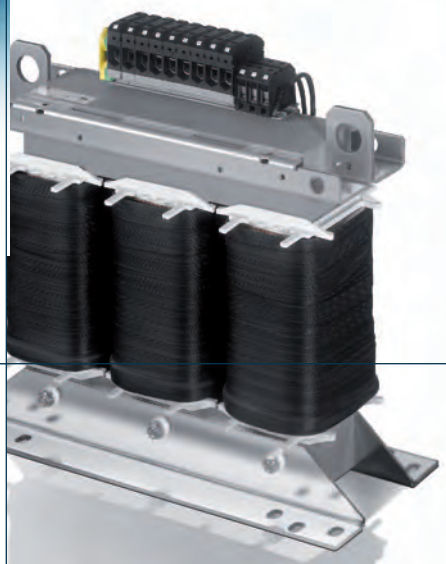
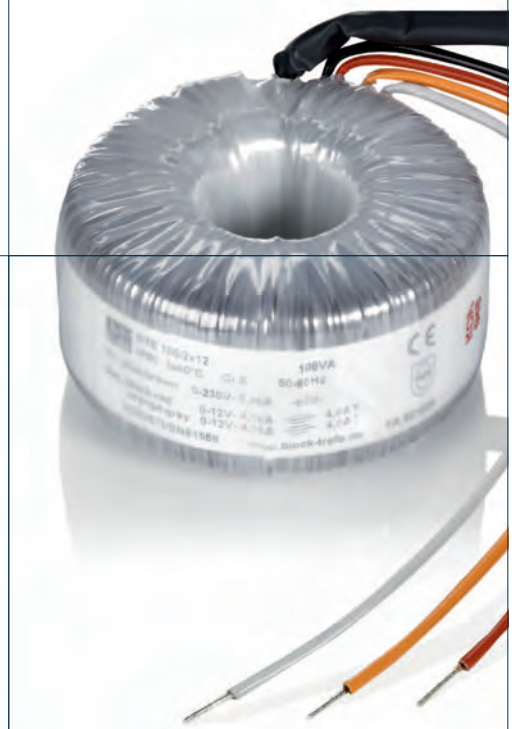
2011/12
Edition 1

BLOCK
CATALOGUE 1

Control transformers / Isolating transformers / Safety transformers / PCB transformers / Dry-type power transformers / Autotransformers / Adapter transformers / Toroidal transformers / 100 V transformers / Electronic transformers / Starting current limiters / Energy-saving systems / Testing and measuring equipment / Winding wires / Housings / Inductive components

TRANSFORMERS





perfecting power

BLOCK
block-trafo.de

Catalogues

Catalogue 1
TRANSFORMERS

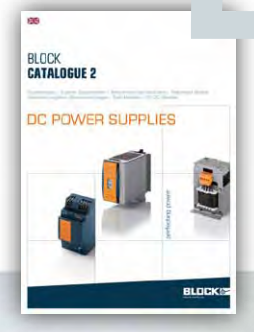
- ☐ Control transformers
- ☐ Isolating transformers
- ☐ Safety transformers
- ☐ PCB transformers
- ☐ Dry-type power transformers
- ☐ Autotransformers / Adapter transformers
- ☐ Toroidal transformers
- ☐ 100 Vac transformers
- ☐ Electronic transformers
- ☐ Starting current limiters
- ☐ Energy-saving systems
- ☐ Testing and measuring equipment
- ☐ Winding wires
- ☐ Housings
- ☐ Inductive components for switched mode power supplies

Catalogue 2
DC POWER SUPPLIES

- ☐ Switched mode power supplies, PEL series
- ☐ Switched mode power supplies, PowerVision series
- ☐ Switched mode power supplies, PSR series
- ☐ Electronic circuit breakers
- ☐ Redandancy modules
- ☐ Capacitive buffer modules
- ☐ Uninterruptible power supplies
- ☐ DC-DC converters
- ☐ Linearly regulated DC power supplies
- ☐ Unregulated DC power supplies
- ☐ Adapter transformers for power supplies

Catalogue 3
EMC FILTERS/REACTORS

- ☐ Line reactors
- ☐ Filter reactors
- ☐ Harmonics filters
- ☐ Interference filters
- ☐ Sinusoidal filters
- ☐ All-pole filters
- ☐ Motor reactors
- ☐ Stabilisers
- ☐ Testing lab



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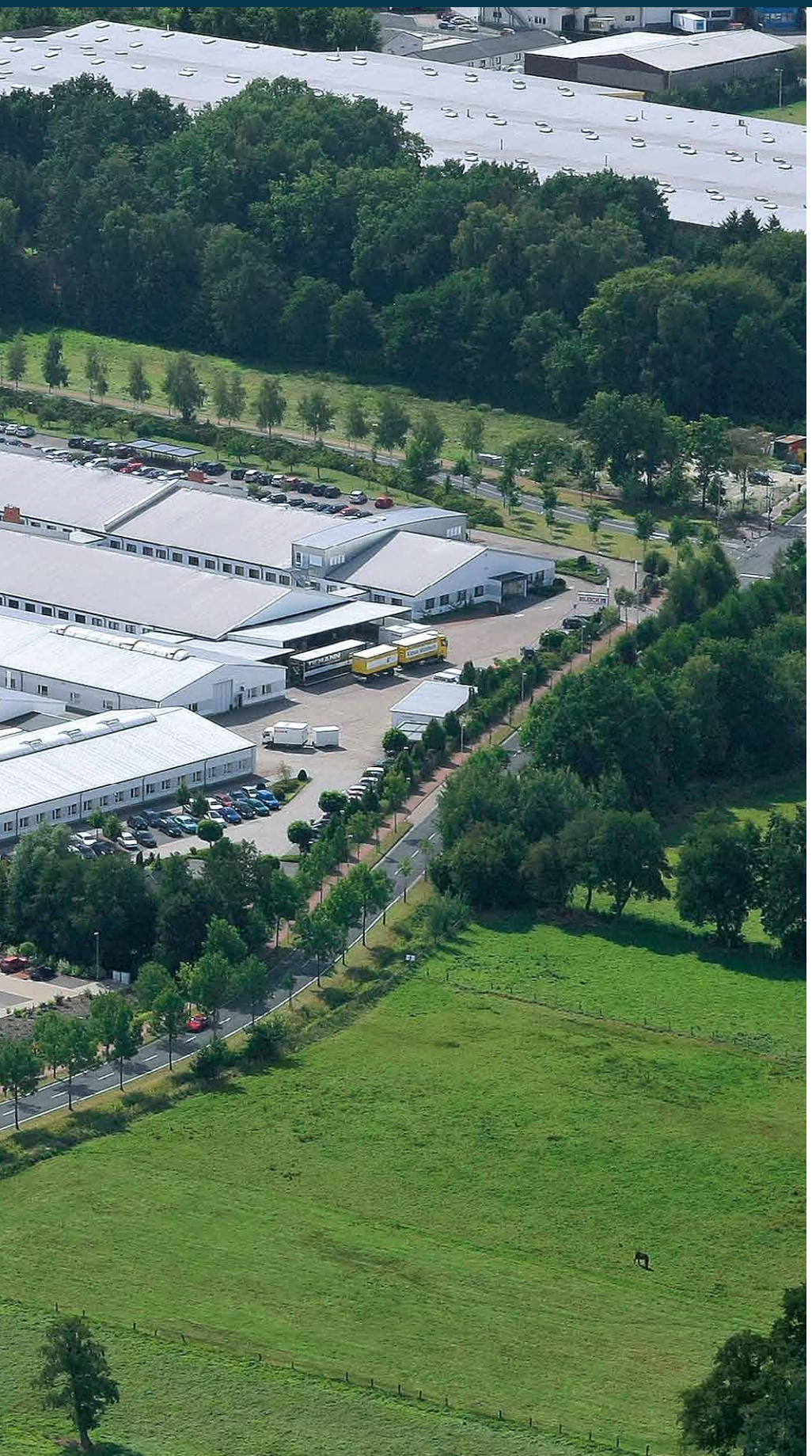


perfecting power

BLOCK's products and solutions guarantee maximum voltage and power supply quality in every single area of business and industry. Encompassing over 2000 standard products as well as a myriad of customised solutions, our extensive product portfolio is a reliable choice for customers throughout the world who want exactly the right amount of power and power quality.

Our transformers, power supplies, reactors and interference filters, not to mention our other innovative products and solutions, improve the efficiency of devices, plants, control facilities and systems by minimising the wear and tear these experience, extending their service life and enabling them to use energy in a way that is more efficient and cost-effective.

All BLOCK products are developed and produced in-house, from the research and development phase to production and quality assurance, right through to certification. At our in-house testing lab, we perform tests relating to electromagnetic compatibility (EMC) and device safety, as well as simulating environmental influences.

Through our unswerving commitment to providing customers with everything they need from a single source, we can respond to even the most unconventional demands using an approach that is highly flexible, prompt and creative.

BLOCK – perfecting power

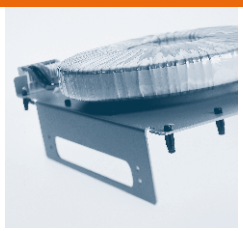
Contacts around the globe.

Commercial relationships reaching all four corners of the globe have long been a reality here at BLOCK. When it comes to connecting to the grid, our products are the first choice in many countries. With six BLOCK companies as well as numerous national and international agencies situated right across the globe, we successfully supply international markets with transformers, reactors, EMC filters, switched mode power supplies, and much more.

Well over half of our deliveries are exported to destinations throughout the world. This being the case, it goes without saying that precise knowledge of the technical requirements and standards of individual countries is a must. That's why all the key national and international marks of conformity are applied to BLOCK products.

Comprehensive warehousing facilities ensure items are available quickly, keeping downtimes to a minimum, whilst our logistics system gets them to our customers without delay.

BLOCK – perfecting power



A space-saving toroidal transformer developed specifically for lifts.

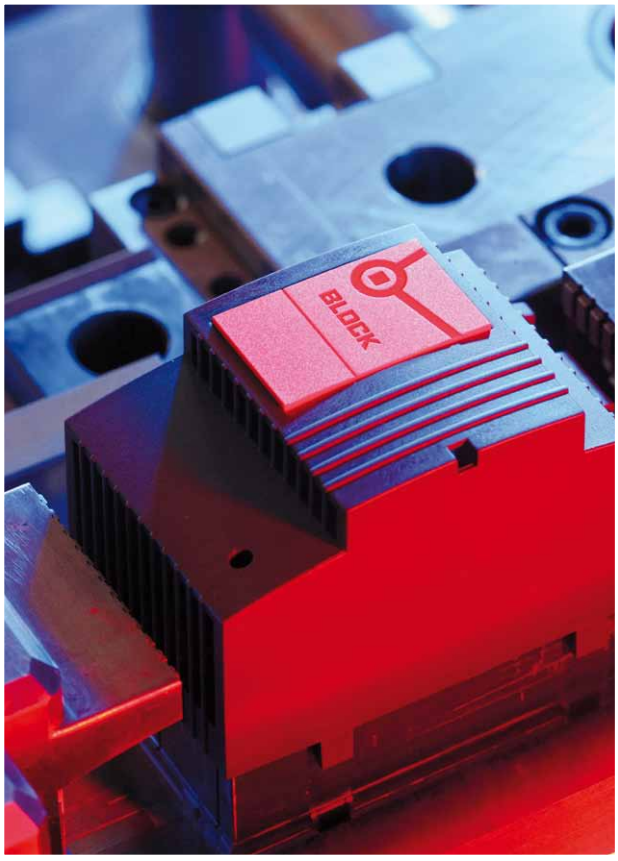
Individual

Our practical collaborative work with industry means that we here at BLOCK are continually able to develop sophisticated solutions. Thanks to our unique vertical range of manufacture as well as our unparalleled technological expertise, we can address individual customer requirements and problems directly. The result is applications tailored specifically to our customers, which are ultimately transformed into products at our prototyping facilities. Our cutting-edge machinery means we have the tools to produce both individual and series-manufactured items cost-effectively and with a short lead time. So we can make specific customer requirements a reality.

CUSTOM MADE

2500 m² punching and nibbling machines for metalworking

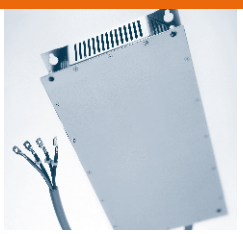
Plastic injection moulding with in-house toolmaking facilities



Automated cable assembly

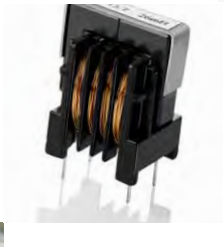
Fully automatic coil production for small transformers

BLOCK CUSTOM MADE

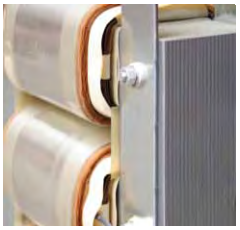


EMC filters, suitable for a frequency converter

Cable drums (filters) for tractors, to supply power out in fields.



Ferrite components for rail engineering

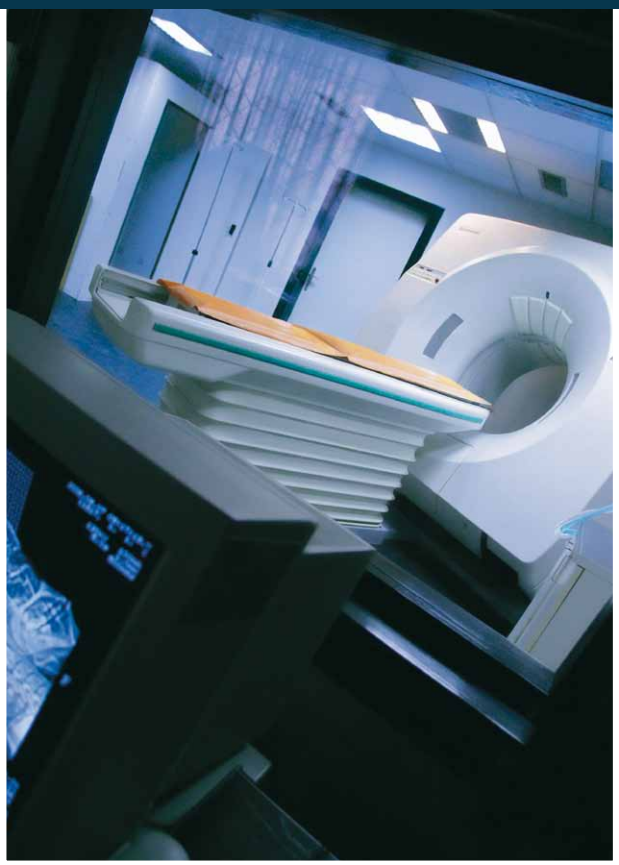


Welding transformer

Europe's largest low-voltage winding machine combining foil and wire winding

State-of-the-art production lines: SMD printed circuit board manufacturing

BLOCK – perfecting power



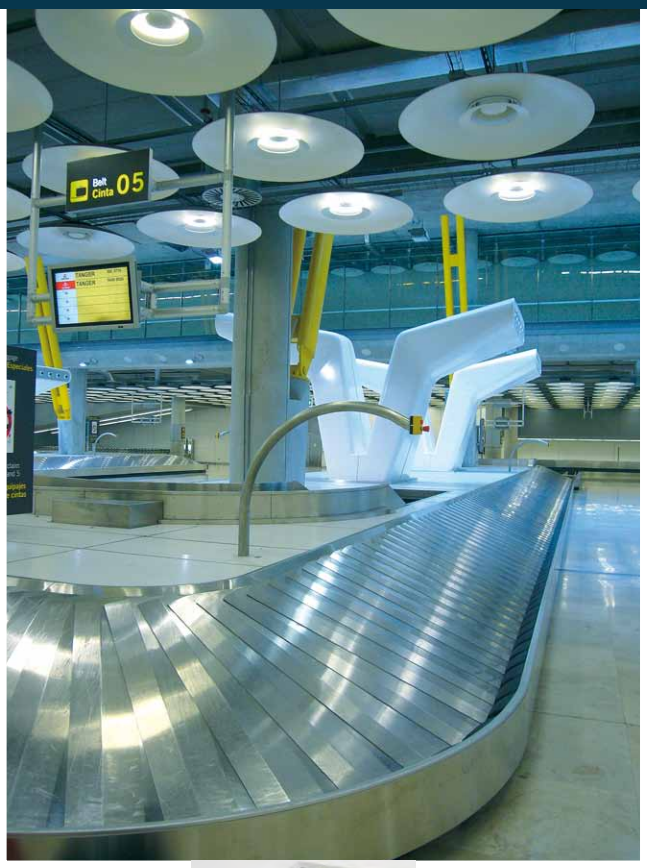
CUSTOM MADE

Built-in door power supplies for building technology

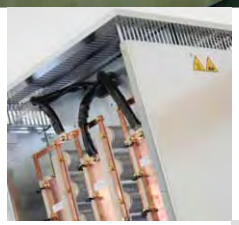
Power supplies for LED street lighting technology

Individual

You can find our products and solutions at work no matter which business and industrial sectors you look in - from mechanical and system engineering to drive, materials handling and medical technology, regenerative energies and energy efficiency, building infrastructure, shipbuilding and rail engineering. We focus our efforts on what we can realistically achieve through technology and on maximum product quality. That's why we're able to pass major benefits on to customers across the world, and particularly in our target markets of Europe, Asia and the USA.



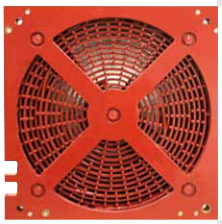
Reactors for generating energy in wind turbines



Harmonics filters for drive technology

Switched mode power supply for high-intensity floodlights, for lighting up buildings and large events

BLOCK CUSTOM MADE



Reactors for rail engineering

Transformers for the groand power supply at airports

Overview of sections

The products

1.1 Transformers

1.2 PCB transformers

1.3 Inductive components

Catalogue 1

TRANSFORMERS

Overview control transformers

Power at a glance

Type	Features	Rated input Vacacoltage	Rated output Vacoltage
STE	spring-loaded terminals, up to 250 VA with combination footplate for bolted and rail mounting	230 Vac, tappings for ± 5 %	24 Vac
		400 Vac, tappings for ± 5 %	24 Vac
		400 Vac, tappings for ± 5 %	230 Vac
STEU	dual input voltage, spring-loaded terminals, up to 250 VA with combination footplate for bolted and rail mounting	230 and 400 Vac, tappings for ± 5 %	2x12 Vac
			2x24 Vac
			2x115 Vac
USTE	universal input voltages, spring-loaded terminals, up to 250 VA with combination footplate for bolted and rail mounting	208, 230, 380, 400, 415, 440, 460, 480, 500, 525, 550, 575, 600 Vac	2x12 Vac
			2x115 Vac
ST	screw-type terminals	230 Vac, tappings for ± 5 %	12 Vac
		230 Vac, tappings for ± 5 %	24 Vac
		230 Vac, tappings for ± 5 %	42 Vac
		230 Vac, tappings for ± 5 %	110 Vac
		230 Vac, tappings for ± 5 %	230 Vac
		400 Vac, tappings for ± 5 %	24 Vac
		400 Vac, tappings for ± 5 %	42 Vac
		400 Vac tappings for ± 5 %	230 Vac
		440 Vac, tappings for ± 5 %	230 Vac
		500 Vac, tappings for ± 5 %	230 Vac
		690 Vac, tappings for ± 5 %	230 Vac
STU	universal input voltages, screw-type terminals	210, 230, 250, 380, 400, 420, 440, 460, 480, 500, 520, 540 Vac	24 Vac
			2x115 Vac
BUST	low hight, screw-type terminals	230 Vac, tappings for ± 5 %	24 Vac
		230 Vac, tappings for ± 5 %	2x115 Vac
		400 Vac, tappings for ± 5 %	42 Vac
		400 Vac, tappings for ± 5 %	2x115 Vac
		440 Vac, tappings for ± 5 %	2x115 Vac
		500 Vac, tappings for ± 5 %	2x115 Vac

20 VA	63 VA	100 VA	130 VA	160 VA	250 VA	320 VA	400 VA	500 VA	630 VA	800 VA	1000 VA	1600 VA	2000 VA	2500 VA	3000 VA	3200 VA	4000 VA	5000 VA	6300 VA	8000 VA	10000 VA	Page
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Control- and safety isolating- resp. isolating transformer
STE

General Data

Rated input voltage 230 - 400 Vac
Rated output voltage 24 - 230 Vac
Rated power 63 - 2500 VA
Insulation class B
Maximum ambient temperature 40 °C
Efficiency up to 95 %
Degree of protection IP 00

Advantages

Very good switch-on behaviour thanks to reduced starting currents
High performance for the volume thanks to compact design
Primary side ±5 % tappings for voltage adjustment
Very good corrosion protection and low noise thanks to BLOCKIMPEX vacuum impregnation
Quick to cable up thanks to the use of spring-loaded terminals
Contact protected screw connection terminals complying with UVV BVG A3
Simple mounting thanks to robust metal footplate with oval slots
Up to 250 VA with combination footplate for bolted and rail mounting

Applications

As a control transformer for the electrical isolation of the input and output sides.The construction of the transformer to supply control systems according to VDE 0113 is designed.

As an isolating transformer for the safe electrical isolation of the input and output sides. The transformer may be used to set up protective separation as a protective measure in accordance with VDE 0100.

As a safety isolating transformer for the safe electrical isolation of the input and output sides. The transformer is suitable for creating SELV and PELV circuits because of the limit on the output voltage.

Standards

Control transformer
to: VDE 0570 Teil 2-2, DIN EN 61558-2-2, EN 61558-2-2, IEC 61558-2-2, UL 5085-1/-2, CSA 22.2 No.66

Isolating transformer
to: VDE 0570 Part 2-4, DIN EN 61558-2-4, EN 61558-2-4, IEC 61558-2-4, UL 5085-1/-2, CSA 22.2 No.66

Safety isolating transformer
to: VDE 0570 Part 2-6, DIN EN 61558-2-6, EN 61558-2-6, IEC 61558-2-6, UL 5085-1/-2, CSA 22.2 No.66

Certifications

UL 5085-1/-2, CSA 22.2 No.66

Control- and safety isolating- resp. isolating transformer
STE

Electrical data

Type	STE 63/23/24	STE 63/4/24	STE 63/4/23	STE 100/23/24	STE 100/4/23	STE 160/23/24
Input						
Rated input voltage	230 Vac	400 Vac	400 Vac	230 Vac	400 Vac	230 Vac
Tappings Input	±5 %	±5 %	±5 %	±5 %	±5 %	±5 %
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	24 Vac	24 Vac	230 Vac	24 Vac	230 Vac	24 Vac
Rated power VDE (DB cos phi=1)	63 VA	63 VA	63 VA	100 VA	100 VA	160 VA
Rated power VDE (KB cos phi=0.5)	175 VA	175 VA	175 VA	310 VA	310 VA	490 VA
No-load voltage (app. x factor)	1.10	1.10	1.10	1.07	1.07	1.06
Efficiency	87 %	87 %	87 %	87 %	87 %	90 %
Standards						
Classification	Control- and safety isolating transformer	Control- and safety isolating transformer	Control- and isolating transformer	Control- and safety isolating transformer	Control- and isolating transformer	Control- and safety isolating transformer
Approvals						
Approvals	cURus	cURus	cURus	cURus	cURus	cURus
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Cooling method	self cooling	self cooling	self cooling	self cooling	self cooling	self cooling
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Short circuit proof and overload proof*						
Setting range	0.25 - 0.40 A	0.16 - 0.25 A	0.16 - 0.25 A	0.40 - 0.63 A	0.25 - 0.40 A	0.63 - 1.00 A
Setting value	0.35 A	0.20 A	0.20 A	0.50 A	0.29 A	0.78 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set					
Order numbers						
Order Number	**STE 63/23/24**	**STE 63/4/24**	**STE 63/4/23**	**STE 100/23/24**	**STE 100/4/23**	**STE 160/23/24**

Control- and safety isolating- resp. isolating transformer
STE

Electrical data

Type	STE 160/4/23	STE 250/23/24	STE 250/4/24	STE 250/4/23	STE 320/23/24	STE 320/4/23
Input						
Rated input voltage	400 Vac	230 Vac	400 Vac	400 Vac	230 Vac	400 Vac
Tappings Input	±5 %	±5 %	±5 %	±5 %	±5 %	±5 %
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	230 Vac	24 Vac	24 Vac	230 Vac	24 Vac	230 Vac
Rated power VDE (DB cos phi=1)	160 VA	250 VA	250 VA	250 VA	320 VA	320 VA
Rated power VDE (KB cos phi=0.5)	490 VA	850 VA	850 VA	850 VA	1120 VA	1120 VA
No-load voltage (app. x factor)	1.06	1.07	1.07	1.07	1.05	1.05
Efficiency	90 %	90 %	90 %	90 %	91 %	91 %
Standards						
Classification	Control- and isolating transformer	Control- and safety isolating transformer	Control- and safety isolating transformer	Control- and isolating transformer	Control- and safety isolating transformer	Control- and isolating transformer
Approvals						
Approvals	cURus	cURus	cURus	cURus	cURus	cURus
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Cooling method	self cooling	self cooling	self cooling	self cooling	self cooling	self cooling
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Short circuit proof and overload proof*						
Setting range	0.40 - 0.63 A	1.00 - 1.60 A	0.63 - 1.00 A	0.63 - 1.00 A	1.00 - 1.60 A	0.63 - 1.00 A
Setting value	0.45 A	1.20 A	0.70 A	0.70 A	1.50 A	0.88 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set					
Order numbers						
Order Number	**STE 160/4/23**	**STE 250/23/24**	**STE 250/4/24**	**STE 250/4/23**	**STE 320/23/24**	**STE 320/4/23**

Control- and safety isolating- resp. isolating transformer
STE

Electrical data

Type	STE 400/23/24	STE 400/4/23	STE 500/23/24	STE 500/4/24	STE 500/4/23	STE 630/4/23
Input						
Rated input voltage	230 Vac	400 Vac	230 Vac	400 Vac	400 Vac	400 Vac
Tappings Input	±5 %	±5 %	±5 %	±5 %	±5 %	±5 %
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	24 Vac	230 Vac	24 Vac	24 Vac	230 Vac	230 Vac
Rated power VDE (DB cos phi=1)	400 VA	400 VA	500 VA	500 VA	500 VA	630 VA
Rated power VDE (KB cos phi=0.5)	1440 VA	1440 VA	2000 VA	2000 VA	2000 VA	2350 VA
No-load voltage (app. x factor)	1.05	1.05	1.05	1.05	1.05	1.03
Efficiency	92 %	92 %	93 %	93 %	93 %	93 %
Standards						
Classification	Control- and safety isolating transformer	Control- and isolating transformer	Control- and safety isolating transformer	Control- and safety isolating transformer	Control- and isolating transformer	Control- and isolating transformer
Approvals						
Approvals	cURus	cURus	cURus	cURus	cURus	cURus
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Cooling method	self cooling	self cooling	self cooling	self cooling	self cooling	self cooling
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Short circuit proof and overload proof*						
Setting range	1.60 - 2.50 A	1.00 - 1.60 A	1.60 - 2.50 A	1.00 - 1.60 A	1.00 - 1.60 A	1.60 - 2.50 A
Setting value	1.90 A	1.10 A	2.40 A	1.40 A	1.40 A	1.70 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set					
Order numbers						
Order Number	**STE 400/23/24**	**STE 400/4/23**	**STE 500/23/24**	**STE 500/4/24**	**STE 500/4/23**	**STE 630/4/23**

Control- and safety isolating- resp. isolating transformer
STE

Electrical data

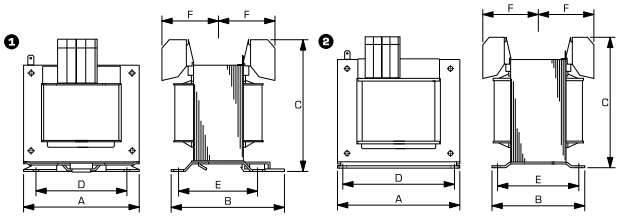
Type	STE 800/4/23	STE 1000/4/23	STE 1600/4/23	STE 2000/4/23	STE 2500/4/23
Input					
Rated input voltage	400 Vac	400 Vac	400 Vac	400 Vac	400 Vac
Tappings Input	±5 %	±5 %	±5 %	±5 %	±5 %
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output					
Rated output voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Rated power VDE (DB cos phi=1)	800 VA	1000 VA	1600 VA	2000 VA	2500 VA
Rated power VDE (KB cos phi=0.5)	3400 VA	5000 VA	7800 VA	10900 VA	12500 VA
No-load voltage (app. x factor)	1.03	1.02	1.02	1.02	1.01
Efficiency	93 %	94 %	94 %	95 %	95 %
Standards					
Classification	Control- and isolating transformer	Control- and isolating transformer	Control- and isolating transformer	Control- and isolating transformer	Control- and isolating transformer
Approvals					
Approvals	cURus	cURus	cURus	cURus	cURus
Environment					
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C
Cooling method	self cooling	self cooling	self cooling	self cooling	self cooling
Safety and protection					
Type	open type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Short circuit proof and overload proof*					
Setting range	1.60 - 2.50 A	2.50 - 4.00 A	4.00 - 6.30 A	4.00 - 6.30 A	6.30 - 10.00 A
Setting value	2.10 A	2.60 A	4.20 A	5.20 A	6.40 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set				
Order numbers					
Order Number	**STE 800/4/23**	**STE 1000/4/23**	**STE 1600/4/23**	**STE 2000/4/23**	**STE 2500/4/23**

Control- and safety isolating- resp. isolating transformer
STE

30 Mechanical data

Typ	Terminals	Fixing method	Fixing screws	Weight	Dimension picture (in mm)	A	B	C	D	E	F
STE 63/23/24	Spring clamp terminal, PE 6.3 x 0.8	Dual purpose base plate also for installation on mounting rails	M4	1.20 kg	❶	78	85	88	64	64	46
STE 63/4/24	Spring clamp terminal, PE 6.3 x 0.8	Dual purpose base plate also for installation on mounting rails	M4	1.20 kg	❶	78	85	88	64	64	46
STE 63/4/23	Spring clamp terminal, PE 6.3 x 0.8	Dual purpose base plate also for installation on mounting rails	M4	1.20 kg	❶	78	85	88	64	64	46
STE 100/23/24	Spring clamp terminal, PE 6.3 x 0.8	Dual purpose base plate also for installation on mounting rails	M4	2.00 kg	❶	84	85	96	64	64	54.5
STE 100/4/23	Spring clamp terminal, PE 6.3 x 0.8	Dual purpose base plate also for installation on mounting rails	M4	2.00 kg	❶	84	85	96	64	64	54.5
STE 160/23/24	Spring clamp terminal, PE 6.3 x 0.8	Dual purpose foot plate also for installation on mounting rails	M5	2.90 kg	❶	96	102	104	84	87	56
STE 160/4/23	Spring clamp terminal, PE 6.3 x 0.8	Dual purpose base plate also for installation on mounting rails	M5	2.90 kg	❶	96	102	104	84	87	56
STE 250/23/24	Spring clamp terminal, PE 6.3 x 0.8	Dual purpose base plate also for installation on mounting rails	M5	3.50 kg	❶	96	102	104	84	87	62.5
STE 250/4/24	Spring clamp terminal, PE 6.3 x 0.8	Dual purpose base plate also for installation on mounting rails	M5	3.50 kg	❶	96	102	104	84	87	62.5
STE 250/4/23	Spring clamp terminal, PE 6.3 x 0.8	Dual purpose base plate also for installation on mounting rails	M5	3.50 kg	❶	96	102	104	84	87	62.5
STE 320/23/24	Spring clamp terminal, PE 6.3 x 0.8	Base plate	M5	4.30 kg	❷	105	103	110	81	86	63
STE 320/4/23	Spring clamp terminal, PE 6.3 x 0.8	Base plate	M5	4.30 kg	❷	105	103	110	81	86	63
STE 400/23/24	Spring clamp terminal, PE 6.3 x 0.8	Base plate	M5	5.00 kg	❷	120	104	121	90	86	60
STE 400/4/23	Spring clamp terminal, PE 6.3 x 0.8	Base plate	M5	5.00 kg	❷	120	104	121	90	86	60
STE 500/23/24	Spring clamp terminal, PE 6.3 x 0.8	Base plate	M5	6.50 kg	❷	120	124	121	90	106	71
STE 500/4/24	Spring clamp terminal, PE 6.3 x 0.8	Base plate	M5	6.50 kg	❷	120	124	121	90	106	71
STE 500/4/23	Spring clamp terminal, PE 6.3 x 0.8	Base plate	M5	6.50 kg	❷	120	124	121	90	106	71
STE 630/4/23	Spring clamp terminal, PE 6.3 x 0.8	Base plate	M6	7.80 kg	❷	150	113	143	122	91	59
STE 800/4/23	Spring clamp terminal, PE 6.3 x 0.8	Base plate	M6	9.90 kg	❷	150	130	143	122	107.5	65
STE 1000/4/23	Spring clamp terminal, PE 6.3 x 0.8	Base plate	M6	13.10 kg	❷	150	156	143	122	134	82
STE 1600/4/23	Spring clamp terminal, PE 6.3 x 0.8	Base plate	M8	18.00 kg	❷	192	145	180.5	156	117	72
STE 2000/4/23	Spring clamp terminal, PE 6.3 x 0.8	Base plate	M8	21.80 kg	❷	192	161	180.5	156	136	80
STE 2500/4/23	Spring clamp terminal, PE 6.3 x 0.8	Base plate	M8	25.50 kg	❷	192	179	180.5	156	151	91

Dimension pictures



Control- and safety isolating- resp. isolating transformer
STEU

General Data

Rated input voltage 230 and 400 Vac
Rated output voltage 24 - 230 Vac
Rated power 63 - 2500 VA
Insulation class B
Maximum ambient temperature 40 °C
Efficiency up to 94 %
Degree of protection IP 00

Advantages

Dual input voltage 230 and 400 Vac
Very good switch-on behaviour thanks to reduced starting currents
High performance for the volume thanks to compact design
Primary side ±5 % tappings for voltage adjustment
Very good corrosion protection and low noise thanks to BLOCKIMPEX vacuum impregnation
Quick to cable up thanks to the use of spring-loaded terminals
Contact protected screw connection terminals complying with UVV BVG A3
Simple mounting thanks to robust metal footplate with oval slots
Up to 250 VA with combination footplate for bolted and rail mounting

Applications

As a control transformer for the electrical isolation of the input and output sides. The construction of the transformer to supply control systems according to VDE 0113 is designed.

As an isolating transformer for the safe electrical isolation of the input and output sides. The transformer may be used to set up protective separation as a protective measure in accordance with VDE 0100.

As a safety transformer for the safe electrical isolation of the input and output sides. The transformer is suitable for creating SELV and PELV circuits because of the limit on the output voltage.

Standards

Control transformer
to: VDE 0570 Teil 2-2, DIN EN 61558-2-2, EN 61558-2-2, IEC 61558-2-2, UL 5085-1/-2, CSA 22.2 No.66

Isolating transformer
to: VDE 0570 Part 2-4, DIN EN 61558-2-4, EN 61558-2-4, IEC 61558-2-4, UL 5085-1/-2, CSA 22.2 No.66

Safety isolating transformer
to: VDE 0570 Part 2-6, DIN EN 61558-2-6, EN 61558-2-6, IEC 61558-2-6, UL 5085-1/-2, CSA 22.2 No.66

Certifications

UL 5085-1/-2, CSA 22.2 No.66

Control- and safety isolating- resp. isolating transformer
STEU

Electrical data

Type	STEU 63/48	STEU 63/24	STEU 63/23	STEU 100/48	STEU 100/24	STEU 100/23
Input						
Rated input Voltage	230 and 400 Vac	230 and 400 Vac	230 and 400 Vac	230 and 400 Vac	230 and 400 Vac	230 and 400 Vac
Tappings Input	±5 %	±5 %	±5 %	±5 %	±5 %	±5 %
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	2x24 Vac	2x12 Vac	2x115 Vac	2x24 Vac	2x12 Vac	2x115 Vac
Rated power VDE (DB cos phi=1)	63 VA	63 VA	63 VA	100 VA	100 VA	63 VA
Rated power VDE (KB cos phi=0.5)	175 VA	175 VA	175 VA	310 VA	310 VA	175 VA
No-load voltage (app. x factor)	1.10	1.10	1.10	1.07	1.07	1.07
Efficiency	86 %	86 %	86 %	86 %	86 %	86 %
Standards						
Classification	Control- and safety isolating transformer	Control- and safety isolating transformer	Control- and isolating transformer	Control- and isolating transformer	Control- and safety isolating transformer	Control- and isolating transformer
Approvals						
Approvals	cURus	cURus	cURus	cURus	cURus	cURus
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Cooling method	self cooling	self cooling	self cooling	self cooling	self cooling	self cooling
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Short circuit proof and overload proof*						
Setting range 230 ±15 Vac	0.25 - 0.40 A	0.25 - 0.40 A	0.25 - 0.40 A	0.40 - 0.63 A	0.40 - 0.63 A	0.40 - 0.63 A
Setting value 230 ±15 Vac	0.35 A	0.35 A	0.35 A	0.50 A	0.50 A	0.50 A
Setting range 400 ±15 Vac	0.16 - 0.25 A	0.16 - 0.25 A	0.16 - 0.25 A	0.25 - 0.40 A	0.25 - 0.40 A	0.25 - 0.40 A
Setting value 400 ±15 Vac	0.20 A	0.20 A	0.20 A	0.29 A	0.29 A	0.29 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set					
Order numbers						
Order Number	**STEU 63/48**	**STEU 63/24**	**STEU 63/23**	**STEU 100/48**	**STEU 100/24**	**STEU 100/23**

Control- and safety isolating- resp. isolating transformer
STEU

Electrical data

Type	STEU 160/48	STEU 160/24	STEU 160/23	STEU 250/48	STEU 250/24	STEU 250/23
Input						
Rated input Voltage	230 and 400 Vac	230 and 400 Vac	230 and 400 Vac	230 and 400 Vac	230 and 400 Vac	230 and 400 Vac
Tappings Input	±5 %	±5 %	±5 %	±5 %	±5 %	±5 %
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	2x24 Vac	2x12 Vac	2x115 Vac	2x24 Vac	2x12 Vac	2x115 Vac
Rated power VDE (DB cos phi=1)	160 VA	160 VA	160 VA	250 VA	250 VA	250 VA
Rated power VDE (KB cos phi=0.5)	490 VA	490 VA	490 VA	850 VA	850 VA	850 VA
No-load voltage (app. x factor)	1.10	1.10	1.10	1.07	1.07	1.07
Efficiency	86 %	86 %	86 %	88 %	88 %	88 %
Standards						
Classification	Control- and isolating transformer	Control- and safety isolating transformer	Control- and isolating transformer	Control- and isolating transformer	Control- and safety isolating transformer	Control- and isolating transformer
Approvals						
Approvals	cURus	cURus	cURus	cURus	cURus	cURus
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Cooling method	self cooling	self cooling	self cooling	self cooling	self cooling	self cooling
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Short circuit proof and overload proof*						
Setting range 230 ±15 Vac	0.63 - 1.00 A	0.63 - 1.00 A	0.63 - 1.00 A	1.00 - 1.60 A	1.00 - 1.60 A	1.00 - 1.60 A
Setting value 230 ±15 Vac	0.80 A	0.80 A	0.80 A	1.20 A	1.20 A	1.20 A
Setting range 400 ±15 Vac	0.40 - 0.63 A	0.40 - 0.63 A	0.40 - 0.63 A	0.63 - 1.00 A	0.63 - 1.00 A	0.63 - 1.00 A
Setting value 400 ±15 Vac	0.46 A	0.46 A	0.46 A	0.70 A	0.70 A	0.70 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set					
Order numbers						
Order Number	**STEU 160/48**	**STEU 160/24**	**STEU 160/23**	**STEU 250/48**	**STEU 250/24**	**STEU 250/23**

Control- and safety isolating- resp. isolating transformer
STEU

Electrical data

Type	STEU 320/48	STEU 320/24	STEU 320/23	STEU 400/24	STEU 400/23	STEU 500/48
Input						
Rated input Voltage	230 and 400 Vac	230 and 400 Vac	230 and 400 Vac	230 and 400 Vac	230 and 400 Vac	230 and 400 Vac
Tappings Input	±5 %	±5 %	±5 %	±5 %	±5 %	±5 %
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	2x24 Vac	2x12 Vac	2x115 Vac	2x12 Vac	2x115 Vac	2x24 Vac
Rated power VDE (DB cos phi=1)	320 VA	320 VA	320 VA	400 VA	400 VA	500 VA
Rated power VDE (KB cos phi=0.5)	1120 VA	1120 VA	1120 VA	1440 VA	1440 VA	2000 VA
No-load voltage (app. x factor)	1.07	1.07	1.07	1.04	1.04	1.04
Efficiency	90 %	90 %	90 %	90 %	90 %	92 %
Standards						
Classification	Control- and isolating transformer	Control- and safety isolating transformer	Control- and isolating transformer	Control- and safety isolating transformer	Control- and isolating transformer	Control- and isolating transformer
Approvals						
Approvals	cURus	cURus	cURus	cURus	cURus	cURus
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Cooling method	self cooling	self cooling	self cooling	self cooling	self cooling	self cooling
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Short circuit proof and overload proof*						
Setting range 230 ±15 Vac	1.00 - 1.60 A	1.00 - 1.60 A	1.00 - 1.60 A	1.60 - 2.50 A	1.60 - 2.50 A	1.60 - 2.50 A
Setting value 230 ±15 Vac	1.50 A	1.50 A	1.50 A	1.90 A	1.90 A	2.40 A
Setting range 400 ±15 Vac	0.63 - 1.00 A	0.63 - 1.00 A	0.63 - 1.00 A	1.00 - 1.60 A	1.00 - 1.60 A	1.00 - 1.60 A
Setting value 400 ±15 Vac	0.88 A	0.88 A	0.88 A	1.10 A	1.10 A	1.40 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set					
Order numbers						
Order Number	**STEU 320/48**	**STEU 320/24**	**STEU 320/23**	**STEU 400/24**	**STEU 400/23**	**STEU 500/48**

Control- and safety isolating- resp. isolating transformer
STEU

Electrical data

Type	STEU 500/24	STEU 500/23	STEU 630/24	STEU 630/23	STEU 800/48	STEU 800/24
Input						
Rated input Voltage	230 and 400 Vac	230 and 400 Vac	230 and 400 Vac	230 and 400 Vac	230 and 400 Vac	230 and 400 Vac
Tappings Input	±5 %	±5 %	±5 %	±5 %	±5 %	±5 %
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	2x12 Vac	2x115 Vac	2x12 Vac	2x115 Vac	2x24 Vac	2x12 Vac
Rated power VDE (DB cos phi=1)	500 VA	500 VA	630 VA	630 VA	800 VA	800 VA
Rated power VDE (KB cos phi=0.5)	2000 VA	2000 VA	2350 VA	2350 VA	3400 VA	3400 VA
No-load voltage (app. x factor)	1.04	1.04	1.04	1.04	1.03	1.03
Efficiency	92 %	92 %	92 %	92 %	94 %	94 %
Standards						
Classification	Control- and safety isolating transformer	Control- and isolating transformer	Control- and safety isolating transformer	Control- and isolating transformer	Control- and isolating transformer	Control- and safety isolating transformer
Approvals						
Approvals	cURus	cURus	cURus	cURus	cURus	cURus
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Cooling method	self cooling	self cooling	self cooling	self cooling	self cooling	self cooling
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Short circuit proof and overload proof*						
Setting range 230 ±15 Vac	1.60 - 2.50 A	1.60 - 2.50 A	2.50 - 4.00 A	2.50 - 4.00 A	2.50 - 4.00 A	2.50 - 4.00 A
Setting value 230 ±15 Vac	2.40 A	2.40 A	3.00 A	3.00 A	3.70 A	3.70 A
Setting range 400 ±15 Vac	1.00 - 1.60 A	1.00 - 1.60 A	1.60 - 2.50 A	1.60 - 2.50 A	1.60 - 2.50 A	1.60 - 2.50 A
Setting value 400 ±15 Vac	1.40 A	1.40 A	1.70 A	1.70 A	2.20 A	2.20 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set					
Order numbers						
Order Number	**STEU 500/24**	**STEU 500/23**	**STEU 630/24**	**STEU 630/23**	**STEU 800/48**	**STEU 800/24**

Control- and safety isolating- resp. isolating transformer
STEU

Electrical data

Type	STEU 800/23	STEU 1000/48	STEU 1000/24	STEU 1000/23	STEU 1600/23	STEU 2000/23
Input						
Rated input Voltage	230 and 400 Vac	230 and 400 Vac	230 and 400 Vac	230 and 400 Vac	230 and 400 Vac	230 and 400 Vac
Tappings Input	±5 %	±5 %	±5 %	±5 %	±5 %	±5 %
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	2x115 Vac	2x24 Vac	2x12 Vac	2x115 Vac	2x115 Vac	2x115 Vac
Rated power VDE (DB cos phi=1)	800 VA	1000 VA	1000 VA	1000 VA	1600 VA	2000 VA
Rated power VDE (KB cos phi=0.5)	3400 VA	5000 VA	5000 VA	5000 VA	7800 VA	10900 VA
No-load voltage (app. x factor)	1.03	1.03	1.03	1.03	1.01	1.02
Efficiency	94 %	94 %	94 %	94 %	94 %	94 %
Standards						
Classification	Control- and isolating transformer	Control- and isolating transformer	Control- and safety isolating transformer	Control- and isolating transformer	Control- and isolating transformer	Control- and isolating transformer
Approvals						
Approvals	cURus	cURus	cURus	cURus	cURus	cURus
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Cooling method	self cooling	self cooling	self cooling	self cooling	self cooling	self cooling
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Short circuit proof and overload proof*						
Setting range 230 ±15 Vac	2.50 - 4.00 A	4.00 - 6.30 A	4.00 - 6.30 A	4.00 - 6.30 A	6.30 - 10.00 A	8.00 - 10.00 A
Setting value 230 ±15 Vac	3.70 A	4.60 A	4.60 A	4.60 A	7.30 A	9.10 A
Setting range 400 ±15 Vac	1.60 - 2.50 A	2.50 - 4.00 A	2.50 - 4.00 A	2.50 - 4.00 A	4.00 - 6.30 A	4.00 - 6.30 A
Setting value 400 ±15 Vac	2.20 A	2.70 A	2.70 A	2.70 A	4.20 A	5.20 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set					
Order numbers						
Order Number	**STEU 800/23**	**STEU 1000/48**	**STEU 1000/24**	**STEU 1000/23**	**STEU 1600/23**	**STEU 2000/23**

Control- and safety isolating- resp. isolating transformer
STEU

Electrical data

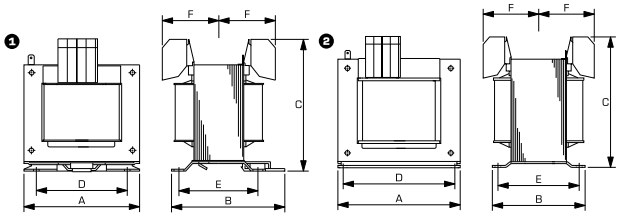
Type	STEU 2500/23
Input	
Rated input Voltage	230 and 400 Vac
Tappings Input	±5 %
Frequency range	50 - 60 Hz
Output	
Rated output voltage	2x115 Vac
Rated power VDE (DB cos phi=1)	2500 VA
Rated power VDE (KB cos phi=0.5)	12400 VA
No-load voltage (app. x factor)	1.02
Efficiency	94 %
Standards	
Classification	Control- and isolating transformer
Approvals	
Approvals	cURus
Environment	
Ambient temperature max.	40 °C
Cooling method	self cooling
Safety and protection	
Type	open type
Class of Insulation System	VDE=B, UL=class 130
Protection index	IP 00
Safety class (prepared)	I
Short circuit strength	non-short-circuit proof
Short circuit proof and overload proof*	
Setting range 230 ±15 Vac	10.00 - 16.00 A
Setting value 230 ±15 Vac	11.20 A
Setting range 400 ±15 Vac	6.30 - 10.00 A
Setting value 400 ±15 Vac	6.50 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set
Order numbers	
Order Number	**STEU 2500/23**

Control- and safety isolating- resp. isolating transformer
STEU

30 Mechanical data

Typ	Terminals	Fixing method	Fixing screws	Weight	Dimension picture (in mm)	A	B	C	D	E	F	Cu-Weight
STEU 63/48	Spring terminal, PE 6.3 x 0.8	Dual purpose base plate also for installation on mounting rails	M4	1.30 kg	1	78	85	88	64	64	46	0.30 kg
STEU 63/24	Spring terminal, PE 6.3 x 0.8	Dual purpose base plate also for installation on mounting rails	M4	1.30 kg	1	78	85	88	64	64	46	0.30 kg
STEU 63/23	Spring terminal, PE 6.3 x 0.8	Dual purpose base plate also for installation on mounting rails	M4	1.30 kg	1	78	85	88	64	64	46	0.30 kg
STEU 100/48	Spring terminal, PE 6.3 x 0.8	Dual purpose base plate also for installation on mounting rails	M4	2.10 kg	1	84	85	96	64	64	54.5	0.40 kg
STEU 100/24	Spring terminal, PE 6.3 x 0.8	Dual purpose base plate also for installation on mounting rails	M4	2.10 kg	1	84	85	96	64	64	54.5	0.40 kg
STEU 100/23	Spring terminal, PE 6.3 x 0.8	Dual purpose base plate also for installation on mounting rails	M4	1.30 kg	1	84	85	96	64	64	54.5	0.30 kg
STEU 160/48	Spring terminal, PE 6.3 x 0.8	Dual purpose base plate also for installation on mounting rails	M5	2.90 kg	1	96	102	104	84	87	56	0.50 kg
STEU 160/24	Spring terminal, PE 6.3 x 0.8	Dual purpose base plate also for installation on mounting rails	M5	2.90 kg	1	96	102	104	84	87	56	0.50 kg
STEU 160/23	Spring terminal, PE 6.3 x 0.8	Dual purpose base plate also for installation on mounting rails	M5	2.90 kg	1	96	102	104	84	87	56	0.50 kg
STEU 250/48	Spring terminal, PE 6.3 x 0.8	Dual purpose base plate also for installation on mounting rails	M5	3.60 kg	1	96	102	104	84	87	62.5	0.70 kg
STEU 250/24	Spring terminal, PE 6.3 x 0.8	Dual purpose base plate also for installation on mounting rails	M5	3.60 kg	1	96	102	104	84	87	62.5	0.70 kg
STEU 250/23	Spring terminal, PE 6.3 x 0.8	Dual purpose base plate also for installation on mounting rails	M5	3.60 kg	1	96	102	104	84	87	62.5	0.70 kg
STEU 320/48	Spring terminal, PE 6.3 x 0.8	Base plate	M5	4.30 kg	2	120	92	121	90	74	55	1.10 kg
STEU 320/24	Spring terminal, PE 6.3 x 0.8	Base plate	M5	4.30 kg	2	120	92	121	90	74	55	1.10 kg
STEU 320/23	Spring terminal, PE 6.3 x 0.8	Base plate	M5	4.30 kg	2	120	92	121	90	74	55	1.10 kg
STEU 400/24	Spring terminal, PE 6.3 x 0.8	Base plate	M5	5.30 kg	2	120	104	121	90	86	60	1.20 kg
STEU 400/23	Spring terminal, PE 6.3 x 0.8	Base plate	M5	5.30 kg	2	120	104	121	90	86	60	1.20 kg
STEU 500/48	Spring terminal, PE 6.3 x 0.8	Base plate	M5	7.70 kg	2	120	124	121	90	106	71	1.40 kg
STEU 500/24	Spring terminal, PE 6.3 x 0.8	Base plate	M5	7.70 kg	2	120	124	121	90	106	71	1.40 kg
STEU 500/23	Spring terminal, PE 6.3 x 0.8	Base plate	M5	7.70 kg	2	120	124	121	90	106	71	1.40 kg
STEU 630/24	Spring terminal, PE 6.3 x 0.8	Base plate	M6	7.90 kg	2	150	113	143	122	91	59	1.80 kg
STEU 630/23	Spring terminal, PE 6.3 x 0.8	Base plate	M6	7.90 kg	2	150	113	143	122	91	59	1.80 kg
STEU 800/48	Spring terminal, PE 6.3 x 0.8	Base plate	M6	10.30 kg	2	150	130	143	122	107.5	65	2.50 kg
STEU 800/24	Spring terminal, PE 6.3 x 0.8	Base plate	M6	10.30 kg	2	150	130	143	122	107.5	65	2.50 kg
STEU 800/23	Spring terminal, PE 6.3 x 0.8	Base plate	M6	10.30 kg	2	150	130	143	122	107.5	65	2.50 kg
STEU 1000/48	Spring terminal, PE 6.3 x 0.8	Base plate	M6	13.30 kg	2	150	156	143	122	134	82	2.60 kg
STEU 1000/24	Spring terminal, PE 6.3 x 0.8	Base plate	M6	13.30 kg	2	150	156	143	122	134	82	2.60 kg
STEU 1000/23	Spring terminal, PE 6.3 x 0.8	Base plate	M6	13.30 kg	2	150	156	143	122	134	82	2.60 kg
STEU 1600/23	Spring terminal, PE 6.3 x 0.8	Base plate	M8	20.80 kg	2	192	161	180.5	156	133	80	3.80 kg
STEU 2000/23	Spring terminal, PE 6.3 x 0.8	Base plate	M8	26.00 kg	2	192	184	180.5	156	155	91	5.10 kg
STEU 2500/23	Spring terminal, PE 6.3 x 0.8	Base plate	M8	26.30 kg	2	192	190	180.5	156	161	94	5.60 kg

Dimension pictures



Universal control- and safety isolating- resp. isolating transformer **USTE**

General Data

Rated input voltage 208 - 600 Vac
Rated output voltage 24 - 230 Vac
Rated power 100 - 3200 VA
Insulation class B
Maximum ambient temperature 40 °C
Efficiency up to 96 %
Degree of protection IP 00

Advantages

Universal input voltages 208 to 600 Vac
Very good switch-on behaviour thanks to reduced starting currents
High performance for the volume thanks to compact design
Very good corrosion protection and low noise thanks to BLOCKIMPEX vacuum impregnation
Quick to cable up thanks to the use of spring-loaded terminals
Contact protected screw connection terminals complying with UVV BVG A3
Simple mounting thanks to robust metal footplate with oval slots
Up to 250 VA with combination footplate for bolted and rail mounting

Applications

As a control transformer for the electrical isolation of the input and output sides. The construction of the transformer to supply control systems according to VDE 0113 is designed.

As an isolating transformer for the safe electrical isolation of the input and output sides. The transformer may be used to set up protective separation as a protective measure in accordance with VDE 0100.

As a safety isolating transformer for the safe electrical isolation of the input and output sides. The transformer is suitable for creating SELV and PELV circuits because of the limit on the output voltage.

Standards

Control transformer
to: VDE 0570 Teil 2-2, DIN EN 61558-2-2, EN 61558-2-2, IEC 61558-2-2, UL 5085-1/-2, CSA 22.2 No.66

Isolating transformer
to: VDE 0570 Part 2-4, DIN EN 61558-2-4, EN 61558-2-4, IEC 61558-2-4, UL 5085-1/-2, CSA 22.2 No.66

Safety isolating transformer
to: VDE 0570 Part 2-6, DIN EN 61558-2-6, EN 61558-2-6, IEC 61558-2-6, UL 5085-1/-2, CSA 22.2 No.66

Certifications

UL 5085-1/-2, CSA 22.2 No.66

Universal control- and safety isolating-resp. isolating transformer
USTE

Electrical data

Type	USTE 100/2x12	USTE 100/2x115	USTE 250/2x12	USTE 250/2x115	USTE 400/2x12	USTE 400/2x115
Input						
Rated input Voltage	208 Vac/230 Vac/380 Vac 400 Vac/415 Vac/440 Vac 460 Vac/480 Vac/500 Vac 525 Vac/550 Vac/575 Vac 600 Vac	208 Vac/230 Vac/380 Vac 400 Vac/415 Vac/440 Vac 460 Vac/480 Vac/500 Vac 525 Vac/550 Vac/575 Vac 600 Vac	208 Vac/230 Vac/380 Vac 400 Vac/415 Vac/440 Vac 460 Vac/480 Vac/500 Vac 525 Vac/550 Vac/575 Vac 600 Vac	208 Vac/230 Vac/380 Vac 400 Vac/415 Vac/440 Vac 460 Vac/480 Vac/500 Vac 525 Vac/550 Vac/575 Vac 600 Vac	208 Vac/230 Vac/380 Vac 400 Vac/415 Vac/440 Vac 460 Vac/480 Vac/500 Vac 525 Vac/550 Vac/575 Vac 600 Vac	208 Vac/230 Vac/380 Vac 400 Vac/415 Vac/440 Vac 460 Vac/480 Vac/500 Vac 525 Vac/550 Vac/575 Vac 600 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	2x12 Vac	2x115 Vac	2x12 Vac	2x115 Vac	2x12 Vac	2x115 Vac
Rated power VDE (DB cos phi=1)	100 VA	100 VA	250 VA	250 VA	400 VA	400 VA
Rated power VDE (KB cos phi=0.5)	310 VA	310 VA	850 VA	850 VA	1440 VA	1440 VA
No-load voltage (app. x factor)	1.07	1.07	1.07	1.07	1.05	1.05
Efficiency	87 %	87 %	90 %	90 %	92 %	92 %
Standards						
Classification	Control- and safety isolating transformer	Control- and isolating transformer	Control- and safety isolating transformer	Control- and isolating transformer	Control- and safety isolating transformer	Control- and isolating transformer
Approvals						
Approvals	cURus	cURus	cURus	cURus	cURus	cURus
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Cooling method	self cooling	self cooling	self cooling	self cooling	self cooling	self cooling
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Short circuit proof and overload proof*						
Setting range 208 - 230 Vac	0.63 - 1.00 A	0.63 - 1.00 A	1.00 - 1.60 A	1.00 - 1.60 A	1.60 - 2.50 A	1.60 - 2.50 A
Setting value 208 - 230 Vac	0.63 A	0.63 A	1.30 A	1.30 A	2.10 A	2.10 A
Setting range 380 - 415 Vac	0.25 - 0.40 A	0.25 - 0.40 A	0.63 - 1.00 A	0.63 - 1.00 A	1.00 - 1.60 A	1.00 - 1.60 A
Setting value 380 - 415 Vac	0.34 A	0.34 A	0.71 A	0.71 A	1.10 A	1.10 A
Setting range 440 +20Vac	0.25 - 0.40 A	0.25 - 0.40 A	0.63 - 1.00 A	0.63 - 1.00 A	1.00 - 1.60 A	1.00 - 1.60 A
Setting value 440 +20 Vac	0.31 A	0.31 A	0.64 A	0.64 A	1.00 A	1.00 A
Setting range 500 -20/+25 Vac	0.25 - 0.40 A	0.25 - 0.40 A	0.40 - 0.63 A	0.40 - 0.63 A	0.63 - 1.00 A	0.63 - 1.00 A
Setting value 500 -20/+25 Vac	0.27 A	0.27 A	0.57 A	0.57 A	0.90 A	0.90 A
Setting range 575 ±25 Vac	0.16 - 0.25 A	0.16 - 0.25 A	0.40 - 0.63 A	0.40 - 0.63 A	0.63 - 1.00 A	0.63 - 1.00 A
Setting value 575 ±25 Vac	0.24 A	0.24 A	0.50 A	0.81 A	0.81 A	0.81 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set					
Order numbers						
Order Number	**USTE 100/2x12**	**USTE 100/2x115**	**USTE 250/2x12**	**USTE 250/2x115**	**USTE 400/2x12**	**USTE 400/2x115**

1.1
1.2
1.3
1.4
1.5

Universal control- and safety isolating-resp. isolating transformer **USTE**

Electrical data

Type	USTE 630/2x12	USTE 630/2x115	USTE 800/2x115	USTE 1000/2x115	USTE 1600/2x115	USTE 2500/2x115
Input						
Rated input Voltage	208 Vac/230 Vac/380 Vac 400 Vac/415 Vac/440 Vac 460 Vac/480 Vac/500 Vac 525 Vac/550 Vac/575 Vac 600 Vac	208 Vac/230 Vac/380 Vac 400 Vac/415 Vac/440 Vac 460 Vac/480 Vac/500 Vac 525 Vac/550 Vac/575 Vac 600 Vac	208 Vac/230 Vac/380 Vac 400 Vac/415 Vac/440 Vac 460 Vac/480 Vac/500 Vac 525 Vac/550 Vac/575 Vac 600 Vac	208 Vac/230 Vac/380 Vac 400 Vac/415 Vac/440 Vac 460 Vac/480 Vac/500 Vac 525 Vac/550 Vac/575 Vac 600 Vac	208 Vac/230 Vac/380 Vac 400 Vac/415 Vac/440 Vac 460 Vac/480 Vac/500 Vac 525 Vac/550 Vac/575 Vac 600 Vac	208 Vac/230 Vac/380 Vac 400 Vac/415 Vac/440 Vac 460 Vac/480 Vac/500 Vac 525 Vac/550 Vac/575 Vac 600 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	2x12 Vac	2x115 Vac	2x115 Vac	2x115 Vac	2x115 Vac	2x115 Vac
Rated power VDE (DB cos phi=1)	630 VA	630 VA	800 VA	1000 VA	1600 VA	2500 VA
Rated power VDE (KB cos phi=0.5)	2350 VA	2350 VA	3400 VA	5000 VA	7800 VA	12500 VA
No-load voltage (app. x factor)	1.03	1.03	1.03	1.02	1.02	1.01
Efficiency	93 %	93 %	93 %	94 %	94 %	95 %
Standards						
Classification	Control- and safety isolating transformer	Control- and isolating transformer	Control- and isolating transformer	Control- and isolating transformer	Control- and isolating transformer	Control- and isolating transformer
Approvals						
Approvals	cURus	cURus	cURus	cURus	cURus	cURus
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Cooling method	self cooling	self cooling	self cooling	self cooling	self cooling	self cooling
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Short circuit proof and overload proof*						
Setting range 208 - 230 Vac	2.50 - 4.00 A	2.50 - 4.00 A	2.50 - 4.00 A	4.00 - 6.30 A	6.30 - 10.00 A	10.00 - 16.00 A
Setting value 208 - 230 Vac	3.20 A	3.20 A	3.90 A	5.00 A	7.50 A	12.50 A
Setting range 380 - 415 Vac	1.60 - 2.50 A	1.60 - 2.50 A	1.60 - 2.50 A	2.50 - 4.00 A	4.00 - 6.30 A	6.30 - 10.00 A
Setting value 380 - 415 Vac	1.70 A	1.70 A	2.20 A	2.70 A	4.10 A	6.90 A
Setting range 440 +20Vac	1.00 - 1.60 A	1.00 - 1.60 A	1.60 - 2.50 A	1.60 - 2.50 A	2.50 - 4.00 A	4.00 - 6.30 A
Setting value 440 +20 Vac	1.50 A	1.50 A	1.90 A	2.40 A	3.70 A	6.10 A
Setting range 500 -20/+25 Vac	1.00 - 1.60 A	1.00 - 1.60 A	1.60 - 2.50 A	1.60 - 2.50 A	2.50 - 4.00 A	4.00 - 6.30 A
Setting value 500 -20/+25 Vac	1.30 A	1.30 A	1.70 A	2.20 A	2.30 A	5.20 A
Setting range 575 ±25 Vac	1.00 - 1.60 A	1.00 - 1.60 A	1.00 - 1.60 A	1.60 - 2.50 A	2.50 - 4.00 A	4.00 - 6.30 A
Setting value 575 ±25 Vac	1.20 A	1.20 A	1.50 A	1.90 A	2.90 A	4.70 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set					
Order numbers						
Order Number	**USTE 630/2x12**	**USTE 630/2x115**	**USTE 800/2x115**	**USTE 1000/2x115**	**USTE 1600/2x115**	**USTE 2500/2x115**

Universal control- and safety isolating- resp. isolating transformer
USTE

Electrical data

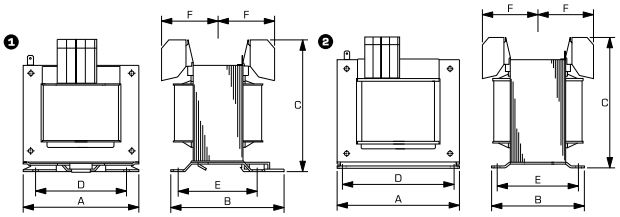
Type	USTE 3200/2x115
Input	
Rated input Voltage	208 Vac/230 Vac/380 Vac 400 Vac/415 Vac/440 Vac 460 Vac/480 Vac/500 Vac 525 Vac/550 Vac/575 Vac 600 Vac
Frequency range	50 - 60 Hz
Output	
Rated output voltage	2x115 Vac
Rated power VDE (DB cos phi=1)	3200 VA
Rated power VDE (KB cos phi=0.5)	14400 VA
No-load voltage (app. x factor)	1.02
Efficiency	96 %
Standards	
Classification	Control- and isolating transformer
Approvals	
Approvals	cURus
Environment	
Ambient temperature max.	40 °C
Cooling method	self cooling
Safety and protection	
Type	open type
Class of Insulation System	VDE=B, UL=class 130
Protection index	IP 00
Safety class (prepared)	I
Short circuit strength	non-short-circuit proof
Short circuit proof and overload proof*	
Setting range 208 - 230 Vac	10.00 - 16.00 A
Setting value 208 - 230 Vac	15.20 A
Setting range 380 - 415 Vac	6.30-10.00 A
Setting value 380 - 415 Vac	8.40 A
Setting range 440 +20Vac	6.30-10.00 A
Setting value 440 +20 Vac	7.50 A
Setting range 500 -20/+25 Vac	6.30-10.00 A
Setting value 500 -20/+25 Vac	6.50 A
Setting range 575 ±25 Vac	4.00 - 6.30 A
Setting value 575 ±25 Vac	5.80 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set
Order numbers	
Order Number	**USTE 3200/2x115**

Universal control- and safety isolating- resp. isolating transformer
USTE

Mechanical data 30

Typ	Terminals	Fixing method	Fixing screws	Weight	Dimension picture (in mm)	A	B	C	D	E	F
USTE 100/2x12	Spring terminals, PE 6.3 x 0.8	Dual purpose base plate also for installation on mounting rails	M4	2.10 kg	❶	84	85	86	64	64	54.5
USTE 100/2x115	Spring terminals, PE 6.3 x 0.8	Dual purpose base plate also for installation on mounting rails	M4	2.10 kg	❶	84	85	96	64	64	54.5
USTE 250/2x12	Spring terminals, PE 6.3 x 0.8	Dual purpose base plate also for installation on mounting rails	M5	3.60 kg	❶	96	102	104	84	87	62.5
USTE 250/2x115	Spring terminals, PE 6.3 x 0.8	Dual purpose base plate also for installation on mounting rails	M5	3.60 kg	❶	96	102	104	84	87	62.5
USTE 400/2x12	Spring terminals, PE 6.3 x 0.8	Base plate	M5	5.30 kg	❷	120	104	121	90	86	60
USTE 400/2x115	Spring terminals, PE 6.3 x 0.8	Base plate	M5	5.30 kg	❷	120	104	121	90	86	60
USTE 630/2x12	Spring terminals, PE 6.3 x 0.8	Base plate	M6	7.90 kg	❷	150	113	143	122	91	59
USTE 630/2x115	Spring terminals, PE 6.3 x 0.8	Base plate	M6	7.90 kg	❷	150	113	143	122	91	59
USTE 800/2x115	Spring terminals, PE 6.3 x 0.8	Base plate	M6	10.90 kg	❷	150	130	143	122	108	68
USTE 1000/2x115	Spring terminals, PE 6.3 x 0.8	Base plate	M6	13.80 kg	❷	150	156	143	122	134	82
USTE 1600/2x115	Spring terminals, PE 6.3 x 0.8	Base plate	M8	20.80 kg	❷	192	145	180.5	156	117	72
USTE 2500/2x115	Spring terminals, PE 6.3 x 0.8	Base plate	M8	26.30 kg	❷	192	190	180.5	156	161	94
USTE 3200/2x115	Spring terminals, PE 6.3 x 0.8	Base plate	M10	39.00 kg	❷	231	220	250	180	148	92

Dimension pictures



Control- and safety isolating- resp. isolating transformer
ST

General Data

Rated input voltage 230 - 690 Vac
Rated output voltage 12 - 230 Vac
Rated power 20 - 2500 VA
Insulation class B
Maximum ambient temperature 40 °C
Efficiency up to 96 %
Degree of protection IP 00

Advantages

Very good switch-on behaviour thanks to reduced starting currents
High performance for the volume thanks to compact design
Primary side ±5 % tappings for voltage adjustment
Very good corrosion protection and low noise thanks to BLOCKIMPEX vacuum impregnation
Contact protected screw connection terminals complying with UVV BVG A3
Simple mounting thanks to robust metal footplate with oval slots

Applications

As a control transformer for the electrical isolation of the input and output sides.The construction of the transformer to supply control systems according to VDE 0113 is designed.

As an isolating transformer for the safe electrical isolation of the input and output sides. The transformer may be used to set up protective separation as a protective measure in accordance with VDE 0100.

As a safety isolating transformer for the safe electrical isolation of the input and output sides. The transformer is suitable for creating SELV and PELV circuits because of the limit on the output voltage.

Standards

Control transformer
to: VDE 0570 Teil 2-2, DIN EN 61558-2-2, EN 61558-2-2, IEC 61558-2-2, UL 5085-1/-2, CSA 22.2 No.66

Isolating transformer
to: VDE 0570 Part 2-4, DIN EN 61558-2-4, EN 61558-2-4, IEC 61558-2-4, UL 5085-1/-2, CSA 22.2 No.66

Safety isolating transformer
to: VDE 0570 Part 2-6, DIN EN 61558-2-6, EN 61558-2-6, IEC 61558-2-6, UL 5085-1/-2, CSA 22.2 No.66

Certifications

ENEC 10 (VDE), UL 5085-1/-2, CSA 22.2 No.66

Control- and safety isolating- resp. isolating transformer
ST

Electrical data

Type	ST 20/23/12	ST 20/23/24	ST 20/23/23	ST 20/4/23	ST 63/23/12	ST 63/23/24
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	400 Vac	230 Vac	230 Vac
Tappings Input	±5 %	±5 %	±5 %	±5 %	±5 %	±5 %
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	12 Vac	24 Vac	230 Vac	230 Vac	12 Vac	24 Vac
Rated power VDE (DB cos phi=1)	20 VA	20 VA	20 VA	20 VA	63 VA	63 VA
Rated power VDE (KB cos phi=0.5)	42 VA	42 VA	42 VA	42 VA	110 VA	110 VA
No-load voltage (app. x factor)	1.10	1.10	1.10	1.10	1.10	1.10
Efficiency	81 %	81 %	81 %	81 %	84 %	84 %
Standards						
Classification	Safety isolating transformer	Safety isolating transformer	Isolating transformer	Isolating transformer	Control- and safety isolating transformer	Control- and safety isolating transformer
Approvals						
Approvals	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Cooling method	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Short circuit proof and overload proof*						
Setting range	0.10 - 0.16 A	0.10 - 0.16 A	0.10 - 0.16 A	0.10 - 0.16 A	0.25 - 0.40 A	0.25 - 0.40 A
Setting value	0.11 A	0.11 A	0.11 A	0.10 A	0.33 A	0.33 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set					
Order numbers						
Order Number	**ST 20/23/12**	**ST 20/23/24**	**ST 20/23/23**	**ST 20/4/23**	**ST 63/23/12**	**ST 63/23/24**

Control- and safety isolating- resp. isolating transformer
ST

Electrical data

Type	ST 63/23/23	ST 63/4/24	ST 63/4/42	ST 63/4/23	ST 63/44/23	ST 63/69/23
Input						
Rated input voltage	230 Vac	400 Vac	400 Vac	400 Vac	440 Vac	690 Vac
Tappings Input	±5 %	±5 %	±5 %	±5 %	±5 %	±5 %
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	230 Vac	24 Vac	42 Vac	230 Vac	230 Vac	230 Vac
Rated power VDE (DB cos phi=1)	63 VA	63 VA	63 VA	63 VA	63 VA	63 VA
Rated power VDE (KB cos phi=0.5)	110 VA	110 VA	110 VA	110 VA	110 VA	110 VA
No-load voltage (app. x factor)	1.10	1.10	1.10	1.10	1.10	1.10
Efficiency	84 %	84 %	84 %	84 %	84 %	84 %
Standards						
Classification	Control- and isolating transformer	Control- and safety isolating transformer	Control- and safety isolating transformer	Control- and isolating transformer	Control- and isolating transformer	Control- and isolating transformer
Approvals						
Approvals	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	-
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Cooling method	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	B
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Short circuit proof and overload proof*						
Setting range	0.25 - 0.40 A	0.16 - 0.25 A	0.16 - 0.25 A	0.16 - 0.25 A	0.16 - 0.25 A	0.10 - 0.16 A
Setting value	0.33 A	0.19 A	0.19 A	0.19 A	0.17 A	0.10 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set					
Order numbers						
Order Number	**ST 63/23/23**	**ST 63/4/24**	**ST 63/4/42**	**ST 63/4/23**	**ST 63/44/23**	**ST 63/69/23**

Control- and safety isolating- resp. isolating transformer
ST

Electrical data

Type	ST 100/23/12	ST 100/23/24	ST 100/23/23	ST 100/4/24	ST 100/4/23	ST 100/69/23
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	400 Vac	400 Vac	690 Vac
Tappings Input	±5 %	±5 %	±5 %	±5 %	±5 %	±5 %
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	12 Vac	24 Vac	230 Vac	24 Vac	230 Vac	230 Vac
Rated power VDE (DB cos phi=1)	100 VA	100 VA	100 VA	100 VA	100 VA	100 VA
Rated power VDE (KB cos phi=0.5)	225 VA	225 VA	225 VA	225 VA	225 VA	225 VA
No-load voltage (app. x factor)	1.10	1.10	1.10	1.10	1.10	1.10
Efficiency	86 %	86 %	86 %	86 %	86 %	86 %
Standards						
Classification	Control- and safety isolating transformer	Control- and safety isolating transformer	Control- and isolating transformer	Control- and safety isolating transformer	Control- and isolating transformer	Control- and isolating transformer
Approvals						
Approvals	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	-
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Cooling method	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	B
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Short circuit proof and overload proof*						
Setting range	0.40 - 0.63 A	0.40 - 0.63 A	0.40 - 0.63 A	0.25 - 0.40 A	0.25 - 0.40 A	0.15 - 0.25 A
Setting value	0.50 A	0.50 A	0.50 A	0.29 A	0.29 A	0.18 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set					
Order numbers						
Order Number	**ST 100/23/12**	**ST 100/23/24**	**ST 100/23/23**	**ST 100/4/24**	**ST 100/4/23**	**ST 100/69/23**

Control- and safety isolating- resp. isolating transformer
ST

Electrical data

Type	ST 130/23/24	ST 130/23/11	ST 130/4/23	ST 130/69/23	ST 160/23/24	ST 160/23/23
Input						
Rated input voltage	230 Vac	230 Vac	400 Vac	690 Vac	230 Vac	230 Vac
Tappings Input	±5 %	±5 %	±5 %	±5 %	±5 %	±5 %
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	24 Vac	110 Vac	230 Vac	230 Vac	24 Vac	230 Vac
Rated power VDE (DB cos phi=1)	130 VA	130 VA	130 VA	130 VA	160 VA	160 VA
Rated power VDE (KB cos phi=0.5)	300 VA	300 VA	300 VA	300 VA	390 VA	390 VA
No-load voltage (app. x factor)	1.10	1.10	1.10	1.10	1.10	1.09
Efficiency	86 %	86 %	86 %	86 %	86 %	87 %
Standards						
Classification	Control- and safety isolating transformer	Control- and isolating transformer	Control- and isolating transformer	Control- and isolating transformer	Control- and safety isolating transformer	Control- and isolating transformer
Approvals						
Approvals	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	-	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Cooling method	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	B	VDE=B, UL=class 105	VDE=B, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Short circuit proof and overload proof*						
Setting range	0.63 - 1.00 A	0.63 - 1.00 A	0.25 - 0.40 A	0.16 - 0.25 A	0.63 - 1.00 A	0.63 - 1.00 A
Setting value	0.64 A	0.64 A	0.37 A	0.23 A	0.78 A	0.78 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set					
Order numbers						
Order Number	**ST 130/23/24**	**ST 130/23/11**	**ST 130/4/23**	**ST 130/69/23**	**ST 160/23/24**	**ST 160/23/23**

Control- and safety isolating- resp. isolating transformer
ST

Electrical data

Type	ST 160/4/24	ST 160/4/23	ST 160/69/23	ST 250/23/12	ST 250/23/24	ST 250/23/42
Input						
Rated input voltage	400 Vac	400 Vac	690 Vac	230 Vac	230 Vac	230 Vac
Tappings Input	±5 %	±5 %	±5 %	±5 %	±5 %	±5 %
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	24 Vac	230 Vac	230 Vac	12 Vac	24 Vac	42 Vac
Rated power VDE (DB cos phi=1)	160 VA	160 VA	160 VA	250 VA	250 VA	250 VA
Rated power VDE (KB cos phi=0.5)	390 VA	390 VA	390 VA	555 VA	555 VA	555 VA
No-load voltage (app. x factor)	1.09	1.09	1.09	1.08	1.08	1.08
Efficiency	87 %	87 %	87 %	90 %	90 %	90 %
Standards						
Classification	Control- and safety isolating transformer	Control- and isolating transformer	Control- and isolating transformer	Control- and safety isolating transformer	Control- and safety isolating transformer	Control- and safety isolating transformer
Approvals						
Approvals	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	-	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Cooling method	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105	B	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Short circuit proof and overload proof*						
Setting range	0.40 - 0.63 A	0.40 - 0.63 A	0.25 - 0.40 A	1.00 - 1.60 A	1.00 - 1.60 A	1.00 - 1.60 A
Setting value	0.45 A	0.45 A	0.28 A	1.20 A	1.20 A	1.20 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set					
Order numbers						
Order Number	**ST 160/4/24**	**ST 160/4/23**	**ST 160/69/23**	**ST 250/23/12**	**ST 250/23/24**	**ST 250/23/42**

Control- and safety isolating- resp. isolating transformer
ST

Electrical data

Type	ST 250/23/23	ST 250/4/23	ST 250/44/23	ST 250/69/23	ST 320/23/24	ST 320/23/23
Input						
Rated input voltage	230 Vac	400 Vac	440 Vac	690 Vac	230 Vac	230 Vac
Tappings Input	±5 %	±5 %	±5 %	±5 %	±5 %	±5 %
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	230 Vac	230 Vac	230 Vac	230 Vac	24 Vac	230 Vac
Rated power VDE (DB cos phi=1)	250 VA	250 VA	250 VA	250 VA	320 VA	320 VA
Rated power VDE (KB cos phi=0.5)	555 VA	555 VA	555 VA	555 VA	810 VA	810 VA
No-load voltage (app. x factor)	1.08	1.08	1.08	1.08	1.06	1.06
Efficiency	90 %	90 %	90 %	90 %	91 %	91 %
Standards						
Classification	Control- and isolating transformer	Control- and isolating transformer	Control- and isolating transformer	Control- and isolating transformer	Control- and safety isolating transformer	Control- and isolating transformer
Approvals						
Approvals	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	-	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Cooling method	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	B	VDE=B, UL=class 105	VDE=B, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Short circuit proof and overload proof*						
Setting range	1.00 - 1.60 A	0.63 - 1.00 A	0.63 - 1.00 A	0.40 - 0.63 A	1.00 - 1.60 A	1.00 - 1.60 A
Setting value	1.20 A	0.69 A	0.63 A	0.43 A	1.50 A	1.50 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set					
Order numbers						
Order Number	**ST 250/23/23**	**ST 250/4/23**	**ST 250/44/23**	**ST 250/69/23**	**ST 320/23/24**	**ST 320/23/23**

Control- and safety isolating- resp. isolating transformer
ST

Electrical data

Type	ST 320/4/23	ST 320/69/23	ST 400/23/24	ST 400/23/23	ST 400/4/24	ST 400/4/23
Input						
Rated input voltage	400 Vac	690 Vac	230 Vac	230 Vac	400 Vac	400 Vac
Tappings Input	±5 %	±5 %	±5 %	±5 %	±5 %	±5 %
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	230 Vac	230 Vac	24 Vac	230 Vac	24 Vac	230 Vac
Rated power VDE (DB cos phi=1)	320 VA	320 VA	400 VA	400 VA	400 VA	400 VA
Rated power VDE (KB cos phi=0.5)	810 VA	810 VA	1020 VA	1020 VA	1020 VA	1020 VA
No-load voltage (app. x factor)	1.06	1.06	1.06	1.06	1.06	1.06
Efficiency	91 %	91 %	91 %	91 %	91 %	91 %
Standards						
Classification	Control- and isolating transformer	Control- and isolating transformer	Control- and safety isolating transformer	Control- and isolating transformer	Control- and safety isolating transformer	Control- and isolating transformer
Approvals						
Approvals	cURus, ENEC 10 (VDE)	-	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Cooling method	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 105	B	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Short circuit proof and overload proof*						
Setting range	0.63 - 1.00 A	0.40 - 0.63 A	1.60 - 2.50 A	1.60 - 2.50 A	1.00 - 1.60 A	1.00 - 1.60 A
Setting value	0.88 A	0.55 A	1.90 A	1.90 A	1.10 A	1.10 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set					
Order numbers						
Order Number	**ST 320/4/23**	**ST 320/69/23**	**ST 400/23/24**	**ST 400/23/23**	**ST 400/4/24**	**ST 400/4/23**

Control- and safety isolating- resp. isolating transformer
ST

Electrical data

Type	ST 400/69/23	ST 500/23/23	ST 500/4/23	ST 500/44/23	ST 500/69/23	ST 630/4/23
Input						
Rated input voltage	690 Vac	230 Vac	400 Vac	440 Vac	690 Vac	400 Vac
Tappings Input	±5 %	±5 %	±5 %	±5 %	±5 %	±5 %
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Rated power VDE (DB cos phi=1)	400 VA	500 VA	500 VA	500 VA	500 VA	630 VA
Rated power VDE (KB cos phi=0.5)	1020 VA	1370 VA	1370 VA	1370 VA	1370 VA	1540 VA
No-load voltage (app. x factor)	1.06	1.05	1.05	1.05	1.05	1.05
Efficiency	91 %	91 %	91 %	91 %	91 %	92 %
Standards						
Classification	Control- and isolating transformer	Control- and isolating transformer	Control- and isolating transformer	Control- and isolating transformer	Control- and isolating transformer	Control- and isolating transformer
Approvals						
Approvals	-	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	-	cURus, ENEC 10 (VDE)
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Cooling method	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	B	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	B	VDE=B, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Short circuit proof and overload proof*						
Setting range	0.63 - 1.00 A	1.60 - 2.50 A	1.00 - 1.60 A	1.00 - 1.60 A	0.63 - 1.00 A	1.60 - 2.50 A
Setting value	0.65 A	2.40 A	1.40 A	1.20 A	0.80 A	1.70 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set					
Order numbers						
Order Number	**ST 400/69/23**	**ST 500/23/23**	**ST 500/4/23**	**ST 500/44/23**	**ST 500/69/23**	**ST 630/4/23**

Control- and safety isolating- resp. isolating transformer
ST

Electrical data

Type	ST 630/69/23	ST 800/23/23	ST 800/4/23	ST 800/44/23	ST 800/69/23	ST 1000/23/23
Input						
Rated input voltage	690 Vac	230 Vac	400 Vac	440 Vac	690 Vac	230 Vac
Tappings Input	±5 %	±5 %	±5 %	±5 %	±5 %	±5 %
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Rated power VDE (DB cos phi=1)	630 VA	800 VA	800 VA	800 VA	800 VA	1000 VA
Rated power VDE (KB cos phi=0.5)	1540 VA	2000 VA	2000 VA	2000 VA	2000 VA	3120 VA
No-load voltage (app. x factor)	1.05	1.04	1.04	1.04	1.04	1.03
Efficiency	92 %	92 %	92 %	92 %	92 %	94 %
Standards						
Classification	Control- and isolating transformer	Control- and isolating transformer	Control- and isolating transformer	Control- and isolating transformer	Control- and isolating transformer	Control- and isolating transformer
Approvals						
Approvals	-	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	-	cURus, ENEC 10 (VDE)
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Cooling method	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	B	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	B	VDE=B, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Short circuit proof and overload proof*						
Setting range	1.00 - 1.60 A	2.50 - 4.00 A	1.60 - 2.50 A	1.60 - 2.50 A	1.00 - 1.60 A	4.00 - 6.30 A
Setting value	1.00 A	3.70 A	2.10 A	2.00 A	1.24 A	4.60 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set					
Order numbers						
Order Number	**ST 630/69/23**	**ST 800/23/23**	**ST 800/4/23**	**ST 800/44/23**	**ST 800/69/23**	**ST 1000/23/23**

Control- and safety isolating- resp. isolating transformer
ST

Electrical data

Type	ST 1000/4/23	ST 1000/44/23	ST 1000/5/23	ST 1000/69/23	ST 1600/4/23	ST 1600/69/23
Input						
Rated input voltage	400 Vac	440 Vac	500 Vac	690 Vac	400 Vac	690 Vac
Tappings Input	±5 %	±5 %	±5 %	±5 %	±5 %	±5 %
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Rated power VDE (DB cos phi=1)	1000 VA	1000 VA	1000 VA	1000 VA	1600 VA	1600 VA
Rated power VDE (KB cos phi=0.5)	3120 VA	3120 VA	3120 VA	3120 VA	4400 VA	4400 VA
No-load voltage (app. x factor)	1.03	1.03	1.03	1.03	1.03	1.03
Efficiency	94 %	94 %	94 %	94 %	94 %	94 %
Standards						
Classification	Control- and isolating transformer	Control- and isolating transformer	Control- and isolating transformer	Control- and isolating transformer	Control- and isolating transformer	Control- and isolating transformer
Approvals						
Approvals	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	-	cURus, ENEC 10 (VDE)	-
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Cooling method	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	B	VDE=B, UL=class 130	B
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Short circuit proof and overload proof*						
Setting range	2.50 - 4.00 A	1.60 - 2.50 A	1.60 - 2.50 A	1.60 - 2.50 A	4.00 - 6.30 A	1.60 - 2.50 A
Setting value	2.70 A	2.40 A	2.20 A	1.60 A	4.30 A	2.50 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set					
Order numbers						
Order Number	**ST 1000/4/23**	**ST 1000/44/23**	**ST 1000/5/23**	**ST 1000/69/23**	**ST 1600/4/23**	**ST 1600/69/23**

Control- and safety isolating- resp. isolating transformer
ST

Electrical data

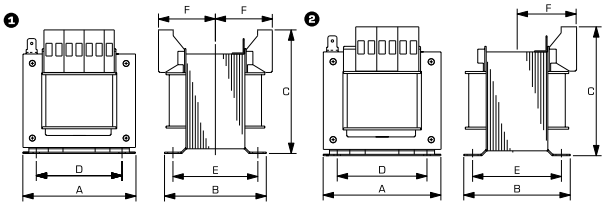
Type	ST 2000/4/23	ST 2000/69/23	ST 2500/4/23	ST 2500/69/23
Input				
Rated input voltage	400 Vac	690 Vac	400 Vac	690 Vac
Tappings Input	±5 %	±5 %	±5 %	±5 %
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output				
Rated output voltage	230 Vac	230 Vac	230 Vac	230 Vac
Rated power VDE (DB cos phi=1)	2000 VA	2000 VA	2500 VA	2500 VA
Rated power VDE (KB cos phi=0.5)	10900 VA	10900 VA	12400 VA	12400 VA
No-load voltage (app. x factor)	1.03	1.03	1.03	1.03
Efficiency	96 %	96 %	96 %	96 %
Standards				
Classification	Control- and isolating transformer	Control- and isolating transformer	Control- and isolating transformer	Control- and isolating transformer
Approvals				
Approvals	cURus, ENEC 10 (VDE)	-	cURus, ENEC 10 (VDE)	-
Environment				
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C
Cooling method	by self-cooling	by self-cooling	by self-cooling	by self-cooling
Safety and protection				
Type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 130	B	VDE=B, UL=class 130	B
Protection index	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Short circuit proof and overload proof*				
Setting range	4.00 - 6.30 A	2.50 - 4.00 A	6.30 - 10.00 A	2.50 - 4.00 A
Setting value	5.30 A	3.00 A	6.50 A	3.80 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set			
Order numbers				
Order Number	**ST 2000/4/23**	**ST 2000/69/23**	**ST 2500/4/23**	**ST 2500/69/23**

Control- and safety isolating- resp. isolating transformer
ST

30 Mechanical data

Typ	Terminals	Fixing method	Fixing screws	Weight	Dimension picture (in mm)	A	B	C	D	E	F
ST 20/23/12	Screw-type terminals, PE 6.3 x 0.8	Base plate	M4	0.90 kg	1	66	56	81	50	44.5	42
ST 20/23/24	Screw-type terminals, PE 6.3 x 0.8	Base plate	M4	0.90 kg	1	66	56	81	50	44.5	42
ST 20/23/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M4	0.90 kg	1	66	56	81	50	44.5	42
ST 20/4/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M4	0.90 kg	1	66	56	81	50	44.5	42
ST 63/23/12	Screw-type terminals, PE 6.3 x 0.8	Base plate	M4	1.30 kg	1	78	60	89	56	48.5	44
ST 63/23/24	Screw-type terminals, PE 6.3 x 0.8	Base plate	M4	1.30 kg	1	78	60	89	56	48.5	44
ST 63/23/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M4	1.30 kg	1	78	60	89	56	48.5	44
ST 63/4/24	Screw-type terminals, PE 6.3 x 0.8	Base plate	M4	1.30 kg	1	78	60	89	56	48.5	44
ST 63/4/42	Screw-type terminals, PE 6.3 x 0.8	Base plate	M4	1.30 kg	1	78	60	89	56	48.5	44
ST 63/4/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M4	1.30 kg	1	78	60	89	56	48.5	44
ST 63/44/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M4	1.30 kg	1	78	60	89	56	48.5	44
ST 63/69/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M4	1.30 kg	1	78	60	89	56	48.5	44
ST 100/23/12	Screw-type terminals, PE 6.3 x 0.8	Base plate	M4	2.20 kg	2	84	76	95	64	63.5	53
ST 100/23/24	Screw-type terminals, PE 6.3 x 0.8	Base plate	M4	2.20 kg	2	84	76	95	64	63.5	53
ST 100/23/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M4	2.20 kg	2	84	76	95	64	63.5	53
ST 100/4/24	Screw-type terminals, PE 6.3 x 0.8	Base plate	M4	2.20 kg	2	84	76	95	64	63.5	53
ST 100/4/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M4	2.20 kg	2	84	76	95	64	63.5	53
ST 100/69/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M4	2.20 kg	1	84	76	95	64	63.5	53
ST 130/23/24	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	2.40 kg	2	96	78	105	84	63.5	48
ST 130/23/11	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	2.40 kg	2	96	78	105	84	63.5	48
ST 130/4/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	2.40 kg	2	96	78	105	84	63.5	48
ST 130/69/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	2.40 kg	2	96	78	105	84	63.5	48
ST 160/23/24	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	2.40 kg	2	96	88	105	84	73	53
ST 160/23/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	2.90 kg	2	96	88	105	84	73	53
ST 160/4/24	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	2.90 kg	2	96	88	105	84	73	53
ST 160/4/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	2.90 kg	2	96	88	105	84	73	53
ST 160/69/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	2.90 kg	2	96	88	105	84	73	53
ST 250/23/12	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	3.90 kg	2	96	103	105	84	86.5	61
ST 250/23/24	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	3.90 kg	2	96	103	105	84	86.5	61
ST 250/23/42	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	3.90 kg	2	96	103	105	84	86.5	61
ST 250/23/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	3.90 kg	2	96	103	105	84	86.5	61
ST 250/4/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	3.90 kg	2	96	103	105	84	86.5	61
ST 250/44/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	3.90 kg	2	96	103	105	84	86.5	61
ST 250/69/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	3.90 kg	2	96	103	105	84	86.5	61
ST 320/23/24	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	4.60 kg	2	105	103	114	80	83	61
ST 320/23/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	4.60 kg	2	105	103	114	80	83	61
ST 320/4/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	4.60 kg	2	105	103	114	80	83	61
ST 320/69/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	4.60 kg	2	105	103	114	80	83	61
ST 400/23/24	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	5.50 kg	2	120	102	123	90	85	57
ST 400/23/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	5.50 kg	2	120	102	123	90	85	57
ST 400/4/24	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	5.50 kg	2	120	102	123	90	85	57
ST 400/4/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	5.50 kg	2	120	102	123	90	85	57
ST 400/69/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	5.50 kg	2	120	102	123	90	85	57
ST 500/23/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	7.20 kg	2	120	122	123	90	104	68
ST 500/4/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	7.20 kg	2	120	122	123	90	104	68
ST 500/44/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	7.20 kg	2	120	122	123	90	104	68
ST 500/69/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	7.20 kg	2	120	122	123	90	104	68

Dimension pictures



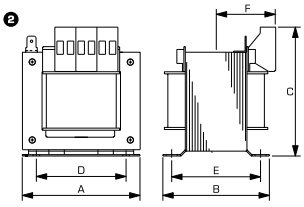
Control- and safety isolating- resp. isolating transformer
ST

30 Mechanical data

Typ	Terminals	Fixing method	Fixing screws	Weight	Dimension picture (in mm)	A	B	C	D	E	F
ST 630/4/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M6	8.00 kg	❷	150	111	148	122	90	56
ST 630/69/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M6	8.00 kg	❷	150	111	148	122	90	56
ST 800/23/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M6	9.60 kg	❷	150	128	148	122	106	63
ST 800/4/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M6	9.60 kg	❷	150	128	148	122	106	63
ST 800/44/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M6	9.60 kg	❷	150	128	148	122	106	63
ST 800/69/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M6	9.60 kg	❷	150	128	148	122	106	63
ST 1000/23/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M6	13.50 kg	❷	150	154	148	122	130	77
ST 1000/4/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M6	13.50 kg	❷	150	154	148	122	130	77
ST 1000/44/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M6	13.50 kg	❷	150	154	148	122	130	77
ST 1000/5/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M6	13.50 kg	❷	150	154	148	122	130	77
ST 1000/69/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M6	13.50 kg	❷	150	154	148	122	130	77
ST 1600/4/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M8	17.50 kg	❷	192	146	182	156	119	65
ST 1600/69/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M8	17.50 kg	❷	192	146	182	156	119	65
ST 2000/4/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M8	22.00 kg	❷	192	162	182	156	135	73
ST 2000/69/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M8	22.00 kg	❷	192	162	182	156	135	73
ST 2500/4/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M8	24.80 kg	❷	192	184	182	156	157	84
ST 2500/69/23	Screw-type terminals, PE 6.3 x 0.8	Base plate	M8	24.80 kg	❷	192	184	182	156	157	84

Dimension pictures

❷



Universal Control- and safety isolating- resp. isolating transformer **STU**

General Data

- Rated input voltage 210 - 540 Vac
- Rated output voltage 24 - 230 Vac
- Rated power 63 - 2500 VA
- Insulation class B
- Maximum ambient temperature 40 °C
- Efficiency up to 95 %
- Degree of protection IP 00

Advantages

- Universal input voltages 210 to 540 Vac
- Very good switch-on behaviour thanks to reduced starting currents
- High performance for the volume thanks to compact design
- Very good corrosion protection and low noise thanks to BLOCKIMPEX vacuum impregnation
- Contact protected screw connection terminals complying with UVV BVG A3
- Simple mounting thanks to robust metal footplate with oval slots

Applications

As a control transformer for the electrical isolation of the input and output sides.The construction of the transformer to supply control systems according to VDE 0113 is designed.

As an isolating transformer for the safe electrical isolation of the input and output sides. The transformer may be used to set up protective separation as a protective measure in accordance with VDE 0100.

As a safety isolating transformer for the safe electrical isolation of the input and output sides. The transformer is suitable for creating SELV and PELV circuits because of the limit on the output voltage.

Standards

Control transformer
to: VDE 0570 Teil 2-2, DIN EN 61558-2-2, EN 61558-2-2, IEC 61558-2-2, UL 5085-1/-2, CSA 22.2 No.66

Isolating transformer
to: VDE 0570 Part 2-4, DIN EN 61558-2-4, EN 61558-2-4, IEC 61558-2-4, UL 5085-1/-2, CSA 22.2 No.66

Safety isolating transformer
to: VDE 0570 Part 2-6, DIN EN 61558-2-6, EN 61558-2-6, IEC 61558-2-6, UL 5085-1/-2, CSA 22.2 No.66

Certifications

ENEC 10 (VDE), UL 5085-1/-2, CSA 22.2 No.66

Universal Control- and safety isolating-resp. isolating transformer
STU

Electrical data

Type	STU 63/24	STU 63/2x115	STU 100/24	STU 100/2x115	STU 130/24	STU 130/2x115
Input						
Rated input Voltage	210 Vac/230 Vac/250 Vac 380 Vac/400 Vac/420 Vac 440 Vac/460 Vac/480 Vac 500 Vac/520 Vac/540 Vac	210 Vac/230 Vac/250 Vac 380 Vac/400 Vac/420 Vac 440 Vac/460 Vac/480 Vac 500 Vac/520 Vac/540 Vac	210 Vac/230 Vac/250 Vac 380 Vac/400 Vac/420 Vac 440 Vac/460 Vac/480 Vac 500 Vac/520 Vac/540 Vac	210 Vac/230 Vac/250 Vac 380 Vac/400 Vac/420 Vac 440 Vac/460 Vac/480 Vac 500 Vac/520 Vac/540 Vac	210 Vac/230 Vac/250 Vac 380 Vac/400 Vac/420 Vac 440 Vac/460 Vac/480 Vac 500 Vac/520 Vac/540 Vac	210 Vac/230 Vac/250 Vac 380 Vac/400 Vac/420 Vac 440 Vac/460 Vac/480 Vac 500 Vac/520 Vac/540 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	24 Vac	2x115 Vac	24 Vac	2x115 Vac	24 Vac	2x115 Vac
Rated power VDE (DB cos phi=1)	63 VA	63 VA	100 VA	100 VA	130 VA	130 VA
Rated power VDE (KB cos phi=0.5)	110 VA	110 VA	225 VA	225 VA	300 VA	300 VA
No-load voltage (app. x factor)	1.10	1.10	1.10	1.10	1.10	1.10
Efficiency	84 %	84 %	86 %	86 %	86 %	86 %
Standards						
Classification	Control- and safety isolating transformer	Control- and isolating transformer	Control- and safety isolating transformer	Control- and isolating transformer	Control- and safety isolating transformer	Control- and isolating transformer
Approvals						
Approvals	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Cooling method	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Short circuit proof and overload proof*						
Setting range 230 ±20 Vac	0.25 - 0.40 A	0.25 - 0.40 A	0.40 - 0.63 A	0.40 - 0.63 A	0.63 - 1.00 A	0.63 - 1.00 A
Setting value 230 ±20 Vac	0.30 A	0.30 A	0.53 A	0.53 A	0.66 A	0.66 A
Setting range 400 ±20 Vac	0.16 - 0.25 A	0.16 - 0.25 A	0.25 - 0.40 A	0.25 - 0.40 A	0.40 - 0.63 A	0.25 - 0.40 A
Setting value 400 ±20 Vac	0.20 A	0.20 A	0.31 A	0.31 A	0.38 A	0.38 A
Setting range 460 ±20 Vac	0.16 - 0.25 A	0.16 - 0.25 A	0.25 - 0.40 A	0.25 - 0.40 A	0.25 - 0.40 A	0.25 - 0.40 A
Setting value 460 ±20 Vac	0.17 A	0.17 A	0.27 A	0.27 A	0.33 A	0.33 A
Setting range 520 ±20 Vac	0.10 - 0.16 A	0.10 - 0.16 A	0.16 - 0.25 A	0.16 - 0.25 A	0.25 - 0.40 A	0.25 - 0.40 A
Setting value 520 ±20 Vac	0.15 A	0.15 A	0.24 A	0.24 A	0.30 A	0.30 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set					
Order numbers						
Order Number	**STU 63/24**	**STU 63/2x115**	**STU 100/24**	**STU 100/2x115**	**STU 130/24**	**STU 130/2x115**

Universal Control- and safety isolating- resp. isolating transformer **STU**

Electrical data

Type	STU 160/24	STU 160/2x115	STU 250/24	STU 250/2x115	STU 400/24	STU 400/2x115
Input						
Rated input Voltage	210 Vac/230 Vac/250 Vac 380 Vac/400 Vac/420 Vac 440 Vac/460 Vac/480 Vac 500 Vac/520 Vac/540 Vac	210 Vac/230 Vac/250 Vac 380 Vac/400 Vac/420 Vac 440 Vac/460 Vac/480 Vac 500 Vac/520 Vac/540 Vac	210 Vac/230 Vac/250 Vac 380 Vac/400 Vac/420 Vac 440 Vac/460 Vac/480 Vac 500 Vac/520 Vac/540 Vac	210 Vac/230 Vac/250 Vac 380 Vac/400 Vac/420 Vac 440 Vac/460 Vac/480 Vac 500 Vac/520 Vac/540 Vac	210 Vac/230 Vac/250 Vac 380 Vac/400 Vac/420 Vac 440 Vac/460 Vac/480 Vac 500 Vac/520 Vac/540 Vac	210 Vac/230 Vac/250 Vac 380 Vac/400 Vac/420 Vac 440 Vac/460 Vac/480 Vac 500 Vac/520 Vac/540 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	24 Vac	2x115 Vac	24 Vac	2x115 Vac	24 Vac	2x115 Vac
Rated power VDE (DB cos phi=1)	160 VA	160 VA	250 VA	250 VA	400 VA	400 VA
Rated power VDE (KB cos phi=0.5)	390 VA	390 VA	555 VA	555 VA	1020 VA	1020 VA
No-load voltage (app. x factor)	1.09	1.09	1.08	1.08	1.06	1.06
Efficiency	87 %	87 %	90 %	90 %	91 %	91 %
Standards						
Classification	Control- and safety isolating transformer	Control- and isolating transformer	Control- and safety isolating transformer	Control- and isolating transformer	Control- and safety isolating transformer	Control- and isolating transformer
Approvals						
Approvals	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Cooling method	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Short circuit proof and overload proof*						
Setting range 230 ±20 Vac	0.63 - 1.00 A	0.63 - 1.00 A	1.00 - 1.60 A	1.00 - 1.60 A	1.60 - 2.50 A	1.60 - 2.50 A
Setting value 230 ±20 Vac	0.80 A	0.80 A	1.20 A	1.20 A	1.90 A	1.90 A
Setting range 400 ±20 Vac	0.40 - 0.63 A	0.40 - 0.63 A	0.63 - 1.00 A	0.63 - 1.00 A	1.00 - 1.60 A	1.00 - 1.60 A
Setting value 400 ±20 Vac	0.50 A	0.50 A	0.70 A	0.70 A	1.10 A	1.10 A
Setting range 460 ±20 Vac	0.40 - 0.63 A	0.40 - 0.63 A	0.40 - 0.63 A	0.40 - 0.63 A	1.00 - 1.60 A	1.00 - 1.60 A
Setting value 460 ±20 Vac	0.40 A	0.40 A	0.60 A	0.60 A	1.00 A	1.00 A
Setting range 520 ±20 Vac	0.25 - 0.40 A	0.25 - 0.40 A	0.40 - 0.63 A	0.40 - 0.63 A	0.63 - 1.00 A	0.63 - 1.00 A
Setting value 520 ±20 Vac	0.30 A	0.30 A	0.50 A	0.50 A	0.90 A	0.90 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set					
Order numbers						
Order Number	**STU 160/24**	**STU 160/2x115**	**STU 250/24**	**STU 250/2x115**	**STU 400/24**	**STU 400/2x115**

Universal Control- and safety isolating- resp. isolating transformer
STU

Electrical data

Type	STU 500/24	STU 500/2x115	STU 630/24	STU 630/2x115	STU 800/24	STU 800/2x115
Input						
Rated input Voltage	210 Vac/230 Vac/250 Vac 380 Vac/400 Vac/420 Vac 440 Vac/460 Vac/480 Vac 500 Vac/520 Vac/540 Vac	210 Vac/230 Vac/250 Vac 380 Vac/400 Vac/420 Vac 440 Vac/460 Vac/480 Vac 500 Vac/520 Vac/540 Vac	210 Vac/230 Vac/250 Vac 380 Vac/400 Vac/420 Vac 440 Vac/460 Vac/480 Vac 500 Vac/520 Vac/540 Vac	210 Vac/230 Vac/250 Vac 380 Vac/400 Vac/420 Vac 440 Vac/460 Vac/480 Vac 500 Vac/520 Vac/540 Vac	210 Vac/230 Vac/250 Vac 380 Vac/400 Vac/420 Vac 440 Vac/460 Vac/480 Vac 500 Vac/520 Vac/540 Vac	210 Vac/230 Vac/250 Vac 380 Vac/400 Vac/420 Vac 440 Vac/460 Vac/480 Vac 500 Vac/520 Vac/540 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	24 Vac	2x115 Vac	24 Vac	2x115 Vac	24 Vac	2x115 Vac
Rated power VDE (DB cos phi=1)	500 VA	500 VA	630 VA	630 VA	800 VA	800 VA
Rated power VDE (KB cos phi=0.5)	1370 VA	1370 VA	1540 VA	1540 VA	2000 VA	2000 VA
No-load voltage (app. x factor)	1.05	1.05	1.05	1.05	1.04	1.04
Efficiency	91 %	91 %	92 %	92 %	92 %	92 %
Standards						
Classification	Control- and safety isolating transformer	Control- and isolating transformer	Control- and safety isolating transformer	Control- and isolating transformer	Control- and safety isolating transformer	Control- and isolating transformer
Approvals						
Approvals	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Cooling method	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Short circuit proof and overload proof*						
Setting range 230 ±20 Vac	1.60 - 2.50 A	1.60 - 2.50 A	2.50 - 4.00 A	2.50 - 4.00 A	2.50 - 4.00 A	2.50 - 4.00 A
Setting value 230 ±20 Vac	2.30 A	2.30 A	3.00 A	3.00 A	3.70 A	3.70 A
Setting range 400 ±20 Vac	1.00 - 1.60 A	1.00 - 1.60 A	1.60 - 2.50 A	1.60 - 2.50 A	1.60 - 2.50 A	1.60 - 2.50 A
Setting value 400 ±20 Vac	1.40 A	1.40 A	1.70 A	1.70 A	2.10 A	2.10 A
Setting range 460 ±20 Vac	1.00 - 1.60 A	1.00 - 1.60 A	1.00 - 1.60 A	1.00 - 1.60 A	1.60 - 2.50 A	1.60 - 2.50 A
Setting value 460 ±20 Vac	1.20 A	1.20 A	1.50 A	1.50 A	1.70 A	1.70 A
Setting range 520 ±20 Vac	1.00 - 1.60 A	1.00 - 1.60 A	1.00 - 1.60 A	1.00 - 1.60 A	1.60 - 2.50 A	1.60 - 2.50 A
Setting value 520 ±20 Vac	1.00 A	1.00 A	1.30 A	1.30 A	1.60 A	1.60 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set					
Order numbers						
Order Number	**STU 500/24**	**STU 500/2x115**	**STU 630/24**	**STU 630/2x115**	**STU 800/24**	**STU 800/2x115**

Universal Control- and safety isolating- resp. isolating transformer
STU

Electrical data

Type	STU 1000/2x115	STU 1600/2x115	STU 2000/2x115	STU 2500/2x115
Input				
Rated input Voltage	210 Vac/230 Vac/250 Vac 380 Vac/400 Vac/420 Vac 440 Vac/460 Vac/480 Vac 500 Vac/520 Vac/540 Vac	210 Vac/230 Vac/250 Vac 380 Vac/400 Vac/420 Vac 440 Vac/460 Vac/480 Vac 500 Vac/520 Vac/540 Vac	210 Vac/230 Vac/250 Vac 380 Vac/400 Vac/420 Vac 440 Vac/460 Vac/480 Vac 500 Vac/520 Vac/540 Vac	210 Vac/230 Vac/250 Vac 380 Vac/400 Vac/420 Vac 440 Vac/460 Vac/480 Vac 500 Vac/520 Vac/540 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output				
Rated output voltage	2x115 Vac	2x115 Vac	2x115 Vac	2x115 Vac
Rated power VDE (DB cos phi=1)	1000 VA	1600 VA	2000 VA	2500 VA
Rated power VDE (KB cos phi=0.5)	3120 VA	3800 VA	5770 VA	6200 VA
No-load voltage (app. x factor)	1.03	1.03	1.02	1.02
Efficiency	94 %	94 %	95 %	95 %
Standards				
Classification	Control- and isolating transformer	Control- and isolating transformer	Control- and isolating transformer	Control- and isolating transformer
Approvals				
Approvals	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)
Environment				
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C
Cooling method	by self-cooling	by self-cooling	by self-cooling	by self-cooling
Safety and protection				
Type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Short circuit proof and overload proof*				
Setting range 230 ±20 Vac	4.00 - 6.30 A	6.30 - 10.00 A	8.00 - 12.00 A	10.00 - 16.00 A
Setting value 230 ±20 Vac	4.60 A	7.30 A	9.10 A	11.20 A
Setting range 400 ±20 Vac	2.50 - 4.00 A	4.00 - 6.30 A	4.00 - 6.30 A	6.30 - 10.00 A
Setting value 400 ±20 Vac	2.60 A	4.20 A	5.20 A	6.50 A
Setting range 460 ±20 Vac	1.60 - 2.50 A	2.50 - 4.00 A	4.00 - 6.30 A	4.00 - 6.30 A
Setting value 460 ±20 Vac	2.30 A	3.70 A	4.50 A	5.60 A
Setting range 520 ±20 Vac	1.60 - 2.50 A	2.50 - 4.00 A	4.00 - 6.30 A	4.00 - 6.30 A
Setting value 520 ±20 Vac	2.00 A	3.20 A	4.00 A	5.00 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set			
Order numbers				
Order Number	**STU 1000/2x115**	**STU 1600/2x115**	**STU 2000/2x115**	**STU 2500/2x115**

Universal Control- and safety isolating- resp. isolating transformer **STU**

Mechanical data 30

Typ	Terminals	Fixing method	Fixing screws	Weight	Dimension picture (in mm)	A	B	C	D	E	F1	F2
STU 63/24	Screw-type terminals, PE 6.3 x 0.8	Base plate	M4	1.50 kg	1	84	64	94	64	50	38	38
STU 63/2x115	Screw-type terminals, PE 6.3 x 0.8	Base plate	M4	1.50 kg	1	84	64	94	64	50	38	38
STU 100/24	Screw-type terminals, PE 6.3 x 0.8	Base plate	M4	2.00 kg	1	84	76	94	64	63.5	43	43
STU 100/2x115	Screw-type terminals, PE 6.3 x 0.8	Base plate	M4	2.00 kg	1	84	76	94	64	63.5	43	43
STU 130/24	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	2.30 kg	1	96	78	105	84	63.5	39	39
STU 130/2x115	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	2.30 kg	1	96	78	105	84	63.5	39	39
STU 160/24	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	2.80 kg	1	96	88	105	84	73	43	43
STU 160/2x115	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	2.80 kg	1	96	88	105	84	73	43	43
STU 250/24	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	4.10 kg	1	120	92	123	90	74	42	42
STU 250/2x115	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	4.10 kg	1	120	92	123	90	74	42	42
STU 400/24	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	5.40 kg	1	120	102	123	90	85	50	67
STU 400/2x115	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	5.40 kg	1	120	102	123	90	85	50	58
STU 500/24	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	7.00 kg	1	120	122	126	90	104	60	77
STU 500/2x115	Screw-type terminals, PE 6.3 x 0.8	Base plate	M5	7.00 kg	1	120	122	126	90	104	60	68
STU 630/24	Screw-type terminals, PE 6.3 x 0.8	Base plate	M6	7.90 kg	1	150	111	149	122	90	47	65
STU 630/2x115	Screw-type terminals, PE 6.3 x 0.8	Base plate	M6	7.90 kg	1	150	111	149	122	90	47	56
STU 800/24	Screw-type terminals, PE 6.3 x 0.8	Base plate	M6	10.30 kg	1	150	128	150	122	106	54	74
STU 800/2x115	Screw-type terminals, PE 6.3 x 0.8	Base plate	M6	10.30 kg	1	150	128	150	122	106	54	65
STU 1000/2x115	Screw-type terminals, PE 6.3 x 0.8	Base plate	M6	13.50 kg	1	150	154	145	122	130	68	77
STU 1600/2x115	Screw-type terminals, PE 6.3 x 0.8	Base plate	M8	17.80 kg	1	190	145	163	156	120	86	66
STU 2000/2x115	Screw-type terminals, PE 6.3 x 0.8	Base plate	M8	22.40 kg	1	190	180	163	156	150	82	83
STU 2500/2x115	Screw-type terminals, PE 6.3 x 0.8	Base plate	M8	25.30 kg	1	190	185	163	156	160	87	88

Dimension pictures

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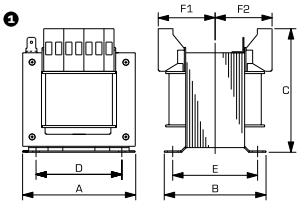

Control transformer
BUST

General Data

- Rated input voltage 230 - 500 Vac
- Rated output voltage 24 - 230 Vac
- Rated power 1000 - 10000 VA
- Insulation class B
- Maximum ambient temperature 40 °C
- Efficiency up to 96.8 %
- Degree of protection IP 00

Advantages

- High performance for the volume thanks to compact design
- Primary side ±5 % tappings for voltage adjustment
- Very good corrosion protection and low noise thanks to BLOCKIMPEX vacuum impregnation
- Contact protected screw connection terminals complying with UVV BVG A3
- Low height

Applications

Control transformer for the electrical isolation of the input and output sides. The design of the transformer makes it suitable for the supply of control systems complying with VDE 0113.

Standards

Control transformer
to: VDE 0570 Teil 2-2, DIN EN 61558-2-2, EN 61558-2-2, IEC 61558-2-2, UL 5085-1/-2, CSA 22.2 No.66

Certifications

UL 5085-1/-2, CSA 22.2 No.66

Control transformer
BUST

Electrical data

Type	BUST 1000/23/24	BUST 1000/4/23	BUST 1600/23/24	BUST 1600/4/42	BUST 1600/4/23	BUST 2000/23/23
Input						
Rated input voltage	230 Vac	400 Vac	230 Vac	400 Vac	400 Vac	230 Vac
Tappings Input	±5 %	±5 %	±5 %	±5 %	±5 %	±5 %
Low-inrush current	typ. rated current 12 times	typ. rated current 12 times	typ. rated current 12 times	typ. rated current 12 times	typ. rated current 12 times	typ. rated current 12 times
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	24 Vac	2x115 Vac	24 Vac	42 Vac	2x115 Vac	2x115 Vac
Rated power VDE (DB cos phi=1)	1000 VA	1000 VA	1600 VA	1600 VA	1600 VA	2000 VA
Rated power VDE (KB cos phi=0.5)	2500 VA	2500 VA	4300 VA	4300 VA	4300 VA	5300 VA
Efficiency	92.6 %	92.5 %	93.5 %	93.3 %	93.2 %	93.7 %
Standards						
Classification	Control transformer	Control transformer	Control transformer	Control transformer	Control transformer	Control transformer
Approvals						
Approvals	cURus	cURus	cURus	cURus	cURus	cURus
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Cooling method	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Short circuit proof and overload proof*						
Setting range	4.00 - 6.30 A	2.50 - 4.00 A	6.30 - 10.00 A	4.00 - 6.30 A	4.00 - 6.30 A	8.00 - 12.00 A
Setting value	4.70 A	2.70 A	7.40 A	4.30 A	4.30 A	9.30 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set					
Order numbers						
Order Number	**BUST 1000/23/24**	**BUST 1000/4/23**	**BUST 1600/23/24**	**BUST 1600/4/42**	**BUST 1600/4/23**	**BUST 2000/23/23**

Control transformer
BUST

Electrical data

Type	BUST 2000/4/23	BUST 2500/4/23	BUST 3000/4/23	BUST 3000/44/23	BUST 3000/5/23	BUST 4000/23/23
Input						
Rated input voltage	400 Vac	400 Vac	400 Vac	440 Vac	500 Vac	230 Vac
Tappings Input	±5 %	±5 %	±5 %	±5 %	±5 %	±5 %
Low-inrush current	typ. rated current 12 times	typ. rated current 12 times	typ. rated current 12 times	typ. rated current 12 times	typ. rated current 12 times	typ. rated current 12 times
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	2x115 Vac	2x115 Vac	2x115 Vac	2x115 Vac	2x115 Vac	2x115 Vac
Rated power VDE (DB cos phi=1)	2000 VA	2500 VA	3000 VA	3000 VA	3000 VA	4000 VA
Rated power VDE (KB cos phi=0.5)	5300 VA	6900 VA	8900 VA	8900 VA	8900 VA	11000 VA
Efficiency	93.9 %	94.8 %	95.3 %	95.4 %	95.3 %	95.4 %
Standards						
Classification	Control transformer	Control transformer	Control transformer	Control transformer	Control transformer	Control transformer
Approvals						
Approvals	cURus	cURus	cURus	cURus	cURus	cURus
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Cooling method	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Short circuit proof and overload proof*						
Setting range	4.00 - 6.30 A	6.30 - 10.00 A	6.30 - 10.00 A	6.30 - 10.00 A	6.30 - 10.00 A	16.00 - 20.00 A
Setting value	5.30 A	6.50 A	7.80 A	7.10 A	6.30 A	18.10 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set					
Order numbers						
Order Number	**BUST 2000/4/23**	**BUST 2500/4/23**	**BUST 3000/4/23**	**BUST 3000/44/23**	**BUST 3000/5/23**	**BUST 4000/23/23**

Control transformer
BUST

Electrical data

Type	BUST 4000/4/23	BUST 4000/44/23	BUST 5000/23/23	BUST 5000/4/23	BUST 6300/4/23	BUST 6300/44/23
Input						
Rated input voltage	400 Vac	440 Vac	230 Vac	400 Vac	400 Vac	440 Vac
Tappings Input	±5 %	±5 %	±5 %	±5 %	±5 %	±5 %
Low-inrush current	typ. rated current 12 times	typ. rated current 12 times	typ. rated current 12 times	typ. rated current 12 times	typ. rated current 12 times	typ. rated current 12 times
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	2x115 Vac	2x115 Vac	2x115 Vac	2x115 Vac	2x115 Vac	2x115 Vac
Rated power VDE (DB cos phi=1)	4000 VA	4000 VA	5000 VA	5000 VA	6300 VA	6300 VA
Rated power VDE (KB cos phi=0.5)	11000 VA	11000 VA	15700 VA	15700 VA	16000 VA	16000 VA
Efficiency	95.4 %	95.4 %	95.8 %	95.7 %	96.2 %	96.4 %
Standards						
Classification	Control transformer	Control transformer	Control transformer	Control transformer	Control transformer	Control transformer
Approvals						
Approvals	cURus	cURus	cURus	cURus	cURus	cURus
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Cooling method	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling	by self-cooling
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Short circuit proof and overload proof*						
Setting range	8.00 - 12.00 A	6.30 - 10.00 A	20.00 - 25.00 A	10.00 - 16.00 A	16.00 - 20.00 A	10.00 - 16.00 A
Setting value	10.40 A	9.00 A	22.00 A	12.90 A	16.20 A	14.80 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set					
Order numbers						
Order Number	**BUST 4000/4/23**	**BUST 4000/44/23**	**BUST 5000/23/23**	**BUST 5000/4/23**	**BUST 6300/4/23**	**BUST 6300/44/23**

Control transformer
BUST

Electrical data

Type	BUST 6300/5/23	BUST 8000/4/23	BUST 10000/4/23
Input			
Rated input voltage	500 Vac	400 Vac	400 Vac
Tappings Input	±5 %	±5 %	±5 %
Low-inrush current	typ. rated current 12 times	typ. rated current 12 times	typ. rated current 12 times
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output			
Rated output voltage	2x115 Vac	2x115 Vac	2x115 Vac
Rated power VDE (DB cos phi=1)	6300 VA	8000 VA	10000 VA
Rated power VDE (KB cos phi=0.5)	16000 VA	26500 VA	27000 VA
Efficiency	96.3%	96.5 %	96.8 %
Standards			
Classification	Control transformer	Control transformer	Control transformer
Approvals			
Approvals	cURus	cURus	cURus
Environment			
Ambient temperature max.	40 °C	40 °C	40 °C
Cooling method	by self-cooling	by self-cooling	by self-cooling
Safety and protection			
Type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 130	VDE=B, UL=class 130	VDE=B, UL=class 130
Protection index	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Short circuit proof and overload proof*			
Setting range	10.00 - 16.00 A	20.00 - 25.00 A	20.00 - 25.00 A
Setting value	13.00 A	21.00 A	25.00 A
	* Fusing recommendation for the primary circuit by circuit breaker with tripping characteristic type 20 x Inom related to set		
Order numbers			
Order Number	**BUST 6300/5/23**	**BUST 8000/4/23**	**BUST 10000/4/23**

Control transformer
BUST

Mechanical data

Typ	Terminals	Fixing method	Fixing screws	Weight	Dimension picture (in mm)	A	B	C	D	E
BUST 1000/23/24	Screw-type terminals	Foot brackets	M5	10.00 kg	❶	150	220	130	126	152
BUST 1000/4/23	Screw-type terminals	Foot brackets	M5	10.00 kg	❷	150	220	130	126	152
BUST 1600/23/24	Screw-type terminals	Foot brackets	M6	16.00 kg	❶	180	245	156	146	176
BUST 1600/4/42	Screw-type terminals	Foot brackets	M6	16.00 kg	❶	180	245	156	146	176
BUST 1600/4/23	Screw-type terminals	Foot brackets	M6	16.00 kg	❷	180	245	156	146	176
BUST 2000/23/23	Screw-type terminals	Foot brackets	M6	19.00 kg	❷	200	275	175	174	200
BUST 2000/4/23	Screw-type terminals	Foot brackets	M6	19.00 kg	❷	200	275	175	174	200
BUST 2500/4/23	Screw-type terminals	Foot brackets	M6	25.00 kg	❷	200	275	175	174	200
BUST 3000/4/23	Screw-type terminals	Foot brackets	M6	28.00 kg	❷	200	275	175	174	200
BUST 3000/44/23	Screw-type terminals	Foot brackets	M6	28.00 kg	❷	200	275	175	174	200
BUST 3000/5/23	Screw-type terminals	Foot brackets	M6	28.00 kg	❷	200	275	175	174	200
BUST 4000/23/23	Screw-type terminals	Foot brackets	M8	37.00 kg	❷	240	325	175	204	240
BUST 4000/4/23	Screw-type terminals	Foot brackets	M8	37.00 kg	❷	240	325	175	204	240
BUST 4000/44/23	Screw-type terminals	Foot brackets	M8	37.00 kg	❷	240	325	175	204	240
BUST 5000/23/23	Screw-type terminals	Foot brackets	M8	41.00 kg	❷	240	325	190	204	240
BUST 5000/4/23	Screw-type terminals	Foot brackets	M8	41.00 kg	❷	240	325	190	204	240
BUST 6300/4/23	Screw-type terminals	Foot brackets	M8	58.00 kg	❷	280	350	220	234	280
BUST 6300/44/23	Screw-type terminals	Foot brackets	M8	58.00 kg	❷	280	350	220	234	280
BUST 6300/5/23	Screw-type terminals	Foot brackets	M8	58.00 kg	❷	280	350	220	234	280
BUST 8000/4/23	Screw-type terminals	Foot brackets	M8	72.00 kg	❷	280	350	250	234	280
BUST 10000/4/23	Screw-type terminals	Foot brackets	M10	86.00 kg	❷	320	400	245	264	320

Dimension pictures

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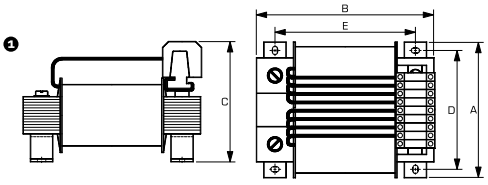

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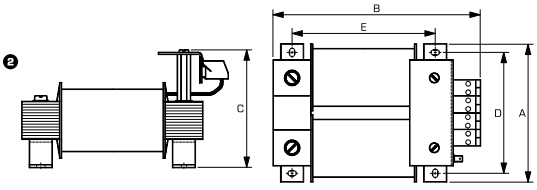


Overview
Safty isolating transformers / Interference suppressing isolating transformers

Power at a glance
Safty isolating transformers

	Typ	Features	Rated input voltage	Rated output voltage	60 VA	100 VA	160 VA	200 VA	250 VA	300 VA	400 VA	500 VA
1-phase	TIM	in housing, IP 20	230 Vac	2 x 115 Vac	■	■		■		■		■
	ETTK	Resin encapsulation, IP 67, for mobile use	230 Vac	230 Vac			■		■			
	TTML	for medical rooms, horizontal	230 Vac	115 Vac and 230 Vac								
	TTMS	for medical rooms, vertical	230 Vac	115 Vac and 230 Vac								
	TTIT	for creating a monitored IT main	230 Vac	230 Vac								
3-phase	TT3	IP 00 or up to IP 23 in housing	3 x 400 Vac	3 x 400 Vac ± 5 %								

Power at a glance
Interference suppressing isolating transformers

	Typ	Features	Rated input voltage	Rated output voltage	60 VA	100 VA	150 VA	200 VA	250 VA	300 VA	400 VA	500 VA
1-phase	STT	for mobile use	230 Vac	230 Vac		■		■			■	
	SMTT	safty isolating transformer, for mobile use	230 Vac	230 Vac			■					

630 VA	800 VA	1000 VA	1600 VA	2500 VA	3150 VA	4000 VA	5000 VA	6300 VA	8000 VA	10000 VA	12500 VA	16000 VA	20000 VA	25000 VA	30000 VA	Page
		■	■													64
	■		■	■	■											68
						■	■	■	■	■						74
						■	■	■	■	■						76
					■											78
			■		■			■	■	■	■	■	■	■	■	70

630 VA	800 VA	1000 VA	1600 VA	2500 VA	3150 VA	4000 VA	5000 VA	6300 VA	8000 VA	10000 VA	Page
											80
											82

Isolating transformer
TIM

General Data

Rated input voltage 230 Vac
Rated output voltage 2 x 115 Vac
Rated power 60 - 1000 VA
Insulation class A or B
Maximum ambient temperature 40 °C
Efficiency up to 95 %
Degree of protection IP 20

Advantages

Safe galvanic isolation
Integrated short circuit and overload protection
Double output voltage for series or parallel connection
Very good moisture protection and low noise thanks to XtraDenseFill resin encapsulation (up to 300 VA)
Screw terminals under cover with strain relief

Applications

Isolating transformer for the safe electrical isolation of the input and output sides. The transformer may be used to set up protective separation as a protective measure in accordance with VDE 0100.

Standards

Isolating transformer
to: VDE 0570 Part 2-4, DIN EN 61558-2-4, EN 61558-2-4, IEC 61558-2-4

Certifications

VDE

Isolating transformer
TIM

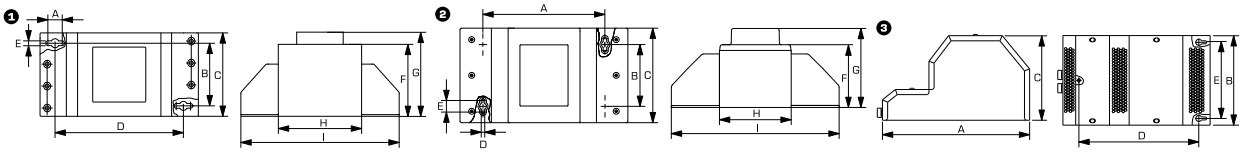
Electrical data

Type	TIM 60	TIM 100	TIM 200	TIM 300	TIM 500	TIM 800
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	2x115 Vac	2x115 Vac	2x115 Vac	2x115 Vac	2x115 Vac	2x115 Vac
Rated Power	60 VA	100 VA	200 VA	300 VA	500 VA	800 VA
No-load voltage (app. x factor)	1.15	1.08	1.07	1.05	1.02	1.02
No-load loss (typ.)	3.30 W	4.90 W	7.40 W	14.00 W	18.00 W	31.00 W
Efficiency	83.5 %	87.5 %	89.5 %	91 %	92 %	94 %
Standards						
Classification	Isolating transformer	Isolating transformer	Isolating transformer	Isolating transformer	Isolating transformer	Isolating transformer
Approvals						
Approvals	VDE	VDE	VDE	VDE	VDE, cURus	VDE, cURus
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	Resin encapsulated transformer	Resin encapsulated transformer	Resin encapsulated transformer	Resin encapsulated transformer	encapsulated in metal housing	encapsulated in metal housing
Class of Insulation System	A	A	A	A	B	B
Protection index	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20
Safety class	II	II	II	II	I	I
Short circuit strength	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof
Test voltage	5000 Vac, 50 Hz	5000 Vac, 50 Hz	5000 Vac, 50 Hz	5000 Vac, 50 Hz	3750 Vac, 50 Hz	3750 Vac, 50 Hz
Order numbers						
Order Number	**TIM 60**	**TIM 100**	**TIM 200**	**TIM 300**	**TIM 500**	**TIM 800**

Mechanical data

Terminal and mounting						
Terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals
Fixing method	Fixing holes in the terminal connection compartment	Fixing holes in the terminal connection compartment	Fixing holes in the terminal connection compartment	Fixing holes in the terminal connection compartment	Fixing holes in the housing	Fixing holes in the housing
Measures and weights						
Weight	1.55 kg	2.00 kg	3.60 kg	4.90 kg	9.10 kg	15.60 kg
Dimension picture (in mm)	❶	❶	❷	❷	❸	❸
A	14.2	14.2	167	167	283	283
B	58	58	76	76	176	200
C	77	77	117	117	150	166
D	135	135	4.3	4.3	245	245
E	4.3	4.3	14	14	123	148
F	65	65	77	100	-	-
G	76	76	97	117	-	-
H	90	90	97	97	-	-
I	166	166	223	223	-	-

Dimension pictures



Isolating transformer
TIM

Electrical data

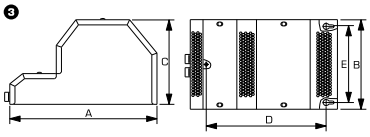
Type	TIM 1000
Input	
Rated input voltage	230 Vac
Frequency range	50 - 60 Hz
Output	
Rated output voltage	2x115 Vac
Rated Power	1000 VA
No-load voltage (app. x factor)	1.02
No-load loss (typ.)	27.00 W
Efficiency	95 %
Standards	
Classification	Isolating transformer
Approvals	
Approvals	VDE, cURus
Environment	
Ambient temperature max.	40 °C
Safety and protection	
Type	encapsulated in metal housing
Class of Insulation System	B
Protection index	IP 20
Safety class	I
Short circuit strength	non-inherently short-circuit proof
Test voltage	3750 Vac, 50 Hz
Order numbers	
Order Number	**TIM 1000**

Mechanical data

Terminal and mounting	
Terminals	Screw-type terminals
Fixing method	Fixing holes in the housing
Measures and weights	
Weight	17.10 kg
Dimension picture (in mm)	❸
A	283
B	200
C	166
D	245
E	148
F	-
G	-
H	-
I	-

Dimension pictures

❸




ISOLATING-TRANSFORMER
TIM 100
HV-Test 5000V
ta=40°C Cl. A
VDE 0570/EN 61558
100VA
IP20
PRI :
230V
50-60Hz
SEC :
2x115V - 0,43A
www.block-trafo.de
ISOLATING-TRANSFORMER
TIM 200

Isolating transformer
ETTK

General Data

Rated input voltage 230 Vac
Rated output voltage 230 Vac
Rated power 160 - 2500 VA
Insulation class A
Maximum ambient temperature 40 °C
Degree of protection IP 67

Advantages

Safe galvanic isolation
Integrated short circuit and overload protection
Very good moisture protection and low noise thanks to resin encapsulation
High degree of protection
Carrying handle, mains connecting lead and socket for mobile use

Applications

Isolating transformer for the safe electrical isolation of the input and output sides. The transformer may be used to set up protective separation as a protective measure in accordance with VDE 0100.

Standards

Isolating transformer
to: VDE 0570 Part 2-4, DIN EN 61558-2-4, EN 61558-2-4, IEC 61558-2-4

Certifications

VDE

Isolating transformer
ETTK

Electrical data

Type	ETTK 160	ETTK 250	ETTK 630	ETTK 1000	ETTK 1600	ETTK 2500
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Rated Power	160 VA	250 VA	630 VA	1000 VA	1600 VA	2500 VA
Standards						
Classification	Isolating transformer	Isolating transformer	Isolating transformer	Isolating transformer	Isolating transformer	Isolating transformer
Approvals						
Approvals	VDE	VDE	VDE	VDE	VDE	VDE
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	Resin encapsulated transformer	Resin encapsulated transformer	Resin encapsulated transformer	Resin encapsulated transformer	Resin encapsulated transformer	Resin encapsulated transformer
Class of Insulation System	A	A	A	A	A	A
Protection index	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67
Safety class	II	II	II	II	II	II
Short circuit strength	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof
Test voltage	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz
Order numbers						
Order Number	**ETTK 160**	**ETTK 250**	**ETTK 630**	**ETTK 1000**	**ETTK 1600**	**ETTK 2500**

Mechanical data

Terminal and mounting						
Terminals PRI	Mains connecting cable with safety plug	Mains connecting cable with safety plug	Mains connecting cable with safety plug	Mains connecting cable with safety plug	Mains connecting cable with safety plug	Mains connecting cable with safety plug
Terminals SEC	Protective contact socket	Protective contact socket	Protective contact socket	Protective contact socket	Protective contact socket	Protective contact socket
Measures and weights						
Weight	5.80 kg	9.40 kg	16.40 kg	21.00 kg	35.80 kg	39.00 kg
Wide	105 mm	120 mm	120 mm	140 mm	170 mm	170 mm
Height	160 mm	185 mm	230 mm	230 mm	225 mm	225 mm
Depth	170 mm	200 mm	300 mm	300 mm	340 mm	340 mm

Isolating transformer
TT3

General Data

Rated input voltage 3 x 400 Vac
Rated output voltage 3 x 380 - 3 x 420 Vac
Rated power 1000 - 30000 VA
Insulation class F
Maximum ambient temperature 50 °C
Efficiency up to 97.5 %
Degree of protection IP 00
Optionally adapted package for higher degrees of protection (see data table)

Advantages

Safe galvanic isolation
Patented assembly technology to lower heat losses
Very good corrosion protection and low noise thanks to BLOCKIMPEX vacuum impregnation
Secondary side ±5 % tappings for voltage adjustment
Fixed, contact protected screw connection terminals complying with UVV VBG3
Multifunctional fixing rails with 12 oval slots
Enlarged fixing rail for easy installation from above
Integrated crane eyes

Applications

Isolating transformer for the safe electrical isolation of the input and output sides. The transformer may be used to set up protective separation as a protective measure in accordance with VDE 0100.

Standards

Isolating transformer
to: VDE 0570 Teil 2-4, DIN EN 61558-2-4, EN 61558-2-4, IEC 61558-2-4, UL 5085-1/-2, CSA 22.2 No.66

Certifications

UL 5085-1/-2, CSA 22.2 No.66

Isolating transformer
TT3

Electrical data

Type	TT3 1-4-4	TT3 2,5-4-4	TT3 5-4-4	TT3 6,3-4-4	TT3 8-4-4	TT3 10-4-4
Input						
Rated input Voltage	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac
Rated Power	1000 VA	2500 VA	5000 VA	6300 VA	8000 VA	10000 VA
Rated current	3 x 1.52 Aac (3 x 380 Vac) 3 x 1.44 Aac (3 x 400 Vac) 3 x 1.38 Aac (3 x 420 Vac)	3 x 3.8 Aac (3 x 380 Vac) 3 x 3.7 Aac (3 x 400 Vac) 3 x 3.5 Aac (3 x 420 Vac)	3 x 7.6 Aac (3 x 380 Vac) 3 x 7.2 Aac (3 x 400 Vac) 3 x 6.9 Aac (3 x 420 Vac)	3 x 9.6 Aac (3 x 380 Vac) 3 x 9.1 Aac (3 x 400 Vac) 3 x 8.6 Aac (3 x 420 Vac)	3 x 12.2 Aac (3 x 380 Vac) 3 x 11.5 Aac (3 x 400 Vac) 3 x 11 Aac (3 x 420 Vac)	3 x 15.1 Aac (3 x 380 Vac) 3 x 14.4 Aac (3 x 400 Vac) 3 x 13.8 Aac (3 x 420 Vac)
Short circuit voltage	6.4 %	3.7 %	3.6 %	2.8 %	2.2 %	1.9 %
Power loss	92.0 W	155.0 W	275.0 W	290.0 W	320.0 W	350.0 W
Tappings Output (±)	±5 %	±5 %	±5 %	±5 %	±5 %	±5 %
Vector group	Dyn 5	Dyn 5	Dyn 5	Dyn 5	Dyn 5	Dyn 5
Efficiency	91.5 %	94.3 %	94.7 %	95.5 %	96 %	96.5 %
Approvals						
Approvals	cURus	cURus	cURus	cURus	cURus	cURus
Environment						
Ambient temperature max.	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	VDE=F, UL=class 155	VDE=F, UL=class 155	VDE=F, UL=class 155	VDE=F, UL=class 155	VDE=F, UL=class 155	VDE=F, UL=class 155
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Order numbers						
Order Number without housing	**TT3 1-4-4**	**TT3 2,5-4-4**	**TT3 5-4-4**	**TT3 6,3-4-4**	**TT3 8-4-4**	**TT3 10-4-4**
Order Number in housing IP23	**TT3 1-4-4-23**	**TT3 2,5-4-4-23**	**TT3 5-4-4-23**	**TT3 6,3-4-4-23**	**TT3 8-4-4-23**	**TT3 10-4-4-23**

Isolating transformer
TT3

Electrical data

Type	TT3 12,5-4-4	TT3 16-4-4	TT3 20-4-4	TT3 25-4-4	TT3 30-4-4
Input					
Rated input Voltage	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output					
Rated output voltage	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac
Rated Power	12500 VA	16000 VA	20000 VA	25000 VA	30000 VA
Rated current	3 x 19 Aac (3 x 380 Vac) 3 x 14.4 Aac (3 x 400 Vac) 3 x 19 Aac (3 x 420 Vac)	3 x 24.4 Aac (3 x 380 Vac) 3 x 23.1 Aac (3 x 400 Vac) 3 x 22 Aac (3 x 420 Vac)	3 x 30.4 Aac (3 x 380 Vac) 3 x 28.9 Aac (3 x 400 Vac) 3 x 27.5 Aac (3 x 420 Vac)	3 x 38.1 Aac (3 x 380 Vac) 3 x 36.1 Aac (3 x 400 Vac) 3 x 34.4 Aac (3 x 420 Vac)	3 x 45.7 Aac (3 x 380 Vac) 3 x 43.3 Aac (3 x 400 Vac) 3 x 41.3 Aac (3 x 420 Vac)
Short circuit voltage	1.65 %	1.5 %	1.5 %	1.2 %	1.7 %
Power loss	380.0 W	500.0 W	525.0 W	604.0 W	770.0 W
Tappings Output (±)	±5 %	±5 %	±5 %	±5 %	±5 %
Vector group	Dyn 5	Dyn 5	Dyn 5	Dyn 5	Dyn 5
Efficiency	97 %	97 %	97.5 %	97.5 %	97.5 %
Approvals					
Approvals	cURus	cURus	cURus	cURus	cURus
Environment					
Ambient temperature max.	50 °C	50 °C	50 °C	50 °C	50 °C
Safety and protection					
Type	open type	open type	open type	open type	open type
Class of Insulation System	VDE=F, UL=class 155	VDE=F, UL=class 155	VDE=F, UL=class 155	VDE=F, UL=class 155	VDE=F, UL=class 155
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Order numbers					
Order Number without housing	**TT3 12,5-4-4**	**TT3 16-4-4**	**TT3 20-4-4**	**TT3 25-4-4**	**TT3 30-4-4**
Order Number in housing IP23	**TT3 12,5-4-4-23**	**TT3 16-4-4-23**	**TT3 20-4-4-23**	**TT3 25-4-4-23**	**TT3 30-4-4-23**

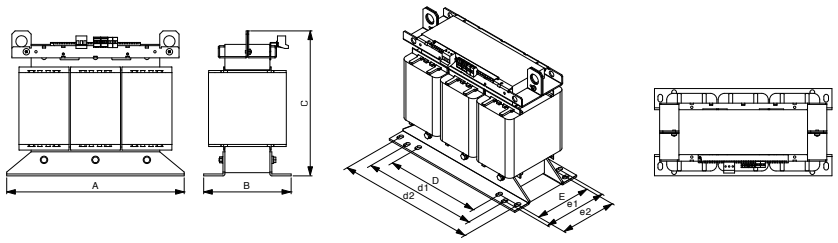
Isolating transformer
TT3

30 Mechanical data

Typ	Terminals	Fixing method	Fixing screws	Weight	Core type	Dimension picture (in mm)	A	B	C	D	d1	d2	E	e1	e2
TT3 1-4-4	Screw-type terminal	Fixing rail	M6	15.00 kg	3UI 114/40	1	267	125	215	176	180	249	71	79	98
TT3 2,5-4-4	Screw-type terminal	Fixing rail	M8	32.00 kg	3UI 132/72	1	315	165	250	200	215	292	102	124	126
TT3 5-4-4	Screw-type terminal	Fixing rail	M8	48.00 kg	3UI 180/63	1	410	155	355	264	310	388	125	125	115
TT3 6,3-4-4	Screw-type terminal	Fixing rail	M8	55.00 kg	3UI 180/63	1	410	175	360	264	310	388	125	125	115
TT3 8-4-4	Screw-type terminal	Fixing rail	M8	67.00 kg	3UI 180/78	1	410	180	360	264	310	388	140	140	130
TT3 10-4-4	Screw-type terminal	Fixing rail	M10	87.00 kg	3UI 210/73	1	480	192	400	316	370	450	143	151	133
TT3 12,5-4-4	Screw-type terminal	Fixing rail	M10	115.00 kg	3UI 210/103	1	480	222	400	316	370	450	173	181	163
TT3 16-4-4	Screw-type terminal	Fixing rail	M12	150.00 kg	3UI 240/110	1	550	267	510	356	430	516	184	210	182
TT3 20-4-4	Screw-type terminal	Fixing rail	M12	180.00 kg	3UI 240/140	1	550	297	510	356	430	516	214	240	212
TT3 25-4-4	Screw-type terminal	Fixing rail	M12	205.00 kg	3UI 240/140	1	550	297	510	356	430	516	214	240	212
TT3 30-4-4	Screw-type terminal	Fixing rail	M12	230.00 kg	3UI 240/170	2	550	320	480	356	430	516	244	270	242

Dimension pictures

1



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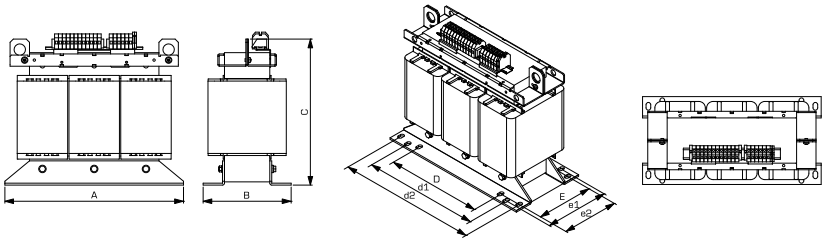


Isolating transformer for supply of medical rooms
TTML

General Data

Rated input voltage 230 Vac
Rated output voltage 115 and 230 Vac
Rated power 3150 - 8000 VA
Insulation class B
Maximum ambient temperature 40 °C
Efficiency up to 97 %
Degree of protection IP 00

Advantages

Safe galvanic isolation
PTC resistor built into every coil to set up an external monitoring unit for protection against overload
Very good switch-on behaviour thanks to reduced starting currents
Very high efficiency
Very low short circuit voltage
Very low idle current
Very good corrosion protection and low noise thanks to BLOCKIMPEX vacuum impregnation
Contact protected screw connection terminals complying with UVV BVG A3
Low height
Low leakage current

Applications

Isolating transformer for supply of medical rooms of the User group 2.

Standards

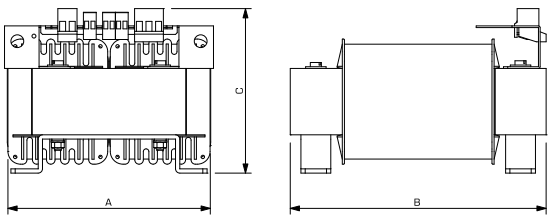
Isolating transformer for supply of medical rooms
to: VDE 0570 Part 2-15, VDE 0100 Part 710, DIN EN 61558-2-15, EN 61558-2-15

Isolating transformer for supply of medical rooms
TTML

Type	TTML 3150/230	TTML 4000/230	TTML 5000/230	TTML 6300/230	TTML 8000/230
Electrical data					
Input					
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Low-inrush current	≤12 x INom	≤12 x INom	≤12 x INom	≤12 x INom	≤12 x INom
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output					
Rated output voltage	115 and 230 Vac	115 and 230 Vac	115 and 230 Vac	115 and 230 Vac	115 and 230 Vac
Rated Power	3150 VA	4000 VA	5000 VA	6300 VA	8000 VA
Short circuit voltage	≤3 %	≤3 %	≤3 %	≤3 %	≤3 %
No-load current	≤3 %	≤3 %	≤3 %	≤3 %	≤3 %
Efficiency	97 %	97 %	97 %	97 %	97 %
Environment					
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection					
Type	open type	open type	open type	open type	open type
Class of Insulation System	B	B	B	B	B
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II	II
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Test voltage	3.75 kVac	3.75 kVac	3.75 kVac	3.75 kVac	3.75 kVac
Order numbers					
Order Number	**TTML 3150/230**	**TTML 4000/230**	**TTML 5000/230**	**TTML 6300/230**	**TTML 8000/230**
Mechanical data					
Terminal and mounting					
Terminals	Screw-type terminal 10 mm², Screw-type terminal 4 mm²	Screw-type terminal 10 mm², Screw-type terminal 4 mm²	Screw-type terminal 10 mm², Screw-type terminal 4 mm²	Screw-type terminal 10 mm², Screw-type terminal 4 mm²	Screw-type terminal 10 mm², Screw-type terminal 4 mm²
Fixing method	Fixing rail	Fixing rail	Fixing rail	Fixing rail	Fixing rail
Fixing screws	M8	M8	M8	M8	M8
Measures and weights					
Weight	50.00 kg	55.00 kg	60.00 kg	67.00 kg	75.00 kg
Dimension picture (in mm)	❶	❶	❶	❶	❶
A	245	275	275	275	275
B	300	350	350	350	350
C	200	200	210	225	240

Dimension pictures

❶



Isolating transformer for supply of medical rooms **TTMS**

General Data

Rated input voltage 230 Vac
Rated output voltage 115 and 230 Vac
Rated power 3150 - 8000 VA
Insulation class B
Maximum ambient temperature 40 °C
Efficiency up to 97 %
Degree of protection IP 00
Optionally adapted package for higher degrees of protection

Advantages

Safe galvanic isolation
PTC resistor built into every coil to set up an external monitoring unit for protection against overload
Very good switch-on behaviour thanks to reduced starting currents
High efficiency
Low short circuit voltage
Very low idle current
Very good corrosion protection and low noise thanks to BLOCKIMPEX vacuum impregnation
Contact protected screw connection terminals complying with UVV BVG A3
Simple mounting thanks to robust metal fixing rail with 8 oval slots

Applications

Isolating transformer for supply of medical rooms of the user group 2.

Standards

Isolating transformer for supply of medical rooms
to: VDE 0570 Part 2-15, VDE 0100 Part 710, DIN EN 61558-2-15, EN 61558-2-15

Isolating transformer for supply of medical rooms
TTMS

Electrical data

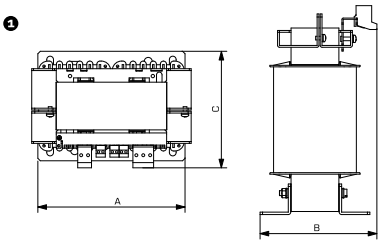
Type	TTMS 3150/230	TTMS 4000/230	TTMS 5000/230	TTMS 6300/230	TTMS 8000/230
Input					
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Low-inrush current	≤12 x INom	≤12 x INom	≤12 x INom	≤12 x INom	≤12 x INom
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output					
Rated output voltage	115 and 230 Vac	115 and 230 Vac	115 and 230 Vac	115 and 230 Vac	115 and 230 Vac
Rated Power	3150 VA	4000 VA	5000 VA	6300 VA	8000 VA
Short circuit voltage	≤3 %	≤3 %	≤3 %	≤3 %	≤3 %
No-load current	≤3 %	≤3 %	≤3 %	≤3 %	≤3 %
Efficiency	97 %	97 %	97 %	97 %	97 %
Environment					
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection					
Type	open type	open type	open type	open type	open type
Class of Insulation System	B	B	B	B	B
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II	II
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Test voltage	3.75 kVac	3.75 kVac	3.75 kVac	3.75 kVac	3.75 kVac
Order numbers					
Order Number without housing	**TTMS 3150/230**	**TTMS 4000/230**	**TTMS 5000/230**	**TTMS 6300/230**	**TTMS 8000/230**
Order Number in housing IP23	**TTM 3150/230-23**	**TTM 4000/230-23**	**TTM 5000/230-23**	**TTM 6300/230-23**	**TTM 8000/230-23**

Mechanical data

Terminal and mounting					
Terminals	Screw-type terminal 10 mm², Screw-type terminal 4 mm²	Screw-type terminal 10 mm², Screw-type terminal 4 mm²	Screw-type terminal 10 mm², Screw-type terminal 4 mm²	Screw-type terminal 10 mm², Screw-type terminal 4 mm²	Screw-type terminal 10 mm², Screw-type terminal 4 mm²
Fixing screws	M8	M8	M8	M8	M8
Fixing method	Fixing rail	Fixing rail	Fixing rail	Fixing rail	Fixing rail
Measures and weights					
Weight	50.00 kg	55.00 kg	60.00 kg	67.00 kg	75.00 kg
Dimension picture (in mm)	❶	❶	❶	❶	❶
A	260	310	310	310	310
B	195	190	200	215	230
C	345	395	395	395	395

Dimension pictures

❶



Isolating transformer with integrated insulation monitoring
TTIT

General Data

Rated input voltage 230 Vac
Rated output voltage 230 Vac
Rated power 2500 VA
Insulation class B
Maximum ambient temperature 40 °C
Efficiency up to 98 %
Degree of protection IP 65

Advantages

Safe galvanic isolation
Visual status indicator
Integrated short circuit and overload protection
Very high efficiency
Very low idle current
High insulation strengh, very good moisture protection and low noise thanks to XtraDenseFill resin High insulation strengh, very good moisture protection and low noise thanks to XtraDenseFill resin encapsulation
High degree of protection
Carrying handles, mains connecting lead and socket for mobile use

Applications

Isolating transformer for mobile use for the safe electrical isolation of the input and output sides. The transformer can be used to build an IT network.

Standards

Isolating transformer
to: VDE 0570 Part 2-4, DIN EN 61558-2-4, EN 61558-2-4, IEC 61558-2-4

Isolating transformer with integrated insulation monitoring
TTIT

Electrical data

Type	TTIT 2500/230
Input	
Rated input voltage	230 Vac
Low-inrush current	315 A
Frequency range	50 - 60 Hz
Output	
Rated output voltage	230 Vac
Rated Power	2500 VA
Short circuit voltage	2.7 %
No-load current	0.6 Adc
Efficiency	98 %
Environment	
Ambient temperature max.	40 °C
Safety and protection	
Short circuit strength	short-circuit proof
Class of Insulation System	B
Type	encapsulated in metal housing
Protection index	IP 65
Safety class (prepared)	II
Test voltage	3.6 kVac
Order numbers	
Order Number	**TTIT 2500/230**

Mechanical data

Terminal and mounting	
Terminals PRI	Mains connection cable with protected contact plug
Terminals SEC	Protective contact socket
Measures and weights	
Weight	30.00 kg
Wide	250 mm
Height	180 mm
Depth	410 mm

Interference suppressing transformer
STT

General Data

Rated input voltage 230 Vac
Rated output voltage 230 Vac
Rated power 100 - 400 VA
Insulation class A
Maximum ambient temperature 40 °C
Efficiency up to 91 %
Degree of protection IP 44

Advantages

Good attenuation against radio frequency interference and pulses
Low magnetic leakage field
Integrated short circuit and overload protection
Very good moisture protection and low noise thanks to resin encapsulation
High degree of protection
Carrying handle, mains connecting lead and socket for mobile use

Applications

Mains transformer complying with EN 61558-2-4 for mobile use to minimize mains supply faults such as disturbing pulses and electrical noise.

Standards

Isolating transformer
to: VDE 0570 Part 2-4, DIN EN 61558-2-4, EN 61558-2-4, IEC 61558-2-4

Interference suppressing transformer
STT

Electrical data

Type	STT 100	STT 200	STT 400
Input			
Rated input voltage	230 Vac	230 Vac	230 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output			
Rated output voltage	230 Vac	230 Vac	230 Vac
Rated Power	100 VA	200 VA	400 VA
No-load voltage (app. x factor)	1.06	1.07	1.10
Leakage cur. (PRI-PE)	43 µA (typ.)	57 µA (typ.)	85 µA (typ.)
Leakage cur. (PRI-SEC)	16 µA (typ.)	26 µA (typ.)	41 µA (typ.)
Efficiency	89 %	90 %	92 %
Environment			
Ambient temperature max.	40 °C	40 °C	40 °C
Safety and protection			
Type	enclosed	enclosed	enclosed
Class of Insulation System	A	A	A
Protection index	IP 44	IP 44	IP 44
Safety class	I	I	I
Insulation res. (PRI-PE)	>10 GΩ (typ.)	>10 GΩ (typ.)	>10 GΩ (typ.)
Insulation res. (PRI-SEC)	>10 GΩ (typ.)	>10 GΩ (typ.)	>10 GΩ (typ.)
Coupling cap. (PRI-SEC)	172 pF (typ.)	262 pF (typ.)	390 pF (typ.)
Magn. 50 Hz stray f. (Encl.)	0.33 mT (typ.)	0.30 mT (typ.)	0.85 mT (typ.)
Short circuit strength	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof
Test voltage	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz
Order numbers			
Order Number	**STT 100**	**STT 200**	**STT 400**

Mechanical data

Terminal and mounting			
Terminals PRI	Mains connecting cable with safety plug	Mains connecting cable with safety plug	Mains connecting cable with safety plug
Terminals SEC	Protective contact socket	Protective contact socket	Protective contact socket
Measures and weights			
Weight	5.10 kg	8.00 kg	12.70 kg
Wide	105 mm	120 mm	120 mm
Height	125 mm	150 mm	175 mm
Depth	170 mm	200 mm	300 mm

Interference suppressing isolating transformer
SMTT

General Data

Rated input voltage 230 Vac
Rated output voltage 230 Vac
Rated power 150 VA
Insulation class A
Maximum ambient temperature 40 °C
Efficiency up to 90 %
Degree of protection IP 40

Advantages

Safe galvanic isolation
Low leakage current and high insulation resistance
Good attenuation against radio frequency interference and pulses
Low magnetic 50 Hz leakage field
Integrated short circuit and overload protection
Very good moisture protection and low noise thanks to XtraDenseFill resin encapsulation
High degree of protection
Carrying handle, mains connecting lead and socket for mobile use

Applications

Isolating transformer for mobile use to minimize mains supply faults such as disturbing pulses and electrical noise.

Standards

Isolating transformer
to: VDE 0570 Part 2-4, DIN EN 61558-2-4, EN 61558-2-4, IEC 61558-2-4

Interference suppressing isolating transformer
SMTT

Electrical data

Type	SMTT 150
Input	
Rated input voltage	230 Vac
Frequency range	50 - 60 Hz
Active-Power input	typ. 6.5 W (running at no load)
Output	
Rated output voltage	230 Vac
Rated Power	150 VA
Leakage cur. (PRI-PE)	9 µA (typ.)
Leakage cur. (PRI-SEC)	8 µA (typ.)
Efficiency	90 %
Environment	
Ambient temperature max.	40 °C
Safety and protection	
Type	Resin encapsulated transformer
Class of Insulation System	A
Protection index	IP 40
Safety class	II
Coupling cap. (PRI-SEC)	90 pF (typ.)
Magn. 50 Hz stray f. (Encl.)	9.00 mT (typ.)
Short circuit strength	non-inherently short-circuit proof
Test voltage	5000 Vac, 50 Hz
Order numbers	
Order Number	**SMTT 150**

Mechanical data

Terminal and mounting	
Terminals PRI	Mains connecting cable with safety plug
Terminals SEC	Protective contact socket
Measures and weights	
Weight	3.50 kg
Wide	95 mm
Height	155 mm
Depth	160 mm

Overview
Safty isolating transformers

Power at a glance
Safty isolating transformers

Typ	Features	Rated input voltage	Rated output voltage	7,5 VA	10 VA	13 VA	18 VA	25 VA	28 VA	40 VA	50 VA	63 VA
EL	free wiring	230 Vac	2x6 Vac	■		■	■		■		■	
			2x9 Vac	■		■	■		■		■	
			2x12 Vac	■		■	■		■		■	
			2x15 Vac	■		■	■		■		■	
			2x18 Vac	■		■	■		■		■	
			2x24 Vac									
ACT	in housing, rail mounting	230 Vac	24 Vac		■			■				■
SIM	in housing, IP 20	230 Vac	2 x 12 Vac									■
EVKE	resin encapsulation, IP 67/68	230 Vac	24 Vac					■		■		■
ETKEC	resin encapsulation, for mobile use, CEE socket outlet, IP 44	230 Vac	24 Vac									

Power at a glance
Safty isolating transformers for halogen lamps

Typ	Features	Rated input voltage	Rated output voltage	50 VA	60 W	70 W	105 W	150 W	200 W	250 W	300 W	Page
HIT	screw-type terminals, resin encapsulation	230 Vac	11,3 - 11,5 Vac		■		■	■	■	■	■	98
HLVT	screw-type terminals, resin encapsulation	230 Vac	11,5 Vac	■								100
HES	electronic, light wight	230 Vac	11,5 Vac			■	■					102

100 VA	160 VA	200 VA	250 VA	300 VA	400 VA	500 VA	630 VA	800 VA	Page
	■								86
	■								
	■								
	■								
	■								
	■								88
	■		■		■		■		■ 90
	■	■		■		■		■		92
	■		■							96

Safety isolating transformer
EL

General Data

Rated input voltage 230 Vac
Rated output voltage 2 x 6 - 2 x 18 Vac
Rated power 7.5 - 100 VA
Insulation class E
Maximum ambient temperature 40 °C
Efficiency up to 88 %
Degree of protection IP 00

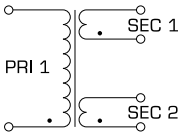
Advantages

Solder tab for free wiring
Very good corrosion protection and low noise thanks to BLOCKIMPEX vacuum impregnation
Coil shell in 2-chamber technology
Simple mounting thanks to robust metal footplate with oval slots

Applications

Safety isolating transformer for the safe electrical isolation of the input and output sides. The transformer is suitable for creating SELV and PELV circuits because of the limit on the output voltage.

Sample application



Standards

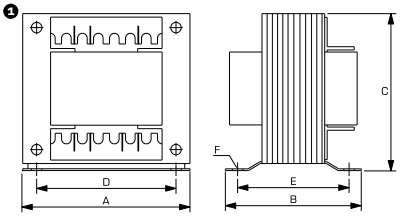
Safety isolating transformer
to: VDE 0570 Part 2-6, DIN EN 61558-2-6, EN 61558-2-6, IEC 61558-2-6

Safety isolating transformer
EL

Type	EL 7,5/..	EL 13/..	EL 18/..	EL 28/..	EL 50/..	EL 100/..
Electrical data						
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage: Order no.	2x6 Vac: EL 7,5/6 2x9 Vac: EL 7,5/9 2x12 Vac: EL 7,5/12 2x15 Vac: EL 7,5/15 2x18 Vac: EL 7,5/18	2x6 Vac: EL 13/6 2x9 Vac: EL 13/9 2x12 Vac: EL 13/12 2x15 Vac: EL 13/15 2x18 Vac: EL 13/18	2x6 Vac: EL 18/6 2x9 Vac: EL 18/9 2x12 Vac: EL 18/12 2x15 Vac: EL 18/15 2x18 Vac: EL 18/18	2x6 Vac: EL 28/6 2x9 Vac: EL 28/9 2x12 Vac: EL 28/12 2x15 Vac: EL 28/15 2x18 Vac: EL 28/18	2x6 Vac: EL 50/6 2x9 Vac: EL 50/9 2x12 Vac: EL 50/12 2x15 Vac: EL 50/15 2x18 Vac: EL 50/18	2x9 Vac: EL 100/9 2x12 Vac: EL 100/12 2x15 Vac: EL 100/15 2x18 Vac: EL 100/18 2x24 Vac: EL 100/24
Rated Power	7.5 VA	13.0 VA	18.0 VA	28.0 VA	50.0 VA	100.0 VA
No-load voltage (app. x factor)	1.38	1.28	1.18	1.16	1.15	1.11
No-load loss (typ.)	2.00 W	2.20 W	2.70 W	3.10 W	3.50 W	4.70 W
Efficiency	62 %	67 %	72 %	77 %	81 %	88 %
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	E	E	E	E	E	E
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II	II	II
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Overload protection	Typ PTC 880 (Accessory - available on request)	Typ PTC 872 (Accessory - available on request)	Typ PTC 860 (Accessory - available on request)	Typ PTC 850 (Accessory - available on request)	Typ PTC 840 (Accessory - available on request)	Typ PTC 810 (Accessory - available on request)
Test voltage	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz
Order numbers						
Order Number	**see output voltage**	**see output voltage**	**see output voltage**	**see output voltage**	**see output voltage**	**see output voltage**
Mechanical data						
Terminal and mounting						
Terminals	Solder tab for free wiring	Solder tab for free wiring	Solder tab for free wiring	Solder tab for free wiring	Solder tab for free wiring	Solder tab for free wiring
Fixing method	Base plate	Base plate	Base plate	Base plate	Base plate	Base plate
Fixing screws	M3	M3	M3	M3	M4	M4
Measures and weights						
Weight	0.26 kg	0.36 kg	0.50 kg	0.68 kg	0.97 kg	1.96 kg
Core type	EI 48/16,5	EI 54/18,8	EI 60/21	EI 60/30	EI 75/26,5	EI 84/43,5
Dimension picture (in mm)	❶	❶	❶	❶	❶	❶
A	48	54	60	60	75	84
B	39	40	47	56	59	80
C	45	50	55	55	67	76
D	40	45	50	50	62.5	64
E	32	30	32	42	45	63.5

Dimension pictures

❶



Safety isolating transformer
ACT

General Data

- Rated input voltage 230 Vac
- Rated output voltage 24 Vac
- Rated power 10 - 100 VA
- Insulation class B
- Maximum ambient temperature 25 °C
- Degree of protection IP 00

Advantages

- Integrated short circuit and overload protection thanks to temperature fuse in the input and fuse in the output (ACT 10 only temperature fuse)
- Permanent corrosion protection, high insulation value and maximum electrical reliability thanks to XtraDensiFill resin encapsulation
- Stable plastic housing for rail mounting, e.g. in consumer units or meter mounting boards

Applications

Safety isolating transformer for the safe electrical isolation of the input and output sides. The transformer is suitable for creating SELV and PELV circuits because of the limit on the output voltage.

Standards

Safety isolating transformer
to: VDE 0570 Part 2-6, DIN EN 61558-2-6, EN 61558-2-6, IEC 61558-2-6

Safety isolating transformer
ACT

Electrical data

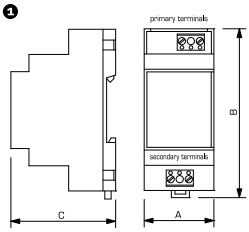
Type	ACT 10	ACT 25	ACT 63	ACT 100
Input				
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output				
Rated output voltage	24 Vac	24 Vac	24 Vac	24 Vac
Rated Power	10 VA	25 VA	63 VA	100 VA
Environment				
Ambient temperature max.	25 °C	25 °C	25 °C	25 °C
Cooling method	self cooling	self cooling	self cooling	self cooling
Safety and protection				
Type	Resin encapsulated transformer	Resin encapsulated transformer	Resin encapsulated transformer	Resin encapsulated transformer
Class of Insulation System	B	B	B	B
Protection index	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II
Short circuit strength	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof
Test voltage	3750 Vac, 50 Hz	3750 Vac, 50 Hz	3750 Vac, 50 Hz	3750 Vac, 50 Hz
Order numbers				
Order Number	**ACT 10**	**ACT 25**	**ACT 63**	**ACT 100**

Mechanical data

Terminal and mounting				
Terminals	Screw-type terminal	Screw-type terminal	Screw-type terminal	Screw-type terminal
Fixing method	Panel installation on mounting rails	Panel installation on mounting rails	Panel installation on mounting rails	Panel installation on mounting rails
Measures and weights				
Weight	0.36 kg	0.95 kg	1.93 kg	1.93 kg
Dimension picture (in mm)	❶	❷	❸	❸
A	35	106	159	159
B	94	94	94	94
C	63	63	63	63

Dimension pictures

❶



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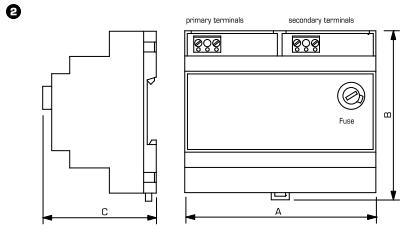

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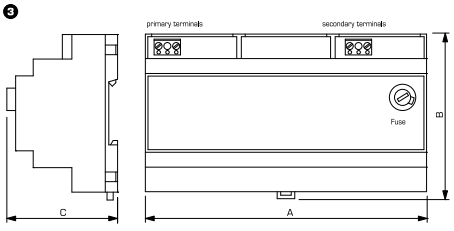


Safety isolating transformer
SIM

General Data

Rated input voltage 230 Vac
Rated output voltage 2 x 12 Vac
Rated power 60 - 800 VA
Insulation class A
Maximum ambient temperature 40 °C
Efficiency up to 95 %
Degree of protection IP 20

Advantages

Integrated short circuit and overload protection
Double output voltage for series or parallel connection
Very good moisture protection and low noise thanks to XtraDenseFill resin encapsulation (up to 300 VA)
Screw terminals under cover with strain relief

Applications

Safety isolating transformer for the safe electrical isolation of the input and output sides. The transformer is suitable for creating SELV and PELV circuits because of the limit on the output voltage.

Standards

Safety isolating transformer
to: VDE 0570 Part 2-6, DIN EN 61558-2-6, EN 61558-2-6, IEC 61558-2-6

Certifications

VDE

Safety isolating transformer
SIM

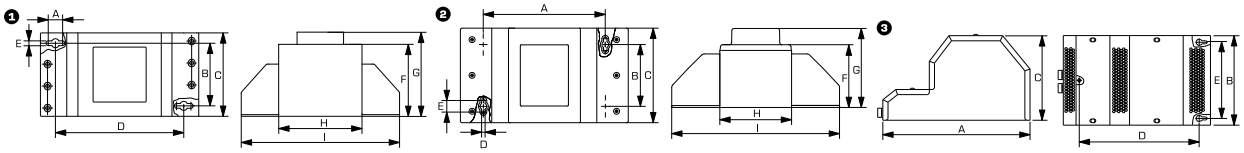
Electrical data

Type	SIM 60	SIM 100	SIM 200	SIM 300	SIM 500	SIM 800
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	2 x 12 Vac	2 x 12 Vac	2 x 12 Vac	2 x 12 Vac	2 x 12 Vac	2 x 12 Vac
Rated Power	60 VA	100 VA	200 VA	300 VA	500 VA	800 VA
No-load voltage (app. x factor)	1.15	1.08	1.07	1.05	1.04	1.03
No-load loss (typ.)	3.30 W	4.90 W	7.40 W	14.00 W	18.00 W	27.00 W
Efficiency	83.5 %	87.5 %	89.5 %	91 %	92 %	95 %
Standards						
Classification	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer
Approvals						
Approvals	VDE	VDE	VDE	VDE	VDE, cURus	VDE, cURus
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	Resin encapsulated transformer	Resin encapsulated transformer	Resin encapsulated transformer	Resin encapsulated transformer	encapsulated in metal housing	encapsulated in metal housing
Class of Insulation System	A	A	A	A	B	B
Protection index	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20
Safety class	II	II	II	II	I	I
Short circuit strength	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof
Test voltage	5000 Vac, 50 Hz	5000 Vac, 50 Hz	5000 Vac, 50 Hz	5000 Vac, 50 Hz	3750 Vac, 50 Hz	3750 Vac, 50 Hz
Order numbers						
Order Number	**SIM 60**	**SIM 100**	**SIM 200**	**SIM 300**	**SIM 500**	**SIM 800**

Mechanical data

Terminal and mounting						
Terminals	Screw-type terminal	Screw-type terminal	Screw-type terminal	Screw-type terminal	Screw-type terminal	Screw-type terminal
Fixing method	Fixing holes in the terminal connection compartment	Fixing holes in the terminal connection compartment	Fixing holes in the terminal connection compartment	Fixing holes in the terminal connection compartment	Fixing holes in housing	Fixing holes in housing
Measures and weights						
Weight	1.55 kg	2.00 kg	3.60 kg	4.90 kg	9.10 kg	15.60 kg
Dimension picture (in mm)	❶	❶	❷	❷	❸	❸
A	14.2	14.2	167	167	283	283
B	58	58	76	76	200	200
C	77	77	117	117	166	166
D	135	135	4.3	4.3	245	245
E	4.3	4.3	14	14	148	148
F	65	65	77	100	-	-
G	76	76	97	117	-	-
H	90	90	97	97	-	-
I	166	166	223	223	-	-

Dimension pictures



Safety isolating transformer
EVKE

General Data

Rated input voltage 230 Vac
Rated output voltage 24 Vac
Rated power 25 - 630 VA
Insulation class E
Maximum ambient temperature 40 °C
Degree of protection IP 65 or IP 68

Advantages

Integrated short circuit and overload protection
Very good moisture protection and low noise thanks to resin encapsulation
High degree of protection
Plastic fittings on terminals

Applications

Safety isolating transformer for the safe electrical isolation of the input and output sides. The transformer is suitable for creating SELV and PELV circuits because of the limit on the output voltage.

Standards

Safety isolating transformer
to: VDE 0570 Part 2-6, DIN EN 61558-2-6, EN 61558-2-6, IEC 61558-2-6

Safety isolating transformer
EVKE

Type	EVKE 25/24	EVKE 40/24	EVKE 63/24	EVKE 100/24	EVKE 160/24	EVKE 250/24
Electrical data						
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	24 Vac	24 Vac	24 Vac	24 Vac	24 Vac	24 Vac
Rated Power	25 VA	40 VA	63 VA	100 VA	160 VA	250 VA
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	Resin encapsulated transformer	Resin encapsulated transformer	Resin encapsulated transformer	Resin encapsulated transformer	Resin encapsulated transformer	Resin encapsulated transformer
Class of Insulation System	E	E	E	E	E	E
Test voltage	3750 Vac, 50 Hz	3750 Vac, 50 Hz	3750 Vac, 50 Hz	3750 Vac, 50 Hz	3750 Vac, 50 Hz	3750 Vac, 50 Hz
Protection index	IP 68	IP 68	IP 68	IP 68	IP 68	IP 65
Safety class	II	II	II	II	II	II
Short circuit strength	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof
Order numbers						
Order Number	**EVKE 25/24**	**EVKE 40/24**	**EVKE 63/24**	**EVKE 100/24**	**EVKE 160/24**	**EVKE 250/24**
Mechanical data						
Terminal and mounting						
Terminals	Plastic fittings on 2 x M16 terminals	Plastic fittings on 2 x M16 terminals	Plastic fittings on 2 x M16 terminals	Plastic fittings on 2 x M16 terminals	Plastic fittings on 1 x M16, 1 x M20 terminals	Plastic fittings on 2 x M16 terminals
Fixing method	Mounting lugs	Mounting lugs	Mounting lugs	Mounting lugs	Mounting lugs	Mounting lugs
Fixing screws	M4	M6	M6	M6	M6	M6
Measures and weights						
Weight	1.30 kg	2.70 kg	2.90 kg	3.20 kg	5.00 kg	5.30 kg
Dimension picture (in mm)	❶	❶	❶	❶	❷	❷
A1	90	130	130	130	200	200
A2	-	-	-	-	135	135
B1	80	95	95	95	140	140
B2	95	130	130	130	170	170
C	75	95	95	95	160	160
D	5	5	5	5	10.5	10.5

Dimension pictures

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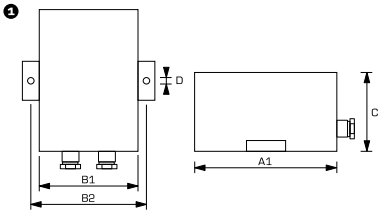

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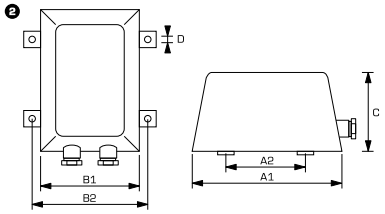


Safety isolating transformer
EVKE

Electrical data

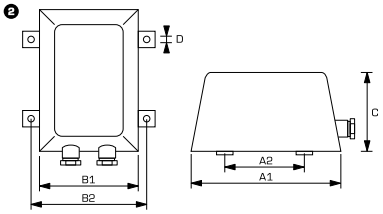
Type	EVKE 400/24	EVKE 630/24
Input		
Rated input voltage	230 Vac	230 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz
Output		
Rated output voltage	24 Vac	24 Vac
Rated Power	400 VA	630 VA
Environment		
Ambient temperature max.	40 °C	40 °C
Safety and protection		
Type	Resin encapsulated transformer	Resin encapsulated transformer
Class of Insulation System	E	E
Test voltage	3750 Vac, 50 Hz	3750 Vac, 50 Hz
Protection index	IP 68	IP 68
Safety class	II	II
Short circuit strength	non-inherently short-circuit proof	non-inherently short-circuit proof
Order numbers		
Order Number	**EVKE 400/24**	**EVKE 630/24**

Mechanical data

Terminal and mounting		
Terminals	Plastic fittings on 2 x M16 terminals	Plastic fittings on 1 x M16, 1 x M20 terminals
Fixing method	Mounting lugs	Mounting lugs
Fixing screws	M6	M6
Measures and weights		
Weight	7.00 kg	13.00 kg
Dimension picture (in mm)	❷	❷
A1	210	210
A2	130	135
B1	120	145
B2	142	195
C	125	160
D	6	10.5

Dimension pictures

❷




EVKE 250/24
IP 65
ta 40°C
Cl.A
250VA
50-60Hz
Pri.: 230V - 1.2A
2.0AT
Sec.: 24V - 10.4A
VDE 0570/EN 61558
www.block-trafo.de
FA.NR.:5097737
2,0AT

Safety isolating transformer
ETKEC

General Data

Rated input voltage 230 Vac
Rated output voltage 24 Vac
Rated power 100 - 200 VA
Insulation class E
Maximum ambient temperature 40 °C
Degree of protection IP 44

Advantages

Integrated short circuit and overload protection
Very good moisture protection and low noise thanks to resin encapsulation
High degree of protection
Carrying handle, mains connecting lead and CEE socket for mobile use

Applications

Safety isolating transformer for the safe electrical isolation of the input and output sides. The transformer is suitable for creating SELV and PELV circuits because of the limit on the output voltage.

Standards

Safety isolating transformer
to: VDE 0570 Part 2-6, DIN EN 61558-2-6, EN 61558-2-6, IEC 61558-2-6

Safety isolating transformer
ETKEC

Type	ETKEC 100/24	ETKEC 200/24
Input		
Rated input voltage	230 Vac	230 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz
Output		
Rated output voltage	24 Vac	24 Vac
Rated Power	100 VA	200 VA
Environment		
Ambient temperature max.	40 °C	40 °C
Safety and protection		
Type	Resin encapsulated transformer	Resin encapsulated transformer
Class of Insulation System	E	E
Protection index	IP 44	IP 44
Safety class	II	II
Short circuit strength	non-inherently short-circuit proof	non-inherently short-circuit proof
Test voltage	3750 Vac, 50 Hz	3750 Vac, 50 Hz
Order numbers		
Order Number	**ETKEC 100/24**	**ETKEC 200/24**
Terminal and mounting		
Terminals PRI	Mains connecting cable with safety plug	Mains connecting cable with safety plug
Terminals SEC	CEE-socket	2 CEE-sockets
Measures and weights		
Weight	3.50 kg	6.70 kg
Wide	110 mm	140 mm
Height	120 mm	145 mm
Depth	265 mm	220 mm

Electrical data

Mechanical data

Safety isolating transformer for halogen lamps **HIT**

General Data

Rated input voltage 230 Vac
Rated output voltage 11.3 - 11.5 Vac
Rated output 60 - 300 W
Insulation class A
Maximum ambient temperature 40 °C
Efficiency up to 92 %
Degree of protection IP 20

Advantages

Integrated short circuit and overload protection
Very good moisture protection and low noise thanks to XtraDenseFill resin encapsulation
Screw terminals under cover with strain relief

Applications

Safety isolating transformer for 12 V halogen lamps for the safe electrical isolation of the input and output sides. The transformer is suitable for creating SELV and PELV circuits because of the limit on the output voltage.

Standards

Safety isolating transformer for halogen lamps
to: VDE 0570 Teil 2-6, DIN EN 61558-2-6, EN 61558-2-6, IEC 61558-2-6

Safety isolating transformer for halogen lamps
HIT

Electrical data

Type	HIT 60	HIT 105	HIT 150	HIT 200	HIT 250	HIT 300
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	11.5 Vac	11.5 Vac	11.3 Vac	11.3 Vac	11.3 Vac	11.3 Vac
Number of SEC-Circuits	1	1	3	2	3	3
Rated current	4.80 A	8.40 A	3 x 4.00 A	2 x 8.00 A	2 x 8.00 A, 1 x 4.00 A	3 x 8.00 A
for Lamps power	60 W	105 W	150 W	200 W	250 W	300 W
Efficiency	85.5 %	87 %	89 %	90 %	90 %	92 %
Standards						
Classification	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	Resin encapsulated transformer	Resin encapsulated transformer	Resin encapsulated transformer	Resin encapsulated transformer	Resin encapsulated transformer	Resin encapsulated transformer
Class of Insulation System	A	A	A	A	A	A
Protection index	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20
Safety class	II	II	II	II	II	II
Short circuit strength	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof
Test voltage	5000 Vac, 50 Hz	5000 Vac, 50 Hz	5000 Vac, 50 Hz	5000 Vac, 50 Hz	5000 Vac, 50 Hz	5000 Vac, 50 Hz
Order numbers						
Order Number	**HIT 60**	**HIT 105**	**HIT 150**	**HIT 200**	**HIT 250**	**HIT 300**

Mechanical data

Terminal and mounting						
Terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals
Fixing method	Fixing holes in the terminal connection compartment	Fixing holes in the terminal connection compartment	Fixing holes in the terminal connection compartment	Fixing holes in the terminal connection compartment	Fixing holes in the terminal connection compartment	Fixing holes in the terminal connection compartment
Measures and weights						
Weight	1.42 kg	2.00 kg	3.00 kg	3.55 kg	4.20 kg	5.00 kg
Dimension picture (in mm)	❶	❶	❷	❷	❷	❷
A	14.2	14.2	167	167	167	167
B	58	58	76	76	76	76
C	77	77	117	117	117	117
D	135	135	4.3	4.3	4.3	4.3
E	4.3	4.3	14	14	14	14
F	65	65	77	77	100	100
G	76	76	97	97	117	117
H	90	90	97	97	97	97
I	166	166	223	223	223	223

Dimension pictures

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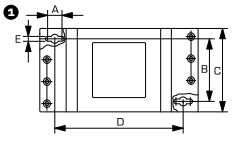

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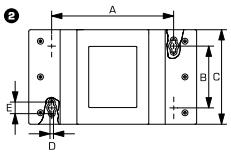

Safety isolating transformer for halogen lamps **HLVT**

General Data

- Rated input voltage 230 Vac
- Rated output voltage 11.5 Vac
- Rated power 50 W
- Insulation class B
- Maximum ambient temperature 40 °C
- Efficiency up to 80 %
- Degree of protection IP 20

Advantages

- Integrated short circuit and overload protection
- Very good moisture protection and low noise thanks to XtraDenseFill resin encapsulation
- Screw terminals under cover with strain relief
- Slender form for 60 mm installation diameter

Applications

Safety isolating transformer for 12 V halogen lamps for the safe electrical isolation of the input and output sides. The transformer is suitable for creating SELV and PELV circuits because of the limit on the output voltage.

Standards

Safety isolating transformer for halogen lamps
to: VDE 0570 Teil 2-6, DIN EN 61558-2-6, EN 61558-2-6, IEC 61558-2-6

Safety isolating transformer for halogen lamps
HLVT

Electrical data

Type	HLVT 50
Input	
Rated input voltage	230 Vac
Frequency range	50 - 60 Hz
Output	
Rated output voltage	11.5 Vac
for Lamps power	50 W
Efficiency	80 %
Environment	
Ambient temperature max.	40 °C
Safety and protection	
Type	Resin encapsulated transformer
Class of Insulation System	B
Protection index	IP 20
Safety class (prepared)	II
Short circuit strength	non-inherently short-circuit proof
Test voltage	3750 Vac, 50 Hz
Order numbers	
Order Number	**HLVT 50**

Mechanical data

Terminal and mounting	
Terminals	Screw-type terminal
Measures and weights	
Weight	1.07 kg
Wide	42 mm
Height	37 mm
Depth	182 mm

Electronic transformer for halogen lamps
HES

General Data

Rated input voltage 230 Vac
Rated output voltage 11,5 Vac
Rated power 20 - 105 W
Maximum ambient temperature 50 °C
Power factor cos approximately 95 %
Degree of protection IP 20

Advantages

Integrated short circuit and overload protection
Screw terminals under cover with strain relief
Low weight
Slim style

Applications

Electronic transformer for supply of 12 Vac halogen lamps.

Standards

Electronic transformer for halogen lamps
to: EN 61347-2-2, EN 61047, EN 55015, EN 61000-3-2, EN 61547

EMV:
EN 61547 (Interference emission), EN 55015, EN 61000-3-2 (Interference emission)

Electronic transformer for halogen lamps
HES

Electrical data

Type	HES 70K	HES 105K
Input		
Rated input voltage	230 Vac	230 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz
Input rated current (rated load)	300 mA	455 mA
Output		
Rated output voltage	11.5 Vac	11.5 Vac
for lamp power (min.)	20 W	35 W
for lamp power (max.)	70 W	105 W
Power factor	cos appr. 95 %	cos appr. 95 %
Environment		
Ambient temperature max.	50 °C	45 °C
Safety and protection		
Type	Resin encapsulated transformer	Resin encapsulated transformer
Protection index	IP 20	IP 20
Safety class	II	II
Short circuit strength	shut down at short-circuit	shut down at short-circuit
Order numbers		
Order Number	**HES 70K**	**HES 105K**

Mechanical data

Terminal and mounting		
Fixing method	Fixing hole	Fixing hole
Terminals	Screw-type terminal	Screw-type terminal
Measures and weights		
Housing colour	Bordeaux-red, blue	Bordeaux-red, blue
Weight	0.14 kg	0.20 kg
Dimension picture (in mm)	❶	❶
A	100	125
B	48	48.5
C	28	28.5
D	96	121
E	4.5	4.5

Dimension pictures

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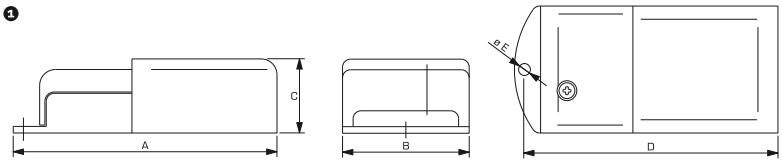

Overview Autotransformers

Power at a glance

	Typ	Features	Rated input voltage	Rated output voltage	0,8 A	1,25 A
1-phase	AIM	in housing, IP 20	115 Vac	220, 230, 240 Vac	■	
			115 Vac	115 Vac		
			220, 230, 240 Vac	115, 220, 230, 240 Vac		
	ESP	for fan speed control	230 Vac	80 Vac/115 Vac/130 Vac/150 Vac/170 Vac/190 Vac		
			400 Vac	140 Vac/170 Vac/200 Vac/235 Vac/270 Vac/310 Vac	■	
	ESS	variable transformer	230 Vac	0 - 230 Vac	■	■
				0 - 230/250 Vac		
				0 - 230/260 Vac		
3-phase	DSP	for fan speed control	3 x 400 Vac	3 x 240 Vac/3 x 230 Vac/3 x 190 Vac/3 x 170 Vac/3 x 130 Vac		

	Typ	Features	Rated input voltage	Rated output voltage	150 VA	250 VA	350 VA	500 VA	1000 VA	2000 VA	3000 VA
1-phase	VT-EN		110, 125, 230, 240 Vac	110, 125, 230, 240 Vac	■		■	■	■	■	■
	E-JET	mobil	230 Vac	110 Vac		■		■	■		
	JET	mobil	110 Vac	230 Vac		■		■	■		
3-phase	AT3	IP 00, optional IP 23 or IP 54 in housing	3 x 200/208 - 3 x 690	3 x 400 Vac						■	

1,5 A	1,6 A	1,8 A	2,0 A	2,5 A	2,8 A	3,0 A	3,15 A	3,20 A	3,60 VA	4,00 VA	5,00 VA	5,40 VA	5,80 VA	6,00 VA	6,30 VA	8,00 VA	9,00 VA	10,00 VA	15,00 VA	16,00 VA	18,00 VA	20,00 VA	Page
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	■								■			■						■					
			■				■			■					■	■		■			■		140
		■					■				■					■					■		
■						■								■			■		■				138

3500 VA	10000 VA	15000 VA	25000 VA	45000 VA	70000 VA	110000 VA	160000 VA	250000 VA	Page
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									114
									116
■	■	■	■	■	■	■	■	■	118

Autotransformer
AIM

General Data

Rated input voltage 115/220/230/240 Vac
Rated output voltage 115/220/230/240 Vac
Rated output voltage 0.8 - 16 A
Insulation class A or B
Maximum ambient temperature 40 °C
Degree of protection IP 20

Advantages

Low weight and small size (compared to isolating transformers)
Integrated short circuit and overload protection
Very high efficiency
Very good moisture protection and low noise thanks to XtraDenseFill resin encapsulation (AIM 1.8/8 - AIM 5.0/2.5)
Screw terminals under cover with strain relief

Applications

Autotransformer for adjustment of the voltage on the input and output sides with no requirement for electrical isolation.

Standards

Autotransformer
to: VDE 0570 Part 2-13, DIN EN 61558-2-13, EN 61558-2-13, IEC 61558-2-13

Autotransformer
AIM

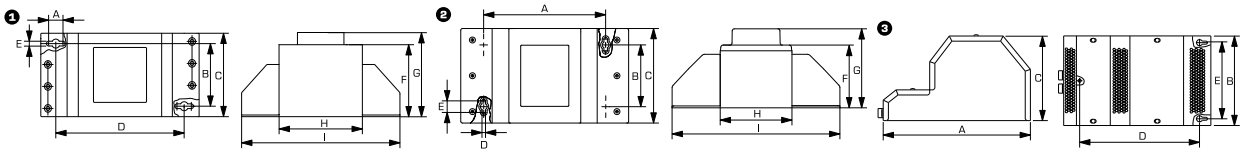
Electrical data

Type	AIM 1,6/0,8	AIM 3,2/1,6	AIM 5,0/2,5	AIM 10/5	AIM 16/8
Input					
Rated input Voltage	115 Vac/220 Vac 230 Vac/240 Vac	115 Vac/220 Vac 230 Vac/240 Vac	115 Vac/220 Vac 230 Vac/240 Vac	115 Vac/220 Vac 230 Vac/240 Vac	115 Vac/220 Vac 230 Vac/240 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output					
Rated output voltage	115 Vac/220 Vac 230 Vac/240 Vac	115 Vac/220 Vac 230 Vac/240 Vac	115 Vac/220 Vac 230 Vac/240 Vac	115 Vac/220 Vac 230 Vac/240 Vac	115 Vac/220 Vac 230 Vac/240 Vac
Rated output voltage	0.80 (PRI 115 / SEC 220, 230, 240); 1.60 (PRI 115 / SEC 115); 1.60 (PRI 220, 230, 240 / SEC 115, 220, 230, 240)	1.60 (PRI 115 / SEC 220, 230, 240); 3.20 (PRI 115 / SEC 115); 3.20 (PRI 220, 230, 240 / SEC 115, 220, 230, 240)	2.50 (PRI 115 / SEC 220, 230, 240); 5.00 (PRI 115 / SEC 115); 5.00 (PRI 220, 230, 240 / SEC 115, 220, 230, 240)	5.00 (PRI 115 / SEC 220, 230, 240); 10.00 (PRI 115 / SEC 115); 10.00 (PRI 220, 230, 240 / SEC 115, 220, 230, 240)	8.00 (PRI 115 / SEC 220, 230, 240); 16.00 (PRI 115 / SEC 115); 16.00 (PRI 220, 230, 240 / SEC 115, 220, 230, 240)
No-load loss (typ.)	4.70 W	6.70 W	11.80 W	18.00 W	21.00 W
Environment					
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection					
Type	Resin encapsulated transformer	Resin encapsulated transformer	Resin encapsulated transformer	enclosed	enclosed
Class of Insulation System	A	A	A	B	B
Protection index	IP 20	IP 20	IP 20	IP 20	IP 20
Safety class	May be used in protection category I and II. When protection category I devices are equipped the protective conductor in the output must be connected with the lead-in protective conductor.	May be used in protection category I and II. When protection category I devices are equipped the protective conductor in the output must be connected with the lead-in protective conductor.	May be used in protection category I and II. When protection category I devices are equipped the protective conductor in the output must be connected with the lead-in protective conductor.	I	I
Short circuit strength	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof
Order numbers					
Order Number	**AIM 1,6/0,8**	**AIM 3,2/1,6**	**AIM 5,0/2,5**	**AIM 10/5**	**AIM 16/8**

Mechanical data

Terminal and mounting					
Terminals	Screw-type terminal	Screw-type terminal	Screw-type terminal	Screw-type terminal	Screw-type terminal
Fixing method	Fixing holes in the terminal connection compartment	Fixing holes in the terminal connection compartment	Fixing holes in the terminal connection compartment	Fixing holes in the housing	Fixing holes in the housing
Measures and weights					
Weight	2.10 kg	3.60 kg	5.00 kg	12.10 kg	16.50 kg
Dimension picture (in mm)	❶	❷	❷	❸	❸
A	14.2	167	167	283	283
B	58	76	76	200	200
C	77	117	117	166	165
D	135	4.3	4.3	245	245
E	4.3	14	14	148	148
F	65	77	100	-	-
G	76	97	117	-	-
H	90	97	97	-	-
I	166	223	223	-	-

Dimension pictures



Autotransformer
VT-EN

General Data

Rated input voltage 110/125/230/240 Vac
Rated output voltage 110/125/230/240 Vac
Rated power 150 - 3000 VA
Insulation class B or E
Maximum ambient temperature 40 °C
Degree of protection IP 00

Advantages

Low weight and small size (compared to isolating transformers)
Very high efficiency
Very good moisture protection and low noise thanks to BLOCKIMPEX vacuum impregnation
Contact protected screw connection terminals complying with UVV BVG A3
Simple mounting thanks to robust metal fixing rail with oval slots

Applications

Autotransformer for adjustment of the voltage on the input and output sides with no requirement for electrical isolation.

Standards

Autotransformer
to: VDE 0570 Teil 2-13, DIN EN 61558-2-13, EN 61558-2-13, IEC 61558-2-13, UL 5085-1/-2, CSA 22.2 No.66

Certifications

UL 5085-1/-2, CSA 22.2 No.66

Autotransformer
VT-EN

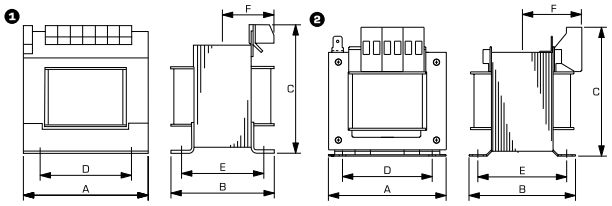
Electrical data

Type	VT 15-EN	VT 35-EN	VT 50-EN	VT 100-EN	VT 200-EN	VT 300-EN
Input						
Rated input Voltage	110 Vac/125 Vac 230 Vac/240 Vac	110 Vac/125 Vac 230 Vac/240 Vac	110 Vac/125 Vac 230 Vac/240 Vac	110 Vac/125 Vac 230 Vac/240 Vac	110 Vac/125 Vac 230 Vac/240 Vac	110 Vac/125 Vac 230 Vac/240 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	110 Vac/125 Vac 230 Vac/240 Vac	110 Vac/125 Vac 230 Vac/240 Vac	110 Vac/125 Vac 230 Vac/240 Vac	110 Vac/125 Vac 230 Vac/240 Vac	110 Vac/125 Vac 230 Vac/240 Vac	110 Vac/125 Vac 230 Vac/240 Vac
Rated Power	150 VA	350 VA	500 VA	1000 VA	2000 VA	3000 VA
Approvals						
Approvals	-	cURus	cURus	-	cURus	-
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	E	B	E	E	B	B
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Test voltage	2500 Vac, 50 Hz	2500 Vac, 50 Hz	2500 Vac, 50 Hz	2500 Vac, 50 Hz	2500 Vac, 50 Hz	2500 Vac, 50 Hz
Order numbers						
Order Number	**VT 15-EN**	**VT 35-EN**	**VT 50-EN**	**VT 100-EN**	**VT 200-EN**	**VT 300-EN**

Mechanical data

Terminal and mounting						
Terminals	Screw-type terminal, PE 6.3 x 0.8	Screw-type terminal, PE 6.3 x 0.8	Screw-type terminal, PE 6.3 x 0.8	Screw-type terminal, PE 6.3 x 0.8	Screw-type terminal, PE 6.3 x 0.8	Screw-type terminal, PE 6.3 x 0.8
Fixing method	Base plate	Fixing rail	Base plate	Base plate	Fixing rail	Fixing rail
Measures and weights						
Weight	1.90 kg	3.30 kg	4.20 kg	7.80 kg	14.10 kg	19.40 kg
Dimension picture (in mm)	❷	❶	❷	❷	❶	❶
A	84	105	120	150	174	174
B	75	87	86	104	126	155
C	100	120	130	140	150	150
D	54	84	90	122	135	135
E	63	70	70	84	106	134
F	50	50	50	60	70	90

Dimension pictures



Autotransformer
ESP

General Data

Rated input voltage 230 or 400 Vac
Rated output voltage 80 - 310 Vac
Rated output voltage 0.8 - 18 A
Insulation class B
Maximum ambient temperature 40 °C
Degree of protection IP 00

Advantages

Low weight and small size (compared to isolating transformers)
Very high efficiency
Very good moisture protection and low noise thanks to BLOCKIMPEX vacuum impregnation
Contact protected screw connection terminals complying with UVV BVG A3
Simple mounting thanks to robust metal footplate with oval slots

Applications

Autotransformer for example for setting the speed of single phase blower motors.

Standards

Autotransformer
to: VDE 0570 Teil 2-13, DIN EN 61558-2-13, EN 61558-2-13,
IEC 61558-2-13

Autotransformer
ESP

Electrical data

Type	ESP 230/1,5	ESP 230/2,8	ESP 230/5,8	ESP 230/10	ESP 230/18	ESP 400/0,8
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	400 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	80 Vac/115 Vac/130 Vac 150 Vac/170 Vac/190 Vac	80 Vac/115 Vac/130 Vac 150 Vac/170 Vac/190 Vac	80 Vac/115 Vac/130 Vac 150 Vac/170 Vac/190 Vac	80 Vac/115 Vac/130 Vac 150 Vac/170 Vac/190 Vac	80 Vac/115 Vac/130 Vac/ 150 Vac/170 Vac/190 Vac	140 Vac/170 Vac/200 Vac 235 Vac/270 Vac/310 Vac
Rated output voltage	1.50 A	2.80 A	5.80 A	10.00 A	18.00 A	0.80 A
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	B	B	B	B	B	B
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Order numbers						
Order Number	**ESP 230/1,5**	**ESP 230/2,8**	**ESP 230/5,8**	**ESP 230/10**	**ESP 230/18**	**ESP 400/0,8**

Mechanical data

Terminal and mounting						
Terminals	Screw-type terminals, PE 6.3 x 0.8	Screw-type terminals, PE 6.3 x 0.8	Screw-type terminals, PE 6.3 x 0.8	Screw-type terminals, PE 6.3 x 0.8	Screw-type terminals, PE 6.3 x 0.8	Screw-type terminals, PE 6.3 x 0.8
Fixing method	Fixing rail	Fixing rail	Base plate	Base plate	Fixing rail	Fixing rail
Fixing screws	M4	M5	M5	M6	M6	M4
Measures and weights						
Weight	1.50 kg	3.00 kg	4.30 kg	7.80 kg	11.50 kg	1.50 kg
Dimension picture (in mm)	❶	❶	❷	❷	❶	❶
A	84	105	120	150	174	84
B	75	85	91	112	120	75
C	100	118	130	135	150	100
D	64	84	90	122	135	64
E	50	62	70	84	85	50
F	42	45	48	58	60	42

Dimension pictures

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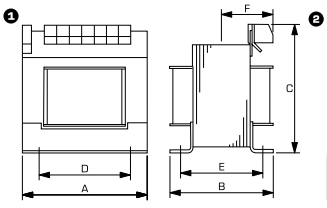

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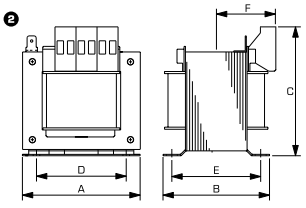

Autotransformer
ESP

Electrical data

Type	ESP 400/1,6	ESP 400/3,6	ESP 400/5,4	ESP 400/10
Input				
Rated input voltage	400 Vac	400 Vac	400 Vac	400 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output				
Rated output voltage	140 Vac/170 Vac/200 Vac 235 Vac/270 Vac/310 Vac	140 Vac/170 Vac/200 Vac 235 Vac/270 Vac/310 Vac	140 Vac/170 Vac/200 Vac 235 Vac/270 Vac/310 Vac	140 Vac/170 Vac/200 Vac 235 Vac/270 Vac/310 Vac
Rated output voltage	1.60 A	3.60 A	5.40 A	10.00 A
Environment				
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C
Safety and protection				
Type	open type	open type	open type	open type
Class of Insulation System	B	B	B	B
Protection index	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Order numbers				
Order Number	**ESP 400/1,6**	**ESP 400/3,6**	**ESP 400/5,4**	**ESP 400/10**

Mechanical data

Terminal and mounting				
Terminals	Screw-type terminals, PE 6.3 x 0.8	Screw-type terminals, PE 6.3 x 0.8	Screw-type terminals, PE 6.3 x 0.8	Screw-type terminals, PE 6.3 x 0.8
Fixing method	Fixing rail	Fixing rail	Fixing rail	Fixing rail
Fixing screws	M5	M5	M6	M6
Measures and weights				
Weight	3.00 kg	4.30 kg	7.80 kg	11.50 kg
Dimension picture (in mm)	❶	❶	❶	❶
A	105	120	150	174
B	85	91	112	120
C	118	130	135	150
D	84	90	122	135
E	62	70	84	85
F	45	48	58	60

Dimension pictures

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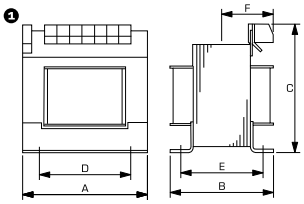
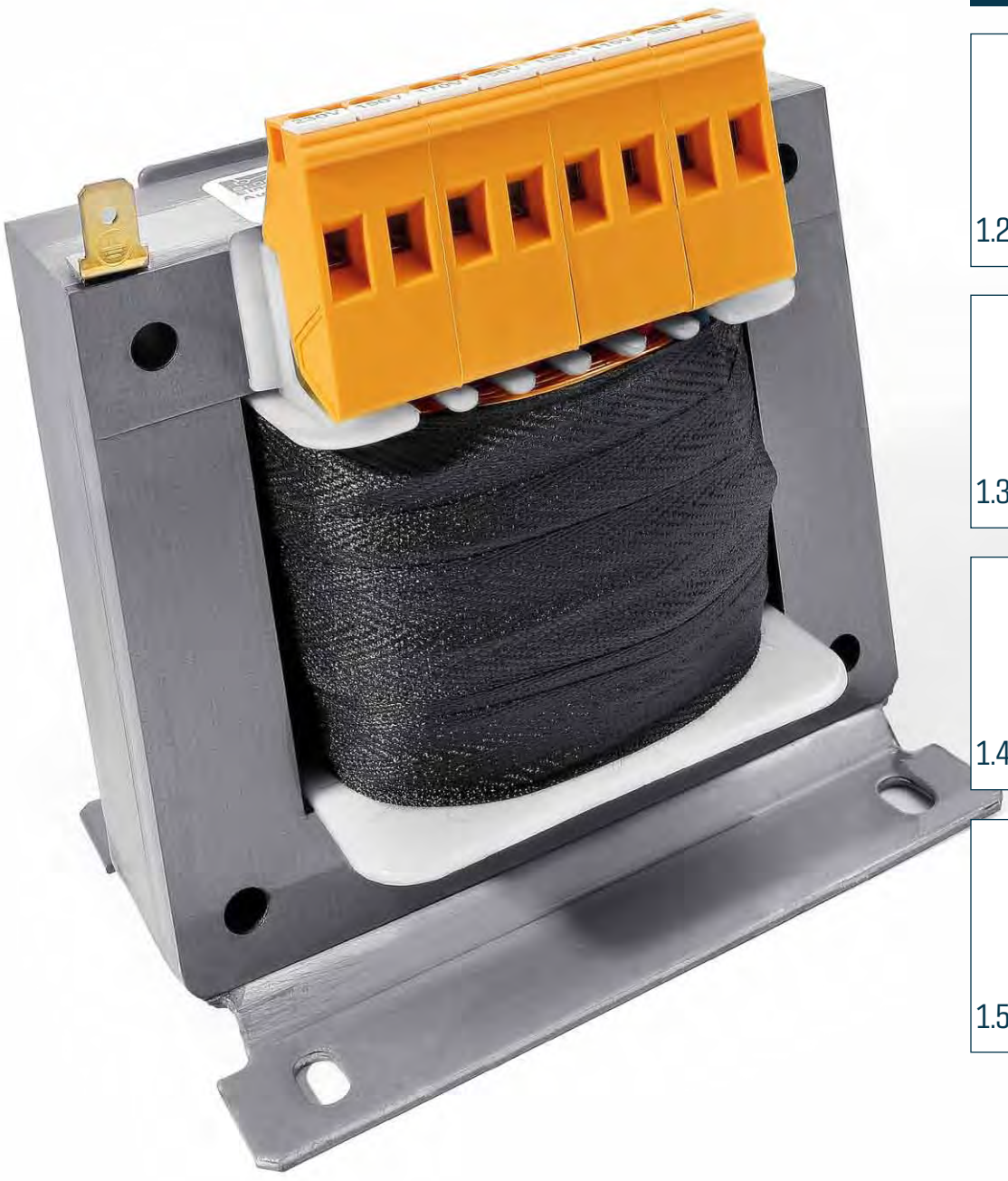




Autotransformer
E-JET

General Data

Rated input voltage 230 Vac
Rated output voltage 110 Vac
Rated power 250 - 1000 VA
Insulation class A
Maximum ambient temperature 40 °C
Efficiency up to 96 %
Degree of protection IP 22

Advantages

Electronic potential monitoring by not connecting the output voltage until the protected contact plug is inserted correctly
Integrated short circuit and overload protection
Very high efficiency
Very good moisture protection and low noise thanks to XtraDenseFill resin encapsulation
Carrying handle, mains connecting lead and socket NEMA5-15 (USA) for mobile use

Applications

Autotransformer for mobile use for the adjustment of the voltage in 230 Vac networks to 110 Vac equipment when no electrical isolation is required.

Standards

Autotransformer
to: VDE 0570 Part 2-13, DIN EN 61558-2-13, EN 61558-2-13, IEC 61558-2-13

Autotransformer
E-JET

Electrical data

Type	E-JET 250	E-JET 500	E-JET 1000
Input			
Rated input voltage	230 Vac	230 Vac	230 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output			
Rated output voltage	110 Vac	110 Vac	110 Vac
Rated Power	250 VA	500 VA	1000 VA
No-load voltage (app. x factor)	1.04	1.04	1.03
Efficiency	94 %	94 %	96 %
Environment			
Ambient temperature max.	40 °C	40 °C	40 °C
Safety and protection			
Type	Resin encapsulated transformer	Resin encapsulated transformer	Resin encapsulated transformer
Class of Insulation System	A	A	A
Protection index	IP 22	IP 22	IP 22
Safety class	I	I	I
Short circuit strength	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof

Order numbers

Order Number	**E-JET 250**	**E-JET 500**	**E-JET 1000**

Mechanical data

Terminal and mounting			
Terminals PRI	Connecting cable with safety plug	Connecting cable with safety plug	Connecting cable with safety plug
Terminals SEC	NEMA5-15 socket (USA)	NEMA5-15 socket (USA)	NEMA5-15 socket (USA)
Measures and weights			
Weight	3.10 kg	6.80 kg	9.90 kg
Wide	95 mm	126 mm	143 mm
Height	155 mm	192 mm	197 mm
Depth	160 mm	180 mm	244 mm

Autotransformer
JET

General Data

Rated input voltage 110 Vac
Rated output voltage 230 Vac
Rated power 250 - 1000 VA
Insulation class A
Maximum ambient temperature 40 °C
Efficiency up to 96 %
Degree of protection IP 22

Advantages

Integrated short circuit and overload protection
Very high efficiency
Very good moisture protection and low noise thanks to XtraDenseFill resin encapsulation
Carrying handle, mains connecting lead NEMA5-15 (USA) and socket for mobile use

Applications

Autotransformer for mobile use for the adjustment of the voltage in 110 Vac networks to 230 Vac equipment when no electrical isolation is required.

Standards

Autotransformer
to: VDE 0570 Part 2-13, DIN EN 61558-2-13, EN 61558-2-13, IEC 61558-2-13

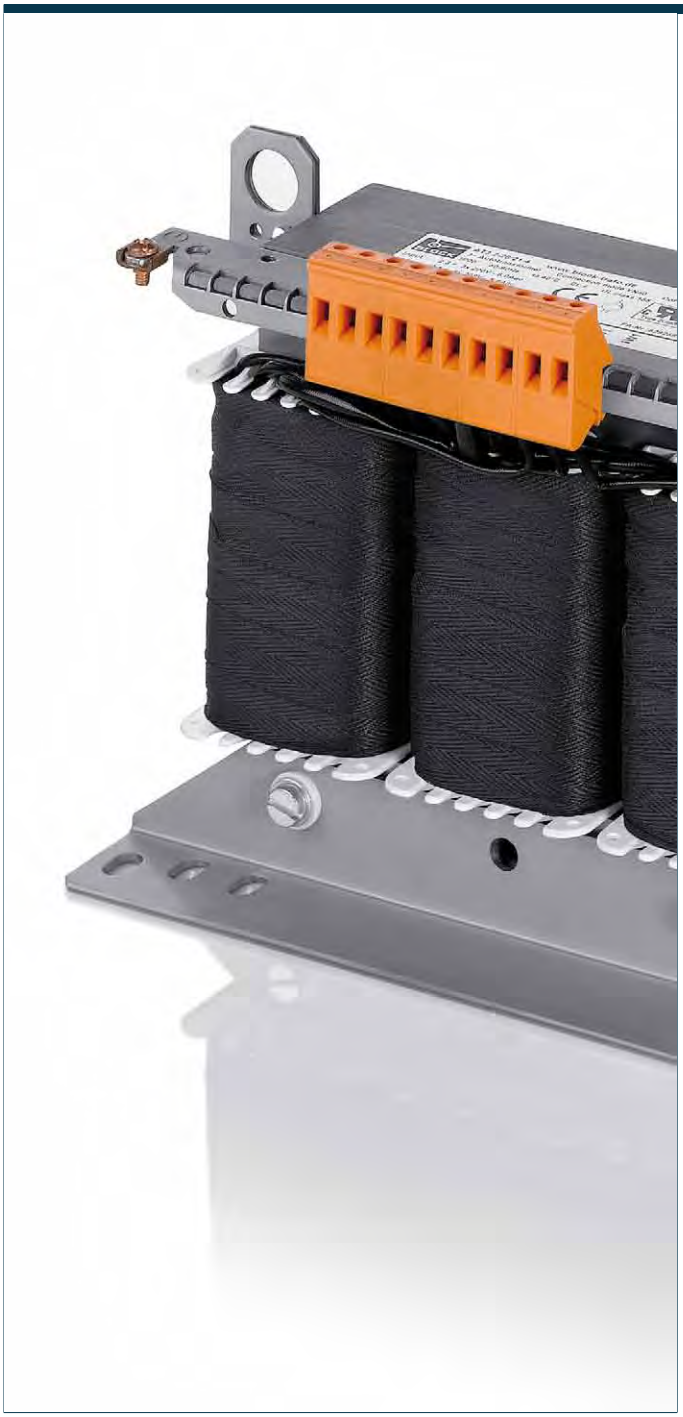
Autotransformer
JET

Type	JET 250	JET 500	JET 1000
Input			
Rated input voltage	110 Vac	110 Vac	110 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output			
Rated output voltage	230 Vac	230 Vac	230 Vac
Rated Power	250 VA	500 VA	1000 VA
No-load voltage (app. x factor)	1.04	1.04	1.03
Efficiency	94 %	91 %	96 %
Environment			
Ambient temperature max.	40 °C	40 °C	40 °C
Safety and protection			
Type	Resin encapsulated transformer	Resin encapsulated transformer	Resin encapsulated transformer
Class of Insulation System	A	A	A
Protection index	IP 22	IP 22	IP 22
Safety class	I	I	I
Short circuit strength	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof
Order numbers			
Order Number	**JET 250**	**JET 500**	**JET 1000**
Terminal and mounting			
Terminals PRI	Connecting cable with NEMAS-15 plug (USA)	Connecting cable with NEMAS-15 plug (USA)	Connecting cable with NEMAS-15 plug (USA)
Terminals SEC	Protective contact socket	Protective contact socket	Protective contact socket
Measures and weights			
Weight	3.10 kg	6.70 kg	9.70 kg
Wide	95 mm	126 mm	143 mm
Height	155 mm	192 mm	197 mm
Depth	160 mm	180 mm	244 mm

Electrical data

Mechanical data

Autotransformer
AT3



General Data

Rated input voltage 3 x 200/208 - 3 x 690 Vac
Rated output voltage 3 x 400 Vac
Rated power 2000 - 250000 VA
Insulation class F
Maximum ambient temperature 40 °C
Efficiency up to 98 %
Degree of protection IP 00
Optionally adapted package for higher degrees of protection

Advantages

Low weight and small size (compared to isolating transformers)
Very high efficiency
Inverse operation possible
Patented assembly technology to lower heat losses
Very good corrosion protection and low noise thanks to BLOCKIMPEX vacuum impregnation
Fixed, contact protected screw connection terminals complying with UVV VBG4
Multifunctional fixing rails with 12 oval slots
Enlarged fixing rail for easy installation from above
Integrated crane eyes

Applications

Autotransformer for adjustment of the voltage on the input and output sides with no requirement for electrical isolation.

Standards

Autotransformer
to: VDE 0570 Teil 2-13, DIN EN 61558-2-13, EN 61558-2-13, IEC 61558-2-13, UL 5085-1/-2, CSA 22.2 No.66

Certifications

UL 5085-1/-2, CSA 22.2 No.66

Autotransformer
AT3

Electrical data

Type	AT3 2-20/21-4	AT3 2-22/23-4	AT3 2-24/35-4	AT3 2-38/42-4	AT3 2-44/46-4	AT3 2-48/50-4
Input						
Rated input Voltage	3 x 200/208 Vac	3 x 220/230 Vac	3 x 240/346 Vac	3 x 380/415 Vac	3 x 440/460 Vac	3 x 480/500 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac
Rated Power	2000 VA	2000 VA	2000 VA	2000 VA	2000 VA	2000 VA
Vector group	YNaO	YNaO	YNaO	YNaO	YNaO	YNaO
Efficiency	91 %	90 %	90 %	78 %	87 %	90 %
Approvals						
Approvals	cURus	cURus	cURus	cURus	cURus	cURus
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	F	F	F	F	F	F
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Test voltage	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz
Order numbers						
Order Number without housing	**AT3 2-20/21-4**	**AT3 2-22/23-4**	**AT3 2-24/35-4**	**AT3 2-38/42-4**	**AT3 2-44/46-4**	**AT3 2-48/50-4**
Order Number in housing IP23	**AT3 2-2021-23**	**AT3 2-2223-23**	**AT3 2-2435-23**	**AT3 2-3842-23**	**AT3 2-4446-23**	**AT3 2-4850-23**
Order Number in housing IP54	**AT3 2-2021-54**	**AT3 2-2223-54**	**AT3 2-2435-54**	**AT3 2-3842-54**	**AT3 2-4446-54**	**AT3 2-4850-54**

Autotransformer
AT3

Electrical data

Type	AT3 2-58/60-4	AT3 2-69-4	AT3 3,5-20/21-4	AT3 3,5-22/23-4	AT3 3,5-24/35-4	AT3 3,5-38/42-4
Input						
Rated input Voltage	3 x 575/600 Vac	3 x 690 Vac	3 x 200/208 Vac	3 x 220/230 Vac	3 x 240/346 Vac	3 x 380/415 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac
Rated Power	2000 VA	2000 VA	3500 VA	3500 VA	3500 VA	3500 VA
Vector group	YNaO	YNaO	YNaO	YNaO	YNaO	YNaO
Efficiency	88 %	90 %	93 %	93 %	91 %	86 %
Approvals						
Approvals	cURus	cURus	cURus	cURus	cURus	cURus
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	F	F	F	F	F	F
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Test voltage	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz
Order numbers						
Order Number without housing	**AT3 2-58/60-4**	**AT3 2-69-4**	**AT3 3,5-20/21-4**	**AT3 3,5-22/23-4**	**AT3 3,5-24/35-4**	**AT3 3,5-38/42-4**
Order Number in housing IP23	**AT3 2-5860-23**	**AT3 2-69 -23**	**AT3 3,5-2021-23**	**AT3 3,5-2223-23**	**AT3 3,5-2435-23**	**AT3 3,5-3842-23**
Order Number in housing IP54	**AT3 2-5860-54**	**AT3 2-69 -54**	**AT3 3,5-2021-54**	**AT3 3,5-2223-54**	**AT3 3,5-2435-54**	**AT3 3,5-3842-54**

Autotransformer
AT3

Electrical data

Type	AT3 3,5-44/46-4	AT3 3,5-48/50-4	AT3 3,5-58/60-4	AT3 3,5-69-4	AT3 10-20/21-4	AT3 10-22/23-4
Input						
Rated input Voltage	3 x 440/460 Vac	3 x 480/500 Vac	3 x 575/600 Vac	3 x 690 Vac	3 x 200/208 Vac	3 x 220/230 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac
Rated Power	3500 VA	3500 VA	3500 VA	3500 VA	10000 VA	10000 VA
Vector group	YNaO	YNaO	YNaO	YNaO	YNaO	YNaO
Efficiency	88 %	90 %	92 %	92 %	95 %	94 %
Approvals						
Approvals	cURus	cURus	cURus	cURus	cURus	cURus
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	F	F	F	F	F	F
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Test voltage	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz
Order numbers						
Order Number without housing	**AT3 3,5-44/46-4**	**AT3 3,5-48/50-4**	**AT3 3,5-58/60-4**	**AT3 3,5-69-4**	**AT3 10-20/21-4**	**AT3 10-22/23-4**
Order Number in housing IP23	**AT3 3,5-4446-23**	**AT3 3,5-4850-23**	**AT3 3,5-5860-23**	**AT3 3,5-69-23**	**AT3 10-2021-23**	**AT3 10-2223-23**
Order Number in housing IP54	**AT3 3,5-4446-54**	**AT3 3,5-4850-54**	**AT3 3,5-5860-54**	**AT3 3,5-69-54**	**AT3 10-2021-54**	**AT3 10-2223-54**

Autotransformer
AT3

Electrical data

Type	AT3 10-24/35-4	AT3 10-38/42-4	AT3 10-44/46-4	AT3 10-48/50-4	AT3 10-58/60-4	AT3 10-69-4
Input						
Rated input Voltage	3 x 240/346 Vac	3 x 380/415 Vac	3 x 440/460 Vac	3 x 480/500 Vac	3 x 575/600 Vac	3 x 690 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac
Rated Power	10000 VA	10000 VA	10000 VA	10000 VA	10000 VA	10000 VA
Vector group	YNaO	YNaO	YNaO	YNaO	YNaO	YNaO
Efficiency	95 %	84 %	91 %	93 %	94 %	95 %
Approvals						
Approvals	cURus	cURus	cURus	cURus	cURus	cURus
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	F	F	F	F	F	F
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Test voltage	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz
Order numbers						
Order Number without housing	**AT3 10-24/35-4**	**AT3 10-38/42-4**	**AT3 10-44/46-4**	**AT3 10-48/50-4**	**AT3 10-58/60-4**	**AT3 10-69-4**
Order Number in housing IP23	**AT3 10-2435-23**	**AT3 10-3842-23**	**AT3 10-4446-23**	**AT3 10-4850-23**	**AT3 10-5860-23**	**AT3 10-69-23**
Order Number in housing IP54	**AT3 10-2435-54**	**AT3 10-3842-54**	**AT3 10-4446-54**	**AT3 10-4850-54**	**AT3 10-5860-54**	**AT3 10-69-54**

Autotransformer
AT3

Electrical data

Type	AT3 15-20/21-4	AT3 15-22/23-4	AT3 15-24/35-4	AT3 15-38/42-4	AT3 15-44/46-4	AT3 15-48/50-4
Input						
Rated input Voltage	3 x 200/208 Vac	3 x 220/230 Vac	3 x 240/346 Vac	3 x 380/415 Vac	3 x 440/460 Vac	3 x 480/500 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac
Rated Power	15000 VA	15000 VA	15000 VA	15000 VA	15000 VA	15000 VA
Vector group	YNaO	YNaO	YNaO	YNaO	YNaO	YNaO
Efficiency	96 %	96 %	95 %	89 %	93 %	93 %
Approvals						
Approvals	cURus	cURus	cURus	cURus	cURus	cURus
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	F	F	F	F	F	F
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Test voltage	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz
Order numbers						
Order Number without housing	**AT3 15-20/21-4**	**AT3 15-22/23-4**	**AT3 15-24/35-4**	**AT3 15-38/42-4**	**AT3 15-44/46-4**	**AT3 15-48/50-4**
Order Number in housing IP23	**AT3 15-2021-23**	**AT3 15-2223-23**	**AT3 15-2435-23**	**AT3 15-3842-23**	**AT3 15-4446-23**	**AT3 15-4850-23**
Order Number in housing IP54	**AT3 15-2021-54**	**AT3 15-2223-54**	**AT3 15-2435-54**	**AT3 15-3842-54**	**AT3 15-4446-54**	**AT3 15-4850-54**

Autotransformer
AT3

Electrical data

Type	AT3 15-58/60-4	AT3 15-69-4	AT3 25-20/21-4	AT3 25-22/23-4	AT3 25-24/35-4	AT3 25-38/42-4
Input						
Rated input Voltage	3 x 575/600 Vac	3 x 690 Vac	3 x 200/208 Vac	3 x 220/230 Vac	3 x 240/346 Vac	3 x 380/415 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac
Rated Power	15000 VA	15000 VA	25000 VA	25000 VA	25000 VA	25000 VA
Vector group	YNaO	YNaO	YNaO	YNaO	YNaO	YNaO
Efficiency	95 %	95 %	97 %	96 %	96 %	90 %
Approvals						
Approvals	cURus	cURus	cURus	cURus	cURus	cURus
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	F	F	F	F	F	F
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Test voltage	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz
Order numbers						
Order Number without housing	**AT3 15-58/60-4**	**AT3 15-69-4**	**AT3 25-20/21-4**	**AT3 25-22/23-4**	**AT3 25-24/35-4**	**AT3 25-38/42-4**
Order Number in housing IP23	**AT3 15-5860-23**	**AT3 15-69-23**	**AT3 25-2021-23**	**AT3 25-2223-23**	**AT3 25-2435-23**	**AT3 25-3842-23**
Order Number in housing IP54	**AT3 15-5860-54**	**AT3 15-69-54**	**AT3 25-2021-54**	**AT3 25-2223-54**	**AT3 25-2435-54**	**AT3 25-3842-54**

Autotransformer
AT3

Electrical data

Type	AT3 25-44/46-4	AT3 25-48/50-4	AT3 25-58/60-4	AT3 25-69-4	AT3 45-20/21-4	AT3 45-22/23-4
Input						
Rated input Voltage	3 x 440/460 Vac	3 x 480/500 Vac	3 x 575/600 Vac	3 x 690 Vac	3 x 200/208 Vac	3 x 220/230 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac
Rated Power	25000 VA	25000 VA	25000 VA	25000 VA	45000 VA	45000 VA
Vector group	YNaO	YNaO	YNaO	YNaO	YNaO	YNaO
Efficiency	94 %	95 %	96 %	96 %	97 %	97 %
Approvals						
Approvals	cURus	cURus	cURus	cURus	cURus	cURus
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	F	F	F	F	F	F
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Test voltage	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz
Order numbers						
Order Number without housing	**AT3 25-44/46-4**	**AT3 25-48/50-4**	**AT3 25-58/60-4**	**AT3 25-69-4**	**AT3 45-20/21-4**	**AT3 45-22/23-4**
Order Number in housing IP23	**AT3 25-4446-23**	**AT3 25-4850-23**	**AT3 25-5860-23**	**AT3 25-69-23**	**AT3 45-2021-23**	**AT3 45-2223-23**
Order Number in housing IP54	**AT3 25-4446-54**	**AT3 25-4850-54**	**AT3 25-5860-54**	**AT3 25-69-54**	**AT3 45-2021-54**	**AT3 45-2223-54**

Autotransformer
AT3

Electrical data

Type	AT3 45-24/35-4	AT3 45-38/42-4	AT3 45-44/46-4	AT3 45-48/50-4	AT3 45-58/60-4	AT3 45-69-4
Input						
Rated input Voltage	3 x 240/346 Vac	3 x 380/415 Vac	3 x 440/460 Vac	3 x 480/500 Vac	3 x 575/600 Vac	3 x 690 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac
Rated Power	45000 VA	45000 VA	45000 VA	45000 VA	45000 VA	45000 VA
Vector group	YNaO	YNaO	YNaO	YNaO	YNaO	YNaO
Efficiency	97 %	92 %	95 %	96 %	97 %	97 %
Approvals						
Approvals	cURus	cURus	cURus	cURus	cURus	-
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	F	F	F	F	F	F
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Test voltage	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz
Order numbers						
Order Number without housing	**AT3 45-24/35-4**	**AT3 45-38/42-4**	**AT3 45-44/46-4**	**AT3 45-48/50-4**	**AT3 45-58/60-4**	**AT3 45-69-4**
Order Number in housing IP23	**AT3 45-2435-23**	**AT3 45-3842-23**	**AT3 45-4446-23**	**AT3 45-4850-23**	**AT3 45-5860-23**	**AT3 45-69-23**
Order Number in housing IP54	**AT3 45-2435-54**	**AT3 45-3842-54**	**AT3 45-4446-54**	**AT3 45-4850-54**	**AT3 45-5860-54**	**AT3 45-69-54**

Autotransformer
AT3

Electrical data

Type	AT3 70-20/21-4	AT3 70-22/23-4	AT3 70-24/35-4	AT3 70-38/42-4	AT3 70-44/46-4	AT3 70-48/50-4
Input						
Rated input Voltage	3 x 200/208 Vac	3 x 220/230 Vac	3 x 240/346 Vac	3 x 380/415 Vac	3 x 440/460 Vac	3 x 480/500 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac
Rated Power	70000 VA	70000 VA	70000 VA	70000 VA	70000 VA	70000 VA
Vector group	YNaO	YNaO	YNaO	YNaO	YNaO	YNaO
Efficiency	98 %	97 %	97 %	93 %	96 %	96 %
Approvals						
Approvals	cURus	cURus	cURus	cURus	cURus	cURus
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	F	F	F	F	F	F
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Test voltage	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz
Order numbers						
Order Number without housing	**AT3 70-20/21-4**	**AT3 70-22/23-4**	**AT3 70-24/35-4**	**AT3 70-38/42-4**	**AT3 70-44/46-4**	**AT3 70-48/50-4**
Order Number in housing IP23	**AT3 70-2021-23**	**AT3 70-2223-23**	**AT3 70-2435-23**	**AT3 70-3842-23**	**AT3 70-4446-23**	**AT3 70-4850-23**
Order Number in housing IP54	**AT3 70-2021-54**	**AT3 70-2223-54**	**AT3 70-2435-54**	**AT3 70-3842-54**	**AT3 70-4446-54**	**AT3 70-4850-54**

Autotransformer
AT3

Electrical data

Type	AT3 70-58/60-4	AT3 70-69-4	AT3 110-20/21-4	AT3 110-22/23-4	AT3 110-24/35-4	AT3 110-38/42-4
Input						
Rated input Voltage	3 x 575/600 Vac	3 x 690 Vac	3 x 200/208 Vac	3 x 220/230 Vac	3 x 240/346 Vac	3 x 380/415 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac
Rated Power	70000 VA	70000 VA	110000 VA	110000 VA	110000 VA	110000 VA
Vector group	YNaO	YNaO	YNaO	YNaO	YNaO	YNaO
Efficiency	97 %	97 %	98 %	98 %	98 %	94 %
Approvals						
Approvals	cURus	-	cURus	cURus	cURus	cURus
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	F	F	F	F	F	F
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Test voltage	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz
Order numbers						
Order Number without housing	**AT3 70-58/60-4**	**AT3 70-69-4**	**AT3 110-20/21-4**	**AT3 110-22/23-4**	**AT3 110-24/35-4**	**AT3 110-38/42-4**
Order Number in housing IP23	**AT3 70-5860-23**	**AT3 70-69-23**	**AT3 110-2021-23**	**AT3 110-2223-23**	**AT3 110-2435-23**	**AT3 110-3842-23**
Order Number in housing IP54	**AT3 70-5860-54**	**AT3 70-69-54**	**AT3 110-2021-54**	**AT3 110-2223-54**	**AT3 110-2435-54**	**AT3 110-3842-54**

Autotransformer
AT3

Electrical data

Type	AT3 110-44/46-4	AT3 110-48/50-4	AT3 110-58/60-4	AT3 110-69-4	AT3 160-20/21-4	AT3 160-22/23-4
Input						
Rated input Voltage	3 x 440/460 Vac	3 x 480/500 Vac	3 x 575/600 Vac	3 x 690 Vac	3 x 200/208 Vac	3 x 220/230 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac
Rated Power	110000 VA	110000 VA	110000 VA	110000 VA	160000 VA	160000 VA
Vector group	YNaO	YNaO	YNaO	YNaO	YNaO	YNaO
Efficiency	96 %	97 %	97 %	98 %	98 %	98 %
Approvals						
Approvals	cURus	cURus	cURus	-	cURus	cURus
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	F	F	F	F	F	F
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Test voltage	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz
Order numbers						
Order Number without housing	**AT3 110-44/46-4**	**AT3 110-48/50-4**	**AT3 110-58/60-4**	**AT3 110-69-4**	**AT3 160-20/21-4**	**AT3 160-22/23-4**
Order Number in housing IP23	**AT3 110-4446-23**	**AT3 110-4850-23**	**AT3 110-5860-23**	**AT3 110-69-23**	**AT3 160-2021-23**	**AT3 160-2223-23**
Order Number in housing IP54	**AT3 110-4446-54**	**AT3 110-4850-54**	**AT3 110-5860-54**	**AT3 110-69-54**	**AT3 160-2021-54**	**AT3 160-2223-54**

Autotransformer
AT3

Electrical data

Type	AT3 160-24/35-4	AT3 160-38/42-4	AT3 160-44/46-4	AT3 160-48/50-4	AT3 160-58/60-4	AT3 160-69-4
Input						
Rated input Voltage	3 x 240/346 Vac	3 x 380/415 Vac	3 x 440/460 Vac	3 x 480/500 Vac	3 x 575/600 Vac	3 x 690 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac
Rated Power	160000 VA	160000 VA	160000 VA	160000 VA	160000 VA	160000 VA
Vector group	YNaO	YNaO	YNaO	YNaO	YNaO	YNaO
Efficiency	98 %	94 %	96 %	97 %	98 %	98 %
Approvals						
Approvals	cURus	cURus	cURus	cURus	cURus	-
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	F	F	F	F	F	F
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Test voltage	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz
Order numbers						
Order Number without housing	**AT3 160-24/35-4**	**AT3 160-38/42-4**	**AT3 160-44/46-4**	**AT3 160-48/50-4**	**AT3 160-58/60-4**	**AT3 160-69-4**
Order Number in housing IP23	**AT3 160-2435-23**	**AT3 160-3842-23**	**AT3 160-4446-23**	**AT3 160-4850-23**	**AT3 160-5860-23**	**AT3 160-69-23**
Order Number in housing IP54	**AT3 160-2435-54**	**AT3 160-3842-54**	**AT3 160-4446-54**	**AT3 160-4850-54**	**AT3 160-5860-54**	**AT3 160-69-54**

Autotransformer
AT3

Electrical data

Type	AT3 250-20/21-4	AT3 250-22/23-4	AT3 250-24/35-4	AT3 250-38/42-4	AT3 250-44/46-4	AT3 250-48/50-4
Input						
Rated input Voltage	3 x 200/208 Vac	3 x 220/230 Vac	3 x 240/346 Vac	3 x 380/415 Vac	3 x 440/460 Vac	3 x 480/500 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac
Rated Power	250000 VA	250000 VA	250000 VA	250000 VA	250000 VA	250000 VA
Vector group	YNaO	YNaO	YNaO	YNaO	YNaO	YNaO
Efficiency	98 %	98 %	98 %	95 %	96 %	98 %
Approvals						
Approvals	cURus	cURus	cURus	cURus	cURus	cURus
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	F	F	F	F	F	F
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Test voltage	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz
Order numbers						
Order Number without housing	**AT3 250-20/21-4**	**AT3 250-22/23-4**	**AT3 250-24/35-4**	**AT3 250-38/42-4**	**AT3 250-44/46-4**	**AT3 250-48/50-4**
Order Number in housing IP23	**AT3 250-2021-23**	**AT3 250-2223-23**	**AT3 250-2435-23**	**AT3 250-3842-23**	**AT3 250-4446-23**	**AT3 250-4850-23**
Order Number in housing IP54	**AT3 250-2021-54**	**AT3 250-2223-54**	**AT3 250-2435-54**	**AT3 250-3842-54**	**AT3 250-4446-54**	**AT3 250-4850-54**

Autotransformer
AT3

Electrical data

Type	AT3 250-58/60-4	AT3 250-69-4
Input		
Rated input Voltage	3 x 575/600 Vac	3 x 690 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz
Output		
Rated output voltage	3 x 400 Vac	3 x 400 Vac
Rated Power	250000 VA	250000 VA
Vector group	YNaO	YNaO
Efficiency	98 %	98 %
Approvals		
Approvals	cURus	-
Environment		
Ambient temperature max.	40 °C	40 °C
Safety and protection		
Type	open type	open type
Class of Insulation System	F	F
Protection index	IP 00	IP 00
Safety class (prepared)	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof
Test voltage	4000 Vac, 50 Hz	4000 Vac, 50 Hz
Order numbers		
Order Number without housing	**AT3 250-58/60-4**	**AT3 250-69-4**
Order Number in housing IP23	**AT3 250-5860-23**	**AT3 250-69-23**
Order Number in housing IP54	**AT3 250-5860-54**	**AT3 250-69-54**

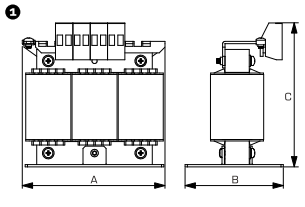
Autotransformer
AT3

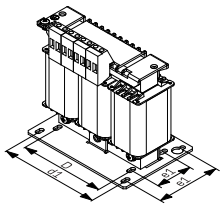
30 Mechanical data

Typ	Terminals	Fixing method	Fixing screws	Weight	Core type	Dimension picture (in mm)	A	B	C	D	d1	d2	E	e1	e2
AT3 2-20/21-4	Screw-type terminals	Fixing rail	M6	10.50 kg	3 UI 90/51,5	2	220	125	175	136	170	201	77	78	91
AT3 2-22/23-4	Screw-type terminals	Fixing rail	M6	10.50 kg	3 UI 90/51,5	2	220	125	175	136	170	201	77	78	91
AT3 2-24/35-4	Screw-type terminals	Fixing rail	M6	9.80 kg	3 UI 90/41,5	2	220	115	175	136	170	201	67	68	81
AT3 2-38/42-4	Screw-type terminals	Fixing rail	M4	2.20 kg	3 UI 60/21	1	125	85	125	90	105	-	39	70	-
AT3 2-44/46-4	Screw-type terminals	Fixing rail	M5	4.10 kg	3 UI 75/26,5	1	155	95	155	113	135	-	50	80	-
AT3 2-48/50-4	Screw-type terminals	Fixing rail	M5	6.10 kg	3 UI 75/41,5	1	155	110	155	113	135	-	65	95	-
AT3 2-58/60-4	Screw-type terminals	Fixing rail	M6	7.50 kg	3 UI 90/31,5	2	220	105	175	136	170	201	57	58	71
AT3 2-69-4	Screw-type terminals	Fixing rail	M6	10.00 kg	3 UI 90/41,5	2	220	115	175	136	170	201	67	68	81
AT3 3,5-20/21-4	Screw-type terminals	Fixing rail	M6	20.00 kg	3 UI 114/64	2	267	150	220	176	180	249	95	103	122
AT3 3,5-22/23-4	Screw-type terminals	Fixing rail	M6	20.70 kg	3 UI 114/64	2	267	150	220	176	180	249	95	103	122
AT3 3,5-24/35-4	Screw-type terminals	Fixing rail	M6	14.50 kg	3 UI 114/40	2	267	125	215	176	180	249	71	79	98
AT3 3,5-38/42-4	Screw-type terminals	Fixing rail	M5	4.30 kg	3 UI 75/26,5	1	155	95	155	113	135	-	50	80	-
AT3 3,5-44/46-4	Screw-type terminals	Fixing rail	M5	6.10 kg	3 UI 75/41,5	1	155	110	155	113	135	-	65	95	-
AT3 3,5-48/50-4	Screw-type terminals	Fixing rail	M6	8.70 kg	3 UI 90/41,5	2	220	115	175	136	170	201	67	68	81
AT3 3,5-58/60-4	Screw-type terminals	Fixing rail	M6	14.20 kg	3 UI 114/40	2	267	125	215	176	180	249	71	79	98
AT3 3,5-69-4	Screw-type terminals	Fixing rail	M6	15.00 kg	3 UI 114/40	2	267	125	215	176	180	249	71	79	98
AT3 10-20/21-4	Screw-type terminals	Fixing rail	M8	47.60 kg	3 UI 150/77	2	350	192	280	224	240	328	119	129	145
AT3 10-22/23-4	Screw-type terminals	Fixing rail	M8	42.40 kg	3 UI 150/77	2	350	192	280	224	240	328	119	129	145
AT3 10-24/35-4	Screw-type terminals	Fixing rail	M8	39.30 kg	3 UI 150/65	2	350	162	280	224	240	328	107	117	133
AT3 10-38/42-4	Screw-type terminals	Fixing rail	M6	7.00 kg	3 UI 90/31,5	2	220	105	175	136	170	201	57	58	71
AT3 10-44/46-4	Screw-type terminals	Fixing rail	M6	14.40 kg	3 UI 114/40	2	267	125	215	176	180	249	71	79	98
AT3 10-48/50-4	Screw-type terminals	Fixing rail	M6	20.80 kg	3 UI 114/64	2	267	150	220	176	180	249	95	103	122
AT3 10-58/60-4	Screw-type terminals	Fixing rail	M8	32.10 kg	3 UI 132/72	2	315	165	250	200	215	292	102	124	126
AT3 10-69-4	Screw-type terminals	Fixing rail	M8	38.00 kg	3 UI 150/65	2	350	162	280	224	240	328	107	117	133
AT3 15-20/21-4	Screw-type terminals	Fixing rail	M8	67.60 kg	3 UI 180/78	3	410	170	380	264	310	388	140	140	130
AT3 15-22/23-4	Screw-type terminals	Fixing rail	M8	64.90 kg	3 UI 180/78	4	410	195	345	264	310	388	140	140	130
AT3 15-24/35-4	Screw-type terminals	Fixing rail	M8	54.40 kg	3 UI 180/63	4	410	175	345	264	310	388	125	125	115

Dimension pictures

1





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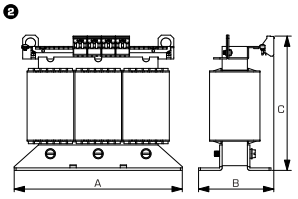

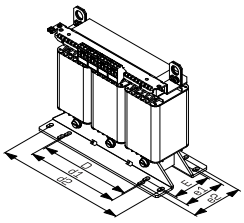

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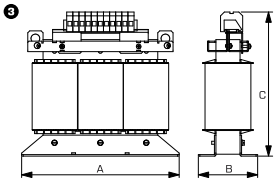

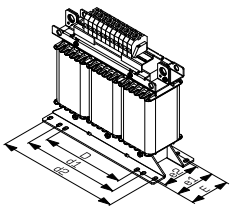

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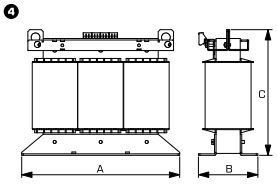
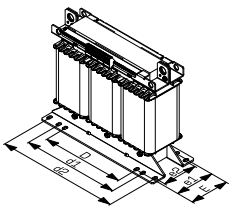




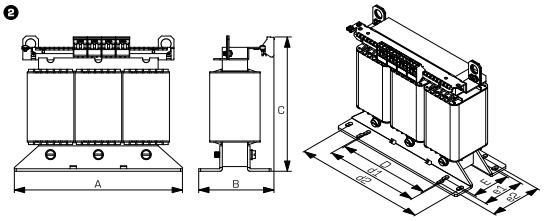
Autotransformer
AT3

30 Mechanical data

Typ	Terminals	Fixing method	Fixing screws	Weight	Core type	Dimension picture (in mm)	A	B	C	D	d1	d2	E	e1	e2
AT3 15-38/42-4	Screw-type terminals	Fixing rail	M6	10.00 kg	3 UI 90/51,1	❷	220	125	175	136	170	201	77	78	91
AT3 15-44/46-4	Screw-type terminals	Fixing rail	M6	20.10 kg	3 UI 114/64	❷	267	150	215	176	180	249	95	103	122
AT3 15-48/50-4	Screw-type terminals	Fixing rail	M8	29.40 kg	3 UI 132/72	❷	315	165	250	200	215	292	102	104	126
AT3 15-58/60-4	Screw-type terminals	Fixing rail	M8	44.00 kg	3 UI 150/77	❷	350	177	280	224	240	328	119	129	145
AT3 15-69-4	Screw-type terminals	Fixing rail	M8	58.00 kg	3 UI 180/63	❹	410	155	340	264	310	388	125	125	115
AT3 25-20/21-4	Screw-type terminals	Fixing rail	M10	103.00 kg	3 UI 210/88	❸	480	220	440	316	370	450	158	166	148
AT3 25-22/23-4	Screw-type terminals	Fixing rail	M10	99.30 kg	3 UI 210/88	❸	480	220	440	316	370	450	158	166	148
AT3 25-24/35-4	Screw-type terminals	Fixing rail	M10	83.40 kg	3 UI 210/73	❸	480	180	430	316	370	450	143	151	133
AT3 25-38/42-4	Screw-type terminals	Fixing rail	M6	15.00 kg	3 UI 114/40	❷	267	145	220	176	180	249	71	79	98
AT3 25-44/46-4	Screw-type terminals	Fixing rail	M8	30.30 kg	3 UI 132/72	❷	315	185	255	200	215	292	102	124	126
AT3 25-48/50-4	Screw-type terminals	Fixing rail	M8	44.00 kg	3 UI 150/77	❷	350	192	280	224	240	328	119	129	145
AT3 25-58/60-4	Screw-type terminals	Fixing rail	M10	75.60 kg	3 UI 210/63	❹	480	182	395	316	370	450	133	141	123
AT3 25-69-4	Screw-type terminals	Fixing rail	M10	83.00 kg	3 UI 210/73	❹	480	192	395	316	370	450	143	151	133
AT3 45-20/21-4	Screw-type terminals	Fixing rail	M12	197.00 kg	3 UI 240/140	❸	550	290	510	356	430	516	214	240	212
AT3 45-22/23-4	Screw-type terminals	Fixing rail	M12	162.00 kg	3 UI 240/110	❸	550	260	510	356	430	516	184	210	182
AT3 45-24/35-4	Screw-type terminals	Fixing rail	M12	149.00 kg	3 UI 240/110	❸	550	260	510	356	430	516	184	210	182
AT3 45-38/42-4	Screw-type terminals	Fixing rail	M8	23.90 kg	3 UI 132/46	❸	315	170	295	200	215	292	76	78	100
AT3 45-44/46-4	Screw-type terminals	Fixing rail	M8	59.90 kg	3 UI 180/63	❸	410	155	380	264	310	388	125	125	115
AT3 45-48/50-4	Screw-type terminals	Fixing rail	M10	77.30 kg	3 UI 210/63	❸	480	170	425	316	370	450	133	141	123
AT3 45-58/60-4	Screw-type terminals	Fixing rail	M12	125.00 kg	3 UI 240/83	❸	550	240	480	356	430	516	157	183	155
AT3 45-69-4	Screw-type terminals	Fixing rail	M12	116.00 kg	3 UI 240/110	❸	550	260	485	356	430	516	184	210	182
AT3 70-20/21-4	Screw-type terminals	Fixing rail	M12	239.00 kg	3 UI 240/140	❸	550	290	520	356	430	516	214	240	212

Dimension pictures

❷



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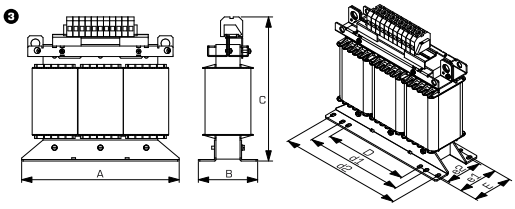

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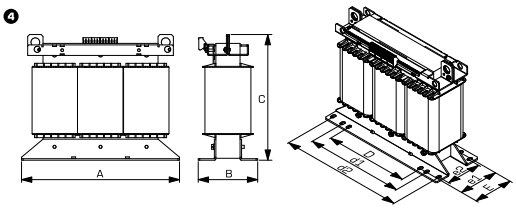


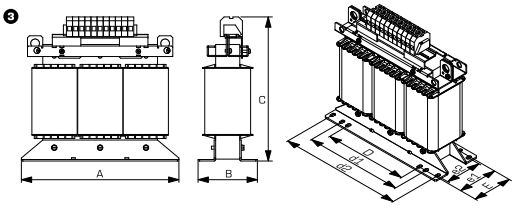
Autotransformer
AT3

Mechanical data

Typ	Terminals	Fixing method	Fixing screws	Weight	Core type	Dimension picture (in mm)	A	B	C	D	d1	d2	E	e1	e2
AT3 70-22/23-4	Screw-type terminals	Fixing rail	M12	218.00 kg	3 UI 240/140	3	550	290	520	356	430	516	214	240	212
AT3 70-24/35-4	Screw-type terminals	Fixing rail	M12	212.00 kg	3 UI 240/140	3	550	290	520	356	430	516	214	240	212
AT3 70-38/42-4	Screw-type terminals	Fixing rail	M8	38.90 kg	3 UI 150/65	3	350	185	320	224	240	328	107	117	133
AT3 70-44/46-4	Screw-type terminals	Fixing rail	M10	83.20 kg	3 UI 210/63	3	480	195	440	316	370	450	133	141	123
AT3 70-48/50-4	Screw-type terminals	Fixing rail	M12	123.00 kg	3 UI 240/83	3	550	240	485	356	430	516	157	183	155
AT3 70-58/60-4	Screw-type terminals	Fixing rail	M12	192.00 kg	3 UI 240/140	3	550	290	485	356	430	516	214	240	212
AT3 70-69-4	Screw-type terminals	Fixing rail	M12	199.00 kg	3 UI 240/140	3	550	290	485	356	430	516	214	240	212
AT3 110-20/21-4	Screw-type terminals	Fixing rail	M12	264.00 kg	3 UI 270/135	5	530	430	500	180	490	-	200	-	-
AT3 110-22/23-4	Screw-type terminals	Fixing rail	M12	258.00 kg	3 UI 270/120	5	530	415	500	180	490	-	185	-	-
AT3 110-24/35-4	Screw-type terminals	Fixing rail	M12	243.00 kg	3 UI 270/120	5	530	400	500	180	490	-	185	-	-
AT3 110-38/42-4	Screw-type terminals	Fixing rail	M8	54.40 kg	3 UI 180/63	3	410	165	415	264	310	388	125	125	115
AT3 110-44/46-4	Screw-type terminals	Fixing rail	M12	123.00 kg	3 UI 240/83	3	550	240	520	356	430	516	157	183	155
AT3 110-48/50-4	Screw-type terminals	Fixing rail	M12	166.00 kg	3 UI 240/110	3	550	260	520	356	430	516	184	210	182
AT3 110-58/60-4	Screw-type terminals	Fixing rail	M12	220.00 kg	3 UI 270/120	5	530	380	500	180	490	-	185	-	-
AT3 110-69-4	Screw-type terminals	Fixing rail	M12	251.00 kg	3 UI 270/120	5	530	380	500	180	490	-	185	-	-
AT3 160-20/21-4	Screw-type terminals	Fixing rail	M12	380.00 kg	3 UI 300/150	6	600	420	635	200	540	-	215	-	-
AT3 160-22/23-4	Screw-type terminals	Fixing rail	M12	336.00 kg	3 UI 300/125	6	600	390	635	200	540	-	190	-	-
AT3 160-24/35-4	Screw-type terminals	Fixing rail	M12	310.00 kg	3 UI 300/125	6	600	390	635	200	540	-	190	-	-
AT3 160-38/42-4	Screw-type terminals	Fixing rail	M10	82.00 kg	3 UI 210/63	3	480	235	490	316	370	450	133	141	123
AT3 160-44/46-4	Screw-type terminals	Fixing rail	M12	166.00 kg	3 UI 240/110	3	550	260	545	356	430	516	184	210	182
AT3 160-48/50-4	Screw-type terminals	Fixing rail	M12	213.00 kg	3 UI 240/140	3	550	290	520	356	430	516	214	240	212
AT3 160-58/60-4	Screw-type terminals	Fixing rail	M12	269.00 kg	3 UI 270/120	5	530	400	500	180	490	-	185	-	-

Dimension pictures

3



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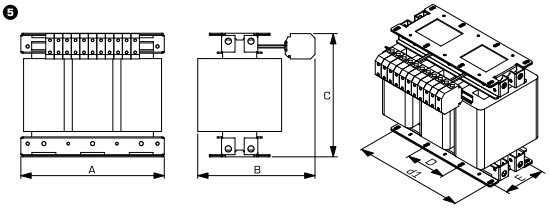

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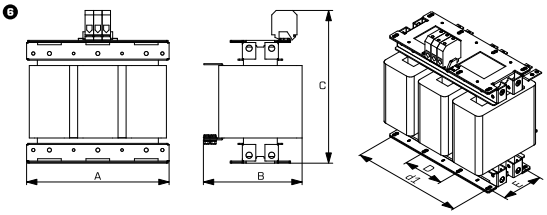


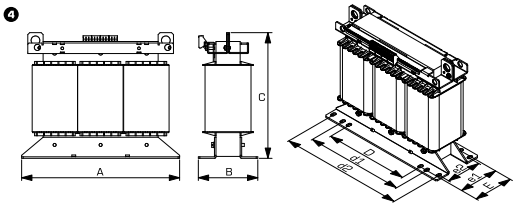
Autotransformer
AT3

30 Mechanical data

Typ	Terminals	Fixing method	Fixing screws	Weight	Core type	Dimension picture (in mm)	A	B	C	D	d1	d2	E	e1	e2
AT3 160-69-4	Screw-type terminals	Fixing rail	M12	334.00 kg	3 UI 300/125	5	600	480	550	200	540	-	190	-	-
AT3 250-20/21-4	Screw-type terminals	Fixing rail	M16	545.00 kg	3 UI 375/150	8	750	605	730	500	-	-	490	-	-
AT3 250-22/23-4	Screw-type terminals	Fixing rail	M16	550.00 kg	3 UI 375/150	8	750	605	730	500	-	-	490	-	-
AT3 250-24/35-4	Screw-type terminals	Fixing rail	M12	439.00 kg	3 UI 300/175	8	600	510	550	200	540	-	240	-	-
AT3 250-38/42-4	Screw-type terminals	Fixing rail	M10	104.00 kg	3 UI 210/88	4	480	270	395	316	370	450	158	166	148
AT3 250-44/46-4	Screw-type terminals	Fixing rail	M12	210.00 kg	3 UI 270/120	5	530	415	500	180	490	-	185	-	-
AT3 250-48/50-4	Screw-type terminals	Fixing rail	M12	266.00 kg	3 UI 270/120	5	530	415	500	180	490	-	185	-	-
AT3 250-58/60-4	Screw-type terminals	Fixing rail	M12	390.00 kg	3 UI 300/150	5	600	505	550	200	540	-	215	-	-
AT3 250-69-4	Screw-type terminals	Fixing rail	M16	510.00 kg	3 UI 375/150	8	750	605	730	500	-	-	490	-	-

Dimension pictures

4



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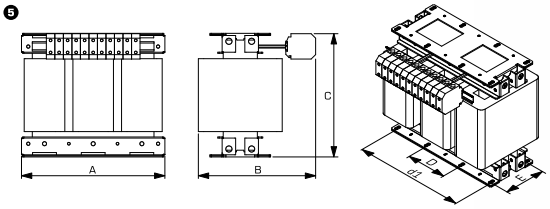

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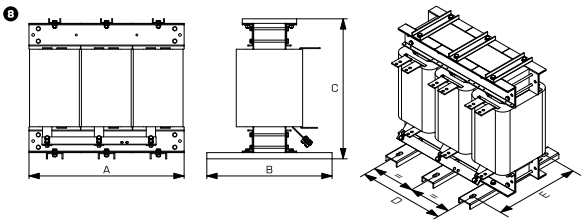


Autotransformer
DSP

General Data

Rated input voltage 3 x 400 Vac
Rated output voltage 3 x 130 - 3 x 240 Vac (5 stages)
Rated current 3 x 1.5 - 3 x 15 A
Insulation class E
Maximum ambient temperature 40 °C
Degree of protection IP 00

Advantages

Low weight and small size (compared to isolating transformers)
Very high efficiency
Very good moisture protection and low noise thanks to BLOCKIMPEX vacuum impregnation
Contact protected screw connection terminals complying with UVV BVG A3
Simple mounting thanks to robust metal fixing rail with oval slots

Applications

Autotransformer for example for setting the speed of single phase blower motors.

Standards

Autotransformer
to: VDE 0570 Teil 2-13, DIN EN 61558-2-13, EN 61558-2-13, IEC 61558-2-13

Autotransformer
DSP

Electrical data

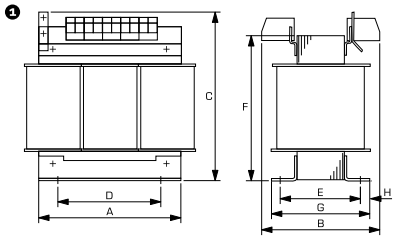
Type	DSP 400/1,5	DSP 400/3	DSP 400/6	DSP 400/9	DSP 400/15
Input					
Rated input Voltage	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac	3 x 400 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output					
Rated output voltage	3 x 240 Vac/3 x 230 Vac 3 x 190 Vac/3 x 170 Vac 3 x 130 Vac	3 x 240 Vac/3 x 230 Vac 3 x 190 Vac/3 x 170 Vac 3 x 130 Vac	3 x 240 Vac/3 x 230 Vac 3 x 190 Vac/3 x 170 Vac 3 x 130 Vac	3 x 240 Vac/3 x 230 Vac 3 x 190 Vac/3 x 170 Vac 3 x 130 Vac	3 x 240 Vac/3 x 230 Vac 3 x 190 Vac/3 x 170 Vac 3 x 130 Vac
Rated output voltage	3 x 1.5 A	3 x 3 A	3 x 6 A	3 x 9 A	3 x 15 A
Vector group	YNaO	YNaO	YNaO	YNaO	YNaO
Environment					
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection					
Class of Insulation System	E	E	E	E	E
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Order numbers					
Order Number	**DSP 400/1,5**	**DSP 400/3**	**DSP 400/6**	**DSP 400/9**	**DSP 400/15**

Mechanical data

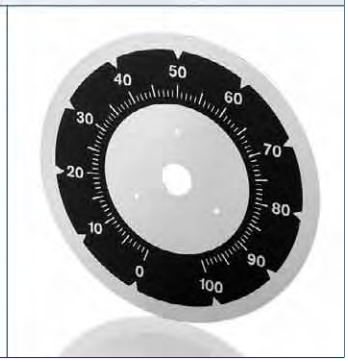
Safety and protection					
Type	open type	open type	open type	open type	open type
Terminal and mounting					
Terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals	Screw-type terminals
Fixing method	Mounting brackets	Mounting brackets	Mounting brackets	Mounting brackets	Mounting brackets
Fixing screws	M5	M6	M6	M8	M8
Measures and weights					
Weight	3.80 kg	6.50 kg	13.50 kg	17.80 kg	30.00 kg
Dimension picture (in mm)	❶	❶	❶	❶	❶
A	150	179	238	263	263
B	90	97	112	110	137
C	160	180	220	243	243
D	113	136	140	200	200
E	49	56	82	75	101
F	133	158	202	230	230
G	67	76	112	107	133
H	9	10	15.5	16	16

Dimension pictures

❶



Variable transformer
ESS



General Data

Rated input voltage 230 Vac
Rated output voltage 0 - 250 Vac
Rated current 0.8 - 20 A
Insulation class B
Maximum ambient temperature 45 °C
Degree of protection IP 00

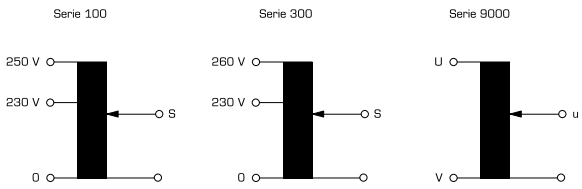
Advantages

Stepless adjustment of the AC voltage from zero to the maximum value
Self-cleaning of the exposed contact tracks
4-point flange mounting
Rotary knobs and scales optionally available

Applications

Variable auto transformer for continuous adjustment of AC voltages or currents under load.

Sample application



Standards

Variable transformer
to: VDE 0552

Variable transformer
ESS

Electrical data

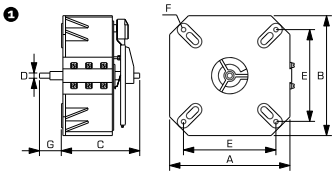
Type	ESS 102	ESS 103	ESS 104	ESS 106	ESS 108	ESS 110
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Angle of rotation	320 °	320 °	320 °	320 °	320 °	320 °
Rated output voltage	0...230/250 Vac	0...230/250 Vac	0...230/250 Vac	0...230/250 Vac	0...230/250 Vac	0...230/250 Vac
Rated output voltage	2.00 A	3.15 A	4.00 A	6.30 A	8.00 A	10.00 A
Environment						
Ambient temperature max.	45 °C	45 °C	45 °C	45 °C	45 °C	45 °C
Safety and protection						
Class of Insulation System	B	B	B	B	B	B
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Test voltage control spindle	4 kV	4 kV	4 kV	4 kV	4 kV	4 kV
Order numbers						
Order Number	**ESS 102**	**ESS 103**	**ESS 104**	**ESS 106**	**ESS 108**	**ESS 110**

Mechanical data

Accessory						
Rotary knob (optional)	50/6-1	50/6-1	50/6-1	50/6-1	50/8-1	50/8-1
Scale (optional)	SK/120	SK/120	SK/120	SK/120	SK/120	SK/120
Terminal and mounting						
Terminals	Screw-type terminals, PE 6.3 x 0.8	Screw-type terminals, PE 6.3 x 0.8	Screw-type terminals, PE 6.3 x 0.8	Screw-type terminals, PE 6.3 x 0.8	Screw-type terminals, PE 6.3 x 0.8	Screw-type terminals, PE 6.3 x 0.8
Fixing method	4-point bolted flange joint	4-point bolted flange joint	4-point bolted flange joint	4-point bolted flange joint	4-point bolted flange joint	4-point bolted flange joint
Measures and weights						
Weight	2.60 kg	3.80 kg	3.80 kg	5.20 kg	7.80 kg	7.80 kg
Dimension picture (in mm)	❶	❶	❶	❶	❶	❶
A	137	159	159	159	197	197
B	125	147	147	147	185	185
C	84	84	84	103	118	118
D	6	6	6	6	8	8
E	96	112	112	112	142	142
F	5.8	5.8	5.8	7	7	7
G	32	32	32	32	32	32

Dimension pictures

❶



Variable transformer
ESS

Electrical data

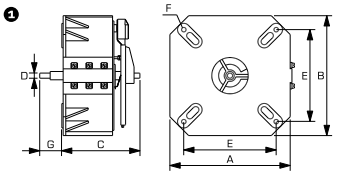
Type	ESS 118	ESS 120	ESS 302	ESS 303	ESS 305	ESS 308
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Angle of rotation	320 °	320 °	320 °	320 °	320 °	320 °
Rated output voltage	0...230/250 Vac	0...230/250 Vac	0...230/260 Vac	0...230/260 Vac	0...230/260 Vac	0...230/260 Vac
Rated output voltage	18.00 A	20.00 A	1.8 A	3.15 A	5.00 A	8.00 A
Environment						
Ambient temperature max.	45 °C	45 °C	45 °C	45 °C	45 °C	45 °C
Safety and protection						
Class of Insulation System	B	B	B	B	B	B
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Test voltage control spindle	4 kV	4 kV	4 kV	4 kV	4 kV	4 kV
Order numbers						
Order Number	**ESS 118**	**ESS 120**	**ESS 302**	**ESS 303**	**ESS 305**	**ESS 308**

Mechanical data

Accessory						
Rotary knob (optional)	50/8-1	50/8-1	50/6-1	50/6-1	50/6-1	50/8-1
Scale (optional)	SK/120	SK/120	SK/120	SK/120	SK/120	SK/120
Terminal and mounting						
Terminals	Screw-type terminals, PE 6.3 x 0.8	Screw-type terminals, PE 6.3 x 0.8	Screw-type terminals, PE 6.3 x 0.8	Screw-type terminals, PE 6.3 x 0.8	Screw-type terminals, PE 6.3 x 0.8	Screw-type terminals, PE 6.3 x 0.8
Fixing method	4-point bolted flange joint	4-point bolted flange joint	4-point bolted flange joint	4-point bolted flange joint	4-point bolted flange joint	4-point bolted flange joint
Measures and weights						
Weight	14.00 kg	14.00 kg	2.60 kg	3.80 kg	5.20 kg	7.80 kg
Dimension picture (in mm)	❶	❶	❶	❶	❶	❶
A	243	243	137	159	159	197
B	231	231	125	147	147	185
C	121	121	84	84	103	118
D	8	8	6	6	6	8
E	180	180	96	112	112	142
F	11	11	5.8	5.8	7	7
G	32	32	32	32	32	32

Dimension pictures

❶

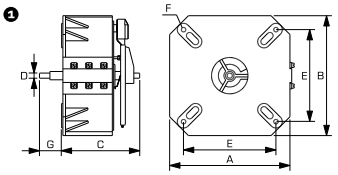


Variable transformer
ESS

Type	ESS 318	ESS 9008	ESS 9013
Input			
Rated input voltage	230 Vac	230 Vac	230 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output			
Angle of rotation	320 °	320 °	320 °
Rated output voltage	0...230/260 Vac	0...230 Vac	0...230 Vac
Rated output voltage	18.00 A	0.80 A	1.25 A
Environment			
Ambient temperature max.	45 °C	45 °C	45 °C
Safety and protection			
Class of Insulation System	B	B	B
Protection index	IP 00	IP 00	IP 00
Test voltage control spindle	4 kV	4 kV	4 kV
Order numbers			
Order Number	**ESS 318**	**ESS 9008**	**ESS 9013**
Accessory			
Rotary knob (optional)	50/8-1	50/6-1	50/6-1
Scale (optional)	SK/120	SK/85	SK/120
Terminal and mounting			
Terminals	Screw-type terminals, PE 6.3 x 0.8	Screw-type terminals, PE 6.3 x 0.8	Screw-type terminals, PE 6.3 x 0.8
Fixing method	4-point bolted flange joint	Fixing hole	Fixing hole
Measures and weights			
Weight	14.00 kg	1.40 kg	1.40 kg
Dimension picture (in mm)	❶	❷	❷
A	243	94.5	94.5
B	231	98	95
C	121	58	58
D	8	6	6
E	180	-	-
F	11	3	3
G	32	23	28

Dimension pictures

❶



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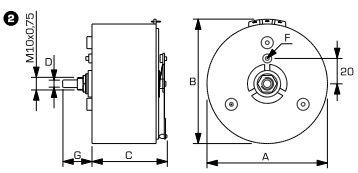

Overview
Toroidal transformers

Power at a glance

Typ	Features	Rated input voltage	Rated output voltage	15 VA	20 VA	30 VA	40 VA	50 VA	60 VA	80 VA	100 VA	120 VA	160 VA	200 VA	225 VA	250 VA	300 VA
RKD	double input voltage	2 x 115 Vac	2 x 12 Vac	■	■	■	■	■	■	■	■	■	■	■	■	■	■
			2 x 15 Vac	■	■	■	■	■	■	■	■	■	■	■	■		
			2 x 18 Vac	■	■	■	■	■	■	■	■	■	■	■	■	■	■
			2 x 24 Vac		■	■	■	■	■	■	■	■	■	■	■	■	■
			2 x 30 Vac													■	
			2 x 35 Vac														
			2 x 40 Vac														
			2 x 50 Vac														
			2 x 115 Vac														
RTE	integral temperature fuse	230 Vac	2 x 12 Vac	■	■	■	■	■	■	■	■	■	■	■	■	■	
			2 x 15 Vac	■	■	■	■	■	■	■	■	■	■	■	■		
			2 x 18 Vac	■	■	■	■	■	■	■	■	■	■	■	■	■	■
			2 x 24 Vac		■	■	■	■	■	■	■	■	■	■	■	■	■
			2 x 30 Vac													■	
			2 x 35 Vac														

330 VA	400 VA	500 VA	625 VA	800 VA	1000 VA	1200 VA	1600 VA	2000 VA	3000 VA	Page
■	■									
	■	■								
	■	■	■							146
		■								
				■						
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			■	■	■	■	■	■	■	
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	■	■								
	■	■	■							154
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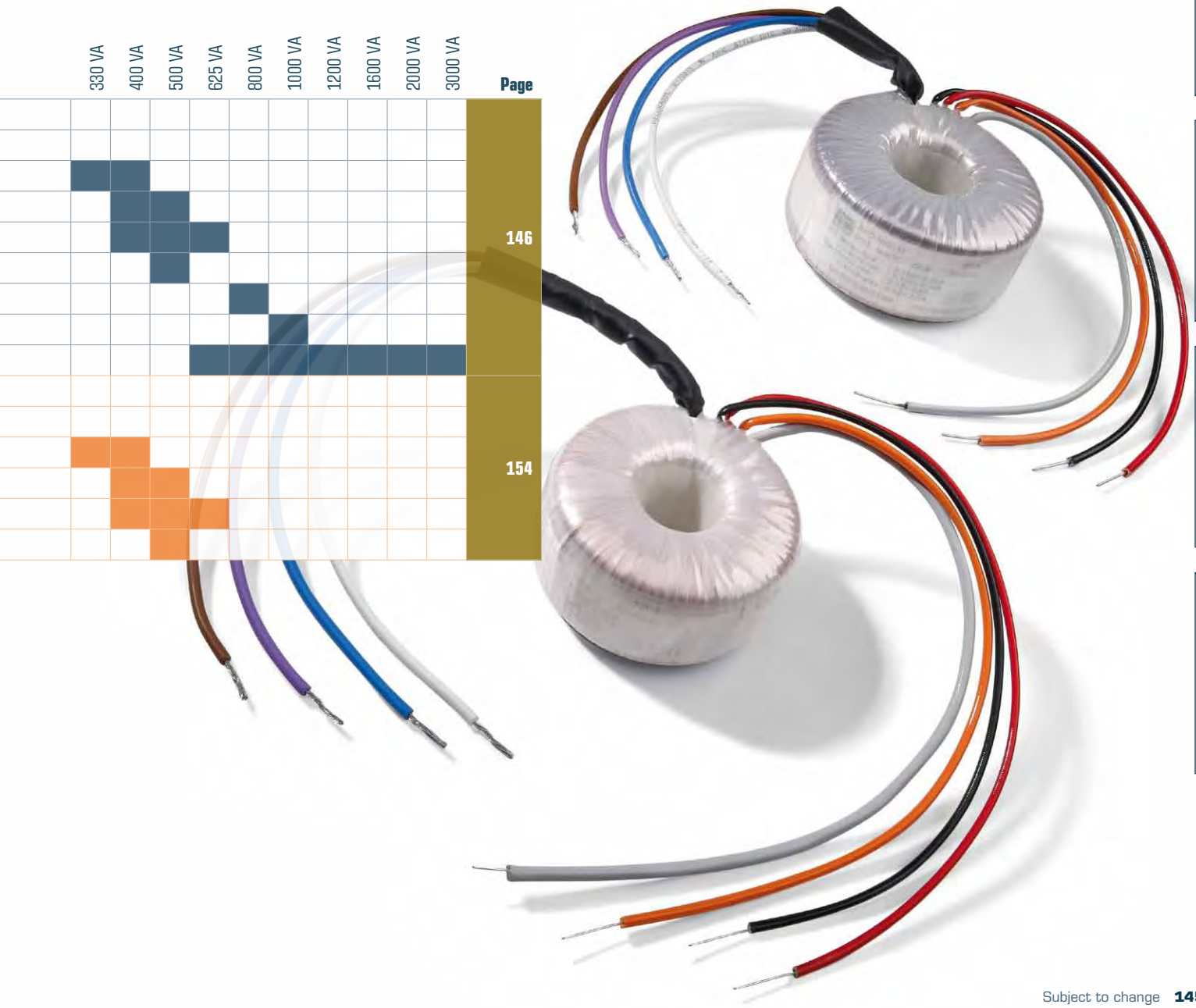


Toroidal transformer
RKD

General Data

Rated input voltage 2 x 115 Vac
Rated output voltage 2 x 12 - 2 x 115 Vac
Power 15 - 3000 VA
Insulation class B
Maximum ambient temperature 40 °C
Efficiency up to 98 %
Degree of protection IP 00

Advantages

Minimum size at high output
Low weight
Double input voltage for series or parallel connection
Double output voltage for series or parallel connection
Minimal no-load losses
Outstanding temperature behaviour thanks to low magnetic leakage field
Very low noise field

Applications

As a mains transformer for adjustment of the voltage and simple electrical isolation.

As an isolating transformer for the safe electrical isolation of the input and output sides. The transformer may be used to set up protective separation as a protective measure in accordance with VDE 0100.

As a safety isolating transformer for the safe electrical isolation of the input and output sides. The transformer is suitable for creating SELV and PELV circuits because of the limit on the output voltage.

Standards

Mains transformer
to: VDE 0570 Teil 2-1, DIN EN 61558-2-1, EN 61558-2-1, IEC 61558-2-1, UL 5085-1/-2, CSA 22.2 No.66

Isolating transformer
to: VDE 0570 Part 2-4, DIN EN 61558-2-4, EN 61558-2-4, IEC 61558-2-4, UL 5085-1/-2, CSA 22.2 No.66

Safety isolating transformer
to: VDE 0570 Part 2-6, DIN EN 61558-2-6, EN 61558-2-6, IEC 61558-2-6, UL 5085-1/-2, CSA 22.2 No.66

Certifications

UL 5085-1/-2, CSA 22.2 No.66

Toroidal transformer
RKD

Electrical data

Type	RKD 15/..	RKD 20/..	RKD 30/..	RKD 40/..
Input				
Rated input Voltage	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output				
Rated output voltage: Order no.	2x12 Vac: RKD 15/2x12 2x15 Vac: RKD 15/2x15 2x18 Vac: RKD 15/2x18	2x12 Vac: RKD 20/2x12 2x15 Vac: RKD 20/2x15 2x18 Vac: RKD 20/2x18 2x24 Vac: RKD 20/2x24**	2x12 Vac: RKD 30/2x12 2x15 Vac: RKD 30/2x15 2x18 Vac: RKD 30/2x18 2x24 Vac: RKD 30/2x24*	2x12 Vac: RKD 40/2x12 2x15 Vac: RKD 40/2x15 2x18 Vac: RKD 40/2x18 2x24 Vac: RKD 40/2x24*
Rated Power	15 VA	20 VA	30 VA	40 VA
No-load voltage (app. x factor)	1.15	1.30	1.16	1.18
No-load loss (typ.)	0.30 W	0.20 W	0.45 W	0.40 W
Efficiency	83 %	74 %	82 %	84 %
Standards				
Classification	Safety isolating transformer	Safety isolating transformer **Mains transformer	Safety isolating transformer *Isolating transformer	Safety isolating transformer *Isolating transformer
Approvals				
Approvals	cURus	cURus	cURus	cURus
Environment				
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C
Safety and protection				
Type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Test voltage	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz
Order numbers				
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

Toroidal transformer
RKD

Electrical data

Type	RKD 50/..	RKD 60/..	RKD 80/..	RKD 100/..
Input				
Rated input Voltage	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output				
Rated output voltage: Order no.	2x12 Vac: RKD 50/2x12 2x15 Vac: RKD 50/2x15 2x18 Vac: RKD 50/2x18 2x24 Vac: RKD 50/2x24*	2x12 Vac: RKD 60/2x12 2x15 Vac: RKD 60/2x15 2x18 Vac: RKD 60/2x18 2x24 Vac: RKD 60/2x24*	2x12 Vac: RKD 80/2x12 2x15 Vac: RKD 80/2x15 2x18 Vac: RKD 80/2x18 2x24 Vac: RKD 80/2x24*	2x12 Vac: RKD 100/2x12 2x15 Vac: RKD 100/2x15 2x18 Vac: RKD 100/2x18 2x24 Vac: RKD 100/2x24*
Rated Power	50 VA	60 VA	80 VA	100 VA
No-load voltage (app. x factor)	1.18	1.14	1.12	1.10
No-load loss (typ.)	0.40 W	0.70 W	0.90 W	0.90 W
Efficiency	83 %	86 %	88 %	89 %
Standards				
Classification	Safety isolating transformer *Isolating transformer	Safety isolating transformer *Isolating transformer	Safety isolating transformer *Isolating transformer	Safety isolating transformer *Isolating transformer
Approvals				
Approvals	cURus	cURus	cURus	cURus
Environment				
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C
Safety and protection				
Type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Test voltage	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz
Order numbers				
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

Toroidal transformer
RKD

Electrical data

Type	RKD 120/..	RKD 160/..	RKD 200/..	RKD 225/..
Input				
Rated input Voltage	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output				
Rated output voltage: Order no.	2x12 Vac: RKD 120/2x12 2x15 Vac: RKD 120/2x15 2x18 Vac: RKD 120/2x18 2x24 Vac: RKD 120/2x24*	2x12 Vac: RKD 160/2x12 2x15 Vac: RKD 160/2x15 2x18 Vac: RKD 160/2x18 2x24 Vac: RKD 160/2x24*	2x12 Vac: RKD 200/2x12 2x15 Vac: RKD 200/2x15 2x18 Vac: RKD 200/2x18 2x24 Vac: RKD 200/2x24*	2x12 Vac: RKD 225/2x12 2x15 Vac: RKD 225/2x15 2x18 Vac: RKD 225/2x18 2x24 Vac: RKD 225/2x24*
Rated Power	120 VA	160 VA	200 VA	225 VA
No-load voltage (app. x factor)	1.09	1.08	1.07	1.07
No-load loss (typ.)	0.90 W	1.10 W	1.50 W	1.50 W
Efficiency	91 %	91 %	92 %	93 %
Standards				
Classification	Safety isolating transformer *Isolating transformer	Safety isolating transformer *Isolating transformer	Safety isolating transformer *Isolating transformer	Safety isolating transformer *Isolating transformer
Approvals				
Approvals	cURus	cURus	cURus	cURus
Environment				
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C
Safety and protection				
Type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Test voltage	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz
Order numbers				
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

Toroidal transformer
RKD

Electrical data

Type	RKD 250/..	RKD 300/..	RKD 330/..	RKD 400/..
Input				
Rated input Voltage	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output				
Rated output voltage: Order no.	2x12 Vac: RKD 250/2x12 2x18 Vac: RKD 250/2x18 2x24 Vac: RKD 250/2x24* 2x30 Vac: RKD 250/2x30*	2x12 Vac: RKD 300/2x12 2x18 Vac: RKD 300/2x18 2x24 Vac: RKD 300/2x24*	2x18 Vac: RKD 330/2x18	2x18 Vac: RKD 400/2x18 2x24 Vac: RKD 400/2x24* 2x30 Vac: RKD 400/2x30*
Rated Power	250 VA	300 VA	330 VA	400 VA
No-load voltage (app. x factor)	1.05	1.06	1.05	1.05
No-load loss (typ.)	2.10 W	2.80 W	2.80 W	3.10 W
Efficiency	93 %	93 %	94 %	94 %
Standards				
Classification	Safety isolating transformer *Isolating transformer	Safety isolating transformer *Isolating transformer	Safety isolating transformer	Safety isolating transformer *Isolating transformer
Approvals				
Approvals	cURus	cURus	cURus	cURus
Environment				
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C
Safety and protection				
Type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Test voltage	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz
Order numbers				
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

Toroidal transformer
RKD

Electrical data

Type	RKD 500/..	RKD 625/..	RKD 800/..	RKD 1000/..
Input				
Rated input Voltage	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output				
Rated output voltage: Order no.	2x24 Vac: RKD 500/2x24 2x30 Vac: RKD 500/2x30 2x35 Vac: RKD 500/2x35	2x30 Vac: RKD 625/2x30 2x115 Vac: RKD 625/2x115	2x40 Vac: RKD 800/2x40 2x115 Vac: RKD 800/2x115	2x50 Vac: RKD 1000/2x50 2x115 Vac: RKD 1000/2x115
Rated Power	500 VA	625 VA	800 VA	1000 VA
No-load voltage (app. x factor)	1.04	1.04	1.04	1.02
No-load loss (typ.)	3.40 W	4.90 W	5.30 W	6.50 W
Efficiency	95 %	95 %	96 %	96 %
Standards				
Classification	Isolating transformer	Isolating transformer	Isolating transformer	Isolating transformer
Approvals				
Approvals	cURus	cURus	cURus	cURus
Environment				
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C
Safety and protection				
Type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Test voltage	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz
Order numbers				
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

Toroidal transformer
RKD

Electrical data

Type	RKD 1200/..	RKD 1600/..	RKD 2000/..	RKD 3000/..
Input				
Rated input Voltage	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output				
Rated output voltage: Order no.	2x115 Vac: RKD 1200/2x115	2x115 Vac: RKD 1600/2x115	2x115 Vac: RKD 2000/2x115	2x115 Vac: RKD 3000/2x115
Rated Power	1200 VA	1600 VA	2000 VA	3000 VA
No-load voltage (app. x factor)	1.03	1.02	1.02	1.01
No-load loss (typ.)	7.50 W	9.60 W	10.40 W	12.60 W
Efficiency	96 %	97 %	97 %	98 %
Standards				
Classification	Isolating transformer	Isolating transformer	Isolating transformer	Isolating transformer
Approvals				
Approvals	cURus	cURus	cURus	cURus
Environment				
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C
Safety and protection				
Type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Test voltage	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz
Order numbers				
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

Toroidal transformer
RKD

30 Mechanical data

Typ	Fixing method	Terminals	Weight	Major diameter Ø	Outside diameter in the area of the wire lead	S
RKD 15/..	Mounting kit, M5 bolt	Connecting leads, 200 mm	0.32 kg	59 mm	62 mm	30 mm
RKD 20/..	Mounting kit, M5 bolt	Connecting leads, 200 mm	0.35 kg	61 mm	63 mm	32 mm
RKD 30/..	Mounting kit, M5 bolt	Connecting leads, 200 mm	0.47 kg	68 mm	70 mm	31 mm
RKD 40/..	Mounting kit, M6 bolt	Connecting leads, 200 mm	0.56 kg	75 mm	77 mm	34 mm
RKD 50/..	Mounting kit, M6 bolt	Connecting leads, 200 mm	0.70 kg	77 mm	79 mm	39 mm
RKD 60/..	Mounting kit, M6 bolt	Connecting leads, 200 mm	0.75 kg	80 mm	83 mm	38 mm
RKD 80/..	Mounting kit, M6 bolt	Connecting leads, 200 mm	1.08 kg	88 mm	91 mm	43 mm
RKD 100/..	Mounting kit, M6 bolt	Connecting leads, 200 mm	1.19 kg	92 mm	94 mm	45 mm
RKD 120/..	Mounting kit, M6 bolt	Connecting leads, 200 mm	1.41 kg	94 mm	96 mm	45 mm
RKD 160/..	Mounting kit, M6 bolt	Connecting leads, 200 mm	1.73 kg	105 mm	107 mm	50 mm
RKD 200/..	Mounting kit, M8 bolt	Connecting leads, 200 mm	2.16 kg	114 mm	116 mm	53 mm
RKD 225/..	Mounting kit, M8 bolt	Connecting leads, 200 mm	2.35 kg	115 mm	117 mm	54 mm
RKD 250/..	Mounting kit, M8 bolt	Connecting leads, 200 mm	2.52 kg	114 mm	117 mm	54 mm
RKD 300/..	Mounting kit, M8 bolt	Connecting leads, 200 mm	3.01 kg	125 mm	127 mm	64 mm
RKD 330/..	Mounting kit, M8 bolt	Connecting leads, 200 mm	3.30 kg	124 mm	127 mm	65 mm
RKD 400/..	Mounting kit, M8 bolt	Connecting leads, 200 mm	4.05 kg	128 mm	131 mm	75 mm
RKD 500/..	Mounting kit, M8 bolt	Connecting leads, 200 mm	4.80 kg	140 mm	143 mm	66 mm
RKD 625/..	Mounting kit, M8 bolt	Connecting leads, 200 mm	6.10 kg	152 mm	154 mm	74 mm
RKD 800/..	Mounting kit, M8 bolt	Connecting leads, 200 mm	7.00 kg	170 mm	172 mm	72 mm
RKD 1000/..	Mounting kit, M8 bolt	Connecting leads, 200 mm	8.25 kg	168 mm	170 mm	85 mm
RKD 1200/..	Remaining hole casting, with integrated mounting holes	Connecting leads, 200 mm	9.80 kg	167 mm	170 mm	100 mm
RKD 1600/..	Remaining hole casting, with integrated mounting holes	Connecting leads, 200 mm	13.50 kg	202 mm	205 mm	100 mm
RKD 2000/..	Remaining hole casting, with integrated mounting holes	Connecting leads, 200 mm	15.00 kg	206 mm	209 mm	108 mm
RKD 3000/..	Remaining hole casting, with integrated mounting holes	Connecting leads, 200 mm	21.00 kg	215 mm	225 mm	130 mm

Toroidal transformer
RTE

General Data

Rated input voltage 230 Vac
Rated output voltage 2 x 12 - 2 x 35 Vac
Power 15 - 625 VA
Insulation class B
Maximum ambient temperature 40 °C
Efficiency up to 95 %
Degree of protection IP 00

Advantages

Minimum size at high output
Low weight
Double output voltage for series or parallel connection
Protected against overload by integral temperature fuse
Minimal no-load losses
Outstanding temperature behaviour thanks to low magnetic leakage field
Very low noise field

Applications

As a mains transformer for adjustment of the voltage and simple electrical isolation.

As an isolating transformer as specified in EN 61558-2-6 for the safe electrical isolation of the input and output sides. The transformer may be used to set up protective separation as a protective measure in accordance with VDE 0100.

As a safety isolating transformer as specified in EN 61558-2-6 for the safe electrical isolation of the input and output sides. The transformer is suitable for creating SELV and PELV circuits because of the limit on the output voltage.

Standards

Mains transformer
to: VDE 0570 Teil 2-1, DIN EN 61558-2-1, EN 61558-2-1, IEC 61558-2-1, UL 5085-1/-2, CSA 22.2 No.66

Isolating transformer
to: VDE 0570 Part 2-4, DIN EN 61558-2-4, EN 61558-2-4, IEC 61558-2-4, UL 5085-1/-2, CSA 22.2 No.66

Safety isolating transformer
to: VDE 0570 Part 2-6, DIN EN 61558-2-6, EN 61558-2-6, IEC 61558-2-6, UL 5085-1/-2, CSA 22.2 No.66

Certifications

UL 5085-1/-2, CSA 22.2 No.66

Toroidal transformer
RTE

Electrical data

Type	RTE 15/..	RTE 20/..	RTE 30/..	RTE 40/..	RTE 50/..	RTE 60/..
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage: Order no.	2x12 Vac: RTE 15/2x12 2x15 Vac: RTE 15/2x15 2x18 Vac: RTE 15/2x18	2x12 Vac: RTE 20/2x12 2x15 Vac: RTE 20/2x15 2x18 Vac: RTE 20/2x18 2x24 Vac: RTE 20/2x24**	2x12 Vac: RTE 30/2x12 2x15 Vac: RTE 30/2x15 2x18 Vac: RTE 30/2x18 2x24 Vac: RTE 30/2x24*	2x12 Vac: RTE 40/2x12 2x15 Vac: RTE 40/2x15 2x18 Vac: RTE 40/2x18 2x24 Vac: RTE 40/2x24*	2x12 Vac: RTE 50/2x12 2x15 Vac: RTE 50/2x15 2x18 Vac: RTE 50/2x18 2x24 Vac: RTE 50/2x24*	2x12 Vac: RTE 60/2x12 2x15 Vac: RTE 60/2x15 2x18 Vac: RTE 60/2x18 2x24 Vac: RTE 60/2x24*
Rated Power	15 VA	20 VA	30 VA	40 VA	50 VA	60 VA
No-load voltage (app. x factor)	1.15	1.30	1.16	1.18	1.18	1.14
No-load loss (typ.)	0.30 W	0.20 W	0.45 W	0.40 W	0.40 W	0.70 W
Efficiency	83 %	74 %	82 %	84 %	83 %	86 %
Standards						
Classification	Safety isolating transformer	Safety isolating transformer **Mains transformer	Safety isolating transformer *Isolating transformer	Safety isolating transformer *Isolating transformer	Safety isolating transformer *Isolating transformer	Safety isolating transformer *Isolating transformer
Approvals						
Approvals	cURus	cURus	cURus	cURus	cURus	cURus
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II	II	II
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Test voltage	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz
Order numbers						
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

Toroidal transformer
RTE

Electrical data

Type	RTE 80/..	RTE 100/..	RTE 120/..	RTE 160/..	RTE 200/..	RTE 225/..
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage: Order no.	2x12 Vac: RTE 80/2x12 2x15 Vac: RTE 80/2x15 2x18 Vac: RTE 80/2x18 2x24 Vac: RTE 80/2x24*	2x12 Vac: RTE 100/2x12 2x15 Vac: RTE 100/2x15 2x18 Vac: RTE 100/2x18 2x24 Vac: RTE 100/2x24*	2x12 Vac: RTE 120/2x12 2x15 Vac: RTE 120/2x15 2x18 Vac: RTE 120/2x18 2x24 Vac: RTE 120/2x24*	2x12 Vac: RTE 160/2x12 2x15 Vac: RTE 160/2x15 2x18 Vac: RTE 160/2x18 2x24 Vac: RTE 160/2x24*	2x12 Vac: RTE 200/2x12 2x15 Vac: RTE 200/2x15 2x18 Vac: RTE 200/2x18 2x24 Vac: RTE 200/2x24*	2x12 Vac: RTE 225/2x12 2x15 Vac: RTE 225/2x15 2x18 Vac: RTE 225/2x18 2x24 Vac: RTE 225/2x24*
Rated Power	80 VA	100 VA	120 VA	160 VA	200 VA	225 VA
No-load voltage (app. x factor)	1.12	1.10	1.09	1.08	1.07	1.07
No-load loss (typ.)	0.90 W	0.90 W	0.90 W	1.10 W	1.50 W	1.50 W
Efficiency	88 %	89 %	91 %	91 %	92 %	93 %
Standards						
Classification	Safety isolating transformer *Isolating transformer	Safety isolating transformer *Isolating transformer	Safety isolating transformer *Isolating transformer	Safety isolating transformer *Isolating transformer	Safety isolating transformer *Isolating transformer	Safety isolating transformer *Isolating transformer
Approvals						
Approvals	cURus	cURus	cURus	cURus	cURus	cURus
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II	II	II
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Test voltage	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz
Order numbers						
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

Toroidal transformer
RTE

Electrical data

Type	RTE 250/..	RTE 300/..	RTE 330/..	RTE 400/..	RTE 500/..	RTE 625/..
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage: Order no.	2x12 Vac: RTE 250/2x12 2x18 Vac: RTE 250/2x18 2x24 Vac: RTE 250/2x24* 2x30 Vac: RTE 250/2x30*	2x18 Vac: RTE 300/2x18 2x24 Vac: RTE 300/2x24*	2x18 Vac: RTE 330/2x18	2x18 Vac: RTE 400/2x18 2x24 Vac: RTE 400/2x24* 2x30 Vac: RTE 400/2x30*	2x24 Vac: RTE 500/2x24 2x30 Vac: RTE 500/2x30 2x35 Vac: RTE 500/2x35	2x30 Vac: RTE 625/2x30
Rated Power	250 VA	300 VA	330 VA	400 VA	500 VA	625 VA
No-load voltage (app. x factor)	1.05	1.06	1.05	1.05	1.04	1.04
No-load loss (typ.)	2.10 W	2.80 W	2.80 W	3.10 W	3.40 W	4.90 W
Efficiency	93 %	93 %	94 %	94 %	95 %	95 %
Standards						
Classification	Safety isolating transformer *Isolating transformer	Safety isolating transformer *Isolating transformer	Safety isolating transformer	Safety isolating transformer *Isolating transformer	Isolating transformer	Isolating transformer
Approvals						
Approvals	cURus	cURus	cURus	cURus	cURus	cURus
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II	II	II
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Test voltage	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz	4000 Vac, 50 Hz
Order numbers						
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

Toroidal transformer
RTE

30 Mechanical data

Typ	Fixing method	Terminals	Weight	Major diameter Ø	Outside diameter in the area of the wire lead	S
RTE 15/..	Mounting kit, M5 bolt	Connecting leads, 200 mm	0.32 kg	59 mm	62 mm	30 mm
RTE 20/..	Mounting kit, M5 bolt	Connecting leads, 200 mm	0.35 kg	61 mm	62 mm	32 mm
RTE 30/..	Mounting kit, M5 bolt	Connecting leads, 200 mm	0.47 kg	68 mm	70 mm	31 mm
RTE 40/..	Mounting kit, M6 bolt	Connecting leads, 200 mm	0.56 kg	75 mm	77 mm	34 mm
RTE 50/..	Mounting kit, M6 bolt	Connecting leads, 200 mm	0.70 kg	77 mm	79 mm	39 mm
RTE 60/..	Mounting kit, M6 bolt	Connecting leads, 200 mm	0.75 kg	80 mm	83 mm	38 mm
RTE 80/..	Mounting kit, M6 bolt	Connecting leads, 200 mm	1.08 kg	88 mm	91 mm	43 mm
RTE 100/..	Mounting kit, M6 bolt	Connecting leads, 200 mm	1.20 kg	92 mm	94 mm	45 mm
RTE 120/..	Mounting kit, M6 bolt	Connecting leads, 200 mm	1.41 kg	94 mm	96 mm	45 mm
RTE 160/..	Mounting kit, M6 bolt	Connecting leads, 200 mm	1.73 kg	105 mm	107 mm	50 mm
RTE 200/..	Mounting kit, M8 bolt	Connecting leads, 200 mm	2.16 kg	114 mm	116 mm	53 mm
RTE 225/..	Mounting kit, M8 bolt	Connecting leads, 200 mm	2.35 kg	115 mm	117 mm	54 mm
RTE 250/..	Mounting kit, M8 bolt	Connecting leads, 200 mm	2.52 kg	114 mm	117 mm	54 mm
RTE 300/..	Mounting kit, M8 bolt	Connecting leads, 200 mm	3.10 kg	125 mm	127 mm	64 mm
RTE 330/..	Mounting kit, M8 bolt	Connecting leads, 200 mm	3.30 kg	124 mm	127 mm	65 mm
RTE 400/..	Mounting kit, M8 bolt	Connecting leads, 200 mm	4.05 kg	128 mm	131 mm	74 mm
RTE 500/..	Mounting kit, M8 bolt	Connecting leads, 200 mm	4.80 kg	140 mm	143 mm	66 mm
RTE 625/..	Mounting kit, M8 bolt	Connecting leads, 200 mm	6.10 kg	152 mm	154 mm	74 mm


20VA

100 V-line transformer
AÜ

General Data

Rated input voltage 0 - 100 Vac
Output power 1 - 120 W
Impedance 1 - 1600 Ohms
Insulation class E
Maximum ambient temperature 40 °C
Degree of protection IP 00

Advantages

Solder tab for free wiring
Universally designed for 4, 8 and 16 Ohms
Additional tappings at 3/4, 1/2 and 1/4 output
Very good moisture protection and low noise thanks to BLOCKIMPEX vacuum impregnation
Simple mounting thanks to robust metal fixing rail with oval slots

Applications

100 Vac transformer for electro-acoustic installations with a 100 Vac transmission circuit.

Standards

100 V-line transformer
to DIN EN 60950

100 V-line transformer
AÜ

Electrical data

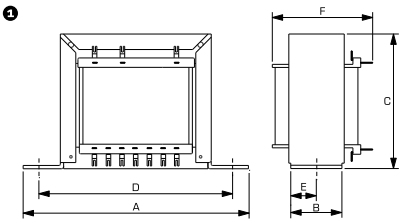
Type	AÜ 100/4	AÜ 100/6	AÜ 100/10	AÜ 100/25	AÜ 100/50	AÜ 100/120
Input						
Rated input Voltage	0 - 100 Vac	0 - 100 Vac	0 - 100 Vac	0 - 100 Vac	0 - 100 Vac	0 - 100 Vac
Frequency range	50 - 15000 Hz	45 - 15000 Hz	40 - 17000 Hz	35 - 15000 Hz	30 - 15000 Hz	30 - 15000 Hz
Output						
Output power	4/3/2/1 W	6/4.5/3/1.5 W	10/7.5/5/2.5 W	25/18.8/12.5/6.3 W	50/37.5/25/12.5 W	120/100/90/60/30 W
Impedance	2.5/3.3/5/10 kΩ	1.6/2.2/3.3/6.6 kΩ	1/1.3/2/4 kΩ	400/532/800/1600 Ω	200/266/400/800 Ω	83/100/111/166/333 Ω
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	E	E	E	E	E	E
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	I	I	I	I	I	I
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Test voltage	1500 Vac, 50 Hz	1500 Vac, 50 Hz	1500 Vac, 50 Hz	1500 Vac, 50 Hz	1500 Vac, 50 Hz	1500 Vac, 50 Hz
Order numbers						
Order Number	**AÜ100/4**	**AÜ100/6**	**AÜ100/10**	**AÜ100/25**	**AÜ100/50**	**AÜ100/120**

Mechanical data

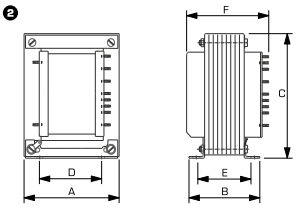
Terminal and mounting						
Terminals	Solder tab	Solder tab	Solder tab	Solder tab	Solder tab	Solder tab
Fixing method	Hood	Hood	Hood	Mounting brackets	Mounting brackets	Mounting brackets
Measures and weights						
Weight	0.27 kg	0.39 kg	0.71 kg	0.96 kg	1.94 kg	4.40 kg
Dimension picture (in mm)	❶	❶	❶	❷	❷	❷
A	73	85	96	60	85	102
B	16	19	28	55	64	92
C	43	48	52	71	91	110
D	61	72	80	49	64	84
E	8	9.5	14	44	51	78
F	41	45	59	58	62	88

Dimension pictures

❶



❷



Starting current limiter, current-controlled with no-load detection
ESG 6

General Data

- Rated voltage 115 - 230 Vac ±10 %
- Maximum rated current 16 A
- Internal resistance 7.8 Ohms
- Maximum ambient temperature 40 °C
- Degree of protection IP 20

Advantages

- Dynamic limit times for optimum starting of consumers with high starting currents
- Current-controlled with no-load detection, hence full current limit protection, even if momentarily switched back on
- Integrated, non-exchangeable temperature fuse in the input circuit
- Very good moisture protection thanks to XtraDenseFill resin encapsulation
- Stable plastic housing for rail mounting, e.g. in consumer units or meter mounting boards

Applications

Starting current limiting option for limiting the starting current in power tools, transformers and other consumers with high switch-on or starting currents.

Starting current limiter, current-controlled with no-load detection
ESG 6

Electrical data

Type	ESG 6
Operating data	
Rated voltage	115 - 230 Vac ±10 %
Rated frequency	50 - 60 Hz
Rated current	max. 16 A
Environment	
Ambient temperature max.	40 °C
Safety and protection	
Type	Resin encapsulated transformer
Protection index	IP 20
Safety class (prepared)	I
Internal impedance	7.80 Ω
Order numbers	
Order Number	**ESG 6**

Mechanical data

Terminal and mounting	
Terminals PRI	Spring clamp terminal max 2.5mm²
Terminals SEC	Spring clamp terminal max 2.5mm²
Measures and weights	
Weight	0.00 kg
Wide	72 mm
Height	89 mm
Depth	59 mm

Starting current limiter
ES 00 / ES 30

General Data

- Rated voltage 220 - 400 Vac
- Maximum rated current 16 A
- Internal resistance 3.75 Ohms
- Maximum ambient temperature 40 °C
- Degree of protection IP 00

Advantages

- Integrated, non-exchangeable thermal fuse in the input circuit
- Very good moisture protection thanks to XtraDenseFill resin encapsulation (ES30)
- ES 00: Stable plastic housing for screwed mounting
- ES 30: Stable plastic housing for rail mounting, e.g. in consumer units or meter mounting boards

Applications

Starting current limiting option for limiting the starting current in transformers with high switch-on or starting currents (not suited for electrical machinery or motors).

Starting current limiter
ES 00 / ES 30

Electrical data

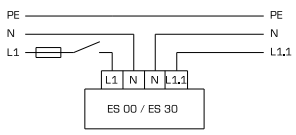
Type	ES 00	ES 30
Operating data		
Rated voltage	220 - 400 Vac	220 - 400 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz
Rated current	max. 16 A	max. 16 A
Environment		
Ambient temperature max.	40 °C	40 °C
Safety and protection		
Type	Mounting lugs with fixing holes	Fixing holes and for panel installation on mounting rails
Protection index	IP 00	IP 30
Safety class (prepared)	II	II
Internal impedance	3.75 Ω	3.75 Ω
Safety	integrated, non-replaceable thermal fuse in the input circuit	integrated, non-replaceable thermal fuse in the input circuit
Order numbers		
Order Number	**ES 00**	**ES 30**

Mechanical data

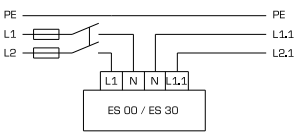
Terminal and mounting		
Terminals	Screw terminal	Screw terminal
Fixing method	Fastener holes in the housing	Rail mounting
Measures and weights		
Weight	0.27 kg	0.47 kg
Dimension picture (in mm)	❶	❶
A	60	95
B	94	71
C	60	58

Dimension pictures

Beschaltung für Einphasenverbraucher zwischen L und N

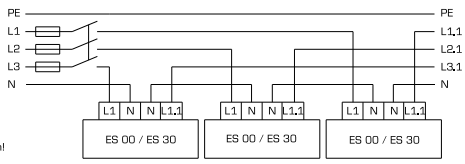


Beschaltung für Einphasenverbraucher zwischen L und L



Verbraucher dürfen nicht gegen L3 oder gen N angeschlossen werden!

Beschaltung für Drehstromverbraucher



Starting current limiter
ESG 1 / ESG 2

General Data

- Rated voltage 220 - 250 Vac
- Maximum rated current 16 A
- Internal resistance 3.75 Ohms
- Maximum ambient temperature 40 °C
- Degree of protection IP 20

Advantages

- Integrated, non-exchangeable temperature fuse in the input circuit
- Very good moisture protection thanks to XtraDenseFill resin encapsulation
- May be used anywhere for stationary and mobile applications
- ESG 1: Integrated safety plug and built-in safety socket
- ESG 2: 1.4 m connecting cable with safety plug and built-in safety socket

Applications

Starting current limiting option for limiting the starting current in transformers with high switch-on or starting currents (not suited for electrical machinery or motors).

Starting current limiter
ESG 1 / ESG 2

Electrical data

Type	ESG 1	ESG 2
Operating data		
Rated voltage	220 - 250 Vac	220 - 250 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz
Rated current	max. 16 A	max. 16 A
Environment		
Ambient temperature max.	40 °C	40 °C
Safety and protection		
Type	Resin encapsulated transformer	Resin encapsulated transformer
Protection index	IP 20	IP 20
Safety class (prepared)	I	I
Internal impedance	3.75 Ω	3.75 Ω
Order numbers		
Order Number	**ESG 1**	**ESG 2**

Mechanical data

Terminal and mounting		
Terminals PRI	Integrated safety plug	Mains connecting cable with safety plug
Terminals SEC	Safety socket	Safety socket
Measures and weights		
Weight	0.40 kg	0.55 kg
Wide	90 mm	90 mm
Height	65 mm	65 mm
Depth	130 mm	130 mm

Circuit diagramm

Starting current limiter
ESG 3 / ESG 4 / ESG 5

General Data

Rated voltage 115 - 230 Vac ±10 %
Maximum rated current 16 A
Internal resistance 7.8 Ohms (ESG 3/4), 4.4 Ohms (ESG 5)
Maximum ambient temperature 40 °C
Degree of protection IP 65

Advantages

- Dynamic limit times for optimum starting of consumers with high starting currents
- Current-controlled with no-load detection, hence full current limit protection, even if momentarily switched back on
- Integrated, non-exchangeable temperature fuse in the input circuit
- Very good moisture protection thanks to XtraDenseFill resin encapsulation
- May be used anywhere for stationary and mobile applications
- High degree of protection
- ESG 3: 2 x 1.4 m connecting cable with DIN 49440,1 safety plug and safety connector (GER)
- ESG 4: 2 x 1.4 m connecting cable with BS 1663 safety plug and safety connector (UK)
- ESG 5: 2 x 1.4 m connecting cable with NEMA5-15 safety plug and safety connector (USA)

Applications

Starting current limiting option for limiting the starting current in power tools, transformers and other consumers with high switch-on or starting currents.

Starting current limiter
ESG 3 / ESG 4 / ESG 5

Electrical data

Type	ESG 3	ESG 4	ESG 5
Operating data			
Rated voltage	115 - 230 Vac ±10 %	115 - 230 Vac ±10 %	115 - 230 Vac ±10 %
Rated current	max. 16 A	max. 16 A	max. 16 A
Input			
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Environment			
Ambient temperature max.	40 °C	40 °C	40 °C
Safety and protection			
Type	Resin encapsulated transformer	Resin encapsulated transformer	Resin encapsulated transformer
Protection index	housing IP 65	housing IP 65	housing IP 65
Safety class (prepared)	I	I	I
Internal impedance	7.80 Ω	7.80 Ω	4.40 Ω
Order numbers			
Order Number	**ESG 3**	**ESG 4**	**ESG 5**

Mechanical data

Terminal and mounting			
Terminals PRI	Connecting cable with DIN49440,1 protected contact plug (GER)	Connecting cable with BS 1663 protected contact plug (UK)	Connecting cable with NEMA5-15 protected contact plug (USA)
Terminals SEC	Cconnecting cable with DIN49440,1 protected contact coupling (GER)	Connecting cable with BS 1663 protected contact coupling (UK)	Connecting cable with NEMA5-15 protected contact coupling (USA)
Measures and weights			
Weight	0.69 kg	0.69 kg	0.69 kg
Wide	66 mm	66 mm	66 mm
Height	70 mm	70 mm	70 mm
Depth	121 mm	121 mm	121 mm

Energy-saving system
SAVERGY 1

General Data

Rated input voltage 230 Vac
Rated output voltage 207 Vac
Rated current 16 - 25 A
Insulation class B
Maximum ambient temperature 40 °C
Degree of protection IP 00 - IP 20

Advantages

Energy savings of up to 30 %
Straightforward, low-maintenance technology
Pays for itself in no time at all
Increasing the service life of lamps
e-switch: 2-stage auto connection increases savings in the case of fluctuating mains voltages
Uninterruptible stage and bypass switching protects against failures
100 % capable of handling load imbalances
Individual voltage adjustment through the selection of various tappings
DIN IEC 60038 and VDE 0175-compliant; minimum output voltage of 207 Vac
Easy to integrate into existing installations
Very good moisture protection and low transformer noise thanks to BLOCKIMPEX vacuum impregnation

Applications

BLOCK SAVERGY to reduce the energy consumed by lighting installations, and to protect them against excessively high voltages. The fundamental principle is based on reducing the voltage within the limits specified for the lamps in question. The output voltage supplied by BLOCK SAVERGY is still a sinusoidal one, however, making it suitable for operating mixed, centralised or distributed power supplies to all lighting installations which use HQL, NAV and fluorescent lamps. BLOCK SAVERGY works on the principle of uninterruptible, evaluates permanent the primary power supply, controls the output voltage, thereby optimizing the consumption.

Standards

Energy-saving system
to IEC 61558-2-26 (CD)

Energy-saving system
SAVERGY 1

Electrical data

Type	SAVERGY 1-16B1	SAVERGY 1-16T1	SAVERGY 1-25B1	SAVERGY 1-25T1
Input				
Rated input Voltage	230 Vac (±10 %)	230 Vac (±10 %)	230 Vac (±10 %)	230 Vac (±10 %)
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output				
Rated output voltage	207 Vac*	207 Vac*	207 Vac*	207 Vac*
e switch**	✔	✔	✔	✔
e connect***	✔	✔	✔	✔
Rated current	16 A	16 A	25 A	25 A
Environment				
Ambient temperature	40 °C	40 °C	40 °C	40 °C
Safety and protection				
Type	Sheet steel enclosure, for indoor installation	open, for indoor installation	Sheet steel enclosure, for indoor installation	open, for indoor installation
Class of Insulation System	B (130 °C)	B (130 °C)	B (130 °C)	B (130 °C)
Protection index	IP 20	IP 00	IP 20	IP 00
Safety class (prepared)	I	I	I	I
Internal protection (main circuit)	F1 circuit breaker, 16A	F1 circuit breaker, 16A	F1 circuit breaker 25 A	F1 circuit breaker 25 A
Internal protection (control circuit)	F2, F3 fuse 1.6AT	F2, F3 fuse 1.6AT	1.6 A T fuses	Fuses 1.6 AT
Notes				
*	The voltage can be individually set to the values Uin x 0.86; Uin x 0.88; Uin x 0.9; Uin x 0.92; Uin x 0.94 (207 Vac corresponds to a factor of 0.9)	The voltage can be individually set to the values Uin x 0.86; Uin x 0.88; Uin x 0.9; Uin x 0.92; Uin x 0.94 (207 Vac corresponds to a factor of 0.9)	The voltage can be individually set to the values Uin x 0.86; Uin x 0.88; Uin x 0.9; Uin x 0.92; Uin x 0.94 (207 Vac corresponds to a factor of 0.9)	The voltage can be individually set to the values Uin x 0.86; Uin x 0.88; Uin x 0.9; Uin x 0.92; Uin x 0.94 (207 Vac corresponds to a factor of 0.9)
**	eswitch: If the input voltage increases by 5%, the rated voltage will be reset to the specified value.	eswitch: If the input voltage increases by 5%, the rated voltage will be reset to the specified value.	eswitch: If the input voltage increases by 5%, the rated voltage will be reset to the specified value.	eswitch: If the input voltage increases by 5%, the rated voltage will be reset to the specified value.
***	econnect: Reconnection enables an even greater reduction in the rated voltage (by 2% or 4%) to be achieved.	econnect: Reconnection enables an even greater reduction in the rated voltage (by 2% or 4%) to be achieved.	econnect: Reconnection enables an even greater reduction in the rated voltage (by 2% or 4%) to be achieved.	econnect: Reconnection enables an even greater reduction in the rated voltage (by 2% or 4%) to be achieved.
Order numbers				
Order Number	**SAVERGY 1-16B1**	**SAVERGY 1-16T1**	**SAVERGY 1-25B1**	**SAVERGY 1-25T1**

Mechanical data

30

Terminal and mounting				
Terminals	Screw-type terminal	Screw-type terminal	Screw-type terminal	Screw-type terminal
Wire range	4 mm²	4 mm²	4 mm²	4 mm²
Fixing screws	M6	M6	M6	M6
Measures and weights				
Wide	453 mm	450 mm	453 mm	450 mm
Height	185 mm	175 mm	185 mm	175 mm
Depth	260 mm	240 mm	260 mm	240 mm
Weight	17.50 kg	13.60 kg	18.40 kg	14.50 kg

Energy-saving system
SAVERGY 3

General Data

Rated input voltage 3 x 400 Vac
Rated output voltage 3 x 360 Vac (207 V L-N)*
Rated current 25 - 63 A
Insulation class B
Maximum ambient temperature 40 °C
Degree of protection IP 20 - 44

Advantages

Energy savings of up to 30 %
Straightforward, low-maintenance technology
Pays for itself in no time at all
Increasing the service life of lamps
e-switch: 2-stage auto connection increases savings in the case of fluctuating mains voltages
Uninterruptible stage and bypass switching protects against failures
100 % capable of handling load imbalances
Individual voltage adjustment through the selection of various tappings
DIN IEC 60038 and VDE 0175-compliant; minimum output voltage of 207 Vac
Easy to integrate into existing installations
Very good moisture protection and low transformer noise thanks to BLOCKIMPEX vacuum impregnation

Applications

BLOCK SAVERGY to reduce the energy consumed by lighting installations, and to protect them against excessively high voltages. The fundamental principle is based on reducing the voltage within the limits specified for the lamps in question. The output voltage supplied by BLOCK SAVERGY is still a sinusoidal one, however, making it suitable for operating mixed, centralised or distributed power supplies to all lighting installations which use HQL, NAV and fluorescent lamps. BLOCK SAVERGY works on the principle of uninterruptible, evaluates permanent the primary power supply, controls the output voltage, thereby optimizing the consumption.

Standards

Energy-saving system
to IEC 61558-2-26 (CD)

Energy-saving system
SAVERGY 3

Electrical data

Type	SAVERGY 3-25A1	SAVERGY 3-25B1	SAVERGY 3-40A1	SAVERGY 3-40B1	SAVERGY 3-63A1	SAVERGY 3-63B1
Input						
Rated input Voltage	3 x 400 Vac (±10 %)	3 x 400 Vac (±10 %)	3 x 400 Vac (±10 %)	3 x 400 Vac (±10 %)	3 x 400 Vac (±10 %)	3 x 400 Vac (±10 %)
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
e connect***	✔	✔	✔	✔	✔	✔
e switch**	✔	✔	✔	✔	✔	✔
Rated output voltage	3 x 360 Vac (207 L-N)*	3 x 360 Vac (207 V L-N)*	3 x 360 Vac (207 V L-N)*	3 x 360 Vac (207 V L-N)*	3 x 360 Vac (207 V L-N)*	3 x 360 Vac (207 V L-N)*
Rated current	25 A	25 A	40 A	40 A	63 A	63 A
Environment						
Ambient temperature	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	Plastic enclosure, for outdoor installation	Sheet steel enclosure, for indoor installation	Plastic enclosure, for outdoor installation	Sheet steel enclosure, for indoor installation	Plastic enclosure, for outdoor installation	Sheet steel enclosure, for indoor installation
Class of Insulation System	B (130 °C)	B (130 °C)	B (130 °C)	B (130 °C)	B (130 °C)	B (130 °C)
Protection index	IP 44	IP 20	IP 44	IP 20	IP 44	IP 20
Safety class (prepared)	I	I	I	I	I	I
Internal protection (main circuit)	Fuses 3 x 25 A g	Fuses 3 x 25 A g G	Fuses 3 x 40 A g G	Fuses 3 x 40 A g G	Fuses 3 x 63 A g G	Fuses 3 x 63 A g G
Internal protection (control circuit)	Fuses 1.6 At	Fuses 1.6 AT	Fuses 1.6 AT	Fuses 1.6 AT	Fuses 1.6 AT	Fuses 1.6 AT
Notes						
*	The voltage can be individually set to the values Uin x 0.86; Uin x 0.88; Uin x 0.9; Uin x 0.92; Uin x 0.94 (207 Vac corresponds to a factor of 0.9)	The voltage can be individually set to the values Uin x 0.86; Uin x 0.88; Uin x 0.9; Uin x 0.92; Uin x 0.94 (207 Vac corresponds to a factor of 0.9)	The voltage can be individually set to the values Uin x 0.86; Uin x 0.88; Uin x 0.9; Uin x 0.92; Uin x 0.94 (207 Vac corresponds to a factor of 0.9)	The voltage can be individually set to the values Uin x 0.86; Uin x 0.88; Uin x 0.9; Uin x 0.92; Uin x 0.94 (207 Vac corresponds to a factor of 0.9)	The voltage can be individually set to the values Uin x 0.86; Uin x 0.88; Uin x 0.9; Uin x 0.92; Uin x 0.94 (207 Vac corresponds to a factor of 0.9)	The voltage can be individually set to the values Uin x 0.86; Uin x 0.88; Uin x 0.9; Uin x 0.92; Uin x 0.94 (207 Vac corresponds to a factor of 0.9)
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Order numbers						
Order Number	**SAVERGY 3-25A1**	**SAVERGY 3-25B1**	**SAVERGY 3-40A1**	**SAVERGY 3-40B1**	**SAVERGY 3-63A1**	**SAVERGY 3-63B1**

Mechanical data

30

Terminal and mounting						
Terminals	Screw-type terminal	Screw-type terminal	Screw-type terminal	Screw-type terminal	Screw-type terminal	Screw-type terminal
Wire range	16 mm²	16 mm²	16 mm²	16 mm²	16 mm²	16 mm²
Fixing screws	-	M8	-	M8	-	M8
Measures and weights						
Wide	590 mm	640 mm	590 mm	640 mm	590 mm	640 mm
Height	1050 mm	725 mm	1050 mm	725 mm	1050 mm	725 mm
Depth	330 mm	290 mm	330 mm	290 mm	330 mm	290 mm
Weight	91.00 kg	76.00 kg	114.00 kg	92.00 kg	133.00 kg	106.00 kg

AC current supply for laboratories
BRS

General Data

- Rated input voltage 230 Vac
- Rated output voltage 0 - 250 Vac
- Rated power 400 - 2200 VA
- Insulation class B
- Maximum ambient temperature 40 °C
- Efficiency up to 93 %
- Internal resistance 1.80 - 4.96 Ohms
- Self-cooling

Advantages

- Limited short-circuit protection
- Digital current and voltage display
- Switchable output indicator (effective power/apparent power) through touchscreen
- Output circuit breakers may be operated from the front
- Plug-in rack for installation in 19 inches cabinets
- Mains connecting lead and socket

Applications

Isolating transformer with controllable output voltage for use in the laboratory.

Standards

Isolating transformer
to: VDE 0570 Teil 2-4, VDE 0411 Teil 1, DIN EN 61558-2-4, EN 61558-2-4, EN 61010-1, IEC 61558-2-4, IEC 61010-1

AC current supply for laboratories
BRS

Electrical data

Type	BRS 400	BRS 1000	BRS 2200
Input			
Rated input voltage	230 Vac	230 Vac	230 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output			
Rated output voltage	0 - 250 Vac	0 - 250 Vac	0 - 250 Vac
Rated Power	400 VA	1000 VA	2200 VA
Efficiency	92 %	93 %	89 %
Environment			
Cooling method	by self-cooling	by self-cooling	by self-cooling
Safety and protection			
Type	encapsulated in metal housing	encapsulated in metal housing	encapsulated in metal housing
Internal impedance	4.96 Ω	2.25 Ω	1.80 Ω
Class of Insulation System	B	B	B
Test voltage	3750 Vac, 50 Hz	3750 Vac, 50 Hz	3750 Vac, 50 Hz
Protection index	IP 20	IP 20	IP 20
Safety class	I	I	I
Short circuit strength	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof
Order numbers			
Order Number	**BRS 400**	**BRS 1000**	**BRS 2200**

Mechanical data

Terminal and mounting			
Terminals PRI	Mains connecting cable with safety plug	Mains connecting cable with safety plug	Mains connecting cable with safety plug
Terminals SEC	Protective contact socket	Protective contact socket	Protective contact socket
Measures and weights			
Wide	487 mm	487 mm	487 mm
Weight	13.00 kg	20.00 kg	45.00 kg
Height	143.5 mm	210 mm	210 mm
Depth	300 mm	300 mm	300 mm

AC current supply for laboratories
BR

General Data

Rated input voltage 230 Vac
Rated output voltage 0 - 250 Vac
Rated power 350 - 2200 VA
Insulation class E
Maximum ambient temperature 40 °C
Efficiency up to 93 %
Internal resistance 1.80 - 4.96 Ohms
Self-cooling

Advantages

Limited short-circuit protection
Analogue current and voltage indicator
Output circuit breakers may be operated from the front
Carrying handle, mains connecting lead and socket for mobile use

Applications

Isolating transformer with controllable output voltage for use in the laboratory.

Standards

Isolating transformer
to: VDE 0570 Part 2-4, DIN EN 61558-2-4, EN 61558-2-4, IEC 61558-2-4

AC current supply for laboratories
BR

Electrical data

Type	BR 351	BR 1000	BR 2200
Input			
Rated input voltage	230 Vac	230 Vac	230 Vac
Frequency range	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output			
Rated output voltage	0 - 250 Vac	0 - 250 Vac	0 - 250 Vac
Rated Power	350 VA	1000 VA	2200 VA
Efficiency	92 %	93 %	89 %
Environment			
Cooling method	by self cooling	by self cooling	by self cooling
Ambient temperature max.	40 °C	40 °C	40 °C
Safety and protection			
Type	enclosed	enclosed	enclosed
Internal impedance	4.96 Ω	2.25 Ω	1.80 Ω
Class of Insulation System	E	E	E
Test voltage	3750 Vac, 50 Hz	3750 Vac, 50 Hz	3750 Vac, 50 Hz
Protection index	IP 20	IP 20	IP 20
Safety class	II	I	I
Short circuit strength	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof
Order numbers			
Order Number	**BR 351**	**BR 1000**	**BR 2200**

Mechanical data

Terminal and mounting			
Terminals PRI	Mains connecting cable with safety plug	Mains connecting cable with safety plug	Mains connecting cable with safety plug
Terminals SEC	Protective contact socket	Protective contact socket	Protective contact socket
Measures and weights			
Wide	318 mm	400 mm	450 mm
Weight	13.00 kg	20.00 kg	45.00 kg
Height	195 mm	195 mm	300 mm
Depth	225 mm	250 mm	340 mm

High voltage test apparatus
HS 0110

General Data

Rated input voltage 230 Vac
Input current 4 A
Rated output voltage 500 - 6000 Vac, continuous and potential-free
Insulation class E
Maximum ambient temperature 40 °C
Degree of protection IP 30
WG 162 warning device optionally available

Advantages

LCD voltage indicator
Visual and acoustic breakdown indicator
Continuously variable output voltage
Two fail-safe test probes

Applications

High voltage test device for the inspection of the insulation withstand of transformers, motors, electrical machinery as well as equipment and installations.

Standards

Testing apparatus
to VDE 0104

High voltage test apparatus
HS 0110

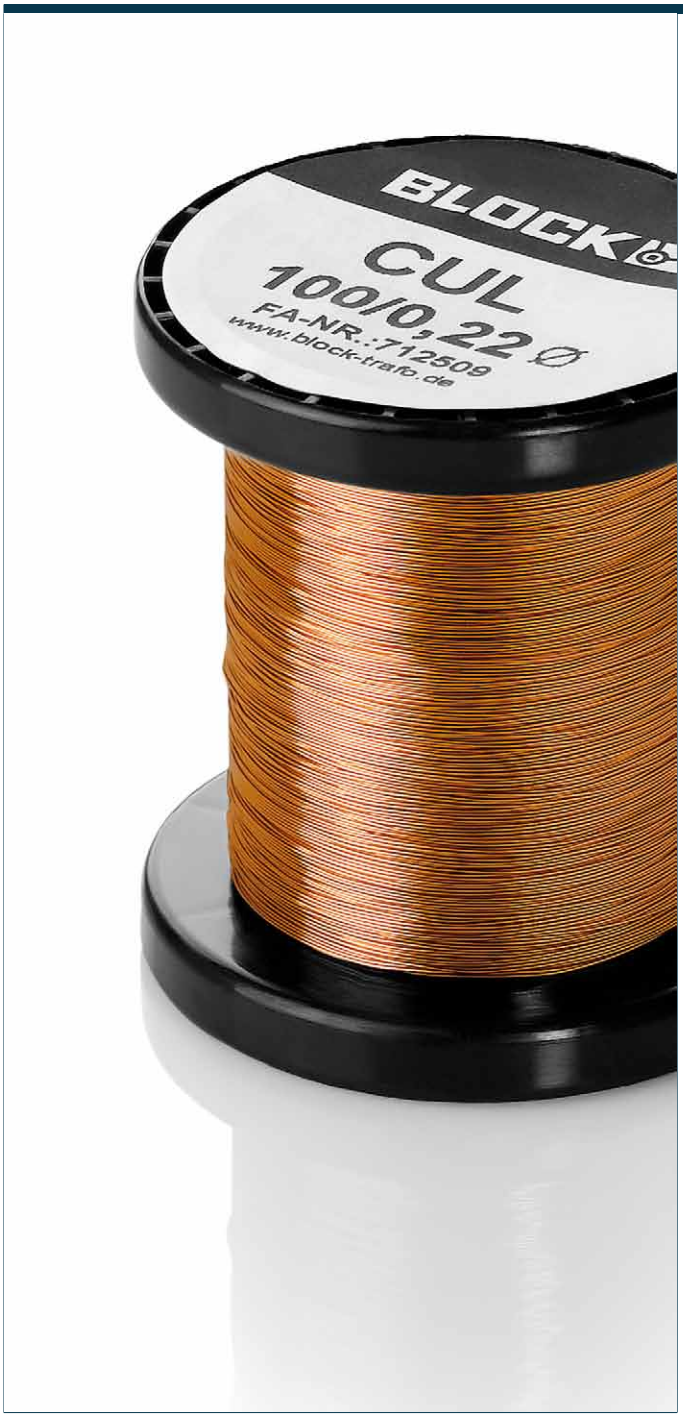
Electrical data

Type	HS 0110
Input	
Rated input voltage	230 Vac
Frequency range	50 - 60 Hz
Input current	4.0 A
Permissible tolerance (Input voltage)	+6 up to -10 %
Output	
Interrupting current	10 mA, 50 mA, 100 mA switchable
Burn-out current	0 - 100 mA
Output rated voltage	500 - 6000 Vac, continuous and potential-free
Burn-out time / Time interval	app. 1:10
Burn-time at 100 mA	app. 1 min
Short circuit current	secondary 200 mA to VDE 0570
Signalling	
Display	LCD-indication of the voltage 3 1/2 digit
Voltage puncture display	optical and acoustical
Environment	
Ambient temperature max.	40 °C
Safety and protection	
Type	enclosed
Class of Insulation System	E
Protection index	IP 30
Safety class (prepared)	I
Accessory	
Warning device (optional)	WG 162
Order numbers	
Order Number	**HS 0110**

Mechanical data

Terminal and mounting	
Terminals	Main connecting cable with safety plug
Measures and weights	
Weight	23.00 kg
Wide	360 mm
Height	212 mm
Depth	530 mm

Enamelled copper wire on mini bobbin
CUL



General Data

- Current loading 0.02 - 11.5 A
- Long-term thermal resistance 150°C (class F)
- May be tinned >350 °C
- Wire diameter 0.08 - 2 mm

Advantages

- Insulating varnish basis min, polyurethane, mod. current loading
- Degree 1
- TJ min. 155 °C
- Solderable

Applications

Enamelled copper wire for the production of coils and winding and for general laboratory needs.

Enamelled copper wire on mini bobbin
CUL

Technische Daten 30

Typ	current car. cap.	Heat resistance	insulating varnish	Tin-plate	Wire diameter	Weight	Length
CUL 50/0,08	0.02 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	0.08 mm	0.05 kg	990 m
CUL 50/0,10	0.03 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	0.10 mm	0.05 kg	675 m
CUL 50/0,15	0.06 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	0.15 mm	0.05 kg	304 m
CUL 50/0,22	0.14 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	0.22 mm	0.05 kg	142 m
CUL 100/0,10	0.03 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	0.10 mm	0.10 kg	1351 m
CUL 100/0,15	0.06 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	0.15 mm	0.10 kg	609 m
CUL 100/0,22	0.14 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	0.22 mm	0.10 kg	285 m
CUL 100/0,28	0.22 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	0.28 mm	0.10 kg	175 m
CUL 100/0,35	0.35 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	0.35 mm	0.10 kg	112 m
CUL 100/0,40	0.45 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	0.40 mm	0.10 kg	86 m
CUL 100/0,50	0.70 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	0.50 mm	0.10 kg	54 m
CUL 100/0,63	1.00 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	0.63 mm	0.10 kg	33 m
CUL 100/0,75	1.55 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	0.75 mm	0.10 kg	25 m
CUL 100/0,85	2.00 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	0.85 mm	0.10 kg	19 m
CUL 100/1,00	2.80 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	1.00 mm	0.10 kg	14 m
CUL 100/1,12	3.50 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	1.12 mm	0.10 kg	11 m
CUL 200/0,10	0.03 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	0.10 mm	0.20 kg	2702 m
CUL 200/0,15	0.06 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	0.15 mm	0.20 kg	1219 m
CUL 200/0,22	0.14 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	0.22 mm	0.20 kg	571 m
CUL 200/0,28	0.22 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	0.28 mm	0.20 kg	350 m
CUL 200/0,35	0.35 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	0.35 mm	0.20 kg	224 m
CUL 200/0,40	0.45 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	0.40 mm	0.20 kg	172 m
CUL 200/0,50	1.70 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	0.50 mm	0.20 kg	109 m
CUL 200/0,63	1.00 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	0.63 mm	0.20 kg	76 m
CUL 200/0,75	1.55 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	0.75 mm	0.20 kg	50 m
CUL 200/0,85	2.00 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	0.85 mm	0.20 kg	39 m
CUL 200/1,00	2.80 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	1.00 mm	0.20 kg	28 m
CUL 200/1,12	3.50 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	1.12 mm	0.20 kg	23 m
CUL 500/0,40	0.45 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	0.40 mm	0.50 kg	430 m
CUL 500/0,50	0.70 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	0.50 mm	0.50 kg	270 m
CUL 500/0,63	1.00 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	0.63 mm	0.50 kg	165 m
CUL 500/0,75	1.55 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	0.75 mm	0.50 kg	125 m
CUL 500/0,85	2.00 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	0.85 mm	0.50 kg	95 m
CUL 500/1,00	2.80 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	1.00 mm	0.50 kg	70 m
CUL 500/1,12	3.50 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	1.12 mm	0.50 kg	55 m
CUL 500/1,32	5.00 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	1.32 mm	0.50 kg	39 m
CUL 500/1,50	6.50 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	1.50 mm	0.50 kg	30 m
CUL 500/1,80	9.50 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	1.80 mm	0.50 kg	21 m
CUL 500/2,00	11.50 A	155 °C (CL.F)	min. Polyurethan, mod.	>350 °C	2.00 mm	0.50 kg	17 m

Stranded copper wire on mini bobbin
CLI

General Data

Current loading 0.42 - 3.36 A
Long-term thermal resistance 130°C (class B)
May be tinned >350 °C
Wire diameter 15 x 0.1 - 120 x 0.1 mm
Effective Cross-section 0.118 - 0.943 mm

Advantages

Insulating varnish basis polyurethane, mod.
Degree 1
TJ min. 130 °C
Solderable

Applications

Varnish insulated radio frequency copper braid for the production of coils and windings in the radio frequency range and for general laboratory needs.

Stranded copper wire on mini bobbin
CLI

Technische Daten 30

Typ	current car. cap.	Heat resistance	insulating varnish	Tin-plate	Wire diameter	Eff. cross section	Weight	Length
CLI 200/15	0.42 A	130 °C (Kl.B)	Polyurethane, mod.	>350 °C	15 x 0,1 mm	0.118 mm²	0.20 kg	192 m
CLI 200/30	0.84 A	130 °C (Kl.B)	Polyurethane, mod.	>350 °C	30 x 0,1 mm	0.236 mm²	0.20 kg	96 m
CLI 200/60	1.68 A	130 °C (Kl.B)	Polyurethane, mod.	>350 °C	60 x 0,1 mm	0.471 mm²	0.20 kg	48 m
CLI 200/90	2.52 A	130 °C (Kl.B)	Polyurethane, mod.	>350 °C	90 x 0,1 mm	0.707 mm²	0.20 kg	36 m
CLI 200/120	3.36 A	130 °C (Kl.B)	Polyurethane, mod.	>350 °C	120 x 0,1 mm	0.943 mm²	0.20 kg	24 m

Resistance wire on mini bobbin
RD

General Data

Resistor allow as specified in DIN 46 461 (CuNi44)
Specific electrical resistance 0.49 ((x mm)/m)
Average temperature constant of the electrical resistor at 20°C = 0.00004-0.00008
Average linear thermal expansion coefficient between 20 - 100 °C = 13.5x10-6
Melting temperature 1220-1270 °C
Maximum permissible wire temperature up to 600 °C

Advantages

Resistant in specific resistance
Influence of the temperature or inherent heating on the resistance value practically insignificant (max. 0.8 % at 100 °C temperature rise)
Firmly adhering surface oxide coating withstands any temperature change and protects against further oxidation under continuous load
Very easy to machine thanks to softness and malleability
Suitable for soft soldering, hard soldering or welding

Applications

Resistance wire for the production of technical resistances, shunts and for general laboratory needs.

Resistance wire on mini bobbin
RD

Technische Daten 30

Typ	Resistance	highest wire temperature	Mean linear coefficient of thermal expansion between 20 - 100 °C	Mean temperature coefficient of resistance at 20 °C	Melting point	Specific electrical resistance	Current intensity for wire temperature (100°C)	Current intensity for wire temperature (200°C)	Current intensity for wire temperature (300°C)	Wire diameter	Weight	Length
RD 50/0,1	62.400 Ω/m	to 600 °C	13,5x10-6	0,00004-0,00008	1220-1270 °C	0.49 (Ω x mm²)/m	0.237 A	0.396 A	0.537 A	0.10 mm	0.05 kg	715 m
RD 50/0,2	15.600 Ω/m	to 600 °C	13,5x10-6	0,00004-0,00008	1220-1270 °C	0.49 (Ω x mm²)/m	0.560 A	0.940 A	1.280 A	0.20 mm	0.05 kg	178 m
RD 50/0,3	6.930 Ω/m	to 600 °C	13,5x10-6	0,00004-0,00008	1220-1270 °C	0.49 (Ω x mm²)/m	0.940 A	1.570 A	2.120 A	0.30 mm	0.05 kg	79 m
RD 50/0,4	3.900 Ω/m	to 600 °C	13,5x10-6	0,00004-0,00008	1220-1270 °C	0.49 (Ω x mm²)/m	1.340 A	2.240 A	3.080 A	0.40 mm	0.05 kg	45 m
RD 50/0,6	1.730 Ω/m	to 600 °C	13,5x10-6	0,00004-0,00008	1220-1270 °C	0.49 (Ω x mm²)/m	2.210 A	3.700 A	5.000 A	0.60 mm	0.05 kg	20 m
RD 50/0,8	0.975 Ω/m	to 600 °C	13,5x10-6	0,00004-0,00008	1220-1270 °C	0.49 (Ω x mm²)/m	3.190 A	5.330 A	7.210 A	0.80 mm	0.05 kg	11 m
RD 50/1,0	0.624 Ω/m	to 600 °C	13,5x10-6	0,00004-0,00008	1220-1270 °C	0.49 (Ω x mm²)/m	4.220 A	7.050 A	9.550 A	1.00 mm	0.05 kg	7 m
RD 50/1,2	0.433 Ω/m	to 600 °C	13,5x10-6	0,00004-0,00008	1220-1270 °C	0.49 (Ω x mm²)/m	5.300 A	8.850 A	12.000 A	1.20 mm	0.05 kg	5 m
RD 100/0,1	62.400 Ω/m	to 600 °C	13,5x10-6	0,00004-0,00008	1220-1270 °C	0.49 (Ω x mm²)/m	0.237 A	0.396 A	0.537 A	0.10 mm	0.10 kg	1430 m
RD 100/0,2	15.600 Ω/m	to 600 °C	13,5x10-6	0,00004-0,00008	1220-1270 °C	0.49 (Ω x mm²)/m	0.560 A	0.610 A	1.280 A	0.20 mm	0.10 kg	357 m
RD 100/0,3	6.930 Ω/m	to 600 °C	13,5x10-6	0,00004-0,00008	1220-1270 °C	0.49 (Ω x mm²)/m	0.940 A	1.570 A	2.120 A	0.30 mm	0.10 kg	158 m
RD 100/0,4	3.900 Ω/m	to 600 °C	13,5x10-6	0,00004-0,00008	1220-1270 °C	0.49 (Ω x mm²)/m	1.340 A	2.240 A	3.080 A	0.40 mm	0.10 kg	89 m
RD 100/0,6	1.730 Ω/m	to 600 °C	13,5x10-6	0,00004-0,00008	1220-1270 °C	0.49 (Ω x mm²)/m	2.210 A	3.700 A	5.000 A	0.60 mm	0.10 kg	39 m
RD 100/0,8	0.975 Ω/m	to 600 °C	13,5x10-6	0,00004-0,00008	1220-1270 °C	0.49 (Ω x mm²)/m	3.190 A	5.330 A	7.210 A	0.80 mm	0.10 kg	22 m
RD 100/1,0	0.624 Ω/m	to 600 °C	13,5x10-6	0,00004-0,00008	1220-1270 °C	0.49 (Ω x mm²)/m	4.220 A	7.050 A	9.550 A	1.00 mm	0.10 kg	14 m
RD 100/1,2	0.433 Ω/m	to 600 °C	13,5x10-6	0,00004-0,00008	1220-1270 °C	0.49 (Ω x mm²)/m	5.300 A	8.850 A	12.000 A	1.20 mm	0.10 kg	9.9 m
RD 100/1,5	0.277 Ω/m	to 600 °C	13,5x10-6	0,00004-0,00008	1220-1270 °C	0.49 (Ω x mm²)/m	7.000 A	11.700 A	15.800 A	1.50 mm	0.10 kg	6.3 m
RD 100/2,0	0.156 Ω/m	to 600 °C	13,5x10-6	0,00004-0,00008	1220-1270 °C	0.49 (Ω x mm²)/m	10.000 A	16.800 A	22.700 A	2.00 mm	0.10 kg	3.5 m
RD 100/3,0	0.069 Ω/m	to 600 °C	13,5x10-6	0,00004-0,00008	1220-1270 °C	0.49 (Ω x mm²)/m	16.600 A	27.800 A	37.700 A	3.00 mm	0.10 kg	1.5 m
RD 100/4,0	0.039 Ω/m	to 600 °C	13,5x10-6	0,00004-0,00008	1220-1270 °C	0.49 (Ω x mm²)/m	23.900 A	40.000 A	54.000 A	4.00 mm	0.10 kg	0.8 m

Sheetsteel housing
BG

General Data

Degree of protection IP 20 - IP 23
Colour RAL 7032 (BG 1 - BG 50), RAL 5008 (BG 240 - BG 450)
For floor and wall mounting (BG 1 - BG 50)
Floor mounting (BG 240 - BG 450)

Advantages

Powder-coated surfaces
With feet for transport by forklift from housing size BG 240
Optionally available in degree of protection IP 54
Optionally available cooling fins
Optionally available with special paint

Sheetsteel housing
BG

Electrical data

Type	BG 1	BG 2	BG 3	BG 10	BG 20	BG 30
Operating data						
For power (three phase)	100 VA	160 VA	400 VA	750 VA	1500 VA	3000 VA
For power (single phase)	63 VA	250 VA	500 VA	1600 VA	2500 VA	5000 VA
Enclosure suitable for protection index	IP 20 (Floor mounting)	IP 20 (Floor mounting)	IP 20 (Floor mounting)	IP 23	IP 23	IP 23
Max. Power loos (at 40 °C ambient temperature)	17 W	25 W	48 W	71 W	150 W	160 W
Order numbers						
Order Number	**BG 1**	**BG 2**	**BG 3**	**BG 10**	**BG 20**	**BG 30**

Mechanical data

Measures and weights						
Weight	2.50 kg	3.00 kg	3.70 kg	4.00 kg	7.00 kg	11.00 kg
Cable glanding type	PG 11	PG 11	PG 11	PG 13,5 / M25	PG 13,5 / M25	PG 13,5 / M25
Cable glanding Ø	8 - 12 mm	8 - 12 mm	8 - 12 mm	7 - 13 mm	7 - 13 mm	7 - 13 mm
Effective inside dimension (A)	100 mm	150 mm	190 mm	235 mm	305 mm	355 mm
Effective inside dimension (B)	100 mm	170 mm	210 mm	160 mm	185 mm	230 mm
Effective inside dimension (C)	100 mm	130 mm	170 mm	225 mm	295 mm	375 mm
Fixing hole Ø	5.5 mm	5.5 mm	5.5 mm	9 mm	9 mm	11x14 mm
Dimension picture (in mm)	❶	❶	❶	❷	❷	❷
A	140	190	230	320	420	470
B	150	200	250	200	230	270
C	130	170	210	260	360	460
D	77	127	167	304	400	446
E	100	150	200	160	160	200
F	24	24	24	40	40	40
G	-	-	-	-	-	-
H	-	-	-	-	-	-
I	-	-	-	-	-	-
J	-	-	-	-	-	-
K	-	-	-	-	-	-

Dimension pictures

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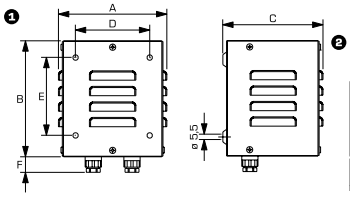

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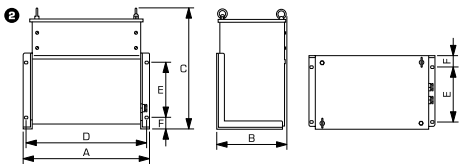


Sheetsteel housing
BG

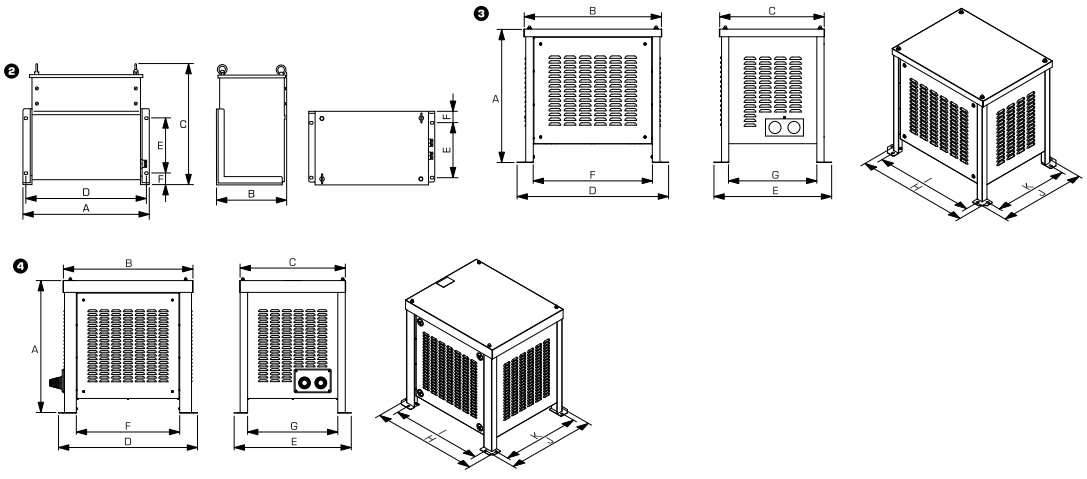
Electrical data

Type	BG 40	BG 50	BG 240	BG 270	BG 300	BG 450
Operating data						
For power (three phase)	6300 VA	15000 VA	-	-	-	-
For power (single phase)	10000 VA	15000 VA	-	-	-	-
Enclosure suitable for protection index	IP 23	IP 23	IP 23	IP 23	IP 23	IP 23
Max. Power loos (at 40 °C ambient temperature)	214 W	480 W	800 W	1200 W	1700 W	2500 W
Order numbers						
Order Number	**BG 40**	**BG 50**	**BG 240**	**BG 270**	**BG 300**	**BG 450**

Mechanical data

Measures and weights						
Weight	16.00 kg	30.00 kg	45.00 kg	60.00 kg	110.00 kg	160.00 kg
Cable glanding type	PG 21 / M32	PG 29 / M40	2 x M50	2 x M63	2 Universal entries	2 Universal entries
Cable glanding Ø	14 - 20 mm	23 - 29 mm	23 - 32 mm	37 - 44 mm	30 - 66 mm	30 - 66 mm
Effective inside dimension (A)	455 mm	555 mm	on request	on request	on request	on request
Effective inside dimension (B)	280 mm	380 mm	on request	on request	on request	on request
Effective inside dimension (C)	425 mm	525 mm	on request	on request	on request	on request
Fixing hole Ø	11x14 mm	13x17 mm	11x22 mm	11x22 mm	11x22 mm	11x22 mm
Dimension picture (in mm)	❷	❷	❸	❸	❹	❹
A	580	700	715	825	918	1161
B	325	425	726	786	878	1198
C	510	620	554	615	716	916
D	550	660	798	858	940	1260
E	255	325	620	690	792	991
F	40	40	627	687	699	1019
G	-	-	464	534	610	809
H	-	-	760	802	904	1224
I	-	-	676	736	779	1099
J	-	-	582	652	756	955
K	-	-	502	572	661	860

Dimension pictures



Overview PCB transformers

Power at a glance

Typ	Features	Rated input voltage	Rated output voltage	0.35 VA	0.5 VA	0.7 VA	1.0 VA	1.2 VA	1.5 VA	1.9 VA	2.0 VA	2.1 VA	2.3 VA
VBN	short circuit proof, ta 70° C Cl.B	230 Vac	6 - 36 Vac										
VB	short circuit proof, ta 70° C Cl.B	230 Vac	6 - 48 Vac										
AVB	short circuit proof, ta 70° C Cl.B, double input voltage	2 x 115 Vac	6 - 48 Vac										
VBEI	short circuit proof, geringe Bauhöhe, ta 70° C Cl.B	230 Vac	6 - 48 Vac										
ECO2003	short circuit proof, low no-load losses	230 Vac	6 - 24 Vac										
VCN	ta 70° C Cl.B	230 Vac	6 - 36 Vac										
VC		230 Vac	6 - 48 Vac										
VCM	with fixing points	230 Vac	6 - 48 Vac										
VR	fixing by foot plate	230 Vac	8 - 36 Vac										
PT	short circuit proof, fixing by foot plate	230 Vac	6 - 48 Vac										
EP	encapsulated bobbin	230 Vac	2 x 6 - 2 x 18 Vac										

2.5 VA	2.8 VA	3.0 VA	3.2 VA	4.5 VA	5.0 VA	6.0 VA	6.5 VA	7.5 VA	10.0 VA	12.0 VA	13.0 VA	16.0 VA	18.0 VA	20.0 VA	22.0 VA	25.0 VA	28.0 VA	30.0 VA	33.0 VA	35.0 VA	36.0 VA	44.0 VA	50.0 VA	Page
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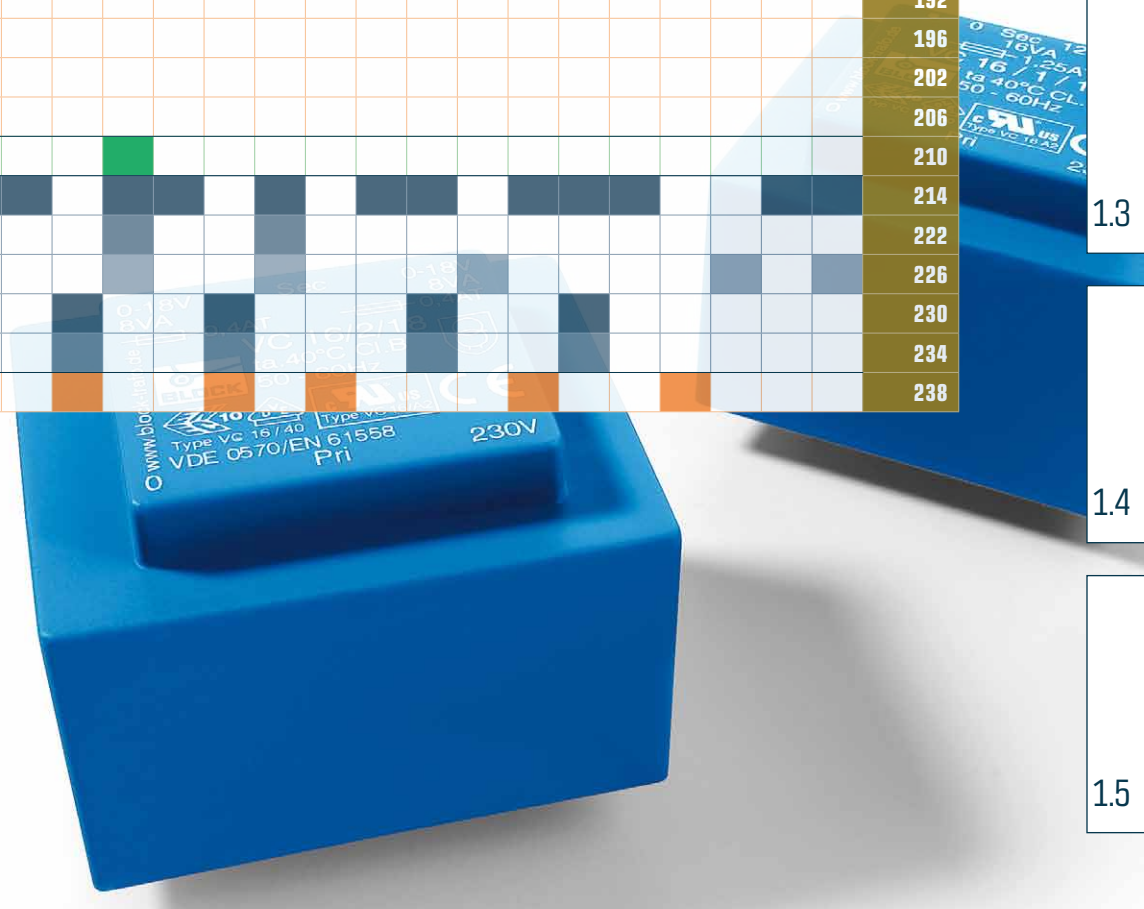


Short circuit proof PCB transformer
VBN

General Data

Rated input voltage 230 Vac
Rated output voltage 6 - 2 x 18 Vac
Rated power 0.7 - 3 VA
Insulation class B
Maximum ambient temperature 70 °C
Efficiency up to 59 %
Degree of protection IP 00

Advantages

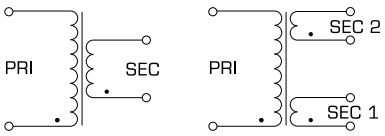
Minimum size at high output
Unconditionally short-circuit proof
Also with double output voltage for series or parallel connection
Designed for high ambient temperatures
Permanent corrosion protection, high insulation value and maximum electrical reliability thanks to XtraDensiFill resin encapsulation
Coil shell in 2-chamber technology
Self-extinguishing potting material

Applications

As a mains transformer for adjustment of the voltage and simple electrical isolation.

As a safety isolating transformer for the safe electrical isolation of the input and output sides. The transformer is suitable for creating SELV and PELV circuits because of the limit on the output voltage.

Circuit Diagram



Standards

Mains transformer
to: VDE 0570 Teil 2-1, DIN EN 61558-2-1, EN 61558-2-1, IEC 61558-2-1

Safety isolating transformer
to: VDE 0570 Teil 2-6, DIN EN 61558-2-6, EN 61558-2-6, IEC 61558-2-6

Short circuit proof PCB transformer
VBN

VBN also available with 115 Vac rated input voltage!

Electrical data

Type	VBN 0,7/1/..	VBN 0,7/2/..	VBN 1,5/1/..	VBN 1,5/2/..	VBN 1,9/1/..	VBN 1,9/2/..
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage: Order no.	6 Vac: VBN 0,7/1/6 7,5 Vac: VBN 0,7/1/7,5 9 Vac: VBN 0,7/1/9 12 Vac: VBN 0,7/1/12 15 Vac: VBN 0,7/1/15 18 Vac: VBN 0,7/1/18 24 Vac: VBN 0,7/1/24	2x6 Vac: VBN 0,7/2/6 2x7,5 Vac: VBN 0,7/2/7,5 2x9 Vac: VBN 0,7/2/9 2x12 Vac: VBN 0,7/2/12 2x15 Vac: VBN 0,7/2/15 2x18 Vac: VBN 0,7/2/18*	6 Vac: VBN 1,5/1/6 8 Vac: VBN 1,5/1/7,5 9 Vac: VBN 1,5/1/9 12 Vac: VBN 1,5/1/12 15 Vac: VBN 1,5/1/15 18 Vac: VBN 1,5/1/18 24 Vac: VBN 1,5/1/24	2x6 Vac: VBN 1,5/2/6 2x8 Vac: VBN 1,5/2/7,5 2x9 Vac: VBN 1,5/2/9 2x12 Vac: VBN 1,5/2/12 2x15 Vac: VBN 1,5/2/15 2x18 Vac: VBN 1,5/2/18*	6 Vac: VBN 1,9/1/6 7,5 Vac: VBN 1,9/1/7,5 9 Vac: VBN 1,9/1/9 12 Vac: VBN 1,9/1/12 15 Vac: VBN 1,9/1/15 18 Vac: VBN 1,9/1/18 24 Vac: VBN 1,9/1/24	2x6 Vac: VBN 1,9/2/6 2x7,5 Vac: VBN 1,9/2/7,5 2x9 Vac: VBN 1,9/2/9 2x12 Vac: VBN 1,9/2/12 2x15 Vac: VBN 1,9/2/15 2x18 Vac: VBN 1,9/2/18*
Rated Power	0.7 VA	0.7 VA	1.5 VA	1.5 VA	1.9 VA	1.9 VA
No-load voltage (app. x factor)	1.60	1.60	1.44	1.44	1.43	1.43
No-load loss (typ.)	2.20 W	2.20 W	1.60 W	1.60 W	1.40 W	1.40 W
Efficiency	30 %	30 %	51 %	51 %	54.5 %	54.5 %
Standards						
Classification	Safety isolating transformer	Safety isolating transformer *Mains transformer	Safety isolating transformer	Safety isolating transformer *Mains transformer	Safety isolating transformer	Safety isolating transformer *Mains transformer
Approvals						
Approvals	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation
Environment						
Ambient temperature max.	70 °C	70 °C	70 °C	70 °C	70 °C	70 °C
Safety and protection						
Type	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated
Class of Insulation System	B	B	B	B	B	B
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II	II	II
Short circuit strength	inherently short-circuit proof	inherently short-circuit proof	inherently short-circuit proof	inherently short-circuit proof	inherently short-circuit proof	inherently short-circuit proof
Order numbers						
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

Short circuit proof PCB transformer
VBN

VBN also available with 115 Vac rated input voltage!

Electrical data

Type	VBN 2,1/1/..	VBN 2,1/2/..	VBN 2,3/1/..	VBN 2,3/2/..	VBN 3,0/1/..	VBN 3,0/2/..
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage: Order no.	6 Vac: VBN 2,1/1/6 7,5 Vac: VBN 2,1/1/7,5 9 Vac: VBN 2,1/1/9 12 Vac: VBN 2,1/1/12 15 Vac: VBN 2,1/1/15 18 Vac: VBN 2,1/1/18 24 Vac: VBN 2,1/1/24	2x6 Vac: VBN 2,1/2/6 2x7,5 Vac: VBN 2,1/2/7,5 2x9 Vac: VBN 2,1/2/9 2x12 Vac: VBN 2,1/2/12 2x15 Vac: VBN 2,1/2/15 2x18 Vac: VBN 2,1/2/18*	6 Vac: VBN 2,3/1/6 8 Vac: VBN 2,3/1/7,5 9 Vac: VBN 2,3/1/9 12 Vac: VBN 2,3/1/12 15 Vac: VBN 2,3/1/15 18 Vac: VBN 2,3/1/18 24 Vac: VBN 2,3/1/24	2x6 Vac: VBN 2,3/2/6 2x8 Vac: VBN 2,3/2/7,5 2x9 Vac: VBN 2,3/2/9 2x12 Vac: VBN 2,3/2/12 2x15 Vac: VBN 2,3/2/15 2x18 Vac: VBN 2,3/2/18*	6 Vac: VBN 3,0/1/6 7,5 Vac: VBN 3,0/1/7,5 9 Vac: VBN 3,0/1/9 12 Vac: VBN 3,0/1/12 15 Vac: VBN 3,0/1/15 18 Vac: VBN 3,0/1/18 24 Vac: VBN 3,0/1/24	2x6 Vac: VBN 3,0/2/6 2x7,5 Vac: VBN 3,0/2/7,5 2x9 Vac: VBN 3,0/2/9 2x12 Vac: VBN 3,0/2/12 2x15 Vac: VBN 3,0/2/15 2x18 Vac: VBN 3,0/2/18*
Rated Power	2.1 VA	2.1 VA	2.3 VA	2.3 VA	3.0 VA	3.0 VA
No-load voltage (app. x factor)	1.68	1.68	1.43	1.43	1.47	1.47
No-load loss (typ.)	0.90 W	0.90 W	0.90 W	0.90 W	0.90 W	0.90 W
Efficiency	53 %	53 %	59 %	59 %	59 %	59 %
Standards						
Classification	Safety isolating transformer	Safety isolating transformer *Mains transformer	Safety isolating transformer	Safety isolating transformer *Mains transformer	Safety isolating transformer	Safety isolating transformer *Mains transformer
Approvals						
Approvals	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation
Environment						
Ambient temperature max.	70 °C	70 °C	70 °C	70 °C	70 °C	70 °C
Safety and protection						
Type	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated
Class of Insulation System	B	B	B	B	B	B
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II	II	II
Short circuit strength	inherently short-circuit proof	inherently short-circuit proof	inherently short-circuit proof	inherently short-circuit proof	inherently short-circuit proof	inherently short-circuit proof
Order numbers						
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

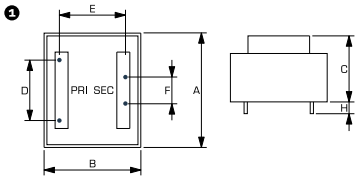
Short circuit proof PCB transformer
VBN

30 Mechanical data

Typ	Terminals	Pin (ø)	Core type	Weight	Dimension picture (in mm)	A	B	C	D	E	F	G	H
VBN 0,7/1/..	Pins for printed circuit boards	0.8 mm	EI 30/5,5	0.04 kg	❶	32.5	27.3	15	20	20	10	-	6.7
VBN 0,7/2/..	Pins for printed circuit boards	0.8 mm	EI 30/5,5	0.04 kg	❷	32.5	27.3	15	20	20	10	5	6.7
VBN 1,5/1/..	Pins for printed circuit boards	0.8 mm	EI 30/10,5	0.08 kg	❶	32.3	27.3	21.8	20	20	10	-	5
VBN 1,5/2/..	Pins for printed circuit boards	0.8 mm	EI 30/10,5	0.07 kg	❷	32.3	27.3	21.8	20	20	10	5	5
VBN 1,9/1/..	Pins for printed circuit boards	0.8 mm	EI 30/12,5	0.08 kg	❶	32.3	27.3	23.8	20	20	10	-	5
VBN 1,9/2/..	Pins for printed circuit boards	0.8 mm	EI 30/12,5	0.08 kg	❷	32.3	27.3	23.8	20	20	10	5	5
VBN 2,1/1/..	Pins for printed circuit boards	0.8 mm	EI 30/15,5	0.10 kg	❶	32.3	27.3	26.8	20	20	10	-	5
VBN 2,1/2/..	Pins for printed circuit boards	0.8 mm	EI 30/15,5	0.10 kg	❷	32.3	27.3	26.8	20	20	10	5	5
VBN 2,3/1/..	Pins for printed circuit boards	0.8 mm	EI 30/18,0	0.11 kg	❶	32.3	27.3	29	20	20	10	-	5
VBN 2,3/2/..	Pins for printed circuit boards	0.8 mm	EI 30/18,0	0.11 kg	❷	32.3	27.3	29	20	20	10	5	5
VBN 3,0/1/..	Pins for printed circuit boards	0.8 mm	EI 30/23	0.14 kg	❶	32.3	27.3	34	20	20	10	-	5
VBN 3,0/2/..	Pins for printed circuit boards	0.8 mm	EI 30/23	0.14 kg	❷	32.3	27.3	34	20	20	10	5	5

Dimension pictures

❶



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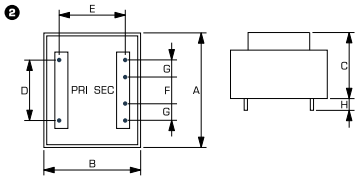


Short circuit proof PCB transformer
VB

General Data

Rated input voltage 230 Vac
Rated output voltage 6 - 2 x 24 Vac
Rated power 0.35 - 3.2 VA
Insulation class B
Maximum ambient temperature 70 °C
Efficiency up to 58 %
Degree of protection IP 00

Advantages

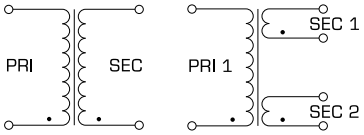
Minimum size at high output
Unconditionally short-circuit proof
Also with double output voltage for series or parallel connection
Designed for high ambient temperatures
Permanent corrosion protection, high insulation value and maximum electrical reliability thanks to XtraDensiFill resin encapsulation
Coil shell in 2-chamber technology
Self-extinguishing potting material

Applications

As a mains transformer for adjustment of the voltage and simple electrical isolation.

As a safety isolating transformer for the safe electrical isolation of the input and output sides. The transformer is suitable for creating SELV and PELV circuits because of the limit on the output voltage.

Circuit diagram



Standards

Mains transformer
to: VDE 0570 Teil 2-1, DIN EN 61558-2-1, EN 61558-2-1, IEC 61558-2-1, UL 5085-1/-2, CSA 22.2 No.66

Safety isolating transformer
to: VDE 0570 Teil 2-6, DIN EN 61558-2-6, EN 61558-2-6, IEC 61558-2-6, UL 5085-1/-2, CSA 22.2 No.66

Certifications

ENEC 10 (VDE), UL 5085-1/-2, CSA 22.2 No.66

Short circuit proof PCB transformer
VB

Electrical data

Type	VB 0,35/1/..	VB 0,35/2/..	VB 0,5/1/..	VB 0,5/2/..	VB 1,0/1/..	VB 1,0/2/..
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage: Order no.	6 Vac: VB 0,35/1/6 8 Vac: VB 0,35/1/8 9 Vac: VB 0,35/1/9 12 Vac: VB 0,35/1/12 15 Vac: VB 0,35/1/15 18 Vac: VB 0,35/1/18 24 Vac: VB 0,35/1/24	2x6 Vac: VB 0,35/2/6 2x8 Vac: VB 0,35/2/8 2x9 Vac: VB 0,35/2/9 2x12 Vac: VB 0,35/2/12 2x15 Vac: VB 0,35/2/15* 2x18 Vac: VB 0,35/2/18* 2x24 Vac: VB 0,35/2/24*	6 Vac: VB 0,5/1/6 8 Vac: VB 0,5/1/8 9 Vac: VB 0,5/1/9 12 Vac: VB 0,5/1/12 15 Vac: VB 0,5/1/15 18 Vac: VB 0,5/1/18 24 Vac: VB 0,5/1/24	2x6 Vac: VB 0,5/2/6 2x8 Vac: VB 0,5/2/8 2x9 Vac: VB 0,5/2/9 2x12 Vac: VB 0,5/2/12 2x15 Vac: VB 0,5/2/15* 2x18 Vac: VB 0,5/2/18* 2x24 Vac: VB 0,5/2/24*	6 Vac: VB 1,0/1/6 8 Vac: VB 1,0/1/8 9 Vac: VB 1,0/1/9 12 Vac: VB 1,0/1/12 15 Vac: VB 1,0/1/15 18 Vac: VB 1,0/1/18 24 Vac: VB 1,0/1/24	2x6 Vac: VB 1,0/2/6 2x8 Vac: VB 1,0/2/8 2x9 Vac: VB 1,0/2/9 2x12 Vac: VB 1,0/2/12 2x15 Vac: VB 1,0/2/15* 2x18 Vac: VB 1,0/2/18* 2x24 Vac: VB 1,0/2/24*
Rated Power	0.35 VA	0.35 VA	0.50 VA	0.50 VA	1.00 VA	1.00 VA
No-load voltage (app. x factor)	1.80	1.80	1.80	1.80	1.40	1.40
No-load loss (typ.)	1.30 W	1.30 W	1.10 W	1.10 W	0.90 W	0.90 W
Efficiency	30 %	30 %	40 %	40 %	55 %	55 %
Standards						
Classification	Safety isolating transformer	Safety isolating transformer *Mains transformer (without VDE mark)	Safety isolating transformer	Safety isolating transformer *Mains transformer (without VDE mark)	Safety isolating transformer	Safety isolating transformer *Mains transformer (without VDE mark)
Approvals						
Approvals	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)
Environment						
Ambient temperature max.	70 °C	70 °C	70 °C	70 °C	70 °C	70 °C
Safety and protection						
Type	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II	II	II
Short circuit strength	inherently short-circuit proof	inherently short-circuit proof	inherently short-circuit proof	inherently short-circuit proof	inherently short-circuit proof	inherently short-circuit proof
Order numbers						
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

Short circuit proof PCB transformer
VB

Electrical data

Type	VB 1,2/1/..	VB 1,2/2/..	VB 1,5/1/..	VB 1,5/2/..	VB 2,0/1/..	VB 2,0/2/..
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage: Order no.	6 Vac: VB 1,2/1/6 8 Vac: VB 1,2/1/8 9 Vac: VB 1,2/1/9 12 Vac: VB 1,2/1/12 15 Vac: VB 1,2/1/15 18 Vac: VB 1,2/1/18 24 Vac: VB 1,2/1/24	2x6 Vac: VB 1,2/2/6 2x8 Vac: VB 1,2/2/8 2x9 Vac: VB 1,2/2/9 2x12 Vac: VB 1,2/2/12 2x15 Vac: VB 1,2/2/15* 2x18 Vac: VB 1,2/2/18* 2x24 Vac: VB 1,2/2/24*	6 Vac: VB 1,5/1/6 8 Vac: VB 1,5/1/8 9 Vac: VB 1,5/1/9 12 Vac: VB 1,5/1/12 15 Vac: VB 1,5/1/15 18 Vac: VB 1,5/1/18 24 Vac: VB 1,5/1/24	2x6 Vac: VB 1,5/2/6 2x8 Vac: VB 1,5/2/8 2x9 Vac: VB 1,5/2/9 2x12 Vac: VB 1,5/2/12 2x15 Vac: VB 1,5/2/15* 2x18 Vac: VB 1,5/2/18* 2x24 Vac: VB 1,5/2/24*	6 Vac: VB 2,0/1/6 8 Vac: VB 2,0/1/8 9 Vac: VB 2,0/1/9 12 Vac: VB 2,0/1/12 15 Vac: VB 2,0/1/15 18 Vac: VB 2,0/1/18 24 Vac: VB 2,0/1/24	2x6 Vac: VB 2,0/2/6 2x8 Vac: VB 2,0/2/8 2x9 Vac: VB 2,0/2/9 2x12 Vac: VB 2,0/2/12 2x15 Vac: VB 2,0/2/15* 2x18 Vac: VB 2,0/2/18* 2x24 Vac: VB 2,0/2/24*
Rated Power	1.20 VA	1.20 VA	1.50 VA	1.50 VA	2.00 VA	2.00 VA
No-load voltage (app. x factor)	1.35	1.35	1.45	1.45	1.70	1.70
No-load loss (typ.)	1.00 W	1.00 W	1.00 W	1.00 W	1.10 W	1.10 W
Efficiency	57 %	57 %	57 %	57 %	52 %	52 %
Standards						
Classification	Safety isolating transformer	Safety isolating transformer *Mains transformer (without VDE mark)	Safety isolating transformer	Safety isolating transformer *Mains transformer (without VDE mark)	Safety isolating transformer	Safety isolating transformer *Mains transformer (without VDE mark)
Approvals						
Approvals	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)
Environment						
Ambient temperature max.	70 °C	70 °C	70 °C	70 °C	70 °C	70 °C
Safety and protection						
Type	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II	II	II
Short circuit strength	inherently short-circuit proof	inherently short-circuit proof	inherently short-circuit proof	inherently short-circuit proof	inherently short-circuit proof	inherently short-circuit proof
Order numbers						
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

Short circuit proof PCB transformer
VB

Electrical data

Type	VB 2,3/1/..	VB 2,3/2/..	VB 2,8/1/..	VB 2,8/2/..	VB 3,2/1/..	VB 3,2/2/..
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage: Order no.	6 Vac: VB 2,3/1/6 8 Vac: VB 2,3/1/8 9 Vac: VB 2,3/1/9 12 Vac: VB 2,3/1/12 15 Vac: VB 2,3/1/15 18 Vac: VB 2,3/1/18 24 Vac: VB 2,3/1/24	2x6 Vac: VB 2,3/2/6 2x8 Vac: VB 2,3/2/8 2x9 Vac: VB 2,3/2/9 2x12 Vac: VB 2,3/2/12 2x15 Vac: VB 2,3/2/15* 2x18 Vac: VB 2,3/2/18* 2x24 Vac: VB 2,3/2/24*	6 Vac: VB 2,8/1/6 8 Vac: VB 2,8/1/8 9 Vac: VB 2,8/1/9 12 Vac: VB 2,8/1/12 15 Vac: VB 2,8/1/15 18 Vac: VB 2,8/1/18 24 Vac: VB 2,8/1/24	2x6 Vac: VB 2,8/2/6 2x8 Vac: VB 2,8/2/8 2x9 Vac: VB 2,8/2/9 2x12 Vac: VB 2,8/2/12 2x15 Vac: VB 2,8/2/15* 2x18 Vac: VB 2,8/2/18* 2x24 Vac: VB 2,8/2/24*	6 Vac: VB 3,2/1/6 8 Vac: VB 3,2/1/8 9 Vac: VB 3,2/1/9 12 Vac: VB 3,2/1/12 15 Vac: VB 3,2/1/15 18 Vac: VB 3,2/1/18 24 Vac: VB 3,2/1/24	2x6 Vac: VB 3,2/2/6 2x8 Vac: VB 3,2/2/8 2x9 Vac: VB 3,2/2/9 2x12 Vac: VB 3,2/2/12 2x15 Vac: VB 3,2/2/15* 2x18 Vac: VB 3,2/2/18* 2x24 Vac: VB 3,2/2/24*
Rated Power	2.30 VA	2.30 VA	2.80 VA	2.80 VA	3.20 VA	3.20 VA
No-load voltage (app. x factor)	1.43	1.43	1.80	1.80	1.70	1.70
No-load loss (typ.)	0.90 W	0.90 W	0.90 W	0.90 W	1.00 W	1.00 W
Efficiency	59 %	59 %	57 %	57 %	58 %	58 %
Standards						
Classification	Safety isolating transformer	Safety isolating transformer *Mains transformer (without VDE mark)	Safety isolating transformer	Safety isolating transformer *Mains transformer (without VDE mark)	Safety isolating transformer	Safety isolating transformer *Mains transformer (without VDE mark)
Approvals						
Approvals	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)
Environment						
Ambient temperature max.	70 °C	70 °C	70 °C	70 °C	50 °C	50 °C
Safety and protection						
Type	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II	II	II
Short circuit strength	inherently short-circuit proof	inherently short-circuit proof	inherently short-circuit proof	inherently short-circuit proof	inherently short-circuit proof	inherently short-circuit proof
Order numbers						
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

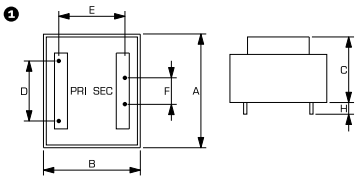
Short circuit proof PCB transformer
VB

30 Mechanical data

Typ	Terminals	Pin (ø)	Core type	Weight	Dimension picture (in mm)	A	B	C	D	E	F	G	H
VB 0,35/1/..	Pins for printed circuit boards	0.6 mm	EE 20/6,1	0.02 kg	❶	22	22.7	15	15	15	5	-	5
VB 0,35/2/..	Pins for printed circuit boards	0.6 mm	EE 20/6,1	0.02 kg	❷	22	22.7	15	15	15	5	5	5
VB 0,5/1/..	Pins for printed circuit boards	0.6 mm	EE 20/10,5	0.04 kg	❶	22	22.7	19	15	15	5	-	5
VB 0,5/2/..	Pins for printed circuit boards	0.6 mm	EE 20/10,5	0.04 kg	❷	22	22.7	19	15	15	5	5	5
VB 1,0/1/..	Pins for printed circuit boards	0.8 mm	EI 30/10,5	0.07 kg	❶	32.3	27.3	21.8	20	20	10	-	5
VB 1,0/2/..	Pins for printed circuit boards	0.8 mm	EI 30/10,5	0.07 kg	❷	32.3	27.3	21.8	20	20	10	5	5
VB 1,2/1/..	Pins for printed circuit boards	0.8 mm	EI 30/12,5	0.08 kg	❶	32.3	27.3	23.8	20	20	10	-	5
VB 1,2/2/..	Pins for printed circuit boards	0.8 mm	EI 30/12,5	0.08 kg	❷	32.3	27.3	23.8	20	20	10	5	5
VB 1,5/1/..	Pins for printed circuit boards	0.8 mm	EI 30/12,5	0.08 kg	❶	32.3	27.3	23.8	20	20	10	-	5
VB 1,5/2/..	Pins for printed circuit boards	0.8 mm	EI 30/12,5	0.08 kg	❷	32.3	27.3	23.8	20	20	10	5	5
VB 2,0/1/..	Pins for printed circuit boards	0.8 mm	EI 30/15,5	0.10 kg	❶	32.3	27.3	26.8	20	20	10	-	5
VB 2,0/2/..	Pins for printed circuit boards	0.8 mm	EI 30/15,5	0.10 kg	❷	32.3	27.3	26.8	20	20	10	5	5
VB 2,3/1/..	Pins for printed circuit boards	0.8 mm	EI 30/18,0	0.11 kg	❶	32.3	27.3	29	20	20	10	-	5
VB 2,3/2/..	Pins for printed circuit boards	0.8 mm	EI 30/18,0	0.11 kg	❷	32.3	27.3	29	20	20	10	5	5
VB 2,8/1/..	Pins for printed circuit boards	0.8 mm	EI 30/23,0	0.14 kg	❶	32.3	27.3	34	20	20	10	-	5
VB 2,8/2/..	Pins for printed circuit boards	0.8 mm	EI 30/23,0	0.14 kg	❷	32.3	27.3	34	20	20	10	5	5
VB 3,2/1/..	Pins for printed circuit boards	0.8 mm	EI 38/16,5	0.17 kg	❶	41	35	30.8	20	25	10	-	5
VB 3,2/2/..	Pins for printed circuit boards	0.8 mm	EI 38/16,5	0.17 kg	❷	41	35	30.8	20	25	10	5	5

Dimension pictures

❶



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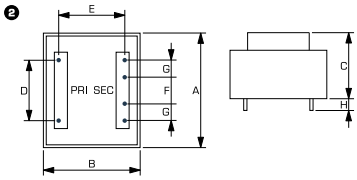
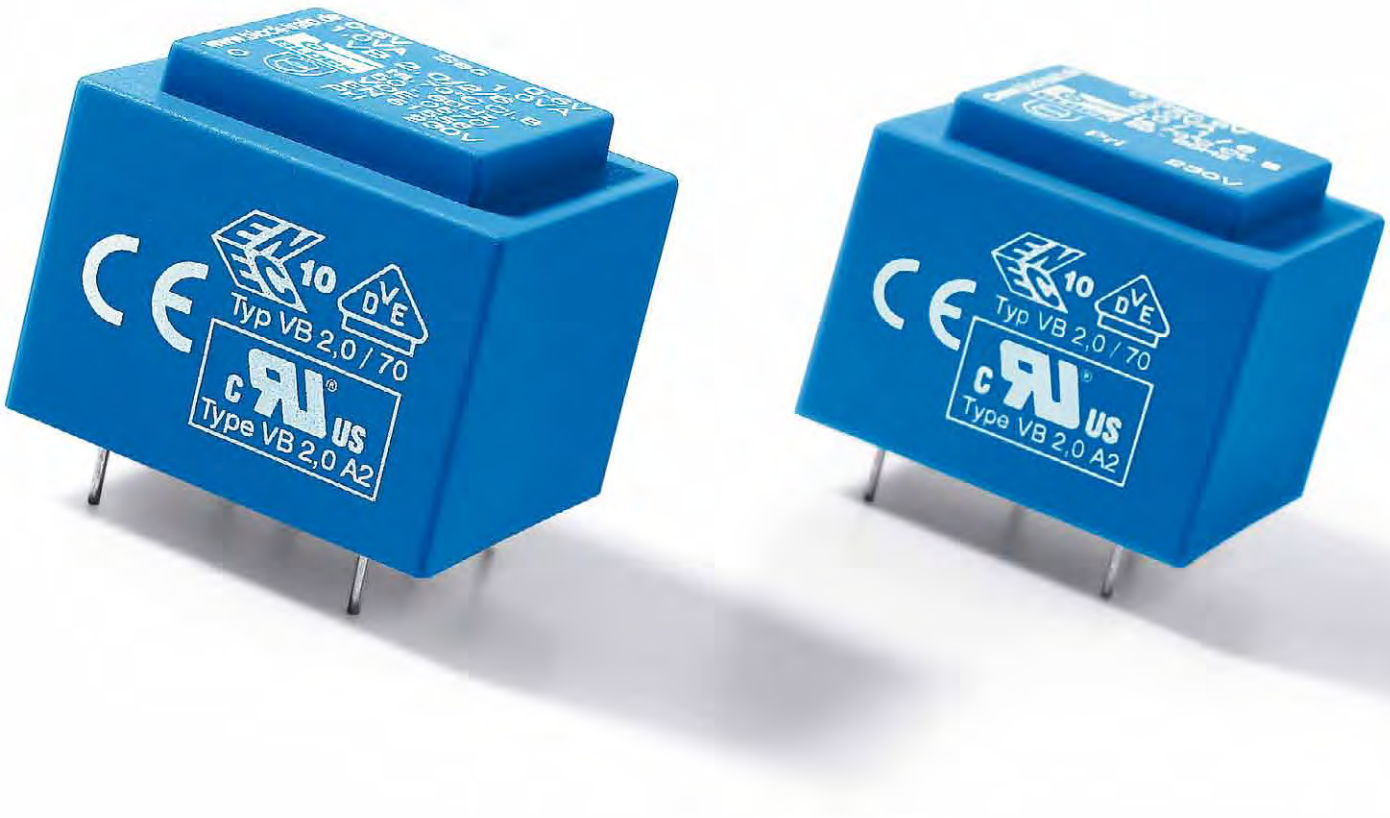



Typ VB 2,0 / 70
Type VB 2,0 A2
Typ VB 2,0 / 70
Type VB 2,0 A2

Short circuit proof PCB transformer
AVB

General Data

Rated input voltage 2 x 115 Vac
Rated output voltage 6 - 2 x 24 Vac
Rated power 0.35 - 3.2 VA
Insulation class B
Maximum ambient temperature 70 °C
Efficiency up to 59 %
Degree of protection IP 00

Advantages

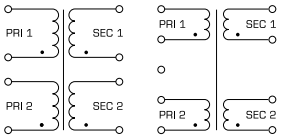
Minimum size at high output
Unconditionally short-circuit proof
Double input voltage for series or parallel connection
Also with double output voltage for series or parallel connection
Designed for high ambient temperatures
Permanent corrosion protection, high insulation value and maximum electrical reliability thanks to XtraDensiFill resin encapsulation
Coil shell in 2-chamber technology
Self-extinguishing potting and hood material

Applications

As a mains transformer for adjustment of the voltage and simple electrical isolation.

As a safety transformer for the safe electrical isolation of the input and output sides. The transformer is suitable for creating SELV and PELV circuits because of the limit on the output voltage.

Circuit Diagram



Standards

Mains transformer
to: VDE 0570 Teil 2-1, DIN EN 61558-2-1, EN 61558-2-1, IEC 61558-2-1, UL 5085-1/-2, CSA 22.2 No.66

Safety isolating transformer
to: VDE 0570 Teil 2-6, DIN EN 61558-2-6, EN 61558-2-6, IEC 61558-2-6, UL 5085-1/-2, CSA 22.2 No.66

Certifications

UL 5085-1/-2, CSA 22.2 No.66

Short circuit proof PCB transformer
AVB

Electrical data

Type	AVB 0,35/2/..	AVB 0,5/2/..	AVB 1,0/2/..	AVB 1,5/2/..	AVB 2,0/2/..	AVB 2,3/2/..
Input						
Rated input Voltage	2x115 Vac	2x115 Vac	2x115 Vac	2x115 Vac	2x115 Vac	2x115 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage: Order no.	2x6 Vac: AVB 0,35/2/6 2x2 Vac: AVB 0,35/2/9 2x12 Vac: AVB 0,35/2/12 2x15 Vac: AVB 0,35/2/15* 2x18 Vac: AVB 0,35/2/18* 2x24 Vac: AVB 0,35/2/24*	2x6 Vac: AVB 0,5/2/6 2x8 Vac: AVB 0,5/2/8 2x9 Vac: AVB 0,5/2/9 2x12 Vac: AVB 0,5/2/12 2x15 Vac: AVB 0,5/2/15* 2x18 Vac: AVB 0,5/2/18* 2x24 Vac: AVB 0,5/2/24*	2x6 Vac: AVB 1,0/2/6 2x9 Vac: AVB 1,0/2/9 2x12 Vac: AVB 1,0/2/12 2x15 Vac: AVB 1,0/2/15 2x18 Vac: AVB 1,0/2/18* 2x24 Vac: AVB 1,0/2/24*	2x6 Vac: AVB 1,5/2/6 2x8 Vac: AVB 1,5/2/8 2x9 Vac: AVB 1,5/2/9 2x12 Vac: AVB 1,5/2/12 2x15 Vac: AVB 1,5/2/15 2x18 Vac: AVB 1,5/2/18* 2x24 Vac: AVB 1,5/2/24*	2x12 Vac: AVB 2,0/2/12	2x6 Vac: AVB 2,3/2/6 2x8 Vac: AVB 2,3/2/8 2x9 Vac: AVB 2,3/2/9 2x12 Vac: AVB 2,3/2/12 2x15 Vac: AVB 2,3/2/15 2x18 Vac: AVB 2,3/2/18* 2x24 Vac: AVB 2,3/2/24*
Rated Power	0.35 VA	0.50 VA	1.00 VA	1.50 VA	2.00 VA	2.30 VA
No-load voltage (app. x factor)	1.80	1.80	1.32	1.39	1.43	1.43
No-load loss (typ.)	1.30 W	1.10 W	0.90 W	1.00 W	0.90 W	0.90 W
Efficiency	30 %	40 %	55 %	57 %	0 %	59 %
Standards						
Classification	Safety isolating transformer *Mains transformer	Safety isolating transformer *Mains transformer	Safety isolating transformer *Mains transformer	Safety isolating transformer *Mains transformer	Safety isolating transformer	Safety isolating transformer *Mains transformer
Approvals						
Approvals	cURus	cURus	cURus	cURus	cURus	cURus
Environment						
Ambient temperature max.	70 °C	70 °C	70 °C	70 °C	70 °C	70 °C
Safety and protection						
Type	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II	II	II
Short circuit strength	inherently short-circuit proof	inherently short-circuit proof	inherently short-circuit proof	inherently short-circuit proof	inherently short-circuit proof	inherently short-circuit proof
Order numbers						
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

Short circuit proof PCB transformer
AVB

Electrical data

Type	AVB 3,2/2/..
Input	
Rated input Voltage	2x115 Vac
Rated frequency	50 - 60 Hz
Output	
Rated output voltage: Order no.	2x6 Vac: AVB 3,2/2/6 2x9 Vac: AVB 3,2/2/9 2x12 Vac: AVB 3,2/2/12 2x15 Vac: AVB 3,2/2/15 2x18 Vac: AVB 3,2/2/18 2x24 Vac: AVB 3,2/2/24*
Rated Power	3.20 VA
No-load voltage (app. x factor)	1.57
No-load loss (typ.)	1.00 W
Efficiency	58 %
Standards	
Classification	Safety isolating transformer *Mains transformer
Approvals	
Approvals	cURus
Environment	
Ambient temperature max.	50 °C
Safety and protection	
Type	encapsulated
Class of Insulation System	VDE=B, UL=class 105
Protection index	IP 00
Safety class (prepared)	II
Short circuit strength	inherently short-circuit proof
Order numbers	
Order Number	**refer to rated output voltage**

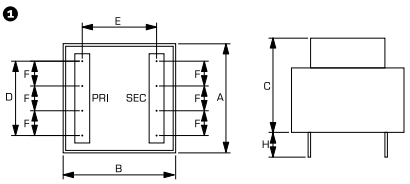
Short circuit proof PCB transformer
AVB

Mechanical data 30

Typ	Terminals	Pin (ø)	Core type	Weight	Dimension picture (in mm)	A	B	C	D	E	F	G	H
AVB 0,35/2/..	Pins for printed circuit boards	0.6	EE 20/6,1	0.02 kg	❶	22	22.7	15	15	15	5	-	5
AVB 0,5/2/..	Pins for printed circuit boards	0.6	EE 20/10,5	0.04 kg	❶	22	22.7	19	15	15	5	-	5
AVB 1,0/2/..	Pins for printed circuit boards	0.8	EI 30/10,5	0.07 kg	❷	32.3	27.3	21.8	20	20	10	5	5
AVB 1,5/2/..	Pins for printed circuit boards	0.8	EI 30/12,5	0.08 kg	❷	32.3	27.3	23.8	20	20	10	5	5
AVB 2,0/2/..	Pins for printed circuit boards	0.8	EI 30/15,5	0.10 kg	❷	32.3	27.3	26.8	20	20	10	5	5
AVB 2,3/2/..	Pins for printed circuit boards	0.8	EI 30/18	0.11 kg	❷	32.3	27.3	34	20	20	10	5	5
AVB 3,2/2/..	Quick connect terminals	0.6 x 0.8	EI 38/16,5	0.17 kg	❷	41	35	30.8	20	25	10	5	5

Dimension pictures

❶



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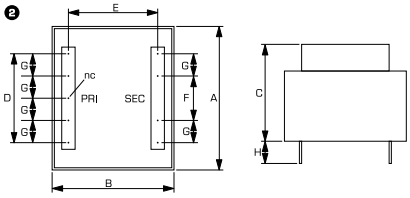
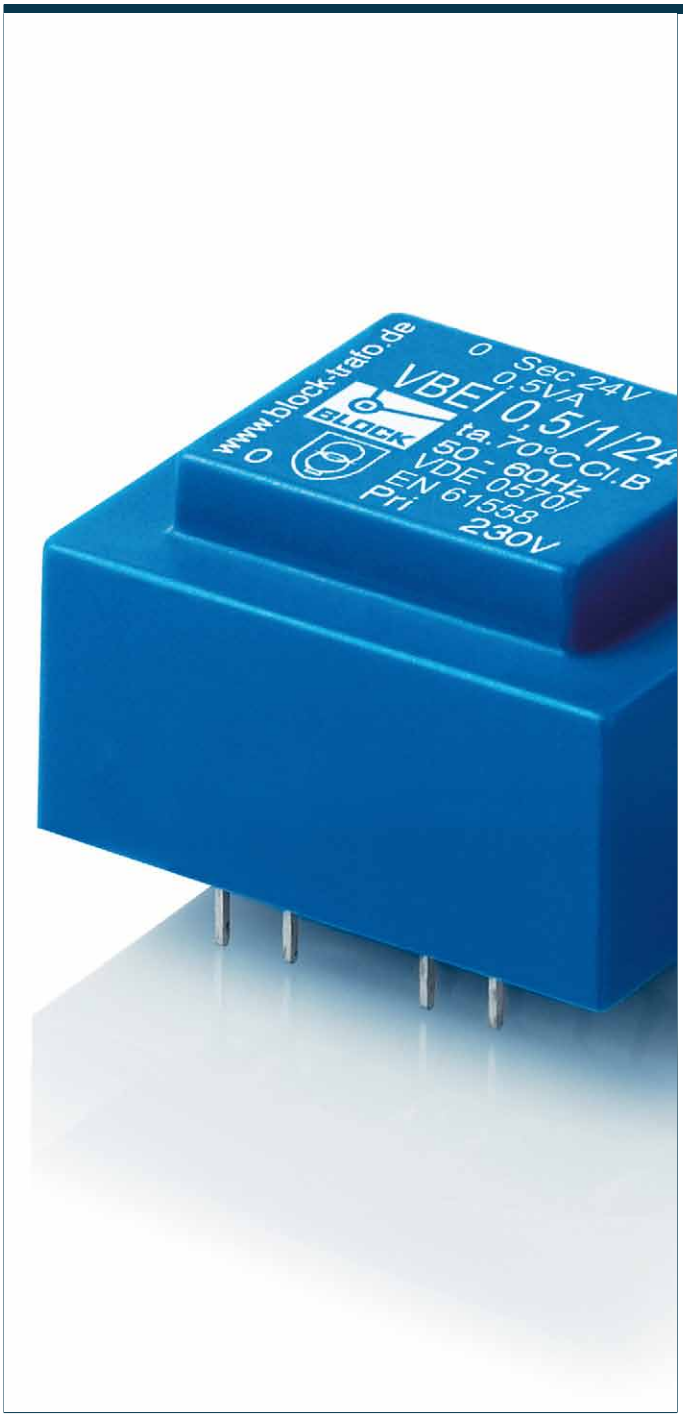


Short circuit proof PCB transformer
VBEI



General Data

Rated input voltage 230 Vac
Rated output voltage 6 - 2 x 24 Vac
Rated power 0.5 VA
Insulation class B
Maximum ambient temperature 70 °C
Efficiency up to 37 %
Degree of protection IP 00

Advantages

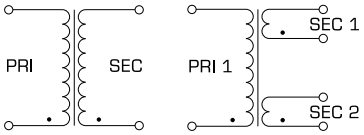
Minimum size at high output
Very low height
Unconditionally short-circuit proof
Also with double output voltage for series or parallel connection
Designed for high ambient temperatures
Permanent corrosion protection, high insulation value and maximum electrical reliability thanks to XtraDensiFill resin encapsulation
Coil shell in 2-chamber technology
Self-extinguishing potting material

Applications

As a mains transformer for adjustment of the voltage and simple electrical isolation.

As a safety transformer for the safe electrical isolation of the input and output sides. The transformer is suitable for creating SELV and PELV circuits because of the limit on the output voltage.

Circuit Diagram



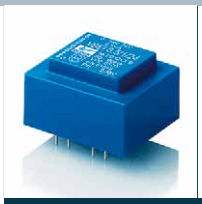
Standards

Mains transformer
to: VDE 0570 Teil 2-1, DIN EN 61558-2-1, EN 61558-2-1, IEC 61558-2-1, UL 5085-1/-2, CSA 22.2 No.66

Safety isolating transformer
to: VDE 0570 Teil 2-6, DIN EN 61558-2-6, EN 61558-2-6, IEC 61558-2-6, UL 5085-1/-2, CSA 22.2 No.66

Certifications

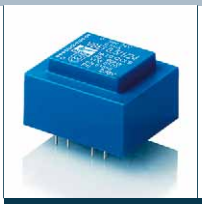
ENEC 10 (VDE), UL 5085-1/-2, CSA 22.2 No.66



Short circuit proof PCB transformer
VBEI

Electrical data

Type	VBEI 0,5/1/..	VBEI 0,5/2/..
Input		
Rated input voltage	230 Vac	230 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz
Output		
Rated output voltage: Order no.	6 Vac: VBEI 0,5/1/6 8 Vac: VBEI 0,5/1/8 9 Vac: VBEI 0,5/1/9 12 Vac: VBEI 0,5/1/12 15 Vac: VBEI 0,5/1/15 18 Vac: VBEI 0,5/1/18 24 Vac: VBEI 0,5/1/24	2x6 Vac: VBEI 0,5/2/6 2x8 Vac: VBEI 0,5/2/8 2x9 Vac: VBEI 0,5/2/9 2x12 Vac: VBEI 0,5/2/12 2x15 Vac: VBEI 0,5/2/15 2x18 Vac: VBEI 0,5/2/18* 2x24 Vac: VBEI 0,5/2/24*
Rated Power	0.50 VA	0.50 VA
No-load voltage (app. x factor)	1.57	1.57
No-load loss (typ.)	1.10 W	1.10 W
Efficiency	37 %	37 %
Standards		
Classification	Safety isolating transformer	Safety isolating transformer *Mains transformer (without VDE mark)
Approvals		
Approvals	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)
Environment		
Ambient temperature max.	70 °C	70 °C
Safety and protection		
Type	encapsulated	encapsulated
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105
Protection index	IP 00	IP 00
Safety class (prepared)	II	II
Short circuit strength	inherently short-circuit proof	inherently short-circuit proof
Order numbers		
Order Number	**VBEI 0,5/1/6**	**VBEI 0,5/2/6**



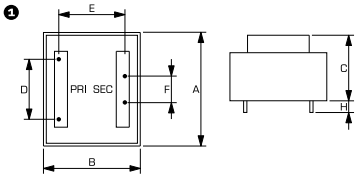
Short circuit proof PCB transformer
VBEI

30 Mechanical data

Typ	Terminals	Pin (ø)	Core type	Weight	Dimension picture (in mm)	A	B	C	D	E	F	G	H
VBEI 0,5/1/..	Pins for printed circuit boards	0.8 mm	EI 30/5,0	0.42 kg	❶	32.5	27.3	15	20	20	10	5	6.7
VBEI 0,5/2/..	Pins for printed circuit boards	0.8 mm	EI 30/5,0	0.42 kg	❷	32.5	27.3	15	20	20	10	5	6.7

Dimension pictures

❶



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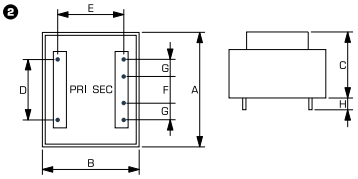



O Sec 24V
0,5VA
VBEI 0,5/1/24
ta 70°C CL.B
50 - 60 Hz
VDE 0570/
EN 61558
PII
230 V
O www.block-trafo.de

Efficient PCB transformer
ECO 2003

General Data

Rated input voltage 230 Vac
Rated output voltage 6 - 2 x 12 Vac
Rated power 1.5 - 10 VA
Insulation class B
Maximum ambient temperature 70 °C
Efficiency up to 77 %
Degree of protection IP 00

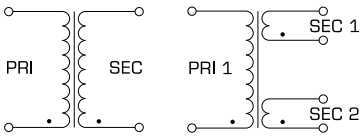
Advantages

Low no-load losses max. 0.6 W
Unconditionally short-circuit proof (up to 1.5 VA)
Also with double output voltage for series or parallel connection
Designed for high ambient temperatures
Permanent corrosion protection, high insulation value and maximum electrical reliability thanks to XtraDensiFill resin encapsulation
Coil shell in 2-chamber technology
Self-extinguishing potting material

Applications

Safety transformer for the safe electrical isolation of the input and output sides. The transformer is suitable for creating SELV and PELV circuits because of the limit on the output voltage.

Circuit Diagram



Standards

Safety isolating transformer
to: VDE 0570 Teil 2-6, DIN EN 61558-2-6, EN 61558-2-6, IEC 61558-2-6, UL 5085-1/-2, CSA 22.2 No.66

Certifications

ENEC 10 (VDE), UL 5085-1/-2, CSA 22.2 No.66

Efficient PCB transformer
ECO 2003

Electrical data

Type	ECO2003-1,5S..	ECO2003-1,5DD..	ECO2003-3,2S..	ECO2003-3,2DD..	ECO2003-5,0S..	ECO2003-5,0DD..
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Output rated voltage: Order no.	6 Vac: ECO2003-1,5S6 8 Vac: ECO2003-1,5S8 9 Vac: ECO2003-1,5S9 12 Vac: ECO2003-1,5S12 18 Vac: ECO2003-1,5S18	2x9 Vac: ECO2003-1,5DD9 2x12 Vac: ECO2003-1,5DD12	8 Vac: ECO2003-3,2S8 12 Vac: ECO2003-3,2S12	2x9 Vac: ECO2003-3,2DD9 2x12 Vac: ECO2003-3,2DD12	8 Vac: ECO2003-5,0S8 12 Vac: ECO2003-5,0S12	2x9 Vac: ECO2003-5,0DD9 2x12 Vac: ECO2003-5,0DD12
Rated Power	1.5 VA	1.5 VA	3.2 VA	3.2 VA	5.0 VA	5.0 VA
No-load voltage (app. x factor)	1.39	1.39	1.50	1.50	1.25	1.25
No-load loss (typ.)	0.60 W	0.60 W	0.60 W	0.60 W	0.60 W	0.60 W
Efficiency	61 %	61 %	64 %	64 %	74 %	74 %
Standards						
Classification	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer
Approvals						
Approvals	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)
Environment						
Ambient temperature max.	70 °C	70 °C	60 °C	60 °C	50 °C	50 °C
Safety and protection						
Type	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II	II	II
Short circuit strength	inherently short-circuit proof	inherently short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Order numbers						
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

Efficient PCB transformer
ECO 2003

Electrical data

Type	ECO2003-10S..
Input	
Rated input voltage	230 Vac
Rated frequency	50 - 60 Hz
Output	
Output rated voltage: Order no.	9 Vac: ECO2003-10S9
Rated Power	10.0 VA
No-load voltage (app. x factor)	1.22
No-load loss (typ.)	0.60 W
Efficiency	77 %
Standards	
Classification	Safety isolating transformer
Approvals	
Approvals	cURus, ENEC 10 (VDE)
Environment	
Ambient temperature max.	40 °C
Safety and protection	
Type	encapsulated
Class of Insulation System	VDE=B, UL=class 105
Protection index	IP 00
Safety class (prepared)	II
Short circuit strength	non-short-circuit proof
Order numbers	
Order Number	**refer to rated output voltage**

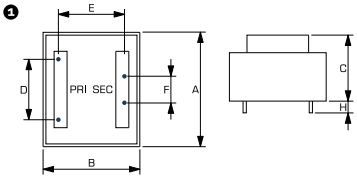
Efficient PCB transformer
ECO 2003

30 Mechanical data

Typ	Terminals	Pin Ø	Core type	Weight	Dimension picture (in mm)	A	B	C	D	E	F	G	H
ECO2003-1,5S..	Pins for printed circuit board	0.8 mm	EI 30/12,5	0.08 kg	❶	32.3	27.3	23.8	20	20	10	5	5
ECO2003-1,5DD..	Pins for printed circuit board	0.8 mm	EI 30/12,5	0.08 kg	❷	32.3	27.3	23.8	20	20	10	5	5
ECO2003-3,2S..	Pins for printed circuit board	0.8 mm	EI 38/13,5	0.15 kg	❷	41	35	28.1	20	25	10	5	5
ECO2003-3,2DD..	Pins for printed circuit board	0.8 mm	EI 38/13,5	0.15 kg	❷	41	35	28.1	20	25	10	5	5
ECO2003-5,0S..	Pins for printed circuit board	0.8 mm	EI 42/14,8	0.20 kg	❷	44	37	33	25	25	15	5	5
ECO2003-5,0DD..	Pins for printed circuit board	0.8 mm	EI 42/14,8	0.20 kg	❷	44	37	33	25	25	15	5	5
ECO2003-10S..	Pins for printed circuit board	0.8 mm	EI 48/16,8	0.30 kg	❷	51	43	34.6	25	27.5	15	5	5

Dimension pictures

❶



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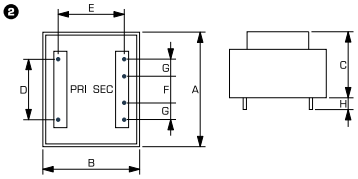


PCB transformer
VCN

General Data

Rated input voltage 230 Vac
Rated output voltage 6 - 2 x 18 Vac
Rated power 4.5 - 50 VA
Insulation class B
Maximum ambient temperature 70 °C
Efficiency up to 84 %
Degree of protection IP 00

Advantages

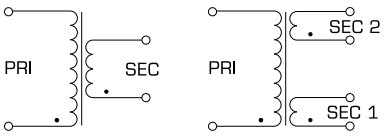
Minimum size at high output
Also with double output voltage for series or parallel connection
Designed for high ambient temperatures
Permanent corrosion protection, high insulation value and maximum electrical reliability thanks to XtraDensiFill resin encapsulation
Coil shell in 2-chamber technology
Self-extinguishing potting material
Additional mounting option with tabs on the housing (from 28 VA)

Applications

As a mains transformer for adjustment of the voltage and simple electrical isolation.

As a safety isolating transformer for the safe electrical isolation of the input and output sides. The transformer is suitable for creating SELV and PELV circuits because of the limit on the output voltage.

Circuit Diagram



Standards

Mains transformer
to: VDE 0570 Teil 2-1, DIN EN 61558-2-1, EN 61558-2-1, IEC 61558-2-1

Safety isolating transformer
to: VDE 0570 Teil 2-6, DIN EN 61558-2-6, EN 61558-2-6, IEC 61558-2-6

PCB transformer
VCN

VCN also available with 115 Vac rated input voltage!

Electrical data

Type	VCN 4,5/1/..	VCN 4,5/2/..	VCN 6/1/..	VCN 6/2/..	VCN 6,5/1/..	VCN 6,5/2/..
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Output rated voltage: Order no.	4,5 Vac: VCN 4,5/1/6 7,5 Vac: VCN 4,5/1/7,5 9 Vac: VCN 4,5/1/9 12 Vac: VCN 4,5/1/12 15 Vac: VCN 4,5/1/15 18 Vac: VCN 4,5/1/18 24 Vac: VCN 4,5/1/24	2x6 Vac: VCN 4,5/2/6 2x7,5 Vac: VCN 4,5/2/7,5 2x9 Vac: VCN 4,5/2/9 2x12 Vac: VCN 4,5/2/12 2x15 Vac: VCN 4,5/2/15 2x18 Vac: VCN 4,5/2/18*	6 Vac: VCN 6/1/6 7,5 Vac: VCN 6/1/7,5 9 Vac: VCN 6/1/9 12 Vac: VCN 6/1/12 15 Vac: VCN 6/1/15 18 Vac: VCN 6/1/18 24 Vac: VCN 6/1/24	2x6 Vac: VCN 6/2/6 2x7,5 Vac: VCN 6/2/7,5 2x9 Vac: VCN 6/2/9 2x12 Vac: VCN 6/2/12 2x15 Vac: VCN 6/2/15 2x18 Vac: VCN 6/2/18*	6 Vac: VCN 6,5/1/6 7,5 Vac: VCN 6,5/1/7,5 9 Vac: VCN 6,5/1/9 12 Vac: VCN 6,5/1/12 15 Vac: VCN 6,5/1/15 18 Vac: VCN 6,5/1/18 24 Vac: VCN 6,5/1/24	2x6 Vac: VCN 6,5/2/6 2x7,5 Vac: VCN 6,5/2/7,5 2x9 Vac: VCN 6,5/2/9 2x12 Vac: VCN 6,5/2/12 2x15 Vac: VCN 6,5/2/15 2x18 Vac: VCN 6,5/2/18
Rated output voltage	4.5 Vac	2x6 Vac	6 Vac	2x6 Vac	6 Vac	2x6 Vac
Rated Power	4.5 VA	4.5 VA	6.0 VA	6.0 VA	6.5 VA	6.5 VA
No-load voltage (app. x factor)	1.53	1.53	1.46	1.46	1.35	1.35
No-load loss (typ.)	1.50 W	1.50 W	2.00 W	2.00 W	1.40 W	1.40 W
Efficiency	59 %	59 %	63 %	63 %	67 %	67 %
Standards						
Classification	Safety isolating transformer	Safety isolating transformer *Mains transformer	Safety isolating transformer	Safety isolating transformer *Mains transformer	Safety isolating transformer	Safety isolating transformer
Approvals						
Approvals	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation
Environment						
Ambient temperature max.	70 °C	70 °C	70 °C	70 °C	70 °C	70 °C
Safety and protection						
Type	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated
Class of Insulation System	B	B	B	B	B	B
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II	II	II
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Order numbers						
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

PCB transformer
VCN

VCN also available with 115 Vac rated input voltage!

Electrical data

Type	VCN 10/1/..	VCN 10/2/..	VCN-A 10/1/..	VCN-A 10/2/..	VCN 12/1/..	VCN 12/2/..
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Output rated voltage: Order no.	6 Vac: VCN 10/1/6 7,5 Vac: VCN 10/1/7,5 9 Vac: VCN 10/1/9 12 Vac: VCN 10/1/12 15 Vac: VCN 10/1/15 18 Vac: VCN 10/1/18 24 Vac: VCN 10/1/24	2x6 Vac: VCN 10/2/6 2x7,5 Vac: VCN 10/2/7,5 2x9 Vac: VCN 10/2/9 2x12 Vac: VCN 10/2/12 2x15 Vac: VCN 10/2/15 2x18 Vac: VCN 10/2/18	6 Vac: VCN-A 10/1/6 7,5 Vac: VCN-A 10/1/7,5 9 Vac: VCN-A 10/1/9 12 Vac: VCN-A 10/1/12 15 Vac: VCN-A 10/1/15 18 Vac: VCN-A 10/1/18 24 Vac: VCN-A 10/1/24	2x6 Vac: VCN-A 10/2/6 2x7,5 Vac: VCN-A 10/2/7,5 2x9 Vac: VCN-A 10/2/9 2x12 Vac: VCN-A 10/2/12 2x15 Vac: VCN-A 10/2/15 2x18 Vac: VCN-A 10/2/18	6 Vac: VCN 12/1/6 7,5 Vac: VCN 12/1/7,5 9 Vac: VCN 12/1/9 12 Vac: VCN 12/1/12 15 Vac: VCN 12/1/15 18 Vac: VCN 12/1/18 24 Vac: VCN 12/1/24	2x6 Vac: VCN 12/2/6 2x7,5 Vac: VCN 12/2/7,5 2x9 Vac: VCN 12/2/9 2x12 Vac: VCN 12/2/12 2x15 Vac: VCN 12/2/15 2x18 Vac: VCN 12/2/18
Rated output voltage	6 Vac	2x6 Vac	0 Vac	2x0 Vac	6 Vac	2x6 Vac
Rated Power	10.0 VA	10.0 VA	10.0 VA	10.0 VA	12.0 VA	12.0 VA
No-load voltage (app. x factor)	1.34	1.34	1.35	1.35	1.25	1.25
No-load loss (typ.)	1.50 W	1.50 W	2.50 W	2.50 W	2.10 W	2.10 W
Efficiency	70 %	70 %	66 %	66 %	72 %	72 %
Standards						
Classification	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer
Approvals						
Approvals	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation
Environment						
Ambient temperature max.	70 °C	70 °C	70 °C	70 °C	70 °C	70 °C
Safety and protection						
Type	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated
Class of Insulation System	B	B	B	B	B	B
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II	II	II
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Order numbers						
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

PCB transformer
VCN

VCN also available with 115 Vac rated input voltage!

Electrical data

Type	VCN 16/1/..	VCN 16/2/..	VCN 20/1/..	VCN 20/2/..	VCN 22/1/..	VCN 22/2/..
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Output rated voltage: Order no.	6 Vac: VCN 16/1/6 7,5 Vac: VCN 16/1/7,5 9 Vac: VCN 16/1/9 12 Vac: VCN 16/1/12 15 Vac: VCN 16/1/15 18 Vac: VCN 16/1/18 24 Vac: VCN 16/1/24	2x6 Vac: VCN 16/2/6 2x7,5 Vac: VCN 16/2/7,5 2x9 Vac: VCN 16/2/9 2x12 Vac: VCN 16/2/12 2x15 Vac: VCN 16/2/15 2x18 Vac: VCN 16/2/18	6 Vac: VCN 20/1/6 7,5 Vac: VCN 20/1/7,5 9 Vac: VCN 20/1/9 12 Vac: VCN 20/1/12 15 Vac: VCN 20/1/15 18 Vac: VCN 20/1/18 24 Vac: VCN 20/1/24	2x6 Vac: VCN 20/2/6 2x7,5 Vac: VCN 20/2/7,5 2x9 Vac: VCN 20/2/9 2x12 Vac: VCN 20/2/12 2x15 Vac: VCN 20/2/15 2x18 Vac: VCN 20/2/18	6 Vac: VCN 22/1/6 7,5 Vac: VCN 22/1/7,5 9 Vac: VCN 22/1/9 12 Vac: VCN 22/1/12 15 Vac: VCN 22/1/15 18 Vac: VCN 22/1/18 24 Vac: VCN 22/1/24	2x6 Vac: VCN 22/2/6 2x7,5 Vac: VCN 22/2/7,5 2x9 Vac: VCN 22/2/9 2x12 Vac: VCN 22/2/12 2x15 Vac: VCN 22/2/15 2x18 Vac: VCN 22/2/18
Rated output voltage	6 Vac	2x6 Vac	6 Vac	2x6 Vac	6 Vac	2x6 Vac
Rated Power	16.0 VA	16.0 VA	20.0 VA	20.0 VA	22.0 VA	22.0 VA
No-load voltage (app. x factor)	1.22	1.22	1.18	1.18	1.20	1.20
No-load loss (typ.)	2.50 W	2.50 W	2.60 W	2.60 W	3.20 W	3.20 W
Efficiency	74 %	74 %	79 %	79 %	77 %	77 %
Standards						
Classification	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer
Approvals						
Approvals	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation
Environment						
Ambient temperature max.	70 °C	70 °C	70 °C	70 °C	70 °C	70 °C
Safety and protection						
Type	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated
Class of Insulation System	B	B	B	B	B	B
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II	II	II
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Order numbers						
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

PCB transformer
VCN

VCN auch mit einer Rated input voltage 115 V lieferbar!

Electrical data

Type	VCN 28/1/..	VCN 28/2/..	VCN 30/1/..	VCN 30/2/..	VCN 33/1/..	VCN 33/2/..
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Output rated voltage: Order no.	6 Vac: VCN 28/1/6 7,5 Vac: VCN 28/1/7,5 9 Vac: VCN 28/1/9 12 Vac: VCN 28/1/12 15 Vac: VCN 28/1/15 18 Vac: VCN 28/1/18 24 Vac: VCN 28/1/24	2x6 Vac: VCN 28/2/6 2x7,5 Vac: VCN 28/2/7,5 2x9 Vac: VCN 28/2/9 2x12 Vac: VCN 28/2/12 2x15 Vac: VCN 28/2/15 2x18 Vac: VCN 28/2/18	6 Vac: VCN 30/1/6 7,5 Vac: VCN 30/1/7,5 9 Vac: VCN 30/1/9 12 Vac: VCN 30/1/12 15 Vac: VCN 30/1/15 18 Vac: VCN 30/1/18 24 Vac: VCN 30/1/24	2x6 Vac: VCN 30/2/6 2x7,5 Vac: VCN 30/2/7,5 2x9 Vac: VCN 30/2/9 2x12 Vac: VCN 30/2/12 2x15 Vac: VCN 30/2/15 2x18 Vac: VCN 30/2/18	6 Vac: VCN 33/1/6 7,5 Vac: VCN 33/1/7,5 9 Vac: VCN 33/1/9 12 Vac: VCN 33/1/12 15 Vac: VCN 33/1/15 18 Vac: VCN 33/1/18 24 Vac: VCN 33/1/24	2x6 Vac: VCN 33/2/6 2x7,5 Vac: VCN 33/2/7,5 2x9 Vac: VCN 33/2/9 2x12 Vac: VCN 33/2/12 2x15 Vac: VCN 33/2/15 2x18 Vac: VCN 33/2/18
Rated output voltage	6 Vac	2x6 Vac	6 Vac	2x6 Vac	6 Vac	2x6 Vac
Rated Power	28.0 VA	28.0 VA	30.0 VA	30.0 VA	33.0 VA	33.0 VA
No-load voltage (app. x factor)	1.20	1.20	1.15	1.15	1.19	1.19
No-load loss (typ.)	3.00 W	3.00 W	3.40 W	3.40 W	3.50 W	3.50 W
Efficiency	80 %	80 %	82 %	82 %	81 %	81 %
Standards						
Classification	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer
Approvals						
Approvals	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation
Environment						
Ambient temperature max.	70 °C	70 °C	70 °C	70 °C	70 °C	70 °C
Safety and protection						
Type	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated
Class of Insulation System	B	B	B	B	B	B
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II	II	II
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Order numbers						
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

PCB transformer
VCN

VCN also available with 115 Vac rated input voltage!

Electrical data

Type	VCN 44/1/..	VCN 44/2/..	VCN 50/1/..	VCN 50/2/..
Input				
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output				
Output rated voltage: Order no.	6 Vac: VCN 44/1/6 7,5 Vac: VCN 44/1/7,5 9 Vac: VCN 44/1/9 12 Vac: VCN 44/1/12 15 Vac: VCN 44/1/15 18 Vac: VCN 44/1/18 24 Vac: VCN 44/1/24	2x6 Vac: VCN 44/2/6 2x7,5 Vac: VCN 44/2/7,5 2x9 Vac: VCN 44/2/9 2x12 Vac: VCN 44/2/12 2x15 Vac: VCN 44/2/15 2x18 Vac: VCN 44/2/18	6 Vac: VCN 50/1/6 7,5 Vac: VCN 50/1/7,5 9 Vac: VCN 50/1/9 12 Vac: VCN 50/1/12 15 Vac: VCN 50/1/15 18 Vac: VCN 50/1/18 24 Vac: VCN 50/1/24	2x6 Vac: VCN 50/2/6 2x7,5 Vac: VCN 50/2/7,5 2x9 Vac: VCN 50/2/9 2x12 Vac: VCN 50/2/12 2x15 Vac: VCN 50/2/15 2x18 Vac: VCN 50/2/18
Rated output voltage	6 Vac	2x6 Vac	6 Vac	2x6 Vac
Rated Power	44.0 VA	44.0 VA	50.0 VA	50.0 VA
No-load voltage (app. x factor)	1.15	1.15	1.13	1.13
No-load loss (typ.)	4.40 W	4.40 W	4.80 W	4.80 W
Efficiency	82 %	82 %	84 %	84 %
Standards				
Classification	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer
Approvals				
Approvals	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation
Environment				
Ambient temperature max.	70 °C	70 °C	70 °C	70 °C
Safety and protection				
Type	encapsulated	encapsulated	encapsulated	encapsulated
Class of Insulation System	B	B	B	B
Protection index	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Order numbers				
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

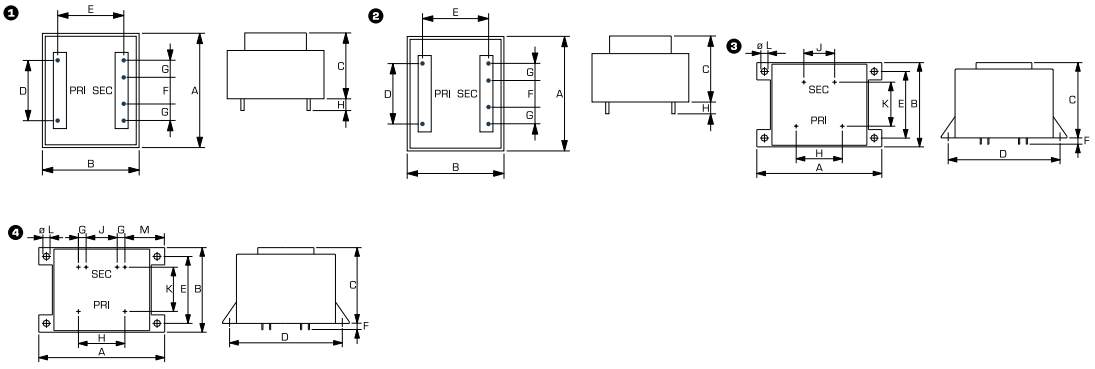
PCB transformer
VCN

VCN also available with 115 Vac rated input voltage!

30 Mechanical data

Typ	Terminals	Pin (ø)	Core type	Weight	Dimension picture (in mm)	A	B	C	D	E	F	G	H	J	K	L
VCN 4,5/1/..	Pins for printed circuit boards	0.8 mm	EI 38/13,6	0.13 kg	1	41	35	28.1	20	25	10	-	5	-	-	-
VCN 4,5/2/..	Pins for printed circuit boards	0.8 mm	EI 38/13,6	0.13 kg	2	41	35	28.1	20	25	10	5	5	-	-	-
VCN 6/1/..	Pins for printed circuit boards	0.8 mm	EI 42/14,8	0.15 kg	1	44	37	33	25	25	15	-	5	-	-	-
VCN 6/2/..	Pins for printed circuit boards	0.8 mm	EI 42/14,8	0.15 kg	2	44	37	33	25	25	15	5	5	-	-	-
VCN 6,5/1/..	Pins for printed circuit boards	0.8 mm	EI 38/16,5	0.19 kg	1	41	35	30.8	20	25	10	-	5	-	-	-
VCN 6,5/2/..	Pins for printed circuit boards	0.8 mm	EI 38/16,5	0.19 kg	2	41	35	30.8	20	25	10	5	5	-	-	-
VCN 10/1/..	Pins for printed circuit boards	0.8 mm	EI 48/16,8	0.29 kg	1	51	43	34.6	25	27.5	15	-	7	-	-	-
VCN 10/2/..	Pins for printed circuit boards	0.8 mm	EI 48/16,8	0.29 kg	2	51	43	34.6	25	27.5	15	5	7	-	-	-
VCN-A 10/1/..	Pins for printed circuit boards	0.8 mm	EI 42/20,5	0.26 kg	1	44	37	38	25	25	15	-	6.5	-	-	-
VCN-A 10/2/..	Pins for printed circuit boards	0.8 mm	EI 42/20,5	0.26 kg	2	44	37	38	25	25	15	5	6.5	-	-	-
VCN 12/1/..	Pins for printed circuit boards	0.8 mm	EI 48/20,5	0.34 kg	1	51	43	38.5	25	27.5	15	-	7	-	-	-
VCN 12/2/..	Pins for printed circuit boards	0.8 mm	EI 48/20,5	0.34 kg	2	51	43	38.5	25	27.5	15	5	7	-	-	-
VCN 16/1/..	Pins for printed circuit boards	0.8 mm	EI 54/18,8	0.40 kg	1	57	48	39	30	30	20	-	7	-	-	-
VCN 16/2/..	Pins for printed circuit boards	0.8 mm	EI 54/18,8	0.40 kg	2	57	48	39	30	30	20	5	7	-	-	-
VCN 20/1/..	Pins for printed circuit boards	0.8 mm	EI 60/21	0.58 kg	1	81.2	55	44.7	72.5	43.5	30	-	6.5	-	-	-
VCN 20/2/..	Pins for printed circuit boards	0.8 mm	EI 60/21	0.58 kg	2	81.2	55	44.7	72.5	43.5	30	5	6.5	-	-	-
VCN 22/1/..	Pins for printed circuit boards	0.8 mm	EI 54/23	0.48 kg	1	57	48	43.3	30	30	20	-	7.5	-	-	-
VCN 22/2/..	Pins for printed circuit boards	0.8 mm	EI 54/23	0.48 kg	2	57	48	43.3	30	30	20	5	7.5	-	-	-
VCN 28/1/..	Pins for printed circuit boards	0.8 mm	EI 60/25,5	0.68 kg	3	81.2	55	49.2	72.5	43.5	6.5	-	30	20	32.5	4.2
VCN 28/2/..	Pins for printed circuit boards	0.8 mm	EI 60/25,5	0.68 kg	4	81.2	55	49.2	72.5	43.5	6.5	5	30	20	32.5	4.2
VCN 30/1/..	Pins for printed circuit boards	0.8 mm	EI 60/31	0.78 kg	3	81.2	55	54.3	72.5	43.5	6.5	-	30	20	32.5	4.2
VCN 30/2/..	Pins for printed circuit boards	0.8 mm	EI 60/31	0.78 kg	4	81.2	55	54.3	72.5	43.5	6.5	5	30	20	32.5	4.2
VCN 33/1/..	Pins for printed circuit boards	0.8 mm	EI 66/23	0.77 kg	3	87.2	60	48.5	77.5	47.5	7	-	35	15	35	4.2
VCN 33/2/..	Pins for printed circuit boards	0.8 mm	EI 66/23	0.77 kg	4	87.2	60	48.5	77.5	47.5	7	10	35	15	35	4.2
VCN 44/1/..	Pins for printed circuit boards	0.8 mm	EI 66/30	0.94 kg	3	87.2	60	55.8	77.5	47.5	7	-	35	15	35	4.2
VCN 44/2/..	Pins for printed circuit boards	0.8 mm	EI 66/30	0.94 kg	4	87.2	60	55.8	77.5	47.5	7	10	35	15	35	4.2
VCN 50/1/..	Pins for printed circuit boards	0.8 mm	EI 66/34,5	1.07 kg	3	87.2	60	60.2	77.5	47.5	7	-	35	15	35	4.2
VCN 50/2/..	Pins for printed circuit boards	0.8 mm	EI 66/34,5	1.07 kg	4	87.2	60	60.2	77.5	47.5	7	10	35	15	35	4.2

Dimension pictures




0-18V
8VA
0,4AT
Sec
0-18V
8VA
0,4AT
VC 16/2/18
ta.40°C Cl.B
50 - 60Hz
BLOCK
Type VC 16 / 40
VDE 0570/EN 61558
Pri
230V
www.block-trafo.de
Sec 12V
16VA
1,25AT
VC 16 / 1 / 12
ta.40°C Cl. B
50 - 60Hz
Pri
230V

PCB transformer
VC

General Data

Rated input voltage 230 Vac
Rated output voltage 6 - 2 x 24 Vac
Rated power 3.2 - 16 VA
Insulation class B
Maximum ambient temperature 40 - 60 °C
Efficiency up to 76 %
Degree of protection IP 00

Advantages

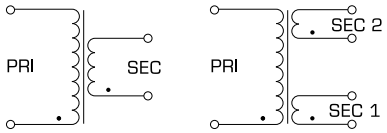
Minimum size at high output
Also with double output voltage for series or parallel connection
Permanent corrosion protection, high insulation value and maximum electrical reliability thanks to XtraDensiFill resin encapsulation
Coil shell in 2-chamber technology
Self-extinguishing potting material

Applications

As a mains transformer for adjustment of the voltage and simple electrical isolation.

As a safety transformer for the safe electrical isolation of the input and output sides. The transformer is suitable for creating SELV and PELV circuits because of the limit on the output voltage.

Circuit Diagram



Standards

Mains transformer
to: VDE 0570 Teil 2-1, DIN EN 61558-2-1, EN 61558-2-1, IEC 61558-2-1, UL 5085-1/-2, CSA 22.2 No.66

Safety isolating transformer
to: VDE 0570 Teil 2-6, DIN EN 61558-2-6, EN 61558-2-6, IEC 61558-2-6, UL 5085-1/-2, CSA 22.2 No.66

Certifications

ENEC 10 (VDE), UL 5085-1/-2, CSA 22.2 No.66

PCB transformer
VC

Electrical data

Type	VC 3,2/1/...	VC 3,2/2/...	VC 5,0/1/...	VC 5,0/2/...	VC 10/1/...	VC 10/2/...
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage: Order no.	6 Vac: VC 3,2/1/6 8 Vac: VC 3,2/1/8 9 Vac: VC 3,2/1/9 12 Vac: VC 3,2/1/12 15 Vac: VC 3,2/1/15 18 Vac: VC 3,2/1/18 24 Vac: VC 3,2/1/24	2x6 Vac: VC 3,2/2/6 2x8 Vac: VC 3,2/2/8 2x9 Vac: VC 3,2/2/9 2x12 Vac: VC 3,2/2/12 2x15 Vac: VC 3,2/2/15 2x18 Vac: VC 3,2/2/18* 2x24 Vac: VC 3,2/2/24*	6 Vac: VC 5,0/1/6 8 Vac: VC 5,0/1/8 9 Vac: VC 5,0/1/9 12 Vac: VC 5,0/1/12 15 Vac: VC 5,0/1/15 18 Vac: VC 5,0/1/18 24 Vac: VC 5,0/1/24	2x6 Vac: VC 5,0/2/6 2x8 Vac: VC 5,0/2/8 2x9 Vac: VC 5,0/2/9 2x12 Vac: VC 5,0/2/12 2x15 Vac: VC 5,0/2/15 2x18 Vac: VC 5,0/2/18 2x24 Vac: VC 5,0/2/24*	6 Vac: VC 10/1/6 8 Vac: VC 10/1/8 9 Vac: VC 10/1/9 12 Vac: VC 10/1/12 15 Vac: VC 10/1/15 18 Vac: VC 10/1/18 24 Vac: VC 10/1/24	2x6 Vac: VC 10/2/6 2x8 Vac: VC 10/2/8 2x9 Vac: VC 10/2/9 2x12 Vac: VC 10/2/12 2x15 Vac: VC 10/2/15 2x18 Vac: VC 10/2/18 2x24 Vac: VC 10/2/24*
Rated Power	3.2 VA	3.2 VA	5.0 VA	5.0 VA	10.0 VA	10.0 VA
No-load voltage (app. x factor)	1.50	1.50	1.25	1.25	1.25	1.25
No-load loss (typ.)	1.00 W	1.00 W	1.50 W	1.50 W	1.60 W	1.60 W
Efficiency	60 %	60 %	68 %	68 %	74 %	74 %
Standards						
Classification	Safety isolating transformer	Safety isolating transformer *Mains transformer (without VDE mark)	Safety isolating transformer	Safety isolating transformer *Mains transformer (without VDE mark)	Safety isolating transformer	Safety isolating transformer *Mains transformer (without VDE mark)
Approvals						
Approvals	cURus, ENEC (VDE)	cURus, ENEC (VDE)	cURus, ENEC (VDE)	cURus, ENEC (VDE)	cURus, ENEC (VDE)	cURus, ENEC (VDE)
Environment						
Ambient temperature max.	60 °C	60 °C	50 °C	50 °C	40 °C	40 °C
Safety and protection						
Type	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II	II	II
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Order numbers						
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

PCB transformer
VC

Electrical data

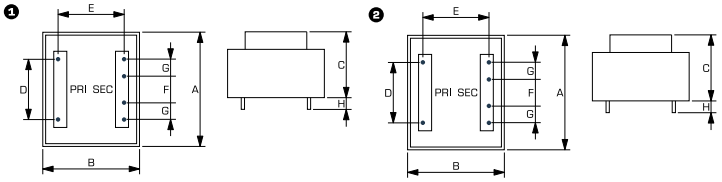
Type	VC 16/1/...	VC 16/2/...
Input		
Rated input voltage	230 Vac	230 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz
Output		
Rated output voltage: Order no.	6 Vac: VC 16/1/6 8 Vac: VC 16/1/8 9 Vac: VC 16/1/9 12 Vac: VC 16/1/12 15 Vac: VC 16/1/15 18 Vac: VC 16/1/18 24 Vac: VC 16/1/24	2x6 Vac: VC 16/2/6 2x8 Vac: VC 16/2/8 2x9 Vac: VC 16/2/9 2x12 Vac: VC 16/2/12 2x15 Vac: VC 16/2/15 2x18 Vac: VC 16/2/18 2x24 Vac: VC 16/2/24*
Rated Power	16.0 VA	16.0 VA
No-load voltage (app. x factor)	1.24	1.24
No-load loss (typ.)	1.80 W	1.80 W
Efficiency	76 %	76 %
Standards		
Classification	Safety isolating transformer	Safety isolating transformer *Mains transformer (without VDE mark)
Approvals		
Approvals	cURus, ENEC (VDE)	cURus, ENEC (VDE)
Environment		
Ambient temperature max.	40 °C	40 °C
Safety and protection		
Type	encapsulated	encapsulated
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105
Protection index	IP 00	IP 00
Safety class (prepared)	II	II
Short circuit strength	non-short-circuit proof	non-short-circuit proof
Order numbers		
Order Number	**refer to rated output voltage**	**refer to rated output voltage**

PCB transformer
VC

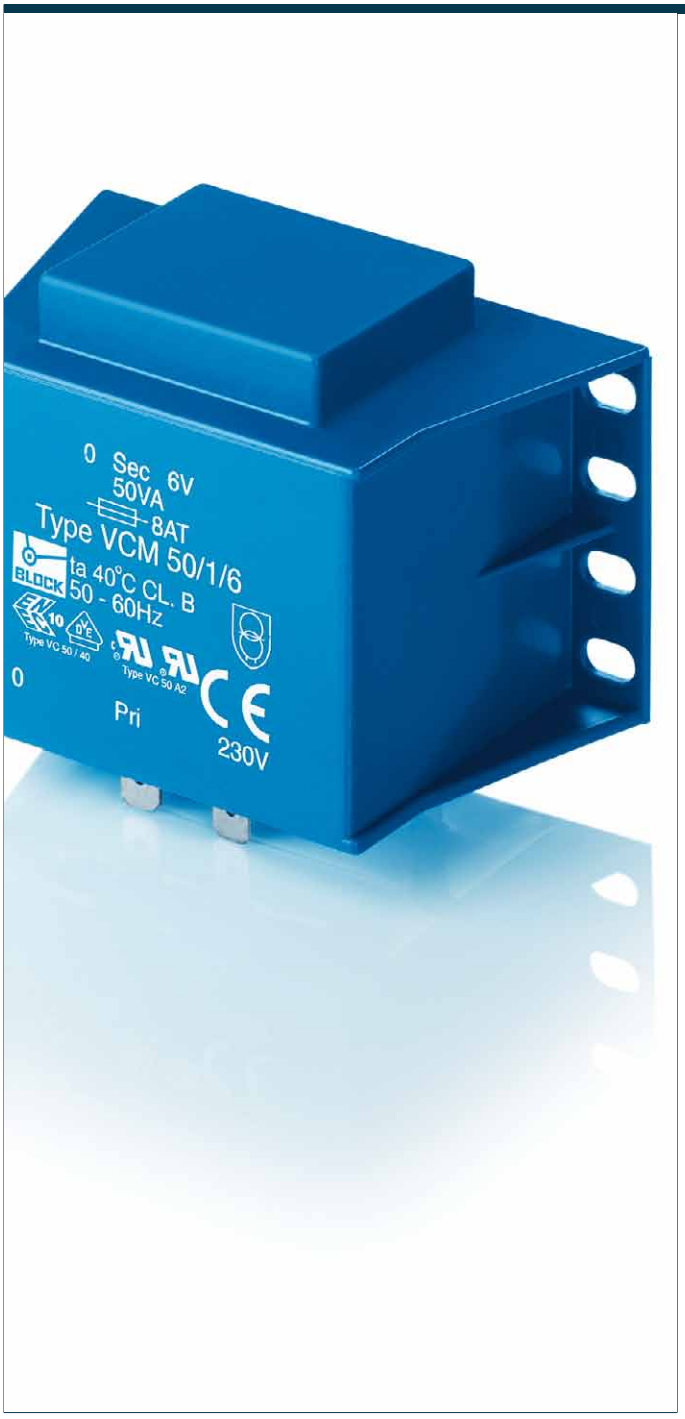
30 Mechanical data

Typ	Terminals	Pin (ø)	Core type	Weight	Dimension picture (in mm)	A	B	C	D	E	F	G	H
VC 3,2/1/...	Pins for printed circuit boards	0.8 mm	EI 38/13,5	0.15 kg	❶	41	35	28.1	20	25	10	5	5
VC 3,2/2/...	Pins for printed circuit boards	0.8 mm	EI 38/13,5	0.15 kg	❷	41	35	28.1	20	25	10	5	5
VC 5,0/1/...	Pins for printed circuit boards	0.8 mm	EI 42/14,8	0.19 kg	❶	44	37	33	25	25	15	5	5
VC 5,0/2/...	Pins for printed circuit boards	0.8 mm	EI 42/14,8	0.19 kg	❷	44	37	33	25	25	15	5	5
VC 10/1/...	Pins for printed circuit boards	0.8 mm	EI 48/16,8	0.28 kg	❶	51	43	34.6	25	27.5	15	5	7
VC 10/2/...	Pins for printed circuit boards	0.8 mm	EI 48/16,8	0.28 kg	❷	51	43	34.6	25	27.5	15	5	7
VC 16/1/...	Pins for printed circuit boards	0.8 mm	EI 54/18,8	0.42 kg	❶	57	48	39	30	30	20	5	7.5
VC 16/2/...	Pins for printed circuit boards	0.8 mm	EI 54/18,8	0.42 kg	❷	57	48	39	30	30	20	5	7.5

Dimension pictures



PCB transformer, mountable
VCM



General Data

Rated input voltage 230 Vac
Rated output voltage 6 - 2 x 24 Vac
Rated power 5 - 50 VA
Insulation class B
Maximum ambient temperature 40 - 50 °C
Efficiency up to 87 %
Degree of protection IP 00

Advantages

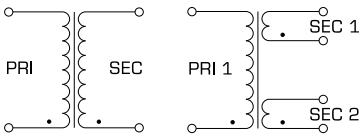
Minimum size at high output
Also with double output voltage for series or parallel connection
Permanent corrosion protection, high insulation value and maximum electrical reliability thanks to XtraDensiFill resin encapsulation
Coil shell in 2-chamber technology
Self-extinguishing potting material
Additional mounting option with tabs on the housing

Applications

As a safety isolating transformer for the safe electrical isolation of the input and output sides.

As a safety isolating transformer for the safe electrical isolation of the input and output sides. The transformer is suitable for creating SELV and PELV circuits because of the limit on the output voltage.

Circuit Diagram



Standards

Mains transformer
to: VDE 0570 Teil 2-1, DIN EN 61558-2-1, EN 61558-2-1, IEC 61558-2-1, UL 5085-1/-2, CSA 22.2 No.66

Safety isolating transformer
to: VDE 0570 Teil 2-6, DIN EN 61558-2-6, EN 61558-2-6, IEC 61558-2-6, UL 5085-1/-2, CSA 22.2 No.66

Certifications

ENEC 10 (VDE), UL 5085-1/-2, CSA 22.2 No.66

PCB transformer, mountable
VCM

Electrical data

Type	VCM 5,0/1/..	VCM 5,0/2/..	VCM 10/1/..	VCM 10/2/..	VCM 16/1/..	VCM 16/2/..
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage: Order no.	6 Vac: VCM 5,0/1/6 8 Vac: VCM 5,0/1/8 9 Vac: VCM 5,0/1/9 12 Vac: VCM 5,0/1/12 15 Vac: VCM 5,0/1/15 18 Vac: VCM 5,0/1/18 24 Vac: VCM 5,0/1/24	2x6 Vac: VCM 5,0/2/6 2x8 Vac: VCM 5,0/2/8 2x9 Vac: VCM 5,0/2/9 2x12 Vac: VCM 5,0/2/12 2x15 Vac: VCM 5,0/2/15 2x18 Vac: VCM 5,0/2/18 2x24 Vac: VCM 5,0/2/24*	6 Vac: VCM 10/1/6 8 Vac: VCM 10/1/8 9 Vac: VCM 10/1/9 12 Vac: VCM 10/1/12 15 Vac: VCM 10/1/15 18 Vac: VCM 10/1/18 24 Vac: VCM 10/1/24	2x6 Vac: VCM 10/2/6 2x8 Vac: VCM 10/2/8 2x9 Vac: VCM 10/2/9 2x12 Vac: VCM 10/2/12 2x15 Vac: VCM 10/2/15 2x18 Vac: VCM 10/2/18 2x24 Vac: VCM 10/2/24*	6 Vac: VCM 16/1/6 8 Vac: VCM 16/1/8 9 Vac: VCM 16/1/9 12 Vac: VCM 16/1/12 15 Vac: VCM 16/1/15 18 Vac: VCM 16/1/18 24 Vac: VCM 16/1/24	2x6 Vac: VCM 16/2/6 2x8 Vac: VCM 16/2/8 2x9 Vac: VCM 16/2/9 2x12 Vac: VCM 16/2/12 2x15 Vac: VCM 16/2/15 2x18 Vac: VCM 16/2/18 2x24 Vac: VCM 16/2/24*
Rated Power	5.0 VA	5.0 VA	10.0 VA	10.0 VA	16.0 VA	16.0 VA
No-load voltage (app. x factor)	1.25	1.25	1.25	1.25	1.24	1.24
No-load loss (typ.)	1.50 W	1.50 W	1.60 W	1.60 W	1.80 W	1.80 W
Efficiency	68 %	68 %	74 %	74 %	76 %	76 %
Standards						
Classification	Safety isolating transformer	Safety isolating transformer *Mains transformer (without VDE mark)	Safety isolating transformer	Safety isolating transformer *Mains transformer (without VDE mark)	Safety isolating transformer	Safety isolating transformer *Mains transformer (without VDE mark)
Approvals						
Approvals	cURus, ENEC (VDE)	cURus, ENEC (VDE)	cURus, ENEC (VDE)	cURus, ENEC (VDE)	cURus, ENEC (VDE)	cURus, ENEC (VDE)
Environment						
Ambient temperature max.	50 °C	50 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II	II	II
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Order numbers						
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

PCB transformer, mountable
VCM

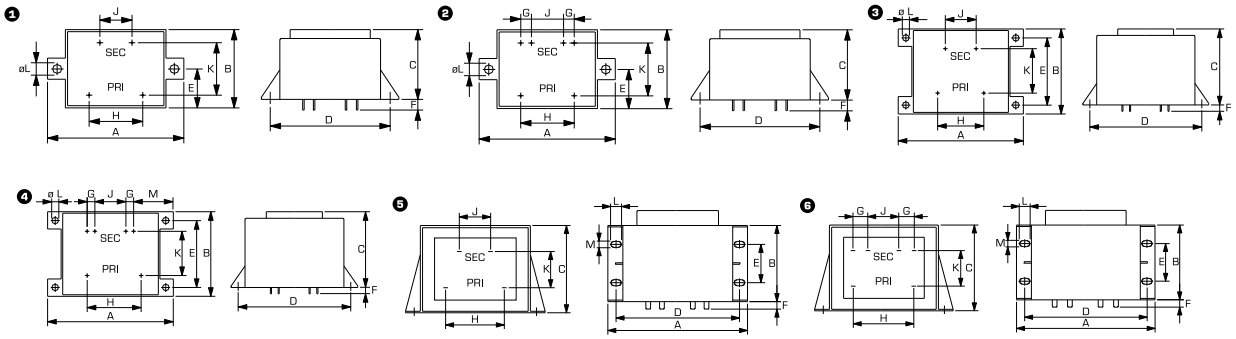
Electrical data

Type	VCM 25/1/..	VCM 25/2/..	VCM 36/1/..	VCM 36/2/..	VCM 50/1/..	VCM 50/2/..
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage: Order no.	6 Vac: VCM 25/1/6 8 Vac: VCM 25/1/8 9 Vac: VCM 25/1/9 12 Vac: VCM 25/1/12 15 Vac: VCM 25/1/15 18 Vac: VCM 25/1/18 24 Vac: VCM 25/1/24	2x6 Vac: VCM 25/2/6 2x8 Vac: VCM 25/2/8 2x9 Vac: VCM 25/2/9 2x12 Vac: VCM 25/2/12 2x15 Vac: VCM 25/2/15 2x18 Vac: VCM 25/2/18 2x24 Vac: VCM 25/2/24*	6 Vac: VCM 36/1/6 8 Vac: VCM 36/1/8 9 Vac: VCM 36/1/9 12 Vac: VCM 36/1/12 15 Vac: VCM 36/1/15 18 Vac: VCM 36/1/18 24 Vac: VCM 36/1/24	2x6 Vac: VCM 36/2/6 2x8 Vac: VCM 36/2/8 2x9 Vac: VCM 36/2/9 2x12 Vac: VCM 36/2/12 2x15 Vac: VCM 36/2/15 2x18 Vac: VCM 36/2/18 2x24 Vac: VCM 36/2/24**	6 Vac: VCM 50/1/6 8 Vac: VCM 50/1/8 9 Vac: VCM 50/1/9 12 Vac: VCM 50/1/12 15 Vac: VCM 50/1/15 18 Vac: VCM 50/1/18 24 Vac: VCM 50/1/24	2x6 Vac: VCM 50/2/6 2x8 Vac: VCM 50/2/8 2x9 Vac: VCM 50/2/9 2x12 Vac: VCM 50/2/12 2x15 Vac: VCM 50/2/15 2x18 Vac: VCM 50/2/18 2x24 Vac: VCM 50/2/24**
Rated Power	25.0 VA	25.0 VA	36.0 VA	36.0 VA	50.0 VA	50.0 VA
No-load voltage (app. x factor)	1.12	1.12	1.11	1.11	1.09	1.09
No-load loss (typ.)	2.50 W	2.50 W	2.60 W	2.60 W	3.80 W	3.80 W
Efficiency	82 %	82 %	83 %	83 %	87 %	87 %
Standards						
Classification	Safety isolating transformer	Safety isolating transformer *Mains transformer (without VDE mark)	Safety isolating transformer	Safety isolating transformer **isolating transformer (without VDE mark)	Safety isolating transformer	Safety isolating transformer **isolating transformer (without VDE mark)
Approvals						
Approvals	cURus, ENEC (VDE)	cURus, ENEC (VDE)	cURus, ENEC (VDE)	cURus, ENEC (VDE)	cURus, ENEC (VDE)	cURus, ENEC (VDE)
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II	II	II
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Order numbers						
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

PCB transformer, mountable
VCM

Typ	Fixing method	Terminals	Pin (ø)	Core type	Weight	Dimension picture (in mm)	A	B	C	D	E	F	G	H	J	K	L	M
VCM 5,0/1/..	Fixing points on the case	Pins for pcb	0.8 mm	EI 42/14,8	0.19 kg	❶	64	37	32.3	55	18.5	5	-	25	15	25	4.2	-
VCM 5,0/2/..	Fixing points on the case	Pins for pcb	0.8 mm	EI 42/14,8	0.19 kg	❷	64	37	32.3	55	18.5	5	5	25	15	25	4.2	-
VCM 10/1/..	Fixing points on the case	Pins for pcb	0.8 mm	EI 48/16,8	0.28 kg	❶	69	42.2	34.6	60	21.1	5	-	25	15	27.5	4.2	-
VCM 10/2/..	Fixing points on the case	Pins for pcb	0.8 mm	EI 48/16,8	0.28 kg	❷	69	42.2	34.6	60	21.1	5	5	25	15	27.5	4.2	-
VCM 16/1/..	Fixing points on the case	Pins for pcb	0.8 mm	EI 54/18,8	0.42 kg	❸	75.2	47.1	39	65	37.5	5	-	30	20	30	4.2	-
VCM 16/2/..	Fixing points on the case	Pins for pcb	0.8 mm	EI 54/18,8	0.42 kg	❹	75.2	47.1	39	65	37.5	5	5	30	20	30	4.2	23.3
VCM 25/1/..	Fixing points on the case	Pins for pcb	0.8 mm	EI 60/25,5	0.61 kg	❸	81.2	55	49.2	72.5	43.5	6.5	-	30	20	32.5	4.2	-
VCM 25/2/..	Fixing points on the case	Pins for pcb	0.8 mm	EI 60/25,5	0.61 kg	❹	81.2	55	49.2	72.5	43.5	6.5	5	30	20	32.5	4.2	26
VCM 36/1/..	Fixing points on the case	Pins for pcb	0.8 mm	EI 66/23,0	0.75 kg	❸	87.2	60	48.5	77.5	47.5	5	-	35	25	35	4.2	-
VCM 36/2/..	Fixing points on the case	Pins for pcb	0.8 mm	EI 66/23,0	0.75 kg	❹	87.2	61	48.5	77.5	47.5	5	5	35	20	35	4.2	31
VCM 50/1/..	Fixing points on the case	Quick connect terminals	PRI 4.8 x 0.8 mm, SEC 6.3 x 0.8 mm	EI 66/34,5	0.99 kg	❺	94	61	58.5	82	37.5	9	-	35	15	35	8.3	4.8
VCM 50/2/..	Fixing points on the case	Quick connect terminals	PRI 4.8 x 0.8 mm, SEC 6.3 x 0.8 mm	EI 66/34,5	0.99 kg	❻	94	61	58.5	82	37.5	9	10	35	15	35	8.3	4.8

Dimension pictures



PCB transformer
VR

General Data

Rated input voltage 230 Vac
Rated output voltage 8 - 2 x 18 Vac
Rated power 4.5 - 30 VA
Insulation class B
Maximum ambient temperature 40 °C
Efficiency up to 84 %
Degree of protection IP 00

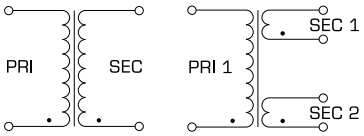
Advantages

Minimum size at high output
Also with double output voltage for series or parallel connection
Permanent corrosion protection, high insulation value and maximum electrical reliability thanks to XtraDensiFill resin encapsulation
Coil shell in 2-chamber technology
Self-extinguishing potting material
Space saving installation thanks to additional screw mounting in the base plate

Applications

Safety transformer for the safe electrical isolation of the input and output sides. The transformer is suitable for creating SELV and PELV circuits because of the limit on the output voltage.

Circuit Diagram



Standards

Safety isolating transformer
to: VDE 0570 Teil 2-6, DIN EN 61558-2-6, EN 61558-2-6, IEC 61558-2-6, UL 5085-1/-2, CSA 22.2 No.66

Certifications

ENEC 10 (VDE), UL 5085-1/-2, CSA 22.2 No.66

PCB transformer
VR

Electrical data

Type	VR 4,5/1/..	VR 4,5/2/..	VR 7,5/1/..	VR 7,5/2/..	VR 13/1/..	VR 13/2/..
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage: Order no.	8 Vac: VR 4,5/1/8 9 Vac: VR 4,5/1/9 12 Vac: VR 4,5/1/12 15 Vac: VR 4,5/1/15 18 Vac: VR 4,5/1/18 24 Vac: VR 4,5/1/24	2x8 Vac: VR 4,5/2/8 2x9 Vac: VR 4,5/2/9 2x12 Vac: VR 4,5/2/12 2x15 Vac: VR 4,5/2/15 2x18 Vac: VR 4,5/2/18	8 Vac: VR 7,5/1/8 9 Vac: VR 7,5/1/9 12 Vac: VR 7,5/1/12 15 Vac: VR 7,5/1/15 18 Vac: VR 7,5/1/18 24 Vac: VR 7,5/1/24	2x8 Vac: VR 7,5/2/8 2x9 Vac: VR 7,5/2/9 2x12 Vac: VR 7,5/2/12 2x15 Vac: VR 7,5/2/15 2x18 Vac: VR 7,5/2/18	8 Vac: VR 13/1/8 9 Vac: VR 13/1/9 12 Vac: VR 13/1/12 15 Vac: VR 13/1/15 18 Vac: VR 13/1/18 24 Vac: VR 13/1/24	2x8 Vac: VR 13/2/8 2x9 Vac: VR 13/2/9 2x12 Vac: VR 13/2/12 2x15 Vac: VR 13/2/15 2x18 Vac: VR 13/2/18
Rated Power	4.5 VA	4.5 VA	7.5 VA	7.5 VA	13.0 VA	13.0 VA
No-load voltage (app. x factor)	1.27	1.27	1.18	1.18	1.19	1.19
No-load loss (typ.)	1.50 W	1.50 W	1.30 W	1.30 W	1.30 W	1.30 W
Efficiency	69 %	69 %	76 %	76 %	78 %	78 %
Standards						
Classification	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer
Approvals						
Approvals	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II	II	II
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Order numbers						
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

PCB transformer
VR

Electrical data

Type	VR 22/1/..	VR 22/2/..	VR 30/1/..	VR 30/2/..
Input				
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output				
Rated output voltage: Order no.	8 Vac: VR 22/1/8 9 Vac: VR 22/1/9 12 Vac: VR 22/1/12 15 Vac: VR 22/1/15 18 Vac: VR 22/1/18 24 Vac: VR 22/1/24	2x8 Vac: VR 22/2/8 2x9 Vac: VR 22/2/9 2x12 Vac: VR 22/2/12 2x15 Vac: VR 22/2/15 2x18 Vac: VR 22/2/18	8 Vac: VR 30/1/8 9 Vac: VR 30/1/9 12 Vac: VR 30/1/12 15 Vac: VR 30/1/15 18 Vac: VR 30/1/18 24 Vac: VR 30/1/24	2x8 Vac: VR 30/2/8 2x9 Vac: VR 30/2/9 2x12 Vac: VR 30/2/12 2x15 Vac: VR 30/2/15 2x18 Vac: VR 30/2/18
Rated Power	22.0 VA	22.0 VA	30.0 VA	30.0 VA
No-load voltage (app. x factor)	1.15	1.15	1.11	1.11
No-load loss (typ.)	2.40 W	2.40 W	2.50 W	2.50 W
Efficiency	80 %	80 %	84 %	84 %
Standards				
Classification	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer
Approvals				
Approvals	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)
Environment				
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C
Safety and protection				
Type	encapsulated	encapsulated	encapsulated	encapsulated
Class of Insulation System	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105	VDE=B, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Order numbers				
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

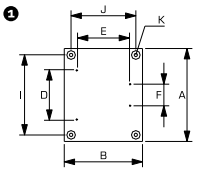
PCB transformer
VR

Mechanical data 30

Typ	Fixing method	Terminals	Pin (ø)	Core type	Weight	Dimension picture (in mm)	A	B	C	D	E	F	G	H	I	J	K
VR 4,5/1/..	Additional fixing by self-tapping screws	Pins for printed circuit boards	0.8 mm	EI 42/14,8	0.19 kg	1	44	37	33	25	25	15	-	5	35	28	2.5
VR 4,5/2/..	Additional fixing by self-tapping screws	Pins for printed circuit boards	0.8 mm	EI 42/14,8	0.19 kg	2	44	37	33	25	25	15	5	5	35	28	2.5
VR 7,5/1/..	Additional fixing by self-tapping screws	Pins for printed circuit boards	0.8 mm	EI 48/16,8	0.28 kg	1	51	43	36	25	27.5	15	-	5	40	32	2.5
VR 7,5/2/..	Additional fixing by self-tapping screws	Pins for printed circuit boards	0.8 mm	EI 48/16,8	0.28 kg	2	51	43	36	25	27.5	15	5	5	40	32	2.5
VR 13/1/..	Additional fixing by self-tapping screws	Pins for printed circuit boards	0.8 mm	EI 54/18,8	0.42 kg	1	56	47	40	30	30	20	-	5	47.5	37.5	2.5
VR 13/2/..	Additional fixing by self-tapping screws	Pins for printed circuit boards	0.8 mm	EI 54/18,8	0.42 kg	2	56	47	40	30	30	20	5	5	47.5	37.5	2.5
VR 22/1/..	Additional fixing by self-tapping screws	Pins for printed circuit boards	0.8 mm	EI 60/21	0.57 kg	1	64	54	46	30	32.5	10	-	5	52.5	40	2.5
VR 22/2/..	Additional fixing by self-tapping screws	Pins for printed circuit boards	0.8 mm	EI 60/21	0.57 kg	2	64	54	46	30	32.5	10	10	5	52.5	40	2.5
VR 30/1/..	Additional fixing by self-tapping screws	Pins for printed circuit boards	0.8 mm	EI 60/30,5	0.78 kg	1	64	54	55	30	32.5	10	-	5	52.5	40	2.5
VR 30/2/..	Additional fixing by self-tapping screws	Pins for printed circuit boards	0.8 mm	EI 60/30,5	0.78 kg	2	64	54	55	30	32.5	10	10	5	52.5	40	2.5

Dimension pictures

1



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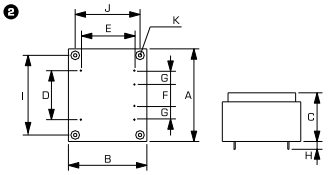


Short circuit proof PCB transformer
PT

General Data

Rated input voltage 230 Vac
Rated output voltage 6 - 2 x 24 Vac
Rated power 4.5 - 30 VA
Insulation class E
Maximum ambient temperature 40 °C
Efficiency up to 83 %
Degree of protection IP 00

Advantages

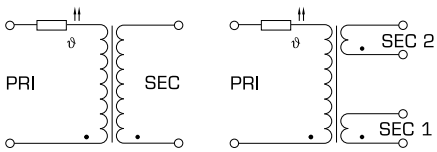
Minimum size at high output
Integrated overload protection using PTC in the input
Also with double output voltage for series or parallel connection
Permanent corrosion protection, high insulation value and maximum electrical reliability thanks to XtraDensiFill resin encapsulation
Coil shell in 2-chamber technology
Self-extinguishing potting material
Space saving installation thanks to additional screw mounting in the base plate

Applications

As a mains transformer for adjustment of the voltage and simple electrical isolation.

Safety transformer for the safe electrical isolation of the input and output sides. The transformer is suitable for creating SELV and PELV circuits because of the limit on the output voltage.

Circuit Diagram



Standards

Mains transformer
to: VDE 0570 Teil 2-1, DIN EN 61558-2-1, EN 61558-2-1, IEC 61558-2-1, UL 5085-1/-2, CSA 22.2 No.66

Safety isolating transformer
to: VDE 0570 Teil 2-6, DIN EN 61558-2-6, EN 61558-2-6, IEC 61558-2-6, UL 5085-1/-2, CSA 22.2 No.66

Certifications

ENEC 10 (VDE), UL 5085-1/-2, CSA 22.2 No.66

Short circuit proof PCB transformer
PT

Electrical data

Type	PT 4,5/1/..	PT 4,5/2/..	PT 7,5/1/..	PT 7,5/2/..	PT 13/1/..	PT 13/2/..
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage: Order no.	6 Vac: PT 4,5/1/6 8 Vac: PT 4,5/1/8 9 Vac: PT 4,5/1/9 12 Vac: PT 4,5/1/12 15 Vac: PT 4,5/1/15 18 Vac: PT 4,5/1/18 24 Vac: PT 4,5/1/24	2x6 Vac: PT 4,5/2/6 2x8 Vac: PT 4,5/2/8 2x9 Vac: PT 4,5/2/9 2x12 Vac: PT 4,5/2/12 2x15 Vac: PT 4,5/2/15 2x18 Vac: PT 4,5/2/18 2x24 Vac: PT 4,5/2/24*	6 Vac: PT 7,5/1/6 8 Vac: PT 7,5/1/8 9 Vac: PT 7,5/1/9 12 Vac: PT 7,5/1/12 15 Vac: PT 7,5/1/15 18 Vac: PT 7,5/1/18 24 Vac: PT 7,5/1/24	2x6 Vac: PT 7,5/2/6 2x8 Vac: PT 7,5/2/8 2x9 Vac: PT 7,5/2/9 2x12 Vac: PT 7,5/2/12 2x15 Vac: PT 7,5/2/15 2x18 Vac: PT 7,5/2/18 2x24 Vac: PT 7,5/2/24*	6 Vac: PT 13/1/6 8 Vac: PT 13/1/8 9 Vac: PT 13/1/9 12 Vac: PT 13/1/12 15 Vac: PT 13/1/15 18 Vac: PT 13/1/18 24 Vac: PT 13/1/24	2x6 Vac: PT 13/2/6 2x8 Vac: PT 13/2/8 2x9 Vac: PT 13/2/9 2x12 Vac: PT 13/2/12 2x15 Vac: PT 13/2/15 2x18 Vac: PT 13/2/18 2x24 Vac: PT 13/2/24*
Rated Power	4.5 VA	4.5 VA	7.5 VA	7.5 VA	13.0 VA	13.0 VA
No-load voltage (app. x factor)	1.32	1.32	1.21	1.21	1.23	1.23
No-load loss (typ.)	1.50 W	1.50 W	1.30 W	1.30 W	1.30 W	1.30 W
Efficiency	65 %	65 %	65 %	65 %	73 %	73 %
Standards						
Classification	Safety isolating transformer	Safety isolating transformer *Mains transformer (without VDE mark)	Safety isolating transformer	Safety isolating transformer *Mains transformer (without VDE mark)	Safety isolating transformer	Safety isolating transformer *Mains transformer (without VDE mark)
Approvals						
Approvals	cURus, ENEC (VDE)	cURus, ENEC (VDE)	cURus, ENEC (VDE)	cURus, ENEC (VDE)	cURus, ENEC (VDE)	cURus, ENEC (VDE)
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated
Class of Insulation System	VDE=E, UL=class 105	VDE=E, UL=class 105	VDE=E, UL=class 105	VDE=E, UL=class 105	VDE=E, UL=class 105	VDE=E, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II	II	II
Short circuit strength	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof
Order numbers						
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

Short circuit proof PCB transformer
PT

Electrical data

Type	PT 22/1/..	PT 22/2/..	PT 30/1/..	PT 30/2/..
Input				
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output				
Rated output voltage: Order no.	6 Vac: PT 22/1/6 8 Vac: PT 22/1/8 9 Vac: PT 22/1/9 12 Vac: PT 22/1/12 15 Vac: PT 22/1/15 18 Vac: PT 22/1/18 24 Vac: PT 22/1/24	2x6 Vac: PT 22/2/6 2x8 Vac: PT 22/2/8 2x9 Vac: PT 22/2/9 2x12 Vac: PT 22/2/12 2x15 Vac: PT 22/2/15 2x18 Vac: PT 22/2/18	6 Vac: PT 30/1/6 8 Vac: PT 30/1/8 9 Vac: PT 30/1/9 12 Vac: PT 30/1/12 15 Vac: PT 30/1/15 18 Vac: PT 30/1/18 24 Vac: PT 30/1/24	2x6 Vac: PT 30/2/6 2x8 Vac: PT 30/2/8 2x9 Vac: PT 30/2/9 2x12 Vac: PT 30/2/12 2x15 Vac: PT 30/2/15 2x18 Vac: PT 30/2/18
Rated Power	22.0 VA	22.0 VA	30.0 VA	30.0 VA
No-load voltage (app. x factor)	1.19	1.19	1.13	1.13
No-load loss (typ.)	2.40 W	2.40 W	2.30 W	2.30 W
Efficiency	77 %	77 %	83 %	83 %
Standards				
Classification	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer
Approvals				
Approvals	cURus, ENEC (VDE)	cURus, ENEC (VDE)	cURus, ENEC (VDE)	cURus, ENEC (VDE)
Environment				
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C
Safety and protection				
Type	encapsulated	encapsulated	encapsulated	encapsulated
Class of Insulation System	VDE=E, UL=class 105	VDE=E, UL=class 105	VDE=E, UL=class 105	VDE=E, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II
Short circuit strength	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof
Order numbers				
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

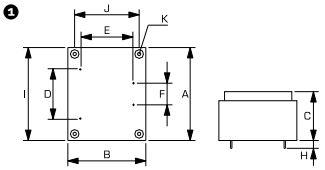
Short circuit proof PCB transformer
PT

30 Mechanical data

Typ	Terminals	Pin (ø)	Core type	Weight	Dimension picture (in mm)	A	B	C	D	E	F	G	H	I	J	K
PT 4,5/1/..	Pins for printed circuit boards	0.8 mm	EI 42/14,8	0.19 kg	❶	44	37	33	25	25	15	-	7	35	28	2.5
PT 4,5/2/..	Pins for printed circuit boards	0.8 mm	EI 42/14,8	0.19 kg	❷	44	37	33	25	25	15	5	7	35	28	2.5
PT 7,5/1/..	Pins for printed circuit boards	0.8 mm	EI 48/16,8	0.28 kg	❶	51	43	36	25	27.5	15	-	7	40	32	2.5
PT 7,5/2/..	Pins for printed circuit boards	0.8 mm	EI 48/16,8	0.28 kg	❷	51	43	36	25	27.5	15	5	7	40	32	2.5
PT 13/1/..	Pins for printed circuit boards	0.8 mm	EI 54/18,8	0.42 kg	❶	56	47	40	30	30	20	-	7	47.5	37.5	2.5
PT 13/2/..	Pins for printed circuit boards	0.8 mm	EI 54/18,8	0.42 kg	❷	56	47	40	30	30	20	5	7	47.5	37.5	2.5
PT 22/1/..	Pins for printed circuit boards	0.8 mm	EI 60/21	0.57 kg	❶	64	54	46	30	32.5	10	-	7	52.5	40	2.5
PT 22/2/..	Pins for printed circuit boards	0.8 mm	EI 60/21	0.57 kg	❷	64	54	46	30	32.5	10	10	7	52.5	40	2.5
PT 30/1/..	Pins for printed circuit boards	0.8 mm	EI 60/30,5	0.78 kg	❶	64	54	55	30	32.5	10	-	7	52.5	40	2.5
PT 30/2/..	Pins for printed circuit boards	0.8 mm	EI 60/30,5	0.78 kg	❷	64	54	55	30	32.5	10	10	7	52.5	40	2.5

Dimension pictures

❶



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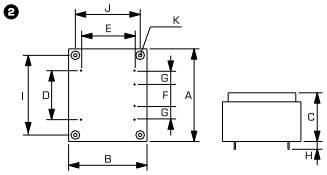
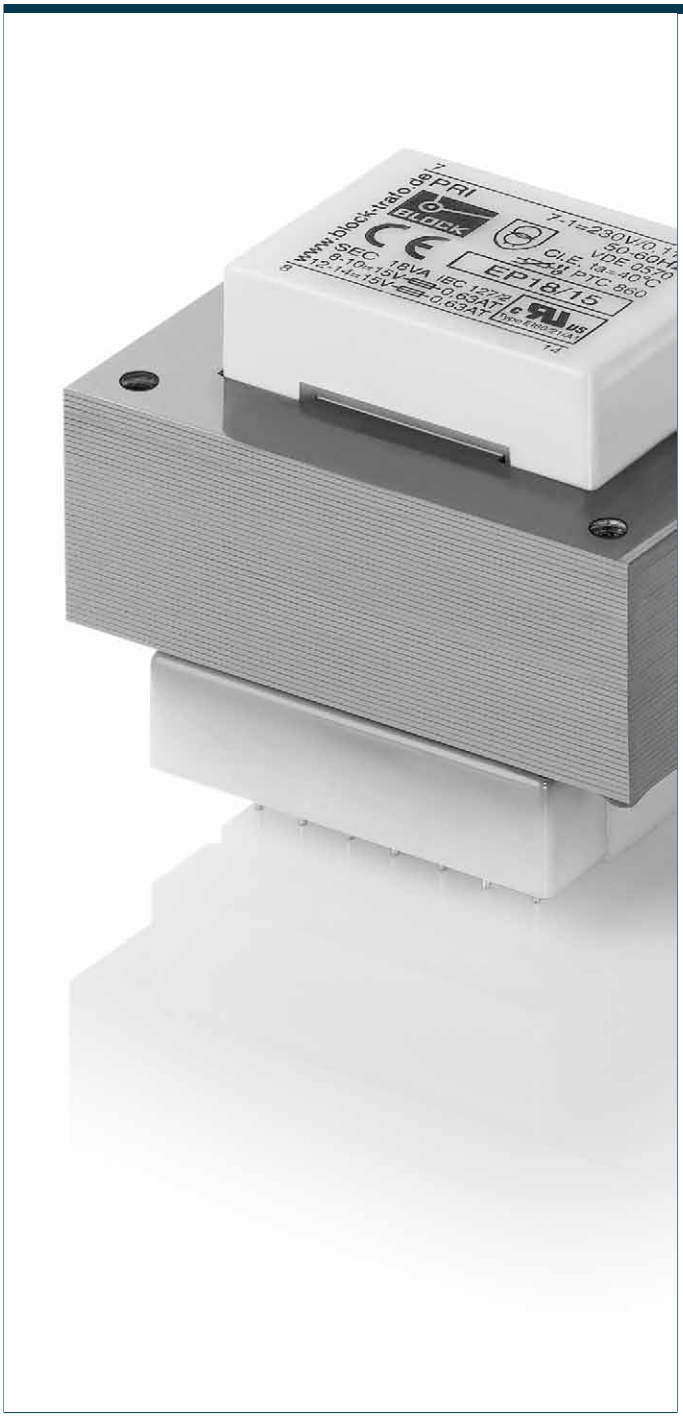


PCB transformer
EP



General Data

Rated input voltage 230 Vac
Rated output voltage 2 x 6 - 2 x 18 Vac
Rated power 2.5 - 35 VA
Insulation class E
Maximum ambient temperature 40 °C
Efficiency up to 79 %
Degree of protection IP 00

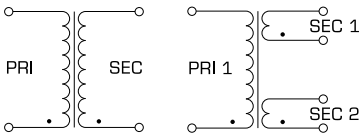
Advantages

Minimum size at high output
Double output voltage for series or parallel connection
Very good moisture protection and low noise thanks to BLOCKIMPEX vacuum impregnation
Encapsulated safety coil bodies in 2-chamber technology
Contact protected on the circuit board thanks to covered solder pin strips
Stable connection technology with injected round wire soldering pins
Additional mounting option with holes in the core

Applications

Safety isolating transformer for the safe electrical isolation of the input and output sides. The transformer is suitable for creating SELV and PELV circuits because of the limit on the output voltage.

Circuit Diagram



Standards

Safety isolating transformer
to: VDE 0570 Part 2-6, DIN EN 61558-2-6, EN 61558-2-6, IEC 61558-2-6

PCB transformer
EP

Electrical data

Type	EP 2,5/..	EP 4,5/..	EP 7,5/..	EP 13/..	EP 18/..	EP 28/..
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage: Order no.	2x6 Vac: EP 2,5/6 2x9 Vac: EP 2,5/9 2x12 Vac: EP 2,5/12	2x6 Vac: EP 4,5/6 2x9 Vac: EP 4,5/9 2x12 Vac: EP 4,5/12 2x15 Vac: EP 4,5/15	2x6 Vac: EP 7,5/6 2x9 Vac: EP 7,5/9 2x12 Vac: EP 7,5/12 2x15 Vac: EP 7,5/15 2x18 Vac: EP 7,5/18	2x6 Vac: EP 13/6 2x9 Vac: EP 13/9 2x12 Vac: EP 13/12 2x15 Vac: EP 13/15 2x18 Vac: EP 13/18	2x6 Vac: EP 18/6 2x9 Vac: EP 18/9 2x12 Vac: EP 18/12 2x15 Vac: EP 18/15 2x18 Vac: EP 18/18	2x6 Vac: EP 28/6 2x9 Vac: EP 28/9 2x12 Vac: EP 28/12 2x15 Vac: EP 28/15 2x18 Vac: EP 28/18
Rated Power	2.5 VA	4.5 VA	7.5 VA	13.0 VA	18.0 VA	28.0 VA
No-load voltage (app. x factor)	1.81	1.51	1.38	1.28	1.18	1.16
No-load loss (typ.)	1.00 W	1.90 W	2.00 W	2.20 W	2.70 W	3.10 W
Efficiency	47 %	56 %	62 %	67 %	72 %	77 %
Standards						
Classification	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	open type	open type	open type	open type	open type	open type
Class of Insulation System	E	E	E	E	E	E
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II	II	II
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Overload protection	Typ PTC 884 (Accessory - available on request)	Typ PTC 890 (Accessory - available on request)	Typ PTC 880 (Accessory - available on request)	Typ PTC 872 (Accessory - available on request)	Typ PTC 860 (Accessory - available on request)	Typ PTC 850 (Accessory - available on request)
Order numbers						
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

PCB transformer
EP

Electrical data

Type	EP 35/..
Input	
Rated input voltage	230 Vac
Rated frequency	50 - 60 Hz
Output	
Rated output voltage: Order no.	2x6 Vac: EP 35/6 2x9 Vac: EP 35/9 2x12 Vac: EP 35/12 2x15 Vac: EP 35/15 2x18 Vac: EP 35/18
Rated Power	35.0 VA
No-load voltage (app. x factor)	1.15
No-load loss (typ.)	3.90 W
Efficiency	79 %
Standards	
Classification	Safety isolating transformer
Environment	
Ambient temperature max.	40 °C
Safety and protection	
Type	open type
Class of Insulation System	E
Protection index	IP 00
Safety class (prepared)	II
Short circuit strength	non-short-circuit proof
Overload protection	Typ PTC 850 (Accessory - available on request)
Order numbers	
Order Number	**refer to rated output voltage**

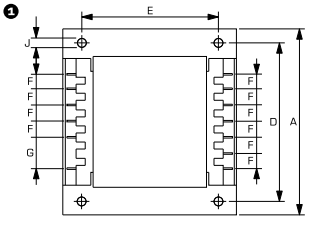
PCB transformer
EP

Mechanical data

Typ	Fixing method	Terminals	Core type	Weight	Dimension picture (in mm)	A	B	C	D	E	F	G	H	J	K	L	M
EP 2,5/..	Holes in the core package	Pins for printed circuit boards	EI 38/13,5	0.13 kg	1	38	38	27.5	-	-	5	10	25	-	4	0.8	-
EP 4,5/..	Holes in the core package	Pins for printed circuit boards	EI 42/14,8	0.16 kg	2	42	35.5	30	35	28	5	12.5	25	3.5	4	0.8	7.5
EP 7,5/..	Holes in the core package	Pins for printed circuit boards	EI 48/16,5	0.25 kg	1	48	43	35	40	32	5	10	27.5	3.5	4	0.8	-
EP 13/..	Holes in the core package	Pins for printed circuit boards	EI 54/18,8	0.35 kg	1	54	45	40	45	36	5	10	30	3.5	4	0.8	-
EP 18/..	Holes in the core package	Pins for printed circuit boards	EI 60/21	0.48 kg	1	60	50	43	50	40	5	10	32.5	3.5	4	0.8	-
EP 28/..	Holes in the core package	Pins for printed circuit boards	EI 60/30	0.66 kg	1	60	50	53	50	40	5	10	32.5	3.5	4	0.8	-
EP 35/..	Holes in the core package	Pins for printed circuit boards	EI 66/30,5	0.80 kg	1	66	55	55	55	44	5	10	35	4.5	4	0.8	-

Dimension pictures

1



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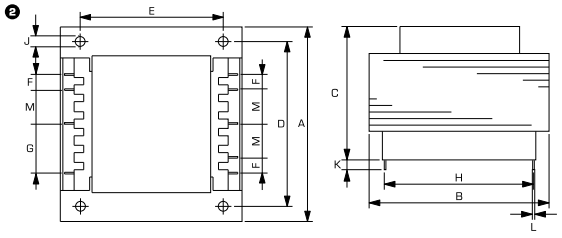
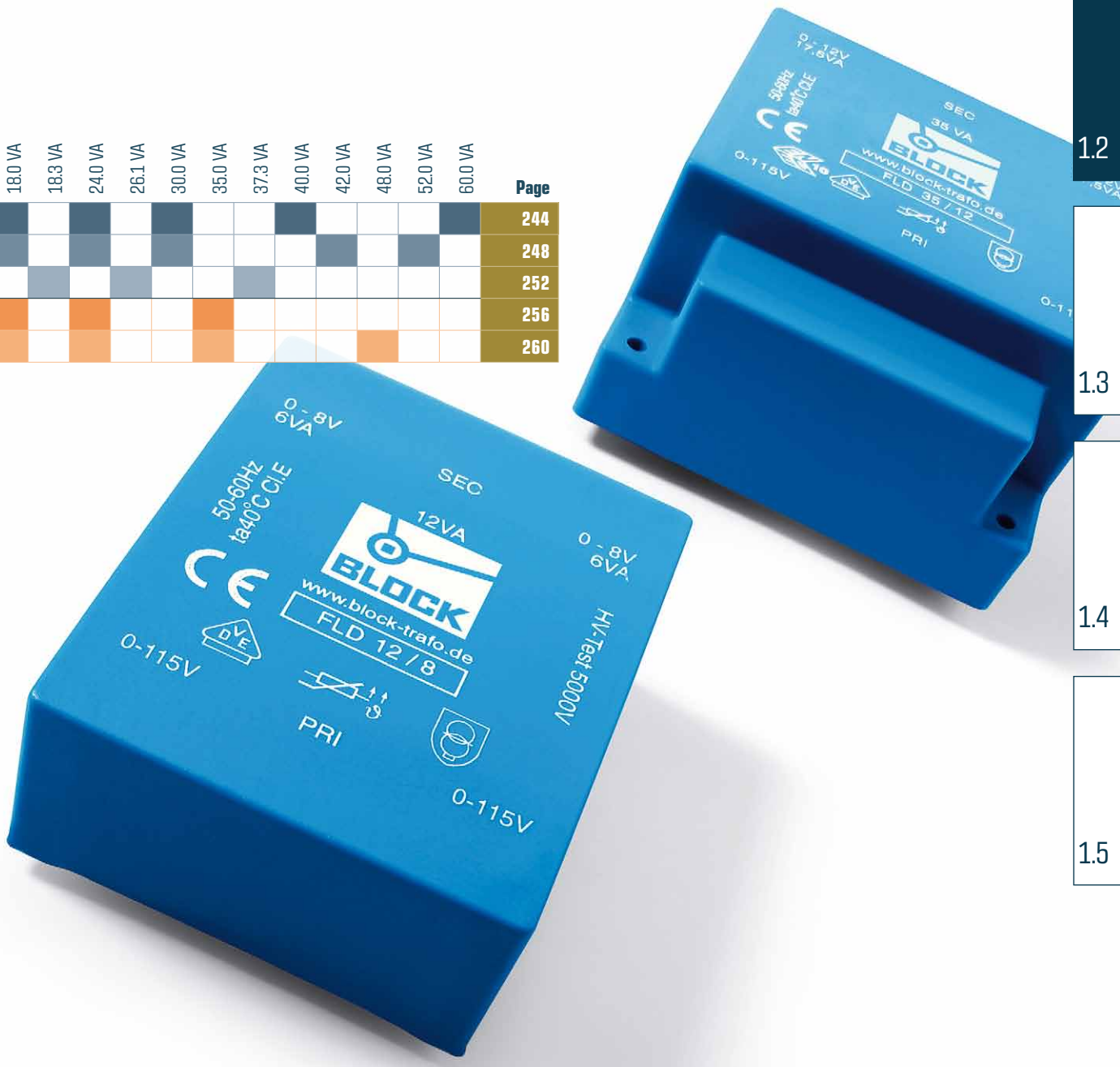


Overview
Low profile transformers

Power at a glance

Typ	Features	Rated input voltage	Rated output voltage	2.0 VA	3.0 VA	4.0 VA	4.3 VA	6.0 VA	7.0 VA	8.0 VA	10.0 VA	11.0 VA	12.0 VA	13.2 VA
FLN	double input voltage, ta 70° C Cl.B	2 x 115 Vac	2 x 6 - 2 x 21 Vac		■	■		■			■	■		
FL	double input voltage	2 x 115 Vac	2 x 5 - 2 x 24 Vac	■		■		■		■	■			
FL 14014	for triple voltage	2 x 115 Vac	9 and 14-0-14 Vac				■		■		■			■
FLE	short circuit proof	230 Vac	2 x 6 - 2 x 18 Vac			■		■					■	
FLD	double input voltage, short circuit proof	2 x 115 Vac	2 x 6 - 2 x 18 Vac			■		■					■	

14.0 VA	16.0 VA	18.0 VA	18.3 VA	24.0 VA	26.1 VA	30.0 VA	35.0 VA	37.3 VA	40.0 VA	42.0 VA	48.0 VA	52.0 VA	60.0 VA	Page
	■	■	■		■		■			■				■	244
	■		■		■		■				■		■		248
				■		■			■						252
			■		■			■							256
			■		■			■				■			260



Low profile transformer
FLN

General Data

Rated input voltage 2 x 115 Vac
Rated output voltage 2 x 6 - 2 x 21 Vac
Rated power 3 - 60 VA
Insulation class B
Maximum ambient temperature 70 °C
Efficiency up to 85 %
Degree of protection IP 00

Advantages

Minimum size at high output
Low height
Double input voltage for series or parallel connection
Double output voltage for series or parallel connection
Designed for high ambient temperatures
Permanent corrosion protection, high insulation value and maximum electrical reliability thanks to XtraDensiFill resin encapsulation
Coil shell in 2-chamber technology
Self-extinguishing potting material

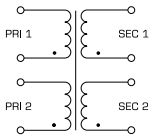
Applications

As a mains transformer for adjustment of the voltage and simple electrical isolation.

As an isolating transformer for the safe electrical isolation of the input and output sides. The transformer may be used to set up protective separation as a protective measure.

As a safety isolating transformer for the safe electrical isolation of the input and output sides. The transformer is suitable for creating SELV and PELV circuits because of the limit on the output voltage.

Circuit Diagram



Standards

Mains transformer
to: VDE 0570 Teil 2-1, DIN EN 61558-2-1, EN 61558-2-1, IEC 61558-2-1

Isolating transformer
to: VDE 0570 Part 2-4, DIN EN 61558-2-4, EN 61558-2-4, IEC 61558-2-4

Safety isolating transformer
to: VDE 0570 Part2-6, DIN EN 61558-2-6, EN 61558-2-6, IEC 61558-2-6

Low profile transformer
FLN

Electrical data

Type	FLN 3/..	FLN 4/..	FLN 6/..	FLN 10/..	FLN 11/..	FLN 14/..
Input						
Rated input Voltage	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage: Order no.	2x6 Vac: FLN 3/6 2x9 Vac: FLN 3/9 2x12 Vac: FLN 3/12 2x15 Vac: FLN 3/15 2x18 Vac: FLN 3/18* 2x21 Vac: FLN 3/21*	2x6 Vac: FLN 4/6 2x9 Vac: FLN 4/9 2x12 Vac: FLN 4/12 2x15 Vac: FLN 4/15 2x18 Vac: FLN 4/18* 2x21 Vac: FLN 4/21*	2x6 Vac: FLN 6/6 2x9 Vac: FLN 6/9 2x12 Vac: FLN 6/12 2x15 Vac: FLN 6/15 2x18 Vac: FLN 6/18* 2x21 Vac: FLN 6/21*	2x6 Vac: FLN 10/6 2x9 Vac: FLN 10/9 2x12 Vac: FLN 10/12 2x15 Vac: FLN 10/15 2x18 Vac: FLN 10/18* 2x21 Vac: FLN 10/21*	2x6 Vac: FLN 11/6 2x9 Vac: FLN 11/9 2x12 Vac: FLN 11/12 2x15 Vac: FLN 11/15 2x18 Vac: FLN 11/18* 2x21 Vac: FLN 11/21*	2x6 Vac: FLN 14/6 2x9 Vac: FLN 14/9 2x12 Vac: FLN 14/12 2x15 Vac: FLN 14/15 2x18 Vac: FLN 14/18* 2x21 Vac: FLN 14/21*
Rated Power	3.0 VA	4.0 VA	6.0 VA	10.0 VA	11.0 VA	14.0 VA
No-load voltage (app. x factor)	1.60	1.53	1.49	1.44	1.37	1.38
No-load loss (typ.)	2.40 W	0.85 W	0.75 W	1.60 W	1.00 W	2.00 W
Efficiency	50 %	58 %	62 %	63 %	66 %	67 %
Standards						
Classification	Safety isolating transformer *Mains transformer	Safety isolating transformer *Mains transformer	Safety isolating transformer *Mains transformer	Safety isolating transformer *Mains transformer	Safety isolating transformer *Mains transformer	Safety isolating transformer *Mains transformer
Approvals						
Approvals	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation
Environment						
Ambient temperature max.	70 °C	70 °C	70 °C	70 °C	70 °C	70 °C
Safety and protection						
Type	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated
Class of Insulation System	B	B	B	B	B	B
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II	II	II
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Order numbers						
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

Low profile transformer
FLN

Electrical data

Type	FLN 16/..	FLN 18/..	FLN 24/..	FLN 30/..	FLN 40/..	FLN 60/..
Input						
Rated input Voltage	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage: Order no.	2x6 Vac: FLN 16/6 2x9 Vac: FLN 16/9 2x12 Vac: FLN 16/12 2x15 Vac: FLN 16/15 2x18 Vac: FLN 16/18 2x21 Vac: FLN 16/21*	2x6 Vac: FLN 18/6 2x9 Vac: FLN 18/9 2x12 Vac: FLN 18/12 2x15 Vac: FLN 18/15 2x18 Vac: FLN 18/18 2x21 Vac: FLN 18/21*	2x6 Vac: FLN 24/6 2x9 Vac: FLN 24/9 2x12 Vac: FLN 24/12 2x15 Vac: FLN 24/15 2x18 Vac: FLN 24/18 2x21 Vac: FLN 24/21*	2x6 Vac: FLN 30/6 2x9 Vac: FLN 30/9 2x12 Vac: FLN 30/12 2x15 Vac: FLN 30/15 2x18 Vac: FLN 30/18 2x21 Vac: FLN 30/21**	2x6 Vac: FLN 40/6 2x9 Vac: FLN 40/9 2x12 Vac: FLN 40/12 2x15 Vac: FLN 40/15 2x18 Vac: FLN 40/18 2x21 Vac: FLN 40/21**	2x6 Vac: FLN 60/6 2x9 Vac: FLN 60/9 2x12 Vac: FLN 60/12 2x15 Vac: FLN 60/15 2x18 Vac: FLN 60/18 2x21 Vac: FLN 60/21**
Rated Power	16.0 VA	18.0 VA	24.0 VA	30.0 VA	40.0 VA	60.0 VA
No-load voltage (app. x factor)	1.26	1.35	1.26	1.19	1.20	1.12
No-load loss (typ.)	1.70 W	1.49 W	2.00 W	2.30 W	2.30 W	3.20 W
Efficiency	74 %	69 %	74 %	77 %	82 %	85 %
Standards						
Classification	Safety isolating transformer *Mains transformer	Safety isolating transformer *Mains transformer	Safety isolating transformer *Mains transformer	Safety isolating transformer **Isolating transformer	Safety isolating transformer **Isolating transformer	Safety isolating transformer **Isolating transformer
Approvals						
Approvals	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation	cURus in preparation, ENEC 10 (VDE) in preparation
Environment						
Ambient temperature max.	70 °C	70 °C	70 °C	70 °C	70 °C	70 °C
Safety and protection						
Type	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated
Class of Insulation System	B	B	B	B	B	B
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II	II	II
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Order numbers						
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

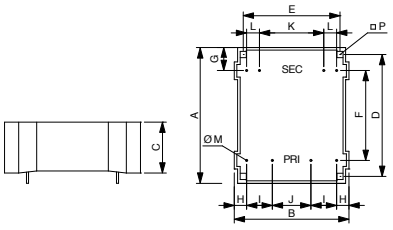
Low profile transformer
FLN

Mechanical data

Typ	Terminals	Core type	Weight	Dimension picture (in mm)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
FLN 3/..	Pins for printed circuit boards	UI 30/5,5	0.13 kg	1	53	44.2	17.8	47.5	37.5	35	9	4.6	10	15	25	5	0.8	-	-	2.4
FLN 4/..	Pins for printed circuit boards	UI 30/7,5	0.15 kg	1	53	44.2	19.8	47.5	37.5	35	9	4.6	10	15	25	5	0.8	-	-	2.4
FLN 6/..	Pins for printed circuit boards	UI 30/10,5	0.19 kg	1	53	44.2	22.8	47.5	37.5	35	9	4.6	10	15	25	5	0.8	-	-	2.4
FLN 10/..	Pins for printed circuit boards	UI 39/8	0.29 kg	2	68.2	57.3	23	62.5	50	45	11.5	5.6	15	16	26	10	0.8	-	-	2.4
FLN 11/..	Pins for printed circuit boards	UI 30/16	0.26 kg	1	53	44.2	28.8	47.5	37.5	35	9	4.6	10	15	25	5	0.8	-	-	2.4
FLN 14/..	Pins for printed circuit boards	UI 39/10,2	0.34 kg	2	68.2	57.3	25.2	62.5	50	45	11.5	5.6	15	16	26	10	0.8	-	-	2.4
FLN 16/..	Pins for printed circuit boards	UI 30/26	0.38 kg	1	53	44.2	37.6	47.5	37.5	35	9	4.6	10	15	25	5	0.8	-	-	2.4
FLN 18/..	Pins for printed circuit boards	UI 39/13,5	0.40 kg	2	68.2	57.3	28.5	62.5	50	45	11.5	5.6	15	16	26	10	0.8	-	-	2.4
FLN 24/..	Pins for printed circuit boards	UI 39/17	0.49 kg	2	68.2	57.3	32	62.5	50	45	11.5	5.6	15	16	26	10	0.8	-	-	2.4
FLN 30/..	Pins for printed circuit boards	UI 39/21	0.57 kg	2	68.2	57.3	36	62.5	50	45	11.5	5.6	15	16	26	10	0.8	-	-	2.4
FLN 40/..	Pins for printed circuit boards	UI 48/17	0.76 kg	3	83.7	70.6	38.7	75	60	53.5	15	6.8	15	27	37	10	-	0.5	1	3.3
FLN 60/..	Pins for printed circuit boards	UI 48/26	1.05 kg	3	83.7	70.6	47.9	75	60	53.5	15	6.8	15	27	37	10	-	0.5	1	3.3

Dimension pictures

1



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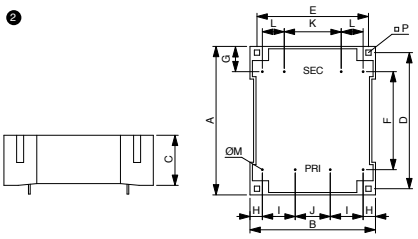

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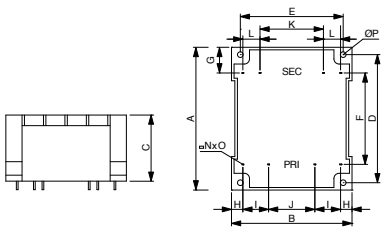


Low profile transformer
FL

General Data

Rated input voltage 2 x 115 Vac
Rated output voltage 2 x 5 - 2 x 24 Vac
Rated power 2 - 52 VA
Insulation class E
Maximum ambient temperature 40 °C
Efficiency up to 81 %
Degree of protection IP 00

Advantages

Minimum size at high output
Low height
Double input voltage for series or parallel connection
Double output voltage for series or parallel connection
Permanent corrosion protection, high insulation value and maximum electrical reliability thanks to XtraDensiFill resin encapsulation
Coil shell in 2-chamber technology
Self-extinguishing potting material

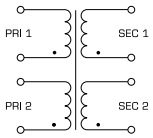
Applications

As a mains transformer for adjustment of the voltage and simple electrical isolation.

As an isolating transformer for the safe electrical isolation of the input and output sides. The transformer may be used to set up protective separation as a protective measure in accordance with VDE 0100.

As a safety isolating transformer for the safe electrical isolation of the input and output sides. The transformer is suitable for creating SELV and PELV circuits because of the limit on the output voltage.

Circuit Diagram



Standards

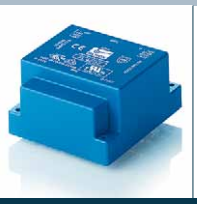
Mains transformer
to: VDE 0570 Teil 2-1, DIN EN 61558-2-1, EN 61558-2-1, IEC 61558-2-1, UL 5085-1/-2, CSA 22.2 No.66

Isolating transformer
to: VDE 0570 Part 2-4, DIN EN 61558-2-4, EN 61558-2-4, IEC 61558-2-4, UL 5085-1/-2, CSA 22.2 No.66

Safety isolating transformer
to: VDE 0570 Part 2-6, DIN EN 61558-2-6, EN 61558-2-6, IEC 61558-2-6, UL 5085-1/-2, CSA 22.2 No.66

Certifications

ENEC 10 (VDE), UL 5085-1/-2, CSA 22.2 No.66



Low profile transformer
FL

Electrical data

Type	FL 2/..	FL 4/..	FL 6/..	FL 8/..	FL 10/..	FL 14/..
Input						
Rated input Voltage	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage: Order no.	2x5 Vac: FL 2/5 2x6 Vac: FL 2/6 2x8 Vac: FL 2/8 2x9 Vac: FL 2/9 2x12 Vac: FL 2/12 2x15 Vac: FL 2/15 2x18 Vac: FL 2/18 2x24 Vac: FL 2/24*	2x5 Vac: FL 4/5 2x6 Vac: FL 4/6 2x8 Vac: FL 4/8 2x9 Vac: FL 4/9 2x12 Vac: FL 4/12 2x15 Vac: FL 4/15 2x18 Vac: FL 4/18 2x24 Vac: FL 4/24*	2x5 Vac: FL 6/5 2x6 Vac: FL 6/6 2x8 Vac: FL 6/8 2x9 Vac: FL 6/9 2x12 Vac: FL 6/12 2x15 Vac: FL 6/15 2x18 Vac: FL 6/18 2x24 Vac: FL 6/24*	2x6 Vac: FL 8/6 2x8 Vac: FL 8/8 2x9 Vac: FL 8/9 2x12 Vac: FL 8/12 2x15 Vac: FL 8/15 2x18 Vac: FL 8/18 2x24 Vac: FL 8/24*	2x5 Vac: FL 10/5 2x6 Vac: FL 10/6 2x8 Vac: FL 10/8 2x9 Vac: FL 10/9 2x12 Vac: FL 10/12 2x15 Vac: FL 10/15 2x18 Vac: FL 10/18 2x24 Vac: FL 10/24*	2x5 Vac: FL 14/5 2x6 Vac: FL 14/6 2x8 Vac: FL 14/8 2x9 Vac: FL 14/9 2x12 Vac: FL 14/12 2x15 Vac: FL 14/15 2x18 Vac: FL 14/18 2x24 Vac: FL 14/24*
Rated Power	2.0 VA	4.0 VA	6.0 VA	8.0 VA	10.0 VA	14.0 VA
No-load voltage (app. x factor)	1.35	1.35	1.35	1.22	1.32	1.28
No-load loss (typ.)	0.60 W	0.90 W	1.20 W	1.30 W	1.10 W	1.20 W
Efficiency	66 %	66 %	69 %	76 %	72 %	74 %
Standards						
Classification	Safety isolating transformer *Mains transformer (without VDE mark)	Safety isolating transformer *Mains transformer (without VDE mark)	Safety isolating transformer *Mains transformer (without VDE mark)	Safety isolating transformer *Mains transformer (without VDE mark)	Safety isolating transformer *Mains transformer (without VDE mark)	Safety isolating transformer *Mains transformer (without VDE mark)
Approvals						
Approvals	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated
Class of Insulation System	VDE=E, UL=class 105	VDE=E, UL=class 105	VDE=E, UL=class 105	VDE=E, UL=class 105	VDE=E, UL=class 105	VDE=E, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II	II	II
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Order numbers						
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

Low profile transformer
FL

Electrical data

Type	FL 18/..	FL 24/..	FL 30/..	FL 42/..	FL 52/..
Input					
Rated input Voltage	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output					
Rated output voltage: Order no.	2x5 Vac: FL 18/5 2x6 Vac: FL 18/6 2x8 Vac: FL 18/8 2x9 Vac: FL 18/9 2x12 Vac: FL 18/12 2x15 Vac: FL 18/15 2x18 Vac: FL 18/18 2x24 Vac: FL 18/24*	2x5 Vac: FL 24/5 2x6 Vac: FL 24/6 2x8 Vac: FL 24/8 2x9 Vac: FL 24/9 2x12 Vac: FL 24/12 2x15 Vac: FL 24/15 2x18 Vac: FL 24/18 2x24 Vac: FL 24/24*	2x5 Vac: FL 30/5 2x6 Vac: FL 30/6 2x8 Vac: FL 30/8 2x9 Vac: FL 30/9 2x12 Vac: FL 30/12 2x15 Vac: FL 30/15 2x18 Vac: FL 30/18 2x24 Vac: FL 30/24*	2x5 Vac: FL 42/5 2x6 Vac: FL 42/6 2x8 Vac: FL 42/8 2x9 Vac: FL 42/9 2x12 Vac: FL 42/12 2x15 Vac: FL 42/15 2x18 Vac: FL 42/18 2x24 Vac: FL 42/24**	2x5 Vac: FL 52/5 2x6 Vac: FL 52/6 2x8 Vac: FL 52/8 2x9 Vac: FL 52/9 2x12 Vac: FL 52/12 2x15 Vac: FL 52/15 2x18 Vac: FL 52/18 2x24 Vac: FL 52/24**
Rated Power	18.0 VA	24.0 VA	30.0 VA	42.0 VA	52.0 VA
No-load voltage (app. x factor)	1.22	1.20	1.17	1.16	1.12
No-load loss (typ.)	1.50 W	1.60 W	1.70 W	3.50 W	4.00 W
Efficiency	77 %	77 %	81 %	81 %	81 %
Standards					
Classification	Safety isolating transformer *Mains transformer (without VDE mark)	Safety isolating transformer *Mains transformer (without VDE mark)	Safety isolating transformer **isolating transformer (without VDE mark)	Safety isolating transformer **isolating transformer (without VDE mark)	Safety isolating transformer **isolating transformer (without VDE mark)
Approvals					
Approvals	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)
Environment					
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection					
Type	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated
Class of Insulation System	VDE=E, UL=class 105	VDE=E, UL=class 105	VDE=E, UL=class 105	VDE=E, UL=class 105	VDE=E, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II	II
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Order numbers					
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

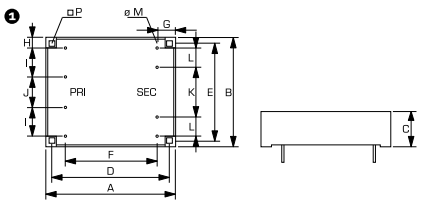
Low profile transformer
FL

Mechanical data

Typ	Terminals	Core type	Weight	Dimension picture (in mm)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
FL 2/..	Pins for printed circuit boards	UI 30/5,5	0.12 kg	1	53	44	17.6	47.5	37.5	35	9	4.5	10	15	25	5	0.8	-	-	2.5
FL 4/..	Pins for printed circuit boards	UI 30/7,5	0.15 kg	1	53	44	19.6	47.5	37.5	35	9	4.5	10	15	25	5	0.8	-	-	2.5
FL 6/..	Pins for printed circuit boards	UI 30/10,5	0.18 kg	1	53	44	22.6	47.5	37.5	35	9	4.5	10	15	25	5	0.8	-	-	2.5
FL 8/..	Pins for printed circuit boards	UI 30/16,5	0.25 kg	1	53	44	28.6	47.5	37.5	35	9	4.5	10	15	25	5	0.8	-	-	2.5
FL 10/..	Pins for printed circuit boards	UI 39/8	0.28 kg	1	68	57	22.8	62.5	50	45	11.5	5.5	15	16	26	10	0.8	-	-	2.5
FL 14/..	Pins for printed circuit boards	UI 39/10,2	0.32 kg	1	68	57	24.4	62.5	50	45	11.5	5.5	15	16	26	10	0.8	-	-	2.5
FL 18/..	Pins for printed circuit boards	UI 39/13,5	0.38 kg	1	68	57	27.6	62.5	50	45	11.5	5.5	15	16	26	10	0.8	-	-	2.5
FL 24/..	Pins for printed circuit boards	UI 39/17	0.45 kg	1	68	57	31.4	62.5	50	45	11.5	5.5	15	16	26	10	0.8	-	-	2.5
FL 30/..	Pins for printed circuit boards	UI 39/21	0.53 kg	1	68	57	35.8	62.5	50	45	11.5	5.5	15	16	26	10	0.8	-	-	2.5
FL 42/..	Pins for printed circuit boards	UI 48/17	0.72 kg	2	83.5	70	39	75	60	53.5	15	6.5	15	27	37	10	-	0.5	1	3.1
FL 52/..	Pins for printed circuit boards	UI 48/26	0.98 kg	2	86.5	70	49	75	60	53.5	16.5	6.5	15	27	37	10	-	0.5	1	3.1

Dimension pictures

1



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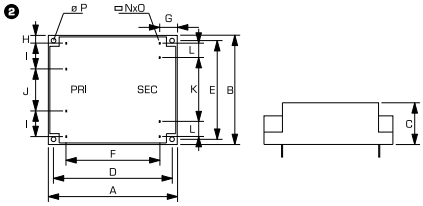


Low profile transformer for three-phase voltage power units
FL 14014

General Data

Rated input voltage 2 x 115 Vac
Rated output voltage I 9 Vac
Rated output voltage II 14.0-0-14.0 Vac
Rated power 4.34 - 37.3 VA
Insulation class E
Maximum ambient temperature 40 °C
Efficiency up to 78 %
Degree of protection IP 00

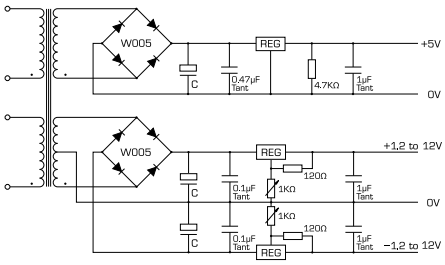
Advantages

Minimum size at high output
Low height
Double input voltage for series or parallel connection
Permanent corrosion protection, high insulation value and maximum electrical reliability thanks to XtraDensiFill resin encapsulation
Coil shell in 2-chamber technology
Self-extinguishing potting material

Applications

Safety isoalting transformer specially trimmed for building a DC supply (see sample application).

Anwendungsbeispiel



Standards

Safety isolating transformer
to: VDE 0570 Teil 2-6, DIN EN 61558-2-6, EN 61558-2-6, IEC 61558-2-6, UL 5085-1/-2, CSA 22.2 No.66

Certifications

ENEC 10 (VDE), UL 5085-1/-2, CSA 22.2 No.66

Low profile transformer for three-phase voltage power units
FL 14014

Electrical data

Type	FL 6/14014/9	FL 10/14014/9	FL 14/14014/9	FL 18/14014/9	FL 24/14014/9	FL 30/14014/9
Input						
Rated input Voltage	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated Output voltage I	9 Vac	9 Vac	9 Vac	9 Vac	9 Vac	9 Vac
Rated Output voltage II	14.0-0-14.0 Vac	14.0-0-14.0 Vac	14.0-0-14.0 Vac	14.0-0-14.0 Vac	14.0-0-14.0 Vac	14.0-0-14.0 Vac
Rated Power	4.34 VA	7.07 VA	10.03 VA	13.19 VA	18.30 VA	26.10 VA
Rated output current I	0.14 A	0.35 A	0.43 A	0.75 A	1.10 A	1.50 A
Rated output current II	0.11 A	0.14 A	0.22 A	0.23 A	0.30 A	0.45 A
Smoothing Cap. C SEC I	470 µF	1000 µF	1000 µF	2000 µF	4700 µF	4700 µF
Smoothing Cap. C SEC II	2 x 220 µF	2 x 220 µF	2 x 220 µF	2 x 220 µF	2 x 1000 µF	2 x 1000 µF
No-load voltage (app. x factor)	1.33	1.32	1.28	1.26	1.22	1.25
No-load loss (typ.)	1.20 W	1.20 W	1.40 W	1.40 W	1.80 W	2.20 W
Regulator Reference SEC I	7805	7805	7805	7805	7805	7805
Regulator Reference SEC II	317L,337LZ	317L,337LZ	317L,337LZ	317L,337LZ	317L,337LZ	317L,337LZ
Efficiency	68 %	71 %	72 %	74 %	76 %	77 %
Standards						
Classification	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer
Approvals						
Approvals	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)	cURus, ENEC 10 (VDE)
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated
Class of Insulation System	VDE=E, UL=class 105	VDE=E, UL=class 105	VDE=E, UL=class 105	VDE=E, UL=class 105	VDE=E, UL=class 105	VDE=E, UL=class 105
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II	II	II
Short circuit strength	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof	non-short-circuit proof
Order numbers						
Order Number	**FL 6/14014/9**	**FL 10/14014/9**	**FL 14/14014/9**	**FL 18/14014/9**	**FL 24/14014/9**	**FL 30/14014/9**

Low profile transformer for three-phase voltage power units
FL 14014

Electrical data

Type	FL 42/14014/9
Input	
Rated input Voltage	2 x 115 Vac
Rated frequency	50 - 60 Hz
Output	
Rated Output voltage I	9 Vac
Rated Output voltage II	14.0-0-14.0 Vac
Rated Power	37.30 VA
Rated output current I	1.50 A
Rated output current II	0.85 A
Smoothing Cap. C SEC I	4700 µF
Smoothing Cap. C SEC II	2 x 1000 µF
No-load voltage (app. x factor)	1.24
No-load loss (typ.)	3.80 W
Regulator Reference SEC I	7805
Regulator Reference SEC II	317L,337LZ
Efficiency	78 %
Standards	
Classification	Safety isolating transformer
Approvals	
Approvals	cURus, ENEC 10 (VDE)
Environment	
Ambient temperature max.	40 °C
Safety and protection	
Type	encapsulated
Class of Insulation System	VDE=E, UL=class 105
Protection index	IP 00
Safety class (prepared)	II
Short circuit strength	non-short-circuit proof
Order numbers	
Order Number	**FL 42/14014/9**

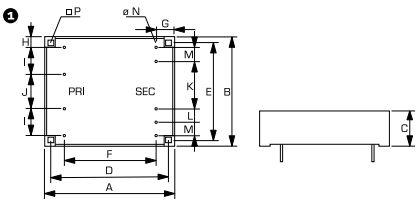
Low profile transformer for three-phase voltage power units
FL 14014

Mechanical data

Typ	Terminals	Weight	Dimension picture (in mm)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
FL 6/14014/9	Pins for printed circuit boards	0.18 kg	1	53	44	22.6	47.5	37.5	35	9	4.5	10	15	20	5	5	0.8	-	2.5
FL 10/14014/9	Pins for printed circuit boards	0.28 kg	1	68	57	22.8	62.5	50	45	11.5	5.5	15	16	30	5	5	0.8	-	2.5
FL 14/14014/9	Pins for printed circuit boards	0.32 kg	1	68	57	24.4	62.5	50	45	11.5	5.5	15	16	30	5	5	0.8	-	2.5
FL 18/14014/9	Pins for printed circuit boards	0.38 kg	1	68	57	27.6	62.5	50	45	11.5	5.5	15	16	30	5	5	0.8	-	2.5
FL 24/14014/9	Pins for printed circuit boards	0.45 kg	1	68	57	31.4	62.5	50	45	11.5	5.5	15	16	30	5	5	0.8	-	2.5
FL 30/14014/9	Pins for printed circuit boards	0.53 kg	1	68	57	35.8	62.5	50	45	11.5	5.5	15	16	30	5	5	0.8	-	2.5
FL 42/14014/9	Pins for printed circuit boards	0.72 kg	2	83.5	70	39	75	60	52.5	15	6.5	15	27	32	5	10	0.5	1	3.1

Dimension pictures

1



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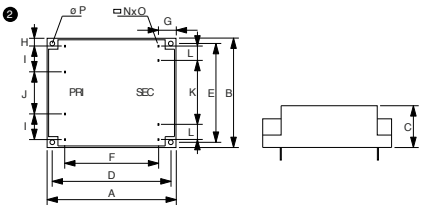


Short circuit proof low profile transformer
FLE

General Data

Rated input voltage 230 Vac
Rated output voltage 2 x 6 - 2 x 18 Vac
Rated power 4 - 35 VA
Insulation class E
Maximum ambient temperature 40 °C
Efficiency up to 78 %
Degree of protection IP 00

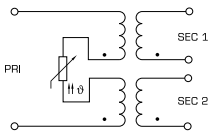
Advantages

Minimum size at high output
Low height
Integrated overload protection using PTC in the input
Double output voltage for series or parallel connection
Permanent corrosion protection, high insulation value and maximum electrical reliability thanks to XtraDensiFill resin encapsulation
Coil shell in 2-chamber technology
Self-extinguishing potting material

Applications

As a safety isolating transformer for the safe electrical isolation of the input and output sides. The transformer is suitable for creating SELV and PELV circuits because of the limit on the output voltage.

Circuit Diagram



Standards

Safety isolating transformer
to: VDE 0570 Part 2-6, DIN EN 61558-2-6, EN 61558-2-6, IEC 61558-2-6

Certifications

ENEC 10 (VDE)

Short circuit proof low profile transformer
FLE

Electrical data

Type	FLE 4/..	FLE 6/..	FLE 12/..	FLE 18/..	FLE 24/..	FLE 35/..
Input						
Rated input voltage	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac	230 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage: Order no.	2x6 Vac: FLE 4/6 2x8 Vac: FLE 4/8 2x9 Vac: FLE 4/9 2x12 Vac: FLE 4/12 2x15 Vac: FLE 4/15 2x18 Vac: FLE 4/18	2x6 Vac: FLE 6/6 2x8 Vac: FLE 6/8 2x9 Vac: FLE 6/9 2x12 Vac: FLE 6/12 2x15 Vac: FLE 6/15 2x18 Vac: FLE 6/18	2x6 Vac: FLE 12/6 2x8 Vac: FLE 12/8 2x9 Vac: FLE 12/9 2x12 Vac: FLE 12/12 2x15 Vac: FLE 12/15 2x18 Vac: FLE 12/18	2x6 Vac: FLE 18/6 2x8 Vac: FLE 18/8 2x9 Vac: FLE 18/9 2x12 Vac: FLE 18/12 2x15 Vac: FLE 18/15 2x18 Vac: FLE 18/18	2x6 Vac: FLE 24/6 2x8 Vac: FLE 24/8 2x9 Vac: FLE 24/9 2x12 Vac: FLE 24/12 2x15 Vac: FLE 24/15 2x18 Vac: FLE 24/18	2x6 Vac: FLE 35/6 2x8 Vac: FLE 35/8 2x9 Vac: FLE 35/9 2x12 Vac: FLE 35/12 2x15 Vac: FLE 35/15 2x18 Vac: FLE 35/18
Rated Power	4.0 VA	6.0 VA	12.0 VA	18.0 VA	24.0 VA	35.0 VA
No-load voltage (app. x factor)	1.37	1.33	1.31	1.30	1.25	1.20
No-load loss (typ.)	0.80 W	1.30 W	1.80 W	2.00 W	2.90 W	3.20 W
Efficiency	70 %	72 %	73 %	75 %	75 %	78 %
Standards						
Classification	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer
Approvals						
Approvals	ENEC 10 (VDE)	ENEC 10 (VDE)	ENEC 10 (VDE)	ENEC 10 (VDE)	ENEC 10 (VDE)	ENEC 10 (VDE)
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated
Class of Insulation System	E	E	E	E	E	E
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II	II	II
Short circuit strength	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof
Order numbers						
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

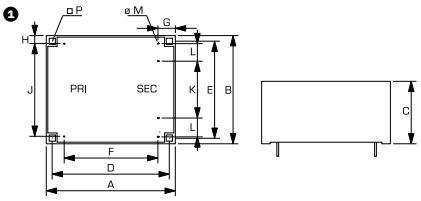
Short circuit proof low profile transformer
FLE

30 Mechanical data

Typ	Terminals	Core type	Weight	Dimension picture (in mm)	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P
FLE 4/..	Pins for printed circuit boards	UI 30/10,5	0.18 kg	1	53	44	22.6	47.5	37.5	35	9	4.5	35	25	5	0.8	-	-	2.5
FLE 6/..	Pins for printed circuit boards	UI 30/16,5	0.25 kg	1	53	44	28.6	47.5	37.5	35	9	4.5	35	25	5	0.8	-	-	2.5
FLE 12/..	Pins for printed circuit boards	UI 39/13,5	0.37 kg	1	68	57	27.6	62.5	50	45	11.5	5.5	46	26	10	0.8	-	-	2.5
FLE 18/..	Pins for printed circuit boards	UI 39/17,0	0.45 kg	1	68	57	31.4	62.5	50	45	11.5	5.5	46	26	10	0.8	-	-	2.5
FLE 24/..	Pins for printed circuit boards	UI 39/21	0.53 kg	1	68	57	35.8	62.5	50	45	11.5	5.5	46	26	10	0.8	-	-	2.5
FLE 35/..	Pins for printed circuit boards	UI 48/17,0	0.74 kg	2	83.5	70	39	75	60	53.5	15	6.5	57	37	10	-	0.5	1	3

Dimension pictures

1



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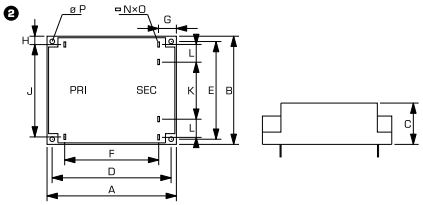
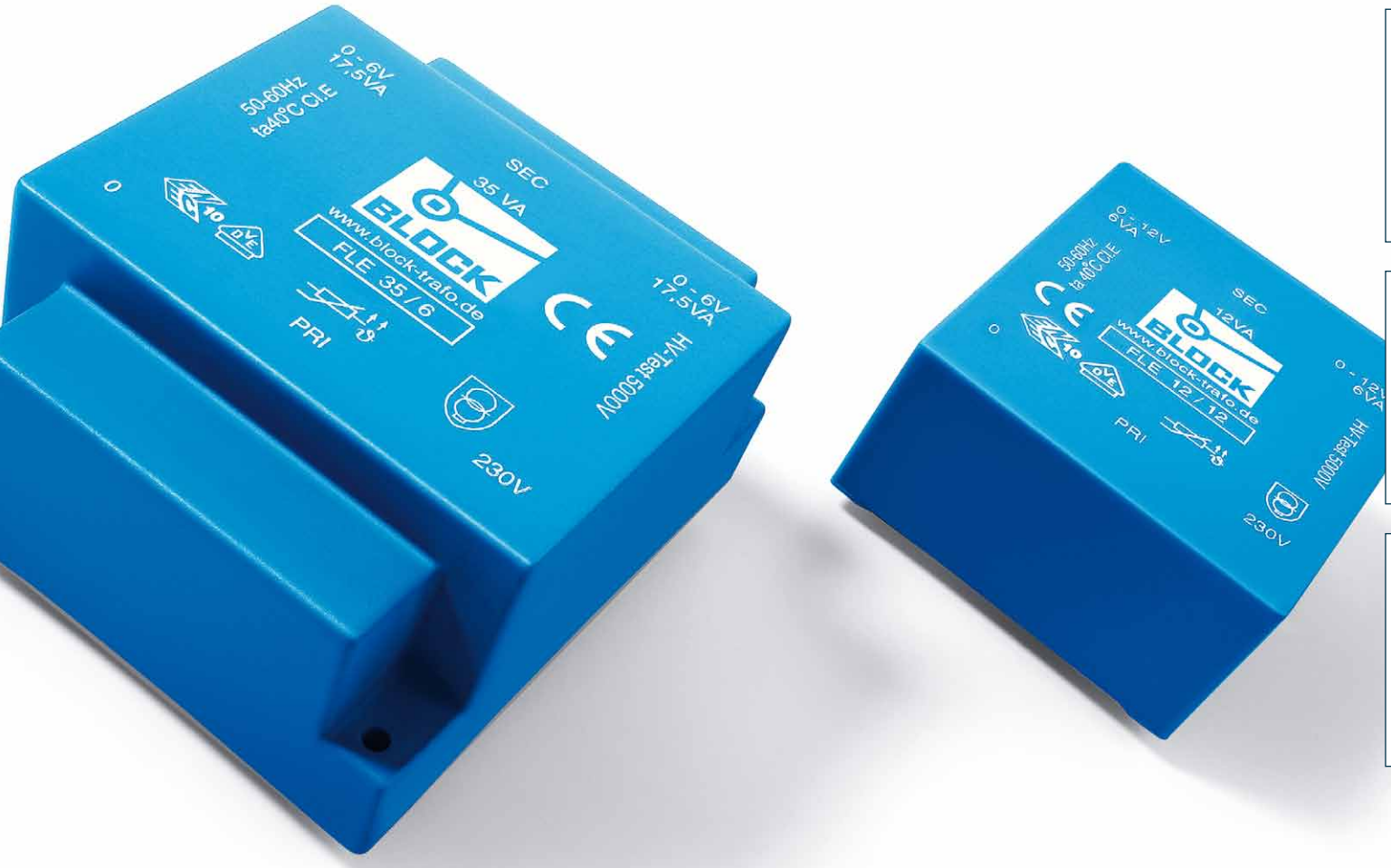



0 - 6V
17.5VA
50-60Hz
ta 40°C Cl.E
0
SEC
35 VA
BLOCK
www.block-trafo.de
FLE 35 / 6
PRI
230V
HV-Test 5000V
0 - 6V
17.5VA
0 - 6V
6VA 12V
50-60Hz
ta 40°C Cl.E
SEC
12VA
BLOCK
www.block-trafo.de
FLE 12 / 12
PRI
230V
HV-Test 5000V
0 - 6V
6VA

Short circuit proof low profile transformer
FLD

General Data

Rated input voltage 2 x 115 Vac
Rated output voltage 2 x 6 - 2 x 18 Vac
Rated power 4 - 48 VA
Insulation class E
Maximum ambient temperature 40 °C
Efficiency up to 79 %
Degree of protection IP 00

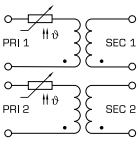
Advantages

Minimum size at high output
Low height
Integrated overload protection using PTC in the input
Double input voltage for series or parallel connection
Double output voltage for series or parallel connection
Permanent corrosion protection, high insulation value and maximum electrical reliability thanks to XtraDensiFill resin encapsulation
Coil shell in 2-chamber technology
Self-extinguishing potting material

Applications

As a safety isolating transformer for the safe electrical isolation of the input and output sides. The transformer is suitable for creating SELV and PELV circuits because of the limit on the output voltage.

Circuit Diagram

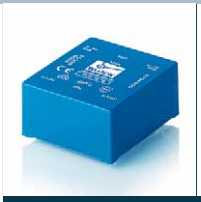


Standards

Safety isolating transformer
to: VDE 0570 Part 2-6, DIN EN 61558-2-6, EN 61558-2-6, IEC 61558-2-6

Certifications

ENEC 10 (VDE)



Short circuit proof low profile transformer
FLD

Electrical data

Type	FLD 4/..	FLD 6/..	FLD 12/..	FLD 18/..	FLD 24/..	FLD 35/..
Input						
Rated input Voltage	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac	2 x 115 Vac
Rated frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Output						
Rated output voltage: Order no.	2x6 Vac: FLD 4/6 2x8 Vac: FLD 4/8 2x9 Vac: FLD 4/9 2x12 Vac: FLD 4/12 2x15 Vac: FLD 4/15 2x18 Vac: FLD 4/18	2x6 Vac: FLD 6/6 2x8 Vac: FLD 6/8 2x9 Vac: FLD 6/9 2x12 Vac: FLD 6/12 2x15 Vac: FLD 6/15 2x18 Vac: FLD 6/18	2x6 Vac: FLD 12/6 2x8 Vac: FLD 12/8 2x9 Vac: FLD 12/9 2x12 Vac: FLD 12/12 2x15 Vac: FLD 12/15 2x18 Vac: FLD 12/18	2x6 Vac: FLD 18/6 2x8 Vac: FLD 18/8 2x9 Vac: FLD 18/9 2x12 Vac: FLD 18/12 2x15 Vac: FLD 18/15 2x18 Vac: FLD 18/18	2x6 Vac: FLD 24/6 2x8 Vac: FLD 24/8 2x9 Vac: FLD 24/9 2x12 Vac: FLD 24/12 2x15 Vac: FLD 24/15 2x18 Vac: FLD 24/18	2x6 Vac: FLD 35/6 2x8 Vac: FLD 35/8 2x9 Vac: FLD 35/9 2x12 Vac: FLD 35/12 2x15 Vac: FLD 35/15 2x18 Vac: FLD 35/18
Rated Power	4.0 VA	6.0 VA	12.0 VA	18.0 VA	24.0 VA	35.0 VA
No-load voltage (app. x factor)	1.37	1.33	1.31	1.30	1.25	1.20
No-load loss (typ.)	0.80 W	1.30 W	1.80 W	2.00 W	2.90 W	3.20 W
Efficiency	70 %	72 %	73 %	75 %	75 %	78 %
Standards						
Classification	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer	Safety isolating transformer
Approvals						
Approvals	ENEC 10 (VDE)	ENEC 10 (VDE)	ENEC 10 (VDE)	ENEC 10 (VDE)	ENEC 10 (VDE)	ENEC 10 (VDE)
Environment						
Ambient temperature max.	40 °C	40 °C	40 °C	40 °C	40 °C	40 °C
Safety and protection						
Type	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated	encapsulated
Class of Insulation System	E	E	E	E	E	E
Protection index	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Safety class (prepared)	II	II	II	II	II	II
Short circuit strength	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof	non-inherently short-circuit proof
Order numbers						
Order Number	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**	**refer to rated output voltage**

Short circuit proof low profile transformer
FLD

Electrical data

Type	FLD 48/..
Input	
Rated input Voltage	2 x 115 Vac
Rated frequency	50 - 60 Hz
Output	
Rated output voltage: Order no.	2x6 Vac: FLD 48/6 2x8 Vac: FLD 48/8 2x9 Vac: FLD 48/9 2x12 Vac: FLD 48/12 2x15 Vac: FLD 48/15 2x18 Vac: FLD 48/18
Rated Power	48.0 VA
No-load voltage (app. x factor)	1.20
No-load loss (typ.)	4.50 W
Efficiency	79 %
Standards	
Classification	Safety isolating transformer
Approvals	
Approvals	ENEC 10 (VDE)
Environment	
Ambient temperature max.	40 °C
Safety and protection	
Type	encapsulated
Class of Insulation System	E
Protection index	IP 00
Safety class (prepared)	II
Short circuit strength	non-inherently short-circuit proof
Order numbers	
Order Number	**refer to rated output voltage**

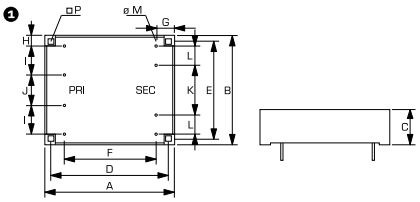
Short circuit proof low profile transformer
FLD

Mechanical data

Typ	Terminals	Core type	Weight	Dimension picture (in mm)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
FLD 4/..	Pins for printed circuit boards	UI 30/10,5	0.18 kg	1	53	44	22.6	47.5	37.5	35	9	4.5	10	15	25	5	0.8	-	-	2.5
FLD 6/..	Pins for printed circuit boards	UI 30/16,5	0.25 kg	1	53	44	28.6	47.5	37.5	35	9	4.5	10	15	25	5	0.8	-	-	2.5
FLD 12/..	Pins for printed circuit boards	UI 39/13,5	0.37 kg	1	68	57	27.6	62.5	50	45	11.5	5.5	15	16	26	10	0.8	-	-	2.5
FLD 18/..	Pins for printed circuit boards	UI 39/17,0	0.45 kg	1	68	57	31.4	62.5	50	45	11.5	5.5	15	16	26	10	0.8	-	-	2.5
FLD 24/..	Pins for printed circuit boards	UI 39/21,0	0.53 kg	1	68	57	35.8	62.5	50	45	11.5	5.5	15	16	26	10	0.8	-	-	2.5
FLD 35/..	Pins for printed circuit boards	UI 48/17,0	0.74 kg	2	83.5	70	39	75	60	53.5	15	6.5	15	27	37	10	-	0.5	1	3
FLD 48/..	Pins for printed circuit boards	UI 48/26,0	1.02 kg	2	86.5	70	49	75	60	53	17	6.5	15	27	37	10	-	0.5	1	3

Dimension pictures

1



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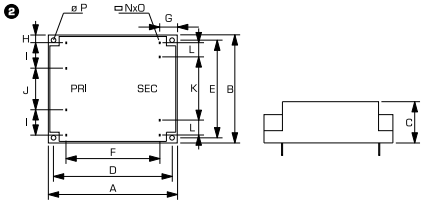
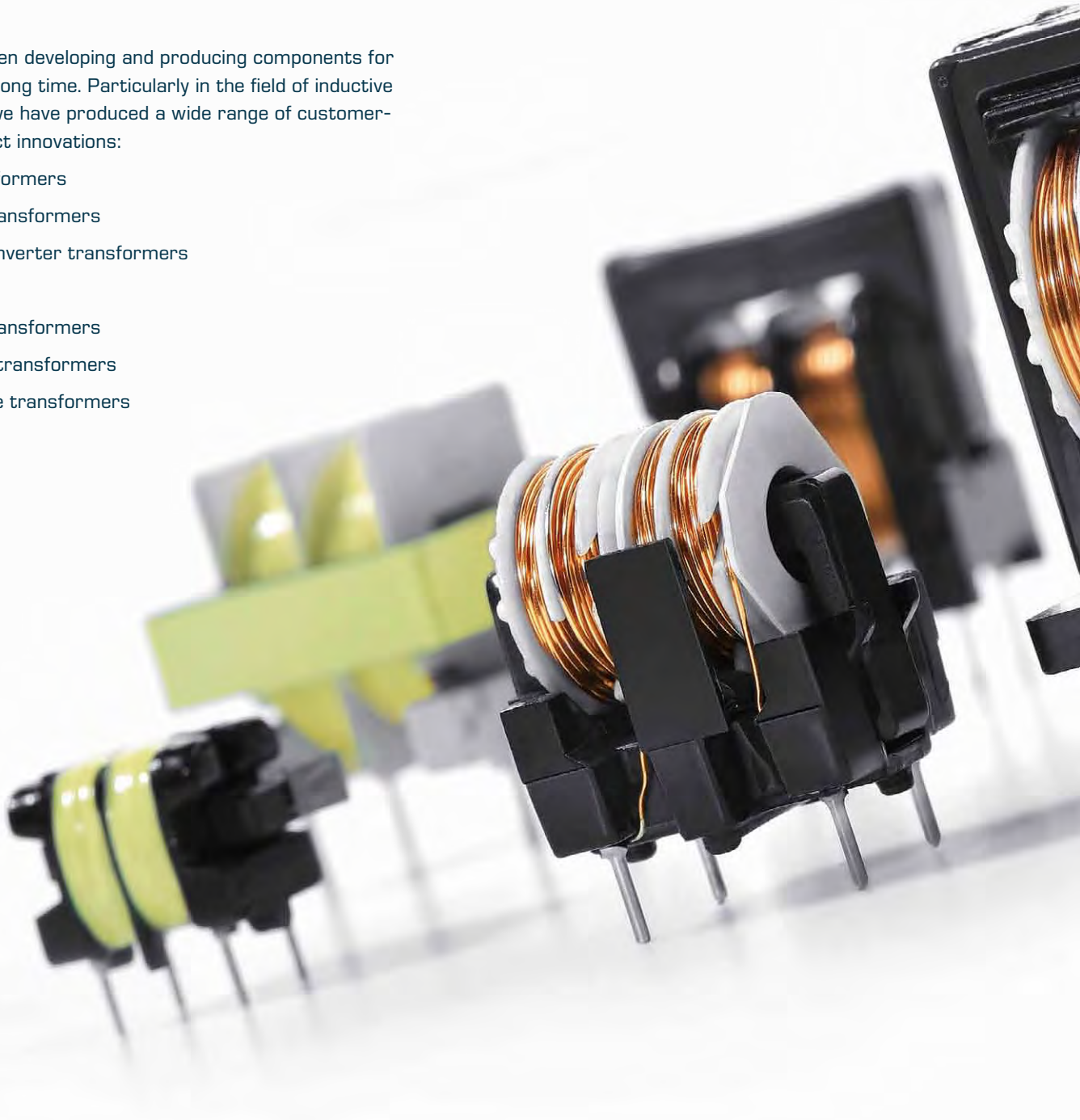
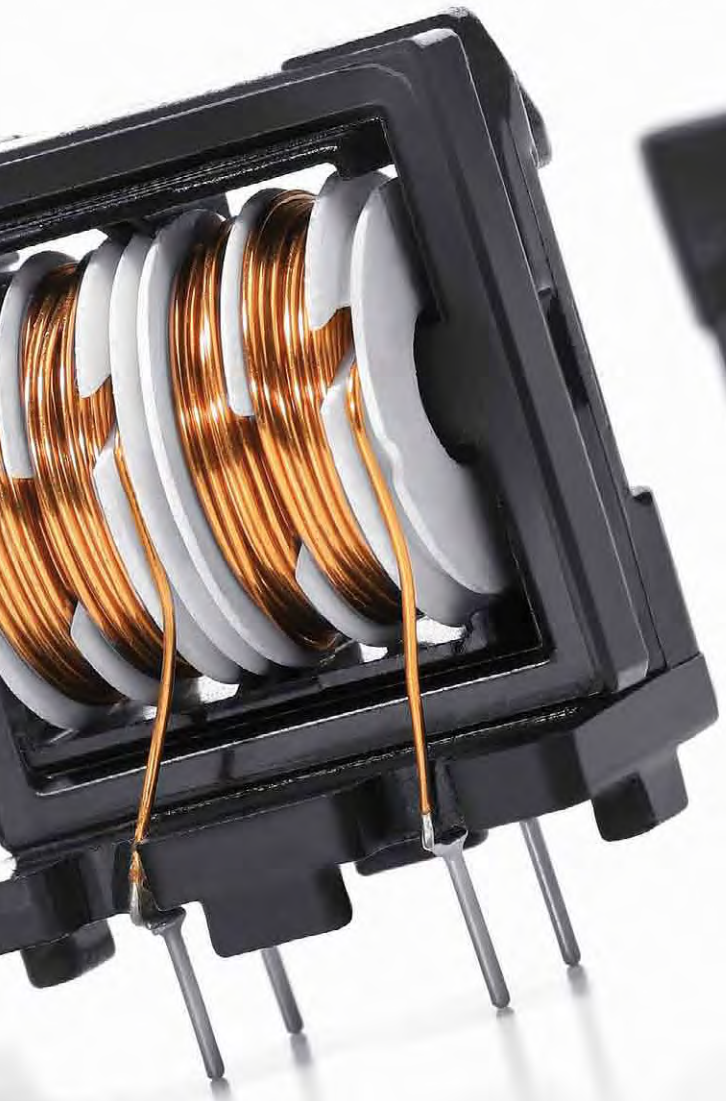


Inductive components

BLOCK has been developing and producing components for industry for a long time. Particularly in the field of inductive components, we have produced a wide range of customer-specific product innovations:

- Drive transformers
- Backlight transformers
- Forward converter transformers
- RFI chokes
- Push-pull transformers
- Half-bridge transformers
- High-voltage transformers



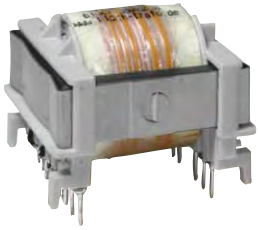


- Series inductors
- Iron powder core chokes
- PFC reactors
- SMPS transformers
- Storage reactors
- Flyback transformers
- Current-compensated chokes up to 320 A
- Current sensors
- Current converters
- TinySwitch transformers
- TOPSwitch transformers
- Full-bridge transformers

BLOCK CUSTOM MADE

Components for switched mode power supplies

Push-pull transformer



- Input voltages up to 10 kVac
- Output voltages up to 10 kVac
- Power up to 100 kW
- Frequencies up to 300 kHz
- Core forms E, ETD, EFD, PQ etc.
- UL-insulating system Class B, Class F

Sample data

Input rated voltage 400 Vac	Switching 66 kHz
Output rated voltage 14 Vac	Core size ETD 39
Power 280 W	Standard EN 60950
Inductance 4,26 mH	

RFI chokes

Current compensated ring core choke

- Current compensated chokes
- Linear series chokes
- Ring core chokes
- Rod core chokes
- UL-insulating system Class B, Class F

Sample data

Rated voltage 250 Vac	Inductance 2 x 3,3 mH
Rated current 4 A	Standard EN 61558

BLOCK experience

When it comes to inductive components you will find BLOCK an efficient partner. The smallest batches or large-scale production are our strength. Alongside product performance in the smallest spaces and precision workmanship, the following market requirements are also increasing:

- Environmental sustainability
- Recyclable
- The latest quality standards
- EMC guidelines

Storage reactors

Step down storage choke

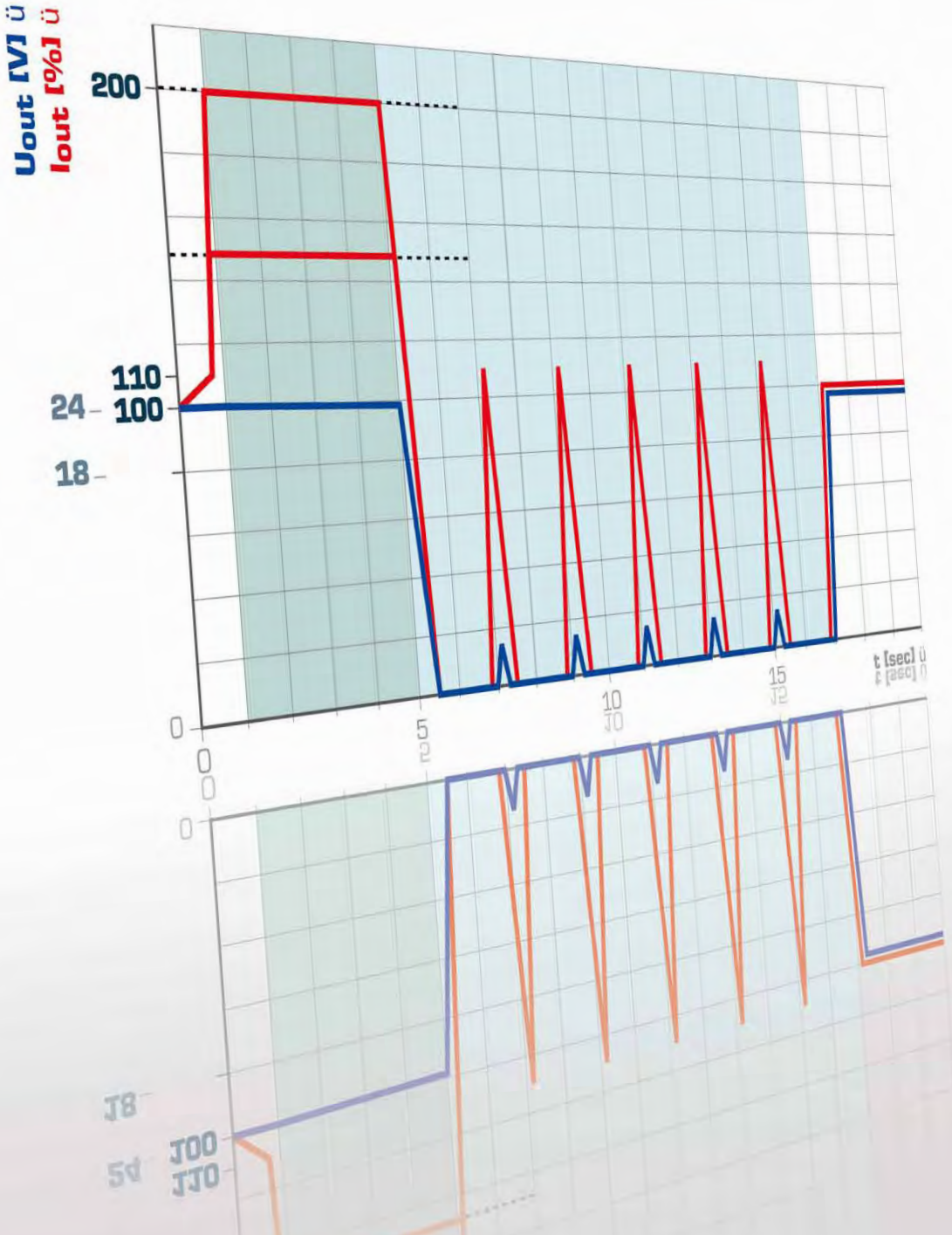
- Input voltages up to 10 kVac
- Output voltages up to 10 kVac
- Power up to 100 kW
- Core materials e.g. Ferrit, Iron powder
- Core forms E, ETD, EFD, PQ etc.
- UL-insulating system Class B, Class F

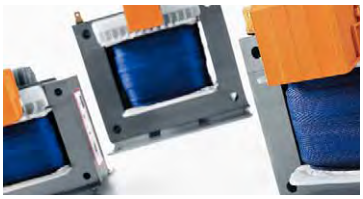
Sample data

Inductance 740 µH @ 7 A	Switching 130 kHz
Input voltage max. 625 Vac	Core E 42/15 (Kool Mµ®)
Output voltage 200 Vac	UL-insulating system Class B
Power 1,2 kW	

Technical informations

Content





Technical informations Transformers

General informations

Transformers

General technical informations

A transformer is a static device with two or more coils which transforms a system of alternating voltage and alternating current through electromagnetic induction, usually with different values but the same frequency, for the purpose of transmitting electrical energy (Ref: VDE 0570, IEV 421-01-01).

Requirements

The design-related differences between transformers are generally determined by their intended utilisation. Respective requirements are established in the installation and device standards
(e.g. VDE 0100, VDE 0113/EN 60204/
IEC 60204, VDE 0700/EN 60335/
VDE 0805/EN 60950/
IEC 60950) and in the transformer standards (e.g. VDE 0570/DIN EN 61558/
EN 61558/IEC 61558).

An important selection criterion is the insulation construction between input and output electrical circuits:

Transformers with double or enhanced insulation

- Safety transformers (for the safety measure of safety extra-low voltage)
- Safety isolating transformers (for the safety measure of protective separation)

Transformes with basic insulation

- Control transformers (for the safety measure of protective earthing)
- Mains transformers with separated coils, general

Transformers without insulation (no metallic isolation) between input and output circuits

- Autotransformers

Standards

Unless otherwise agreed upon with the ordering party, we manufacture in accordance with the latest “State of Technology” and with the following standards:

VDE 0570: Safety of transformers, power units and similar
EN 61558, IEC 61558: Safety of power transformers, power supply units and similar.

Rated input voltage

The rated input voltage (Ref.: VDE 0570, EN 61558, IEC 61558) is the distribution voltage (or the voltage between the external conductors in the cases of multiphase systems), which the manufacturer has assigned to the transformer for the established operating conditions.

Rated input voltage range

The rated input voltage range (Ref.: VDE 0570, EN 61558, IEC 61558) is the input voltage range assigned to the transformer, as expressed in its upper and lower limits. Unless other arrangements have been made, the upper limit is equivalent to 1.10 times the value of the rated input voltage with which the transformer can be continuously operated without suffering any damage. The lower limit is non-critical. It is nevertheless to be noted that the internal resistance (U_K) of the transformer can increase as a result of the reduced magnetic flux through the core. The prerequisite for a description of the limit values is the transformer load at rated (output) power, expressed as the ohmic or active resistance load.

Rated frequency

The rated frequency (Ref.: VDE 0570, EN 61558, IEC 61558) is the frequency allocated to the transformer for the established operating conditions.

Unless other arrangements have been made, transformers will be designed for 50 to 60 Hz.

Open-circuit current

Open-circuit current is the (apparen) input current of the non-loaded transformer at the rated input voltage and the rated frequency.

Because of non sinusoidal shape of the curve, measurements are to be carried out using “true effect” testing equipment. The size of the open-circuit current can also vary within a production lot, mainly because of non-constant core sheet characteristics. The open-circuit current should, however, be lower than the input current at rated (output) power in order to avoid any possible overloading of the input (primary) coil of the transformer during open-circuit operation.

Open-circuit output

Open-circuit output is the (effective) input power of the non-loaded transformer at the rated input voltage and the rated frequency. This power leads to a heating-up of the transformer which is not under a load because of the magnetisation of the core.

Input (primary) coil

The input coil is the coil established for the connection with the electrical supply circuit.

There can be several coils for series and parallel connections, taps can also be present. Depending on number, amount of insulation required and percentile deviation of the taps in relation to rated input voltage, an increase in core power (structural size) may become required for the transformer.

An increase of core power is absolutely mandatory when several different input voltages are to be set up as alternatives. If for example 230 V and 400 V are called for in conjunction with unchanging rated (output) power, then the coil space required is increased by about 21 % (coil former with a single chamber). This comes about since one coil needs to be on hand for the full power of the 230 V input voltage, another one needs to be there for 230 V to 400 V. The core power of the transformer is thus to be set at a level circa 21 % higher than the rated (output) power.

Rated input voltage	**Rated (output) power** x factor = core power	
	I-Kammer	**II-Kammer**
115 + 230 Vac	1.25	1.50
230 + 400 Vac	1.21	1.43
230 + 500 Vac	1.27	1.54
230 + 400 + 500 Vac	1.31	1.63
230 + 400 + 440 + 500 Vac	1.32	1.64
400 + 440 Vac	1.05	1.09
400 + 440 + 500 Vac	1.11	1.21

Rated output voltage

In cases where the transformer is connected to rated input voltage, in the presence of rated frequency and loading with an impedance (which, in connection with rated output voltage and by using the rated power factor for alternating current, results in rated power) the output voltage may not deviate from its rated value by more than the following:

- 10 % for the output voltage of unconditionally short circuit-proof transformers with a rated output voltage,
- 10 % for the highest output voltage of unconditionally short circuit-proof transformers with more than one rated output voltage,
- 15 % for the other output voltages of unconditionally short circuit-proof transformers with more than one rated output voltage,
- 5 % for the output voltages of other transformers.

The percentage values listed above are increased by 5 for transformers with rectifiers.

Measurement is carried out after warmed-up operating temperature has been reached (equilibrium state) and (unless other arrangements have been made) at rated ambient temperature and rated (output) impedance for which the rated power factor = 1.

For transformers with several output coils, each coil group will be simultaneously loaded, unless some other arrangement has been established.

For transformers with attached rectifiers, the output voltage will be measured at the terminations of the direct current circuit with a voltage measuring device as an arithmetic mean value, insofar as the voltage is not expressly specified as an effective value..

Open-circuit operation output voltage

The open-circuit operation output voltage (Ref.: VDE 0570, EN 61558, IEC 61558) is the output voltage of the non-loaded transformer with rated input voltage and rated frequency. For safety, isolating and control transformers, the highest permissible values for deviation in terms of rated output voltage are to be observed to some extent. The respective determinations are specified in Part 2 of the Standard named above for the various transformer types.

$$\text{deviation} = \frac{\text{open-circuit operation output voltage} - \text{nominal output voltage} \times 100\ \%}{\text{nominal output voltage}}$$

Example: Isolating transformer with 230 V rated output voltage and 238 V open-circuit operation output voltage

$$\text{deviation} = \frac{238\ \text{V} - 230\ \text{V} \times 100\ \%}{230\ \text{V}} = 3.48\ \%$$

Common presentations are also, e.g.:

$$\text{open-circuit operation output voltage} = \text{nominal output voltage} \times \text{Factor}$$

Example: Control transformer with 24 V rated output voltage

$$\text{open-circuit operation output voltage} = 24\ \text{V} \times 1.10 = 26.4\ \text{V}$$

Note: In accordance with VDE 0113, IEC 60204 and VDE 0570, EN 61558, IEC 61558, the open-circuit operation output voltage for control transformers may not increase by more than a maximum of 10 %!

or

$$\text{Regulation} = \frac{\text{open-circuit operation output voltage} - \text{nominal output voltage} \times 100\ \%}{\text{open-circuit operation output voltage}}$$

Example: Safety transformer with 11.5 V rated output voltage and 14 V open-circuit operation output voltage

$$\text{Regulation} = \frac{14\ \text{V} - 11.5\ \text{V} \times 100\ \%}{14\ \text{V}} = 17.9\ \%$$

In cases of rated (output) power levels of over 1 kVA, the short circuit voltage (as a percentage of rated input voltage) will be specified. Short circuit voltage (%), deviation (%), regulation (%) and open-circuit voltage factor (factor – 1.00 = %) can be roughly compared with one another.

Output (secondary) coil

The output coil is a coil designated for connection with a distributing network, a device, a piece of equipment or another installation.

There may be several coils and taps present. Depending on number and on the amount of insulation required, an increase of the core power (structural size) of the transformer could become necessary. Unless other arrangements have been made, this is the way that taps are designed for the intensity of the current at the highest voltage level and they can carry loads only in alternation.
If the full rated (output) power is to be available from every tap and/or if several output coils are desired which are not simultaneously able to carry loads or to carry changeable loads, then the need for winding space increases. The core power of the transformer is thus to be set at a level higher than the rated (output) power.

Rated power

The rated power (Ref.: VDE 0570, EN 61558, IEC 61558) is the product arising from rated output voltage and rated output current or, in cases of multiphase transformers, the product times $\sqrt{n}$, where n is the total number of the phases.

Note: When single-phase transformers (e.g. control transformers) are being connected to two external conductors of a three-phase network, the number of phases is to be set to 1 for the rated power of the transformer.

In cases where the transformer has more than one output coil or an output coil with taps, the rated power is the sum of the products of rated output voltage and rated output current of all circuits which can be loaded simultaneously.

Installation altitude

The calculation of the transformers is at an altitude of max. 1000 m above sea level. A higher installation altitude require a power reduction caused by the lower heat dissipation.

Installation altitude in meters above NN	power x factor
1500	0.98
2000	0.97
2500	0.95
3000	0.93
3500	0.92
4000	0.90
4500	0.88
5000	0.86
5500	0.85
6000	0.83

Ambient temperature and rated power

With rated ambient temperature deviating from 40 °C and with reference to insulation material class E, one can proceed approximately as follows:

Rated ambient temperature	Rated (output) power x factor = core power
25 °C	1.14
40 °C	1.00
45 °C	0.93
50 °C	0.87
55 °C	0.80
60 °C	0.73
65 °C	0.67
70 °C	0.60

Core power (structural size) needs to be adjusted to reflect rated (output) power.

Example: How high must the core power of a transformer of 100 VA (at 40 °C) be increased in order to be able to operate it at 70 °C

$$P_{core} = \frac{100\ VA}{0.60} = 167\ VA$$

Example: What is the maximum power to be had from a 100 VA transformer (in terms of 40 °C) at 55 °C?

$$P_{max} = 100\ VA \times 0.80 = 80\ VA$$

Excess temperature

The excess temperature is the temperature in the transformer which is created in the established operating conditions of the transformer as a result of self-heating. The maximum permitted excess temperature is calculated from the difference arising between a temperature assigned to the insulation material class and the rated ambient temperature of the transformer. Depending on the insulation material class, the possible excess temperature is also to be reduced for hot spots.

Example: Insulation material class E (120 °C), hot spot 5 °C, Rated ambient temperature 40 °C

$$\Delta T = 120\ °C - 5\ °C - 40\ °C = 75\ °C$$

Short-circuit-proofness

Transformers are divided up according to their type of short-circuit-proofness (Ref.: VDE 0570, EN 61558, IEC 61558):

A **short circuit-proof transformer** is a transformer for which the temperature does not exceed established limit values when the transformer is overloaded or short-circuited and which continues to fulfil all the requirements of the Standard listed above once the overload or the short circuit has been eliminated.

- An **unconditionally short circuit-proof transformer** is a short circuit-proof transformer without a protective device for which the temperature does not exceed the established temperature limit values in cases of overload or short circuits which can continue to be operated after the overload or the short-circuit has been eliminated.
  Note: Due to physical limitations, this kind of transformer permits only structural designs with low levels of rated power of up to circa 4 VA. The open-circuit voltage factor can thereby take on a value of up to 2.00. The shape of the curve of the output voltage can deviate from the sinusoidal form. It is not mandatory that unconditionally short circuit-proof transformers need be permanently short circuit-proof.
- A **conditionally short circuit-proof transformer** is a short circuit-proof transformer with a built-in protective device, which opens the electrical circuit or limits the electricity in the input or output circuit when the transformer is overloaded or short-circuited.
  Note: Examples of protective devices are fuses, overload releases, temperature fuses, automatic and non-automatic resetting temperature limiters, posistors and automatic mechanically-triggered protective switches.

A **non-short circuit-proof transformer** is a transformer which is intended to be protected against excessive temperatures by means of a protective device which is not built into the transformer.

Note: Unless other arrangements have been made, the ordering party is responsible for taking measures to protect the transformer.

Low-band magnetic leakage fields

Inductive component parts generate low-band magnetic fields, called forth by the leakage fields of the magnetising procedure at the level of the operating frequency. Effects on neighbouring electrical equipment, devices, apparatus or installations cannot to be ruled out entirely. The degree of the influence is essentially dependent upon an EMC-compliant construction (earthing, shielding) of the components and on their spatial clearance from one another. For the purposes of general estimation and as an aid to project design, the following typical values can apply, based on a rated power of circa 200 VA:

Component part* (without shielding)	Leakage field induction within the clearance	
	10 mm	100 mm
Toroidal transformer	1.2 mT	0.02 mT
EI-sheathed core transformer	2.2 mT	0.04 mT
EI-sheathed reactor with gap	12 mT	1.30 mT
Magnetic voltage stabilizer	5 mT	0.30 mT

*Reference: magnetic core induction ca. 1.2 T (1 Tesla = 1 Vs/m²), at 50 Hz

For non-critical applications, we recommend a clearance of 50 mm to 100 mm between the components and between them and the shielding (e.g. sheet metal housing). For critical applications (e.g. sensitive measuring amplifiers, digital circuits, monitors), additional EMC shielding measures or greater clearances are generally necessary. However, EMC measures to be carried out depend heavily upon the components utilised and upon the operating parameters of the system, which means that it is impossible to make statements of universal validity.

Core power

The core power is the power assigned to one particular construction form or structural size, with the specification of particular operating or design characteristics.

Operating characteristics may include, for example, the following:

- Insulation material class E
- Rated ambient temperature 40 °C
- Rated frequency 50 Hz
- Open-circuit operation-output voltage-factor maximum 1.10

Design characteristics may include, for example, the following:

- Type of protection IP 54
- Insulation construction
- Increased need for winding space
- Specification of a particular core type

Autotransformers

Auto transformers are transformers in which input and output coils share common parts (Ref.: VDE 0570 Parts 2–13). For this reason, there is no metallic isolation between the coils.

Requirements

The general statements already made concerning transformers also apply to auto transformers, i.e., such things as protection class, type of protection, insulation material class and rated ambient temperature.

Usually, and unless other arrangements have been made with the ordering party, auto transformers will be manufactured with basic insulation between voltage-bearing parts and the core. Existing taps cannot be subjected to loads simultaneously, unless the dimensioning was especially designed for it.

Standards

Unless otherwise agreed with the buyer, we finished state-of-the-art technology and the following standards:

VDE 0570: Safety of power transformers, power supply units and similar,
Teil 1: General requirements and tests,
Teil 2–13: Particular requirements for auto transformers.

EN 61558, IEC 61558: Safety of power transformers, power supply units and similar,
Part 1: General requirements and tests,
Part 2–13: Particular requirements for auto transformers.

Magnet core power

Magnet core power is the power which would be transmitted to the magnet core as a transformer with separated (spaced apart) coils. In everyday speech, the term “core power” is frequently used for “magnet core power” and “throughput power” for “rated power” in reference to auto transformers.

Auto transformers possess shared input and output coils. For this reason, there is no metallic isolation between the coils. Depending on voltage turns ratio, there is to some extent a considerable reduction of the core power in comparison with a design with separated coils.

$$P_{core} = \frac{U_H - U_N \times P_{nominal}}{U_H}$$

P_{core} = required core power (VA)
P_{rated} = rated power (VA) (throughput power)
U_H = higher voltage (V)
U_N = lower voltage (V)

Example: A load of 400 V/5 kVA is to be modified to suit a network with 460 V.

$$P_{core} = \frac{460\ V - 400\ V}{460\ V} \times 5000\ VA = 652\ VA$$

The required core power of the auto transformer therefore amounts to only 652 VA.

Notes for the low-voltage lightning installation

General requirement

The mounting of low-voltage lighting installations must be carried out in such a way that any danger to persons or property caused by dangerous fault or leakage currents or thermal influences is averted.

Transformers

Use only short circuit-proof transformers in accordance with VDE 0570/ EN 61558/ IEC 61558.

Note: even conditionally short circuit-proof safety transformers are short circuit-proof.

Take care to note temperature of the air surrounding the transformer.
Note:

- Do not operate transformers without a ta-specification with ambient temperatures above 25 °C.
- Transformers with a ta-specification are to be operated at rated ambient temperatures up to the specified value.

Mount transformers with a minimum clearance of about 30 cm from one another in order to avoid heat buildup and the influence of magnetic leakage fields.

Only use transformers with MM designation when the behaviour in fire of the surrounding construction materials (wood, furniture, intermediate ceilings) is unknown.

Charge the transformers to in order to 100 % capacity as much as possible, in order to achieve an optimal voltage adjustment to the halogen lamps.

Install transformers with a rated output voltage of preferably 11.5 V for supplying 12 V halogen lamps in order to extend the service life of the halogen lamps and/or in order not to shorten it when exposed to mains overvoltage.

If the transformer is also to take on the line safety of connected secondary power lines, then the transformer must be an appropriate one for this purpose.

If the transformer is to supply a line system with two directly touchable lines (rope cable systems, conductor rails), then wiring must be carried out with safety device (e.g. electronic automatic current controller).
Safety goal:

- The lamp output is monitored at ±25 W.
- In cases where this is exceeded or where it is not achieved, a switch-off takes place within 0.3 s.

Please observe the regulation for preventing damage “Low-voltage illumination installations and systems” VDS 2324 from the Verband der Sachversicherer e. V. (Association of Property Insurers), Cologne.

The transformer should be placed near to the illumination equipment, since there are relatively high currents flow in low-voltage installations, thus meaning that the conductor length, the conductor cross-section and the voltage drop connected with them must all be considered.
Note:

- Maintain a minimum clearance to the transformer of approx. 40 cm to 50 cm, in order to keep away from heat build-up and heat radiation.
- In order to avoid overheating caused by heat radiation, never direct the light of the halogen lamp at the transformer.
- Cold light reflector lamps radiate a high amount of infrared heat radiation, also towards the back through the reflector.
- Only heat-resistant connection lines are to be used for direct hook-up to.

Mount the transformers in such a way that no oscillations can be transmitted in order to avoid unwanted humming noises. Thin-walled mounting plates (such as a loudspeaker diaphragm) can even increase the mechanical 100 Hz vibration of the transformer!

Mount the transformer in such a way that blown fuses can be replaced without difficulty.

Note: Transformers with integrated semiconductors and resetting temperature limiters are once again ready for operation after elimination of the error, mains interruption and cooling.

Switch on transformers or transformer groups with switch-on current limiters, so that it will not be able to lead to the triggering of safety cutouts connected in series.

When using dimmer operation for brightness setting of the halogen lamps, use only those transformers which are suitable for this.
Note:

- use only special transformer dimmers.
- take into account the efficiency of the transformer.
- note base load as specified by the dimmer manufacturer.
- if the supplying of several transformers is handled by a single dimmer, then the transformers utilised should all be of the same type, in order to minimise compensating currents or any oscillation behaviour.
- Fine-tune the arrangement of the wiring and the cross-section of the wires to meet the requirements of the phase control in order to minimise electromagnetic interference fields and oscillation behaviour.

Halogen lamps

Note: The heat resistance R of the halogen lamp is of slightly lesser low impedance with undervoltage and of slightly greater high impedance with overvoltage.

The power consumption of a halogen lamp can deviate from the rated power by as much as approx. 10 %.

Some kinds of dimmer operation used for adjusting the illumination intensity of halogen lamp types can lead to corrosion of the helical parts and blackening of the quartz bulb in connection with low levels of dimmer voltage. The halogen lamp should be periodically operated at maximum dimmer voltage to ensure that the halogen circuit process is able to take place.

Typical operating conditions			
Operating voltage	**12.5 V**	**12.0 V**	**11.5 V**
Service life	50 %	100 %	180 %
Lightning current	120 %	100 %	80 %
Lamp current	102 %	100 %	98 %
Lamp current in the example	4.26 A	4.17 A	4.07 A

Halogen lamp 12 V/50 W (R = 2.88 Ω)

Loading capacity of cables and power lines

Note:

- based upon VDE 0100 Part 559
- based upon DIN VDE 0298
- in terms of copper wires
- in terms of two loaded PVC-insulated lines and cable
- in terms of 25 C ambient temperature
- in terms of wire placement method B2, placement in electric installation tube or channel (wire lines or multi-wire lines on or in walls or concealed or on the floor)

Electric current loading capacity I_z (A)	10.5	16.5	22.0	30.0	39.0	53.0
Rated cross-section (mm^2)	*1.0	1.5	2.5	4.0	6.0	10.0

*The CU wire cross-section diameter must be at least 1.5 mm^2. It may be reduced to 1 mm^2, if:

flexible lines are used,

- no overloading is possible,
- and a line length of 3 m is not exceeded.

Conversion factors for deviating ambient temperatures:

Ambient temperature (°C)	25	30	35	40	45	50
Electrical current conversion factor	1.0	0.94	0.88	0.82	0.75	0.67

Conversion factors for the accumulation of cables and power lines in the electrical installation pipe or channel:

Number of simultaneously loaded electrical circuits	1	2	3	4	5	6
Electrical current conversion factor	1.00	0.80	0.70	0.65	0.60	0.57

Note: The loading capacity of cables and lines offers information regarding the thermal current carrying capacity, but not about voltage drop, and therefore not about length.

Allocation of the overvoltage protection organs for protection in case of overload

The loading capacity of cables and lines presumes that there is a correct allocation of the overvoltage protection organs (protective devices), such as line protection switches and fuses.

Note: If the transformer is also to assume the line safety of connected secondary power lines, then the transformer must be an appropriate one for this purpose.

Generally speaking, the allocation rules apply (Ref.: VDE 0100 Part 430):

- $I_B \leq I_N \leq I_Z$
- $I_2 \leq 1.48\ I_Z$

with

I_B = operating current of the electrical circuit
I_Z = current load capacity of the line or the cable
I_N = rated electrical current of the protective device
I_2 = conventional tripping current of the protective device (conventional fusing current)

Example: A CU line of 1 mm^2 is to be shielded against overload with a protective device with a rated electrical current of 10 A and a triggering characteristic B or C.

I_B = 10 A
I_Z = 10.5 A (for 1 mm2 CU with PVC insulation at 25 °C ambient temperature, based upon VDE 0298)
I_N = 10 A
I_2 = 14.5 A (multiplied by 1.45 with B or C, in accordance with VDE 0641)

- $I_B \leq I_N \leq I_Z$
  10 A ≤ 10 A ≤ 10.5 A
  is fulfilled
- $I_2 \leq 1.48\ I_Z$
  14.4 A ≤ 1.45 A ≤ 10.5 A
  is fulfilled

Result: The line is protected against overload.

Voltage drop on cables and power lines

In addition to thermal loading capacity, voltage drop also plays an essential role in cables and power lines. A voltage drop of
2.5 % to 3 % has established itself as a practice-oriented compromise between the material costs for wiring and a still-bearable brightness loss for lighting equipment.

The length of the cables and power lines can be calculated with sufficient precision in accordance with:

$$L = \frac{A \times U_B \times U_B \times æ \times dU}{2 \times P \times 100}$$

L = 2-wire cable or length between transformer and halogen lamp (m)
U_B = rated voltage of the transformer (V)
dU = voltage drop (%)
A = cross section of a cable or a conductor (mm^2)
P = rated power of the lamp(s) (W)
æ = electrical conductivity (CU= 56 m/Ω mm^2)

Given a voltage drop of 3 % and a rated transformer voltage of 11.5 V, the following power line lengths emerge. It must be remembered in this connection that the same voltage drop is to be found on all cable and power line lengths, in order to avoid brightness differences in conjunction with the use of the same lighting equipment.

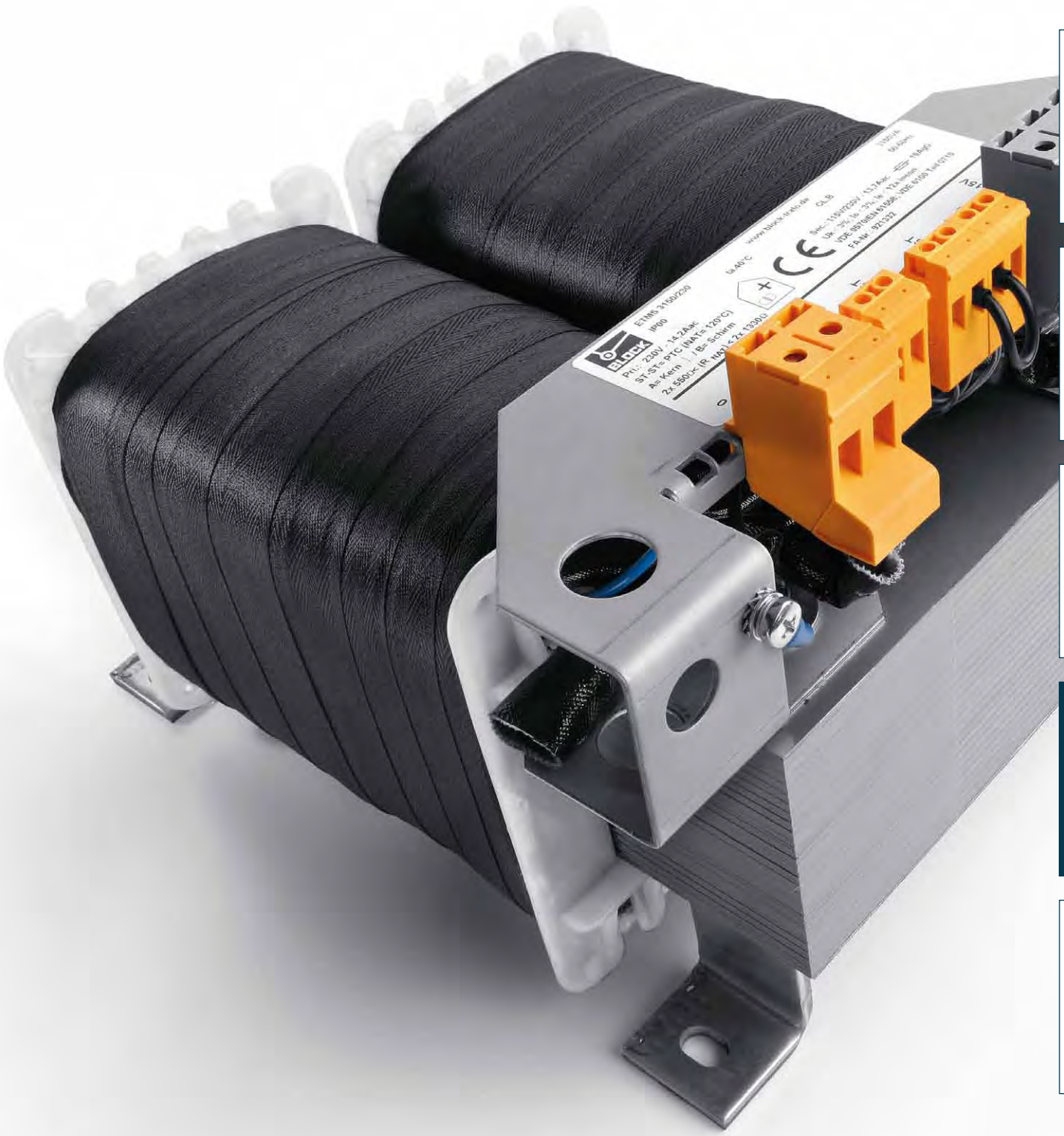
Note: Take into account loading capacity of cables and power lines, as well as the allocation of the overvoltage protection features.

Cable and lead lengths in relation to 3% voltage drop::

Lamps rated power	Electrical current 11.5 V	Length of the 2-wire CU power line with cross-section		
		2x 1.0 mm^2	2x 1.5 mm^2	2x 2.5 mm^2
10 W	0.8 A	11.11 m	16.66 m	27.77 m
20 W	1.6 A	5.56 m	8.33 m	13.89 m
35 W	2.8 A	3.17 m	4.76 m	7.94 m
50 W	4 A	2.22 m	3.33 m	5.56 m
75 W	6 A	1.48 m	2.22 m	3.70 m
100 W	8 A	1.11 m	1.67 m	2.78 m
150 W	12 A	*0.74 m	1.11 m	1.85 m
200 W	16 A	*0.56 m	0.83 m	1.39 m
250 W	20 A	*0.44 m	*0.67 m	1.11 m
300 W	24 A	*0.37 m	*0.56 m	*0.93 m
350 W	28 A	*0.32 m	*0.48 m	*0.79 m
400 W	32 A	*0.28 m	*0.42 m	*0.69 m
450 W	36 A	*0.25 m	*0.37 m	*0.62 m
500 W	40 A	*0.22 m	*0.33 m	*0.56 m
550 W	44 A	*0.20 m	*0.30 m	*0.51 m
600 W	48 A	*0.19 m	*0.28 m	*0.46 m

Lamps rated power	Length of the 2-wire CU power line with cross-section			
	2x 4.0 mm^2	2x 6.0 mm^2	2x 10 mm^2	2x 16 mm^2
10 W	44.45 m	66.65 m	111.1 m	177.7 m
20 W	22.22 m	33.33 m	55.55 m	88.87 m
35 W	12.70 m	19.04 m	31.74 m	50.78 m
50 W	8.89 m	13.33 m	22.22 m	35.55 m
75 W	5.93 m	8.89 m	14.81 m	23.70 m
100 W	4.44 m	6.67 m	11.11 m	17.78 m
150 W	2.96 m	4.44 m	7.41 m	11.85 m
200 W	2.22 m	3.33 m	5.55 m	8.89 m
250 W	1.78 m	2.67 m	4.44 m	7.11 m
300 W	1.48 m	2.22 m	3.70 m	5.93 m
350 W	1.27 m	1.90 m	3.17 m	5.08 m
400 W	*1.11 m	1.67 m	2.78 m	4.44 m
450 W	*0.99 m	1.48 m	2.47 m	3.95 m
500 W	*0.89 m	*1.33 m	2.22 m	3.56 m
550 W	*0.81 m	*1.21 m	2.02 m	3.23 m
600 W	*0.74 m	*1.11 m	1.85 m	2.96 m

*Do not use, because the demand of current carrying capacity I_Z of cables and wires is not fulfilled!



Transformers used for medical purposes

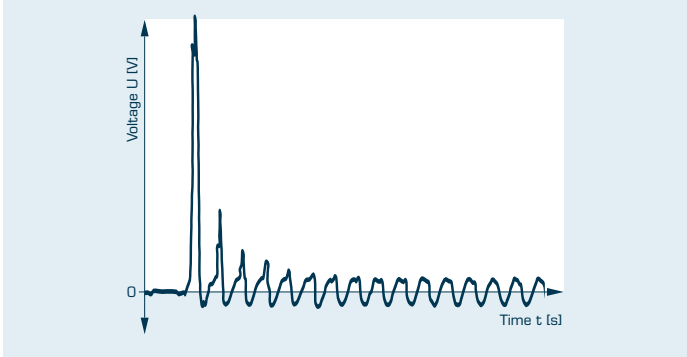
The requirement

For isolating transformers, the following requirements apply, in accordance with VDE 0570 part 2–15, EN 61558-2-15:

- Part 13.3: The switch-on current is not permitted to be in excess of twelve times of the curve summit value of the rated input current.

The switch-on

The oscillogram shows the typical curve progression of the primary switch-on current of a transformer:



The switch-on current is reduced in accordance with an e-function, in order to die off after about 100 ms. The current peaks reach their maximum in unfavourable switch-on moments: in the mains voltage zero crossing, in open-circuit operation (without load) and with high remanence of the iron core.

The rated electrical current

The rated primary current of a transformer comes into force with rated primary voltage, rated frequency and orderly operation with rated power load. If the rated primary current is not known or cannot be determined using measurement technology, then an approximate determination can take place as follows:

$$I_B \approx \frac{P_B}{\eta \times U_B} \text{ (A)}$$

P_B = rated (secondary) power (VA) divided by 3 in the case of alternating current
U_B = rated primary voltage (V) with alternating current combined voltage L – N
η = efficiency of the transformer
typically 0.94 with 3,150 VA
typically 0.95 with 5,000 VA
typically 0.96 with 8,000 VA

Calculation of the peak value of the rated primary current yields:

$I_S = I_B \times \sqrt{2}$ (AS)

The switch-on current factor

Based on the previous models, the switch-on current factor can be defined as the ratio of the maximum switch-on current of the unloaded transformer to the peak value of the rated primary current of the loaded transformer.

The measuring

Determination of switch-on currents using measurement techniques previously proved itself to be expensive and hardly possible to carry out on location in the context of a construction site. The switch-on current is determined by means of a storage oscillograph using a low-impedance shunt (connected in series to the primary coil of the transformer to be tested). Frequent repetition of the switch-on process raises the probability of measuring the maximum value of the switch-on current at the least favourable switch-on moment.

Computation of the switch-on current factor

Starting from the measurement of the switch-on current and of the rated electrical current, the switch-on current factor can be computed as follows:

$$F = \frac{I_{on\,max}}{I_B \times \sqrt{2}}$$

For isolating transformers used for medical purposes with VDE 0100 part 710, VDE 0570 part 2–15, EN 61558-2-15, the switch-on current factor F must be less than 12.

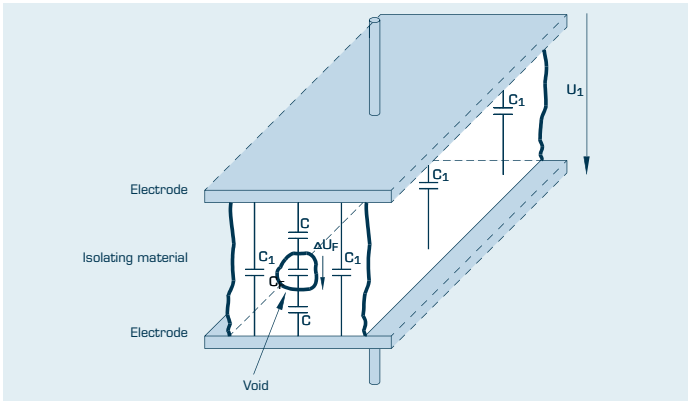
Partial discharge measurement on transformers

In the published standards for devices, partial discharge ability is also required, in addition double or reinforced insulation, to ensure electrical separation in component parts and other electrical modules. An example of this the standard norm, "Outfitting of high-voltage installations with electronic equipment", VDE 0160/ EN 61800/IEC 61800. This standard norm contains a partial discharge test on the insulation system of the winding materials used. The correctly-applied partial discharge measurement offers a non-destruction testing procedure which can be applied for the qualitative evaluation of an insulation system.

What are partial discharges?

This has to do with a stochastic or random discharge between two voltage-bearing electrodes which bridge over only a partial distance of the clearance between the electrodes. They appear first at the contact surface or also sometimes physically displaced within an insulation configuration. If this occurs in a solid insulation material, then it is referred to as an internal partial discharge (PD), the causes of which are to be found either in defective manufacturing technology or in the use of unsuitable materials. Numbered among the latter for actual insulation materials are hollow spaces, voids and non-homogeneities which cannot be ruled out to 100 %.

A simplified insulation configuration between two electrodes is provided in the illustration in order to better clarify the processes which contribute to the formation of a partial discharge. The individual capacitors illustrate the course of the lines of electric flux. C_F indicates the concentration of the lines of electric flux in the flaw position, C symbolises the course of the lines of electric flux from the surface of the insulating material to the walls surrounding the hollow space. If the initial voltage in this configuration crosses over the flaw position which is to be considered a voltage- dependent radio link (C_F), then a voltage drop U_F occurs there, which causes a change in the charge q_F. The voltage leap at the electrodes caused by this can be used for an analysis of the PD activity of the insulating material.

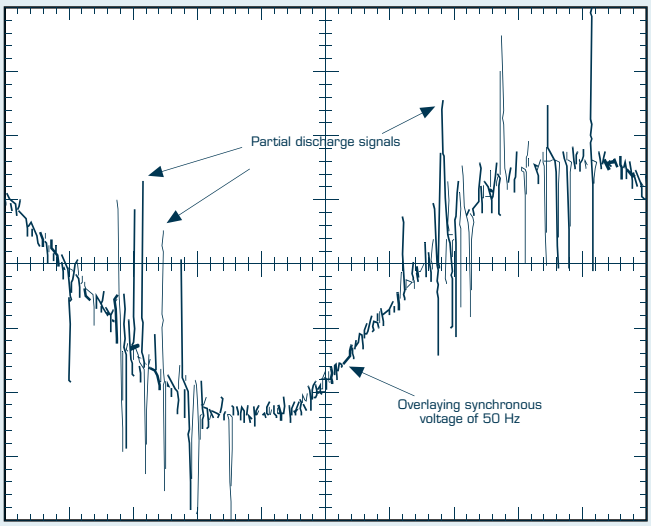


What is the effect of partial discharges?

Every discharge caused by a PD causes a weakening of the material surrounding it. Continuous PD leads to a permanent destruction processes in the insulator. When the damage reaches an advanced state it results in the loss of insulation capability. Therefore, in order to ensure a permanently reliable insulation system configuration, it must be a requirement that:

- no PD shall occur in the insulation system in connection with the maximum allowable operating voltage plus a safety margin
- PD caused by transients shall terminate automatically after cessation of the overvoltage
- PD freedom shall be designed for the maximum peak value plus a safety margin for amplitude stresses with continuously repeating voltage impulses

The previously won research results show a new way for evaluating insulation systems the low-voltage technology transformers. It is becoming possible to make more than just a vague Good/Bad statement about safe electrical separation inside a transformer – now one can also evaluate its quality, which also means a statement predicting its service life.



Instructions for interference protection transformers

Mains interruption and their causes

Mains interruption cause systems failures and impair the functioning of installations, computers and highly sensitive electronic consumers and equipment. Investigations in Central Europe have shown that 3/4 of all sporadically-occuring errors and faulty functioning among highly-sensitive consumers are based on defective quality of the power supply.

The most common occurrences are:

- long-term network overvoltage
- long-term network undervoltage
- interference impulses and transients
- voltage drops and voltage surges
- electrical disturbance
- short-term mains interruption
- long-term mains interruption

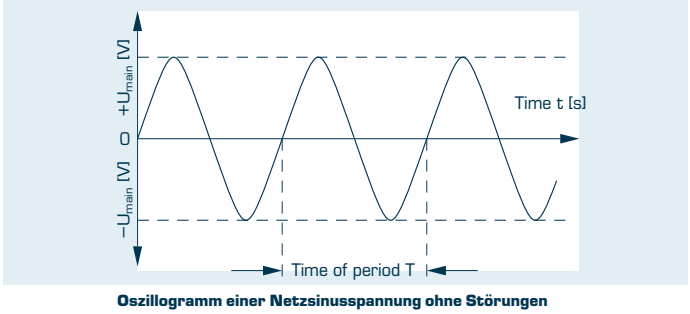
Mains interruptions can result from a wide variety of causes, e.g.:

- switching procedures in the mains
- long cable paths in the mains
- environmental influences, such as storms
- mains overloading

Typical causes for mains interruptions generated in-house include, for example:

- thyristor-controlled operating mechanisms
- elevators, air conditioning systems, copy machines
- motors, compensation installations
- electrical welders, large machines
- switching illumination devices

Types and description of mains interruptions

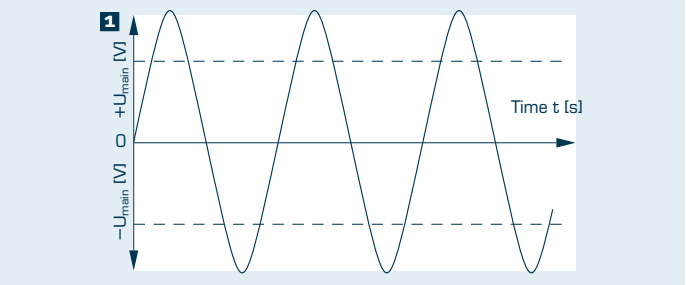


Oszillogramm einer Netzsinusspannung ohne Störungen

1. Mains overvoltage

Mains voltage in excess over a long period by more than +6 % (VDE 0175/HD 472 S1/ IEC 60038).

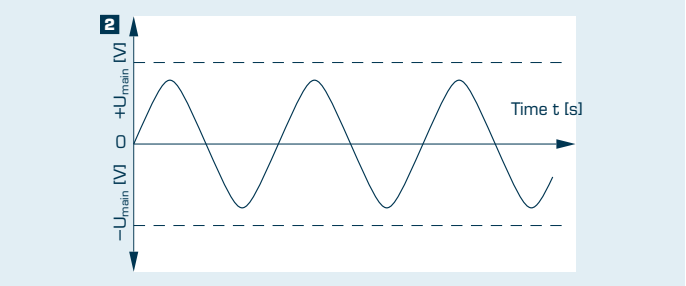
Circa 15–20 % involvement in mains interruptions. Leads to overheating and thermal destruction of components. Causes total failure.



2. Mains undervoltage

Mains voltage fails to achieve minimum levels over a long period by more than –10 % (VDE 0175/HD 472 S1/IEC 60038).

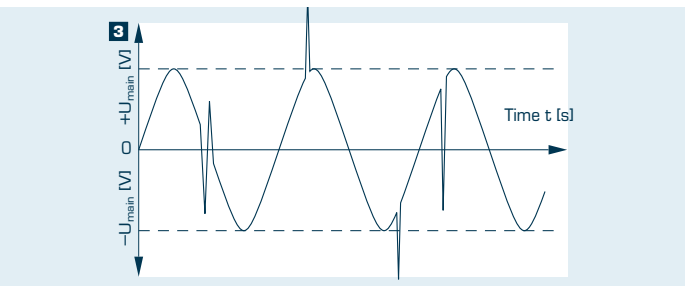
Circa 20–30 % involvement in mains interruptions. Leads to non-defined operating states for the mains units of the components, caused by deficient mains stabilisation. Causes data errors.



3. Interference impulses

Energy-rich impulses (e.g. 700 V/1 ms) and energy-poor transients (e.g. 2500 V/20 µs), by switching processes in the mains.

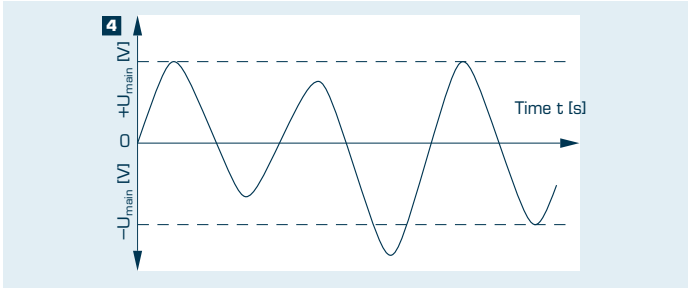
Circa 30–35 % involvement in mains interruptions.



4. Voltage drop and voltage surge

Voltage level changes abruptly and in an uncontrolled manner, e.g. through load changes and long wiring arrangements.

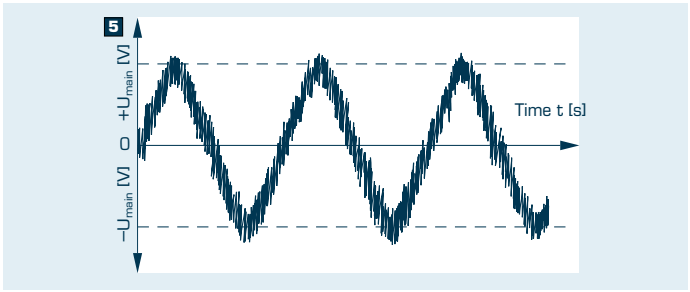
Circa 15–30 % involvement in mains interruptions. Leads to non-defined operating states and can cause the destruction of components. Cause data errors.



5. Electrical noise

The mixture of frequencies superimposed on the mains by poor earthing and/or severe HF disrupters, such as radio stations, storms.

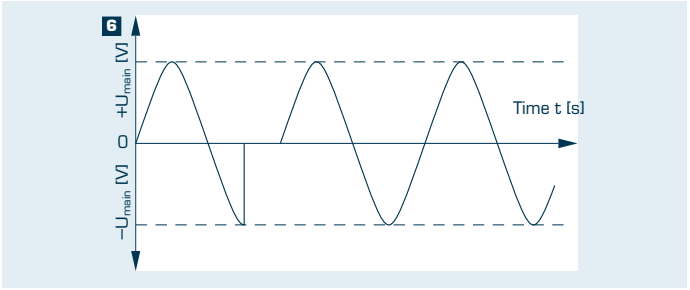
Circa 20–35 % involvement in mains interruptions. Leads to non-defined operating states for the mains units of the components. Causes data errors.



6. Short voltage interruption

Short-term (up to circa 10 ms) interruption of the mains voltage through short-circuit in neighbouring networks or by startup of large electrical machines.

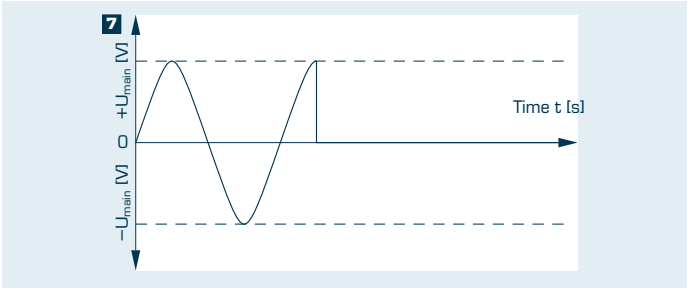
Circa 8–10 % involvement in mains interruptions. Leads to non-defined operating states for the mains units of the components, particularly those with insufficient mains bridging. Causes data errors.



7. Long voltage interruption

Long (more than circa 10 ms) interruption of the mains voltage.

Circa 2–5 % involvement in mains interruptions. Causes data errors.



Countermeasures and their effect

Mains socket

1 2 3 4 5 6 7

Mains socket via seperate power supply lines

1 2 ☐ ☐ 5 6 7

Isolating Transformator e.g.: BLOCK NTT, ETTK ...

1 2 ☐ ☐ ☐ 6 7

Interference protection transformer, e.g.: BLOCK STT, SMTT ...

1 2 **3** 4 **5** 6 7

Magnetic voltage stabilizer, e.g.: BLOCK KH, BSV, BSD ...

1 2 ☐ **4** ☐ **6** 7

Online UPS

1 2 3 4 5 6 7

= no
☐ = conditionally
■ = yes

Evaluation of the efficiency

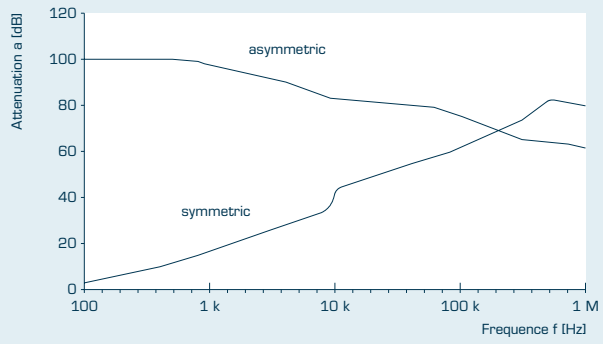
The voltage attenuation a (dB, decibel) describes a logarithmic ratio between two electrical voltage values:

a = 20 x lg (U1 : U2) [dB]

Values often applied for U1 : U2 include:

0 dB = 1 : 1
3 dB = 1 : 1.41
6 dB = 1 : 2
10 dB = 1 : 3.16
20 dB = 1 : 10
40 dB = 1 : 100
60 dB = 1 : 1,000
80 dB = 1 : 10,000
100 dB = 1 : 100,000
120 dB = 1 : 1,000,000
140 dB = 1 : 10,000,000

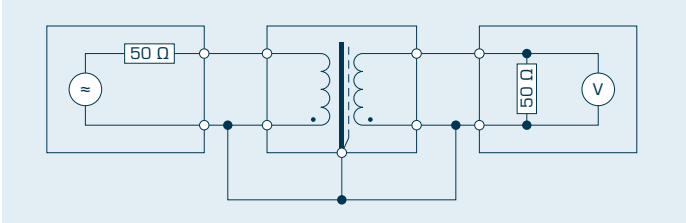
In cases of Interference protection transformers and magnetic voltage stabilisers, it is desirable to obtain an attenuation of interference which is as high as possible. Depending on a (sine) measuring frequency, If one applies the associated attenuation a (calculated according to the formula shown above), then one will obtain the attenuation characteristic curve:



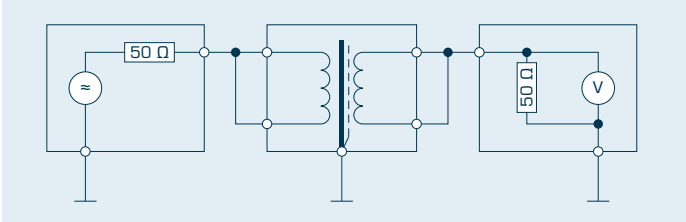
The observation, assessment takes place here for the frequency range up to 1 MHz. An essential distinction is made in accordance with two types of mains borne interference:

- **Symmetrical interference**
- **Asymmetrical interference**

Symmetrical interference occurs between the two power supply lines (L and N). Below the associated basic measurement configuration



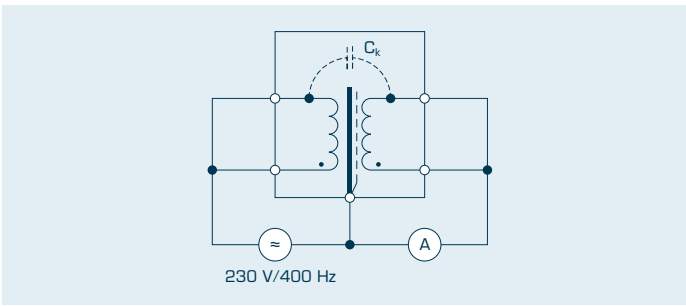
Asymmetrical interference occurs between one of the two power supply lines (L, N) and earth (PE). Below the associated basic measurement configuration



The attenuation represents a non-system-dependent evaluation criterion, preferably with real terminal resistors of 50 Ω, and based on a standardised norm measuring procedure (Ref.: CISPR 17).

Coupling capacity

The coupling capacity represents a measure for the possible transmission of interference between the input and the output sides in cases inductive components are present, such as transformers with metallic isolation of the coils. The value of the coupling capacity should be kept as small as possible and can be influenced by design measures. The decisive influence on the determination of the coupling capacity is the selection of the applied measurement methods and measurement frequencies (despite theoretical frequency independence). In addition, for direct measurement using a C-measuring bridge, a measuring configuration using a test voltage selected to reflect orderly operation appears to make more sense:



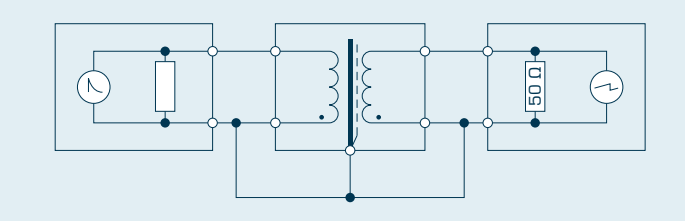
The flowing electrical current is measured by means of the coupling capacity, taking into account the interference suppression measures (e.g. shield and core earthing), in series connection to the testing generator. The coupling capacity C_K is calculated using:

$$C_K = \frac{I}{2 \times \pi \times f \times U} [F]$$

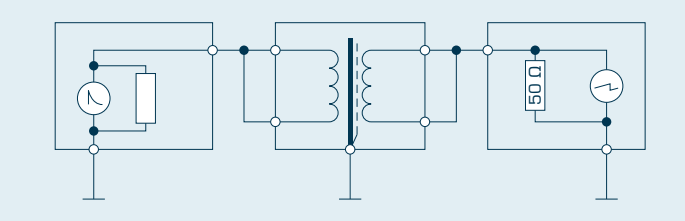
I = electrical current A
π = 3.14
f = frequency Hz
U = voltage V

Impulse attenuation

The specification of the voltage impulse attenuation in dB is a further criterion for the evaluation of the interference protection characteristics for inductive component parts such as Interference protection transformers and magnetic interference protection voltage stabilisers. Impulses of many kilovolts (kV) are not at all unknown in networks as the result of the effects of lightning. To simulate the impulse, the standard lightning surge voltage in the form of 1.2/50 µs can be applied. Here possible measurement configurations:



Symmetrical impulse attenuation

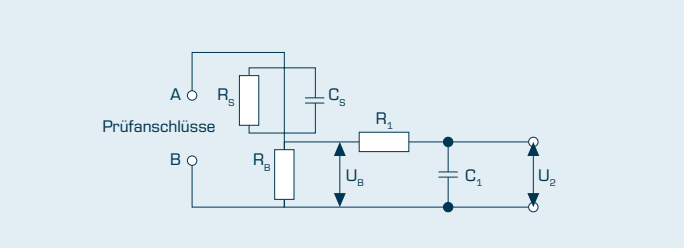


asymmetrical impulse attenuation

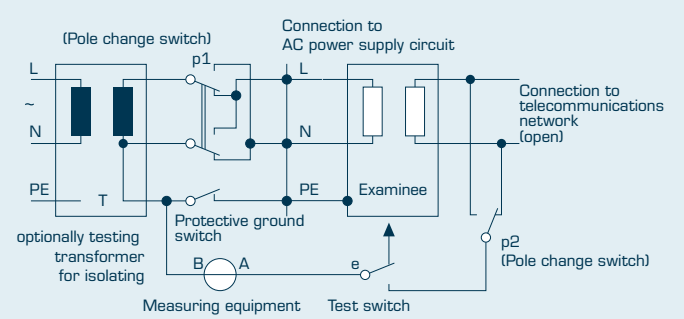
The statements already made concerning attenuation can be applied in their essentials for the determination of the impulse attenuation. One difference, however, is that an impulse with a buildup time of 1.2 µs and a fall time of 50 µs with a voltage level of 5 kV will be applied instead of that of the (sinusoidal) measurement frequencies.

Leakage current

Leakage current is an unwanted flowing alternating current between electrical poles which possesses different levels of voltage potential. The maximum limit values for the leakage current are established in some regulations for installations and devices (e.g. DIN VDE 0100 maximum 0.75 mA, DIN VDE 0750 maximum 0.25 mA). Some of the possible measurement configurations are listed below (e.g. substitute leakage current measurement based upon DIN VDE 0701). The leakage current of a piece of electrical equipment ought to be small, since an additive buildup of current takes place on the mains as a result of the simultaneous operation of several devices.



DIN EN 60990: Measuring circuit for touch current, evaluated for appreciability and reaction



Measurement configuration for the determination of the touch current to EN 60950-1

Insulation resistance

The level of the insulation resistance offers information concerning the insulation capability of an electrical insulation system. For isolating and safety transformers with double or enhanced insulation (Ref.: VDE 0570/EN 61558/ IEC 61558), minimum limit values apply ranging from 2 MΩ to 7 MΩ. As far as the measurement configuration used for the determination of the insulation resistance is concerned, one can proceed the same as with leakage current. One difference, however, is that a direct current voltage of 500 V_{dc} is put into place for testing purposes. The Insulation resistance is then computed as R = U/I.

the EU-Symbol (Communautés Européennes)

The CE marking

General Note

The technical explanations contained here represent points of departure for many areas of application, a number of rules apply in addition to special and exceptional cases. The intention here is to provide a brief introduction into the complex subject field.

EC Designation

EU guidelines have been issued by the Council of the European Union, based upon the Treaty for the Establishment of the European Economic Community (EEC), particularly under Article 100. These EU guidelines are for the purpose of establishing conformity among the legal and administrative regulations of the different member states of the European Union (EU) in cases where differences among national regulations lead to trade restrictions or otherwise hinder the functioning of the internal market of the EU. The guidelines are to be adopted by the national lawmakers within prescribed time periods for the respective national legal system.

The manufacturer is required to attach the EU designation to products which fall under the authority of certain EU regulations as a sign of conformity with them. The products affected are those which are covered by the guidelines made in accordance with the "New Concept" (issued 07.05.1985) which contain requirements governing the technical quality of different products.

EU guidelines are binding legal directives of the European Union. That means that the fulfillment of these requirements is a **precondition for the marketing of the products in Europe. This does not affect the rest of the world trade market.** The attachment of the EU designation confirms product conformity with the corresponding fundamental requirements of all (applicable) guidelines affecting the product. As the documentation of conformity with directives, the EU designation is solely intended for monitoring government agencies. It is, however, often misinterpreted as a "Quality Seal". Because of this, it is unfortunately often demanded in cases where there is no legal requirement for it.

For this reason, our company dispenses with any advertising display of the EU symbol in our catalogue and prospectus pages, since the placement of the EU designation on products is done solely to satisfy a legal requirement which all manufacturers and importers are obligated to adhere to.

Although the EU declaration of conformity on the part of the manufacturer is kept on file only for the purposes of the monitoring agencies (for at least 10 years following the last bringing of the product into circulation), respective copies of it can be made available to customers upon request.

The determination of which guideline(s) is (are) to be applied can be deduced from the EU Declaration of Conformity for the respective product. The directives and their changed directives most commonly applied to our company's range of products are:

1. The Low Voltage Directive (72/23/EEC) for electrical equipment to be used with a rated voltage of between 50 Vac and 1000 Vac and between 75 Vdc and 1500 Vdc.

Title: Directive of the Council for the Establishment of Conformity among Legal Directives of the Member States with respect to Electrical Equipment for Use between Certain Voltage Limits 73/23/EEC of 19. 02. 1973

Almost all of the products in our manufacturing program fall under the area of application of the Low Voltage Directive. The conformity of each piece of electrical equipment, every device, every system and every installation with the safety requirements of the directive is to be certified by

2. The EMC directive (89/336/EEC) for devices which could cause electromagnetic interference or whose operation could be impaired by this kind of interference.

Title: Directive of the Council for the Establishment of Conformity among Legal Directives of the Member States with respect to Electromagnetic Compatibility 89/336/EEC of 03. 05. 1989

Legal basis:
For the purpose of establishing conformity among the legal directives of the member states, the Council of the European Community issued a binding directive for its members on 03. 05. 1989, which was in turn put into effect on 09. 11. 1992 by the Federal Republic of Germany in the form of a federal law governing electromagnetic compatibility (EMVG). The Bureau of Directive for Telekommunikation und Post (RegTP) and its external offices were charged with responsibility for the implementation (monitoring) of the EMC law.

Definition, in accordance with the following extract from Article 1:
Electromagnetic compatibility is the ability of an apparatus, equipment or a system to operate satisfactorily in the electromagnetic environment without itself causing electromagnetic interference while doing so which would be unacceptable to any of the devices, installations or systems present in this environment.

Area of application, in accordance with the following extract from Article 2:
This directive applies to all devices which could cause electromagnetic interference or whose operation could be impaired by such interference.

Note: "Devices" (in accordance with Article 1) consist of all electrical and electronic apparatuses, installations and systems which contain electrical and/or electronic modules.

Fundamental procedural methods:
Starting 01. 01. 1992 (with transition grace period until 31. 12. 1995), only those electrical and electronic devices, systems and installations may be brought into circulation or put into operation in the European Union which are in conformance with the established EMC safety requirements contained in the directive. The conformity of every device, every system and every installation with the safety requirements of the directive is to be certified by the manufacturer by means of an EU Declaration of Conformity and to mark the product with the EU Sign of Conformity.

Modules which are not required to carry the designation of conformity:
For the purposes of the EMC directive, a module is defined as any element which is used for installation in a device but which possesses no function of its own and which is not intended for use by an ultimate consumer. In accordance with Article 1 of the EMC directive, modules are therefore not devices and from the onset do not fall under the jurisdiction of this directive.

Examples:

a) **Modules (for circuit boards, devices, control cabinets)**, which as built-in components are not required to bear the EU designation sign, such as resistors, capacitors, inductance, integrated switching circuits.

b)**Modules** which are required to bear the EU designation sign **(with housing and with protection against accidental contact)**, which are to be operated autonomously and/or are to ultimate consumers, such as plug-ready power supply units, battery charging sets, personal computers, testing and measuring apparatus, isolating transformers for construction sites or service, transformers for halogen lights.

Electromagnetic compatibility

Definition

According to the definition contained in the EMC Regulation 89/336/EEC, electromagnetic compatibility is the capability of a device to be able to work satisfactorily in the electromagnetic environment without itself causing electromagnetic interference while doing so which would be unacceptable to any of the devices, installations or systems present in this environment.

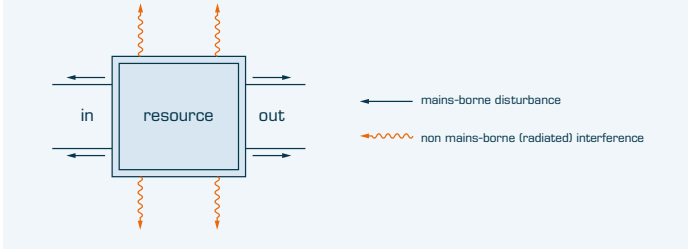
A distinction is made between
1. Electromagnetic interference (EMS)
2. Electromagnetic immunity (EMI)

Electromagnetic interference (EMS)

Electromagnetic interference (emitted interference) is every kind of electromagnetic event (e.g. noise, unwanted signal), which could impair the functioning of a device, an installation or a system.
The basic specification for emitted interference is

- EN 61000-6-3 (Residential, business, trade areas and small-scale enterprises)
- EN 61000-6-4 (Industrial area)

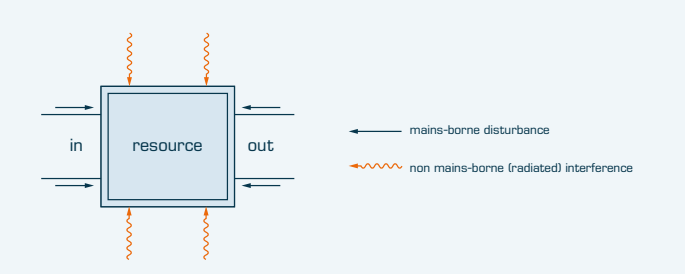
A large number of basic standards (IEC 61000, CISPR) and product standards are also to be taken into consideration as required.



Electromagnetic immunity (EMI)

Test standards are:

- EN 61000-4-2:1995 +A1:1998 +A2:2001
  Electrostatic discharge immunity test
- EN 61000-4-3:2006 +A1:2008
  Radiated, radio-frequency, electromagnetic field immunity test
- EN 61000-4-4:2004
  Electrical fast transient/burst immunity test
- EN 61000-4-5:2006
  Surge immunity test
- EN 61000-4-6:2007
  Immunity to conducted disturbances, induced by radio-frequency fields
- EN 61000-4-8:1993 + A1:2001
  Power frequency magnetic field immunity test
- EN 61000-4-11:2004
  Voltage dips, short interruptions and voltage variations immunity tests

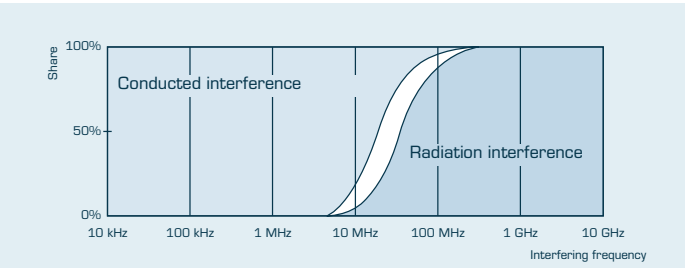


Shielding from interference

There are many opportunities for interference to be transmitted:

- by means of metallic contact as electrical current and voltage, carried by power mains
- as a magnetic field
- as an electrical field
- as an electromagnetic wave or radiation

Propagation of mains borne and radiated interference generally behaves as follows:

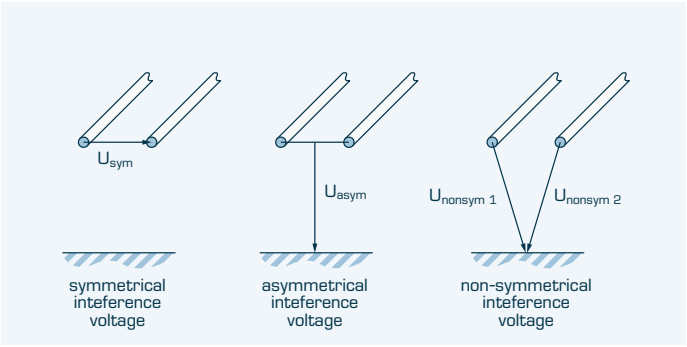


The attenuation of interference is achieved by construction which takes EMC into consideration, involving such things as low-impedance earthing, filters, shielded lines, metallic housing and spatial clearance. The EMC measures to be carried out, however, are highly dependent on the components utilised and on the operating parameters of the system, which means that it is almost impossible to make universally valid statements.

Mains borne interference

Interference voltage often occurs on electrical lines, between conductors and between conductors and the earth, in intensities which can range up to a frequency of circa 30 MHz. A distinction is made between symmetrical, asymmetrical and non-symmetrical interference voltage.

Reactors, capacitors and filters are particularly suitable for the attenuation of mains borne interference, as are – indirectly – shielded cables. As a rule, additional protection measures (radio links, varistors) are necessary against energy-rich interference, e.g. caused by lightning bolts.



EMC Standards

The fundamental principles for EMC standardisation are generally compiled by

- CISPR, founded in 1934 (International Special Committee on Radio Interference, Comité international Spécial des Perturbations Radioélectriques)

and

- IEC TC77, founded in 1974 (International Electrotechnical Commission Technical Committee 77, Comité d'études 77 de la Commission Electrotechnique Internationale)

in coordination with the IEC Regulation Guide 107 (EMC-Guide to the drafting of electromagnetic compatibility publications).

The purpose of Guide 107 is to ensure that identical procedures and points of view are applied during the course of EMC standardisation and to keep everything as conclusive as possible. Observations are carried out on line-borne and radiated phenomena occurring in the frequency range between 0 Hz and 400 GHz, in which electromagnetic compatibility is to be achievable.

Generally speaking, four categories of EMC standards are defined, whereby each EMC standard is, as a whole, assigned to only one of the four categories.

1. Basic publications (Basic Standards) e.g.

- IEC 61000-2, -3, -4, -5 etc.
- CISPR 11, 13, 14, 15, 16, 22

The Basic Standards can have the status of a standard or even that of a technical report. They contain the respective measuring procedures, classification of environmental conditions and testing techniques for EMC, but no measurement limiting values for individual products or product families. Constant reference is made to the Basic Standards in the basic specifications, product family standards and product standards. It should be clear from the title alone that it is a Basic Standard (Basic Norm) which is being dealt with.

2. Basic specifications (Generic Standards)

- Residential and small-scale business enterprises field:
  EN 61000-6-3 (Emitted Interference), EN 61000-6-1 (Interference Immunity)
- Industrial field:
  EN 61000-6-4 (Emitted Interference), EN 61000-6-2 (Interference Immunity)

The basic specifications are to be applied to products for which neither product family standards nor product standards exist. There is always a distinction made between the environmental conditions of industry (supplied by industrial networks) and those of residential, business and trade areas and small-scale enterprises (supplied by public electricity networks). While limited number of EMC tests specify minimum interference limit values and maximum interference emission limit values, they do not address certain product characteristics.

3. Product Family Standards, e.g.

- EN 55011 (Emitted Interference), Industrial, Scientific, Medicinal (ISM) Devices
- EN 55013 (Emitted Interference), EN 55020 (Interference Immunity), Audio, TV, Radio devices
- EN 55014 (Emitted Interference), EN 55104 (Interference Immunity), Household Appliances

The product family standards are tailored to specific product families and contain particular specifications (e.g. limit values, test design, operational criteria and criteria for complaints). Concerning measuring procedures, Basic Standards are referred to and limit values are coordinated with the basic specifications. Product family standards for EMC can exist as independent standards, but also as (autonomous) parts of standards which govern the other aspects (e.g. electrical safety) for the product family.

4. Product standards (Dedicated Product Standards), e.g.

- EN 61800-3, Frequency Converters
- EN 50199, Electric Arc Welding Devices

The product family standards are intended for special products, they enjoy the highest application priority and are therefore the only ones to be applied for ensuring the EMC of the product. In terms of the inclusion of Basic Standards and basic specifications, the rules which apply to the product family standards are the same as those for the product standards.

Classifications

Protection class

The protection class 0, I, II or III (Ref.: VDE 0140/EN 61140/IEC 61140) is a **construction feature** for the classification of electrical equipment for the purpose of security against dangerous fault or leakage currents (electrical shock), e.g.:

- Protection class 0:
  Device with basic insulation as a precaution for basic protection, but without provision for fault protection
- Protection class I:
  Device with protective conductor connection and (at least) basic insulation
- Protection class II:
  Device without protective conductor connection and double or enhanced insulation
- Protection class III:
  Device supplied with SELV (Safety Extra-Low Voltage) and in which no voltages higher than the SELV are generated.

Electrical equipment intended for installation in devices have no safety class and can only be "prepared for" one of these. Electrical equipment which has been prepared for utilisation in protection class II devices can also be utilised in protection class I devices.

Type of protection

Specification of the type of protection (Ref.: DIN VDE 0470, EN 60 529, IEC 60529) describes the protection of electrical equipment by means of housing, covers, enclosures and similar.

The type of protection is specified by letter symbols (IP Code), whereby the first code number (0 to 6) offers information concerning protection against contact and against the penetration of foreign objects. The second code number (0 to 8) provides information about protection against the water penetration.

Common types of protection in use:

- IP 00
  No special protection against accidental contact or against the penetration of foreign objects. No special protection against water. **Constructions of the "open design type" are manufactured for the IP 00 type of protection.**
- IP 20
  Protection against contact and against the penetration of solid foreign objects larger than ø 12 mm. No special protection against water.
- IP 23
  Protection against contact and against the penetration of solid foreign objects larger than ø 12 mm. Protection against water spray falling at any angle of up to 60° to the vertical, so that such jets will have no damaging effects.
- IP 40
  Protection against contact and against the penetration of solid foreign objects larger than ø 1 mm. No special protection against water.
- IP 44
  Protection against contact and against the penetration of solid foreign objects larger than ø 1 mm. Protection against water spray so that no spray hitting the equipment from any direction will have any damaging effect.
- IP 54
  Complete protection against contact. Protection against damaging dust deposits. While dust penetration is not completely prevented, the dust which does enter may not amount to quantities which will impair working procedures. Protection against water spray, so that no spray hitting the equipment from any direction will have any damaging effect.
- IP 65
  Complete protection against contact. Protection against dust penetration. Protection against water spray. Protection against water jets from spray nozzles directed at the equipment from all directions to the extent that no spray will have any damaging effect.
- IP 67
  Complete protection against contact. Protection against the dust penetration. Protection against the effects of temporary immersion in water. Water shall not be permitted to penetrate in a quantity which will would cause damaging effects when the housing is temporarily immersed in water under standardised pressure and time conditions.
- IP 68
  Complete protection against contact. Protection against the dust penetration. Protection against the effects of immersion in water for an indefinite time. Water shall not be permitted to penetrate in a quantity which will would cause damaging effects when the housing is immersed in water under standardised pressure conditions.

Note: The specification of the type of protection refers to the condition at the time of delivery and to the established or usual method of setting up the equipment. The type of protection can change as the result of a different setup or installation method.

Insulation material class

The regulations (Ref.: VDE 0301/ HD 566S1/IEC 60085) in addition to (Ref.: VDE 0304/HD 611.1S1/IEC 60216) describe among other things the thermal resistance of electrical insulation materials. The different insulation material classes are assigned temperatures in reference to their periods of thermal resistance.

Common Insulation material classes:
A (105 °C), E (120 °C), B (130 °C), F (155 °C), H (180 °C)

Unless other arrangements have been made, transformers and power reactors are designed in accordance with the specifications of the insulation material classes E or B.

Insulation system (EIS)

An electrical insulation system (EIS) is an insulating arrangement made up of one or more insulation materials (electrical insulation materials) which is installed together with the associated conduction parts in one piece of electrical equipment (Ref: VDE 0302 Teil 1/ EN 60505/ IEC 60505 sowie VDE 0302 Teil 11/ EN 61857-1/ IEC 61857-1). A judgement is made under thermal stresses of whether or not the combination of insulation materials is suitable for operation in the respective insulation material class.

Ambient air temperature for measurement

The ambient air temperature for measurement is the highest ambient air temperature at which a piece of electrical equipment or an electrical device or an installation component (e.g. transformer, reactor, filter) can be operated continuously under normal operating conditions. It is the air temperature of the immediate surroundings. Electrical values often refer to the ambient air temperature for measurement and they can change with different temperatures! Special attention is to be paid to the installation of components in housings with a higher type of protection. Possible deficient cooling can lead to non-authorised high temperatures in the housing. A reduction of the expected service life of the component is possible in this case (see “Insulation material class”).

The ambient air temperature for measurement is specified using a shortened notation form (Ref.: VDE* 0570, EN 61558, IEC 61558).

Example:
ta=25 °C or ta=40 °C

Unless other arrangements have been made, the rated ambient temperature used for the design of components intended for installation is set at 40 °C and at 25 °C for (table) devices which are to be operated independently.

*Association of german electrical engineersBemessungsumgebungstemperatur ausgelegt.

Test class

The test class indicates climate category (Ref.: DIN EN 60068/EN 60068/ IEC 60068) as the key to the designation of the climatic usability of component parts.

Example:

25/085/21
25 = –25 °C, Test A: coldness, 085 = + 85 °C, Test B: dry heat,
21 = 21 days, Test Ca: moist heat constant

The individual tests are defined in different parts of the standard.

Characters and symbols

VDE 0570 Part 2–6/EN 61558-2-6/IEC 61558-2-6
Safety transformer, short circuit-proof,
double or increased insulation between PRI and SEC, PRI max. 1000 V, SEC max. 50 V AC voltage (effective value) and/or 120 V smoothed DC voltage, frequency max. 500 Hz

VDE 0570 Part 2–6/EN 61558-2-6/IEC 61558-2-6
Safety transformer, not short circuit-proof,
double or increased insulation between PRI and SEC, PRI max. 1000 V, SEC max. 50 V AC voltage (effective value) and/or 120 V smoothed DC voltage, frequency max. 500 Hz

VDE 0570 Part 2–4/EN 61558-2-4/IEC 61558-2-4
Isolating transformer, short circuit-proof,
double or increased insulation between PRI and SEC, PRI max. 1000 V, SEC max. 500 V AC voltage or 708 V smoothed DC voltage, frequency max. 500 Hz.

VDE 0570 Part 2–4/EN 61558-2-4/IEC 61558-2-4
Isolating transformer, not short circuit-proof,
double or increased insulation between PRI and SEC, PRI max. 1000 V, SEC max. 500 V AC voltage or 708 V smoothed DC voltage, frequency max. 500 Hz.

VDE 0570 Part 2–15/EN 61558-2-15/IEC 61558-2-15
Isolating transformer for supplying medical areas, not short circuit-proof, double or increased insulation between PRI and SEC; windings installed one above the other; windings-core; windings-shield; shield-core; PRI max. 1000 V, SEC max. 250 V, frequency max. 500 Hz

VDE 0570 Part 2–12/EN 61558-2-12/IEC 61558-2-12
Magnetic voltage stabiliser acting as isolating transformer, short circuit-proof, double or increased insulation between PRI and SEC, PRI max. 1000 V, SEC max. 500 V, frequency max. 500 Hz (30 kHz internally)

VDE 0570 Part 2–2/EN 61558-2-2/IEC 61558-2-2
Control transformer, not short circuit-proof, basic insulation between PRI and SEC, PRI max. 1000 V, SEC max. 1000 V AC voltage or 1415 V smoothed DC voltage, frequency max. 500 Hz

VDE 0570 Part 2–1/EN 61558-2-1/IEC 61558-2-1
Mains transformer, not short circuit-proof, basic insulation between PRI and SEC, PRI max. 1000 V, SEC max. 1000 V AC voltage or 1415 V smoothed DC voltage, frequency max. 500 Hz

VDE 0570 Part 2–13/EN 61558-2-13/IEC 61558-2-13
Autotransformer, not short circuit-proof, no insulation between PRI and SEC, PRI max. 1100 V, SEC max. 1000 V AC voltage or 1415 V smoothed DC voltage, frequency max. 500 Hz

VDE 0570 Part 2–20/EN 61558-2-20/IEC 61558-2-20
Small reactor, not overload-free, max. 1000 V, frequency max. 1 MHz

Specification for the fuse assigned in the case of transformers that are not short circuit-proof; here, 6.3 A time-lag

Thermal overcurrent release; here, 20 A miniature circuit breaker

Temperature fuse

Temperature fuse

Self-resetting thermal relay
, e.g. thermal time delay switch

Non-self-resetting thermal relay Reset by switching off the mains connection, e.g. thermal time delay switch with locking function, PTC

Non-self-resetting thermal relay Manual reset (e.g. thermal overcurrent release, miniature circuit breaker)

PTC thermistor

NTC thermistor

ta 40 °C
ta 40

Rated ambient temperature; here, 40°C

CL.B
CL.130
class 130

Class of insulation; here, B

Safety class II, total insulation

Protective conductor, earth

Connection for mount or core

Suitable for use with fitments whose flammability properties are not known, e.g. wood, furniture, intermediate ceilings. Sign in acc. with VDE 0710 Part 14.

Sign for domestic use, only for dry rooms, general

Voltage warning, general

Heat source warning: hot surface, general

AC current, also spelled A. C. or ac (alternating current)

DC current, also spelled D. C. or dc (direct current)

cetification marks

CE mark, legal mark of conformity in Europe (stands for Conformité Européenne)

ENEC mark of conformity, Europe; in Germany: certification by VDE (10), European Norms Electrical Certification

VDE mark of conformity, Germany, VDE Testing and Certification Institute

UL mark of conformity (recognized component), USA and Canada; in Germany: certification by UL, Underwriters Laboratories Inc.

UL mark of conformity (recognized component), USA and Canada; in Germany: certification by UL, Underwriters Laboratories Inc., only relates to the integrated transformerr.

UL mark of conformity (recognized component), USA, Underwriters Laboratories Inc.

UL mark of conformity, (Listed) USA, Underwriters Laboratories Inc

CSA mark of conformity, Canada, Canadian Standards Association

GL mark of conformity, certification by Germanischer Lloyd

AS-Interface mark of conformity, certification by AS-International Association

Special signs by BLOCK

XDF

XtraDenseFill: XtraDenseFill from BLOCK, a casting technique that ensures cavity-free filling of the transformer's entire internal structure thanks to high vacuum and pressure phases. It significantly reduces creepage distances and clearances and enables the electrical equipment to enjoy long-term protection against the effects of its environment. A more compact design can also be used.

IMPEX

BLOCK ImpEx: Ensures the winding material is covered evenly, thus providing extensive protection against external influences. The resin developed specifically for BLOCKImpEx, together with our in-house-developed impregnation process, seals as many cavities as possible and creates a temperature reserve to ensure efficiency during long periods of operation.

BLOCK

The BLOCK logo: a sign of quality

BLOCK

The old BLOCK logo: our original logo

Appendix

International agencies

1

Belgium
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3200 Aarschot
Phone: +32 1669-6945
Fax: +32 1669-7972
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2

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3

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4

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5

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6

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7

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8
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9
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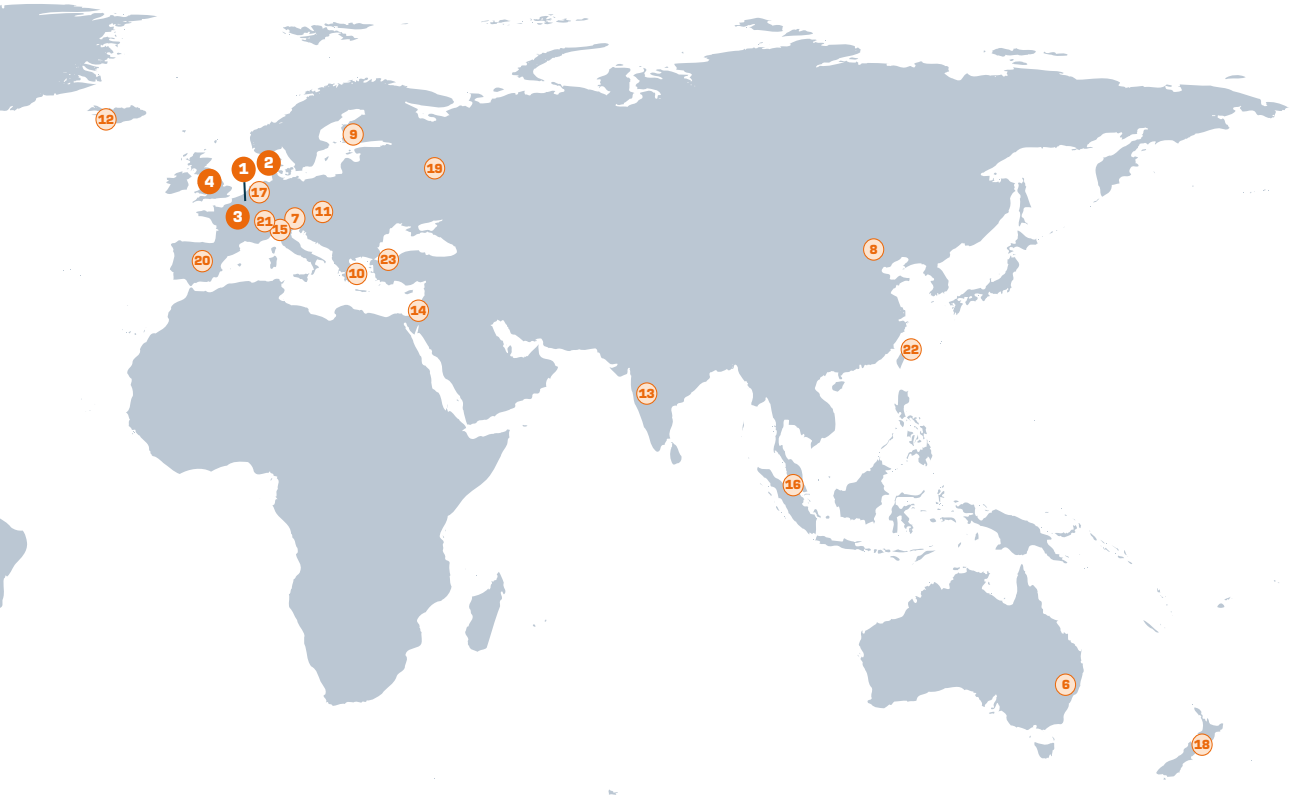

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www.farnell.com

Mütron Müller GmbH & Co. KG
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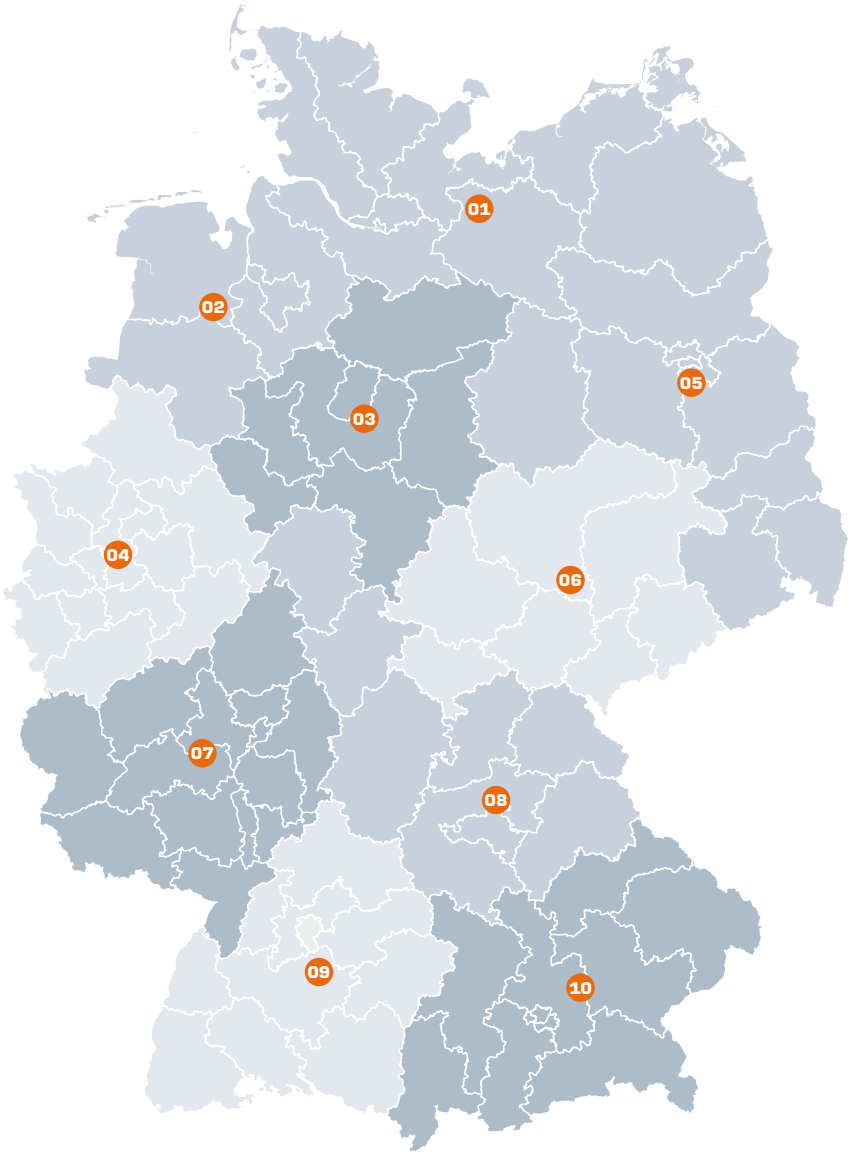

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Bürklin OHG
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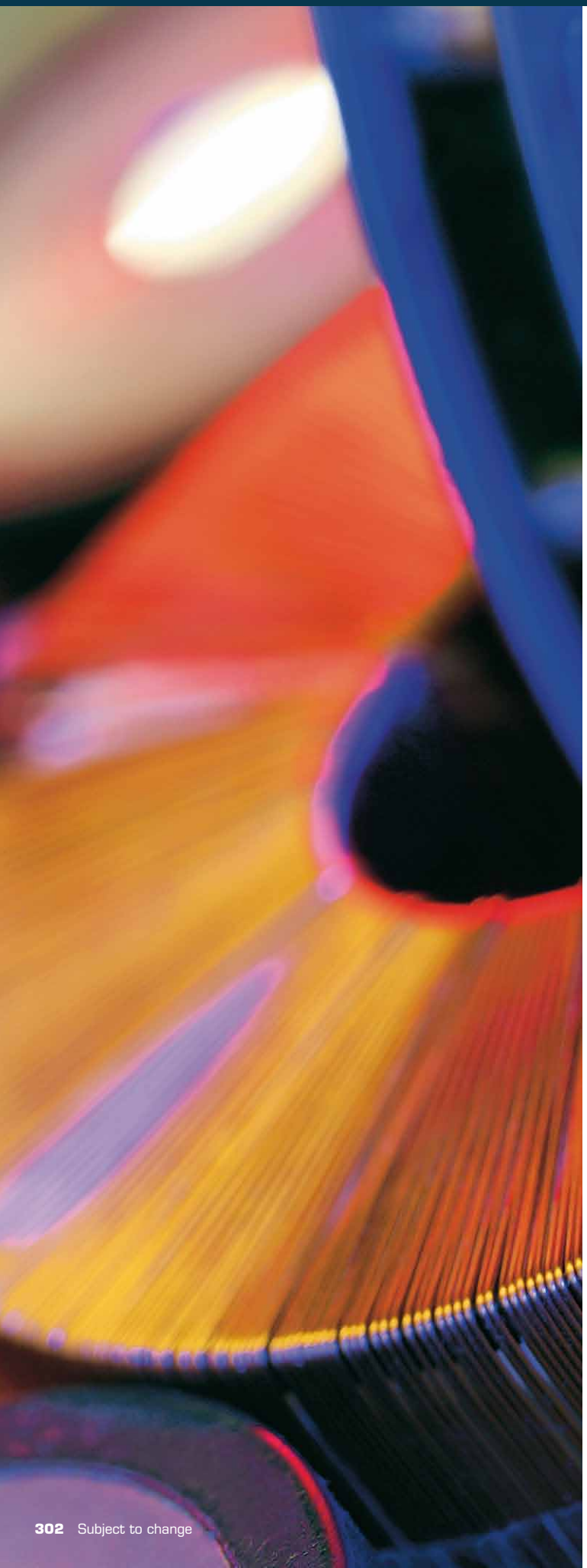

Alphabetical list of types

Catalogue 1
TRANSFORMERS

Catalogue 2
DC POWER SUPPLIES

Catalogue 3
EMC FILTERS/REACTORS

Terms of sale and delivery

§ 1 - General

1. Our terms of sale shall apply exclusively. We shall not recognise any terms of the customer which conflict with or diverge from these. For copper costing €150.00 per 100 kg and up, a copper surcharge shall be levied in accordance with the specified copper weight and the DEL (German electrolytic copper) quotation rate applicable on the date when the order is confirmed.
2. All the arrangements made between us and the customer are stipulated in writing in these terms of delivery.
3. Our terms of delivery shall only apply to companies within the meaning of Section 14 of the German Civil Code (BGB).

§ 2 - Conclusion of contract

1. We are entitled to accept the order within two weeks. This acceptance may be granted in writing or by delivering the goods to the customer. The order confirmation created by us shall exclusively determine the scope of delivery. Subsequent additions or alterations to the order must be expressly confirmed by us in writing in order to become effective.
2. If the goods are ordered electronically, then we shall immediately send the customer confirmation that the order has been received. This confirmation in itself does not constitute any binding acceptance of the order.
3. We reserve all existing copyright to documents, calculations, etc. sent by us. These documents and materials shall also remain our property unless otherwise agreed. These documents and materials may only be passed on to third parties with our written consent.
4. Our quotations are without obligation. We reserve the right to make minor alterations to the construction, design or performance of our equipment compared with what we have specified in our catalogues and brochures or on our website, as well as alterations due to technical progress.
5. Partial deliveries are permissible provided the customer may reasonably be expected to accept them. Each partial delivery shall in all cases be regarded as a separate transaction.

§ 3 - Delivery period

1. Our delivery period shall commence when the order confirmation is sent to the customer. However, commencement of the delivery period we specify assumes in all cases that any technical issues and design specifications have been resolved and clarified.
2. Delivery periods are always specified subject to cooperation by the customer with the terms of the contract. Compliance with our delivery obligations assumes that the customer has fulfilled their obligations in a timely and correct manner (e.g. provision of all required documents, permits, approvals, etc.).
3. The delivery period shall be deemed to have been adhered to if the goods have been dispatched in the period leading up to its deadline or if the customer has been notified in writing that they are ready for dispatch. Where any failure to adhere to the agreed delivery period is due to force majeure (e.g. war, natural disasters, etc.) or events such as strikes, etc., then the delivery period shall be extended accordingly.
4. If the customer defaults on accepting delivery, we shall be entitled to demand compensation for any damage we incur as a result. We reserve the right to assert claims beyond this. If compensation is demanded in lieu of performance pursuant to Section 281 of the German Civil Code, then we shall be entitled to demand 20% of the sale price by way of compensation, irrespective of the possibility of claiming higher compensation. The customer reserves the right to provide evidence that a substantially lower level of damage, or no damage at all, has been incurred.

§ 4 - Prices and terms of payment

1. Price lists and prices quoted in catalogues and on websites are without obligation. All fixed-price agreements must be made in writing.
2. The minimum order value is €40 or €150 for custom-made products.
3. Our prices are ex works or ex warehouse (EXW Verden/Aller – INCOTERMS 2000) and do not include packaging, freight, assembly, commissioning or any other additional costs (e.g. customs duties); these shall be charged separately.
4. Our prices do not include statutory value added tax; this is itemised separately in the invoice at the applicable statutory rate.
5. The purchase price must be paid within 30 days net of the invoicing date without a discount or within 10 days net of the invoicing date with a 2% discount, with no transaction charges in either case. Once the relevant deadline has passed, the customer shall be deemed to have defaulted on payment. The statutory regulations concerning the consequences of payment default shall apply. The same applies to part deliveries invoiced separately.

§ 5 - Right of return/withdrawal for consumer contracts

1. We shall grant the statutory right of return or withdrawal only in the case of legal transactions made with a natural person as defined in the legal system of the Federal Republic of Germany. Such customers shall no longer be bound by their order if they withdraw from the contract within 2 weeks by issuing a written declaration (e.g. letter, fax, e-mail), or by returning the goods (no reasons need be given). This period shall begin, at the earliest, when the customer receives this information. Dispatching the goods or sending the declaration of withdrawal within this time limit shall suffice in order for the deadline to be met. The declaration of withdrawal must be sent to or goods returned to BLOCK Transformatoren Elektronik GmbH, Max-Planck-Straße 36–46, 27283 Verden, Germany. If withdrawal from the contract is effected, the goods and services received by both parties must be returned and, where applicable, any profits gained (e.g. interest) must be surrendered. If the items received are not returned at all or are only returned in a deteriorated condition, then compensation for lost value must be paid. This does not apply if the deteriorated condition can be traced back exclusively to inspecting or trying out the items (such as would be possible in a shop). You can also avoid any obligation to pay compensation for lost value by not using the items as if they were your own property and refraining from any actions that may cause them to decrease in value. Items shall be returned at our expense unless the price of the items to be returned is 40 euros or less or if, in the case of higher-priced items, the consumer has not yet rendered counter-performance or made a part payment by the date of withdrawal from the contract. Items that cannot be sent in a parcel shall be picked up from your premises.

§ 6 - Transfer of risk

1. Unless otherwise specified in the order confirmation, it is agreed that delivery shall be made ex works (EXW Verden/Aller – INCOTERMS 2000). If we have agreed with the customer that the item to be delivered is to be dispatched, then we shall be entitled to choose the type of dispatch.
2. Risk of accidental loss of or damage to the items is transferred to the customer at the point when the items are handed over to or, in the case of a sale by delivery to a place other than the place of performance, when the items are surrendered to the carrier or other person responsible for delivery.

§ 7 - Liability for defects

1. The assertion of claims for defects assumes that the customer has fulfilled their obligations to inspect the goods and lodge complaints in accordance with Section 377 of the German Commercial Code (HGB). In particular, the function of devices must be checked before being put into operation and measuring instruments must be checked and, if necessary, adjusted to ensure they are displaying the correct readings. The specifications in the relevant operating instructions must be observed in this respect.
2. The customer may not derive any additional rights from material defects which do not affect or only negligibly affect the goods' value or suitability for the purpose recognised by us.
3. If the purchased goods are defective, we shall either make subsequent improvements or deliver additional goods, at our discretion. If we choose to make improvements, we shall be obligated to bear all costs required for this, in particular transport, labour and material costs. This shall not apply if the goods ordered have been taken to a location other than the place of performance and the costs increase as a result of this.
4. If we fail in our duty to render supplementary performance, the customer may demand withdrawal from the sales contract or a reduction in the price.
5. If the customer receives an incorrect or incomplete set of assembly instructions, we are only obligated to supply a set that is correct and complete. This applies even if the inaccuracies in or incompleteness of the assembly instructions render correct assembly impossible.
6. Unless otherwise stipulated above, liability is excluded.
7. The period during which claims for defects may be asserted is twelve months from the point of transfer of risk.
8. Assignment of warranty claims is only permissible with our prior written consent.

§ 8 - Damages

1. We shall only be liable for damages in accordance with statutory regulations in cases of personal injury, if the damage is covered by the scope of the German Product Liability Act (ProdHaftG), or if the damage is due to wilful intent or gross negligence.
2. In addition, if the damage is due to culpable breach of an essential contractual duty or a cardinal obligation, we shall only be liable for the damage that is typical for the type of contract concerned.
3. Any additional contractual claims or claims in tort on the part of the customer are excluded. Therefore, we shall in particular not be liable for any damage not occurring on the actual item delivered, or for loss of profits or other financial losses sustained by the customer.

§ 9 - Limitation

1. Accordingly, the right to withdrawal from the contract or a price reduction is excluded according to the legal regulations.

§ 10 - Retention of title

1. We shall reserve the title to the goods delivered until all our claims against the customer based on the business relationship have been paid, including any future claims which may arise from contracts concluded at the same time or a later date.
2. The customer is obligated to handle the goods delivered with care at all times and to insure them against fire, water and theft damage at their own expense.
3. If the customer acts in breach of contract, and in particular if they default on payment, we shall be entitled to withdraw from the contract and reclaim any goods. For the purpose of reclaiming the goods, the customer hereby irrevocably permits us to access their business and storage premises unimpeded and to remove the goods. Once we have taken back the purchased goods, we shall also be entitled to realise them. Any revenue obtained from this shall be offset against the accounts payable of the customer.
4. The customer is required to inform us immediately in writing of any seizure of the delivered goods. The customer is prohibited from entering into any agreements with their own customers that may negatively affect our rights.
5. The customer is entitled to re-sell or process the purchased goods in the normal course of business. Any processing shall be performed on our behalf. If the goods subject to retention of title are processed, combined or merged with other goods, we shall in all cases acquire a co-ownership share of the new item; in the case of processing, this shall be equivalent to the value (= gross invoice value including additional costs and taxes) of the goods subject to retention of title in proportion to the value of the new item; and in the case of combination or merging, it shall be equivalent to the value of the goods subject to retention of title in proportion to the value of the other goods.
6. The customer hereby assigns to us all claims to which they are entitled from the resale,up to the value of the invoice amount (incl. VAT). Even after assignment, the customer shall remain authorised to collect on these claims. Our powers to collect on these claims ourselves shall remain unaffected by this, but we shall not exercise this right as long as the customer fulfils their payment obligations and any other obligations, and as long as no petition to open insolvency proceedings against the customer's assets has been filed. If requested to do so, the customer must inform us of the assigned claims and debtors concerned, provide all the information required to collect on these claims, hand over the relevant documentation, and notify the debtors of the assignment.
7. The customer shall assign to us all claims against a third party that arise if the purchased goods are attached to a piece of real estate.
8. To the extent that and for as long as the retention of title exists, the customer may neither pledge goods or items manufactured from these goods nor assign them by way of security. The conclusion of financial contracts (e.g. leasing) which include the assignment of our rights to retention of title must be approved by us in writing beforehand, unless the contract obligates the financing institution to immediately pay out to us the share of the purchase price to which we are entitled.
9. At the request of the customer, we undertake to release at our own discretion securities to which we are entitled, provided that the realisable value of the securities exceeds the claims to be secured by more than 20% or their par value by more than 50%.

§ 11 - Delivering equipment for trial use

1. If equipment is delivered for trial use, the customer must, unless otherwise agreed, pay the freight costs as well as the costs for packaging, insurance and any depreciation which may have occurred. Additionally, the customer assumes liability for any loss of or damage to the goods delivered throughout the entire trial period. If returned, the goods must always be returned in a perfectly clean condition and with transport insurance at the customer's expense.

§ 12 - Miscellaneous

1. Liability for a breach of duties under the German Equipment and Product Safety Act is limited to products which were placed on the market after 01/05/2004.

§ 13 - Place of jurisdiction – Place of performance

1. The place of jurisdiction shall be our place of business. The same applies if the customer does not have a general place of jurisdiction in Germany or the location in which they are domiciled or normally resident is not known at the time when action is brought. However, we shall also be entitled to bring action against the customer at the court with jurisdiction at the location of their place of business or residence.
2. The laws of the Federal Republic of Germany shall apply; the United Nations Convention on Contracts for the International Sale of Goods is excluded. This shall apply even if the customer is from another country or is based in another country.
3. Unless otherwise stated in the order confirmation, the place of performance shall be our place of business.
4. If any provision of the contract with the customer, including these general terms of business, is or becomes invalid in whole or in part, then this shall not affect the validity of the remaining provisions. The provision which is entirely or partly invalid shall be substituted by one which most closely approximates the invalid provision in terms of its intended commercial outcome.

(Status: June 2010)

The most recent version of the general terms of delivery for products and services for the electrical industry also applies, as does the supplementary clause concerning extended retention of title as well as the software clause concerning the licensing of standard software as part of deliveries.n.

perfecting power

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TK1 2011-12A1/ENG/08-11/REV0 Printed in Germany