

Matching of Voltage and Current



Moeller is Eaton

EATON

Powering Business Worldwide



xCommand
Control and Indication



xStart
Switching, protecting and actuating motors



xCommand
xSystem
Automation, control and visualization



Matching of Voltage and Current



xEnergy
Xpole
Energy distribution, switching and protection



Xboard
Optimal switchgear enclosure



SmartWire-Darwin Communication System



Foot and palm switches FAK, pilot devices RMO, signal towers SL

Position switches LS, pressure switches MCS, sensors

Cam switches T, switch-disconnectors P up to 315 A



Mini contactor relays, contactor relay, contactors DIL

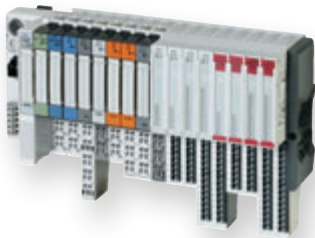
Overload relay Z..., ZEB, ZEV, EMT6

Motor protective circuit breaker PKZ and PKE

MSC motor-starter combinations

DS, DM soft starters

Frequency inverters M-Max™, H-Max™



Timing relays DILET, ETR; measuring relays EMR and monitoring relays EMR

Easy control relay MFD-Titan multi-function display

Safety relay easySafety, safety-related control relay ESR5

Automation solutions, SPS, I/O systems, visualisation

Transformers STN, UTI; universal power supply units AING



Busbar system SASY – accessories for control panel building

Compact circuit-breakers NZM, compact switch-disconnectors N up to 1600 A

IZM circuit-breakers, IN switch-disconnectors up to 6300 A

Circuit-breakers, fuses



Insulated enclosures CI, small enclosures CI-K

CS sheet steel wall-mounting enclosure



Commercial and logistic notes, approvals, After Sales Service, type / alphabetical index



Control transformers STN..., DTZ Multi-winding transformer UTI Multipurpose power supply units AING

All transformers are constructed and tested according to IEC/EN 61558 guidelines. Depending on version, they can therefore be used in compliance with the safety norm IEC/EN 60204.



Single-phase STN control transformers

Complete safety for electrical controls → Page 15/4

Single/three-phase control, isolating, and STI, STZ, DTZ safety transformers

With increased insulation for the production of low voltages → Page 15/6

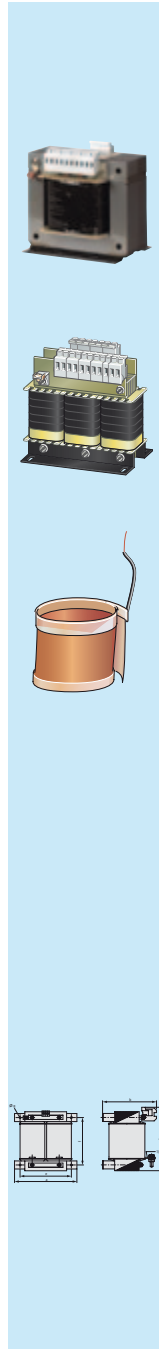
Single-phase UTI multi-winding transformers

Control, isolation and safety transformers according to IEC/EN 61558-2-2 +++ simple engineering as they are adapted to various worldwide control voltages → Page 15/9

Multipurpose power supply units AING

Safety transformers to IEC/EN 61558-2-6 +++ All voltages from one device +++ allow simple engineering and low wiring costs → Page 15/9

Control transformers, multi-winding transformers, universal power supply units



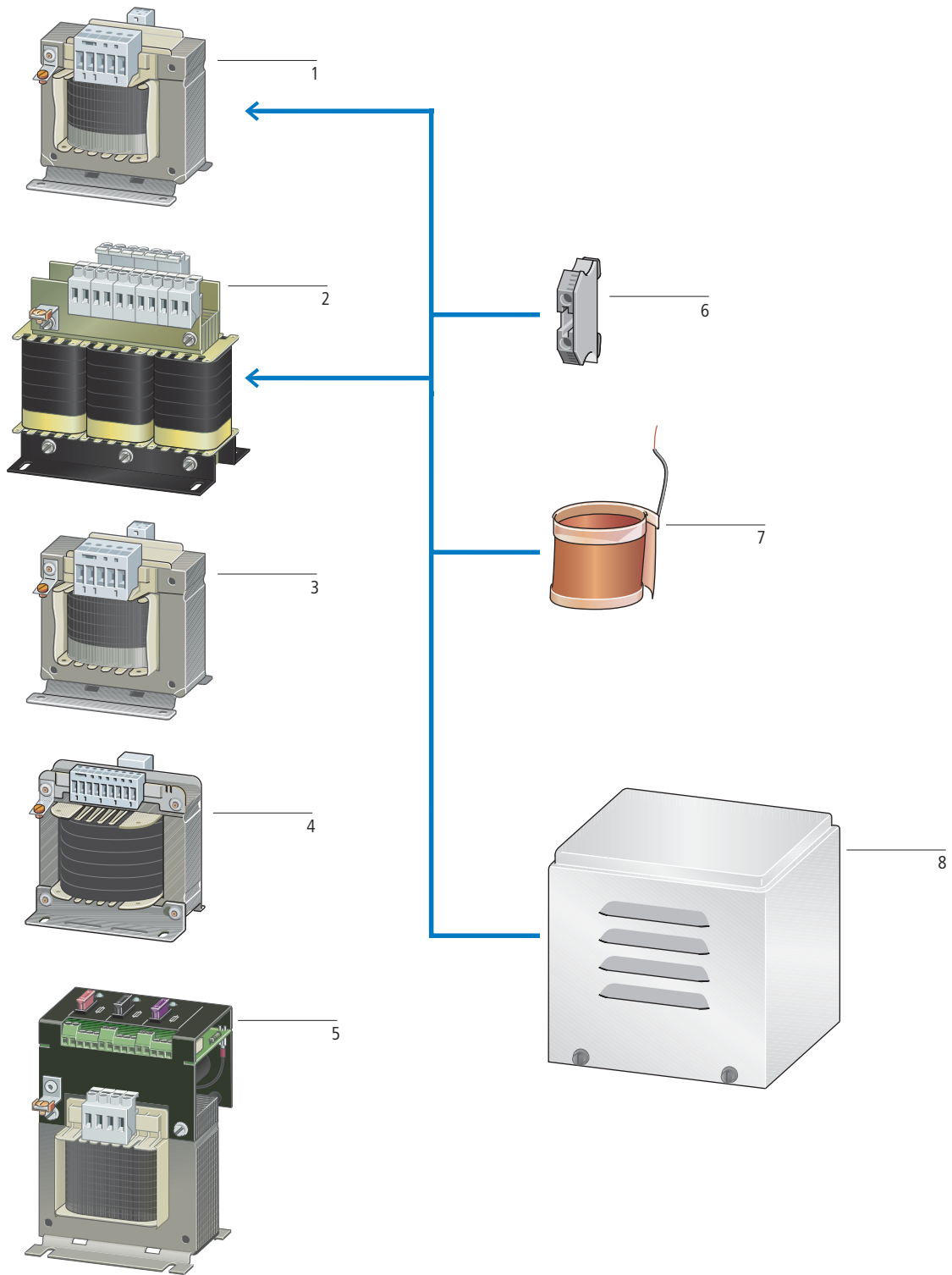
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Further transformers can be obtained from:

Trafomodern Transformatoren Ges.m.b.H.
 Industriestraße 11/11
 A-7053 Hornstein
 E-Mail: info@trafomodern.com
 Internet: www.trafomodern.com

System overview



Standard transformers

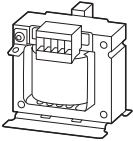


Single-phase control transformers STZ safety transformers STZ isolating transformers STZ	1
Primary tapping $\pm 5\%$	
Built and tested to IEC/EN 61558-2-2/2-4/2-6, VDE 0570-2-2/2-4/2-6, UL 506, CSA 22.2 No. 66	
→ Page 15/7	
Three-phase control transformers DTZ safety transformers DTZ isolating transformers DTZ	2
Primary tapping $\pm 5\%$	
Built and tested to IEC/EN 61558-2-2/2-4/2-6, VDE 0570-2-2/2-4/2-6, UL 506, CSA 22.2 No. 66	
→ Page 15/8	
Single-phase control transformers STI safety transformers STI isolating transformers STI	3
Primary tapping $\pm 5\%$	
Built and tested to IEC/EN 61558-2-2/2-4/2-6, VDE 0570-2-2/2-4/2-6, UL 506, CSA 22.2 No. 66	
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Single-phase control transformers STN	3
Primary tapping $\pm 5\%$	
Built and tested to IEC/EN 61558-2-2, VDE 0570-2-2 UL 506, CSA 22.2 No. 66	
→ Page 15/4	
Single-phase multi-winding transformers UTI	4
Primary tapping 208 to 600 V	
Built and tested to IEC/EN 61558-2-2/2-4/2-6, VDE 0570-2-2/2-4/2-6, UL 506, CSA 22.2 No. 66	
→ Page 15/9	
Universal power supply unit AING	5
Primary tapping $\pm 5\%$	
Safety transformer to IEC/EN 61558-2-2/2-6, VDE 0570-2-2/2-6,	
For every output voltage	
• a fuse	
• an LED	
• a changeover contact	
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Transformer features

Additional tapplings	6
Primary, secondary	
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Sheet-steel enclosure, degree of protection IP23	8
Enclosure for enhanced degree of protection	
Selection of features	
→ Ordering details of the respective transformer	
→ Page 15/10	



Ordering

Rated output kVA	Short-time rating kVA	Preferred voltage 400/230 V		Preferred voltage 400/24 V		Preferred voltage 230/24 V		Std. pack
		Part no. Article no.	Price See price list	Part no. Article no.	Price See price list	Part no. Article no.	Price See price list	
Single-phase control transformers with standard voltages IEC/EN 61558-2-2 VDE 0570 Part 2-2 Rated input voltage 230 ± 5 % V , 400 ± 5 % V Rated output voltage 24 V , 230 V 								
0.06	0.095	STN0.06(400/230) 204936		STN0.06(400/24) 204937		STN0.06(230/24) 204935		1 off  
0.1	0.16	STN0.1(400/230) 204942		STN0.1(400/24) 204943		STN0.1(230/24) 204941		
0.16	0.32	STN0.16(400/230) 204948		STN0.16(400/24) 204949		STN0.16(230/24) 204947		
0.2	0.38	STN0.2(400/230) 204977		STN0.2(400/24) 204978		STN0.2(230/24) 204976		
0.25	0.44	STN0.25(400/230) 204980		STN0.25(400/24) 221509		STN0.25(230/24) 221508		
0.315	0.6	STN0.315(400/230) 204982		STN0.315(400/24) 221511		STN0.315(230/24) 221510		
0.4	0.62	STN0.4(400/230) 204984		STN0.4(400/24) 221514		STN0.4(230/24) 221513		
0.5	0.88	STN0.5(400/230) 204986		STN0.5(400/24) 221516		STN0.5(230/24) 221515		
0.63	1.51	STN0.63(400/230) 204988		STN0.63(400/24) 221518		STN0.63(230/24) 221517		
0.8	2.25	STN0.8(400/230) 204990		STN0.8(400/24) 221520		STN0.8(230/24) 221519		
1	3.28	STN1.0(400/230) 204992		STN1.0(400/24) 221522		STN1.0(230/24) 221521		
1.3	4.8	STN1.3(400/230) 221523						
1.6	3.98	STN1.6(400/230) 221524						
2	5.75	STN2.0(400/230) 221525						
2.5	7.24	STN2.5(400/230) 221526						
3	8.36	STN3.0(400/230) 221527						
4	12.2	STN4.0(400/230) 221528						

Notes

Information relevant for export to North America



Product Standards

UL 506; UL5085-1; UL 5085-2; CSA-C22.2 No. 66; CSA-C22.2 No. 66.1-06; CSA-C22.2 No. 66.2-06; IEC/EN 61558-2-2; CE marking

UL File No.

E167225

UL CCN

XPTQ2, XPTQ8

CSA File No.

UL report applies to both US and Canada

CSA Class No.

-

NA Certification

UL Recognized, certified by UL for use in Canada

Suitable for

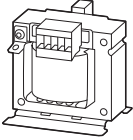


Branch circuits

Max. Voltage Rating

600 V AC

Degree of Protection

IEC: IP00, UL/CSA Type: -

Rated output kVA	Short-time rating kVA	Part no. Article no.	Price See price list	Std. pack	Notes
Single-phase control transformers					
IEC/EN 61558-2-2 VDE 0570 Part 2-2 Rated input voltage 100 – 690 ± 5 % V Rated output voltage 12 – 250 V					
					
0.06	0.095	STN0.06(*/*) 204938		1 off  	Ordering example When ordering, the part number must include the following details: STN0, 1(*/*) First asterisk Δ rated input voltage Second asterisk Δ rated output voltage • Desired part no. STN0, 1 • Desired rated input voltage 200 V • Desired rated output voltage 18.5 V The correct part no. is STN0, 1(200/18.5) Transformer-protective circuit-breakers PKZMO-...-T → Page 7/6
0.1	0.16	STN0.1(*/*) 204939			
0.16	0.32	STN0.16(*/*) 204944			
0.2	0.38	STN0.2(*/*) 204950			
0.25	0.44	STN0.25(*/*) 204979			
0.315	0.6	STN0.315(*/*) 204981			
0.4	0.62	STN0.4(*/*) 204983			
0.5	0.88	STN0.5(*/*) 204985			
0.63	1.51	STN0.63(*/*) 204987			
0.8	2.25	STN0.8(*/*) 204989			
1	3.28	STN1.0(*/*) 204991			
1.3	4.8	STN1.3(*/*) 204993			
1.6	3.98	STN1.6(*/*) 204994			
2	5.75	STN2.0(*/*) 204995			
2.5	7.24	STN2.5(*/*) 204996			
3	8.36	STN3.0(*/*) 204997			
4	12.2	STN4.0(*/*) 204998			

Notes

Information relevant for export to North America

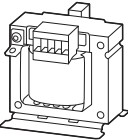




Product Standards

UL File No.
UL CCN
CSA File No.
CSA Class No.
NA Certification
Suitable for
Max. Voltage Rating
Degree of Protection

UL 506; UL5085-1; UL 5085-2; CSA-C22.2 No. 66; CSA-C22.2 No. 66.1-06;
CSA-C22.2 No. 66.2-06; IEC/EN 61558-2-2; CE marking
E167225
XPTQ2, XPTQ8
UL report applies to both US and Canada
-
UL Recognized, certified by UL for use in Canada
Branch circuits
600 V AC
IEC: IP00, UL/CSA Type: -



Rated output kVA	Short-time rating kVA	Standard voltage 400/230 V	Standard voltage 400/24 V	Standard voltage 230/230 V	Standard voltage 230/24 V	Price See price list	Std. pack
		Part no. Article no.	Part no. Article no.	Part no. Article no.	Part no. Article no.		
Single-phase control, isolating and safety transformers with standard voltages IEC/EN 61558-2-2/2-4/2-6 VDE 0570 Part 2-2, Part 2-6 (safety transformers), Part 2-4 (isolating transformers) Rated input voltage 230 ± 5 % V, 400 ± 5 % V Rated output voltage 24 , 230 V 							
0.06	0.13	STI0.06(400/230) 029975	STI0.06(400/24) 029971	STI0.06(230/230) 029968	STI0.06(230/24) 029977		1 off  
0.1	0.24	STI0.1(400/230) 046630	STI0.1(400/24) 046631	STI0.1(230/230) 029976	STI0.1(230/24) 046629		
0.16	0.36	STI0.16(400/230) 046633	STI0.16(400/24) 046634	STI0.16(230/230) 035247	STI0.16(230/24) 046632		
0.2	0.44	STI0.2(400/230) 046636	STI0.2(400/24) 046637	STI0.2(230/230) 035248	STI0.2(230/24) 046635		
0.25	0.6	STI0.25(400/230) 046638	STI0.25(400/24) 035249	STI0.25(230/230) 036400	STI0.25(230/24) 035262		
0.315	0.75	STI0.315(400/230) 046639	STI0.315(400/24) 035250	STI0.315(230/230) 040641	STI0.315(230/24) 036392		
0.4	1.1	STI0.4(400/230) 046640	STI0.4(400/24) 035251	STI0.4(230/230) 040642	STI0.4(230/24) 036393		
0.5	1.6	STI0.5(400/230) 046641	STI0.5(400/24) 035252	STI0.5(230/230) 040643	STI0.5(230/24) 036394		
0.63	1.7	STI0.63(400/230) 046883	STI0.63(400/24) 035253	STI0.63(230/230) 040644	STI0.63(230/24) 036395		
0.8	2	STI0.8(400/230) 046889	STI0.8(400/24) 035254	STI0.8(230/230) 026641	STI0.8(230/24) 036396		
1	2.8	STI1.0(400/230) 046895	STI1.0(400/24) 035255	STI1.0(230/230) 026642	STI1.0(230/24) 036397		
1.3	3.7	STI1.3(400/230) 046918		STI1.3(230/230) 035256			
1.6	5.5	STI1.6(400/230) 046952		STI1.6(230/230) 035257			
2	7	STI2.0(400/230) 035258		STI2.0(230/230) 036398			
2.5	9	STI2.5(400/230) 035259		STI2.5(230/230) 036399			
3	11.5	STI3.0(400/230) 035260					
4	15	STI4.0(400/230) 035261					

Notes

Information relevant for export to North America



Product Standards

UL 506; UL5085-1; UL 5085-2; CSA-C22.2 No. 66; CSA-C22.2 No. 66.1-06; CSA-C22.2 No. 66.2-06; IEC/EN 61558-2-2; CE marking

UL File No.

E167225

UL CCN

XPTQ2, XPTQ8

CSA File No.

UL report applies to both US and Canada

CSA Class No.

-

NA Certification

UL Recognized, certified by UL for use in Canada

Suitable for

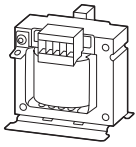

Branch circuits

Max. Voltage Rating

600 V AC

Degree of Protection

IEC: IP00, UL/CSA Type: -

Rated output kVA	Short-time rating kVA	Part no. Article no.	Price See price list	Std. pack	Notes
Single-phase control, isolating and safety transformers					
IEC/EN 61558-2-2/2-4/2-6 VDE 0570 Part 2-2, Part 2-6 (safety transformers), Part 2-4 (isolating transformers) Rated input voltage 50 – 950 ± 5 % V Rated output voltage 12 – 1000 V					
					
0.06	0.13	STZ0.06(*/*) 914761		1 off 	<ul style="list-style-type: none"> Transformers with rated output voltages ≤ 50 V can be used as safety transformers to IEC/EN 61558. <p>Ordering example When ordering, the part number must include the following details: STZ0.06(*/*) First asterisk Δ rated input voltage Second asterisk Δ rated output voltage</p> <ul style="list-style-type: none"> Desired part no. STZ0.06 Desired rated input voltage 230 V Desired rated output voltage 12 V <p>The correct type reference is STZ0.06(230/12)</p> <p>Caution! Standard voltages 400/230 V, 400/24 V, 230/230 V, 230/24 V are only supplied as STI → Page 15/6 if other suffixes, e.g. shield winding, are not ordered.</p> <p>Accessories → Page 15/10</p>
0.1	0.24	STZ0.1(*/*) 914762			
0.16	0.36	STZ0.16(*/*) 914763			
0.2	0.44	STZ0.2(*/*) 914764			
0.25	0.6	STZ0.25(*/*) 914765			
0.315	0.75	STZ0.315(*/*) 914766			
0.4	1.1	STZ0.4(*/*) 914767			
0.5	1.6	STZ0.5(*/*) 914768			
0.63	1.7	STZ0.63(*/*) 914769			
0.8	2	STZ0.8(*/*) 914770			
1	2.8	STZ1.0(*/*) 914771			
1.3	3.7	STZ1.3(*/*) 914772			
1.6	5.5	STZ1.6(*/*) 914773			
2	7	STZ2.0(*/*) 914774			
2.5	9	STZ2.5(*/*) 914775			
3	11.5	STZ3.0(*/*) 914776			
4	15	STZ4.0(*/*) 914777			
5.3	13	STZ5.3(*/*) 201060			
8.3	21	STZ8.3(*/*) 201062			
13.3	34	STZ13.3(*/*) 201064			

Notes

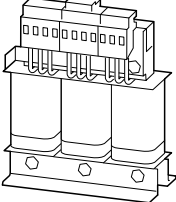

Information relevant for export to North America



Product Standards

UL File No.
UL CCN
CSA File No.
CSA Class No.
NA Certification
Suitable for
Max. Voltage Rating
Degree of Protection

UL 506; UL5085-1; UL 5085-2; CSA-C22.2 No. 66; CSA-C22.2 No. 66.1-06; CSA-C22.2 No. 66.2-06; IEC/EN 61558-2-2; CE marking
E167225
XPTQ2, XPTQ8
UL report applies to both US and Canada
—
UL Recognized, certified by UL for use in Canada
Branch circuits
600 V AC
IEC: IP00, UL/CSA Type: -

Rated output kVA	Short-time rating kVA	Part no. Article no.	Price See price list	Std. pack	Notes
Three-phase control, isolating and safety transformers IEC/EN 61558-2-2/2-4/2-6 VDE 0570 Part 2-2, Part 2-6 (safety transformers), Part 2-4 (isolating transformers) Rated input voltage 50 – 950 ± 5 % V Rated output voltage 18.5 – 1000 V					
					
0.1	0.2	DTZ0.1(*/*)* 914799		1 off 	<ul style="list-style-type: none"> Transformers with rated output voltages ≤ 50 V can be used as safety transformers in accordance with IEC/EN 61558. Ordering example When ordering, the part number must include the following details: DTZ0.1(*/*)* First asterisk \triangleq rated input voltage Second asterisk \triangleq rated output voltage Third asterisk \triangleq configuration <ul style="list-style-type: none"> Desired part no. DTZ0.1 Desired rated input voltage 200 V Desired rated output voltage 18.5 V Desired configuration Dy(n)5 The correct type reference is DTZ0.1(200/18.5)DY(N)5
0.16	0.32	DTZ0.16(*/*)* 914800			
0.25	0.5	DTZ0.25(*/*)* 914801			
0.4	0.8	DTZ0.4(*/*)* 914802			
0.5	1	DTZ0.5(*/*)* 914803			
0.63	1.38	DTZ0.63(*/*)* 914804			
1	2.2	DTZ1.0(*/*)* 914805			
1.6	3.5	DTZ1.6(*/*)* 914806			
2	4.4	DTZ2.0(*/*)* 914807			
2.5	5.5	DTZ2.5(*/*)* 914808			
4	6.2	DTZ4.0(*/*)* 914809			
6.3	15.7	DTZ6.3(*/*)* 914810			
8	20	DTZ8.0(*/*)* 914811			
10	25	DTZ10(*/*)* 914812			
12.5	31	DTZ12.5(*/*)* 914813			
16	40	DTZ16(*/*)* 914814			
20	50	DTZ20(*/*)* 914815			
25	62	DTZ25(*/*)* 914816		1 off	

Notes

Information relevant for export to North America

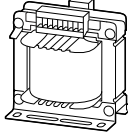



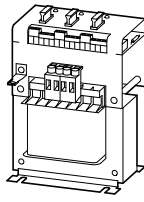
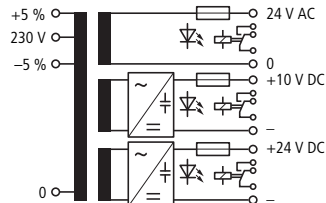
Product Standards

UL File No.
 UL CCN
 CSA File No.
 CSA Class No.
 NA Certification
 Suitable for
 Max. Voltage Rating
 Degree of Protection

UL 506; UL5085-1; UL 5085-2; CSA-C22.2 No. 66; CSA-C22.2 No. 66.1-06;
 CSA-C22.2 No. 66.2-06; IEC/EN 61558-2-2; CE marking
 E167225
 XPTQ2, XPTQ8
 UL report applies to both US and Canada
 –
 UL Recognized, certified by UL for use in Canada
 Branch circuits
 600 V AC
 IEC: IP00, UL/CSA Type: -

HPL15009EN

Rated output kVA	Rated input voltage V	Rated output voltage V	Part no. Article no.	Price See price list	Std. pack	Notes	
Single-phase multi-winding transformers							
(Universal) control, isolating and safety transformers to VDE 0550, IEC/EN 61558-2-2/2-4/2-6 VDE 0570 Part 2-2, Part 2-6 (safety transformers), Part 2-4 (isolating transformers)							
	0.1	208	2 x 115	UT10.1-115 206923	1 off 	Transformer-protective circuit-breakers PKZM0-...-T → Page 7/6	
	0.2	230		UT10.2-115 206924			
		380		UT10.315-115 206925			
	0.315	400					
		415					
	0.5	440					
		460					
0.63	480						
	500						
0.8	525						
	550						
1	575						
	600						
			UT10.8-115 206928				
			UT11.0-115 206929				

Rated output kVA	Max. output current A	Part no. Article no.	Price See price list	Std. pack	Notes
Multipurpose power supply units AING					
Safety transformer to IEC/EN 61558-2-2/2-6 VDE 0570 Part 2-2/2-6 For every output voltage a fuse, an LED and a changeover contact for monitoring and annunciation. Non-standard voltages please enquire Rated input voltage 230 ± 5 % V Rated output voltage 24 AC, 10 DC, 24 DC V					
	0.1	4.2	AING4 269516	1 off	<ul style="list-style-type: none"> • Circuit diagram: 
		1			
	0.192	3	AING8 269517		
		8			
	1				Signal contacts Switching voltage max. 250 V AC/110 V DC max. 1 A Switching duty 62 VA/30 W LED indicators • Output voltage present: LED = green • Fuse fault/missing: LED = red Size/type FK2 fuses are used.
	3				

Notes


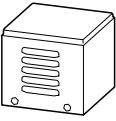
Information relevant for export to North America





Product Standards


UL File No.
UL CCN
CSA File No.
CSA Class No.
NA Certification
Suitable for
Max. Voltage Rating
Degree of Protection

UL 506; UL5085-1; UL 5085-2; CSA-C22.2 No. 66; CSA-C22.2 No. 66.1-06; CSA-C22.2 No. 66.2-06; IEC/EN 61558-2-2; CE marking
E167225
XPTQ2, XPTQ8
UL report applies to both US and Canada
-
UL Recognized, certified by UL for use in Canada
Branch circuits
600 V AC
IEC: IP00, UL/CSA Type: -

For use with	Part no. suffix Article no. for ordering only with basic unit	Price See price list	Std. pack	Notes	Information relevant for export to North America 	
IP23 enclosures						
	STZ0.06 ... STZ0.16	+IP23/01 200618	1 off	Enclosure can be used with primary or secondary voltages >110 V. For lower voltages, please enquire.		
	STZ0.2 ... STZ0.5	+IP23/02 200623				
	STZ0.63 ... STZ1.3	+IP23/03 200624				
	STZ1.6 ... STZ2.0	+IP23/04 226100				
	STZ5.3 ... STZ8.3	+IP23/05 200648				
	STZ13.3	+IP23/06 200649				
	STZ2.5 ... STZ4.0 DTZ1.0 ... DTZ2.0	+IP23/32A 200763				Enclosure can be used with primary or secondary voltages from 42 V to max. 1000 V incl. taps.
	DTZ0.1 ... DTZ0.16	+IP23/30 200706				
	DTZ0.25 ... DTZ0.63	+IP23/31 200753				
	DTZ2.5 ... DTZ6.3	+IP23/33 200754				
	DTZ8.0 ... DTZ25	+IP23/34 200755				

Shielding winding					
	STZ0.06 ... STZ1.6	+W1.8 082270	1 off 	Shielding winding means additional shielding between the primary and secondary winding.	UL/CSA approval not required
	STZ2.0 ... STZ13.3	+W4.0 082271			
	DTZ0.1... DTZ6.3	+W6.0 082274			
	DTZ8.0 ... DTZ20	+W20.0 082275			

Primary current I _N A	For use with	Type Article no. when ordered separately	Price See price list	Type suffix Article no. for ordering only with basic unit	Price See price list	Std. pack	Notes
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Inrush current limiters								
For single-phase transformers								
	1	ST1 STZ	EEB1 226102	+EEB1 226101		1 off	Primary current: from the transformer rating plate or by calculation Single-phase: $I_N = S_N / (U_{Nprim} \times \eta)$ Three-phase: $I_N = S_N / (\sqrt{3} U_{Nprim} \times \eta)$ S_N = rated transformer output U_{Nprim} = Transformer's primary rated voltage η = efficiency (from the technical data table)	
	2		EEB2 226104					+EEB2 226103
	3		EEB3 226106					+EEB3 226105

Current range A	For use with			Part no. suffix Article no. for ordering only with basic unit	Price See price list	Std. pack	Notes
Additional tappings							
For deviations in the rated input or output voltage of more than ± 10 %:							
<ul style="list-style-type: none"> • Ask about size of the transformer. • Also state distribution of rating in addition to the tapping. 							
< 16	STZ	Primary side	Single-phase transformers	+ZA16P(*) 931897		1 off 	<p>Selection of the correct tap. Ordering example for single-phase transformers:</p> <ul style="list-style-type: none"> • Selected transformer STZ0.25(400/24) • Required voltage of additional tapping 22 V • The current for selection of the tapping is calculated as follows: $I = S/U$ <p>I = current S = apparent power U = voltage of the tapping</p> $I = 250/22 = 11.4 \text{ A} \rightarrow +ZA16$ <p>For the secondary tapping, the correct suffix is: +ZA16S(22) A primary side additional tapping is determined in the same manner.</p> <hr/> <p>Selection of the correct tap. Ordering example for three-phase transformers:</p> <ul style="list-style-type: none"> • Selected transformer DTZ0.25(400/24) • Required voltage of additional tapping 22 V • The current for selection of the tapping is calculated as follows: $I = S/(\sqrt{3} \times U)$ <p>I = current S = apparent power U = voltage of the tapping</p> $I = 250/(\sqrt{3} \times 22) = 6.6 \text{ A} \rightarrow +DZA16$ <p>For the secondary tapping, the correct suffix is: +DZA16S(22) A primary side additional tapping is determined in the same manner.</p>
< 16	STZ	Secondary	Single-phase transformers	+ZA16S(*) 931895			
< 16	DTZ	Primary side	Three-phase transformers	+DZA16P(*) 930200			
< 16	DTZ	Secondary	Three-phase transformers	+DZA16S(*) 200406			
Additional windings							
For primary extra winding please enquire A maximum of 5 additional windings can be ordered for the primary and/or secondary side.							
< 16	STZ	Secondary	Single-phase transformers	+ZW16S(*V*VA) 279276		1 off 	<p>Ordering example for single-phase transformers: Transformer STZ...(400 V/200 V) with 1000 VA and a secondary additional winding for 100 V and 200 VA, resulting in the required rating of 1200 VA. The correct part no. is: STZ1.3(400/200)</p> <p>For pricing of the additional winding, the current is calculated as follows.:</p> $I = S/U$ <p>I = current S = apparent power of the additional winding U = voltage of the additional winding</p> $I = 200/100 = 2 \text{ A} \rightarrow +ZW16$ <p>For the secondary additional winding, the correct suffix is: +ZW16S(100V200VA)</p>



Notes

Information relevant for export to North America



UL/CSA approval not required

Engineering

Size selection for control transformers

Determination of the continuous rating

The control transformer must be rated in size so that the voltage drop remains within the permissible tolerance range even under unfavorable conditions. The determination of the transformer rating is performed by the addition of all the sealing powers of all loads which are to be connected simultaneously as well as addition of the inrush power of the largest load, and multiplying the result by a factor of 0.8.

If the ratings of the loads are very similar, the sum of all inrush powers of the simultaneously connected loads is added to the sum of all the sealing powers and the result is multiplied by a factor of 0.8.

Determination of the short-time rating

If the primary requirement is to switch large contactors, it is recommended that the control transformer is selected on the basis of the short-time rating. In most cases, this will mean that the transformer rating is reduced. It is important to ensure that the sealing power does not exceed the continuous rating.

Protection of control transformers

Operational conditions

The protective device shown in the table below must be connected upstream of the primary. The overload release of the circuit-breaker must be set to the stated current. The current to be set must also be stated on the rating plate of the transformer. If a short-circuit release is present it must be set to the maximum value. The setting values of the circuit-breaker apply up to 1.06 times the rated voltage. For a higher mains voltage the +5 % terminal is to be used. In the case of transformers > 2.0 kVA (DT... > 4.0 kVA) the circuit-breaker

may trip under certain mains supply conditions ($I_k > 6 \text{ kA}$) and with unfavorable starting torque. In such cases we recommend the use of an inrush current limiter. The inrush current limiter can be ordered as an accessory. Ordering details → Accessories

Setting range of the motor-protective circuit-breaker as a function of the STI, STZ and DTZ transformer rated power (VA)

Part no.	Primary voltage													
	200 V		230 V		400 V		415 V		440 V		500 V		690 V	
	Protective device	Setting A	Protective device	Setting A	Protective device	Setting A	Protective device	Setting A	Protective device	Setting A	Protective device	Setting A	Protective device	Setting A
ST...0.06	-		PKZM0-0.4	0.3	PKZM0-0.25	0.2	PKZM0-0.25	0.2	PKZM0-0.25	0.2	PKZM0-0.16	0.2	PKZM0-0.16	0.1
ST...0.1	-		PKZM0-0.63	0.5	PKZM0-0.4	0.3	PKZM0-0.4	0.3	PKZM0-0.4	0.3	PKZM0-0.25	0.2	PKZM0-0.25	0.2
ST...0.16	-		PKZM0-1	0.8	PKZM0-0.63	0.5	PKZM0-0.63	0.5	PKZM0-0.63	0.4	PKZM0-0.4	0.4	PKZM0-0.4	0.3
ST...0.2	-		PKZM0-1.6	1.0	PKZM0-0.63	0.6	PKZM0-0.63	0.6	PKZM0-0.63	0.5	PKZM0-0.63	0.5	PKZM0-0.4	0.3
ST...0.25	-		PKZM0-1.6	1.3	PKZM0-1	0.7	PKZM0-1	0.7	PKZM0-1	0.7	PKZM0-0.63	0.6	PKZM0-0.63	0.4
ST...0.315	-		PKZM0-1.6	1.5	PKZM0-1	0.9	PKZM0-1	0.9	PKZM0-1	0.8	PKZM0-1	0.7	PKZM0-0.63	0.5
ST...0.4	-		PKZM0-2.5	2.0	PKZM0-1.6	1.1	PKZM0-1.6	1.1	PKZM0-1.6	1.0	PKZM0-1	0.9	PKZM0-1	0.7
ST...0.5	-		PKZM0-2.5	2.4	PKZM0-1.6	1.4	PKZM0-1.6	1.3	PKZM0-1.6	1.2	PKZM0-1.6	1.1	PKZM0-1	0.8
ST...0.63	-		PKZM0-4	3.0	PKZM0-2.5	1.7	PKZM0-2.5	1.7	PKZM0-1.6	1.6	PKZM0-1.6	1.4	PKZM0-1.6	1.0
ST...0.8	-		PKZM0-4	3.8	PKZM0-2.5	2.2	PKZM0-2.5	2.1	PKZM0-2.5	2.0	PKZM0-2.5	1.7	PKZM0-1.6	1.3
ST...1.0	-		PKZM0-6.3	4.7	PKZM0-4	2.7	PKZM0-4	2.6	PKZM0-4	2.5	PKZM0-2.5	2.2	PKZM0-1.6	1.6
ST...1.3	-		PKZM0-10	6.3	PKZM0-4	3.5	PKZM0-4	3.4	PKZM0-4	3.2	PKZM0-4	2.8	PKZM0-2.5	2.0
ST...1.6	-		PKZM0-10	7.4	PKZM0-6.3	4.2	PKZM0-6.3	4.1	PKZM0-4	4.0	PKZM0-4	3.4	PKZM0-2.5	2.5
ST...2.0	-		PKZM0-16	10.0	PKZM0-6.3	5.3	PKZM0-6.3	5.1	PKZM0-6.3	4.8	PKZM0-6.3	4.2	PKZM0-4	3.1
ST...2.5	-		PKZ2/ZM-16	11.5	PKZ2/ZM-10	6.6	PKZ2/ZM-10	6.4	PKZ2/ZM-10	6.0	PKZ2/ZM-6	5.3	PKZ2/ZM-4	4.0
ST...3.0	-		PKZ2/ZM-25	16.0	PKZ2/ZM-16	10.0	PKZ2/ZM-16	10.0	PKZ2/ZM-10	7.1	PKZ2/ZM-10	6.2	PKZ2/ZM-6	4.5
ST...4.0	-		PKZ2/ZM-25	18.1	PKZ2/ZM-16	10.4	PKZ2/ZM-16	10.0	PKZ2/ZM-10	10.0	PKZ2/ZM-10	8.3	PKZ2/ZM-6	6.0
DT...0.1	PKZM0-0.4	0.4	PKZM0-0.4	0.3	PKZM0-0.25	0.2	PKZM0-0.25	0.2	PKZM0-0.25	0.2	PKZM0-0.16	0.1	PKZM0-0.16	0.1
DT...0.16	PKZM0-0.63	0.5	PKZM0-0.63	0.5	PKZM0-0.4	0.3	PKZM0-0.4	0.3	PKZM0-0.4	0.3	PKZM0-0.25	0.2	PKZM0-0.25	0.2
DT...0.25	PKZM0-1	0.8	PKZM0-1	0.7	PKZM0-0.63	0.4	PKZM0-0.63	0.4	PKZM0-0.4	0.4	PKZM0-0.4	0.3	PKZM0-0.4	0.3
DT...0.4	PKZM0-1.6	1.3	PKZM0-1.6	1.1	PKZM0-1	0.7	PKZM0-1	0.6	PKZM0-0.63	0.6	PKZM0-0.63	0.5	PKZM0-0.63	0.4
DT...0.5	PKZM0-2.5	1.6	PKZM0-1.6	1.4	PKZM0-1	0.8	PKZM0-1	0.8	PKZM0-1	0.7	PKZM0-1	0.6	PKZM0-0.63	0.5
DT...0.63	PKZM0-2.5	2.0	PKZM0-2.5	1.8	PKZM0-1.6	1.0	PKZM0-1.6	1.0	PKZM0-1	0.9	PKZM0-1	0.8	PKZM0-0.63	0.6
DT...1.0	PKZM0-4	3.1	PKZM0-4	2.7	PKZM0-2.5	1.6	PKZM0-1.6	1.5	PKZM0-1.6	1.4	PKZM0-1.6	1.3	PKZM0-1	0.9
DT...1.6	PKZM0-6.3	5.0	PKZM0-6.3	4.3	PKZM0-4	2.5	PKZM0-2.5	2.4	PKZM0-2.5	2.3	PKZM0-2.5	2.0	PKZM0-1.6	1.4
DT...2.0	PKZM0-6.3	6.2	PKZM0-6.3	5.4	PKZM0-4	3.1	PKZM0-4	3.0	PKZM0-4	2.8	PKZM0-2.5	2.5	PKZM0-2.5	1.8
DT...2.5	PKZM0-10	7.6	PKZM0-10	6.7	PKZM0-4	3.8	PKZM0-4	3.7	PKZM0-4	3.5	PKZM0-4	3.1	PKZM0-2.5	2.2
DT...4.0	PKZM0-16	12.0	PKZM0-16	10.4	PKZM0-6.3	6.0	PKZM0-6.3	5.8	PKZM0-6.3	5.5	PKZM0-6.3	4.8	PKZM0-4	3.5
DT...6.3	PKZ2/ZM-25	18.9	PKZ2/ZM-25	16.4	PKZ2/ZM-10	9.5	PKZ2/ZM-10	9.1	PKZ2/ZM-10	8.6	PKZ2/ZM-10	7.6	PKZM0-6.3	5.5

For all other transformers use transformer-protective circuit-breakers PKZM0-...-T. → Page 7/6

Technical data

		Control transformers			Multi-winding transformers UTI	Universal power supply units AING
		STI, STZ	DTZ	STN		
General						
Standards						
Built and tested to		IEC/EN 61558-2-2/ 2-4/2-6 VDE 0570 Part 2-2, Part 2-6 (safety transformers), Part 2-4 (isolating transformers)	IEC/EN 61558-2-2/ 2-4/2-6 VDE 0570 Part 2-2, Part 2-6 (safety transformers), Part 2-4 (isolating transformers)	IEC/EN 61558-2-2 VDE 0570 Part 2-2	(Universal) control, isolating and safety trans- formers to VDE 0550, IEC/EN 61558-2-2/ 2-4/2-6 VDE 0570 Part 2-2, Part 2-6 (safety transformers), Part 2-4 (isolating transformers)	Safety transformer to IEC/EN 61558-2-2/ 2-6 VDE 0570 Part 2-2/ 2-6
Suitable for use to		IEC/EN 60204-1, ÖVE-EN 13 VDE 0113, VDE 0100 Part 410	IEC/EN 60204-1, ÖVE-EN 13 VDE 0113, VDE 0100 Part 410	IEC/EN 60204-1, ÖVE-EN 13 VDE 0113, VDE 0100 Part 410	IEC/EN 60204-1, ÖVE-EN 13 VDE 0113, VDE 0100 Part 410	IEC/EN 60204-1 VDE 0113
Ambient temperature	°C	-25 - +40	-25 - +40	-25 - +40	-25 - +40	-25 - +40
Characteristics						
Terminals		● (< 115 A)	● (< 115 A)	● (< 115 A)	●	●
Connection lugs		● (> 115 A)	● (> 115 A)	● (> 115 A)	–	–
Insulation class		B	B	B	B	B
Rated frequency	Hz	50 - 60	50 - 60	50 - 60	50 - 60	50 - 60
Primary tapping		± 5 %	± 5 %	± 5 %	± 20 %	± 5 %
Degree of protection		IP00	IP00	IP00	IP00	IP20
Separate windings		●	●	●	●	●
Completely vacuum-impregnated		●	●	●	●	●
Reinforced insulation		●	●	–	●	●
Rated duty factor	% DF	100	100	100	100	100



	Total weight kg	No-load losses W	Short-circuit losses W	Short-circuit voltage %	Efficiency
Single-phase control, isolating, and safety transformers¹⁾					
ST...0.06	1.5	6	5	7.8	0.85
ST...0.1	2	7	8	6.9	0.87
ST...0.16	2.3	9	12	6.6	0.88
ST...0.2	3	11	17	6.6	0.88
ST...0.25	3.8	13	14	5.1	0.9
ST...0.315	4.3	10	18	5.5	0.92
ST...0.4	5.2	17	18	4.4	0.92
ST...0.5	6.8	15	24	3.9	0.93
ST...0.63	7.7	15	27	4.1	0.94
ST...0.8	9.6	17	25	3.2	0.95
ST...1.0	13.4	27	29	2.9	0.95
ST...1.3	14.9	32	35	3	0.95
ST...1.6	17.4	21	37	2.4	0.96
ST...2.0	21.5	27	33	2	0.97
ST...2.5	21.5	39	43	2.4	0.97
ST...3.0	26	30	55	2.1	0.97
ST...4.0	35	38	88	2.2	0.97
STZ5.3	40	40	165	4	0.96
STZ8.3	55	65	200	4	0.97
STZ13.3	80	95	265	3.5	0.97
Single-phase control transformers¹⁾					
STN0.06	1	7	10	11	0.79
STN0.1	1.5	7	15	10	0.84
STN0.16	2.4	11	16	6.7	0.87
STN0.2	2.8	9	19	6.8	0.88
STN0.25	2.9	9	21	6.3	0.9
STN0.315	3.5	11	21	5.3	0.91
STN0.4	4.2	12	27	5.3	0.92
STN0.5	5.1	15	27	4.1	0.93
STN0.63	7.1	21	32	3.8	0.93
STN0.8	9.8	24	24	2.5	0.94
STN1.0	12.4	33	26	2.2	0.94
STN1.3	14.1	46	33	2.1	0.94
STN1.6	14.3	43	44	2.5	0.95
STN2.0	19.9	56	42	2	0.95
STN2.5	20	21	145	2.4	0.95
STN3.0	23	32	94	2.4	0.96
STN4.0	27	28	143	2.4	0.96

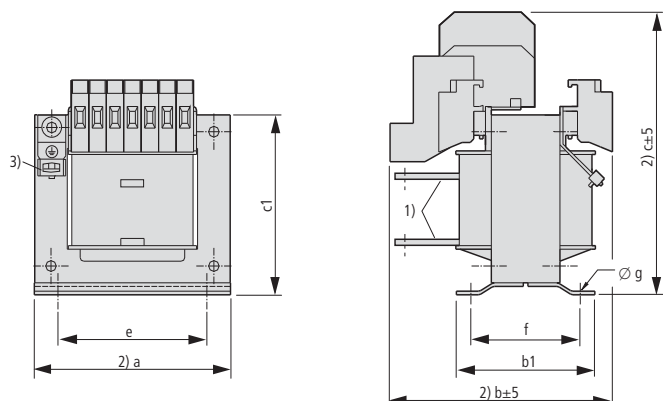
	Total weight kg	No-load losses W	Short-circuit losses W	Short-circuit voltage %	Efficiency
Three-phase control, isolating, and safety transformers¹⁾					
DTZ0.1	1.9	5	28	15	0.75
DTZ0.16	2.5	8	20	9.5	0.85
DTZ0.25	3.6	11	25	8.5	0.88
DTZ0.4	5.1	15	40	8	0.88
DTZ0.5	6.1	20	35	6	0.9
DTZ0.63	8.9	25	50	5.5	0.9
DTZ1.0	12.9	35	50	4	0.92
DTZ1.6	18.5	55	60	3	0.93
DTZ2.0	22.4	60	75	3.5	0.94
DTZ2.5	29.3	80	85	2.5	0.94
DTZ4.0	39.6	60	100	2	0.96
DTZ6.3	50.2	66	170	2	0.96
DTZ8.0	55	60	250	4	0.96
DTZ10	70	80	280	3.5	0.97
DTZ12.5	80	95	300	4	0.97
DTZ16	95	100	420	4.5	0.97
DTZ20	125	140	400	3.5	0.98
DTZ25	160	180	350	3	0.98
Single-phase multi-winding transformers					
UTI0.1	2	8	11	7.5	0.84
UTI0.2	3	10	19	6.5	0.87
UTI0.315	4.3	15	23	5	0.89
UTI0.5	6.8	26	23	3.5	0.92
UTI0.63	7.7	25	32	3.8	0.92
UTI0.8	9.6	33	29	2.8	0.93
UTI1.0	13.4	46	30	2.1	0.93

¹⁾ All no-load loss, short-circuit loss, short-circuit voltage and efficiency values apply at a temperature of 20 °C.

Dimensions

Single-phase control transformers

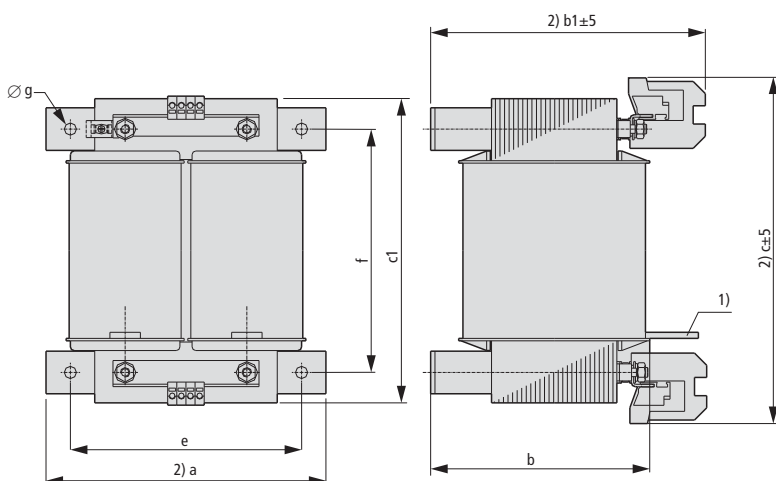
STN0.06...2.0



- ① Connection lugs
- ② Maximum space requirement
- ③ With STN0,06-0.2 ground connection at bottom

Part no.	12 V			24 V		42 V		110 V		230 V		e	f	Øg	b1	c1
	a	b	c	b	c	b	c	b	c	b	c					
STN0.06	66	79	78	79	78	79	78	79	78	79	78	50	56	4.8x8	67	60
STN0.1	85	75	91	75	91	75	91	75	91	75	91	64	47	4.8x8	60	76
STN0.16	85	97	91	97	91	97	91	97	91	97	91	64	70	4.8x8	83	76
STN0.2	106	83	112	83	112	83	112	83	112	83	112	80	61	5.8x9	80	97
STN0.25	106	103	121	83	112	83	112	83	112	83	112	80	61	5.8x9	80	97
STN0.315	106	111	121	91	112	91	112	91	112	91	112	80	70	5.8x9	89	97
STN0.4	121	108	133	88	124	88	124	88	124	88	124	90	68	5.8x12	86	106
STN0.5	121	120	133	120	133	100	124	100	124	100	124	90	80	5.8x12	98	106
STN0.63	151	121	157	121	157	107	145	107	145	107	145	122	82	7x15	104	132
STN0.8	151	124	196	138	157	124	145	124	145	124	145	122	99	7x15	121	132
STN1.0	151	150	196	164	157	164	157	150	145	150	145	122	125	7x15	147	132
STN1.3	175	138	213	148	169	148	169	138	157	138	157	135	110	7x15	135	152
STN1.6	175	183	170	138	216	148	169	138	157	138	157	135	110	7x15	135	152
STN2.0	175	213	170	168	216	178	169	168	157	168	157	135	141	7x15	165	152

STN2.5...4.0

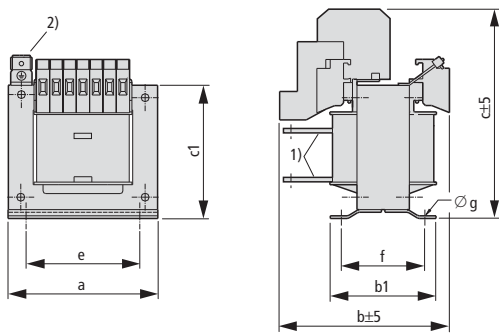


- ① Connection lugs
- ② Maximum space requirement

Part no.	a	b	c1	e	f	Øg	12 V		24V		42 V		110 V		230 V	
							b1	c	b1	c	b1	c	b1	c	b1	c
STN2.5	230	130	250	190	200	11	185	260	185	250	205	255	160	275	145	255
STN3.0	230	155	250	190	200	11	210	260	230	250	230	255	185	275	170	255
STN4.0	230	170	250	190	200	11	225	260	245	250	245	255	200	275	185	255

Single-phase control, isolating, and safety transformers

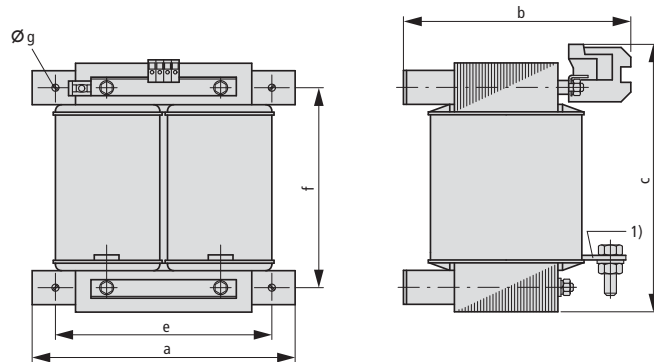
ST...0.06...2.5



- ① Connection lugs
- ② With STI/STZ0.06 ... 0.16 ground connection at bottom

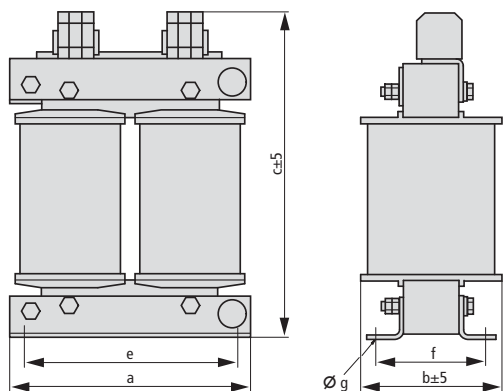
Part no.	12 V			24 V		42 V		110 V		230 V		b1	c1	e	f	Øg
	a	b	c	b	c	b	c	b	c	b	c					
ST...0.06	85	75	91	75	91	75	91	75	91	75	91	60	76	64	47	4.8x8
ST...0.1	85	89	91	89	91	89	91	89	91	89	91	74	76	64	61	4.8x8
ST...0.16	85	97	91	97	91	97	91	97	91	97	91	83	76	64	70	4.8x8
ST...0.2	106	83	112	83	112	83	112	83	112	83	112	80	97	80	61	5.8x9
ST...0.25	106	111	124	91	112	91	112	91	112	91	112	89	97	80	70	5.8x9
ST...0.315	121	-	-	88	119	88	119	88	119	88	119	86	106	90	68	5.8x12
ST...0.4	121	-	-	100	119	100	119	100	119	100	119	98	106	90	80	5.8x12
ST...0.5	121	-	-	140	131	120	119	120	119	120	119	118	106	90	100	5.8x12
ST...0.63	151	-	-	121	157	107	145	107	145	107	145	104	132	122	82	7x15
ST...0.8	151	-	-	138	157	124	145	124	145	124	145	121	132	122	99	7x15
ST...1.0	151	-	-	164	157	164	157	150	145	150	145	147	132	122	125	7x15
ST...1.3	175	-	-	148	169	148	169	138	157	138	157	135	152	135	110	7x15
ST...1.6	195	-	-	142	240	149	186	142	174	142	174	140	166	150	110	10x18
ST...2.0	195	-	-	154	240	161	186	154	174	154	174	152	166	150	122	10x18
ST...2.5	195	-	-	154	240	154	240	161	186	154	174	152	166	150	122	10x18

ST...3.0...4.0



Part no.	12 V			24 V		42 V		110 V		230 V		e	f	Øg
	a	b	c	b	c	b	c	b	c	b	c			
ST...3.0	230	-	-	210	250	230	255	185	275	170	255	190	200	11
ST...4.0	230	-	-	235	250	255	255	210	275	200	255	190	200	11

STZ5.3...13.3

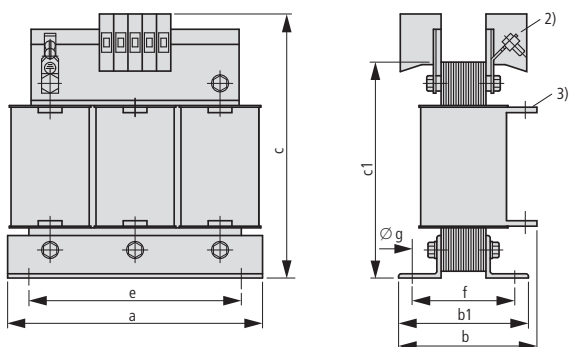


Part no.	12 V			24 V		42 V		110 V		230 V		e	f	Øg
	a	b	c	b	c	b	c	b	c	b	c			
STZ5.3	260	200	*)	200	*)	200	*)	214	374	214	360	230	126	10x18
STZ8.3	260	-	-	230	*)	230	*)	244	374	244	374	230	156	10x18
STZ13.3	320	-	-	240	*)	240	*)	270	440	270	440	270	172	13x20

*) The higher rated voltage is valid

Three-phase control, isolating, and safety transformers

DTZ0.1...25



- ① The higher rated operating voltage applies
- ② Terminals ≤ 25 A
- ③ Connection lugs > 63 A

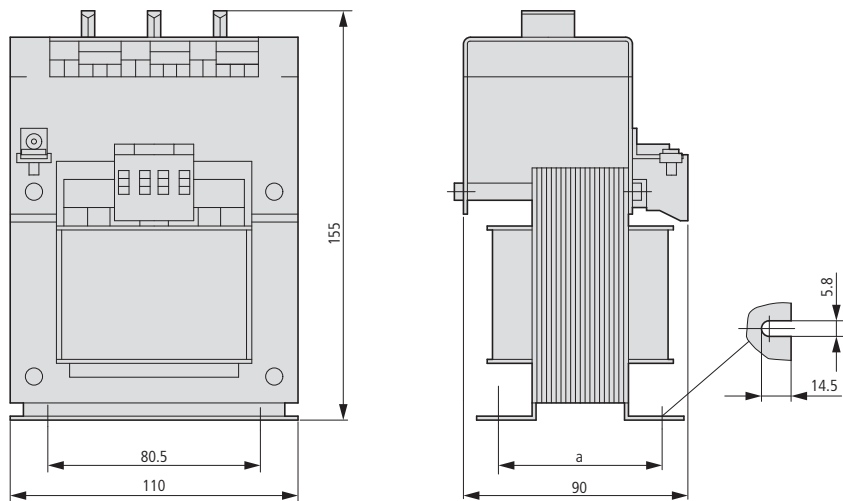
Part no.	a	18.5 V		24 V		42 V		110 V		230-690 V		e	f	Øg	b1	c1
		b	c	b	c	b	c	b	c	b	c					
DTZ0.1	125	65	134	65	134	65	134	65	134	65	134	100	45	8 x 5	61	102
DTZ0.16	125	75	134	75	134	75	134	75	134	75	134	100	55	8 x 5	71	102
DTZ0.25	155	77	154	77	154	77	154	77	154	77	154	130	57	8 x 12	77	128
DTZ0.4	155	92	154	92	154	92	154	92	154	92	154	130	72	8 x 12	92	128
DTZ0.5	190	82	180	112	191	82	180	82	180	82	180	170	58	8 x 12	82	155
DTZ0.63	190	102	180	132	191	102	180	102	180	102	180	170	78	8 x 12	102	155
DTZ1.0	210	137	210	137	210	137	210	117	199	117	199	175	97	8 x 12	117	174
DTZ1.6	230	144	234	114	269	144	234	114	223	114	223	176	95	7 x 13	114	198
DTZ2.0	240	117	279	117	279	117	279	141	244	117	233	185	95	10 x 18	117	208
DTZ2.5	265	132	299	132	299	132	299	152	264	132	253	200	102	10 x 18	132	228
DTZ4.0	300	166	317	166	333	147	333	157	296	157	296	224	119	10 x 18	147	260
DTZ6.3	300	193	285	210	285	193	333	173	333	173	296	224	145	10 x 18	173	260
DTZ8.0	390	200	1)	200	1)	200	1)	184	374	184	374	350	126	10 x 18	152	310
DTZ10.0	390	-	-	216	1)	216	1)	199	374	199	374	350	141	10 x 18	167	310
DTZ12.5	390	-	-	231	1)	231	1)	214	374	214	374	350	156	10 x 18	182	310
DTZ16	450	-	-	221	1)	221	1)	204	434	204	434	400	142	13 x 20	172	360
DTZ20	450	-	-	251	1)	251	1)	234	1)	234	434	400	172	13 x 20	202	360
DTZ25	450	-	-	281	1)	281	1)	264	1)	264	434	400	202	13 x 20	232	360



UTI, AING

Universal power supply units

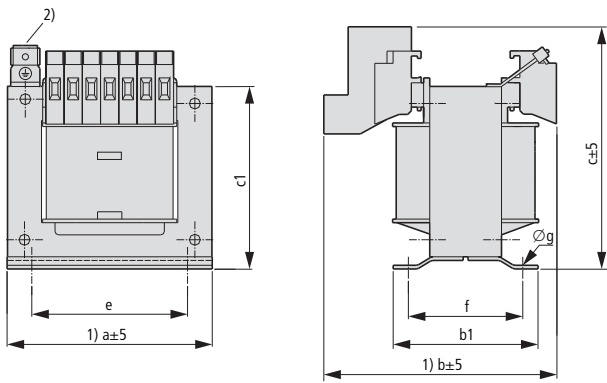
AING4, AING8



Part no.	a
AING4	62
AING8	70

Single-phase multi-winding transformers

UTI...



Part no.	U _s = 115 V							
	a	b	c	e	f	Øg	b1	c1
UTIO.1...	85	89	93	64	61	4.8x8	74	76
UTIO.2...	106	82	112	80	61	5.8x9	80	97
UTIO.315...	121	88	124	90	68	5.8x12	86	106
UTIO.5...	121	120	124	90	100	5.8x12	118	106
UTIO.63...	151	107	150	122	82	7x15	104	132
UTIO.8...	151	124	150	122	99	7x15	121	132
UTI1.0...	151	150	150	122	125	7x15	147	132

U_s ... Secondary voltage

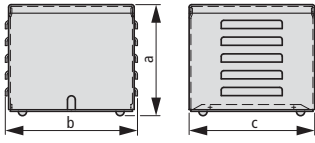
1) Maximum space requirement

2) With type UTIO,1... ground connection at bottom



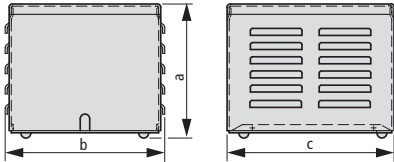
IP23 enclosures

+IP23/01, +IP23/02

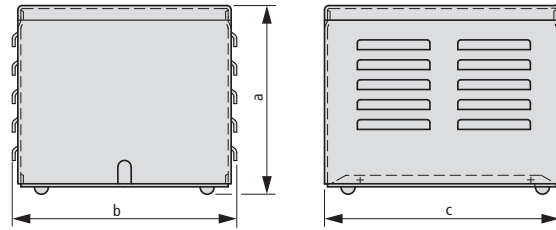


Part no.	a	b	c
+IP23/01	122	118	145
+IP23/02	160	192	184
+IP23/03	203	192	184
+IP23/04	203	231	254
+IP23/30	160	192	184
+IP23/31	203	231	254
+IP23/32A	315	263	360

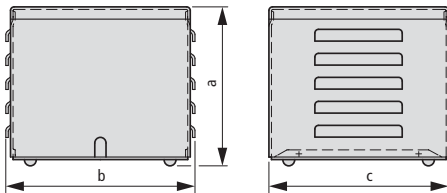
+IP23/03



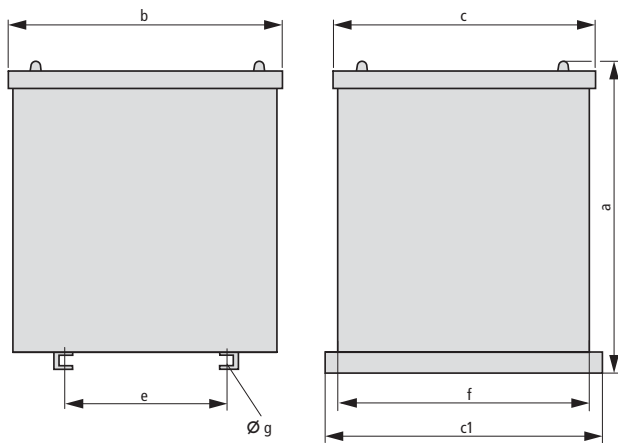
+IP23/04, +IP23/31, +IP 23/32A



+IP23/30



+IP23/05, +IP23/06, +IP 23/33, +IP23/34



Part no.	a	b	c	c1	e	f	Øg
+IP23/05	570	390	390	430	230	390	10
+IP23/06	690	500	480	540	270	500	13
+IP23/33	520	410	340	360	212	330	10
+IP23/34	620	560	440	460	350	430	12

