	10.0	BsRKI / frE	20	–	–	–	C	**4EF15 12-8AA10**	2.700
15	B	36	< 14	6.5	BsRKI / frE	20	–	–	–	C	**4EF15 12-0AA10**	3.200
22	B	50	< 14	4.3	BsRKI / frE	20	–	–	–	C	**4EF15 12-1AA10**	3.700
30	B	66	< 14	2.7	BsRKI / frE	20	–	–	–	C	**4EF15 12-2AA10**	4.300
37	B	90	< 14	2.0	BsRKI / frE	20	–	–	–	C	**4EF15 12-3AA10**	7.700
45	B	120	< 14	1.4	BsRKI / frE	20	–	–	–	C	**4EF15 12-4AA10**	8.300
75	B	150	< 14	0.9	BsRKI / frE	20	–	–	–	C	**4EF15 12-5AA10**	9.700
90	B	200	< 14	0.5	BsRKI / frE	20	–	–	–	C	**4EF15 12-6AA10**	13.500

x available

– not available

[1] Recommended filters for interference suppression according to EN 55011, Class A or Class B, EN 61800-3
In individual cases, compliance with EMC regulations must be ensured by means of an application-related measurement, which must be requested and ordered separately. When selecting the filter, the ratings of the converter must be taken into account.
Always ensure correct installation of filters and additional sensible measures for compliance with the EMC Directive.

[2] BsRKI: safe-to-touch modular terminal block
BsRKI / frE: safe-to-touch modular terminal block / free ends
F: flat termination

[3] If a Class A radio interference suppression filter is already integrated in the converter, no further Class A radio interference suppression filters may be connected upstream. This would cause a malfunction of the converter system, which, in turn could damage components or even the converter itself.

[4] 520 V unless stated otherwise in the table under I_{Ln}

[5] Rated voltage 3 AC 480 V 50/60 Hz

[6] For operation according to UL U_N = 500 V/290 V.

SIDAC
dv/dt Filters

11

Three-phase filters

Application

dv/dt filter

dv/dt filters comprise a limiter circuit and a reactor, or just a reactor. The filter is installed at the output of frequency converters and the motor currents flow through the reactor. By connecting a filter to the three-phase system at the output of the frequency converter, transient voltage peaks are reduced and the voltage gradients in the motor winding are reduced to non-critical values of less than 500 V/μs. If long motor cables are used, the dv/dt filter also reduces capacitive load current peaks resulting from the capacitance per unit length of motor cable. Specifications for motor cable lengths:

- 200 m shielded motor cable
- 300 m unshielded motor cable

Technical specifications

Recommended supply voltage U_N	3 AC 500 V / 690 V
Rated alternating current I_{Ln}	up to approx. 860 A
Test voltage	Depending on the version
Performance range of the drive	up to approx. 800 kW
Total power loss W	on request
Total weight kg	on request
Frequency	f_{max}= 200 Hz at converter output Clock frequencies ≤ 4 kHz
Degree of protection	IP00 according to DIN VDE 0470-1/EN 60529
Safety class	I according to DIN VDE 0160-1/05.82 IEC 536/1976
Terminal	Flat termination/terminals depend on the performance class
Rating of creepage distances and clearances	Degree of soiling 2 according to DIN VDE 0110
Permissible ambient temperature during operation	0°C to +40°C
Deviation of the permissible alternating current from rated alternating current I_{Ln} (at coolant temperatures ≠ +40°C)	on request
Temperature classes	depending on the version
Site altitude	≤ 1000 m above sea level
Deviation of the permissible alternating current from rated alternating current I_{Ln} (at site altitudes > 1000 m above sea level)	See "Configuration notes"
Standards/approvals	The reactors comply with EN 61558-2-20
Storage temperature	-25°C to +55°C
Transport temperature	-25°C to +70°C
Permissible humidity rating	Humidity 5% to 95% occasional condensation permissible

Selection and ordering data

Maximum continuous thermal current 4 kHz	Rated current	Connections T = Terminal F = Flat termination	DT	Core section of Order No.
I_{thmax} A	I_{Ln} A			
3 AC 400 V /500 V 200 Hz, maximum clock frequency 4 kHz				
4	3.6	T	X	on request
6	5.4	T	X	on request
10	9	T	X	on request
17.5	15.8	T	X	on request
26	23.4	T	X	on request
38	34.2	T	X	on request
48	43.2	T	X	on request
63	56.7	T	X	on request
90	81	T	X	on request
150	135	T	X	on request

Higher currents available on request

Queries:

If you have any queries, please fill out the "Specification sheet for customised dv/dt filters". The specified data will enable us to provide a detailed offer. The offer will also contain details of delivery times and dimensions.

Notes

SIDAC
Sinewave Filters

12

Three-phase filters

Application

Sinewave filter

The sinewave filter is installed at the output of frequency converters and motor currents flow through the filter. The frequency converter output variables are filtered in such a way that it produces almost sinusoidal motor voltages and currents. Stray losses in the motor are reduced and the motor runs significantly quieter. If long motor cables are used, the sinewave filter also reduces the load current peaks caused by cable capacities.

EX(d) motors can be converter-fed if a sinewave filter is used [1].

Permissible motor cable lengths when using sinewave filters:
- 200 m shielded motor cable
- 300 m unshielded motor cable

Technical specifications

Recommended supply voltage U_N **Rated alternating current I_{Ln}** **Total power loss W** **Total weight kg**	See "Selection and ordering data" table
Test voltage	3.6 kV DC live parts against casing
Performance range of the drive	1.5 to 75 kW, higher outputs available on request
Frequency	f_{max} = 100 Hz Clock frequency ≥ 4 kHz ≤ 8 kHz
Degree of protection	IP00 according to DIN VDE 0470-1/EN 60529 Safe-to-touch terminals according to BGV A2
Safety class	I according to DIN VDE 0160-1/05.82 IEC 536/1976
Terminal	Safe-to-touch terminals
Rating of creepage distances and clearances	Degree of soiling 2 according to DIN VDE 0110
Rated voltage for insulation (for site altitudes up to 1000 m above sea level)	500 V AC
Permissible ambient temperature during operation	0°C to +40°C
Deviation of the permissible alternating current from rated alternating current I_{Ln} (at coolant temperatures ≠ +40°C)	See "Configuration notes"
Temperature classes	t_a 40°C/F or t_a 40°C/H depending on the design ratings
Site altitude	≤ 1000 m above sea level
Deviation of the permissible alternating current from rated alternating current I_{Ln} (at site altitudes > 1000 m above sea level)	See "Configuring aids"
Standards/approvals	The reactors comply with EN 61558-2-20 UL 508: Device assembly
Storage temperature	-25°C to +55°C
Transport temperature	-25°C to +70°C
Permissible humidity rating	Humidity 5% to 95% occasional condensation permissible

[1] If a sinewave filter is placed upstream of the Ex(d) motor at the converter, please contact us to find out more about the operating conditions.

Selection and ordering data

4EF11

4EF11

Typical drive power	Max. continuous thermal current	Rated current	Inductance	Total losses	Connections T = Terminal F = Flat termination	DT	Order No.	Al weight per PU approx.	Cu weight per PU approx.	Total weight per PU approx.
P_{drive}	I_{thmax}	I_{Ln}	L_x	P_V						
kW	A	A	mH	W				kg	kg	kg
3 AC 400/500 V AC + 10% 100 Hz, clock frequency ≥ 4 kHz ≤ 8 kHz										
400 V										
1.5	4	3.6	12	69.8	T	B	**4EF11 05-0GB**	–	1.270	4.000
2.2	6	5.4	9	81.3	T	B	**4EF11 05-1GB**	–	1.410	4.300
4	10	9	5	81.3	T	B	**4EF11 05-2GB**	–	1.670	5.800
7.5	17.5	15.8	3.2	80.7	T	B	**4EF11 05-3GB**	–	2.400	9.500
11	26	23.4	2.1	237.2	T	B	**4EF11 05-4GB**	–	4.270	13.500
18.5	38	34.2	1.5	230.5	T	B	**4EF11 05-5GB**	–	6.550	20.000
22	48	43.2	1.3	237.2	T	B	**4EF11 05-6GB**	–	9.620	28.000
30	63	56.7	1.2	230.5	T	B	**4EF11 05-7GB**	–	11.700	35.000
45	90	81	0.7	389	T	B	**4EF11 05-8GB**	–	12.400	47.000
75	150	135	0.5	533	T	B	**4EF11 06-0GB**	–	28.600	70.000

Note:

The following generic parameters apply, which must not be exceeded:

- *Maximum motor cable length 200 m, shielded cable*
- *Maximum motor cable length 300 m, unshielded cable*
- *Maximum motor cable cross-sections for performance class:*
  - *up to 2.2 kW 1.5 mm²,*
  - *> 2.2 kW ≤ 7.5 kW/2.5 mm²*
  - *> 7.5 kW ≤ 11 kW/4 mm²*
  - *> 11 kW ≤ 22 kW/10 mm²*
  - *> 22 kW ≤ 30 kW/16 mm²*
  - *> 30 kW ≤ 37 kW/25 mm²*
  - *> 37 kW ≤ 50 kW/35 mm²*
  - *> 50 kW ≤ 75 kW/70 mm²*
- *Maximum clock frequency 8 kHz*
- *Maximum motor frequency of output reactor 200 Hz*
- *Maximum motor frequency of sinewave filter 100 Hz*
- *U_N 3 AC 500 V +5% (+10% sinewave filter)*

If these do not meet your requirements, customised solutions are available.
For further information contact:

E-mail: MD_Inquiry.aud@siemens.com

Operation of the drive in Ex(d) range:
If a sinewave filter is placed upstream of the Ex(d) motor at the converter, please contact us to find out more about the operating conditions.

Notes

SIDAC
Specification Sheets

13

☐ DC reactors (smoothi
DC-link reactors)
L_1 [mH]: _____
I_{d1} [A]: _____
L_2 [mH]: _____
I_{d2} [A]: _____
I_{therm} [A]: _____
U_{sys} [V]: _____
Ripple
DC link
☐ 300 Hz ☐ ____
☐ 30% ☐

Query

Specification sheet for customised reactors

Recipient

mdexx
Magnetronic Devices GmbH & Co. KG
Fax: +49 421 5125-333
Tel: +49 421 5125-528/-616/-644
E-mail: MD_Inquiry.aud@siemens.com

Sender **Date:** _____

Company: _____
Department: _____
Name: _____
City: _____
Tel: _____
Fax: _____
E-mail: _____

Application:

☐ 1-phase ☐ 3-phase

Please specify all currents and voltages as r.m.s. values!

☐ DC reactors (smoothing/ DC-link reactors)

L_1 [mH]: _____
I_{d1} [A]: _____
L_2 [mH]: _____
I_{d2} [A]: _____
I_{therm} [A]: _____
U_{line} [V]: _____
Ripple
DC link
☐ 300 Hz ☐ _____
☐ 30% ☐ _____

☐ Commutation reactors

U_{Dr} [V]: _____
u_D [%]: _____
I_n [A]: _____
I_{max} [A]: _____
U_{line} [V]: _____
f_{line} [Hz]: _____
Harmonics *)
I_1 [A]:_____ f_1 [Hz]:_____
I_2 [A]:_____ f_2 [Hz]:_____
I_3 [A]:_____ f_3 [Hz]:_____
I_4 [A]:_____ f_4 [Hz]:_____
I_5 [A]:_____ f_5 [Hz]:_____
*) List other currents and frequencies below

☐ Output reactors

L_n [mH]: _____
P_{nMot} [kW]: _____
f_{max} [Hz]: _____
U_{line} [V]: _____
f_{clock1} [Hz]: _____
I_{n1} [A]: _____
f_{clock2} [Hz]: _____
I_{n2} [A]: _____
f_{clock3} [Hz]: _____
I_{n3} [A]: _____

☐ Filter reactors

Qc [kvar]: _____
L_n [mH]: _____
$I_{n,eff}$ [A]: _____
U_{line} [V]: _____
f_{line} [Hz]: _____
Reactance [%]: _____
Fundamental and harmonic component
$U_{1[\%]}$ = _____ $I_{1[\%]}$ = _____
$U_{3[\%]}$ = _____ $I_{3[\%]}$ = _____
$U_{5[\%]}$ = _____ $I_{5[\%]}$ = _____
$U_{7[\%]}$ = _____ $I_{7[\%]}$ = _____
$U_{11[\%]}$ = _____ $I_{11[\%]}$ = _____
$U_{13[\%]}$ = _____ $I_{13[\%]}$ = _____

General Information

Ambient temperature:
☐ 40°C ☐ 55°C
☐ _____

Operating mode:
☐ Continuous duty
☐ ON-time [%] _____
Varying load according to specifications

Degree of protection:
☐ IP00 ☐ IP23
☐ IP_____

Design
☐ Book size
☐ Footprint
☐ Acc. to customer specifications

Please enter any alternative or supplementary data on converters and motors:

Converter

Rated power P_n [kW]: _____
$I_{nOutput}$ [A]: _____
$U_{DC\ link}$ [V]: _____
Permitted overload in [%] of $I_{nOutput}$: _____

Motor

P_n [kW]: _____ η: _____
Operating load in [%] of P_n: ____ U_N[V] = ____ I_n [A] = ____ p.f.: = ___
M = constant
M ~ n^2 (fan, pump)
r.p.m.$_n$: _____
r.p.m.$_{operation}$: from: _____ to: _____

Special features/comments:

_____

_____

_____

Scheduled delivery date: _____ No. of items: _____ per annum/per order Target price: _____

Documents: ☐ Dimensional drawings ☐ Load cycle ☐ Electrical data of drive ☐ _____

Query

Specification sheet for customised smoothing reactors, selectable inductance and current

Recipient

mdexx
Magnetronic Devices GmbH & Co. KG
Fax: +49 421 5125-333
Tel: +49 421 5125-528/-616/-644
E-mail: MD_Inquiry.aud@siemens.com

Sender **Date:** _____

Company: _____
Department: _____
Name: _____
City: _____
Tel: _____
Fax: _____
E-mail: _____

Application:

☐ Smoothing reactors with selectable inductance and current

Please specify all currents and voltages as r.m.s. values!

	Iron-core smoothing reactors	Iron-core smoothing reactors	Smoothing air-core reactors
	$I_x = I_{dn}$ $L_x = L_0$	$I_x > I_{dn}$ $L_x \leq L_0$	
Rated direct current I_{dn} [A]			
Inductance [mH] for I_{dn}		_____	
Inductance L_x [mH] for I_x (I_{max})	_____		_____
Inductance L_0 [mH] for I_d = 0A	_____		_____
Connection of converter			
No-load voltage of converter U_{di} [V]			
Line frequency f [Hz]			
Ambient temperature			
Additional information [1)]	mandatory	mandatory	mandatory

1) If you have any special requirements with regard to degree of soiling, reference voltage for the rating of insulation, etc., please enter in the Comments box

Special features/comments:

_____

_____

_____

_____

_____

Scheduled delivery date: _____ No. of items: _____ per annum/per order Target price: _____

Documents: ☐ Dimensional drawings ☐ Load cycle ☐ Electrical data of drive ☐ _____

Query

Specification sheet for customised radio interference suppression filters

Recipient

mdexx
Magnetronic Devices GmbH & Co. KG
Fax: +49 421 5125-333
Tel: +49 421 5125-528/-616/-644
E-mail: MD_Inquiry.aud@siemens.com

Sender **Date:** _____

Company: _____
Department: _____
Name: _____
City: _____
Tel: _____
Fax: _____
E-mail: _____

Application:

Please specify currents and voltages as r.m.s. values!

☐ Radio interference suppression filters DIN EN 133200

P_{nFu} [kW]: _____
I_n [A]: _____
U_{line} [V]: _____
I_{deriv} [mA]: _____
f_{line} [Hz]: _____

Adherence to interference level:
☐ A Industry, DIN EN 50081-2 "Second environment"
☐ B Living and business, DIN EN 50081-1 "First environment"

Optional
Commutation reactors:
☐ u_D = 2% ☐ u_D = 4% ☐ u_D = ____%

Optional
Output reactors:
f_{max} [Hz]: ____ f_{clock} [Hz]: ____

Maximum desired length of motor supply cable [m]:

☐ Shielded cable ☐ Unshielded cable Cable type = _____
Capacitance if known: L' [mH/m]= _____ C' [nF/m] = _____

General Information:

Ambient temperature:
☐ 40°C ☐ 55°C
☐ _____

Operating mode:
☐ Continuous duty
☐ ON-time [%] _____
Varying load according to specifications

Degree of protection:
☐ IP00 ☐ IP23
☐ IP _____

Design:
☐ Book size
☐ Footprint
☐ Acc. to customer specifications

Please enter any alternative or supplementary data on converters and motors:

Converters
Rated power P_n [kW]: _____
$I_{nOutput}$ [A]: _____
$U_{DC\ link}$ [V]: _____
Permitted overload in [%] of $I_{nOutput}$: _____

Motor
P_n [kW]: _____ η: _____
Operating load in [%] of P_n: ____ U_n [V]: ____ I_n [A]: ____ p. f.: ____
M = constant
M ~ n^2 (fan, pump)
r.p.m.$_n$: _____
r.p.m.$_{operation}$: from: _____ to: _____

Special features/comments:

_____
_____
_____

Scheduled delivery date: _____ No. of items: _____ per annum/per order Target price: _____

Documents: ☐ Dimensional drawings ☐ Load cycle ☐ Electrical data of drive ☐ _____

Query

Specification sheet for customised dv/dt filters

Recipient

mdexx
Magnetronic Devices GmbH & Co. KG
Fax: +49 421 5125-333
Tel: +49 421 5125-528/-616/-644
E-mail: MD_Inquiry.aud@siemens.com

Sender **Date:** _____

Company: _____
Department: _____
Name: _____
City: _____
Tel: _____
Fax: _____
E-mail: _____

Application:

Please specify currents and voltages as r.m.s. values!

☐ dv/dt filters

P_{nFu} [kW]: _____
I_n [A]: _____
U_{sys} [V]: _____
f_{max} [Hz]: _____
f_{clock} [Hz]: _____

Maximum desired length of motor supply cable [m]:

☐ Shielded cable ☐ Unshielded cable Cable type = _____
Capacitance if known: L‘ [mH/m]= _____ C‘ [nF/m] = _____

General Information

Ambient temperature:
☐ 40°C ☐ 55°C
☐ _____

Operating mode:
☐ Continuous duty
☐ ON-time [%] _____
Varying load according to specifications

Degree of protection:
☐ IP00 ☐ IP23
☐ IP _____

Design:
☐ Book size
☐ Footprint
☐ Acc. to customer specifications

Please enter any alternative or supplementary data on converters and motors:

Converters
Rated power P_n [kW]: _____
$I_{nOutput}$ [A]: _____
$U_{DC\ link}$ [V]: _____
Permitted overload in [%] of $I_{nOutput}$: _____

Motor
P_n [kW]: _____ η: _____
Operating load in [%] of P_n: ___ U_n [V]: ___ I_n [A]: ___ p. f.: ___
M = constant
M ~ n^2 (fan, pump)
r.p.m.$_n$: _____
r.p.m.$_{operation}$: from: _____ to: _____

Special features/comments:

_____
_____
_____

Scheduled delivery date: _____ No. of items: _____ per annum/per order Target price: _____

Documents: ☐ Dimensional drawings ☐ Load cycle ☐ Electrical data of drive ☐ _____

Query

Specification sheet for customised sinewave filters

Recipient

mdexx
Magnetronic Devices GmbH & Co. KG
Fax: +49 421 5125-333
Tel: +49 421 5125-528/-616/-644
E-mail: MD_Inquiry.aud@siemens.com

Sender **Date:** _____

Company: _____
Department: _____
Name: _____
City: _____
Tel: _____
Fax: _____
E-mail: _____

Application:

Please specify currents and voltages as r.m.s. values!

☐ Sinewave filters

P_{nFu} [kW]: _____
I_n [A]: _____
U_{line} [V]: _____
f_{max} [Hz]: _____
f_{clock} [Hz]: _____

Maximum desired length of motor supply cable [m]:

☐ Shielded cable ☐ Unshielded cable Cable type = _____
Capacitance if known: L' [mH/m]= _____ C' [nF/m] = _____

General Information

Ambient temperature:
☐ 40°C ☐ 55°C
☐ _____

Operating mode:
☐ Continuous duty
☐ ON-time [%] _____
Varying load according to specifications

Degree of protection:
☐ IP00 ☐ IP23
☐ IP _____

Design:
☐ Book size
☐ Footprint
☐ Acc. to customer specifications

Please enter any alternative or supplementary data on converters and motors:

Converters
Rated power P_n [kW]: _____
$I_{nOutput}$ [A]: _____
$U_{DC\ link}$ [V]: _____
Permitted overload in [%] of $I_{nOutput}$: _____

Motor
P_n [kW]: _____ η: _____
Operating load in [%] of P_n: _ U_n [V]: ___ I_n [A]: ___ p. f.: ___
M = constant
M ~ n^2 (fan, pump)
r.p.m.$_n$: _____
r.p.m.$_{operation}$: from: _____ to: _____

Special features/comments:

_____
_____
_____

Scheduled delivery date: _____ No. of items: _____ per annum/per order Target price: _____

Documents: ☐ Dimensional drawings ☐ Load cycle ☐ Electrical data of drive ☐ _____

SIDAC Accessories

14

Terminal covers

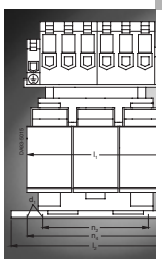
Selection and ordering data

	Version		DT	Order No.	PS*	Weight per PU approx.
						kg
Terminal covers to protect against accidental contact with free bar connections (DIN VDE 0106 Part 100/EN 50274)						
 3TX6 526-3B	The covers are suitable for all reactors and filters with 1-hole flat terminations. The assignment of the terminal covers to the reactors and filters can be carried out by the diameter of the flat connector hole, see "Configuration notes". Unless stated otherwise in the technical specifications, using the covers provides back-of-hand protection against accidental contact with live parts according to BGV A2.					
	Can be screwed onto free screw ends. Covers one rail connection (1 set = 6 items).	M6	B	**3TX6 506-3B**	1 set	0.082
		M8	B	**3TX6 526-3B**	1 set	0.140
		M10	B	**3TX6 546-3B**	1 set	0.260
		M12	D	**3TX6 346-3B**	1 set	0.250

* This quantity or a multiple thereof can be ordered.

SIDAC
Configuration Notes

15

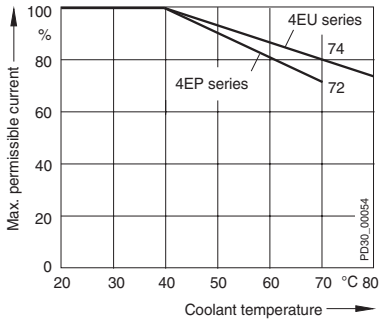


Reactors

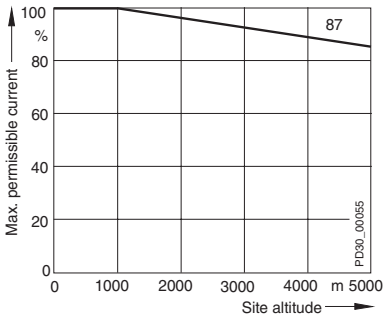
General

Deviations of rated values at site altitudes > 1000 m

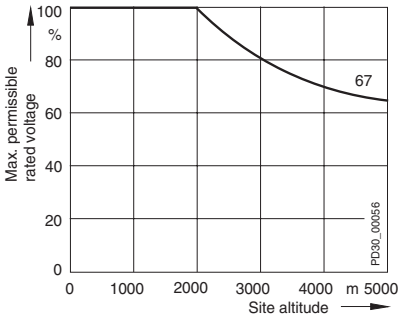
Reduction of the rated voltage and rated current, depending on the site altitude and coolant temperature



Deviation of the permissible direct current of rated direct current I_{dn}, or permissible alternating current of rated alternating current I_n (at coolant temperatures ≠ 40°C)
Characteristic curve 74 applies to reactors 4EU, 4ET, 4PK
Characteristic curve 72 applies to reactors 4EP, 4EM, 4EF11



Deviation of permissible direct current of rated direct current I_{dn}, or permissible alternating current of rated alternating current I_n (at site altitudes > 1000 m above sea level)



Reduction of rated voltage for insulation (at site altitudes > 2000 m above sea level)

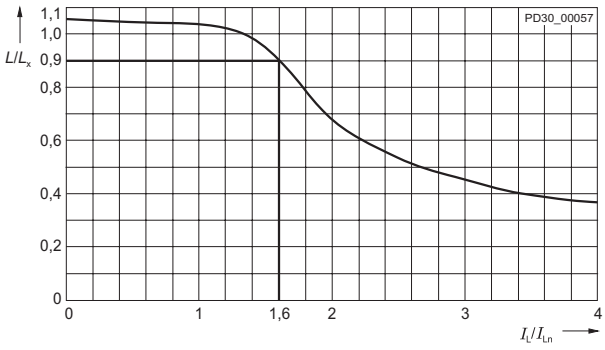
Inductance curve

Commutating reactors and mains reactors

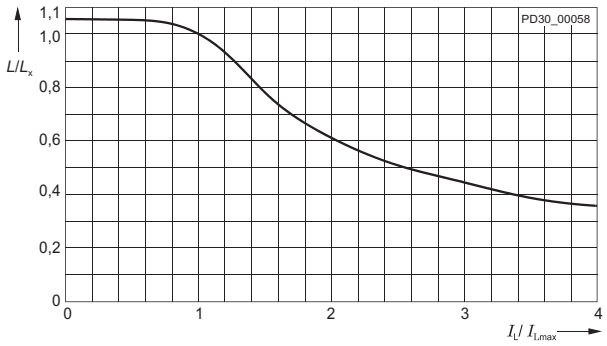
Commutating reactors and mains reactors differ greatly with regard to the inductance curve. The inductance is almost constant through to the rated current I_{Ln},

- Mains reactors still have 90% of their rated inductance at a 1.6-fold rated current I_{Ln}.
- Commutating reactors have a residual inductance of 60% at a 2.0-fold rated current I_{Ln}.

Typical inductance curves over the reactor current are shown in the following illustrations:



Typical curve of the inductance of a **mains reactor** over the reactor current



Typical curve of the inductance of a **commutating reactor** over the reactor current

Voltage drop ΔU or reference voltage drop u_D

In the case of **three-phase reactors**, the voltage drop ΔU per reactor phase when loaded with the maximum continuous thermal current I_{thmax} and line frequency f = 50 Hz or 60 Hz.

The percent voltage drop u_D can be calculated using the following formula:

For converter connection B6

$$u_D = \frac{\Delta U \times 100 \times \sqrt{3}}{U_N} \quad \text{in \%}$$

The inductance per reactor phase is as follows:

$$L_x = \frac{\Delta U}{I_{thmax} \times \omega}$$

$\omega = 2 \pi \times f$

with f = line frequency (50 Hz or 60 Hz)

Recommended supply voltage U_N, reference voltage drop u_D and insulation rating

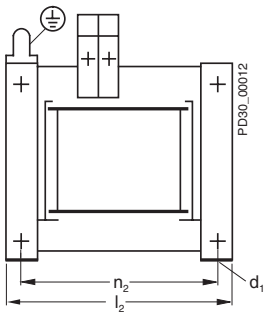
The "Selection and ordering data" table specifies a recommended supply voltage U_N for the reactors. The percent voltage drops u_D assigned to the reactors apply to the relevant recommended supply voltage U_N.

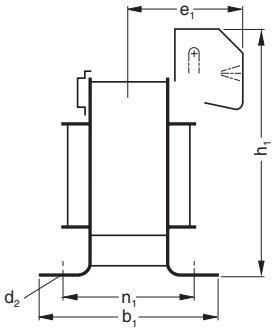
The rated voltage for the insulation specified in the "Selection and ordering data" table also allows the use of reactors at voltages that deviate from the recommended supply voltage U_N, but that are smaller or the same as the rated voltage of the insulation. The reference voltage drop u_D then changes and can be calculated using the formula shown in the Section "Voltage drop ΔU or reference voltage drop u_D".

A reactor with the reference voltage drop u_D specified as a percent value has the same effect on the system as a transformer with the same u_K.

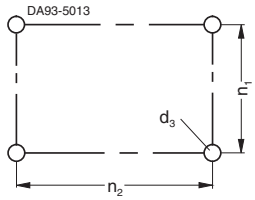
Single-phase reactors

Dimensional drawings





4EM (I_{Ln} ≤ 20 A)

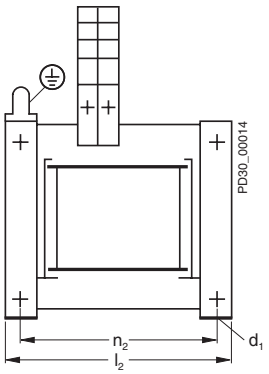


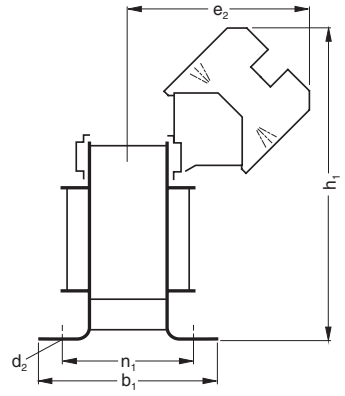
Mounting holes

4EM (I_{Ln} ≤ 20 A)
Terminal 8WA9 200
Cross-sections: solid: 0.5 mm² to 6 mm²
finely stranded: 1.5 mm² to 4 mm²

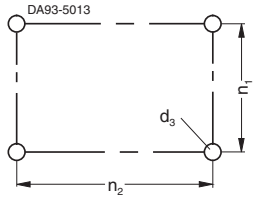
4EM (I_{Ln} 22.4 to 40 A)
Terminal RKW 110 or TRKSD 10
Cross-sections: solid: 1 mm² to 16 mm²
finely stranded: 1 mm² to 10 mm²

Type	Rated alternating current I_{Ln}	b_1	d_1	d_2	d_3	$e_{1\,max}$	$h_{1\,max}$	$l_{2\,max}$	n_1	n_2
Rated alternating current for terminal connections, for user-defined arrangement of reactors										
4EM46	up to 40 A	51	3.6	7	M3	53.0	85.0	61	39	50.0
4EM47	up to 40 A	60	4.8	9	M4	54.0	89.0	67	45	55.0
4EM48	up to 40 A	69	4.8	9	M4	56.5	98.0	79	53	65.0
4EM49	up to 40 A	85	4.8	9	M4	65.0	103.0	85	69	70.0
4EM50	up to 40 A	97	5.8	11	M5	66.0	111.5	97	77	80.0
4EM51	up to 40 A	111	5.8	11	M5	73.0	111.5	97	91	80.0
4EM52	up to 40 A	115	5.8	11	M5	70.5	131.0	121	92	100.0
4EM61	up to 40 A	110	5.8	11	M5	73.5	118.0	106	92	87.5





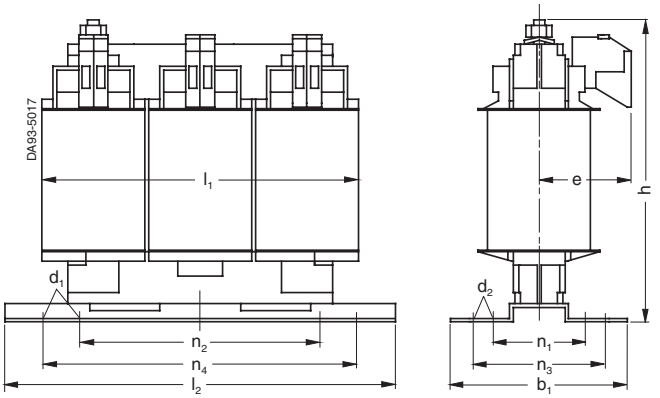
4EM (I_{Ln} 22 to 50 A)



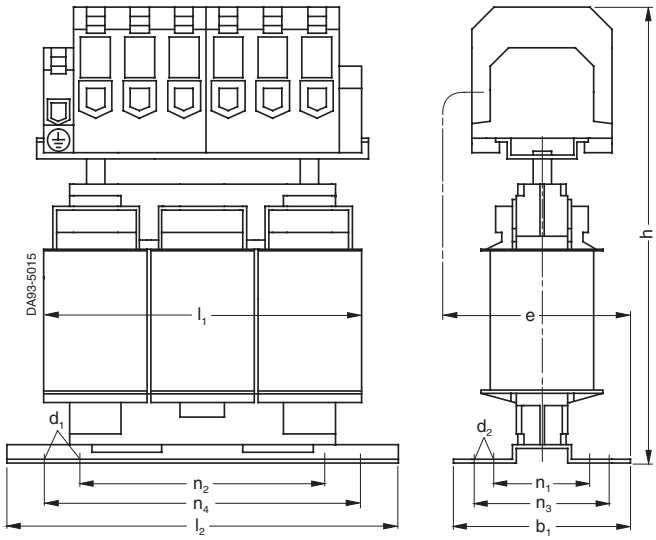
Mounting holes

4EM (I_{Ln} 22 to 50 A)
Terminal 8WA1 204
Cross-sections: solid: 0.5 mm² to 6 mm²
stranded: 10 mm² to 25 mm²
finely stranded: 2.5 mm² to 16 mm²

Type	Rated alternating current I_{Ln}	b_1	d_1	d_2	d_3	$e_{2\,max}$	$h_{1\,max}$	$l_{2\,max}$	n_1	n_2
Rated alternating current for terminal connections, for user-defined arrangement of reactors										
4EM49	22 to 50 A	85	4.8	9	M4	75	120.0	85	69	70.0
4EM50	22 to 50 A	97	5.8	11	M5	76	128.5	97	77	80.0
4EM51	22 to 50 A	111	5.8	11	M5	83	128.5	97	91	80.0
4EM53	22 to 50 A	120	7.0	13	M6	79	168.5	151	92	125.0
4EM61	22 to 50 A	110	5.8	11	M5	83	135.5	106	92	87.5
4EM62	22 to 50 A	135	5.8	11	M5	90	148.0	121	112	100.0



4EP ≤ 40 A



4EP 41 A to 50 A

Terminal RKW110 or TRKSD10
(for I_{Ln} ≤ 40 A)

Cross-sections:	solid:	1 mm² to 16 mm²
	finely stranded:	1 mm² to 10 mm²

Earth stud M6 x 12

Cross-sections:	solid:	2.5 mm² to 10 mm²
	finely stranded:	4 mm² to 10 mm²

Terminal 8WA1 304
(for I_{Ln} = 41 to 50 A)

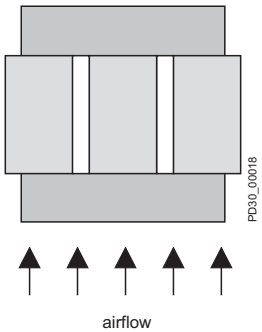
Cross-sections:	solid:	1 mm² to 16 mm²
	stranded:	10 mm² to 25 mm²
	finely stranded:	2.5 mm² to 16 mm²

Corresponding earth terminal EK16/35

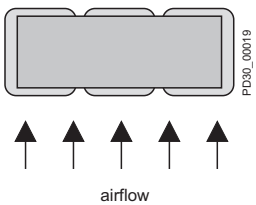
Cross-sections:	solid:	2.5 mm² to 16 mm²
	finely stranded:	4 mm² to 16 mm²

Type	Rated alternating current I_{Ln}	b_1	d_1	d_2	d_3	e	h	l_1	l_2	n_1	n_2	n_3	n_4
Rated alternating currents for terminal connections													
4EP36	up to 40 A	78	4.8	9	M4	62.0	139	120	148	49	90	58	136
4EP37	up to 40 A	73	5.8	11	M5	60.0	159	150	178	49	113	53	166
4EP38	up to 40 A	88	5.8	11	M5	67.0	159	150	178	64	113	68	166
4EP39	up to 40 A	99	7.0	13	M6	62.0	181	182	219	56	136	69	201
4EP40	up to 40 A	119	7.0	13	M6	72.0	181	182	219	76	136	89	201
4EP37	41 – 50 A	73	5.8	11	M5	78.5	193	150	178	49	113	53	166
4EP38	41 – 50 A	88	5.8	11	M5	86.0	193	150	178	64	113	68	166
4EP39	41 – 50 A	99	7.0	13	M6	91.5	220	182	219	56	136	69	201
4EP40	41 – 50 A	119	7.0	13	M6	101.5	220	182	219	76	136	89	201

Arrangement of 4EP reactors:
- User-defined for commutating reactors
- For iron-core output reactors, see drawing



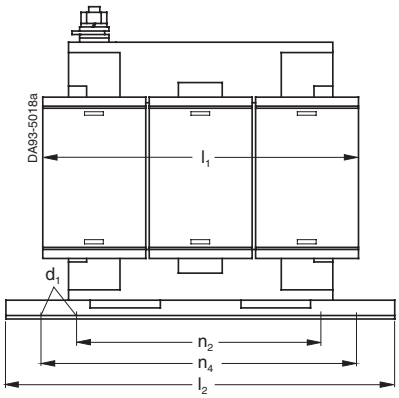
Permissible arrangement of iron-core output reactors, vertical



Permissible arrangement of iron-core output reactors, horizontal

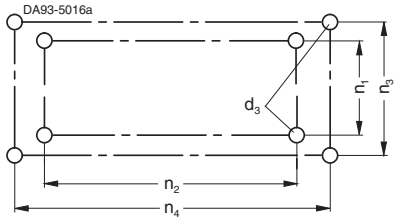
Commutation Reactors for Converters/Iron-core Output Reactors

Three-phase reactors



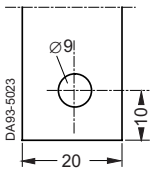
4EP > 51 A

Earth stud M6 x 12
for connection of cables with ring terminal end



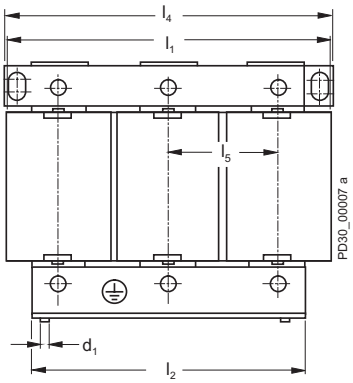
Mounting holes

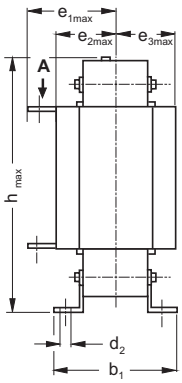
n_1 and n_2 mounting holes according to DIN 41308
n_3 and n_4 mounting holes according to EN 60852-4



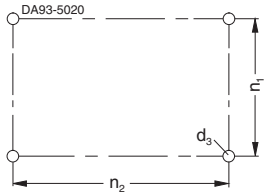
Flat termination

Type	Rated alternating current I_{Ln}	b_1	d_1	d_2	d_3	e	h	l_1	l_2	n_1	n_2	n_3	n_4
Rated alternating currents for flat termination													
4EP37	over 51 A	73	5.8	11	M5	68	153	150	178	49	113	53	166
4EP38	over 51 A	88	5.8	11	M5	76	153	150	178	64	113	68	166
4EP39	over 51 A	99	7.0	13	M6	73	179	182	219	56	136	69	201
4EP40	over 51 A	119	7.0	13	M6	83	179	182	219	76	136	89	201



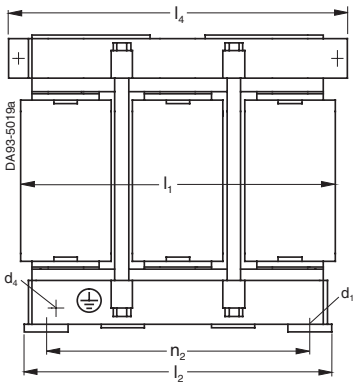


4EU24 to **4EU36**

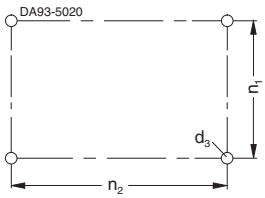


Mounting holes

Type	b_1	d_1	d_2	d_3	$e_{1\,max}$	$e_{2\,max}$	$e_{3\,max}$	h_{max}	l_1	l_2	l_4	l_5	n_1	n_2	Earth
for 4EU24 to 4EU36 with flat terminations, for arrangement of reactors on horizontal surfaces															
4EU24	91	7	12	M6	90.5	56.5	48.5	210	225	190	–	76	70	176	M6
4EU25	115	7	12	M6	102.5	68.5	60.5	210	225	190	–	76	94	176	M6
4EU27	133	10	18	M8	120.5	79.5	67.5	248	260	220	270	88	101	200	M6
4EU30 (Cu)	148	10	18	M8	137.0	89.0	73.0	269	295	250	300	100	118	224	M6
4EU30	148	10	18	M8	144.0	98.0	86.0	269	295	250	300	100	118	224	M6
4EU36 (Cu)	169	10	18	M8	142.0	94.0	78.0	321	357	300	350	120	138	264	M8
4EU36	169	10	18	M8	161.0	111.0	91.0	321	357	300	350	120	138	264	M8

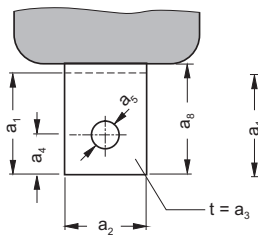


4EU39 to **4EU51**

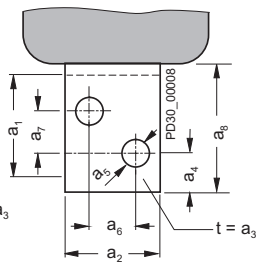


Mounting holes

Type	b_1	d_1	d_2	d_3	$e_{1\,max}$	$e_{2\,max}$	$e_{3\,max}$	h_{max}	l_1	l_2	l_4	l_5	n_1	n_2	Earth
for 4EU39 to 4EU51 with flat terminations, for arrangement of reactors on horizontal surfaces															
4EU39	174	12.0	18.0	M10	142	–	–	385	405	366	410	–	141	316	M6
4EU43	194	15.0	22.0	M12	168	–	–	435	458	416	460	–	155	356	M6
4EU45	221	15.0	22.0	M12	182	–	–	435	458	416	460	–	182	356	M6
4EU47	251	15.0	22.0	M12	197	–	–	435	458	416	460	–	212	356	M6
4EU50	195	12.5	12.5	M10	220	–	–	565	533	470	518	–	158	410	M12
4EU51	207	12.5	12.5	M10	242	–	–	565	533	470	518	–	170	410	M12



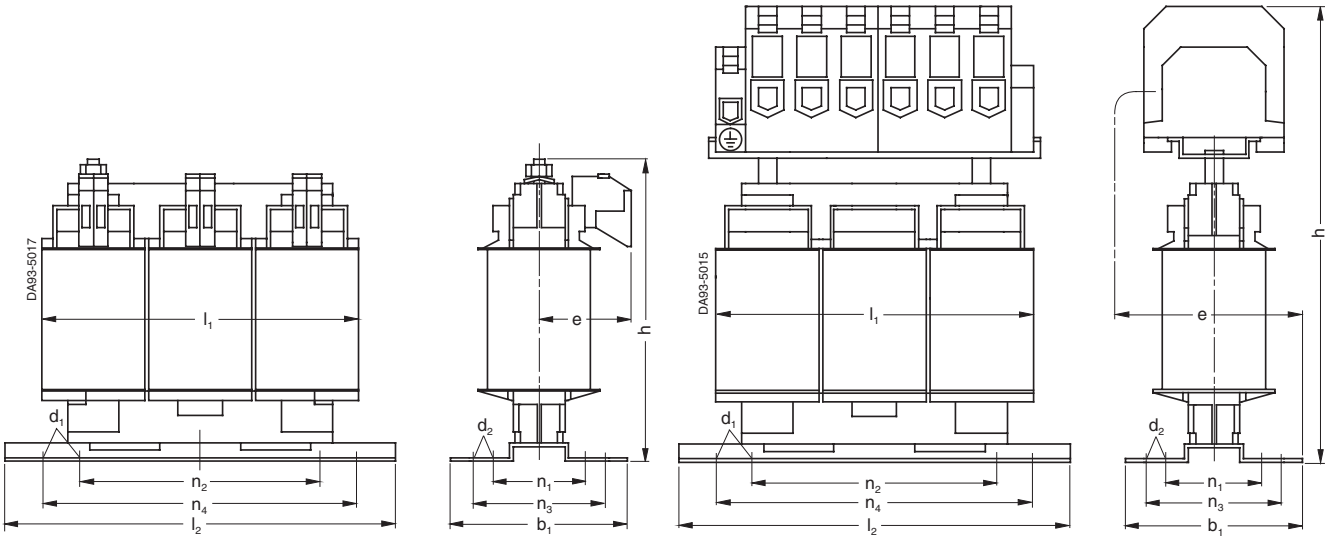
Version
up to 1000 A



Version
> 1000 A

Flat termination	a_1	a_2	a_3 Al	a_3 Cu	a_4	a_5	a_6	a_7	$a_{8\,max.}$
for 4EU24 to 4EU36 with flat terminations, for arrangement of reactors on horizontal surfaces									
≤ 200 A	20	20	4	3	10.0	9	–	–	34
≤ 400 A	25	25	6	5	12.5	11	–	–	41
≤ 630 A	30	30	8	6	15.0	11	–	–	48
≤ 800 A	30	30	10	8	15.0	14	–	–	50
≤ 1000 A	40	40	10	8	20.0	14	–	–	60
≤ 1250 A	50	50	10	8	14.0	14	22	22	70
for 4EU39 to 4EU51 with flat terminations, for arrangement of reactors on horizontal surfaces									
≤ 200 A	35	20	–	3	10.0	9	–	–	–
≤ 400 A	35	30	–	5	12.5	11	–	–	–
≤ 630 A	40	30	–	6	15.0	11	–	–	–
≤ 800 A	40	30	–	8	15.0	14	–	–	–
≤ 1000 A	50	40	–	8	20.0	14	–	–	–
≤ 1250 A	50	50	–	8	14.0	14	22	22	–
≤ 1640 A	60	60	–	12	17.0	14	26	26	–

Three-phase reactors



4EP ≤ 35 A

Earth stud M6 x 12
for connection of cables with ring terminal end

4EP 40 A to 50 A

Terminal 8WA9 200
(for I_{Ln} ≤ 15 A)

Cross-sections:	solid:	0.5 mm² to 6 mm²
	finely stranded:	1.5 mm² to 4 mm²

Terminal RKW110 or TRKSD10
(for I_{Ln} ≤ 16 to 35.5 A)

Cross-sections:	solid:	1 mm² to 16 mm²
	finely stranded:	1 mm² to 10 mm²

Earth stud M6 x 12

Cross-sections:	solid:	2.5 mm² to 10 mm²
	finely stranded:	4 mm² to 10 mm²

Terminal 8WA1 304
(for I_{Ln} = 40 A to 50 A)

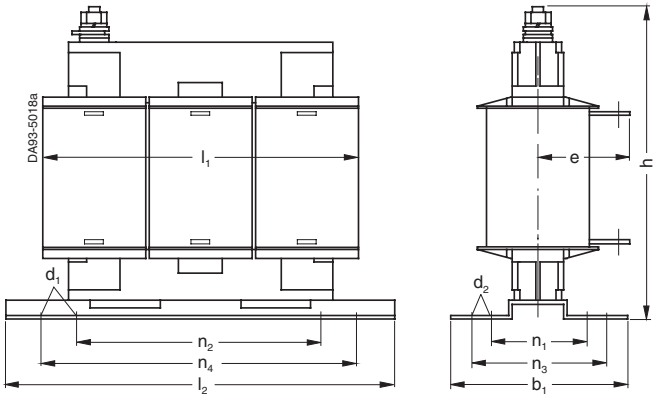
Cross-sections:	solid:	1 mm² to 16 mm²
	stranded:	10 mm² to 25 mm²
	finely stranded:	2.5 mm² to 16 mm²

Corresponding earth terminal EK16/35

Cross-sections:	solid:	2.5 mm² to 16 mm²
	finely stranded:	4 mm² to 16 mm²

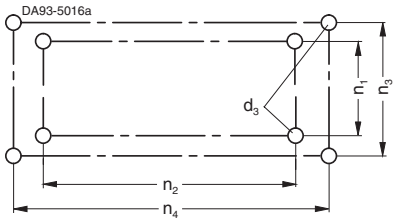
Type	b_1	d_1	d_2	d_3	e	h	l_1	l_2	n_1	n_2	n_3	n_4
I_{Ln} ≤ 35 A, terminal connections for user-defined arrangement of reactors												
4EP32	57.5	4.8	9	M4	56	108	78	88.5	34	1)	42.5	79.5
4EP33	64	4.8	9	M4	55	122	96	124	33	1)	44	112
4EP34	73	4.8	9	M4	59	122	96	124	42	1)	53	112
4EP35	68	4.8	9	M4	57	139	120	148	39	90	48	136
4EP36	78	4.8	9	M4	62	139	120	148	49	90	58	136
4EP37	73	5.8	11	M5	60	159	150	178	49	113	53	166
4EP38	88	5.8	11	M5	67	159	150	178	64	113	68	166
4EP39	99	7.0	13	M6	62	181	182	219	56	136	69	201
4EP40	119	7.0	13	M6	72	181	182	219	76	136	89	201
I_{Ln} 40 A to 50 A, terminal connections for user-defined arrangement of reactors												
4EP37	73	5.8	11	M5	78.5	193	150	178	49	113	53	166
4EP38	88	5.8	11	M5	86.0	193	150	178	64	113	68	166
4EP39	99	7.0	13	M6	91.5	220	182	219	56	136	69	201
4EP40	119	7.0	13	M6	101.5	220	182	219	76	136	89	201

1) Fixing slot in the base centre



4EP ≥ 51 A

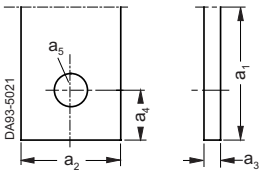
Earth stud M6 x 12
for connection of cables with ring terminal end



Mounting holes

n_1 and n_2 mounting holes according to DIN 41308
n_3 and n_4 mounting holes according to EN 60852-4

Type	b_1	d_1	d_2	d_3	e	h	l_1	l_2	n_1	n_2	n_3	n_4
I_{Ln} ≥ 51 A, flat termination for user-defined arrangement of reactors												
4EP38	88	5.8	11	M5	76	153	150	178	64	113	68	166
4EP39	99	7.0	13	M6	73	179	182	219	56	136	69	201
4EP40	119	7.0	13	M6	83	179	182	219	76	136	89	201

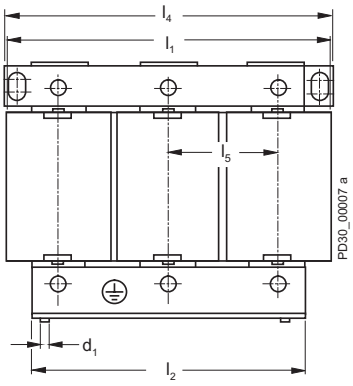


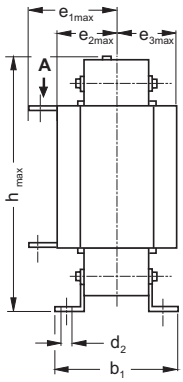
Flat termination

I_{Ln}	a_1	a_2	a_3	a_4	a_5
Flat termination					
51 to 80 A	30	20	3	10	9
81 to 200 A	35	25	5	12.5	11

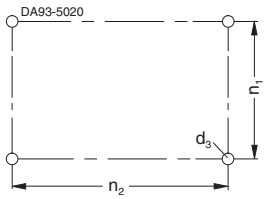
Mains Reactors for Frequency Converters

Three-phase reactors



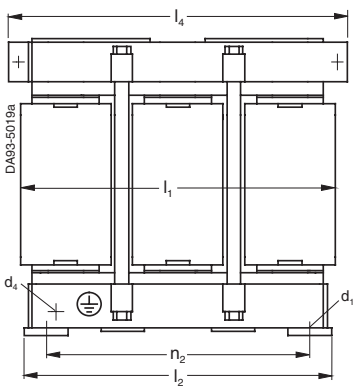


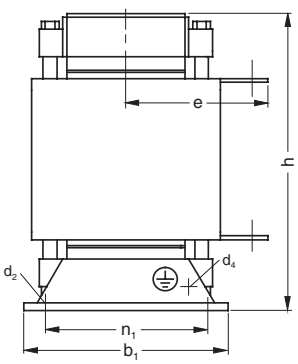
4EU24 to **4EU36**



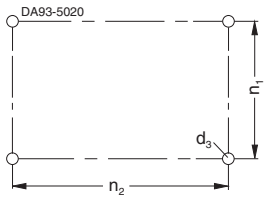
Mounting holes

Type	b_1	d_1	d_2	d_3	$e_{1\,max}$	$e_{2\,max}$	$e_{3\,max}$	h_{max}	l_1	l_2	l_4	l_5	n_1	n_2	Earth
for 4EU24 to 4EU36 with flat terminations, for arrangement of reactors on horizontal surfaces															
4EU24	91	7	13	M6	101.5	60.5	48.5	210	225	190	–	76	70	176	M6
4EU25	115	7	13	M6	118.5	72.5	60.5	210	225	190	–	76	94	176	M6
4EU27	133	10	18	M8	141.5	83.5	67.5	248	260	220	270	88	101	200	M6
4EU30	148	10	18	M8	147.0	89.0	73.0	269	295	250	300	100	118	224	M6
4EU36 (Cu)	169	10	18	M8	152.0	94.0	78.0	321	357	300	350	120	138	264	M8
4EU36	169	10	18	M8	197.0	115.0	91.0	321	357	300	350	120	138	264	M8



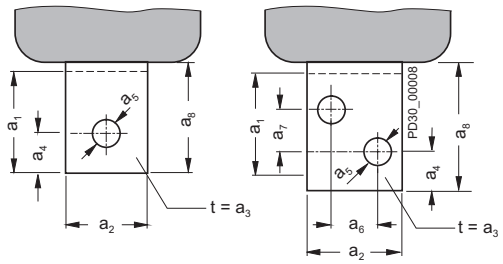


4EU39 to **4EU51**



Mounting holes

Type	b_1	d_1	d_2	d_3	$e_{1\,max}$	$e_{2\,max}$	$e_{3\,max}$	h_{max}	l_1	l_2	l_4	l_5	n_1	n_2	Earth
for 4EU39 to 4EU52 with flat terminations, for arrangement of reactors on horizontal surfaces															
4EU39	174	12.0	18.0	M10	197	–	–	385	405	366	410	–	141	316	M6
4EU43	194	15.0	22.0	M12	212	–	–	435	458	416	460	–	155	356	M6
4EU45	221	15.0	22.0	M12	211	–	–	435	458	416	460	–	182	356	M6
4EU47	251	15.0	22.0	M12	231	–	–	435	458	416	460	–	212	356	M6
4EU50	195	12.5	12.5	M10	220	–	–	565	533	470	518	–	158	410	M12
4EU52	220	12.5	12.5	M10	242	–	–	565	533	470	518	–	183	410	M12



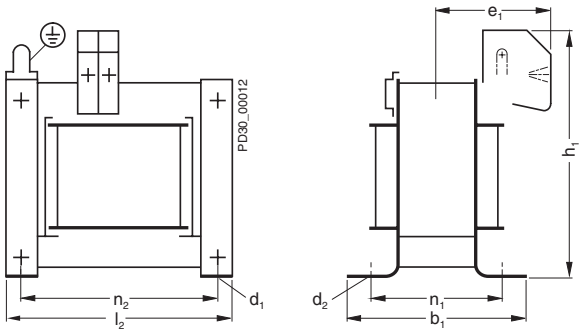
Version
up to 1000 A

Version
> 1000 A

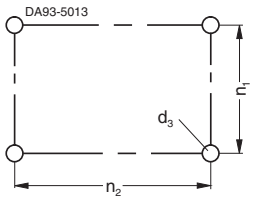
Flat termination	a_1	a_2	a_3 Al	a_3 Cu	a_4	a_5	a_6	a_7	$a_{8\,max}$
for 4EU24 to 4EU36, for arrangement of reactors on horizontal surfaces									
≤ 80 A	20	20	4	3	10.0	9	–	–	34
≤ 200 A	25	25	6	5	12.5	11	–	–	41
≤ 315 A	30	30	6	6	15.0	14	–	–	46
≤ 800 A	40	40	8	6	20.0	14	–	–	58
≤ 1000 A	40	40	10	8	20.0	14	–	–	60
≤ 1600 A	60	60	12	12	17.0	14	26	26	82
for 4EU39 to 4EU52, for arrangement of reactors on horizontal surfaces									
45 A to 80 A	30	20	–	3	10.0	9	–	–	–
81 A to 200 A	35	25	–	5	12.5	11	–	–	–
201 A to 315 A	40	30	–	6	15.0	14	–	–	–
316 A to 800 A	50	40	–	6	20.0	14	–	–	–
801 A to 1000 A	50	40	–	8	20.0	14	–	–	–
1001 A to 1600 A	60	60	–	12	17.0	14	26	26	–

Iron-core Smoothing Reactors

Single-phase reactors



4EM ≤ 40 A



Mounting holes

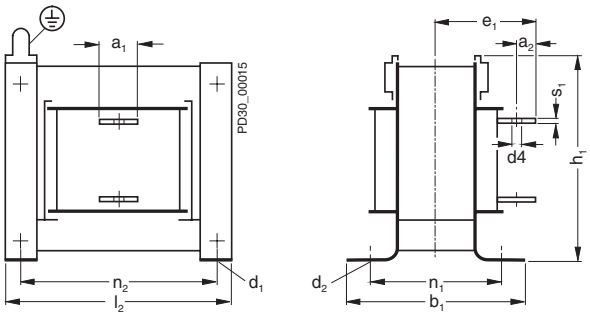
Terminal 8WA9 200
(for I_{dn} = 21 A)

Cross-sections:	solid:	0.5 mm² to 6 mm²
	finely stranded:	0.5 mm² to 4 mm²

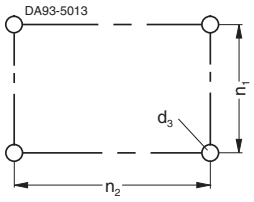
Terminal RKW110 or TRKSD10
(for I_{dn} = 22 A to 40 A)

Cross-sections:	solid:	1 mm² to 16 mm²
	finely stranded:	1 mm² to 10 mm²

Type	b_1	d_1	d_2	d_3	e_1	h_1	l_2	n_1	n_2
Rated direct current I_{dn} ≤ 40 A, with terminal connections, for user-defined arrangement of reactors									
4EM46	51	3.6	7	M3	54	85	61	39	50
4EM47	60	4.8	9	M4	55	89	67	45	55
4EM48	69	4.8	9	M4	57	98	79	53	65
4EM49	85	4.8	9	M4	66	103	85	69	70
4EM50	97	5.8	11	M5	67	111	97	77	80
4EM51	111	5.8	11	M5	74	111	97	91	80
4EM52	115	5.8	11	M5	71	131	121	92	100
4EM53	120	7.0	13	M6	69	151	151	92	125
4EM54	137	7.0	13	M6	78	151	151	109	125
4EM55	157	7.0	13	M6	90	151	151	135.5	125
4EM59	145	7.0	15	M6	84	176	167	118.5	145
4EM60	167	7.0	15	M6	94	176	167	138.5	145
4EM61	110	5.8	11	M5	74	118	106	92	87.5
4EM62	135	5.8	11	M5	81	131	121	112	100



4EM > 40 A



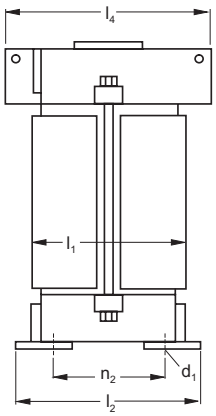
Mounting holes

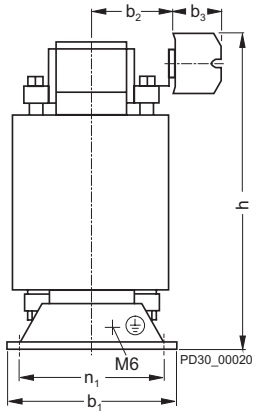
Type	b_1	d_1	d_2	d_3	e_1 (up to 200 A)	e_1 (up to 400 A)	h_1	l_2	n_1	n_2
Rated direct current I_{dn} > 40 A with flat terminations, for user-defined arrangement of reactors										
4EM46	51	3.6	7	M3	58	63	59	61	39	50
4EM47	60	4.8	9	M4	61	66	64	67	45	55
4EM48	69	4.8	9	M4	65	70	73	79	53	65
4EM49	85	4.8	9	M4	74	79	78	85	69	70
4EM50	97	5.8	11	M5	78	83	87.5	97	77	80
4EM51	111	5.8	11	M5	85	90	87.5	97	91	80
4EM52	115	5.8	11	M5	87	92	109	121	92	100
4EM53	120	7.0	13	M6	90	95	135	151	92	125
4EM54	137	7.0	13	M6	99	104	135	151	109	125
4EM55	157	7.0	13	M6	115	120	135	151	135.5	125
4EM59	145	7.0	15	M6	108	113	155	167	118.5	145
4EM60	167	7.0	15	M6	120	125	155	167	118.5	145
4EM61	110	5.8	11	M5	87	92	96.5	106	92	87.5
4EM62	135	5.8	11	M5	97	102	109	121	112	100

Rated current up to	a_1	a_2	d_4	s_1
Flat termination				
100 A	16	8	7	2.5
200 A	20	10	9	3.0
400 A	25	12.5	11	5.0

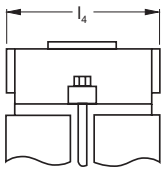
Iron-core Smoothing Reactors

Single-phase reactors

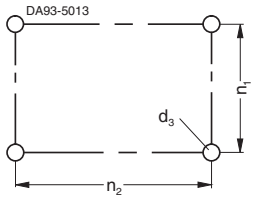




Version **4ET36** to **4ET47**
(shown without terminals)



Version **4ET25** to **4ET30**
(shown without terminals)



Mounting holes

Terminal 8WA1 011-1DG11
(for I_{dn} = 21 A) b_3 = 30 mm

Cross-sections:	solid:	0.5 mm² to 6 mm²
	finely stranded:	0.5 mm² to 4 mm²

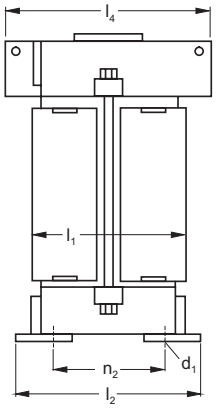
Terminal 8WA1 011-1DH11
(for I_{dn} = 22 to 27 A) b_3 = 30 mm

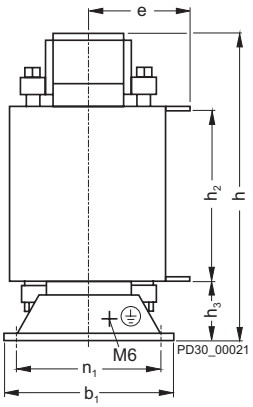
Cross-sections:	solid:	0.75 mm² to 10 mm²
	finely stranded:	1.5 mm² to 6 mm²

Terminal 8WA1 204
(for I_{dn} = 20 to 50 A) b_3 = 38 mm

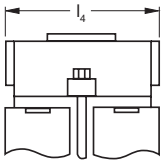
Cross-sections:	solid:	1.0 mm² to 16 mm²
	stranded:	10 mm² to 25 mm²
	finely stranded:	2.5 mm² to 16 mm²

Type	b_1	b_2	d_1	d_2	d_3	h	l_1	l_2	l_4	n_1	n_2	b_3
Rated direct current $I_{dn} \leq$ 50 A, with terminal connections, for arrangement on horizontal surfaces												
4ET25	128	73	7	13	M6	220	140	131	123	94	100	See
4ET27	146	77	10	18	M8	250	164	148	141	101	112	terminals
4ET30	155	80	10	18	M8	280	180	165	159	118	124	above
4ET36	169	85	10	18	M8	335	220	195	241	138	144	
4ET39	174	82	12	18	M10	385	260	227	271	141	176	
4ET43	194	87	15	22	M12	435	290	257	301	155	196	
4ET45	221	101	15	22	M12	435	290	257	301	182	196	
4ET47	251	116	15	22	M12	435	290	257	301	212	196	

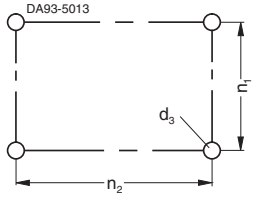




Version **4ET36** to **4ET47**

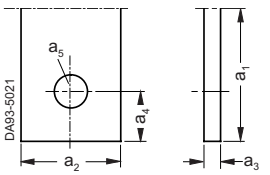


Version **4ET25** to **4ET30**



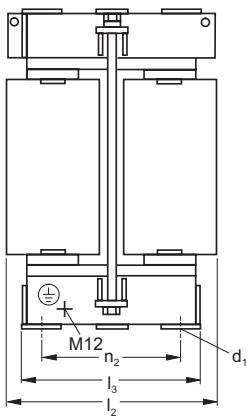
Mounting holes

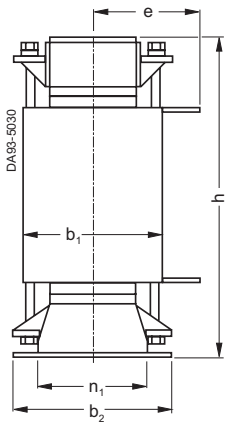
Type	b_1	d_1	d_2	d_3	h	h_2	h_3	l_1	l_2	l_4	n_1	n_2	e
Rated direct current I_{dn} > 50 A, for arrangement on horizontal surfaces													
4ET25	128	7	13	M6	220	124	54	140	131	123	94	100	95
4ET27	146	10	18	M8	250	142	60	164	148	141	101	112	102
4ET30	155	10	18	M8	280	160	66	180	165	159	118	124	104
4ET36	169	10	18	M8	335	190	76	220	195	241	138	144	112
4ET39	174	12	18	M10	385	220	86	260	227	271	141	176	114
4ET43	194	15	22	M12	435	250	96	290	257	301	155	196	119
4ET45	221	15	22	M12	435	250	96	290	257	301	182	196	133
4ET47	251	15	22	M12	435	250	96	290	257	301	212	196	148



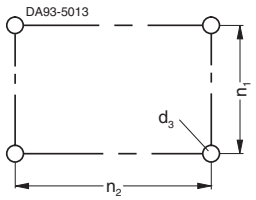
Rated current up to	a_1	a_2	a_3	a_4	a_5
Flat termination					
200 A	35	20	3	10.0	9
400 A	35	25	5	12.5	11
630 A	40	30	6	15.0	11

Flat termination 4ET36 to 4ET47, 4ET25 to 4ET30





4ET51 to **4ET65**

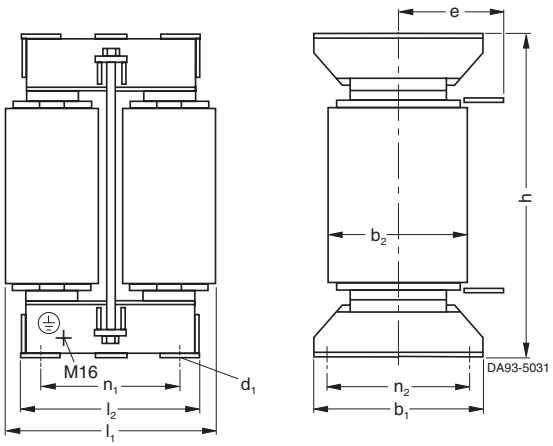


Mounting holes

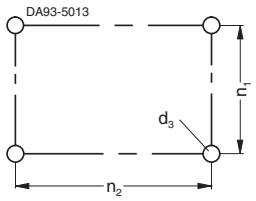
Type	b_1	b_2	d_1	d_3	h	l_2	l_3	n_1	n_2	e
Rated direct current I_{dn} > 50 A, for arrangement on horizontal surfaces										
4ET51	267	210	13.5	M10	565	340	289	170	225	205
4ET52	280	223	13.5	M10	565	340	289	183	225	210
4ET53	295	238	13.5	M10	565	340	289	198	225	220
4ET54	295	248	16.0	M12	650	390	334	198	260	220
4ET55	310	263	16.0	M12	650	390	334	213	260	230
4ET56	330	283	16.0	M12	650	390	334	233	260	240
4ET58	330	293	16.0	M12	745	480	404	241	320	240
4ET59	350	313	16.0	M12	745	480	404	261	320	250
4ET60	375	338	16.0	M12	745	480	404	286	320	260
4ET62	405	318	22.0	M16	880	610	499	261	395	275
4ET63	430	343	22.0	M16	880	610	499	298	395	290
4ET64	460	373	22.0	M16	880	610	499	323	395	300
4ET65	490	403	22.0	M16	880	610	499	353	395	320

Iron-core Smoothing Reactors

Single-phase reactors

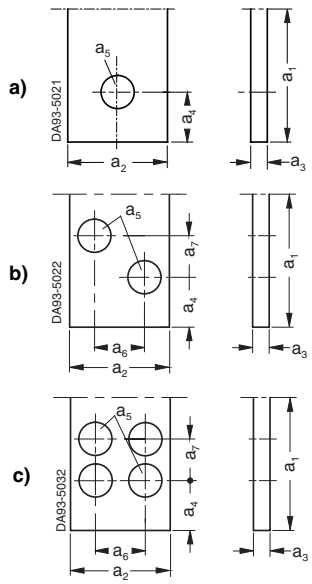


4ET72 to **4ET80**

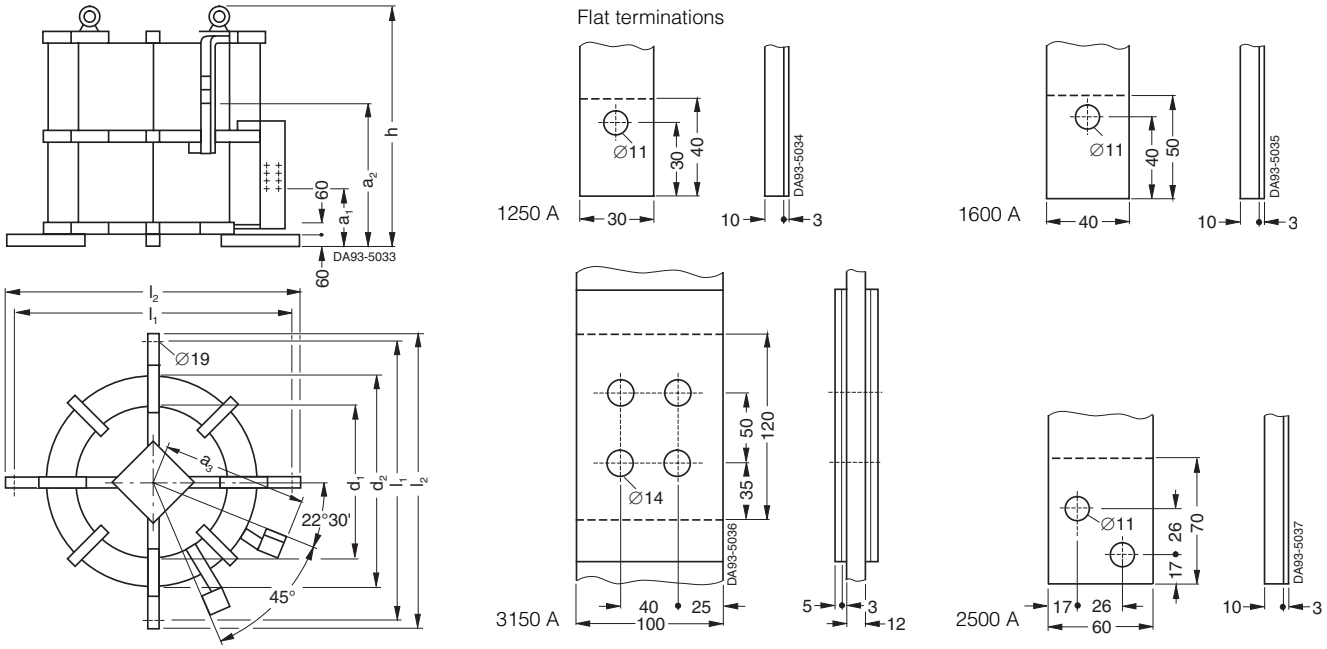


Mounting holes

Type	b_1	b_2	d_1	d_3	h	l_1	l_2	n_1	n_2	e
Rated direct current I_{dn} > 50 A, for arrangement on horizontal surfaces										
4ET72	520	550	24	–	965	710	560	420	440	270
4ET74	490	510	28	–	1135	850	670	530	390	270
4ET75	560	580	28	–	1135	850	670	530	460	290
4ET76	640	660	28	–	1135	850	670	530	540	330
4ET78	620	600	34	–	1340	990	790	650	480	290
4ET79	700	680	34	–	1340	990	790	650	560	330
4ET80	800	780	34	–	1340	990	790	650	660	380



Rated current up to	a_1	a_2	a_3	a_4	a_5	a_6	a_7
a) Flat termination							
100 A	25	16	2.5	8.0	7	–	–
200 A	30	20	3.0	10.0	9	–	–
400 A	35	25	5.0	12.5	11	–	–
630 A	40	30	6.0	15.0	11	–	–
800 A	40	30	8.0	15.0	14	–	–
1000 A	50	40	8.0	20.0	14	–	–
b) Flat termination							
1250 A	60	50	8	14	14	22	22
1600 A	70	60	12	17	14	26	26
c) Flat termination							
2500 A	90	80	12	20	14	40	40

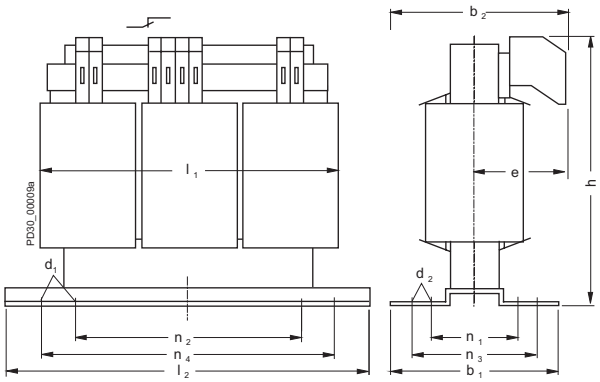


4PK40, 4PK60

Type	a_1	a_2	a_3	d_1	d_2	h	l_1	l_2
4PK40	Position of connections as agreed		593	500	846	1150	1100	1200
4PK60	with the customer		743	800	1146	1150	1400	1500

Ironless zone	Distance between two reactors
axial ≥ 500 radial ≥ 300	axial ≥ 500 radial ≥ 500

Three-phase reactors

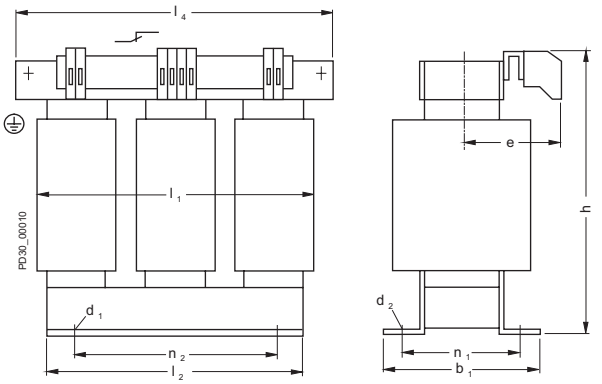


I_{eff} < 15 A: Terminal 4 mm^2
15 A < I_{eff} < 48 A: Terminal 10 mm^2

for user-defined arrangement of reactors

4EP37 to 4EP44

Type	b_1	b_2	d_1	d_2	d_3	e_{max}	h_{max}	$l_{1\,max}$	l_2	n_1	n_2	n_3	n_4
4EP37	73	97	5.8	11	M5	60	159	150	178	49	113	53	166
4EP38	88	111	5.8	11	M5	67	159	150	178	64	113	68	166
4EP39	99	112	7.0	13	M6	62	181	182	219	56	136	69	201
4EP40	119	132	7.0	13	M6	72	181	182	219	76	136	89	201
4EP43	107	120	7.0	13	M6	66	221	228	267	70	176	77	249
4EP44	131	145	7.0	13	M6	79	221	228	267	94	176	101	249

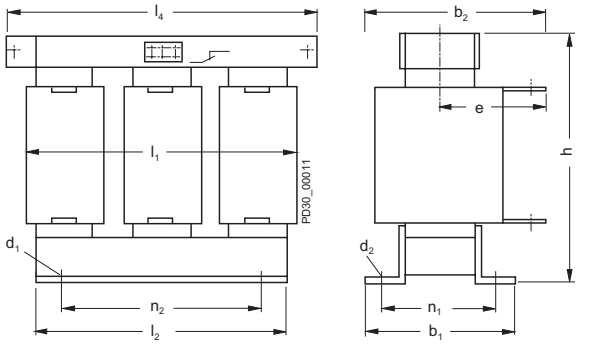


Version with terminal 10 mm^2

for arrangement of reactors on horizontal surfaces

4EU27

Type	b_1	b_2	d_1	d_2	d_3	e_{max}	h_{max}	$l_{1\,max}$	l_2	l_4	n_1	n_2
4EU27	162	189	10	18	M8	108	291	264	220	270	101	200

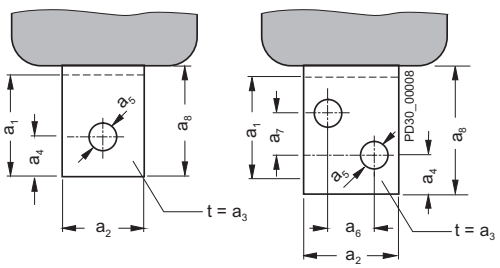


4EU25 to 4EU39

Version with flat termination

for arrangement of reactors on horizontal surfaces

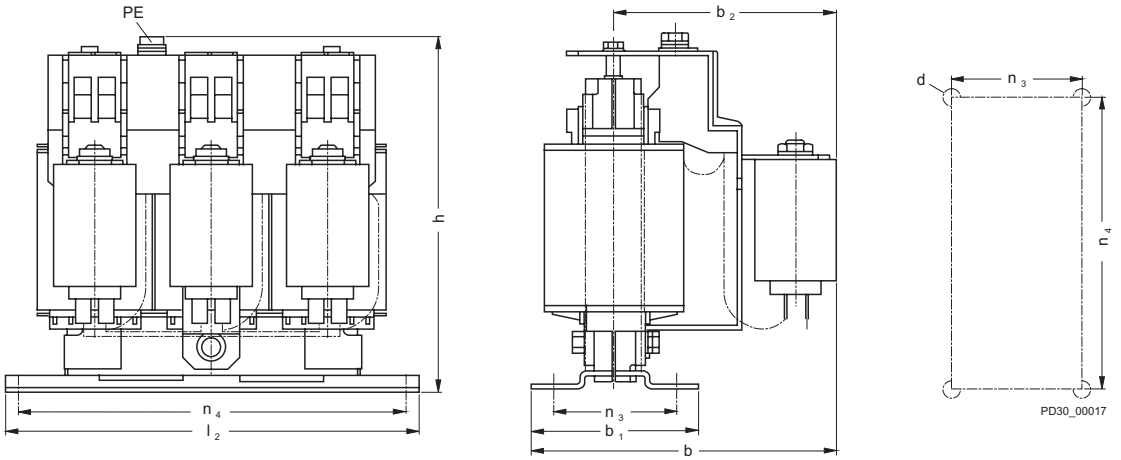
Type	b_1	b_2	d_1	d_2	d_3	e	h	l_1	l_2	l_4	n_1	n_2
4EU25	115	164	7	12	M6	103	210	225	190	–	94	176
4EU27	133	178	10	18	M8	121	248	260	220	270	101	200
4EU30	148	188	10	18	M8	137	269	295	250	300	118	224
4EU36	169	202	10	18	M8	142	321	357	300	350	138	264
4EU39	174	258	12	18	M10	171	385	405	350	410	141	316



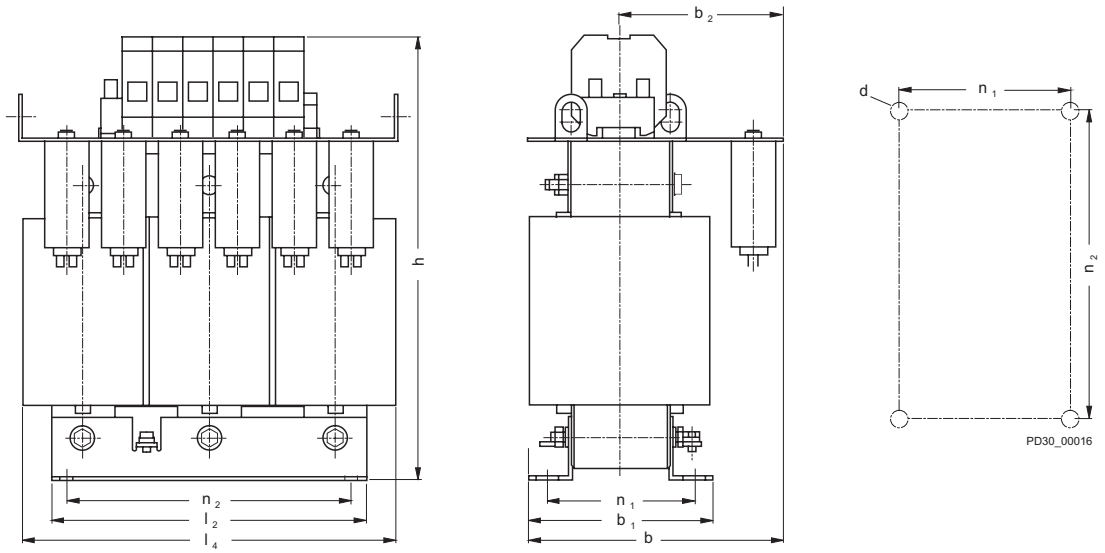
Version
up to 1000 A

Version
> 1000 A

Flat termination	a_1	a_2	a_3 Al	a_3 Cu	a_4	a_5	a_6	a_7	a_8 max
For 4EU25 to 4EU36 with flat terminations, for arrangement of reactors on horizontal surfaces									
< 50 kvar	20	20	4	3	10.0	7	–	–	34
> 50 kvar	20	20	4	3	10.0	9	–	–	34



4EF11 (for drives from 1.5 kW to 7.5 kW)



4EF11 (for drives from 11 kW to 75.0 kW)

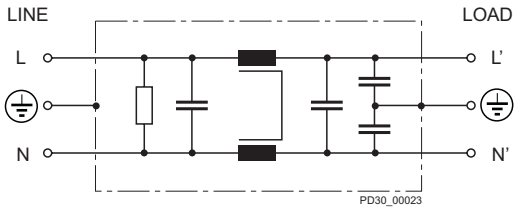
Drawing example, solution with 3 capacitors possible whereby the outline dimensions do not change

for filters with I_{thmax} to	b_{max}	b_1	$b_{2\,max}$	d	h_{max}	l_2	n_3	n_4	Earth
4EF11 sinewave filter for drives with 1.5 kW to 7.5 kW drive power, user-defined arrangement									
6 A	133	73	98	M5	157	178	53	166	M6
10 A	148	88	105	M5	157	178	68	166	M6
17.5 A	175	119	112	M6	182	219	89	201	M6

for filters with I_{thmax} to	b_{max}	b_1	b_2	d	h_{max}	l_2	$l_{4\,max}$	n_1	n_2	Earth
4EF11 sinewave filter for drive with 11 kW to 75 kW drive power, for arrangement of the filter on horizontal surfaces										
26 A	145	91	100	M6	253	189	225	70	176	M6
38 A	169	115	112	M6	253	189	225	94	176	M6
48 A	168	118	112	M8	300	220	260	86	200	M6
63 A	183	133	120	M8	300	220	260	101	200	M6
90 A	208	148	134	M8	362	249	295	118	224	M6
150 A	224	168	136	M8	418	299	357	138	264	M8

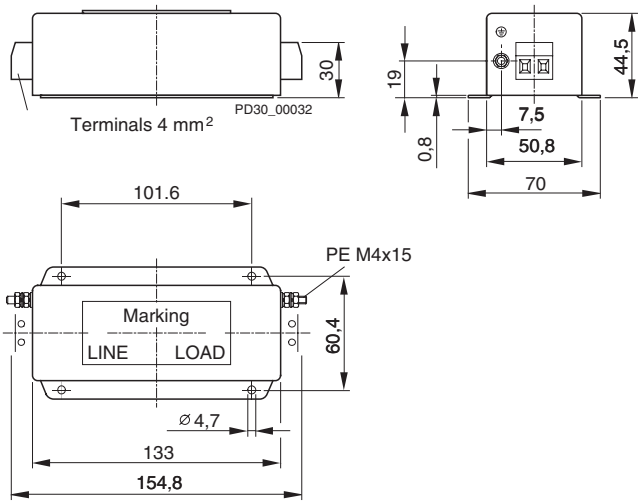
Single-phase filters

Typical circuit diagram



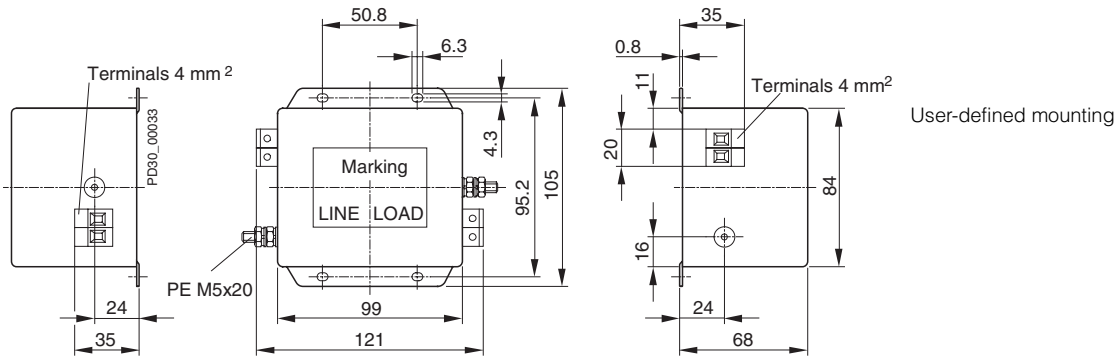
4EF15 10-1AA00, 4EF15 10-2AA00

Dimensions



User-defined mounting

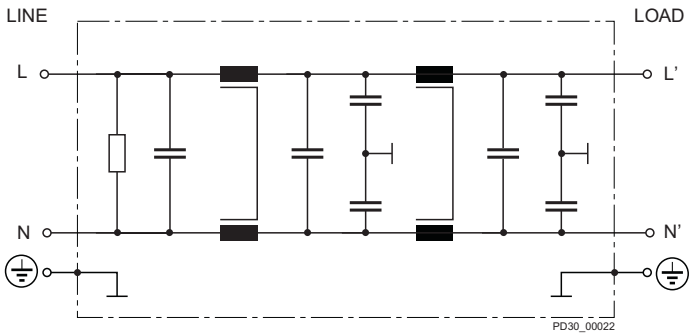
4EF15 10-1AA00



User-defined mounting

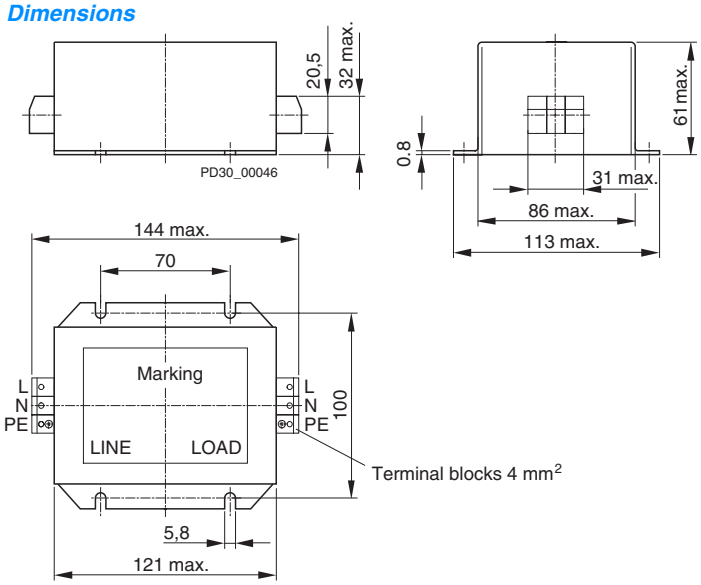
4EF15 10-2AA00

Typical circuit diagram



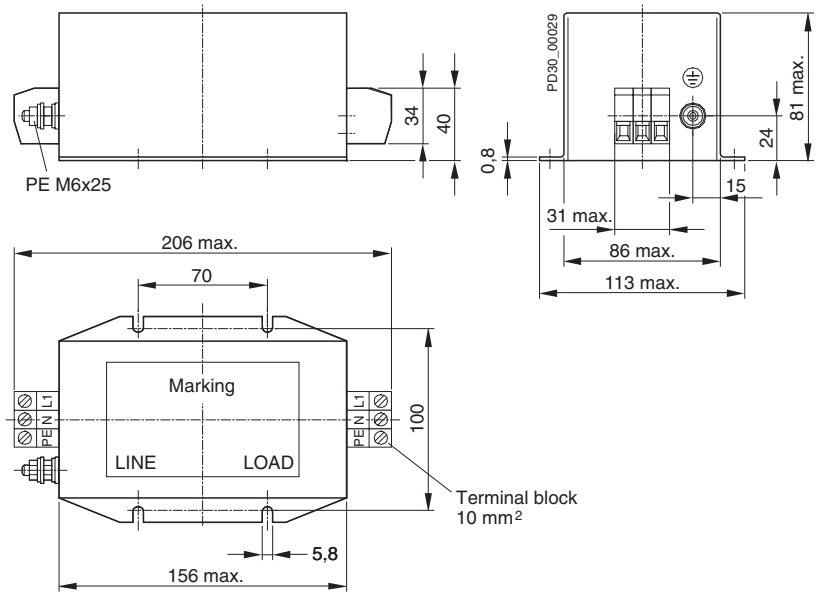
4EF15 10-3AA00, 4EF15 10-4AA00, 4EF15 10-5AA00, 4EF15 10-6AA00

Dimensions



User-defined mounting

4EF15 10-3AA00, 4EF15 10-4AA00, 4EF15 10-5AA00

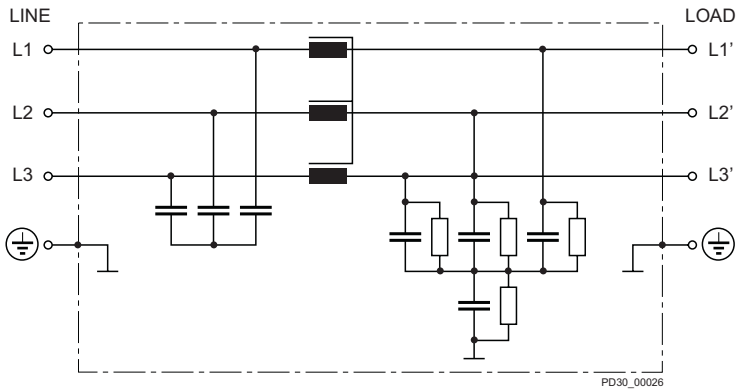


User-defined mounting

4EF15 10-6AA00

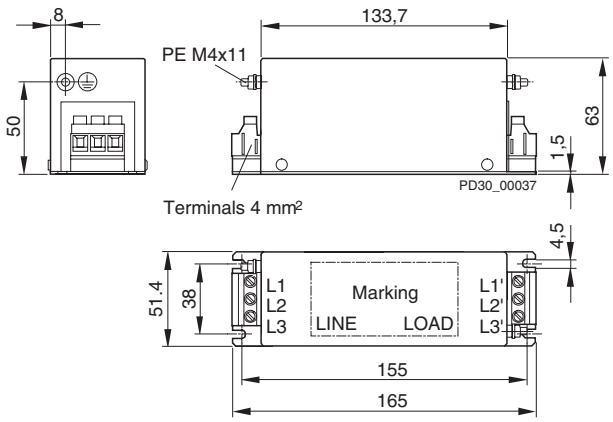
Three-phase filters

Typical circuit diagram



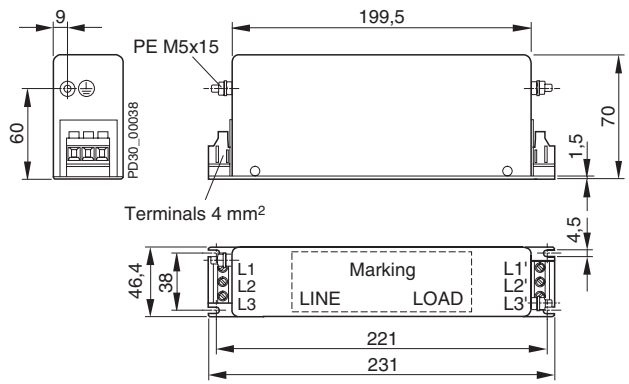
4EF15 10-1AA10 ... 4EF15 10-8AA10, 4EF15 12-7AA10

Dimensions



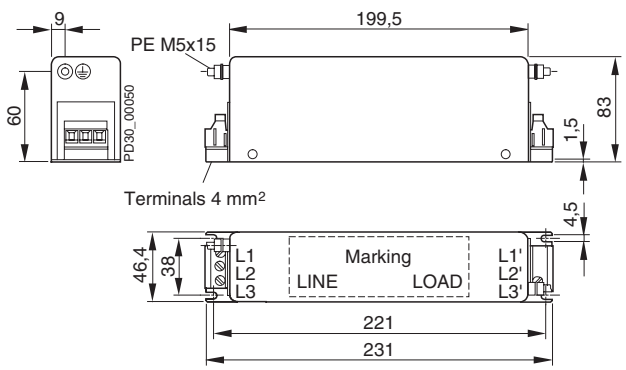
User-defined mounting

4EF15 10-1AA10



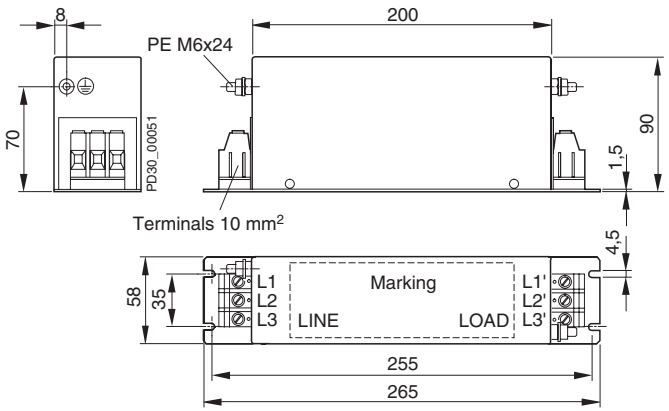
User-defined mounting

4EF15 10-2AA10



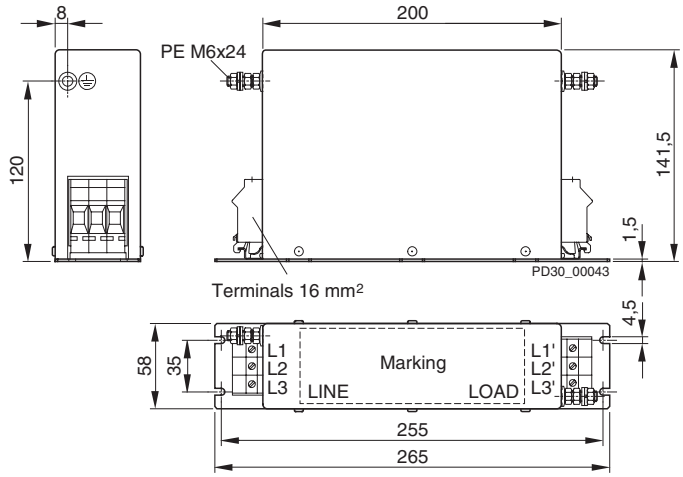
4EF15 10-3AA10

User-defined mounting



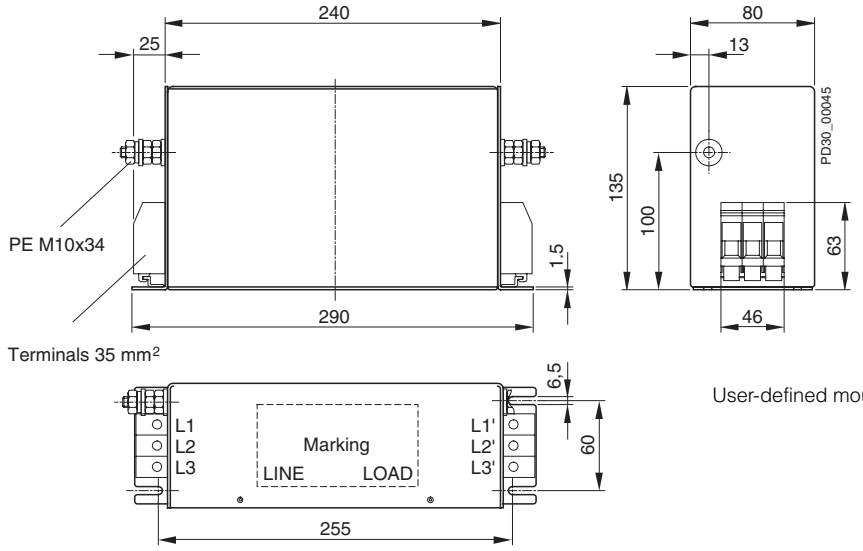
4EF15 10-4AA10, 4EF15 10-5AA10

User-defined mounting



User-defined mounting

4EF15 10-6AA10

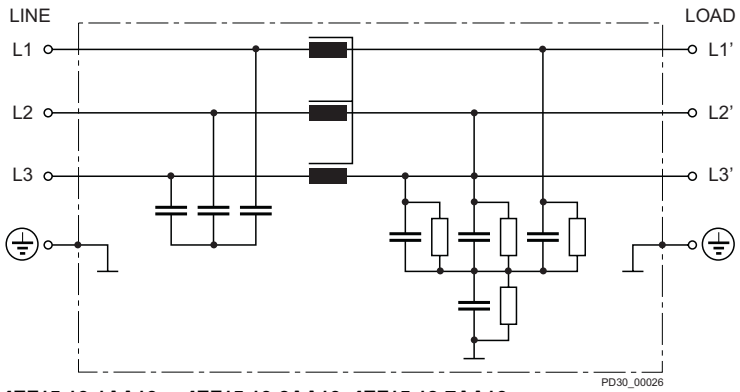


User-defined mounting

4EF15 10-7AA10

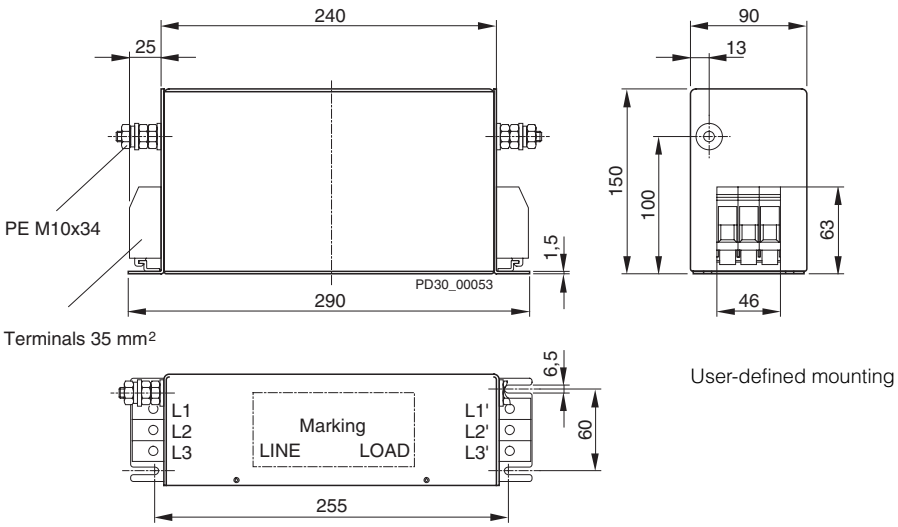
Three-phase filters

Typical circuit diagram

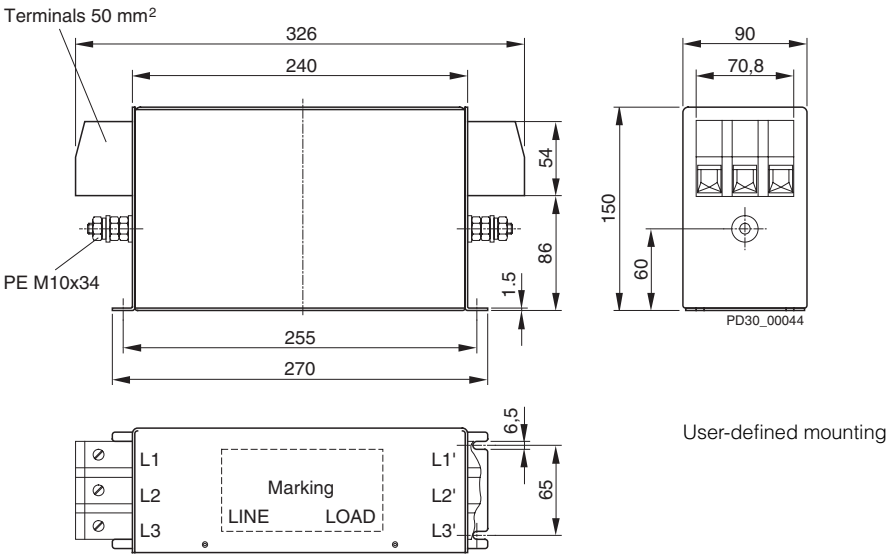


4EF15 10-1AA10 ... 4EF15 10-8AA10, 4EF15 12-7AA10

Dimensions

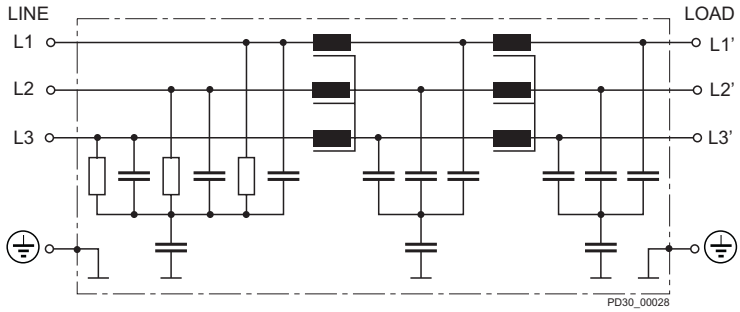


4EF15 10-8AA10



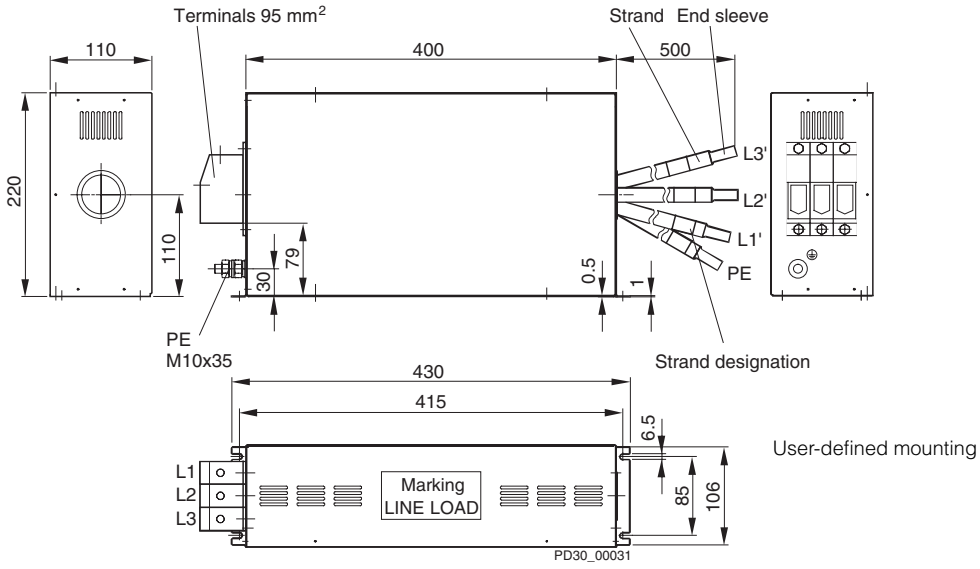
4EF15 12-7AA10

Typical circuit diagram



4EF15 11-0AA10

Dimensions

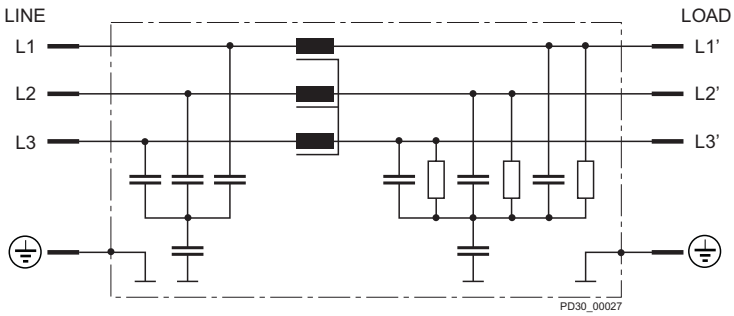


User-defined mounting

4EF15 11-0AA10

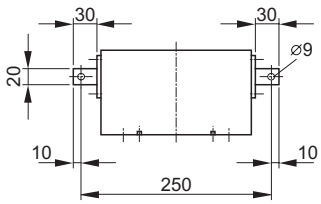
Three-phase filters

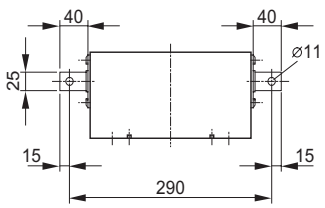
Typical circuit diagram

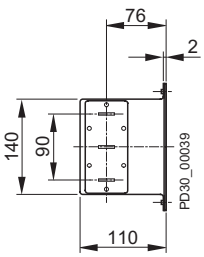


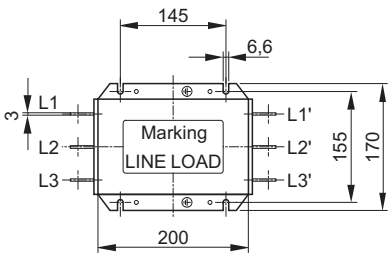
4EF15 11-1AA10 ... 4EF15 11-6AA10

Dimensions



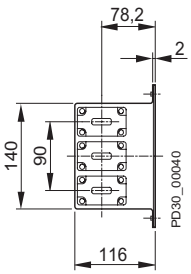


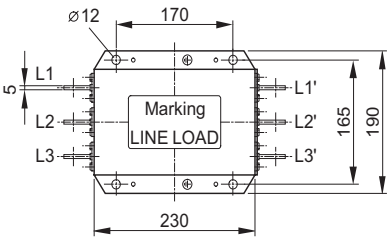




4EF15 11-1AA10

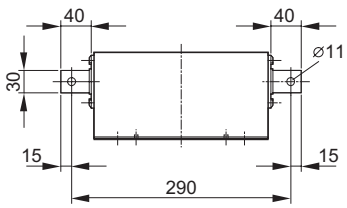
User-defined mounting

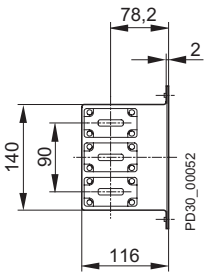


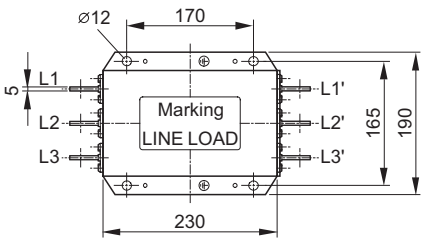


4EF15 11-2AA10, 4EF15 11-3AA10

User-defined mounting

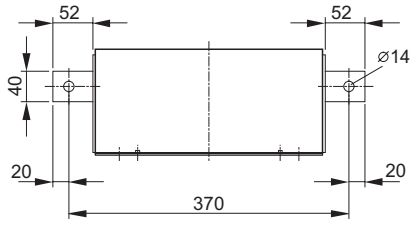


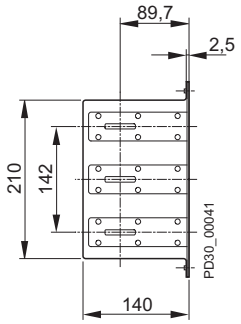


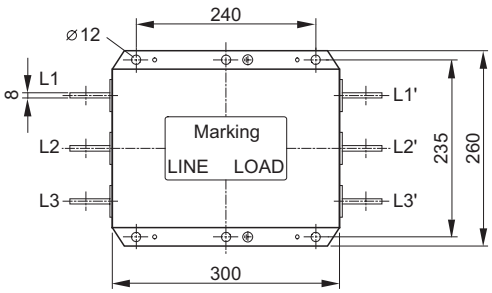


User-defined mounting

4EF15 11-4AA10

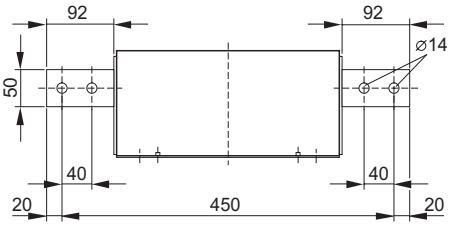


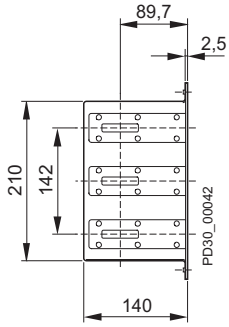


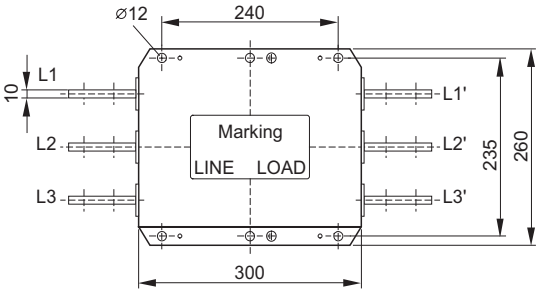


User-defined mounting

4EF15 11-5AA10





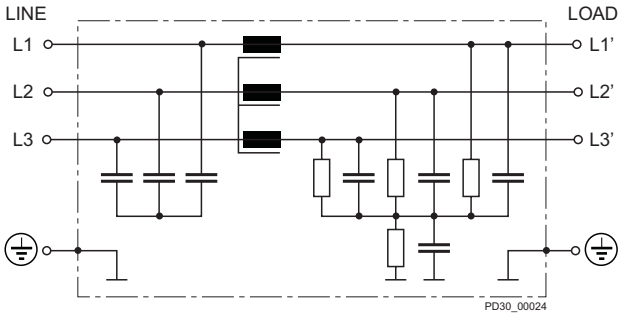


User-defined mounting

4EF15 11-6AA10

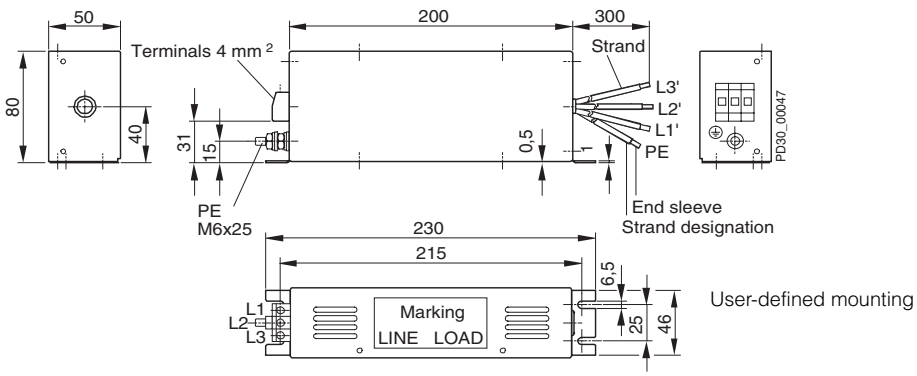
Three-phase filters

Typical circuit diagram



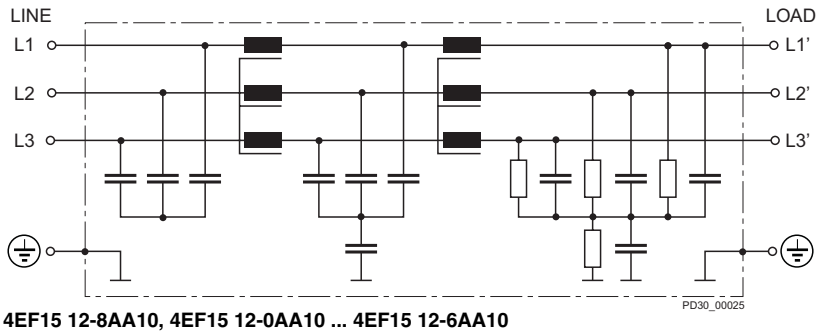
4EF15 11-7AA10, 4EF15 11-8AA10

Dimensions



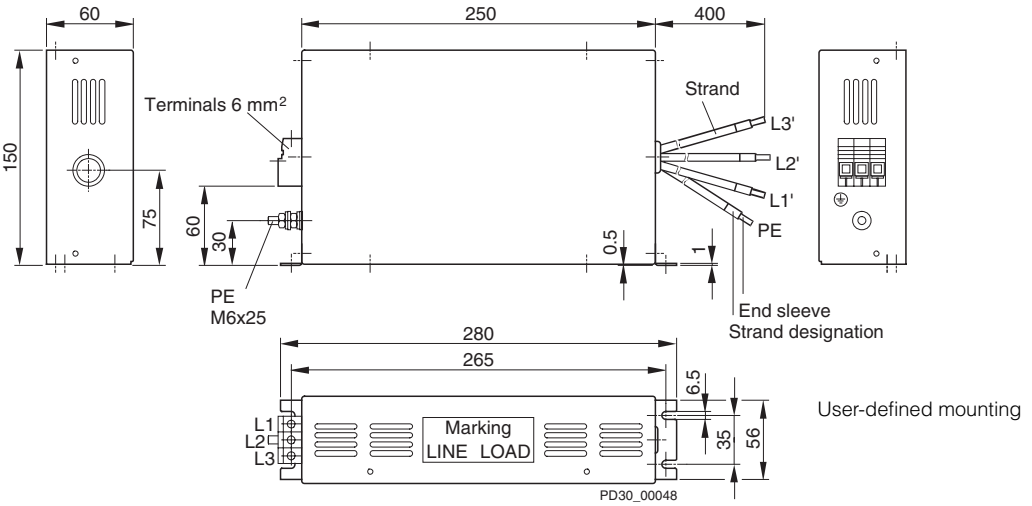
4EF15 11-7AA10, 4EF15 11-8AA10

Typical circuit diagram



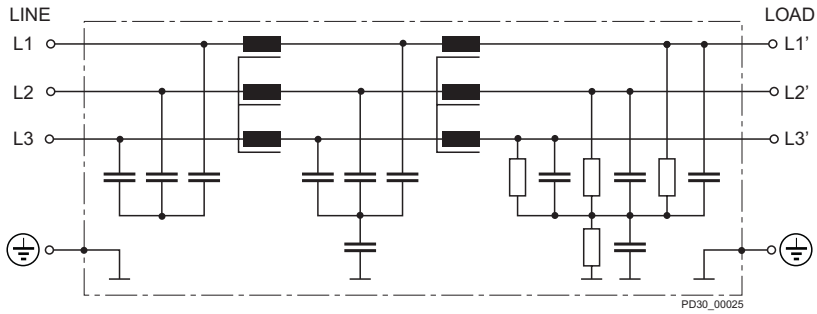
4EF15 12-8AA10, 4EF15 12-0AA10 ... 4EF15 12-6AA10

Dimensions



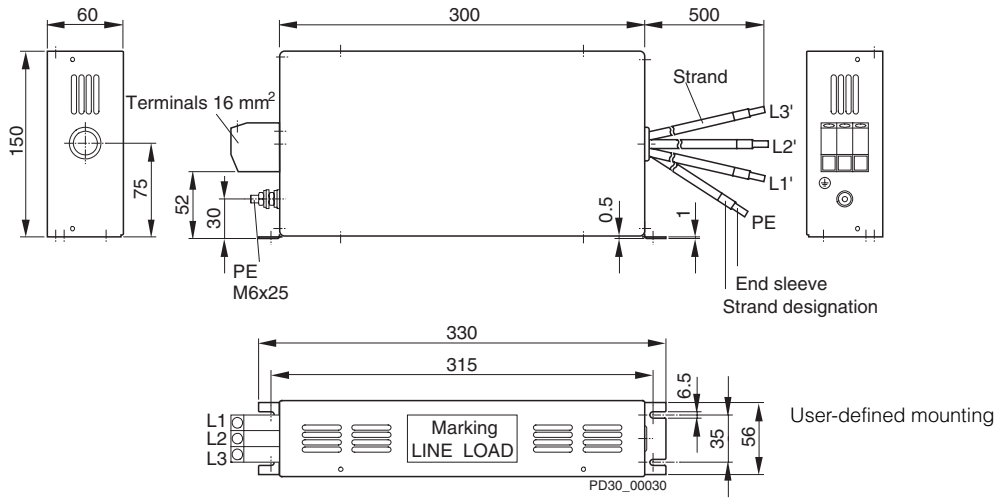
4EF15 12-8AA10, 4EF15 12-0AA10

Typical circuit diagram

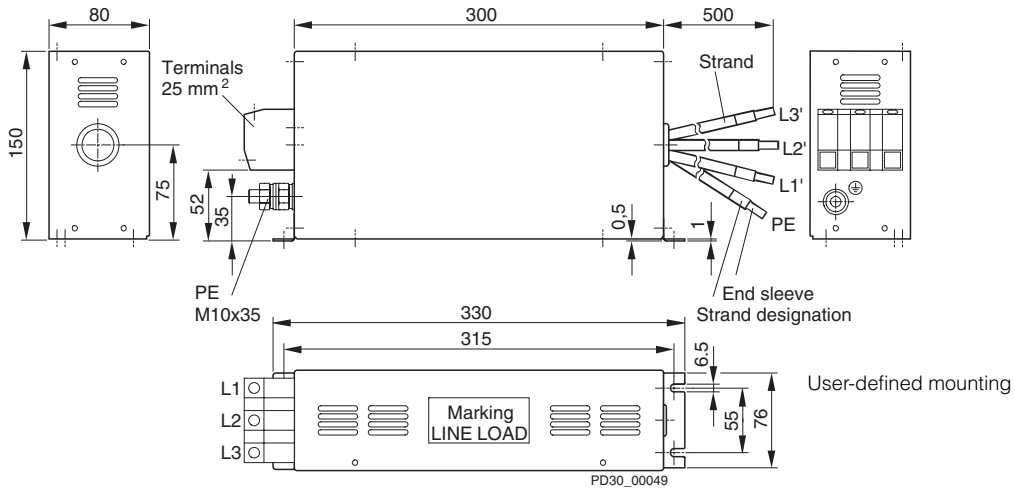


4EF15 12-8AA10, 4EF15 12-0AA10 ... 4EF15 12-6AA10

Dimensions

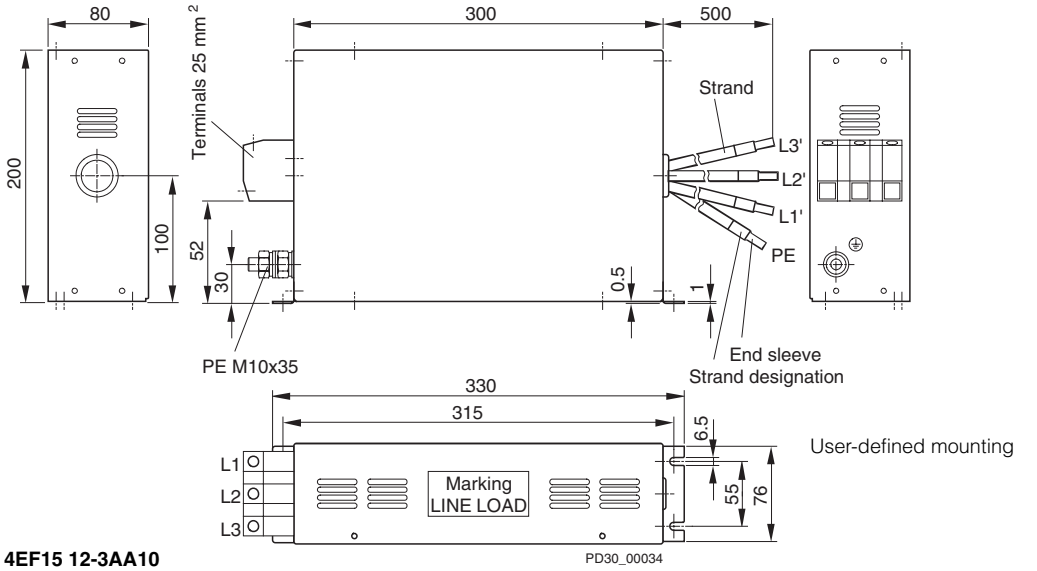


4EF15 12-1AA10

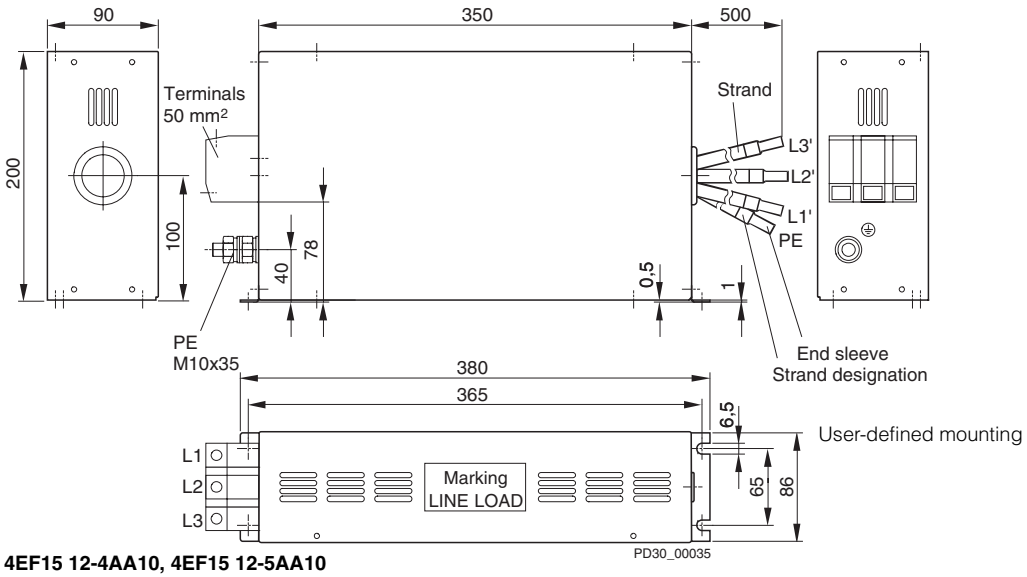


4EF15 12-2AA10

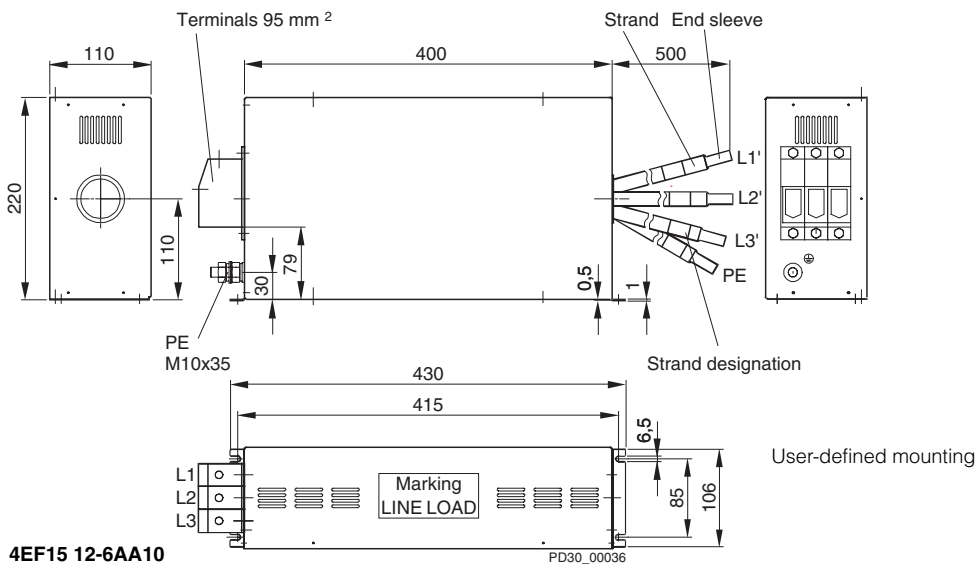
Three-phase filters



4EF15 12-3AA10



4EF15 12-4AA10, 4EF15 12-5AA10



4EF15 12-6AA10

Annexe

16

Ordering notes

Logistics

General

Our logistics service ensures "quality from the time of ordering to delivery" regarding delivery service, communications and environmental protection. We concentrate on optimizing logistics processes by designing our infrastructure to customer requirements and implementing electronic order processing.

Personal consulting, on-time delivery and limiting transport times to 1 day - within Germany - are essential to us.

For this reason, we supply the preferred types marked with ▶ from stock.

The DIN-ISO-9001 approval and subsequent quality check are indispensable prerequisites for us.

Electronic order processing is fast, cost-efficient and error-free. Please contact us if you want to benefit from these advantages.

Packaging, packaging units

The packaging in which our equipment is dispatched provides protection against dust and mechanical damage during transport thus ensuring that you receive our products in a perfect state.
We select our packaging for maximum environmental compatibility and reusability (e.g. crumpled paper instead of polystyrene chips for protection during transport in packages up to 32 kg) and, in particular, with a view to reducing waste.

With our multi-unit packaging, we offer you specific types of packaging that are both kind to the environment and tailored to your requirements:

Your advantages at a glance:

- Lower ordering overhead
- Cost savings through uniform-type packaging: low/no disposal costs.
- Less time and personnel required thanks to short unpacking times.
- Delivery on time and direct to the production line reduces your inventories: Cost savings through reduction of storage area.
- Fast assembly thanks to supply in sets.
- Standardized Euro standard boxes corresponding to modules of the Euro range are suitable for most conveyor systems.
- Active contribution to environmental protection.

Where nothing is stated to the contrary in the "Selection and ordering data" tables of this catalog, our products are supplied individually packed.

For small parts/accessories, we offer you economical packaging units as standard packaging containing more than one item, e.g. 5, 10, 50 or 100 units. It is essential that whole number multiples of these quantities be ordered to ensure satisfactory quality of the products and problem-free order processing.

The products are delivered in a neutral, white carton. The label includes warning notices, the CE mark, the open arrow recycling symbol, and product description information in English and German. In addition to the Order No. (MLFB) and the number of items in the packaging, the Instr. Order No. is also specified for the operating instructions that you can order from your local Siemens branch. (For Siemens contact, see http://www.siemens.com/automation/partner).

The device order nos. of most devices can also be acquired via the EAN barcode to simplify ordering and storage logistics. The assignment of order nos. to EAN codes is stored electronically in the master data of Low-voltage Controlgear, Switchgear and Systems.

Multi-unit and reusable packaging

Set deliveries (reusable, different devices)

On request, we also deliver order-related packaging of larger quantities of different unpacked devices in Euro standard boxes.

For terms of delivery for set deliveries or delivery in reusable packaging please contact your local Siemens branch (please visit our Web site at http://www.siemens.com/automation/partner). To find out the location of your nearest contact). They will work out an agreement that best suits your individual requirements.

Ag and Cu surcharges

Surcharges for copper (Cu) and silver (Ag) will be added to the product prices.

Calculation of the surcharges will be governed by the official Ag quotation for refined silver and by the Cu-DEL quotation applying on the date of receipt of order or of call-off.

The prices for products of catalogue LV 60 include the price of copper calculated on the basis of a list price of € 150/100 kg.

If this quotation is exceeded, a surcharge will be made.

Orders for special designs

For ordering products that differ from the versions listed in the catalogue, the order number specified in the catalogue must be supplemented with **"–Z"**; the required features must be specified by means of the alphanumeric order codes or in plain text.

Small orders

When small orders are placed, the costs associated with order processing are greater than the order value. We recommend therefore that you combine several small orders. Where this is not possible, we unfortunately find it necessary to charge a processing supplement of € 20.-- to cover our costs for order processing and invoicing for all orders with a net goods value of less than € 250.--.

Further documentation

Overview

You will find all the latest information material, such as brochures, catalogues, manuals and operating instructions on low-voltage, controls and distribution on the Internet at:

http://www.siemens.com/lowvoltage/info

Here you can order your copy of the available documentation or download it in common file formats (PDF, ZIP).

We also provide further support for SIRIUS - SENTRON - SIVACON

Brochures, catalogues and CDs offer fast and more in-depth information

We regard product support as just as important as the products and systems themselves. Visit our Support site on the Internet for a comprehensive range of material on SIRIUS, SENTRON and SIVACON, such as

- Catalogues available to order free of charge
- Operating instructions and manuals for direct download
- Online registration for seminars and events
- Up-to-date answers to your queries and problems
- Software upgrades and updates for fast download
- Telephone assistance in more than 190 countries
- Photos and graphics for external use

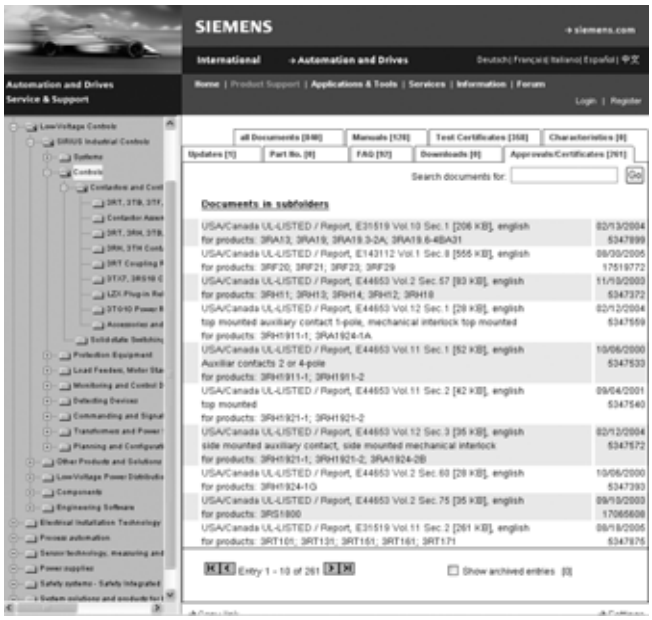
and much, much more - all conveniently and easily accessible

Overview

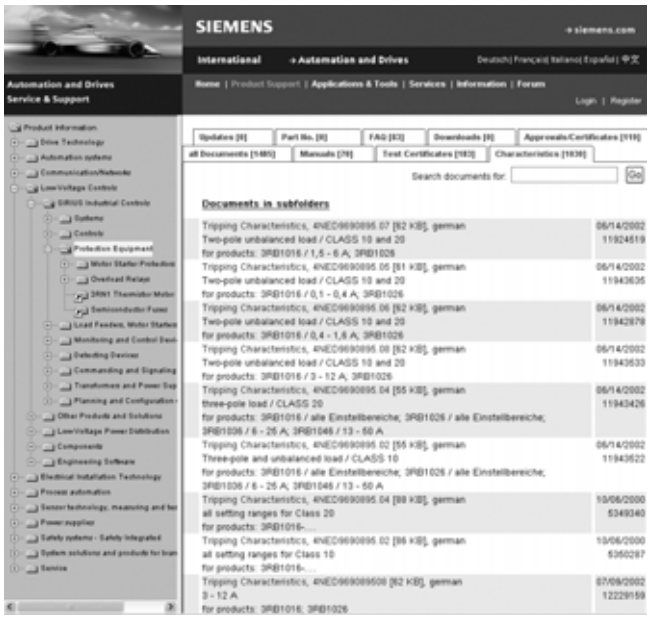
Verification certificates and characteristic curves

To find the latest overview of the certificates available for our low-voltage controls and distribution products, as well as other technical documentation, please visit our Internet site at:

http://www.siemens.com/lowvoltage/support



Product support: Approvals / Certificates



Product support: Characteristic curves

Standards and approvals

IEC	EN	DIN VDE	
IEC 60947-1	EN 60947-1	–	Low-voltage controlgear and switchgear: General requirements
IEC 60947-2	EN 60947-2	–	• Circuit-breakers
IEC 60947-3	EN 60947-3	–	• Load-break switches, disconnectors, switch disconnectors and fuse-combination units
IEC 60947-4-1	EN 60947-4-1	–	• Contactors and motor starters: Electromechanical contactors and motor starters:
IEC 60947-4-2	EN 60947-4-2	–	• Contactors and motor starters: Semiconductor motor controllers and starters, soft starters
IEC 60947-4-3	EN 60947-4-3	–	• AC semiconductor controllers and contactors for loads other than motors
IEC 60947-5-1	EN 60947-5-1	–	• Control circuit devices and switching elements: Electromechanical control circuit devices
IEC 60947-5-2	EN 60947-5-2	–	• Control circuit devices and switching elements: Proximity switches
IEC 60947-5-3	EN 60947-5-3	–	• Proximity switches (specific behavior under fault conditions)
IEC 60947-5-5	EN 60947-5-5	–	• EMERGENCY-STOP devices with mechanical latching
IEC 60947-5-6	EN 60947-5-6	–	• DC interface for proximity switches and switching amplifier (NAMUR)
IEC 60947-5-7	EN 60947-5-7	–	• Requirements for proximity switches with analogue output
IEC 60947-6-1	EN 60947-6-1	–	• Multifunctional controlgear and switchgear: Transfer switches
IEC 60947-6-2	EN 60947-6-2	–	• Multifunctional controlgear and switchgear: Control and protection switchgear (CPS)
IEC 60947-7-1	EN 60947-7-1	–	• Ancillary equipment: Terminal blocks for copper conductors
IEC 60947-7-2	EN 60947-7-2	–	• Ancillary equipment: PE conductor terminal blocks for copper conductors
IEC 60947-7-3	EN 60947-7-3	–	• Ancillary equipment: Safety requirements for terminal blocks
IEC 60947-8	EN 60947-8	–	• Tripping units for the integrated thermal protection (PTC) of rotating electric machines
IEC 62026-2	EN 50295	–	• Actuator-Sensor Interface (AS-i)
IEC 60269-1	EN 60269-1	–	Low-voltage fuses: General requirements
IEC 60269-4	EN 60269-4	–	Low-voltage fuses: Supplementary requirements for fuse links for protecting semiconductor components
IEC 60050-441	–	–	International dictionary / switchgear and / or switching devices and fuses
IEC 60439-1	EN 60439-1	–	Low-voltage switchgear and controlgear assemblies: Type-tested and partially type-tested assemblies
–	EN 50247	–	Protection against electric shock: Location of actuators near live parts
IEC 61140	EN 61140	–	Protection against electric shock - General requirements for apparatus and equipment
IEC 60664-1	EN 60664-1	–	Insulation coordination for electrical equipment in low-voltage systems; Principles, requirements and tests
IEC 60204-1	EN 60204-1	–	Electrical equipment of machines: General requirements
–	EN 50178	–	Equipment of electrical power installations with electronic equipment
IEC 60079-14	EN 60079-14	–	Electrical apparatus in potentially explosive atmospheres
IEC 60079-2	EN 60079-2	–	Electrical apparatus for potentially explosive atmospheres - Part 2: Pressurized enclosures "p"
IEC 61810-1	EN 61810-1	–	Electrical relays without a fixed time response
IEC 61812-1	EN 61812-1	–	Electrical relays, specified-time relays
IEC 60999-1	EN 60999-1	–	Connecting materials: Safety requirements for screw terminals and screwless terminals for copper electrical conductors
IEC 61558-1	EN 61558-1	–	Safety of transformers, power supply units and similar:
IEC 61558-2-1	EN 61558-2-1	–	Particular requirements for line transformers for general use
IEC 61558-2-2	EN 61558-2-2	–	Particular requirements for control-power transformers
IEC 61558-2-4	EN 61558-2-4	–	Particular requirements for isolating transformers for general use
IEC 61558-2-6	EN 61558-2-6	–	Particular requirements for safety isolating transformers for general use
IEC 61558-2-20	EN 61558-2-20		Particular requirements for small reactors
IEC 60076-11	EN 60076-11	–	Power transformers - Part 11: dry transformers
–	–	0552	Specifications for variable transformers with moving contacts perpendicular to the coiling direction
IEC 61000-4-1	EN 61000-4-1	–	Electromagnetic compatibility (EMC); Part 4: Testing and measuring techniques; Main Section 1: Overview of measuring techniques for interference immunity; Basic EMC standard
IEC 61000-6-3	EN 61000-6-3	–	Electromagnetic compatibility (EMC); Basic technical standard for emitted interference in residential and commercial environments as well as in light industry
IEC 61000-6-4	EN 61000-6-4	–	Electromagnetic compatibility (EMC); Basic technical standard for emitted interference in industrial environments
IEC 60044-1	EN 60044-1	–	Instrument transformers: Current transformers
Other specifications			
UL 506			Special transformers
UL 508			Industrial control equipment
UL 489			Molded case circuit-breakers, molded case switches, and circuit-breaker enclosures
UL 1012			Power supplies
UL 1561			General-purpose and power dry-type transformers
UL 1604			Electrical equipment for potentially explosive (classified) atmospheres of classes I and II, category 2, and class III
UL 1059			Terminal blocks
UL 486A-486B			Wire connectors
UL 486E			Internal wiring points for aluminum and / or copper
CSA C22.2 No. 66			Specialty transformers
CSA C22.2 No. 14			Industrial control equipment
CSA C22.2 No. 5			Molded case circuit breakers, molded case switches and circuit-breaker enclosures
CSA C22.2 No. 107			General use power supplies
ASME A17.5 / B 44.1			Elevator and escalator electrical equipment
JIS C 8201-4-1			Low-voltage switchgear and controlgear; Contactors and motor-starters

Approval requirements valid in different countries

Siemens low-voltage switchgear and controlgear are designed, manufactured and tested according to the relevant German standards (DIN and VDE), ICE publications and European standards (EN) as well as CSA and UL standards. The standards assigned to the individual switchgear and controlgear components are stated in the relevant parts of this catalogue.

As far as is economically viable, the requirements of the various regulations valid in other countries are also taken into account in the design of the equipment.

In some countries (see table below), an approval is required for certain low-voltage switchgear and controlgear components. Depending on the market requirements, these components have been submitted for approval to the authorised testing institutes.

In some cases, CSA for Canada and UL for the USA only approve special switchgear designs. Such special types are listed separately from the standard types in the individual parts of this catalogue.

For this equipment, partial limitations of the maximum permissible voltages, currents and ratings can be imposed, or special approval and, in some cases, special identification is required.

For use on board ship, the specifications of the marine classification societies must be observed (see table below). In some cases, they require type tests of the components to be approved.

The present state of approval is shown in the "Overview of approved equipment" tables on pages 16/9.

Testing bodies, approval identification and approval requirements

Country	Canada [1]	USA [1]	China
Government-appointed or private, officially recognised testing bodies	CSA UL (USA)	UL	CQC
Approval symbol	c UL c c UL US	UL c UL US	CCC
Approval requirements	+	+	+
Remarks	UL and CSA are authorized to grant approvals according to Canadian or US regulations. Please Note: these approvals are frequently not recognised and additional approval often has to be obtained from the national testing authority.		CCC

For further details on UL and CSA see page 16/8.

1) For guide numbers and file numbers for the approvals, visit http://www.siemens.com/automation/support, and "Product Support".

Marine classification societies

Country	Germany	United Kingdom	France	Norway	CIS	Italy	Poland	USA
Name	Germanischer Lloyd	Lloyds Register of Shipping	Bureau Veritas	Det Norske Veritas	Russian Maritime Register of Shipping	Registro Italiano Navale	Polski Rejestre Statków	American Bureau of Shipping
Codes	GL	LRS	BV	DNV	RMRS	RINA	PRS	ABS

CE mark of conformity

Manufacturers of products which fall within the subject area to which EU directives apply must identify their products, instruction manuals or packaging with a CE mark of conformity.

The CE mark of conformity confirms that a product fulfills the appropriate basic requirements of all pertinent directives. The mark of conformity is a mandatory requirement for putting products into circulation throughout the EU.

All the products in this catalogue are in conformance with the EU directives and bear the CE mark of conformity.

- Low-voltage directive (NS 73/23/EU)
- EMC directive (EMC 89/336/EU)

Standards and approvals

Special specifications for the USA and Canada

In the USA and Canada, for machine tools and processing machines in particular, supply lines are laid using rubber insulated conductors enclosed in heavy-duty steel piping similar to that used for gas or water pipe systems.

The tubing system must be completely watertight and electrically conductive (especially sleeving and elbows). Since the tubing system can also be earthed, the cable entries of enclosed units equipped with heavy-gauge or metric threads must be fitted with metal adapters between these threads and the tube thread. The necessary adapters are specified for the switchgear as accessories; they should be ordered separately unless otherwise specified.

Low-voltage switchgear and controlgear for auxiliary circuits (e.g. contactor relays, command and signaling devices and control switches/auxiliary contacts in general) are generally only approved by CSA and UL for **"Heavy Duty"** or **"Standard Duty"** and are identified either with these specifications in addition to the maximum permissible voltage or by using an abbreviation.

The abbreviations are harmonized with IEC 60947-5-1 Appendix 1 Table A1 and correspond to the stated utilisation categories.

For various switching devices detailed in the catalogue, a note has been included to the effect that, above a certain voltage, the control switches/auxiliary contacts can only be used if they have the same polarity. This means that the input terminals can only be connected to the same pole of the control voltage, e.g. "600 V AC above 300 V AC same polarity".

Different features of UL approvals (for USA and Canada)

Recognised component	Listed product
UL issues yellow "Guide cards" with a Guide No. and a File No.	UL issues white "Guide cards" with a Guide No. and a File No.
Devices are identified on the rating plate using the "UL recognition mark": USA: 𝓤𝓛, c𝓤𝓛us Canada: c𝓤𝓛, c𝓤𝓛us	Devices are identified using the "UL listing mark" on the rating plate e.g. USA:Ⓛ LISTED 165 CCanada:cⓁ LISTED 165 C IND. CONT. EQ.IND. CONT. EQ. (165 C stands for: Siemens, A & D CD Division, Amberg plant)
Devices are approved as modules for "factory wiring", i.e.: as devices for installation in control systems, which are selected, installed, wired and tested entirely by trained personnel in factories, workshops or elsewhere, **according to the conditions of use**.	Devices are approved for "field wiring", i.e.: • As devices for installation in control systems, which are completely wired by trained personnel in factories, workshops or elsewhere. • As single devices for sale in retail outlets in the USA/Canada.
If devices are Ⓛ or cⓁ approved as "listed products", they are also approved as "recognised components" and allowed to be marked 𝓤𝓛 or c𝓤𝓛.	

For further details on UL and CSA see Page 16/7.

Special specifications for Russia, Australia and China

GOST approval for Russia

A GOST approval is required for all products that are to be sold in Russia. The GOST mark has been obligatory on the packaging of all devices since mid-1998.

All devices delivered to any part of the Russian Federation must have this customs certification.

C-Tick licensing for Australia

The C-Tick license is required for marketing Siemens components in Australia. Electronic devices must provide proof of EMC clearance in Australia, similar to the CE mark of conformity laid down by the EMC directive applicable in the EU and bear the "C-Tick" mark. These requirements have been in force since October 1, 1999.

CCC approval

A003617

Since August 1, 2003, CCC approval is required for all products that are marketed in China.

Overview

Equipment	Type	Approvals										Marine classifications							
		Canada 1) 2)		USA 1)		1)	China	Czech Republic	Slovakia	Poland	Hungary	Germany	United Kingdom	France	Norway	CIS	Italy	Poland	USA
							CCC	EZU	SKTC	SEP	MEEI	GL	LRS	BV	DNV	RMRS	RINA	PRS	ABS
Reactors	4EM, 4EP, 4EU, 4ET	–	+	–		+	m	–	–	–	–	–	–	–	–	–	–	–	–
Filters	4EF11	–	+	–		+	m	–	–	–	–	–	–	–	–	–	–	–	–
	4EF15	–	– 3)	–		–	m	–	–	–	–	–	–	–	–	–	–	–	–

In the event of queries regarding UL/CSA approvals, please contact: Technical Assistance +49 (911) 895 59 00.

For further information about standards and approvals, visit http://www.siemens.com/automation/support and select "Product Support".

\+ Standard version approved.

– Not yet submitted for approval.

O Equipment submitted for approval, please enquire.

× -approval not required because approved.

● Approved for use in connection with AS-Interface, also approved by ABS (American Bureau of Shipping).

m For exporting products to the Peoples Republic of China, CCC marking is not necessary.

1) For guide numbers and file numbers for the approvals, visit http://www.siemens.com/automation/support and select "Product Support".

2) and approvals are available in accordance with the US approval.

3) See “Radio interference suppression filters".

Siemens contacts

Siemens contacts worldwide

At

http://www.siemens.com/automation/partner

you can find details of Siemens contact partners worldwide responsible for particular technologies.

You can obtain in most cases a contact partner for

- Technical Support,
- Spare parts/repairs,
- Service,
- Training,
- Sales or
- Consultation/engineering.

You start by selecting a

- Country,
- Product or
- Sector.

By further specifying the remaining criteria you will find exactly the right contact partner with his/her respective expertise.

A&D in the WWW

A detailed knowledge of the range of products and services available is essential when planning and configuring automation systems. It goes without saying that this information must always be fully up-to-date.

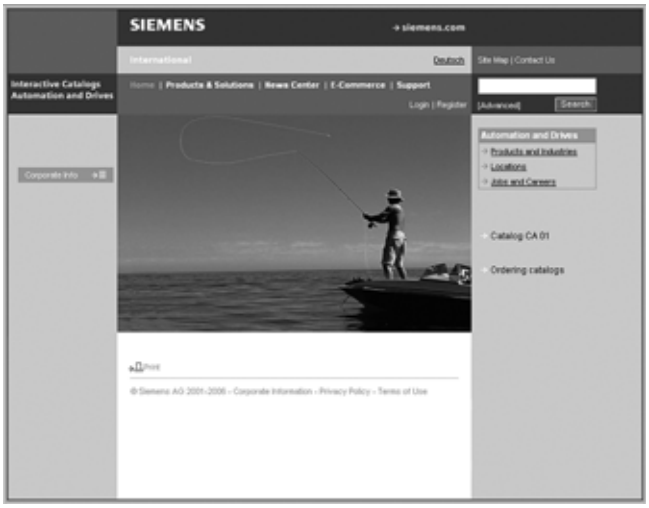
The Siemens Automation and Drives Group (A&D) has therefore built up a comprehensive range of information in the World Wide Web, which offers quick and easy access to all data required.

Under the address

http://www.siemens.com/automation

you will find everything you need to know about products, systems and services.

Product selection using the Offline Mall of Automation and Drives



Detailed information together with convenient interactive functions:
The Offline Mall CA 01 covers more than 80,000 products and thus provides a full summary of the Siemens Automation and Drives product base.

Here you will find everything that you need to solve tasks in the fields of automation, switchgear, installation and drives.
All information is linked into a user interface which is easy to work with and intuitive.

After selecting the product of your choice you can order at the press of a button, by fax or by online link.

Information on the Offline Mall CA 01 can be found on the Internet under

http://www.siemens.com/automation/ca01

or on CD-ROM or DVD.

Easy shopping with the A&D Mall

The A&D Mall is the virtual department store of Siemens AG in the Internet. Here you have access to a huge range of products presented in electronic catalogues in an informative and attractive way.

Data transfer via EDIFACT allows the whole procedure from selection through ordering to tracking of the order to be carried out online via the Internet.

Numerous functions are available to support you.

For example, powerful search functions make it easy to find the required products, which can be immediately checked for availability. Customer-specific discounts and preparation of quotes can be carried out online as well as order tracking and tracing.

Please visit the A&D Mall on the Internet under:

http://www.siemens.com/automation/mall

Customer support

In the face of harsh competition you need optimum conditions to keep ahead all the time.
A strong starting position, a sophisticated strategy and team for the necessary support - in every phase.
Service & Support from Siemens provides this support with a complete range of different services for automation and drives.

In every phase: from planning and startup to maintenance and upgrading.

Our specialists know when and where to act to keep the productivity and cost-effectiveness of your system running in top form.

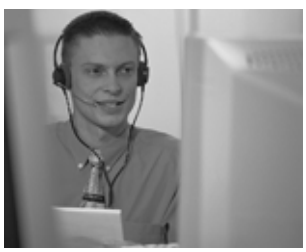
Online support

The comprehensive information system available around the clock via Internet ranging from Product Support and Service & Support services to Support Tools in the shop.
http://www.siemens.com/automation/service&support

Technical consulting

Support in the planning and designing of your project from detailed actual-state analysis, target definition and consulting on product and system questions right up to the creation of the automation solution. [2]

Technical assistance

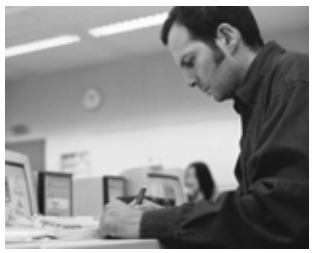


Expert technical assistance[1] for low-voltage controlgear, switchgear and systems and electrical installation.

Tel.: +49 (9 11) 8 95-59 00
Fax: +49 (9 11) 8 95-59 07

E-Mail: technical-assistance@siemens.com

Configuring and software engineering



Support in configuring and developing with customer-oriented services from actual configuration to implementation of the automation project. [2]

Technical support

Competent consulting in technical questions covering a wide range of customer-oriented services for all our products and systems.

Tel.: +49 (180) 50 50 222
Fax: +49 (180) 50 50 223
http://www.siemens.com/automation/support-request

Service on site

With Service On Site we offer services for startup and maintenance, essential for ensuring system availability.
In Germany
Tel.: +49 (180) 50 50 444 [2]

Repairs and spare parts

In the operating phase of a machine or automation system we provide a comprehensive repair and spare parts service ensuring the highest degree of operating safety and reliablity.
In Germany
Tel.: +49 (180) 50 50 446 [2]

Optimisation and upgrading

To enhance productivity and save costs in your project we offer high-quality services in optimisation and upgrading. [2]

1) Contact:
Technical assistance for product selection · old/new code coding · competitor code conversion· special variants · special requirements · sales promotion (info line).
Your regional contact for sales support (prices, discounts, delivery times).
Technical support for commissioning support and after-sales service.

2) For country-specific telephone numbers go to our Internet site
http://www.siemens.com/automation/service&support

Index

Order number index

Order number index
Order number conversion table [1)]

Old order number	New order number
4EM4600-8CB	4EM4600-8CB00
4EM4604-1CB	4EM4604-1CB00
4EM4605-4CB	4EM4605-4CB00
4EM4605-5CB	4EM4605-5CB00
4EM4605-6CB	4EM4605-6CB00
4EM4605-7CB	4EM4605-7CB00
4EM4605-8CB	4EM4605-8CB00
4EM4606-0CB	4EM4606-0CB00
4EM4700-0CB	4EM4700-0CB00
4EM4700-5CB	4EM4700-5CB00
4EM4700-8CB	4EM4700-8CB00
4EM4704-1CB	4EM4704-1CB00
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4EM6100-3CB	4EM6100-3CB00
4EM6100-4CB	4EM6100-4CB00

Old order number	New order number
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Old order number	New order number
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4ET2711-1AA00	4ET2711-1AA00-0A
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4EU2422-0BA00-0A	4EU2422-0BA00-0AA0
4EU2422-1AA00-0A	4EU2422-1AA00-0AA0
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4EU2422-8AA00-0A	4EU2422-8AA00-0AA0
4EU2452-1UA00-0A	4EU2452-1UA00-0AA0
4EU2452-2UA00-0A	4EU2452-2UA00-0AA0

1) Old order number: according to VDE 0550
New order number: according to EN 61558

Order number index
Order number conversion table [1)]

Old order number	New order number
4EU2452-3UA00-0A	4EU2452-3UA00-0AA0
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4EU3022-0CA00-0A	4EU3022-0CA00-0AA0
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Old order number	New order number
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4EU3022-5AA00-0A	4EU3022-5AA00-0AA0
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Old order number	New order number
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4EU4321-0AW00	4EU4321-0AW00-0A
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4EU4321-6DA00	4EU4321-6DA00-0A
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4EU4351-5UA00	4EU4351-5UA00-0A
4EU4351-5UB00	4EU4351-5UB00-0A
4EU4351-6UA00	4EU4351-6UA00-0A

1) Old order number: according to VDE 0550
New order number: according to EN 61558

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• The Offline Mall of Automation and Drives	CA 01
Automation Systems for Machine Tools	
SINUMERIK & SIMODRIVE	NC 60
SINUMERIK & SINAMICS	NC 61
Drive Systems	
Variable-Speed Drives	
SINAMICS G130 Drive Converter Chassis Units, SINAMICS G150 Drive Converter Cabinet Units	D 11
SINAMICS G110 Inverter Chassis Units	D 11.1
SINAMICS GM150/SINAMICS SM150 Medium-Voltage Converters	D 12
SINAMICS S120 Drive Converter Systems	D 21.1
SINAMICS S150 Drive Converter Cabinet Units	D 21.3
Asynchronous Motors Standardline	D 86.1
Synchronous Motors with Permanent-Magnet Technology, HT-direct	D 86.2
DC Motors	DA 12
SIMOREG DC MASTER 6RA70 Digital Chassis Converters	DA 21.1
SIMOREG K 6RA22 Analog Chassis Converters	DA 21.2
SIMOREG DC MASTER 6RM70 Digital Converter Cabinet Units	DA 22
SIMOVERT PM Modular Converter Systems	DA 45
SIEMOSYN Motors	DA 48
MICROMASTER 410/420/430/440 Inverters	DA 51.2
MICROMASTER 411/COMBIMASTER 411	DA 51.3
SIMOVERT MASTERDRIVES Vector Control	DA 65.10
SIMOVERT MASTERDRIVES Motion Control	DA 65.11
Synchronous and asynchronous servomotors for SIMOVERT MASTERDRIVES	DA 65.3
SIMODRIVE 611 universal and POSMO	DA 65.4
Low-Voltage Three-Phase-Motors	
IEC Squirrel-Cage Motors	D 81.1
Automation Systems for Machine Tools SIMODRIVE	NC 60
• Main Spindle/Feed Motors	
• Converter Systems SIMODRIVE 611/POSMO	
Automation Systems for Machine Tools SINAMICS	NC 61
• Main Spindle/Feed Motors	
• Drive System SINAMICS S120	
Drive and Control Components for Hoisting Equipment	HE 1
Electrical Installation Technology	
PDF: ALPHA Small Distribution Boards and Distribution Boards, Terminal Blocks	*ET A1*
PDF: ALPHA 8HP Molded-Plastic Distribution System	*ET A3*
BETA Low-Voltage Circuit Protection	ET B1
PDF: DELTA Switches and Socket Outlets	*ET D1*
GAMMA Building Controls	ET G1
Human Machine Interface Systems SIMATIC HMI	ST 80

	Catalogue
Industrial Communication for Automation and Drives	IK PI
Low-Voltage	
Controls and Distribution – SIRIUS, SENTRON, SIVACON	LV 1
Controls and Distribution – Technical Information SIRIUS, SENTRON, SIVACON	LV 1 T
SIDAC Reactors and Filters	LV 60
SIVENT Fans	LV 65
SIVACON 8PS Busbar Trunking Systems	LV 70
Motion Control System SIMOTION	PM 10
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Field Instruments for Process Automation Measuring Instruments for Pressure, Differential Pressure, Flow, Level and Temperature, Positioners and Liquid Meters	FI 01
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SIPART, Controllers and Software	MP 31
SIWAREX Weighing Systems	WT 01
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