

valid as from 1.10.2012

PRODUCT CATALOGUE

Transformers

Chokes

Power supplies

Customized components

leadership in transformation



leadership in transformation

Since 1945 trafomodern Transformatorengesellschaft m.b.H. located in Hornstein, Austria develops, manufactures, produces and sells transformers, chokes, power supplies and other inductive components. Additionally trafomodern offers services like for example calculations around all kind of inductive components or winding of products.

trafomodern is an international mid-size enterprise (SME) with strong Austrian roots. trafomodern clients at home and abroad trust our products and competence and have turned us into the Austrian market leader for inductive components. Our strength is to understand and to fulfill customer specific requirements.

The product portfolio of trafomodern comprises transformers from 30VA to 800kVA with a rated voltage from 110V to 12kV, chokes with an energy content from 0.2W to 20 kW and standard power supplies up to 50A. Specific power supplies up to 2000A are possible.

An outstanding feature of many of our products is the fulfillment of several quality standards; many of our products are marked with labels of at least one national or international test authority like UL, CSA or Germanischer Lloyd. Further detailed technical information can be found in the internet under www.trafomodern.com.

This catalogue only shows the standard portfolio. But only the fulfillment of customer specific requirements will ensure the market success. You need a different configuration for your power supply unit, you need additional sub-systems for your transformer or simply just an alternative mounting bracket? No problem. Even when you require inductive components with special technical features, e.g. for applications with high ambient temperatures or with special specialized protection against moisture. Trafomodern will manufacture your products according to your specifications. To trafomodern, each transformer, each choke and each inductive component is a miniature-system. With this strategy trafomodern has been successful for decades. Our sales team will be pleased to advise you.



trafomodern Transformatorenges. m.b.H.
Industriestraße 11/11 · A 7053 Hornstein

Tel. +43 / 26 89 / 27 44 - 0
Fax +43 / 26 89 / 27 44 - 9

info@trafomodern.com
www.trafomodern.com



Transformers

Single-phase

Type	Description	page
STN, STI	Single-phase control transformers with preferred rated voltage (types on stock)	6–7
STN	Single-phase control transformers	8–9
STI	Single-phase control, isolating and safety transformers	10–11
STZ	Single-phase control, isolating and safety transformers	12–13
STA	Single-phase control transformers (ATEX-tested)	14–15
ET	Single-phase matching transformers	16–17
ETSP	Single-phase autotransformers	18–19
UTI	Single-phase multi-winding transformers	20–21
TT	Portable transformers for protective separation	22–23
ET-MED	Single-phase transformers for usage in medical environment	42–43



Transformers

Three-phase

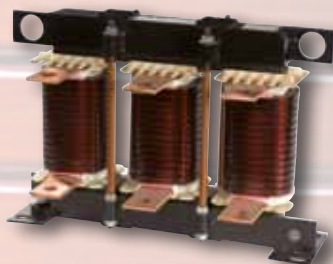
Type	Description	page
DTI	Three-phase control, isolating and safety transformers	24–25
DTZ	Three-phase control, isolating and safety transformers	26–27
DT	Three-phase matching transformers	28–29
DTF	Three-phase transformers	30–31
D4TB, D4TF	Three-phase transformers with 4% u_k	32–33
DTSP	Three-phase autotransformers	34–35
DTFSP	Three-phase autotransformers	36–37
DA, DACB, DANF	Series transformers (with integrated mains filter and circuit breaker)	38–39
DSB	Earthing autotransformers	40–41
DT-MED	Three-phase transformers for usage in medical environment	42–43



DC power supply units

Type	Description	page
GW, GD	Single-phase, three-phase power supplies	44–45
AING	Single-phase “all inclusive power supply”	46





Chokes

Type	Description	page
DEG	Single-phase smoothing chokes	48–49
DEK	Single-phase commutating chokes	50–51
DDK	Three-phase commutating chokes	52–53



Additional equipment

Type	Description	page
	Enclosures	
IP23	Protective steel sheet enclosure IP23	54–55
	optional equipment	
STR	Increased currents	56
W / TA / ZA	Static shield winding, Tropics resistant, Additional tapping	57
EEB / DEB	Inrush current limiter	58
C4 / ZW / DZW	Screw-less terminal, Additional windings, Special accessories	59



Engineering data

Description	page
Material surcharge	60
Standard Terms and Conditions of Delivery and Payment	60–61
Trademarks	61
General design	62
Terms and definitions	63
Engineering data	64–66



Transformers STN

Single-phase-control transformers with preferred rated voltages (types on stock)

Designed and tested according

- IEC/EN 61558-2-2
- VDE 0570-2-2
- UL 5085-2
- CSA 22.2 No. 66

Basic equipment

- Separate windings
- Insulation class B
- Ambient temperature -25 to 40 °C
- Connection terminal (<63 A)
- Frequency 50/60 Hz
- ±5 % tapping on the primary side



For use according to

- IEC/EN 60204-1
- VDE 0113 / VDE 0100 part 410

Technical data: see page 9.

STN

Typical applications

- Control voltage circuits
- Functional low voltage

Rated output	Short time rating	Type Order no.	Price per unit	Type Order no.	Price per unit	Type Order no.	Price per unit	Cu-factor ¹⁾
kVA	kVA	400/230 V	Euro	400/24 V	Euro	230/24 V	Euro	
0.06	0.095	STN0,06(400/230) 4001619	31.70	STN0,06(400/24) 4001620	31.70	STN0,06(230/24) 4001618	31.70	0.20
0.1	0.16	STN0,1(400/230) 4001623	37.30	STN0,1(400/24) 4001624	37.30	STN0,1(230/24) 4001622	37.30	0.30
0.16	0.32	STN0,16(400/230) 4001627	43.90	STN0,16(400/24) 4001628	43.90	STN0,16(230/24) 4001626	43.90	0.38
0.2	0.38	STN0,2(400/230) 4001631	51.50	STN0,2(400/24) 4001632	51.50	STN0,2(230/24) 4001630	51.50	0.55
0.25	0.44	STN0,25(400/230) 4001634	55.00	STN0,25(400/24) 4001635	70.50	STN0,25(230/24) 4001633	70.50	0.65
0.315	0.6	STN0,315(400/230) 4001637	61.40	STN0,315(400/24) 4001638	74.90	STN0,315(230/24) 4001636	74.90	0.80
0.4	0.62	STN0,4(400/230) 4001640	67.00	STN0,4(400/24) 4001641	82.20	STN0,4(230/24) 4001639	82.20	1.10
0.5	0.88	STN0,5(400/230) 4001643	75.60	STN0,5(400/24) 4001644	88.20	STN0,5(230/24) 4001642	88.20	1.15
0.63	1.51	STN0,63(400/230) 4001646	98.50	STN0,63(400/24) 4001647	98.50	STN0,63(230/24) 4001645	98.50	1,35
0.8	2.25	STN0,8(400/230) 4001649	117.50	STN0,8(400/24) 4001650	131.20	STN0,8(230/24) 4001648	131.20	2.30
1	3.28	STN1,0(400/230) 4001652	133.60	STN1,0(400/24) 4001653	145.00	STN1,0(230/24) 4001651	145.00	2.00
1.3	4.08	STN1,3(400/230) 4001654	163.20	-	-	-	-	3.10
1.6	3.98	STN1,6(400/230) 4001655	176.90	-	-	-	-	3.40
2	5.75	STN2,0(400/230) 4001656	212.20	-	-	-	-	4.40
2.5	7.24	STN2,5(400/230) 4001657	359.80	-	-	-	-	6.00
3	8.36	STN3,0(400/230) 4001658	432.20	-	-	-	-	7.00
4	12.2	STN4,0(400/230) 4001659	498.60	-	-	-	-	8.00

¹⁾ Material surcharge → page 60

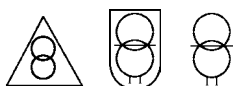
Sample order

The order number depends on the type and the preferred rated voltages:

- requested type: STN0,63
- requested preferred rated voltage: 400/24 V
- order no: 4001647

Transformers STI

Single-phase control, isolating and safety transf. w/ preferred rated voltages (types on stock)



Designed and tested according to

- IEC/EN 61558-2-2 / 2-4 / 2-6
- VDE 0570-2-2 / 2-4 / 2-6
- UL 5085-2
- CSA 22.2 No. 66

For use according to

- IEC/EN 60204-1
- VDE 0113 / VDE 0100 part 410

Basic equipment

- Separate windings
- Insulation class B
- Ambient temperature -25 to 40 °C
- Connection terminal (<63 A)
- Frequency 50/60 Hz
- ±5 % tapping on the primary side

Technical data: see page 11.

Typical applications

- Control voltage circuits
- Functional low voltage
- Protective separation



STI

Rated output	Short time rating	Type Order no.	Type Order no.	Type Order no.	Type Order no.	Price per unit	Cu-factor ¹⁾
kVA	kVA	400/230 V	400/24 V	230/230 V	230/24 V	Euro	
0.06	0.13	STI0,06(400/230) 4001568	STI0,06(400/24) 4001569	STI0,06(230/230) 4001566	STI0,06(230/24) 4001567	48.10	0.20
0.1	0.24	STI0,1(400/230) 4001572	STI0,1(400/24) 4001573	STI0,1(230/230) 4001570	STI0,1(230/24) 4001571	54.50	0.25
0.16	0.36	STI0,16(400/230) 4001576	STI0,16(400/24) 4001577	STI0,16(230/230) 4001574	STI0,16(230/24) 4001575	67.20	0.40
0.2	0.44	STI0,2(400/230) 4001581	STI0,2(400/24) 4001582	STI0,2(230/230) 4001578	STI0,2(230/24) 4001580	74.10	0.65
0.25	0.6	STI0,25(400/230) 4001585	STI0,25(400/24) 4001586	STI0,25(230/230) 4001583	STI0,25(230/24) 4001584	84.50	0.80
0.315	0.75	STI0,315(400/230) 4001589	STI0,315(400/24) 4001590	STI0,315(230/230) 4001587	STI0,315(230/24) 4001588	91.60	1.10
0.4	1.1	STI0,4(400/230) 4001593	STI0,4(400/24) 4001594	STI0,4(230/230) 4001591	STI0,4(230/24) 4001592	94.50	1.15
0.5	1.6	STI0,5(400/230) 4001597	STI0,5(400/24) 4001598	STI0,5(230/230) 4001595	STI0,5(230/24) 4001596	108.00	1.40
0.63	1.7	STI0,63(400/230) 4001601	STI0,63(400/24) 4001602	STI0,63(230/230) 4001599	STI0,63(230/24) 4001600	134.50	1.90
0.8	2.4	STI0,8(400/230) 4001605	STI0,8(400/24) 4004918	STI0,8(230/230) 4001603	STI0,8(230/24) 4001604	149.90	2.10
1	2.8	STI1,0(400/230) 4001608	STI1,0(400/24) 4002884	STI1,0(230/230) 4001606	STI1,0(230/24) 4001607	164.20	2.20
1.3	3.7	STI1,3(400/230) 4001609	-	STI1,3(230/230) 4014112	-	208.30	3.20
1.6	5.5	STI1,6(400/230) 4001611	-	STI1,6(230/230) 4001610	-	282.10	3.40
2	7	STI2,0(400/230) 4001613	-	STI2,0(230/230) 4001612	-	328.40	4.00
2.5	9	STI2,5(400/230) 4001615	-	STI2,5(230/230) 4001614	-	369.20	5.50
3	11.5	STI3,0(400/230) 4001616	-	-	-	532.40	9.50
4	15	STI4,0(400/230) 4007015	-	-	-	657.40	10.40

¹⁾Material surcharge → page 60

Sample order

The order number depends on the type and the preferred rated voltages:

- requested type: STI 0,1
- requested preferred rated voltage: 400/230 V
- order no: 4001572



STN

Transformers

Single-phase control transformers

Designed and tested according to

- IEC/EN 61558-2-2
- VDE 0570-2-2
- UL 5085-2
- CSA 22.2 No. 66

For use according to

- IEC/EN 60204-1
- VDE 0113 / VDE 0100 part 410

Typical applications

- Control voltage circuits
- Functional low voltage

Basic equipment

- Separate windings
- Insulation class B
- Ambient temperature -25 to 40 °C
- Connection terminal (<63 A)
- Frequency 50/60 Hz
- ±5 % tapping on the primary side

Further equipment

- Enclosure IP23 page 54
- Additional tapping page 57
- Additional winding page 59
- Temperature Control page 59
- Static shield winding page 57
- Tropics resistant equipment page 57



Rated output	Short time rating	Rated input voltage	Rated output voltage	Type	Price per unit	Cu-factor ¹⁾
kVA	kVA	V (selectable)	V (selectable)		Euro	
0.03	0.06	100 - 690	12 - 250	STN0,03(*/*)	36.70	0.08
0.06	0.13			STN0,06(*/*)	42.40	0.20
0.1	0.22			STN0,1(*/*)	51.50	0.30
0.16	0.4			STN0,16(*/*)	60.30	0.38
0.2	0.5			STN0,2(*/*)	70.80	0.55
0.25	0.6			STN0,25(*/*)	76.30	0.65
0.315	0.79			STN0,315(*/*)	82.00	0.80
0.4	1			STN0,4(*/*)	90.10	1.10
0.5	1.4			STN0,5(*/*)	95.40	1.15
0.63	2			STN0,63(*/*)	103.30	1.35
0.8	2.1			STN0,8(*/*)	138.10	2.30
1	3			STN1,0(*/*)	151.80	2.00
1.3	4.5			STN1,3(*/*)	172.30	3.10
1.6	5.1			STN1,6(*/*)	187.20	3.40
2	7			STN2,0(*/*)	222.50	4.40
2.5	8.4			STN2,5(*/*)	367.10	6.00
3	12			STN3,0(*/*)	440.80	7.00
4	17			STN4,0(*/*)	508.40	8.00

¹⁾ Material surcharge → page 60

Please note our informations regarding the protection of transformers on page 66.

- The transformers STN are designed for use in control circuits according to VDE 0113 and IEC/EN 60 204
- UL/CSA only up to 600 V (incl. tapping)
- CUR according to UL-File XPTQ2.E168819 (General Purpose-Component)

When ordering, the following information must be added to the type designation:

STN0,1(*/*)

- 1st place holder Δ rated input voltage
- 2nd place holder Δ rated output voltage

Sample order

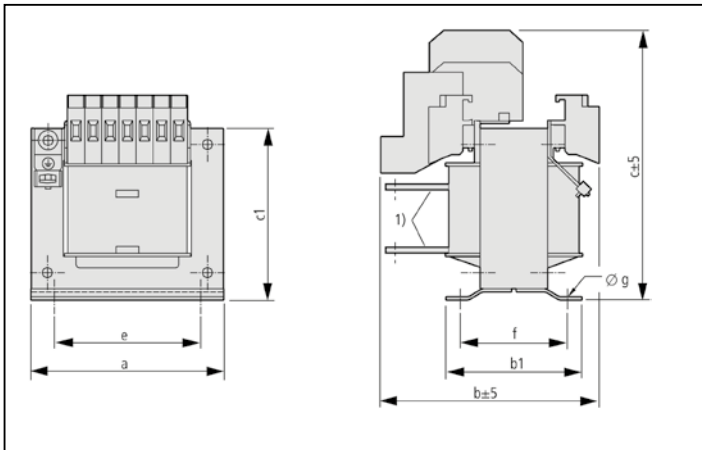
- requested type STN0,1
- requested rated input voltage 200 V
- requested rated output voltage 18.5 V

The correct type designation reads **STN0,1(200/18.5)**

The unambiguous article number of your configuration will be defined by trafomodern during the offer- and order process.

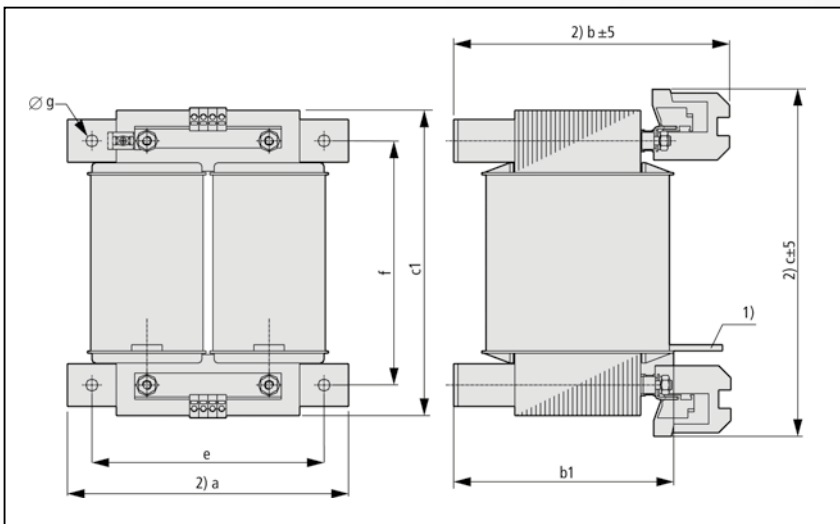
Transformers

Single-phase control transformers STN



- ¹⁾ Connection lugs
- ²⁾ Max. space requirement
- ³⁾ For STN 0.03 ... 0.2 earth connection downwards

Type	Total weight	No-load losses	Short-circuit losses	Short-circuit voltage	Efficiency factor	a	b	c	b	c	b	c	b	c	b	c	e	f	Øg	b1	c1
	kg	W	W	%		12 V	24 V	42 V	110 V	230 V											
STN0,03	0.7	4	5	11	0.75	66	62	78	62	78	62	78	62	78	62	78	50	44	4.8 x 8	55	60
STN0,06	1	7	10	11	0.79	66	79	78	79	78	79	78	79	78	79	78	50	56	4.8 x 8	67	60
STN0,1	1.5	7	15	10	0.84	85	75	91	75	91	75	91	75	91	75	91	64	47	4.8 x 8	60	76
STN0,16	2.4	11	16	6.7	0.87	85	97	91	97	91	97	91	97	91	97	91	64	70	4.8 x 8	83	76
STN0,2	2.8	9	19	6.8	0.88	106	83	112	83	112	83	112	83	112	83	112	80	61	5.8 x 9	80	97
STN0,25	2.9	9	21	6.3	0.9	106	103	121	83	112	83	112	83	112	83	112	80	61	5.8 x 9	80	97
STN0,315	3.5	11	21	5.3	0.91	106	111	121	91	112	91	112	91	112	91	112	80	70	5.8 x 9	89	97
STN0,4	4.2	12	27	5.3	0.92	121	108	133	88	124	88	124	88	124	88	124	90	68	5.8 x 12	86	106
STN0,5	5.1	15	27	4.1	0.93	121	120	133	120	133	100	124	100	124	100	124	90	80	5.8 x 12	98	106
STN0,63	7.1	21	32	3.8	0.93	151	121	157	121	157	107	145	107	145	107	145	122	82	7 x 15	104	132
STN0,8	9.8	24	24	2.5	0.94	151	124	196	138	157	124	145	124	145	124	145	122	99	7 x 15	121	132
STN1,0	12.4	33	26	2.2	0.94	151	150	196	164	157	164	157	150	145	150	145	122	125	7 x 15	147	132
STN1,3	14.1	46	33	2.1	0.94	175	138	213	148	169	148	169	138	157	138	157	135	110	7 x 15	135	152
STN1,6	14.3	43	44	2.5	0.95	175	183	170	138	216	148	169	138	157	138	157	135	110	7 x 15	135	152
STN2,0	19.9	56	42	2	0.95	175	213	170	168	216	178	169	168	157	168	157	135	140	7 x 15	165	152



all dimensions in mm

- ¹⁾ Connection lugs
- ²⁾ Max. space requirement

Type	Total weight	No-load losses	Short-circuit losses	Short-circuit voltage	Efficiency factor	a	b1	c1	e	f	Øg	b	c	b	c	b	c	b	c	b	c
	kg	W	W	%								12 V	12 V	24 V	24 V	42 V	42 V	110 V	110 V	230 V	230 V
STN2,5	20	21	145	2.4	0.95	230	130	250	190	200	11	185	260	185	250	205	255	160	275	145	255
STN3,0	23	32	94	2.4	0.96	230	155	250	190	200	11	210	260	230	250	230	255	185	275	170	255
STN4,0	27	28	143	2.4	0.96	230	170	250	190	200	11	225	260	245	250	245	255	200	275	185	255

all dimensions in mm



Transformers

Single-phase control, isolating and safety transformers

Designed and tested according to

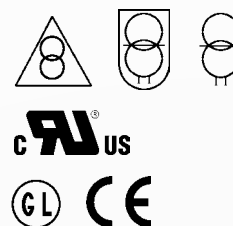
- IEC/EN 61558-2-2 / 2-4 / 2-6
- VDE 0570-2-2 / 2-4 / 2-6
- UL 5085-2
- CSA 22.2 No. 66

For use according to

- IEC/EN 60204-1
- VDE 0113 / VDE 0100 part 410

Basic equipment

- Separate windings
- Insulation class B
- Ambient temperature -25 to 40 °C
- Connection terminal (<63 A)
- Frequency 50/60 Hz
- ±5 % tapping on the primary side



c **UL** US



STI

Typical applications

- Control voltage circuits
- Functional low voltage
- Safety low voltage
- Protective separation

Rated output	Short time rating	Rated input voltage	Rated output voltage	Type	Price per unit	Cu-factor ¹⁾
kVA	kVA	V (selectable)	V (selectable)		Euro	
0.06	0.13	230 ± 5 % 400 ± 5 %	12 24	STI0,06(*/*)	56.60	0.20
0.1	0.24	415 ± 5 % 440 ± 5 %	42 110	STI0,1(*/*)	64.10	0.25
0.16	0.36	500 ± 5 % 690 ± 5 %	230	STI0,16(*/*)	78.70	0.40
0.2	0.44			STI0,2(*/*)	88.00	0.65
0.25	0.6			STI0,25(*/*)	95.70	0.80
0.315	0.75			STI0,315(*/*)	103.80	1.10
0.4	1			STI0,4(*/*)	108.00	1.15
0.5	1.6			STI0,5(*/*)	122.40	1.40
0.63	1.7			STI0,63(*/*)	148.80	1.90
0.8	2			STI0,8(*/*)	166.40	2.10
1	2.8			STI1,0(*/*)	183.00	2.20
1.3	3.7			STI1,3(*/*)	231.50	3.20
1.6	5.5			STI1,6(*/*)	313.10	3.40
2	7			STI2,0(*/*)	364.90	4.00
2.5	9			STI2,5(*/*)	402.30	5.50
3	11.5			STI3,0(*/*)	578.70	9.50
4	15			STI4,0(*/*)	720.90	10.40

¹⁾ Material surcharge → page 60

Please note our informations regarding the protection of transformers on page 66.

- According to IEC/EN 61558 transformers with rated output voltages ranging from 12 V to 42 V can be used as safety transformers.
- UL/CSA only up to 600 V (incl. tapping)
- CUR according to UL-File XPTQ2.E168819 (General Purpose-Component)
- GL test mark up to secondary 250 V
- From STI0,315 (*/*12) → STZ

When ordering, the following information must be added to the type designation:

STI0,06(*/*)

- 1st place holder Δ rated input voltage
- 2nd place holder Δ rated output voltage

Sample order

- requested type STI0,06
- requested rated input voltage 230 V
- requested rated output voltage 12 V

The correct type designation reads **STI0,06(230/12)**

The unambiguous article number of your configuration will be defined by trafomodern during the offer- and order process.

Transformers

Single-phase control, isolating and safety transformers STI

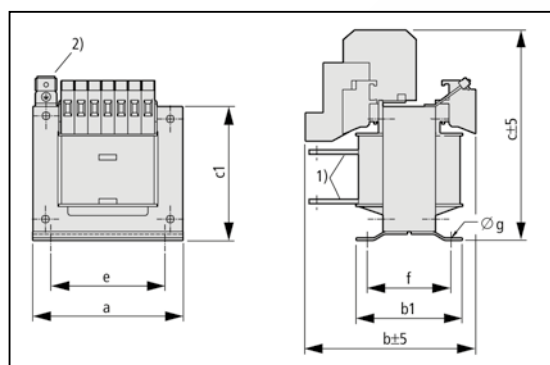


Fig.1

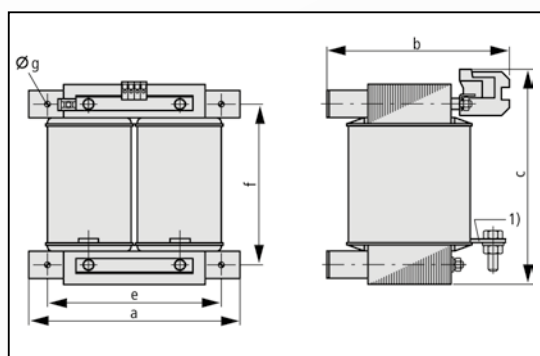


Fig.2

¹⁾ Connection lugs

²⁾ For type STI/STZ 0,06 - 0,16 earth connection downwards

Type	Total weight	No-load losses	Short-circuit losses ¹⁾	Short-circuit voltage	Efficiency factor	12 V		24 V		42 V		110 V		230 V		e	f	Ø g	b1	c1	
						a	b	c	b	c	b	c	b	c							
Fig1	kg	W	W	%			12 V	24 V	42 V	110 V	230 V										
STI0,06	1.5	6	5	7.8	0.85	85	75	91	75	91	75	91	75	91	75	91	64	47	4.8 x 8	60	76
STI0,1	2.0	7	8	6.9	0.87	85	89	91	89	91	89	91	89	91	89	91	64	61	4.8 x 8	74	76
STI0,16	2.3	9	12	6.6	0.88	85	97	91	97	91	97	91	97	91	97	91	64	70	4.8 x 8	83	76
STI0,2	3.0	11	17	6.6	0.88	106	83	112	83	112	83	112	83	112	83	112	80	61	5.8 x 9	80	97
STI0,25	3.8	13	14	5.1	0.90	106	111	124	91	112	91	112	91	112	91	112	80	70	5.8 x 9	89	97
STI0,315	4.3	10	18	5.5	0.92	121	—	—	88	119	88	119	88	119	88	119	90	68	5.8 x 12	86	106
STI0,4	5.2	17	18	4.4	0.92	121	—	—	100	119	100	119	100	119	100	119	90	80	5.8 x 12	98	106
STI0,5	6.8	15	24	3.9	0.93	121	—	—	140	131	120	119	120	119	120	119	90	100	5.8 x 12	118	106
STI0,63	7.7	15	27	4.1	0.94	151	—	—	121	157	107	145	107	145	107	145	122	82	7 x 15	104	132
STI0,8	9.6	17	25	3.2	0.95	151	—	—	138	157	124	145	124	145	124	145	122	99	7 x 15	121	132
STI1,0	13.4	27	29	2.9	0.95	151	—	—	164	157	164	157	150	145	150	145	122	125	7 x 15	147	132
STI1,3	14.9	32	35	3.0	0.95	175	—	—	148	169	148	169	138	157	138	157	135	110	7 x 15	135	152
STI1,6	17.4	21	37	2.4	0.96	195	—	—	142	240	149	186	142	174	142	174	150	110	10 x 18	140	166
STI2,0	21.5	27	33	2.0	0.97	195	—	—	154	240	161	186	154	174	154	174	150	122	10 x 18	152	166
STI2,5	21.5	39	43	2.4	0.97	195	—	—	154	240	154	240	161	186	154	174	150	122	10 x 18	152	166
Fig2																					
STI3,0	26.0	30	55	2.1	0.97	230	—	—	210	250	230	255	185	275	170	255	190	200	11	—	—
STI4,0	35.0	38	88	2.2	0.97	230	—	—	235	250	255	255	210	275	200	255	190	200	11	—	—

¹⁾ Values measured at room temperature all dimensions in mm



STZ

Transformers

Single-phase control, isolating and safety transformers

Designed and tested according to

- IEC/EN 61558-2-2 / 2-4 / 2-6
- VDE 0570-2-2 / 2-4 / 2-6
- UL 5085-2
- CSA 22.2 No. 66

For use according to

- IEC/EN 60204-1
- VDE 0113 / VDE 0100 part 410

Typical applications

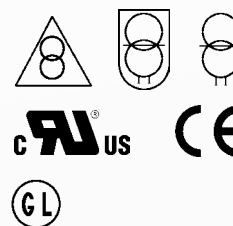
- Control voltage circuits
- Functional low voltage
- Safety low voltage
- Protective separation

Basic equipment

- Separate windings
- Insulation class B
- Ambient temperature -25 to 40 °C
- Connection terminal (<63 A)
- Frequency 50/60 Hz
- ±5 % tapping on the primary side

Further equipment

- Enclosure IP23 page 54
- Additional tapping page 57
- Additional winding page 59
- Temperature Control page 59
- Static shield winding page 57
- Tropics resistant equipment page 57



Rated output	Short time rating	Rated input voltage	Rated output voltage	Type	Price ¹⁾ per unit	Price ¹⁾ for currents up to	Cu-factor ²⁾	
kVA	kVA	V (selectable)	V (selectable)		Euro	A		
0.06	0.13	50-950 ± 5 %	12-400	STZ0,06(*/*)	56.60	16	0.20	
0.1	0.24			STZ0,1(*/*)	64.10		0.25	
0.16	0.36			STZ0,16(*/*)	78.70		0.40	
0.2	0.44			12-1000	STZ0,2(*/*)		88.00	0.65
0.25	0.6				STZ0,25(*/*)		95.70	0.80
0.315	0.75				STZ0,315(*/*)		103.80	1.10
0.4	1				STZ0,4(*/*)		108.00	1.15
0.5	1.6				STZ0,5(*/*)		122.40	1.40
0.63	1.7			STZ0,63(*/*)	148.80		25	1.90
0.8	2			STZ0,8(*/*)	166.40			2.10
1	2.8	STZ1,0(*/*)	183.00		2.20			
1.3	3.7	STZ1,3(*/*)	231.50		3.20			
1.6	5.5	STZ1,6(*/*)	313.10		3.40			
2	7	STZ2,0(*/*)	364.90		4.00			
2.5	9	STZ2,5(*/*)	402.30		5.50			
3	11.5	STZ3,0(*/*)	578.70		9.50			
4	15	STZ4,0(*/*)	720.90		10.40			
5.3	13	STZ5,3(*/*)	921.40		12.50			
8.3	21	STZ8,3(*/*)	1,143.00		17.00			
13.3	34	STZ13,3(*/*)	1,562.60		25.00			

Please note our informations regarding the protection of transformers on page 66.

- According to IEC/EN 61 558 transformers with rated output voltages ≤ 50 V can be used as safety transformers
- For versions with increased climate resistance, the transformer is supplied with a specially insulated finish.
- UL/CSA only up to 600 V (incl. tapping)
- CUR according to UL-File XPTQ2.E168819 (General Purpose-Component)
- GL test mark up to secondary 250 V and 4 kVA rated output

When ordering, the following information must be added to the type designation:

STZ0,06(*/*)

- 1st place holder Δ rated input voltage
- 2nd place holder Δ rated output voltage

Sample order

- requested type STZ0,06
- requested rated input voltage 230 V
- requested rated output voltage 36 V

The correct type designation reads **STZ0,06(230/36)**

The unambiguous article number of your configuration will be defined by trafomodern during the offer- and order process.

¹⁾ Excess charge for increased current → page 56

²⁾ Material surcharge → page 60

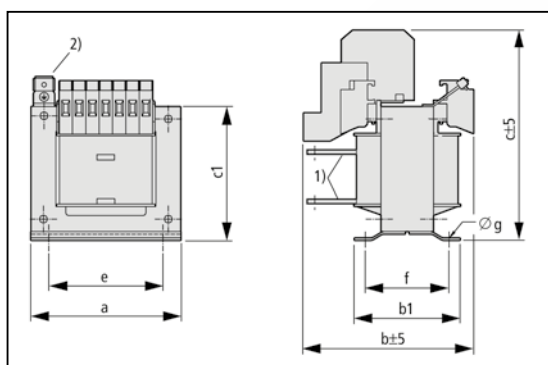


Fig.1

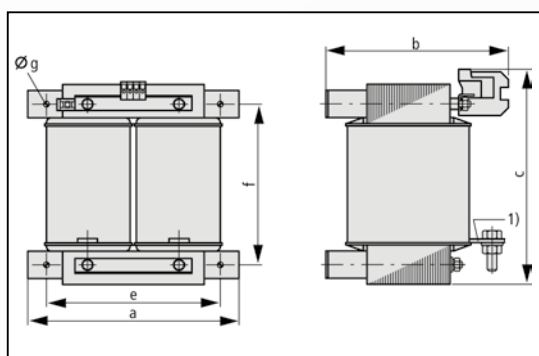


Fig.2

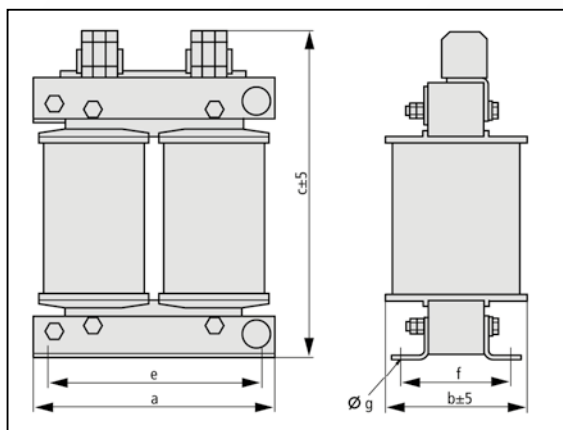


Fig.3

¹⁾ Connection lugs

²⁾ For type ST1/STZ 0,06 - 0,16 earth connection downwards

Type	Total weight	No-load losses	Short-circuit losses ¹⁾	Short-circuit voltage	Efficiency factor	a	b	c	b	c	b	c	b	c	b	c	e	f	Ø g	b1	c1
	kg	W	W	V	%		12 V	24 V	42 V	110 V	230 V										
Fig1																					
STZ0,06	1.5	6	5	7.8	0.85	85	75	91	75	91	75	91	75	91	75	91	64	47	4.8 x 8	60	76
STZ0,1	2.0	7	8	6.9	0.87	85	89	91	89	91	89	91	89	91	89	91	64	61	4.8 x 8	74	76
STZ0,16	2.3	9	12	6.6	0.88	85	97	91	97	91	97	91	97	91	97	91	64	70	4.8 x 8	83	76
STZ0,2	3.0	11	17	6.6	0.88	106	83	112	83	112	83	112	83	112	83	112	80	61	5.8 x 9	80	97
STZ0,25	3.8	13	14	5.1	0.90	106	111	124	91	112	91	112	91	112	91	112	80	70	5.8 x 9	89	97
STZ0,315	4.3	10	18	5.5	0.92	121	-	-	88	119	88	119	88	119	88	119	90	68	5.8 x 12	86	106
STZ0,4	5.2	17	18	4.4	0.92	121	-	-	100	119	100	119	100	119	100	119	90	80	5.8 x 12	98	106
STZ0,5	6.8	15	24	3.9	0.93	121	-	-	140	131	120	119	120	119	120	119	90	100	5.8 x 12	118	106
STZ0,63	7.7	15	27	4.1	0.94	151	-	-	121	157	107	145	107	145	107	145	122	82	7 x 15	104	132
STZ0,8	9.6	17	25	3.2	0.95	151	-	-	138	157	124	145	124	145	124	145	122	99	7 x 15	121	132
STZ1,0	13.4	27	29	2.9	0.95	151	-	-	164	157	164	157	150	145	150	145	122	125	7 x 15	147	132
STZ1,3	14.9	32	35	3.0	0.95	175	-	-	148	169	148	169	138	157	138	157	135	110	7 x 15	135	152
STZ1,6	17.4	21	37	2.4	0.96	195	-	-	142	240	149	186	142	174	142	174	150	110	10 x 18	140	166
STZ2,0	21.5	27	33	2.0	0.97	195	-	-	154	240	161	186	154	174	154	174	150	122	10 x 18	152	166
STZ2,5	21.5	39	43	2.4	0.97	195	-	-	154	240	154	240	161	186	154	174	150	122	10 x 18	152	166
Fig2																					
STZ3,0	26	30	55	2.1	0.97	230	-	-	210	250	230	255	185	275	170	255	190	200	11	-	-
STZ4,0	32	38	88	2.2	0.97	230	-	-	235	250	255	255	210	275	200	255	190	200	11	-	-
Fig3																					
STZ5,3	40	40	165	4.0	0.96	260	200	*)	200	*)	200	*)	214	374	214	360	230	126	10 x 18	-	-
STZ8,3	55	65	200	4.0	0.97	260	-	-	230	*)	230	*)	244	374	244	374	230	156	10 x 18	-	-
STZ13,3	80	95	265	3.5	0.97	320	-	-	240	*)	240	*)	270	440	270	440	270	172	13 x 20	-	-

¹⁾The dimensions of the higher rated voltage are applicable

¹⁾Values measured at room temperature

all dimensions in mm



STA

Transformers

Single-phase control transformers (ATEX-tested)

Designed and tested according to

- IEC/EN 61558-2-2 / 2-4 / 2-6
- VDE 0570-2-2 / 2-4 / 2-6
- EN60079-0
- EN60079-7

For use according to

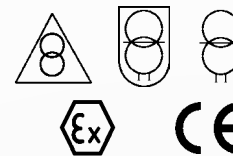
- IEC/EN 60204-1
- VDE 0113 / VDE 0100 part 410
- EU directive 94/9/EG

Typical applications

- Control voltage circuits
- Functional low voltage
- Protective separation

Basic equipment

- Separate windings
- Insulation class B
- Ambient temperature -25 to 40 °C
- Connection terminals
- Frequency 50/60 Hz
- ±5 % tapping on the primary side



Device identification

II 2 G Ex e II

Rated output	Short time rating	Rated input voltage	Rated output voltage	Type	Price ¹⁾ per unit	Price ¹⁾ for currents up to	Cu-factor ²⁾
kVA	kVA	V (selectable)	V (selectable)		Euro	A	
0.1	0.24	50–750 ± 5 %	12–750	STA0,1(*/*)	on request	16	0.35
0.2	0.44			STA0,2(*/*)			0.65
0.4	1.1			STA0,4(*/*)			1.00
0.5	1.6			STA0,5(*/*)			1.40
0.55	1.7			STA0,55(*/*)			1.70
0.75	2.0			STA0,75(*/*)			2.10
1.2	3.7			STA1,2(*/*)			3.20
1.6	5.5			STA1,6(*/*)			4.70

• According to IEC/EN 61 558 transformers with rated output voltages ≤ 50 V can be used as safety transformers

When ordering, the following information must be added to the type designation:

STA0,1(*/*)

- 1st place holder Δ rated input voltage
- 2nd place holder Δ rated output voltage

Sample order

- requested type STA0,1
- requested rated input voltage 230 V
- requested rated output voltage 36 V

The correct type designation reads
STA0,1(230/36)

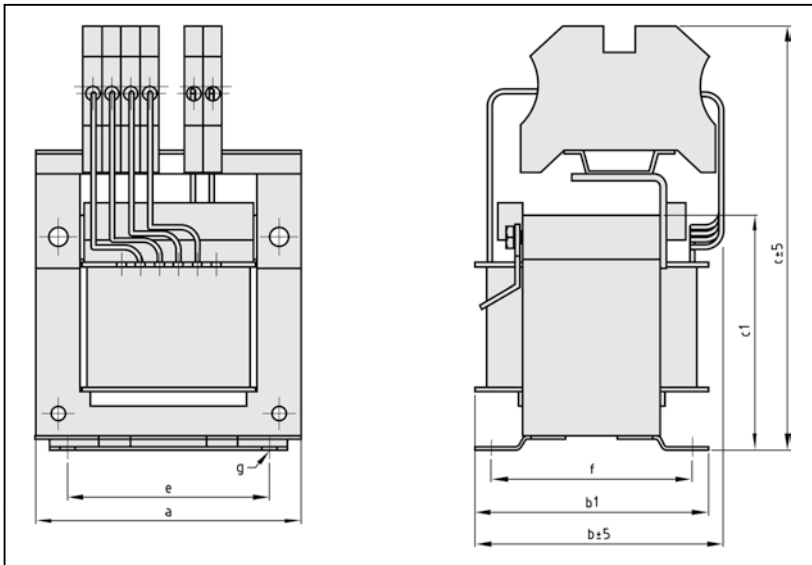
The unambiguous article number of your configuration will be defined by trafomodern during the offer- and order process.

¹⁾ Excess charge for increased current
→ page 56

²⁾ Material surcharge → page 60

Transformers

Single-phase control transformers STA



Type	Total weight	No-load losses	Short-circuit losses ¹⁾	Short-circuit voltage	Efficiency factor	a	b	c (WDU 4)	c (WDU 16)	e	f	ø g	b1	c1
	kg	W	W	V	%									
STA0,1	2.0	6	11	7.5	0.86	85	80	135		64	61	4.8 x 10.3	74	74.5
STA0,2	3.0	10	16	5.9	0.89	106	82	153		80.5	61	5.8 x 14.5	80	94
STA0,4	5.2	18	22	4.1	0.91	121	100	163		90	80	5.8 x 15	98	106
STA0,5	6.8	21	26	3.8	0.91	121	120	163		90	110	5.8 x 15	118	106
STA0,55	7.7	21	25	3.6	0.92	151	107	187	201	122	82	7 x 18.5	104	132
STA0,75	9.6	24	31	3.3	0.93	151	124	187	201	122	99	7 x 20.3	121	132
STA1,2	14.9	41	37	2.5	0.94	175	138	210	224	135	110	10 x 18	135	152
STA1,6	17.4	19	38	2.2	0.97	192	142	226	240	150	110		140	170

¹⁾Values measured at room temperature all dimensions in mm



Transformers

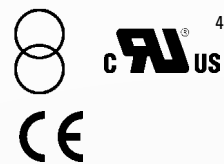
Single-phase matching transformers

Designed and tested according to

- IEC/EN 61558-2-1
- VDE 0570-2-1
- EN 60076-1
- UL 5085-2
- CSA 22.2 No. 66

Basic equipment

- Separate windings
- Insulation class B / F from 6.3 kVA
- Ambient temperature -25 to 40 °C
- Connection terminal (<63 A)
- Frequency 50/60 Hz



Typical applications

- Voltage adjustment

Further equipment

- Enclosure IP23 page 54
- Additional tapping page 57
- Additional winding page 59
- Static shield winding page 57
- Temperature Control page 59
- Tropics resistant equipment page 57

ET

Rated output for use according to insulation class ¹⁾		Rated input voltage	Rated output voltage	Type	Price ²⁾ per unit	Price ³⁾ for currents up to	Cu-factor ⁴⁾
B kVA	F kVA	V (selectable)	V (selectable)		Euro	A	
0.03	-	50-690	12-400	ET0,03(*/*)	35.70	16	0.14
0.06	-			ET0,06(*/*)	41.30		0.28
0.1	-			ET0,1(*/*)	47.90		0.38
0.16	-			ET0,16(*/*)	60.50		0.45
0.2	-			ET0,2(*/*)	68.10	25	0.55
0.25	-	50-1000	12-1000	ET0,25(*/*)	74.80		0.70
0.315	-			ET0,315(*/*)	83.80		0.83
0.4	-			ET0,4(*/*)	93.30		1.00
0.5	-			ET0,5(*/*)	101.70		1.10
0.63	-			ET0,63(*/*)	122.10		1.35
0.8	-			ET0,8(*/*)	136.80		2.20
1	-			ET1,0(*/*)	151.40		2.20
1.3	-			ET1,3(*/*)	193.30		2.45
1.6	-		24-1000	ET1,6(*/*)	264.50		3.90
2	-			ET2,0(*/*)	310.70	63	3.80
2.5	-			ET2,5(*/*)	375.50		6.80
3	-			ET3,0(*/*)	512.60		6.00
4	-			ET4,0(*/*)	613.40		9.90
5	-		60-1000	ET5,0(*/*)	671.20		8.60
6.3	8			ET6,3(*/*)	862.00		12.00
8	10			ET8,0(*/*)	1,104.70		18.90
10	13			ET10,0(*/*)	1,384.60	100	23.00
13	16			ET13,0(*/*)	1,666.60		25.00

- Static shield winding means there is additional shielding between primary and secondary sides.
- For versions with increased climate resistance, the transformer is supplied with a specially insulated finish. The finish enables the transformer to be used in areas of high humidity.
- Transformer version with reinforced insulation upon request.
- UL/CSA only up to 600 V (incl. tapping)
- CUR according to UL-File XPTQ2.E168819 (General Purpose-Component)

When ordering, the following information must be added to the type designation:

ET0,03(*/*)

- 1st place holder Δ rated input voltage
- 2nd place holder Δ rated output voltage

Sample order

- requested type ET0,03
- requested rated input voltage 230 V
- requested rated output voltage 12 V

The correct type designation reads **ET0,03(230/12)**

The unambiguous article number of your configuration will be defined by trafomodern during the offer- and order process.

¹⁾ Rated output when used according to insulation class B, maximum of 130° in the core; for insulation class F maximum of 155° C in the core.

²⁾ Excess charge for increased current → page 58

³⁾ Material surcharge → page 60

⁴⁾ Only on request

Transformers

Single-phase matching transformers ET

Type rating for use according to insulation class		Rated input voltage	Rated output voltage	Type	Price per unit	Price for currents up to	Cu-factor ¹⁾
B kVA	F kVA	V (selectable)	V (selectable)		Euro	A	
16	20	50-1000	60-1000	ET16,0(*/*)	1,865.50	200	28.00
20	25			ET20,0(*/*)	2,171.40		36.50
25	32			ET25,0(*/*)	2,721.70		44.20

¹⁾ Material surcharge → page 60

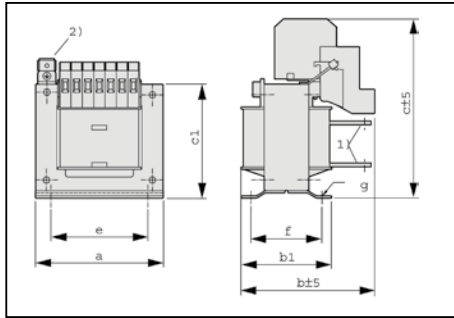


Fig.1
¹⁾ Connection lugs
²⁾ For type ET/ETSP 0,03 - 0,2 earth connection downwards

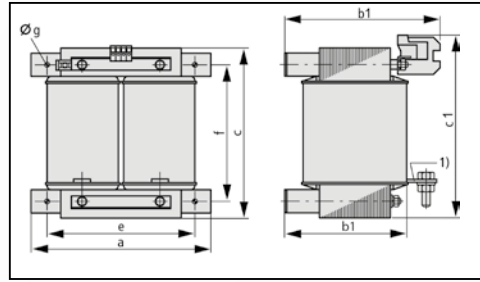


Fig.2

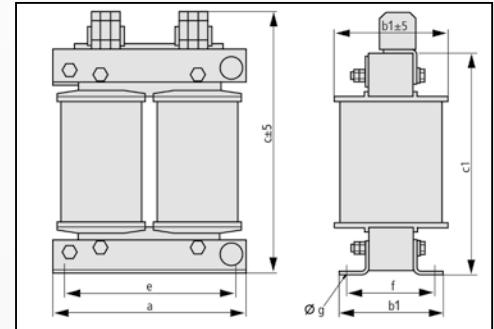


Fig.3

Type	Total weight	No-load losses	Short-circuit losses ¹⁾	Short-circuit voltage	Efficiency factor	12 V		24 V		42 V		110 V		230 V		e	f	ø g	b1	c1	
						a	b	c	b	c	b	c	b	c	b						c
Fig1	kg	W	W	%			12 V	24 V	42 V	110 V	230 V										
ET0,03	0.7	4	4	11.2	0.79	66	62	80	62	80	62	80	62	80	50	44	4.8 x 8	55	60		
ET0,06	0.8	5	7	9.2	0.83	66	74	80	74	80	74	80	74	80	50	56	4.8 x 8	67	60		
ET0,1	1.5	6	9	8.1	0.87	85	68	91	68	91	68	91	68	91	64	47	4.8 x 8	60	76		
ET0,16	2.0	8	10	5.7	0.90	85	82	91	82	91	82	91	82	91	64	61	4.8 x 8	74	76		
ET0,2	2.3	10	10	4.9	0.91	85	91	91	91	91	91	91	91	91	64	70	4.8 x 8	83	76		
ET0,25	3.0	10	15	5.5	0.91	106	82	112	82	112	82	112	82	112	80	61	5.8 x 9	80	97		
ET0,315	3.8	10	15	4.6	0.93	106	90	112	90	112	90	112	90	112	80	70	5.8 x 9	89	97		
ET0,4	4.3	12	19	4.6	0.93	121	88	119	88	119	88	119	88	119	90	68	5.8 x 12	86	106		
ET0,5	5.2	16	19	3.8	0.93	121	121	133	100	119	100	119	100	119	90	80	5.8 x 12	98	106		
ET0,63	6.8	19	19	3.0	0.94	121	141	133	120	119	120	119	120	119	90	100	5.8 x 12	118	106		
ET0,8	7.7	27	26	3.3	0.94	151	107	211	107	145	107	145	107	145	122	82	7 x 15	104	132		
ET1,0	9.6	35	29	2.8	0.94	151	124	211	145	159	124	145	124	145	122	99	7 x 15	121	132		
ET1,3	13.4	46	29	2.3	0.95	151	150	211	171	159	150	145	150	145	122	125	7 x 15	147	132		
ET1,6	14.9	40	30	2.1	0.96	175	138	240	138	240	159	170	138	157	138	157	135	110	152		
ET2,0	20.0	51	35	1.9	0.96	175	200	157	168	240	190	170	168	157	168	157	135	141	152		
Fig2																					
ET2,5	21	23	71	2.8	0.96	230	185	255	215	275	160	275	150	255	150	255	190	200	11	130	250
ET3,0	26	28	77	2.5	0.97	230	210	255	240	275	240	275	175	255	175	255	190	200	11	155	250
ET4,0	32	36	74	1.9	0.97	230	225	255	210	255	255	275	200	275	190	255	190	200	11	170	250
ET5,0	35	46	101	2.3	0.97	230	235	255	235	255	265	275	210	275	200	255	190	200	11	180	250

Type	Total weight	No-load losses	Short-circuit losses ¹⁾	Short-circuit voltage	Efficiency factor	a	b	b1	c	c1	e	f	ø g
	kg	W	W	%									
Fig3													
ET6,3	40	52	130	2.2	0.97	260	185	152	400	310	230	126	10 x 18
ET8	55	77	215	3.2	0.97	260	215	182	400	310	230	156	10 x 18
ET10	67	82	130	1.5	0.98	320	195	172	450	360	270	142	13 x 20
ET13	80	115	150	1.4	0.98	320	225	202	450	360	270	172	13 x 20
ET16	95	182	130	1.0	0.98	320	255	232	450	360	270	202	13 x 20
ET20	106	147	190	1.3	0.98	370	240	220	510	430	320	190	13 x 20
ET25	134	187	180	1.2	0.99	370	270	250	510	430	320	220	13 x 20

¹⁾ Values measured at room temperature
all dimensions in mm



Transformers

Single-phase autotransformers

Designed and tested according to

- IEC/EN 61558-2-13
- VDE 0570-2-13
- EN 60076-1
- UL 5085-2
- CSA 22.2 No. 66

Basic equipment

- Insulation class B / F from 6.3 kVA
- Ambient temperature -25 to 40 °C
- Connection terminal (<63 A)
- Frequency 50/60 Hz



Typical applications

- Cost-efficient solutions for voltage adjustment

Further equipment

- Enclosure IP23 page 54
- Additional tapping page 57
- Additional winding page 59
- Static shield winding page 57
- Temperature Control page 59
- Tropics resistant equipment page 57

ETSP

Rated power for use according to insulation class ¹⁾		Rated input voltage	Rated output voltage	Type	Price ²⁾ per unit	Price ³⁾ for currents up to	Cu-factor ⁴⁾
B kVA	F kVA	V (selectable)	V (selectable)		Euro	A	
0.03	-	50-1000	12-1000	ETSP0,03(*/*)	35.70	25	0.12
0.06	-			ETSP0,06(*/*)	41.30		0.20
0.1	-			ETSP0,1(*/*)	47.90		0.37
0.16	-			ETSP0,16(*/*)	60.50		0.45
0.2	-			ETSP0,2(*/*)	68.10	63	0.55
0.25	-			ETSP0,25(*/*)	74.80		0.70
0.315	-			ETSP0,315(*/*)	83.80		0.85
0.4	-			ETSP0,4(*/*)	93.30		1.10
0.5	-			ETSP0,5(*/*)	101.70		1.10
0.63	-			ETSP0,63(*/*)	122.10		1.35
0.8	-			ETSP0,8(*/*)	136.80		2.20
1	-			ETSP1,0(*/*)	151.40		2.20
1.3	-			ETSP1,3(*/*)	193.30		2.45
1.6	-		24-1000	ETSP1,6(*/*)	264.50		3.90
2	-			ETSP2,0(*/*)	310.70	100	3.80
2.5	-			ETSP2,5(*/*)	375.50		6.80
3	-			ETSP3,0(*/*)	512.60		6.00
4	-			ETSP4,0(*/*)	613.40		9.90
5	-		60-1000	ETSP5,0(*/*)	671.20		10.20
6.3	8			ETSP6,3(*/*)	862.00	100	12.00
8	10			ETSP8,0(*/*)	1,104.70		18.80
10	13			ETSP10,0(*/*)	1,384.60	200	23.00
13	16			ETSP13,0(*/*)	1,666.60		25.00

- For versions with increased climate-resistance, the transformer is supplied with a specially insulated finish. The finish enables the transformer to be used in areas of high humidity
- UL/CSA only up to 600 V (incl. tapping)
- CUR according to EIS 130 or EIS 155 to OBJ2.E160829 (Electrical Insulation-Component)

When ordering, the following information must be added to the type designation:

ETSP25(*/*)

- 1st place holder Δ rated input voltage
- 2nd place holder Δ rated output voltage

Sample order

- required throughput rating: 55 kVA
- requested rated input voltage 400 V
- requested output voltage 230 V

Notes for selection

$S_T = S_N \cdot (1 - \text{lower voltage})$
 $= 55 \text{ kVA} (1 - 230 \text{ V}/400 \text{ V}) = 23.4 \text{ kVA}$
 S_T = Type rated power = power, which is relevant for the size of the transformer
 S_N = Throughput power = Nominal power, which is the relevant figure of the load of the transformer

- The type rated power is always smaller than the throughput rating.
- Versions with delta stabilizing winding on request.

The correct type designation reads **ETSP25(400/230)**

The unambiguous article number of your configuration will be defined by trafomodern during the offer- and order process.

Higher outputs on request.

¹⁾ Rated output when used according to insulation class B, maximum of 130° C in the core; for insulation class F maximum of 155° C in the core.

²⁾ Excess charge for increased current → page 56

³⁾ Material surcharge → page 60

⁴⁾ Only on request

Transformers

Single-phase autotransformers ETSP

Type rating for use according to insulation class		Rated input voltage	Rated output voltage	Typ	Price per unit	Price for currents up to	Cu-factor ¹⁾
B kVA	F kVA	V (selectable)	V (selectable)		Euro	A	
16	20	50-1000	60-1000	ETSP16,0(*/*)	1,865.50	320	26.00
20	25			ETSP20,0(*/*)	2,171.40		36.50
25	32			ETSP25,0(*/*)	2,721.70		44.20

¹⁾ Material surcharge → page 60

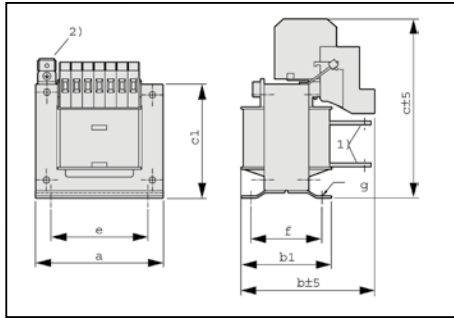


Fig.1
¹⁾ Connection lugs
²⁾ For type ET/ETSP 0,03 - 0,2 earth connection downwards

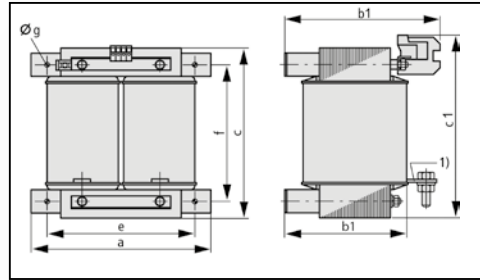


Fig.2

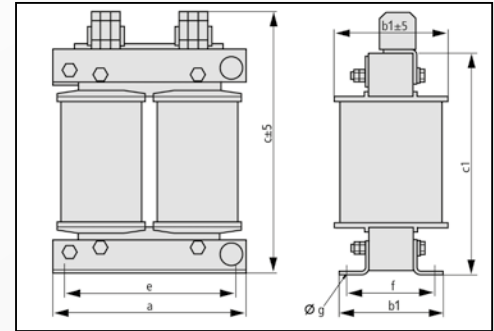


Fig.3

Type	Total weight	No-load losses	Short-circuit losses ¹⁾	Short-circuit voltage	Efficiency factor	a		b		c		b		c		e	f	ø g	b1	c1	
						kg	W	W	%	12 V	24 V	42 V	110 V	230 V							
Fig1																					
ETSP0,03	0.7	4	4	*)	0.79	66	62	80	62	80	62	80	62	80	62	80	50	44	4.8 x 8	55	60
ETSP0,06	0.8	5	7	*)	0.83	66	74	80	74	80	74	80	74	80	74	80	50	56	4.8 x 8	67	60
ETSP0,1	1.5	6	9	*)	0.87	85	68	91	68	91	68	91	68	91	68	91	64	47	4.8 x 8	60	76
ETSP0,16	2.0	8	10	*)	0.90	85	82	91	82	91	82	91	82	91	82	91	64	61	4.8 x 8	74	76
ETSP0,2	2.3	10	10	*)	0.91	85	91	91	91	91	91	91	91	91	91	91	64	70	4.8 x 8	83	76
ETSP0,25	3.0	10	15	*)	0.91	106	82	112	82	112	82	112	82	112	82	112	80	61	5.8 x 9	80	97
ETSP0,315	3.8	10	15	*)	0.93	106	90	112	90	112	90	112	90	112	90	112	80	70	5.8 x 9	89	97
ETSP0,4	4.3	12	19	*)	0.93	121	88	119	88	119	88	119	88	119	88	119	90	68	5.8 x 12	86	106
ETSP0,5	5.2	16	19	*)	0.93	121	121	133	100	119	100	119	100	119	100	119	90	80	5.8 x 12	98	106
ETSP0,63	6.8	19	19	*)	0.94	121	141	133	120	119	120	119	120	119	120	119	90	100	5.8 x 12	118	106
ETSP0,8	7.7	27	26	*)	0.94	151	107	211	107	145	107	145	107	145	107	145	122	82	7 x 15	104	132
ETSP1,0	9.6	35	29	*)	0.94	151	124	211	145	159	124	145	124	145	124	145	122	99	7 x 15	121	132
ETSP1,3	13.4	46	29	*)	0.95	151	150	211	171	159	150	145	150	145	150	145	122	125	7 x 15	147	132
ETSP1,6	14.9	40	30	*)	0.96	175	138	240	138	240	159	170	138	157	138	157	135	110	7 x 15	136	152
ETSP2,0	20.0	51	35	*)	0.96	175	200	157	168	240	190	170	168	157	168	157	135	141	7 x 15	167	152
Fig2																					
ETSP2,5	21	23	71	*)	0.96	230	185	255	215	275	160	275	150	255	150	255	190	200	11	130	250
ETSP3,0	26	28	77	*)	0.97	230	210	255	240	275	240	275	175	255	175	255	190	200	11	155	250
ETSP4,0	32	36	74	*)	0.97	230	225	255	210	255	255	275	200	275	190	255	190	200	11	170	250
ETSP5,0	35	46	101	*)	0.97	230	235	255	235	255	265	275	210	275	200	255	190	200	11	180	250

Typ	Total weight	No-load losses	Short-circuit losses ¹⁾	Short-circuit voltage	Efficiency factor	a	b	b1	c	c1	e	f	ø g
	kg	W	W	%									
Fig3													
ETSP6,3	40	52	130	*)	0.97	260	185	152	400	310	230	126	10 x 18
ETSP8	55	77	215	*)	0.97	260	215	182	400	310	230	156	10 x 18
ETSP10	67	82	130	*)	0.98	320	195	172	450	360	270	142	13 x 20
ETSP13	80	115	150	*)	0.98	320	225	202	450	360	270	172	13 x 20
ETSP16	95	182	130	*)	0.98	320	255	232	450	360	270	202	13 x 20
ETSP20	106	147	190	*)	0.98	370	240	220	510	430	320	190	13 x 20
ETSP25	134	187	180	*)	0.99	370	270	250	510	430	320	220	13 x 20

all dimensions in mm

¹⁾ depending on the voltage ratio



Transformers for various applications

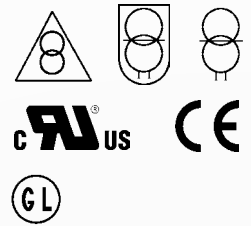
Single-phase multi-winding transformers

Designed and tested according to

- IEC/EN 61558-2-2 / 2-4 / 2-6
- VDE 0570-2-2 / 2-4 / 2-6
- UL 5085-2
- CSA 22.2 No. 66

Basic equipment

- Separate windings
- Insulation class B
- Ambient temperature -25 to 40 °C
- Connection terminal (<63 A)
- Frequency 50/60 Hz



For use according to

- IEC/EN 60204-1
- VDE 0113 / VDE 0100 part 410

Typical applications

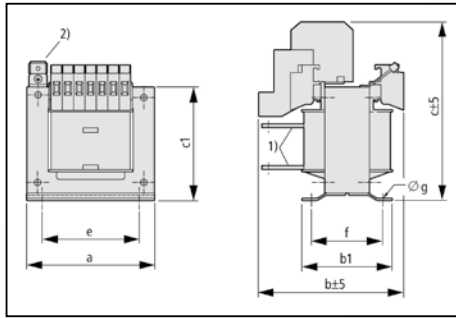
- Control voltage circuits
- Functional low voltage
- Protective separation

UTI

Rated output kVA	Rated input voltage V	Rated output voltage V	Type Order no.	Price per unit Euro	Cu-factor ¹⁾	
0.1	208	2 x 115	UT10,1-115 206923	74.10	0.30	
0.2	230		UT10,2-115 206924	88.00	0.70	
0.315	380		UT10,315-115 206925	100.30	1.10	
0.5	400		UT10,5-115 206926	123.00	1.30	
0.63	415		UT10,63-115 206927	143.20	2.10	
0.8	440		UT10,8-115 206928	163.20	2.30	
1	460		UT11,0-115 206929	191.80	3.00	
0.1	480		1 x 24	UT10,1-24 206930	67.20	0.30
0.2	500			UT10,2-24 206931	80.40	0.70
0.315	525			UT10,315-24 206932	98.50	1.10
0.5	550	UT10,5-24 206933		122.40	1.30	
0.63	575	UT10,63-24 206934		143.20	2.10	
0.8	600	UT10,8-24 206935		158.70	2.30	
1		UT11,0-24 206936		190.70	3.00	

¹⁾ Material surcharge → page 60

- CUR according to UL-File XPTQ2.E168819 (General Purpose-Component)



¹⁾ Max. space requirement
²⁾ For type UT10,1 earth connection downwards

Type	Total weight	No-load losses	Short-circuit losses	Short-circuit voltage	Efficiency factor	a	b1	c1	b	c	b	c	e	f	Øg
	kg	W	W	%					U _s = 24 V		U _s = 115 V				
UT10,1	2	8	11	7.5	0.84	85	74	76	89	93	89	93	64	61	4.8 x 8
UT10,2	3	10	19	6.5	0.87	106	80	97	82	112	82	112	80	61	5.8 x 9
UT10,315	4.3	15	23	5	0.89	121	86	106	88	124	88	124	90	68	5.8 x 12
UT10,5	6.8	26	23	3.5	0.92	121	118	106	140	133	120	124	90	100	5.8 x 12
UT10,63	7.7	25	32	3.8	0.92	151	104	132	122	159	107	150	122	82	7 x 15
UT10,8	9.6	33	29	2.8	0.93	151	121	132	139	159	124	150	122	99	7 x 15
UT11,0	13.4	46	30	2.1	0.93	151	147	132	165	159	150	150	122	125	7 x 15

all dimensions in mm

Circuits of multi winding transformers

	a	c		b	c
U1-1.1	208	1.1-1.9/1.2-1.3	U2-2.1	115	2.1-2.4/2.3-2.2
	230	1.1-1.8/1.2-1.4	2.3	230	2.3-2.4
	380	1.3-1.0	2.4		
1.3	400	1.4-1.0	0-2.2		
1.4	415	1.3-1.9			
1.5	440	1.4-1.9			
1.6	460	1.4-1.8			
1.7	480	1.5-1.8	U2-2.1	24	-
1.8	500	1.6-1.8	2.2		
1.9	525	1.3-1.7			
1.0	550	1.4-1.7			
	575	1.5-1.7			
0-1.2	600	1.6-1.7			

a) primary voltage [V]
b) secondary voltage [V]
c) bridge

Example:

If the transformer will be connected to a 460 V rated input voltage the terminals 1.4 and 1.8 must be connected.
If the transformer shall have 230 V rated output voltage, connect the terminals 2.3 and 2.4.



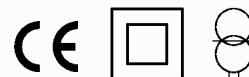
Transformers for various applications

Portable transformers

Isolating transformers according to EN 61558-2-4, double insulated, in a solid portable metal enclosure (metal-clad transformer of protection class II). Conditionally short-circuit-proof due to a built-in overcurrent protection device operable from outside. On the input side the appliance is provided with an exchangeable 2.5 m mains cable, with a tapered form plug (up to TT2.3 as from TT2.8 CEE plugs) plastic cable inlet with pull relief and kink protection; on the output side one or several sockets with hinged lid (shockproof or CEE).

The appliances are not equipped with PE-terminals.

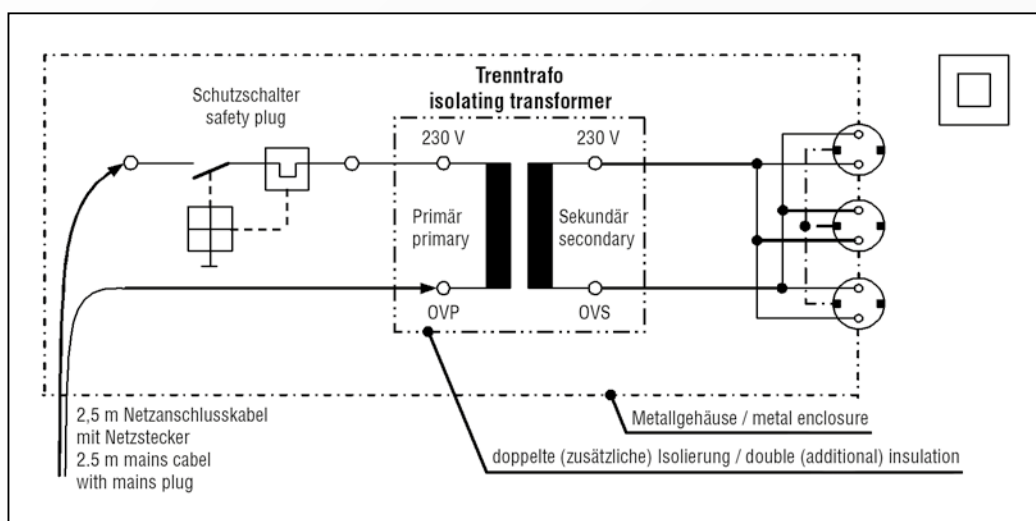
For industrial use only.



Technical Data

Primary:	230 V 50/60 Hz
Secondary:	230 V
Protection:	IP 42
Insulation Class:	B
Duty cycle:	100 %
Installation altitude:	1000 m above sea level
Ambient temperature:	40 °C
Paint:	RAL 7032
Mains cable:	attachment method X

TT



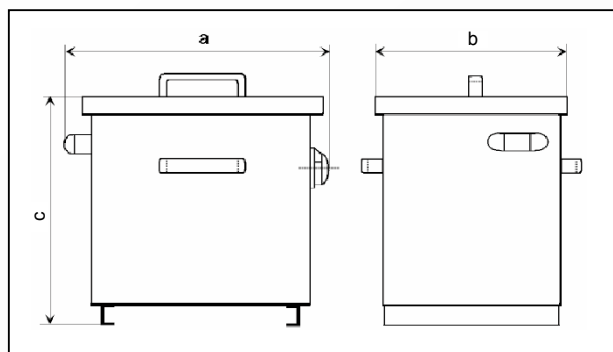
Schematic diagram

Socket without PE-terminal, or several sockets with potential equalization line

Rated output	Rated input voltage	Rated output voltage	Current	Type Order no.	Price per unit	Cu-factor ¹⁾
kVA	V	V	A		Euro	
0.1	230	230	0.44	TT0,1 (230/230) 4001758	426.20	0.32
0.2			0.87	TT0,2 (230/230) 4001759	433.20	0.70
0.3			1.3	TT0,3 (230/230) 4001760	438.60	1.00
0.5			2.17	TT0,5 (230/230) 4001761	480.80	1.90
0.8			3.5	TT0,8 (230/230) 4001762	614.40	2.45
1			4.33	TT1,0 (230/230) 4001763	631.80	2.50
1.4			6	TT1,4 (230/230) 4001764	680.60	4.40
2			8.7	TT2,0 (230/230) 4001765	760.80	6.60
2.3			10	TT2,3 (230/230) 4001766	887.30	6.80
2.8			12	TT2,8 (230/230) 4001767	938.50	6.90
3			13	TT3,0 (230/230) 4001768	952.40	7.20
3.7			16	TT3,7 (230/230) 4001769	995.30	10.20

Other voltage combinations on request.

¹⁾ Material surcharge → page 60



Type	Total weight	Losses	Carrying handle	a	b	c
	kg	W				
TT0,1	5.8	19	1 x on top	139	119	230
TT0,2	7.0	25	1 x on top	139	119	230
TT0,3	8.1	31	1 x on top	139	119	230
TT0,5	12.2	41	1 x on top	169	144	245
TT0,8	19.6	38	1 x on top	211	179	320
TT1,0	23.4	49	1 x on top	211	179	320
TT1,4	27.4	51	1 x on top	211	179	320
TT2,0	34.0	54	1 x on top	211	179	320
TT2,3	36.3	86	2 x lateral	270	308	314
TT2,8	42.3	100	2 x lateral	270	308	314
TT3,0	43.8	102	2 x lateral	270	308	314
TT3,7	46.5	113	2 x lateral	270	308	314

all dimensions in mm



Transformers

Three-phase control, isolating and safety transformers

Designed and tested according to

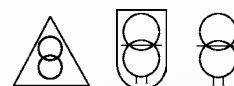
- IEC/EN 61558-2-2 / 2-4 / 2-6
- VDE 0570-2-2 / 2-4 / 2-6
- UL 5085-2
- CSA 22.2 No. 66

For use according to

- IEC/EN 60204-1
- VDE 0113 / VDE 0100 part 410

Basic equipment

- Separate windings
- Insulation class B
- Ambient temperature -25 to 40 °C
- Connection terminal (<63 A)
- Frequency 50/60 Hz
- ±5 % tapping on the primary side



UL US

CE

DTI

Typical applications

- Control voltage circuits
- Functional low voltage
- Safety low voltage
- Protective separation

Rated output	Short time rating	Rated input voltage	Rated output voltage	Type	Price per unit	Cu-factor ¹⁾
kVA	kVA	V (selectable)	V (selectable)		Euro	
0.1	0.2	200 ± 5 % 230 ± 5 %	18.5 24	DTI0,1(*/*)*	145.50	0.55
0.16	0.32	400 ± 5 % 415 ± 5 %	42 110	DTI0,16(*/*)*	159.90	0.70
0.25	0.5	440 ± 5 % 500 ± 5 %	200 230	DTI0,25(*/*)*	177.50	1.00
0.4	0.8	690 ± 5 %	400	DTI0,4(*/*)*	207.20	1.10
0.5	1			DTI0,5(*/*)*	222.70	1.40
0.63	1.38			DTI0,63(*/*)*	248.00	1.60
1	2.2			DTI1,0(*/*)*	308.60	2.90
1.6	3.5			DTI1,6(*/*)*	381.40	4.40
2	4.4			DTI2,0(*/*)*	432.10	6.50
2.5	5.5			DTI2,5(*/*)*	503.70	8.60
4	6.2			DTI4,0(*/*)*	705.60	9.50
6.3	15.7			DTI6,3(*/*)*	889.20	12.00

¹⁾ Material surcharge → page 60

- According to IEC/EN 61 558 transformers with rated output voltages ranging from 18.5 V to 42 V can be used as safety transformers.
- UL/CSA only to 600 V (including tapping)
- CUR according to UL-File XPTQ2.E168819 (General Purpose-Component)

When ordering, the following information must be added to the type designation:

DTI0,1(*/*)*

- 1st place holder Δ rated input voltage
- 2nd place holder Δ rated output voltage
- 3rd place holder Δ vector group

Sample order

- requested type DTI0,1
- requested rated input voltage 200 V
- requested rated output voltage 18.5 V
- requested vector group Dy(n)5

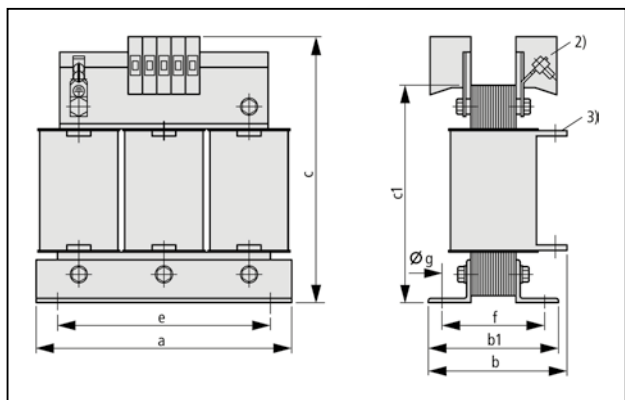
The correct type designation reads **DTI0,1(200/18,5)Dy(n)5**

The unambiguous article number of your configuration will be defined by trafomodern during the offer- and order process.

More information about configuration of three-phase transformers → page 65

Transformers

Three-phase control, isolating and safety transformers DTI



¹⁾The dimensions of the higher rated voltage are applicable

²⁾Terminals < 25 A

³⁾Connection lugs > 63 A

Type	Total weight kg	No-load losses W	Short-circuit losses W	Short-circuit voltage %	Efficiency factor %	18.5 V		24 V		42 V		110 V		230 V		e	f	øg	b1	c1
						a	b	c	b	c	b	c	b	c	b					
DTI0,1	1.9	5	28	15	0.75	125	65	134	65	134	65	134	65	134	100	45	5 x 8	61	102	
DTI0,16	2.5	8	20	9.5	0.85	125	75	134	75	134	75	134	75	134	100	55	5 x 8	71	102	
DTI0,25	3.6	11	25	8.5	0.88	155	77	154	77	154	77	154	77	154	130	57	8 x 12	77	128	
DTI0,4	5.1	15	40	8	0.88	155	92	154	92	154	92	154	92	154	130	72	8 x 12	92	128	
DTI0,5	6.1	20	35	6	0.9	190	82	180	112	191	82	180	82	180	170	58	8 x 12	82	155	
DTI0,63	8.9	25	50	5.5	0.9	190	102	180	132	191	102	180	102	180	170	78	8 x 12	102	155	
DTI1,0	12.9	35	50	4	0.92	210	137	210	137	210	137	210	117	199	175	97	8 x 12	117	174	
DTI1,6	18.5	55	60	3	0.93	230	144	234	114	269	144	234	114	223	176	95	7 x 13	114	198	
DTI2,0	22.4	60	75	3.5	0.94	240	117	279	117	279	117	279	141	244	185	95	10 x 18	117	208	
DTI2,5	29.3	80	85	2.5	0.94	265	132	299	132	299	132	299	152	264	200	102	10 x 18	132	228	
DTI4,0	39.6	60	100	2	0.96	300	166	317	166	333	147	333	157	296	224	119	10 x 18	147	260	
DTI6,3	50.2	58	170	2	0.96	300	193	285	210	285	193	333	173	296	224	145	10 x 18	173	260	

all dimensions in mm



DTZ

Transformers

Three-phase control, isolating and safety transformers

Designed and tested according to

- IEC/EN 61558-2-2 / 2-4 / 2-6
- VDE 0570-2-2 / 2-4 / 2-6
- UL 5085-2
- CSA 22.2 No. 66

For use according to

- IEC/EN 60204-1
- VDE 0113 / VDE 0100 part 410

Typical applications

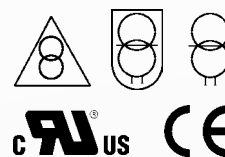
- Control voltage circuits
- Functional low voltage
- Safety low voltage
- Protective separation

Basic equipment

- Separate windings
- Insulation class B/F from 8,0 kVA
- Ambient temperature -25 to 40 °C
- Connection terminal (<63 A)
- Frequency 50/60 Hz
- ±5 % tapping on the primary side

Further equipment

- Enclosure IP23 page 54
- Additional tapping page 57
- Additional winding page 59
- Static shield winding page 57
- Temperature Control page 59
- Tropics resistant equipment page 57



Rated output	Short time rating	Rated input voltage	Rated output voltage	Type	Price ¹⁾ per unit	Price ¹⁾ for currents up to	Cu-factor ²⁾
kVA	kVA	V (selectable)	V (selectable)		Euro	A	
0.1	0.2	50–1000 ± 5 %	18.5–1000	DTZ0,1(*/*)*	145.50	16	0.55
0.16	0.32			DTZ0,16(*/*)*	159.90		0.70
0.25	0.5			DTZ0,25(*/*)*	177.50		1.00
0.4	0.8			DTZ0,4(*/*)*	207.20		1.10
0.5	1			DTZ0,5(*/*)*	222.70		1.40
0.63	1.38			DTZ0,63(*/*)*	248.00		1.60
1	2.2			DTZ1,0(*/*)*	308.60		2.90
1.6	3.5			DTZ1,6(*/*)*	381.40		4.40
2	4.4			DTZ2,0(*/*)*	432.10		6.50
2.5	5.5			DTZ2,5(*/*)*	503.70		8.60
4	6.2	DTZ4,0(*/*)*	705.60	25	9.50		
6.3	15.7	DTZ6,3(*/*)*	1,021.40		12.00		
8	20	DTZ8,0(*/*)*	1,225.50	63	18.00		
10	25	DTZ10,0(*/*)*	1,552.60		30.00		
12.5	31	DTZ12,5(*/*)*	1,756.90	35.00			
16	40	DTZ16,0(*/*)*	2,091.40	37.00			
20	6	DTZ20,0(*/*)*	2,664.20	45.00			
25	62	DTZ25,0(*/*)*	3,279.00	75.00			

- According to IEC/EN 61 558 transformers with rated output voltages < 50 V can be used as safety transformers.
- Specially insulated finish for transformers with increased climate resistance.
- UL/CSA only up to primary 600 V (including tapping)
- CUR according to UL-File XPTQ2.E168819 (General Purpose-Component)

When ordering, the following information must be added to the type designation:

DTZ0,1(*/*)*

- 1st place holder Δ rated input voltage
- 2nd place holder Δ rated output voltage
- 3rd place holder Δ vector group

Sample order

- requested type DTZ0,1
- requested rated input voltage 200 V
- requested rated output voltage 36 V
- requested vector group Dy(n)5

More information about configuration of three-phase transformers → page 65

The correct type designation reads
DTZ0,1(200/36)Dy(n)5

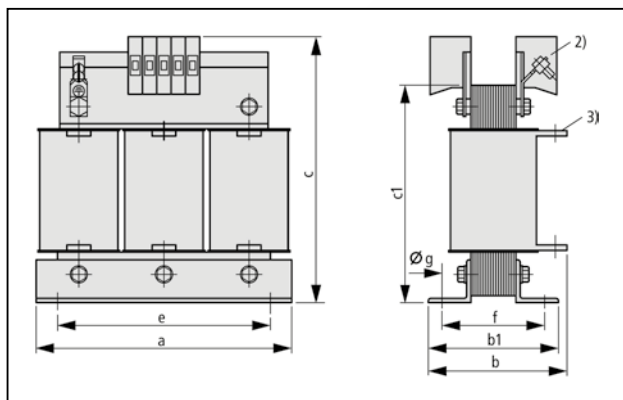
The unambiguous article number of your configuration will be defined by trafomodern during the offer- and order process.

¹⁾ Excess charge for increased current → page 56

²⁾ Material surcharge → page 60

Transformers

Three-phase control, isolating and safety transformers DTZ



¹⁾The dimensions of the higher rated voltage are applicable

²⁾Terminals < 25 A

³⁾Connection lugs > 63 A

Type	Total weight	No-load losses	Short-circuit losses	Short-circuit voltage	Efficiency factor	a	b	c	b	c	b	c	b	c	b	c	e	f	ø g	b1	c1
	kg	W	W	%		18.5 V		24 V		42 V		110 V		230 V							
DTZ0,1	1.9	5	28	15	0.75	125	65	134	65	134	65	134	65	134	65	134	100	45	5 x 8	61	102
DTZ0,16	2.5	8	20	9.5	0.85	125	75	134	75	134	75	134	75	134	75	134	100	55	5 x 8	71	102
DTZ0,25	3.6	11	25	8.5	0.88	155	77	154	77	154	77	154	77	154	77	154	130	57	8 x 12	77	128
DTZ0,4	5.1	15	40	8	0.88	155	92	154	92	154	92	154	92	154	92	154	130	72	8 x 12	92	128
DTZ0,5	6.1	20	35	6	0.9	190	82	180	112	191	82	180	82	180	82	180	170	58	8 x 12	82	155
DTZ0,63	8.9	25	50	5.5	0.9	190	102	180	132	191	102	180	102	180	102	180	170	78	8 x 12	102	155
DTZ1,0	12.9	35	50	4	0.92	210	137	210	137	210	137	210	117	199	117	199	175	97	8 x 12	117	174
DTZ1,6	18.5	55	60	3	0.93	230	144	234	114	269	144	234	114	223	114	223	176	95	7 x 13	114	198
DTZ2,0	22.4	60	75	3.5	0.94	240	117	279	117	279	117	279	141	244	117	233	185	95	10 x 18	117	208
DTZ2,5	29.3	80	85	2.5	0.94	265	132	299	132	299	132	299	152	264	132	253	200	102	10 x 18	132	228
DTZ4,0	39.6	60	100	2	0.96	300	166	317	166	333	147	333	157	296	157	296	224	119	10 x 18	147	260
DTZ6,3	50.2	66	170	2	0.96	300	193	285	210	285	193	333	173	333	173	296	224	145	10 x 18	173	260
DTZ8,0	55	60	250	4	0.96	390	200	1)	200	1)	200	1)	184	374	184	374	350	126	10 x 18	152	310
DTZ10,0	70	80	280	3.5	0.97	390	-	-	216	1)	216	1)	199	374	199	374	350	141	10 x 18	167	310
DTZ12,5	80	95	300	4	0.97	390	-	-	231	1)	231	1)	214	374	214	374	350	156	10 x 18	182	310
DTZ16	95	100	420	4.5	0.97	450	-	-	221	1)	221	1)	204	434	204	434	400	142	13 x 20	172	360
DTZ20	125	140	400	3.5	0.98	450	-	-	251	1)	251	1)	234	1)	234	434	400	172	13 x 20	202	360
DTZ25	160	180	350	3	0.98	450	-	-	281	1)	281	1)	264	1)	264	434	400	202	13 x 20	232	360

all dimensions in mm



Transformers

Three-phase matching transformers

DT

Designed and tested according to

- IEC/EN 61558-2-1 / EN 60076-1
- VDE 0570-2-1
- UL 5085-2
- CSA 22.2 No. 66

For use according to

- IEC/EN 60204-1
- VDE 0113

Typical applications

- Voltage adjustment
- Generation of four-wire networks based on three-wire networks
- Power transfer

Basic equipment

- Separate windings
- Insulation class B / F from 6.3 kVA
- Ambient temperature -25 to 40 °C
- Connection terminal (<63 A)
- Frequency 50/60 Hz

Further equipment

- Enclosure IP23 page 54
- Additional tapping page 57
- Additional winding page 59
- Static shield winding page 57
- Temperature Control page 59
- Tropics resistant equipment page 57



Type rating for use according to insulation class ¹⁾	Rated input voltage	Rated output voltage	Type	Price ²⁾ per unit	Price ³⁾ for currents up to	Cu-factor ³⁾	
B kVA	F kVA	V (selectable)	V (selectable)	Euro	A		
0.1	-	50-1000	12-1000	DT0,1(*/*)*	123.40	16	0.45
0.16	-			DT0,16(*/*)*	135.60		0.77
0.25	-			DT0,25(*/*)*	151.00		1.00
0.4	-			DT0,4(*/*)*	176.40		1.60
0.5	-			DT0,5(*/*)*	189.50		1.85
0.63	-			DT0,63(*/*)*	211.60		2.60
0.8	-			DT0,8(*/*)*	222.70		2.60
1	-			DT1,0(*/*)*	262.30		3.50
1.3	-		24-1000	DT1,3(*/*)*	293.20		4.00
1.6	-			DT1,6(*/*)*	324.10		5.00
2	-			DT2,0(*/*)*	367.00		6.30
2.5	-			DT2,5(*/*)*	427.70	25	7.00
3.2	-			DT3,2(*/*)*	461.80		10.50
4	-			DT4,0(*/*)*	598.50		11.00
5	-			DT5,0(*/*)*	720.90		13.00
6.3	-			DT6,3(*/*)*	817.80		15.00
8	9			DT8,0(*/*)*	1,127.70	63	16.00
10	11.2			DT10,0(*/*)*	1,396.00		27.00

- Static shield winding is additional shielding between primary and secondary sides.
- For versions with increased climate resistance, the transformer is supplied with a specially insulated finish. The finish enables the transformer to be used in areas of high humidity.
- Transformer version with reinforced insulation upon request.
- CUR according to UL-File XPTQ2.E168819 (General Purpose-Component)

When ordering, the following information must be added to the type designation:

DT0,1(*/*)*

- 1st place holder Δ rated input voltage
- 2nd place holder Δ rated output voltage
- 3rd place holder Δ vector group

Sample order

- requested type DT0,1
- requested rated input voltage 1000 V
- requested rated output voltage 12 V
- requested vector group Dy(n)5

More information about configuration of three-phase transformers → page 65

The correct type designation reads **DT0,1(1000/12)Dy(n)5**
Higher outputs on request

The unambiguous article number of your configuration will be defined by trafomodern during the offer- and order process.

¹⁾ Rated output when used according to insulation class B, maximum of 130° in the core; for insulation class F maximum of 155°C in the core

²⁾ Excess charge for increased current → page 56

³⁾ Material surcharge → page 60

⁴⁾ Only on request

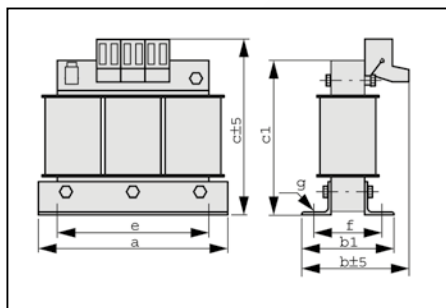


Fig.1

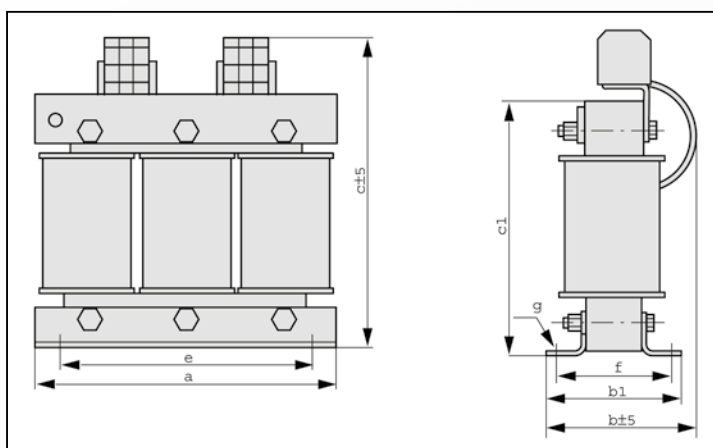


Fig.2

Type	Total weight	No-load losses	Short-circuit losses	Short-circuit voltage	Efficiency factor	a	b	b1	c	c1	e	f	ø g
	kg	W	W	%									
Fig.1													
DT0,1	0.9	5	18	14.8	0.81	105	91	66	128	82	80	50	5 x 8
DT0,16	1.9	6	30	15.5	0.82	125	86	61	148	102	100	45	5 x 8
DT0,25	2.5	9	35	10.9	0.85	125	96	71	148	102	100	55	5 x 8
DT0,4	3.6	11	45	10.1	0.88	155	97	77	168	128	130	57	8 x 12
DT0,5	5.1	17	40	6.7	0.9	155	112	92	168	128	130	72	8 x 12
DT0,63	6.1	19	50	7	0.9	190	102	82	194	155	170	58	8 x 12
DT0,8	7.5	25	50	5.8	0.91	190	112	92	194	155	170	68	8 x 12
DT1,0	8.9	35	55	5.1	0.92	190	122	102	194	155	170	78	8 x 12
DT1,3	11	35	70	5.1	0.93	210	122	107	213	174	175	87	8 x 12
DT1,6	12.9	45	70	4.1	0.93	210	132	117	213	174	175	97	8 x 12
DT2,0	20.1	55	85	3.9	0.93	240	124	107	247	208	185	85	10 x 18
DT2,5	22.4	65	95	3.6	0.94	240	134	117	247	208	185	95	10 x 18
DT3,2	27.7	30	135	4.2	0.94	300	116	106	296	260	224	78	10 x 18
DT4,0	31	35	130	3.2	0.96	300	132	122	296	260	224	94	10 x 18
DT5,0	39.6	75	145	2.5	0.97	300	157	147	296	260	224	119	10 x 18
Fig.2													
DT6,3	45	80	145	2	0.97	300	193	162	334	260	224	134	10 x 18
DT8,0	55	50	215	4.2	0.97	390	184	152	384	310	350	126	10 x 18
DT10,0	70	55	280	3.5	0.97	390	199	167	384	310	350	141	10 x 18

all dimensions in mm



DTF

Transformers

Three-phase transformers

Designed and tested according to

- IEC/EN 61558-2-1 / EN 60067-1
- VDE 0570-2-1

For use according to

- IEC/EN 60204-1
- VDE 0113

Typical applications

- Voltage adjustment
- Production of four-wire networks based on three-wire networks
- Power transfer

Basic equipment

- Separate windings
- Insulation class B
- Ambient temperature -25 to 40 °C
- Connection terminal (<63 A)
- Frequency 50/60 Hz

Further equipment

- Enclosure IP23 page 54
- Additional tapping page 57
- Additional winding page 59
- Static shield winding page 57
- Temperature Control page 59



Type rating for use according to insulation class ¹⁾		Rated input voltage	Rated output voltage	Type	Price ²⁾ per unit	Price ³⁾ for currents up to	Cu-factor ⁴⁾
B kVA	F kVA	V (selectable)	V (selectable)		Euro	A	
12.5	15	50-1000	50-1000	DTF12,5(*/*)*	1,649.00	63	28
16	19			DTF16(*/*)*	1,987.30		30
20	22.5			DTF20(*/*)*	2,443.90		48
25	30			DTF25(*/*)*	2,847.20		50
32	37			DTF32(*/*)*	3,221.00		52
40	46			DTF40(*/*)*	3,703.50	100	55
50	57.5			DTF50(*/*)*	4,465.00		75
63	73.5			DTF63(*/*)*	5,142.00		80
80	89.5			DTF80(*/*)*	5,843.30		110
100	111.5			DTF100(*/*)*	6,919.50	200	100
125	150			DTF125(*/*)*	8,201.00	320	115
160	180			DTF160(*/*)*	9,497.50		120
200	225			DTF200(*/*)*	11,450.50		180
250	280			DTF250(*/*)*	12,806.10	630	180
315	360			DTF315(*/*)*	14,799.30		195
400	450			DTF400(*/*)*	17,556.70		300
500	580			DTF500(*/*)*	20,781.80	800	360

- Static shield winding is additional shielding between primary and secondary sides.
- For versions with increased climate resistance, the transformer is supplied with a specially insulated finish. The finish enables the transformer to be used in areas of high humidity.
- Transformer version with reinforced insulation upon request.
- CUR according to EIS 130 or EIS 155 to OBJ2.E160829 (Electrical Insulation-Component)

When ordering, the following information must be added to the type designation:

DTF100(*/*)*

- 1st place holder Δ rated input voltage
- 2nd place holder Δ rated output voltage
- 3rd place holder Δ vector group

Sample order

- requested type DTF100
- requested rated input voltage 690 V
- requested rated output voltage 400 V
- requested vector group YNyn0

More information about configuration of three-phase transformers → page 65

The correct type designation reads **DTF100 (690/400) YNyn0**

The unambiguous article number of your configuration will be defined by trafomodern during the offer- and order process.

Higher outputs on request.

¹⁾ Rated output when used according to insulation class B, maximum of 130° in the core; for insulation class F maximum of 155°C in the core

²⁾ Excess charge for increased current → page 56

³⁾ Material surcharge → page 60

⁴⁾ Only on request

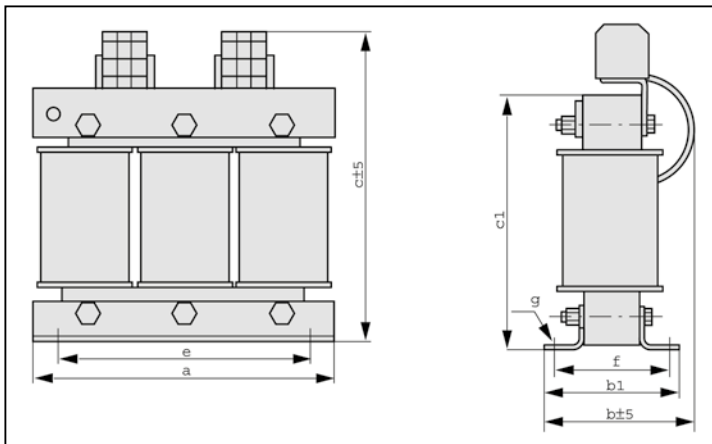


Fig.1

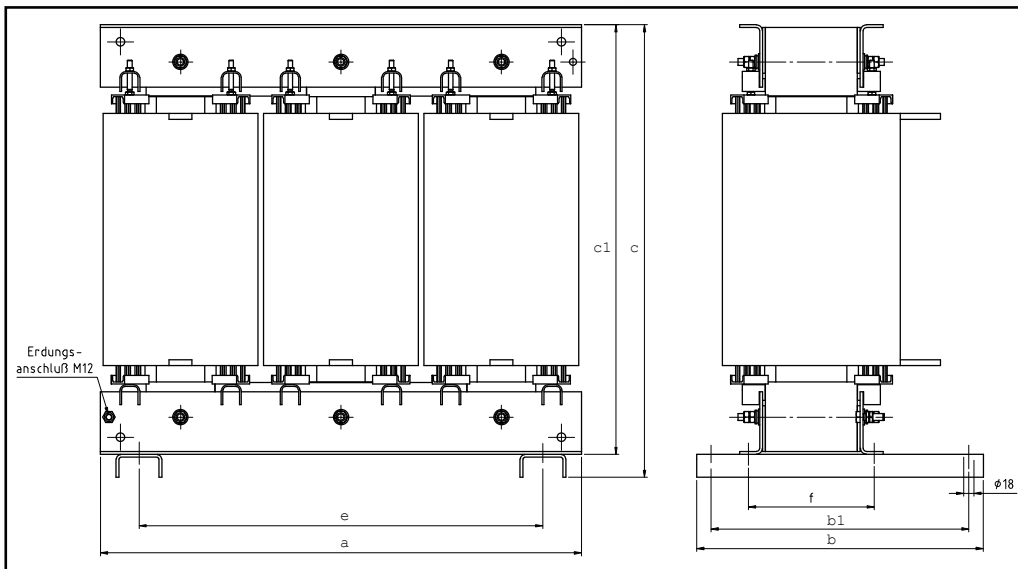


Fig.2

Type	Total weight	No-load losses	Short-* losses	Short-circuit voltage	Efficiency factor	a	b	b1	c	c1	e	f	g
	kg (ca.)	W	W	%									
Fig.1													
DTF12,5	80	85	380	2.7	0.96	450	204	173	434	360	400	143	13 x 20
DTF16	90	110	400	2.1	0.97	450	219	187	434	360	400	157	13 x 20
DTF20	117	120	410	1.8	0.97	450	234	203	434	360	400	173	13 x 20
DTF25	140	140	580	3.8	0.97	540	—	240	517	—	450	170	14 x 20
DTF32	155	180	700	3.2	0.97	540	—	267	517	—	450	197	14 x 20
DTF40	185	230	700	2.6	0.97	540	—	297	517	—	450	227	14 x 20
DTF50	245	260	850	2.8	0.97	690	—	280	572	—	575	230	14 x 20
DTF63	280	320	1260	3.1	0.97	690	—	310	572	—	575	260	14 x 20
DTF80	330	290	1890	3.8	0.97	760	—	260	720	—	575	200	14 x 20
DTF100	345	380	2380	3.8	0.97	760	—	290	720	—	575	230	14 x 20
DTF125	450	560	2600	3.3	0.98	760	—	330	720	—	575	270	14 x 20
Fig.2													
DTF160	550	650	3650	3.1	0.98	840	500	450	790	750	705	220	18
DTF200	620	700	3800	3.5	0.98	840	500	450	790	750	705	220	18
DTF250	730	860	4700	3.2	0.98	840	500	450	790	750	705	270	18
DTF315	980	1200	4800	3.3	0.98	1020	500	450	970	930	705	260	18
DTF400	1100	1300	5000	3.7	0.98	1020	500	450	970	930	705	260	18
DTF500	1380	1780	7300	2.6	0.98	1020	500	450	970	930	705	320	18

* the specified short-circuit losses are heat losses

all dimensions in mm



**D4TB
D4TF**

Transformers

Three-phase transformers with 4% u_k

Designed and tested according to

- IEC/EN 61558-2-1 / EN 60076-1
- VDE 0570-2-1

Typical applications

- Inverter applications

Basic equipment

- Separate windings
- Insulation class B / F from 25 kVA
- Ambient temperature -25 to 40 °C
- Connection terminal (<63 A)
- Frequency 50/60 Hz



Further equipment

- Enclosure IP23 page 54
- Additional tapping page 57
- Additional winding page 59
- Static shield winding page 57
- Temperature Control page 59

Type rating for use according to insulation class ¹⁾		Rated input voltage	Rated output voltage	Type	Price ²⁾ per unit	Price ³⁾ for currents up to	Cu-factor ³⁾
B kVA	F kVA	V (selectable)	V (selectable)		Euro		A
4.0	-	50-1000	50-1000	D4TB4,0(*/*)*	676.70	25	15.00
5.0	-			D4TB5,0(*/*)*	816.20		11.90
6.3	-			D4TB6,3(*/*)*	926.20		10.00
8.0	-			D4TB8,0(*/*)*	1,211.30	63	11.00
10.0	-			D4TB10,0(*/*)*	1,499.90		13.50
12.5	-			D4TB12,5(*/*)*	1,740.10		14.90
16	-			D4TB16,0(*/*)*	2,096.10		26.40
20	-			D4TB20,0(*/*)*	2,578.70		38.30
-	25			D4TF25,0(*/*)*	2,730.40		38.50
-	32			D4TF32,0(*/*)*	3,089.50		39.50
-	40			D4TF40,0(*/*)*	3,686.40	100	51.00
-	50			D4TF50,0(*/*)*	4,443.50		72.80
-	63			D4TF63,0(*/*)*	4,931.60		61.40
-	80			D4TF80,0(*/*)*	5,956.50	200	110.00
-	100			D4TF100,0(*/*)*	7,052.30		120.00

- Static shield winding is additional shielding between primary and secondary sides.
- For versions with increased climate resistance, the transformer is supplied with a specially insulated finish. The finish enables the transformer to be used in areas of high humidity.
- Transformer version with reinforced insulation upon request.
- CUR according to EIS 130 or EIS 155 to OBJ2.E160829 (Electrical Insulation-Component)

When ordering, the following information must be added to the type designation:

D4TF(*/*)*

- 1st place holder Δ rated input voltage
- 2nd place holder Δ rated output voltage
- 3rd place holder Δ vector group

Sample order

- requested type D4TF20
- requested rated input voltage 400 V
- requested rated output voltage 320 V
- requested vector group Yd5

More information about configuration of three-phase transformers → page 65

The correct type designation reads **D4TF20(400/320)Yd5**

The unambiguous article number of your configuration will be defined by trafomodern during the offer- and order process.

Higher outputs on request.

¹⁾ Rated output when used according to insulation class B, maximum of 130° in the core; for insulation class F maximum of 155°C in the core

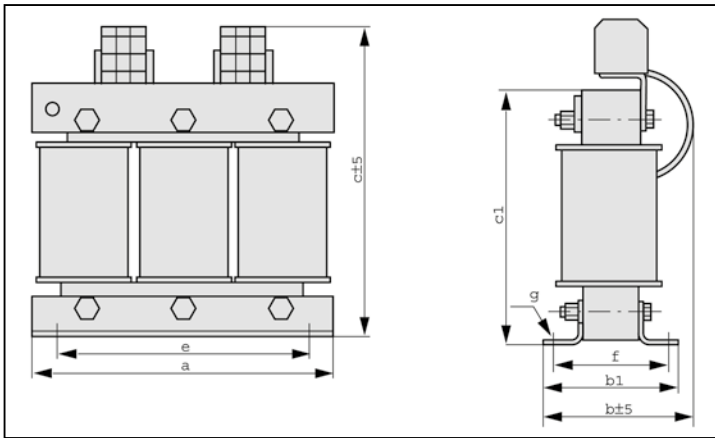
²⁾ Excess charge for increased current → page 56

³⁾ Material surcharge → page 60

⁴⁾ Only on request

Transformers

Three-phase transformers with 4% u_k



Type	Total weight	No-load losses	Short-circuit losses	Short-circuit voltage	Efficiency factor	a	b	b1	c	c1	e	f	ø g
	kg	W	W	%									
D4TB4,0	31	45	210	≥4	0.88	300	154	147	290	260	224	119	10 x 18
D4TB5,0	45	40	270	≥4	0.9	300	193	162	334	260	224	134	10 x 18
D4TB6,3	55	60	315	≥4	0.9	390	184	152	384	310	350	126	10 x 18
D4TB8,0	70	75	340	≥4	0.91	390	199	167	384	310	350	141	10 x 18
D4TB10,0	95	95	505	≥4	0.92	450	204	172	434	360	400	142	13 x 20
D4TB12,5	95	95	490	≥4	0.96	450	204	172	434	360	400	142	13 x 20
D4TB16,0	115	120	650	≥4	0.97	450	264	232	434	360	400	202	13 x 20
D4TB20,0	150	130	720	≥4	0.97	540	267	—	496	—	450	197	14 x 20

Dimensions and drawings of D4TF25,0 bis D4TF100 on request

all dimensions in mm



Transformers

Three-phase autotransformers

Designed and tested according to

- IEC/EN 61558-2-13 / EN 60076-1
- VDE 0570-2-13

Typical applications

- Voltage adjustment

Basic equipment

- Insulation class B / F from 5.0 kVA
- Ambient temperature -25 to 40 °C
- Connection terminal (<63 A)
- Frequency 50/60 Hz
- Vector group Yna0
- Maximum load to neutral point: 10 % of nominal current



Further equipment

- Enclosure IP23 page 54
- Additional tapping page 57
- Additional winding page 59
- Temperature Control page 59
- Delta-connected stabilizing winding on request

DTSP

Type rated power for use according to insulation class ¹⁾		Rated input voltage	Rated output voltage	Type	Price ²⁾ per unit	Price ²⁾ for currents up to	Cu-factor ³⁾
B kVA	F kVA	V (selectable)	V (selectable)		Euro	A	
0.1	-	50-1000	12-1000	DTSP0,1(*/*)	123.40	25	0.45
0.16	-			DTSP0,16(*/*)	135.60		0.77
0.25	-			DTSP0,25(*/*)	151.00		1.00
0.4	-			DTSP0,4(*/*)	176.40		1.60
0.5	-			DTSP0,5(*/*)	189.50		1.85
0.63	-			DTSP0,63(*/*)	211.60		2.60
0.8	-			DTSP0,8(*/*)	222.70		2.60
1	-			DTSP1,0(*/*)	262.30		3.50
1.3	-		24-1000	DTSP1,3(*/*)	293.20		4.00
1.6	-			DTSP1,6(*/*)	324.10		5.00
2	-			DTSP2,0(*/*)	367.00		6.30
2.5	-			DTSP2,5(*/*)	427.70	63	7.00
3.2	-			DTSP3,2(*/*)	461.80		10.50
4	-			DTSP4,0(*/*)	598.50		11.00
5	5.6			DTSP5,0(*/*)	720.90		13.00
6.3	7.1			DTSP6,3(*/*)	817.80		15.00
8	9			DTSP8,0(*/*)	1,127.70	100	16.00
10	11.2			DTSP10,0(*/*)	1,396.00		27.00

- For versions with increased climate resistance, the transformer is supplied with a specially insulated finish. The finish allows the transformer to be used in areas of high humidity.
- CUR according to EIS 130 or EIS 155 to OBJ2.E160829 (Electrical Insulation-Component)

When ordering, the following information must be added to the type designation:

DTSP10,0(*/*)

- 1st place holder Δ rated input voltage
- 2nd place holder Δ rated output voltage

Sample order

- required throughput rating: 22 kVA
- requested rated input voltage: 690 V
- requested output voltage: 400 V

Notes for selection

- $S_T = S_n \cdot (1 - \frac{\text{lowervoltage}}{\text{highervoltage}})$
= 22 kVA (1 - 400 V/690 V) = 9.25 kVA
- S_T = type power = power, which is relevant for the size of the transformer
- S_n = nominal power = power, which is the relevant figure of the load of the transformer

- The type rated power is always smaller than the throughput rating.
- Versions with delta stabilizing winding on request.

The correct type designation reads
DTSP10,0(690/400)

The unambiguous article number of your configuration will be defined by trafomodern during the offer- and order process.

¹⁾ Rated output when used according to insulation class B, maximum of 130° in the core; for insulation class F maximum of 155° C in the core

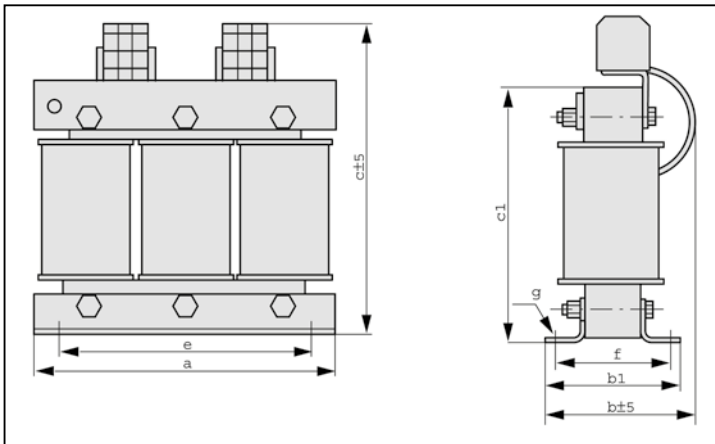
²⁾ Excess charge for increased current → page 56

³⁾ Material surcharge → page 60

⁴⁾ Only on request

Transformers

Three-phase autotransformers DTSP



Type	Total weight	No-load losses	Short-circuit losses	Short-circuit voltage	Efficiency factor	a	b	b1	c	c1	e	f	ø g
	kg	W	W	%									
DTSP 0,1	0.9	5	18	*)	0.81	105	91	66	128	82	80	50	5 x 8
DTSP 0,16	1.9	6	30	*)	0.82	125	86	61	148	102	100	45	5 x 8
DTSP 0,25	2.5	9	35	*)	0.85	125	96	71	148	102	100	55	5 x 8
DTSP 0,4	3.6	11	45	*)	0.88	155	97	77	168	128	130	57	8 x 12
DTSP 0,5	5.1	17	40	*)	0.90	155	112	92	168	128	130	72	8 x 12
DTSP 0,63	6.1	19	50	*)	0.90	190	102	82	194	155	170	58	8 x 12
DTSP 0,8	7.5	25	50	*)	0.91	190	112	92	194	155	170	68	8 x 12
DTSP 1,0	8.9	35	55	*)	0.92	190	122	102	194	155	170	78	8 x 12
DTSP 1,3	11	35	70	*)	0.93	210	122	107	213	174	175	87	8 x 12
DTSP 1,6	12.9	45	70	*)	0.93	210	132	117	213	174	175	97	8 x 12
DTSP 2,0	20.1	55	85	*)	0.93	240	124	107	247	208	185	85	10 x 18
DTSP 2,5	22.4	65	95	*)	0.94	240	134	117	247	208	185	95	10 x 18
DTSP 3,2	27.7	30	135	*)	0.94	300	116	106	296	260	224	78	10 x 18
DTSP 4,0	31	35	130	*)	0.96	300	132	122	296	260	224	94	10 x 18
DTSP 5,0	39.6	75	145	*)	0.97	300	157	147	296	260	224	119	10 x 18
DTSP 6,3	45	80	145	*)	0.97	300	193	162	334	260	224	134	10 x 18
DTSP 8,0	55	50	215	*)	0.97	390	184	152	384	310	350	126	10 x 18
DTSP 10,0	70	55	280	*)	0.97	390	199	167	384	310	350	141	10 x 18

*) depending on the voltage ratio

all dimensions in mm



Transformers

Three-phase autotransformers

Designed and tested according to

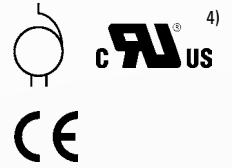
- IEC/EN 61558-2-13 / EN 60076-1
- VDE 0570-2-13

Typical applications

- Voltage adjustment

Basic equipment

- Ambient temperature -25 to 40 °C
- Connection terminal (<63 A)
- Frequency 50/60 Hz
- Vector group Yna0
- Maximum load to neutral point: 10 % of nominal current



Further equipment

- Enclosure IP23 page 54
- Additional tapping page 57
- Additional winding page 59
- Temperature Control page 59
- Delta-connected stabilizing winding on request

DTFSP

Type power for use according to insulation class ¹⁾		Rated input voltage	Rated output voltage	Type	Price ²⁾ per unit	Price ³⁾ for currents up to	Cu-factor ⁴⁾
B kVA	F kVA	V (selectable)	V (selectable)		Euro	A	
12.5	15	50-1000	50-1000	DTFSP12,5(*/*)	1,649.00	63	28
16	19			DTFSP16(*/*)	1,987.30		30
20	22.5			DTFSP20(*/*)	2,443.90		48
25	30			DTFSP25(*/*)	2,847.20		50
32	37			DTFSP32(*/*)	3,221.00		52
40	46			DTFSP40(*/*)	3,703.50	100	55
50	57.5			DTFSP50(*/*)	4,465.00		75
63	73.5			DTFSP63(*/*)	5,142.00		80
80	89.5			DTFSP80(*/*)	5,843.30		110
100	111.5			DTFSP100(*/*)	6,919.50	200	100
125	150			DTFSP125(*/*)	8,201.00	320	115
160	180			DTFSP160(*/*)	9,497.50		120
200	225			DTFSP200(*/*)	11,450.50		180
250	280			DTFSP250(*/*)	12,806.10	630	180
315	360			DTFSP315(*/*)	14,799.30		195
400	450			DTFSP400(*/*)	17,556.70		300
500	580			DTFSP500(*/*)	20,781.80	800	360

- For versions with increased climate resistance, the transformer is supplied with a specially insulated finish. The finish allows the transformer to be used in areas of high humidity.
- CUR according to EIS 130 or EIS 155 to OBJ2.E160829 (Electrical Insulation-Component)

When ordering, the following information must be added to the type designation:

DTFSP100(*/*)

- 1st place holder $\hat{=}$ rated input voltage
- 2nd place holder $\hat{=}$ rated output voltage

Sample order

- required Nominal power: 220 kVA
- requested rated input voltage 690 V
- requested output voltage 400 V highervoltage

Notes for selection

$S_t = S_n \cdot (1 - \text{lowervoltage})$
 $= 22 \text{ kVA} (1 - 400 \text{ V}/690 \text{ V}) = 9.25 \text{ kVA}$
 S_t = type power (= power, which is relevant for the size of the transformer)
 S_n = nominal power (= power, which is the relevant figure of the load of the transformer)

- The type rated power is always smaller than the throughput rating.
- Versions with delta stabilizing winding on request.

The correctly way of ordering:
DTFSP100(690/400)

The unambiguous article number of your configuration will be defined by trafomodern during the offer- and order process.

¹⁾ Rated output when used according to insulation class B, maximum of 130° in the core; for insulation class F maximum of 155° C in the core

²⁾ Excess charge for increased current → page 58

³⁾ Material surcharge → page 60

⁴⁾ Only on request

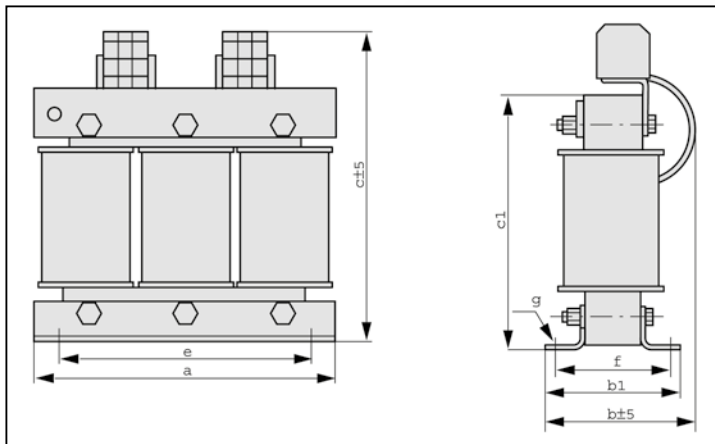


Fig.1

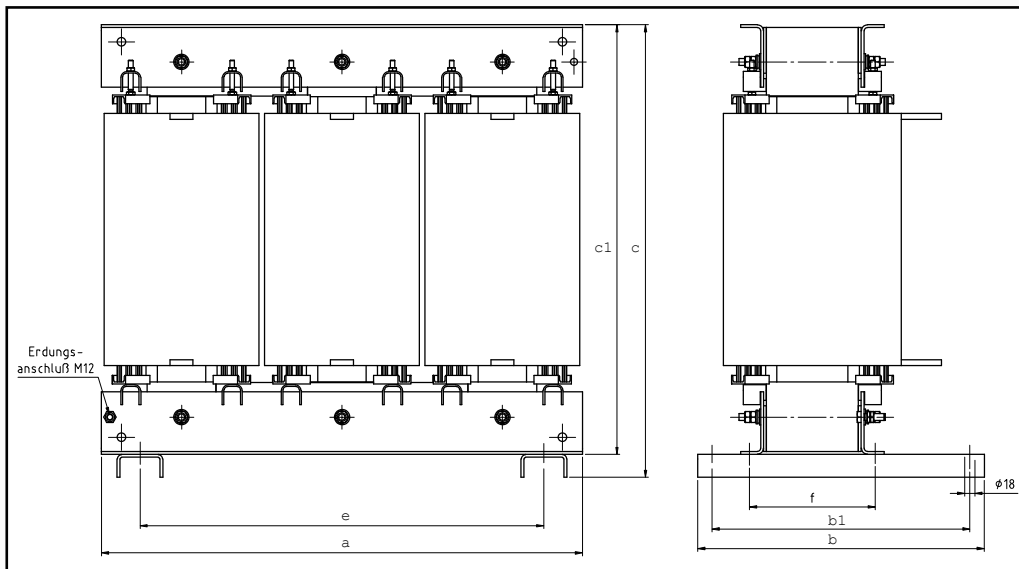


Fig.2

Type	Total weight	No-load losses	Short-* losses	Short-circuit voltage	Efficiency factor	a	b	b1	c	c1	e	f	g
	kg (ca.)	W	W	%									
Fig.1													
DTFSP12,5	80	85	380	*)	0,96	450	204	173	434	360	400	143	13 x 20
DTFSP16	90	110	400	*)	0,97	450	219	187	434	360	400	157	13 x 20
DTFSP20	117	120	410	*)	0,97	450	234	203	434	360	400	173	13 x 20
DTFSP25	140	140	580	*)	0,97	540	—	240	517	—	450	170	14 x 20
DTFSP32	155	180	700	*)	0,97	540	—	267	517	—	450	197	14 x 20
DTFSP40	185	230	700	*)	0,97	540	—	297	517	—	450	227	14 x 20
DTFSP50	245	260	850	*)	0,97	690	—	280	572	—	575	230	14 x 20
DTFSP63	280	320	1260	*)	0,97	690	—	310	572	—	575	260	14 x 20
DTFSP80	330	290	1890	*)	0,97	760	—	260	720	—	575	200	14 x 20
DTFSP100	345	380	2380	*)	0,97	760	—	290	720	—	575	230	14 x 20
DTFSP125	450	460	2600	*)	0,98	760	—	330	720	—	575	270	14 x 20
Fig.2													
DTFSP160	550	620	3650	*)	0,98	840	500	450	790	750	705	220	18
DTFSP200	620	700	4000	*)	0,98	840	500	450	790	750	705	220	18
DTFSP250	730	820	4700	*)	0,98	840	500	450	790	750	705	270	18
DTFSP315	980	1160	6350	*)	0,98	1020	500	450	970	930	705	260	18
DTFSP400	1100	1160	6400	*)	0,98	1020	500	450	970	930	705	260	18
DTFSP500	1380	1550	5850	*)	0,98	1020	500	450	970	930	705	320	18

*) depending on the voltage ratio

all dimensions in mm



DA
DACB
DANF

Matching transformers

DA

Designed and tested according to
· EN 60076-1

Typical applications
Matching transformer for machine and plant components

DACB

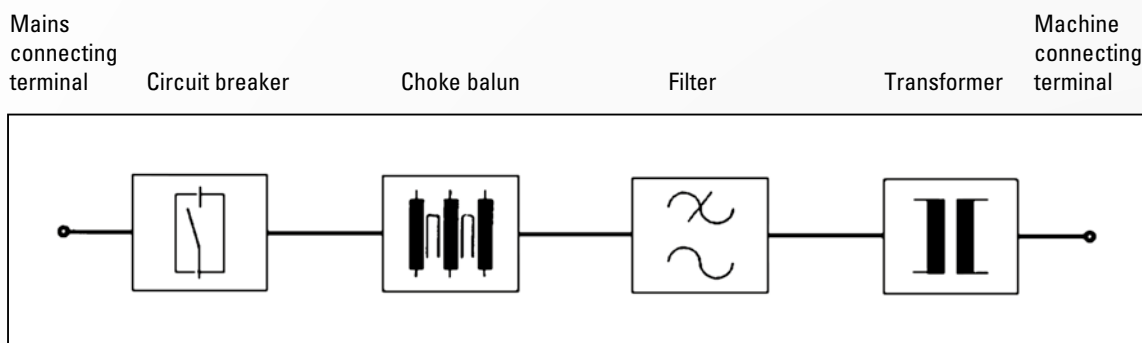
Designed and tested according to
· EN 60076-1

Typical applications
Matching transformer for machine and plant components

DANF

Designed and tested according to
· EN 60076-1
· EN 55011

Typical applications
Matching transformer for machine and plant components which do not comply with the EMC directives. This facilitates compulsory marking and easy system integration.



DA advantages:

- flexible voltage adjustment by primary tapping
- static shield winding between primary and secondary winding
- steel sheet enclosure IP33

DACB advantages:

- flexible voltage adjustment by primary tapping
- static shield winding between primary and secondary winding
- steel sheet enclosure IP33
- circuit-breaker for overload and short-circuit protection, giving full transformer protection, in protection box IP 55 according to the EN60204 European Machinery Directive

DANF advantages:

- flexible voltage adjustment by primary tapping
- static shield winding between primary and secondary winding
- steel sheet enclosure IP33
- circuit-breaker for overload and short-circuit protection, giving full transformer protection, in protection box IP 55 according to the EN60204 European Machinery Directive
- mains filter with an additional choke balun for the suppression of conducted disturbances

Technical data (for DA, DACB and DANF):

Input voltage: 3 x 400 V with tapping at 380 V, 420 V

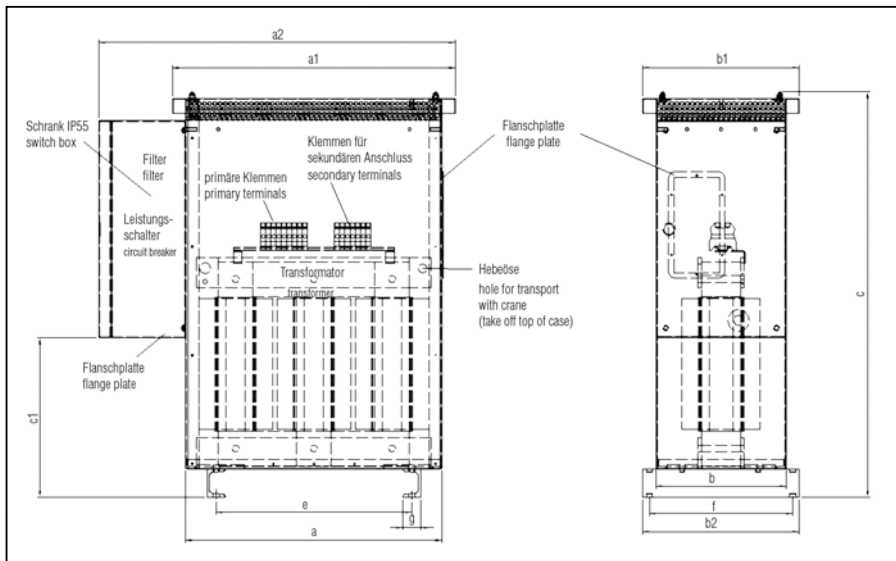
Output voltage: 3 x 200 V (other voltages on request)

Frequency: 50 – 60 Hz

Insulation class: ta40F

Vector group: Yyn0

Type of protection: transformer IP33, protection box IP55



Type	Order no.	Total weight	Cu weight	Output	Output current	a	a1	a2	b	b1	b2	c	c1	e	f	ø g	Price per unit
		kg	kg	kVA	A												Euro
DA 25	4000857	143	29	25	72	590	650	-	300	360	360	933	-	450	330	14	on request
DA 35	4000858	169	40	35	101	590	650	-	300	360	360	933	-	450	330	14	
DA 45	4000859	250	38	45	130	750	650	-	400	460	460	933	-	575	430	14	
DA 55	4000860	280	49	55	159	750	810	-	400	460	460	933	-	575	430	14	
DA 65	4000861	305	44	65	188	850	910	-	400	460	460	933	-	575	430	14	
DA 75	4000862	340	60	75	217	850	910	-	400	460	460	933	-	575	430	14	
DA 90	4000863	395	64	90	260	850	910	-	400	460	460	933	-	575	430	14	
DA 110	4000914	400	102	110	317	850	930	-	500	580	550	1083	-	575	525	14	
DA 130	4000915	470	97	130	375	850	930	-	500	580	550	1083	-	575	525	14	
DA 150	4000916	700	97	150	433	1340	1510	-	800	970	920	1200	-	705	870	26	
DACB 25	4000850	154	29	25	72	590	650	820	300	360	360	933	366	450	330	14	
DACB 35	4000851	180	40	35	101	590	650	820	300	360	360	933	366	450	330	14	
DACB 45	4000852	266	38	45	130	750	650	980	400	460	460	933	267	575	430	14	
DACB 55	4000853	296	49	55	159	750	810	980	400	460	460	933	267	575	430	14	
DACB 65	4000854	320	44	65	188	850	910	1080	400	460	460	933	267	575	430	14	
DACB 75	4000855	355	60	75	217	850	910	1080	400	460	460	933	267	575	430	14	
DACB 90	4000856	410	64	90	260	850	910	1080	400	460	460	933	267	575	430	14	
DACB 110	4000921	425	102	110	317	850	930	1140	500	580	550	1083	317	575	525	14	
DACB 130	4000922	495	97	130	375	850	930	1140	500	580	550	1083	317	575	525	14	
DACB 150	4000923	725	97	150	433	1340	1510	1675	800	970	920	1200	327	705	870	26	
DANF 25	4000283	158	29	25	72	590	650	820	300	360	360	933	366	450	330	14	
DANF 35	4000284	184	40	35	101	590	650	820	300	360	360	933	366	450	330	14	
DANF 45	4000285	275	38	45	130	750	650	980	400	460	460	933	267	575	430	14	
DANF 55	4000286	305	49	55	159	750	810	980	400	460	460	933	267	575	430	14	
DANF 65	4000287	330	44	65	188	850	910	1080	400	460	460	933	267	575	430	14	
DANF 75	4000288	365	60	75	217	850	910	1080	400	460	460	933	267	575	430	14	
DANF 90	4000289	420	64	90	260	850	910	1080	400	460	460	933	267	575	430	14	
DANF 110	4000928	440	102	110	317	850	930	1140	500	580	550	1083	317	575	525	14	
DANF 130	4000929	510	97	130	375	850	930	1140	500	580	550	1083	317	575	525	14	
DANF 150	4000930	740	97	150	433	1340	1510	1675	800	970	920	1200	327	705	870	26	

Special types and higher outputs on request

all dimensions in mm



DSB

Transformers

Earthing autotransformers

Designed and tested according to

- IEC/EN 61558-2-13 / EN 60076-1

Typical applications

- Generation of a neutral point with 230 V

Basic equipment

- Supply voltage 3 x 400 V
- Insulation class B
- Ambient temperature -25 to 40 °C
- Connection terminal (<63 A)
- Frequency 50/60 Hz
- Vector group Zn0



Further equipment

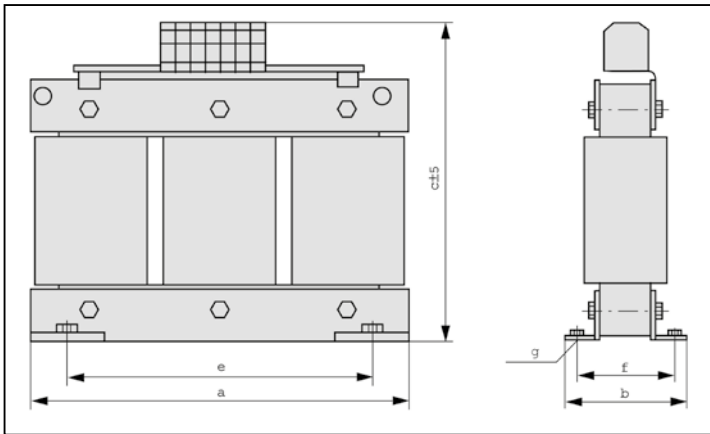
- Enclosure IP23 page 54
- Temperature Control page 59

Neutral current	Rated output voltage	Type Order no.	Price per unit	Cu-factor ¹⁾
A	V		Euro	
5	230	DSB0,67 4000947	211.60	3.00
10		DSB1,3 4000948	293.20	5.00
25		DSB3,3 4000949	466.40	12.00
50		DSB6,7 4000950	825.80	20.00
75		DSB10,0 4000951	1,421.90	28.00
100		DSB13,3 4000952	1,649.00	30.00
150		DSB20,0 4000953	2,443.90	35.00
200		DSB26,7 4000954	2,847.20	48.00
250		DSB33,3 4000955	3,221.00	50.00
300		DSB40,0 4000956	3,843.30	56.00
350		DSB46,7 4000957	4,633.40	75.00
400		DSB53,3 4000958	5,142.00	80.00
450		DSB60,0 4000959	5,408.30	80.00
500		DSB66,7 4000960	5,675.60	80.00
600		DSB80,0 4000961	6,210.30	110.00
700		DSB93,3 4000962	7,354.10	100.00

¹⁾ Material surcharge → page 60

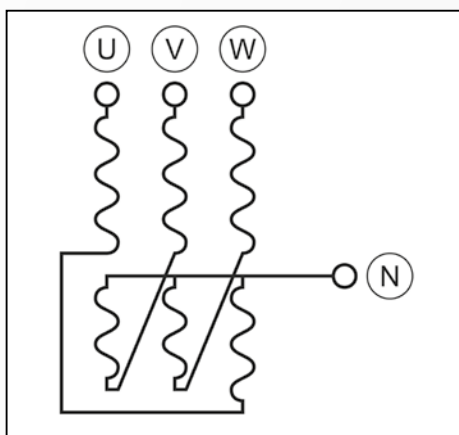
Transformers

Earthing autotransformers DSB



Type	Total weight	No-load losses	Short-circuit losses	Short-circuit voltage	Efficiency factor	a	b	b1	c	c1	e	f	ø g
	kg	W	W	%									
DSB0,67	6.1	20	80	-	0.82	125	86	61	148	102	100	45	5 x 8
DSB1,3	11	35	100	-	0.93	210	122	107	213	174	175	87	8 x 12
DSB3,3	27.7	25	220	-	0.94	300	116	106	296	260	224	78	10 x 18
DSB6,7	45	65	200	-	0.97	300	193	162	334	260	224	134	10 x 18
DSB10,0	70	75	365	-	0.97	390	199	167	384	310	350	141	10 x 18
DSB13,3	80	95	455	-	0.97	450	204	173	434	360	400	143	13 x 20
DSB20,0	90	130	505	-	0.98	450	234	202	434	360	400	172	13 x 20
DSB26,7	140	125	690	-	0.98	540	240	232	517	360	450	170	14 x 20
DSB33,3	155	170	655	-	0.98	540	267	-	517	-	450	197	14 x 20
DSB40,0	185	215	780	-	0.98	540	297	-	517	-	450	227	14 x 20
DSB46,7	245	235	870	-	0.98	690	280	-	572	-	575	230	14 x 20
DSB53,3	270	310	1240	-	0.98	690	310	-	572	-	575	260	14 x 20
DSB60,0	280	310	1240	-	0.98	690	310	-	572	-	575	260	14 x 20
DSB66,7	295	310	1380	-	0.98	690	310	-	572	-	575	260	14 x 20
DSB80,0	330	290	1980	-	0.98	760	260	-	720	-	575	200	14 x 20
DSB93,3	345	420	2210	-	0.99	760	290	-	720	-	575	230	14 x 20

all dimensions in mm





Transformers for usage in medical environments

Single-phase transformers, three-phase transformers



Designed and tested according to

- IEC/EN 61558-2-15
- VDE 0570-2-15

For use according to

- EN 7
- VDE 0100 part 710

Typical applications

- Isolating transformers for use in medical environments

Basic equipment

- Separate windings
- Insulation class B
- Ambient temperature -25 to 40 °C
- Connection terminal (<63 A)
- Frequency 50/60 Hz
- Static shield winding
- Temperature Control by PTC-resistor

Further equipment

- Enclosure IP23 on request
- Other temperature controls

ET-MED
DT-MED

Rated outputs	Rated input voltage	Rated output voltage	Type Order no.	Price per unit	Cu-factor ¹⁾
kVA	V	V		Euro	
3.15	230	230	ET3,15(230/230)-MED 991033	707.70	9.40
4			ET4,0(230/230)-MED 991034	988.80	19.60
5.3			ET5,3(230/230)-MED 991035	1,103.70	18.00
6.3			ET6,3(230/230)-MED 991036	1,223.00	19.00
8.3			ET8,3(230/230)-MED 991037	1,365.60	24.00

Other voltage combinations can be designed on request.

In most applications the standard configuration is needed which is described in the table. If other voltage combinations are needed, the input voltage and the output voltage must be added to the order like follows:

DT3,15(*/*)-MED

1st place holder Δ rated input voltage
2nd place holder \triangle rated output voltage

Sample order

- requested type DT4,0...-MED
- requested rated input voltage 400 V
- requested rated output voltage 230 V

The correct type designation reads
DT4,0(400/230)-MED

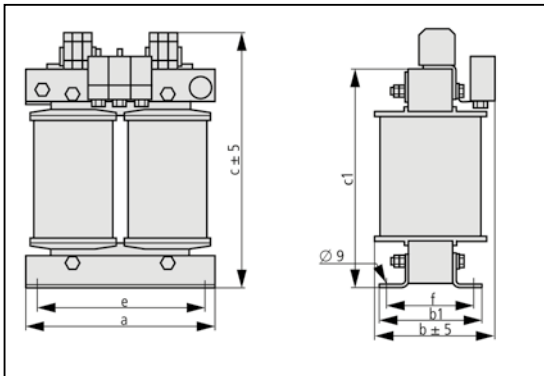


3.15	400	230	DT3,15(400/230)-MED 991038	953.90	14.10
4			DT4,0(400/230)-MED 991039	1,052.10	12.60
5			DT5,0(400/230)-MED 991040	1,179.40	15.00
6.3			DT6,3(400/230)-MED 991041	1,337.80	23.00
8			DT8,0(400/230)-MED 991042	1,580.90	37.00

¹⁾ Material surcharge → page 60

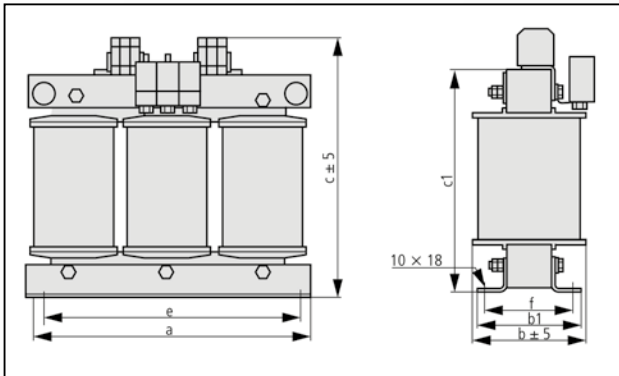
Transformers for usage in medical environments

Single-phase transformers ET-MED, three-phase transformers DT-MED



Type	Total weight	No-load losses	Short-circuit losses	Short-circuit voltage	Efficiency factor	a	b	b1	c	c1	e	f	∅ g
	kg	W	W	%									
ET3,15-MED	31	23	97	—	0.96	200	205	162	340	260	124	134	10 x 18
ET4,0-MED	35	22	100	—	0.96	260	179	153	422	305	230	127	10 x 18
ET5,3-MED	45	24	164	—	0.96	260	194	168	375	310	230	143	10 x 18
ET6,3-MED	55	24	181	—	0.96	260	209	183	422	305	230	157	10 x 18
ET8,3-MED	60	31	215	—	0.97	320	224	205	440	365	270	177	13 x 20

all dimensions in mm



Type	Total weight	No-load losses	Short-circuit losses	Short-circuit voltage	Efficiency factor	a	b	b1	c	c1	e	f
	kg	W	W	%								
DT3,15-MED	36	26	85	—	0.96	300	210	135	335	260	224	107
DT4,0-MED	40	34	117	—	0.96	300	240	147	335	260	224	119
DT5,0-MED	55	50	138	—	0.96	300	255	162	335	260	224	134
DT6,3-MED	60	66	202	—	0.96	390	225	153	374	305	350	127
DT8,0-MED	70	75	213	—	0.96	390	240	168	374	305	350	142

all dimensions in mm



**GW
GD**

Power supplies

DC power supply units

Designed and tested according to

- IEC/EN 61558-2-6
- VDE 0570-2-6
- UL 5085-2
- CSA 22.2 No. 66

For use according to

- IEC/EN 60204-1
- VDE 0113

Typical applications

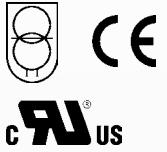
- Control voltage circuits
- Functional low voltage

Basic equipment

- Separate windings
- Insulation class B
- Ambient temperature -25 to 40 °C
- Connection terminal (<63 A)
- Frequency 50/60 Hz
- Single-phase GW units with fuse on the DC side and LED

Further equipment

- Enclosure IP23 page 54
- Additional tapping page 57
- Temperature Control page 59



Design input voltage 50/60 Hz	Design output voltage (residual ripple)	Design output current	Type Order no.	Price ^{*)} per unit	Cu-factor ¹⁾
V AC	V DC	A		Euro	
230	24 (5 %)	3	GW4-030-BA3 200016	88.00	0.36
		5	GW4-050-BA3 200017	110.20	0.37
		8	GW4-080-BA3 200018	126.70	0.82
		10	GW4-100-BA3 200019	136.70	0.96

• CUR according to EIS 130 or EIS 155 to OBJ2.E160829 (Electrical Insulation-Component)



400 (± 5 %)	24 (3 %)	5	GD4-050-BD3 200007	108.80	0.65
		10	GD4-100-BD3 200009	130.10	1.12
		15	GD4-150-BD3 200011	152.10	1.30
		20	GD4-200-BD3 200012	174.20	2.10
		30	GD4-300-BD3 200014	207.80	3.00

^{*)}All prices are quoted net
¹⁾ Material surcharge → page 60

Power supplies

DC power supply units GW, GD

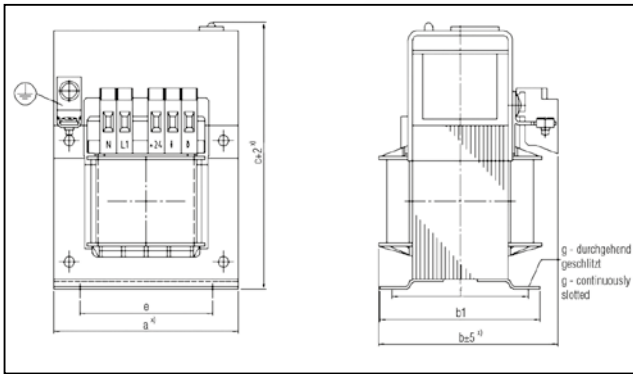


Fig.1

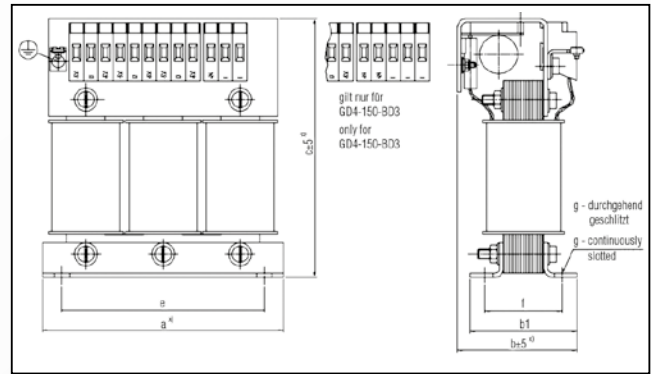


Fig.2

Type	Total weight	No-load losses	Short-circuit losses	Residual ripple	a	b	b1	c	e	f	ø g
	kg	W	W								
Fig1											
GW4-030-BA3	2	7.6	26	< 5 %	85	85	74	119	64	60.5	4.8
GW4-050-BA3	2.5	9	41	< 5 %	85	93	83	134	64	69	4.8
GW4-080-BA3	3.65	12.8	46	< 5 %	106	95	87	150	80.5	69.5	5.8
GW4-100-BA3	4.45	14.1	57	< 5 %	121	100	86	168	90	70	5.8
Fig2											
GD4-050-BD3	2.4	5	27	< 3 %	125	68	61	135	100	45	5
GD4-100-BD3	4.4	14.2	45	< 3 %	155	77	77	165	130	57	8
GD4-150-BD3	5.8	13.9	63	< 3 %	155	92	92	165	130	72	8
GD4-200-BD3	7.6	25.5	89	< 3 %	190	100	83	220	170	58	8
GD4-300-BD3	11.2	38.2	101	< 3 %	190	110	103	235	170	78	8

all dimensions in mm

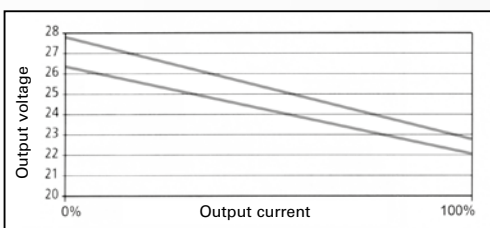
Electromagnetic compatibility

Interference emission	Class B, (EN 55 011, 22)
ESD	6 kV contact (level 3) 8 kV air (level 3), IEC/EN 61 000-4-2
RFI	10 V/m, modulated, IEC/EN 61 000-4-3
Burst	2 kV (level 3), IEC/EN 61 000-4-4
Surge	2 kV (inst.-class 3), IEC/EN 61 000-4-5
Impulse voltage	4.9 kV, IEC/EN 60 947

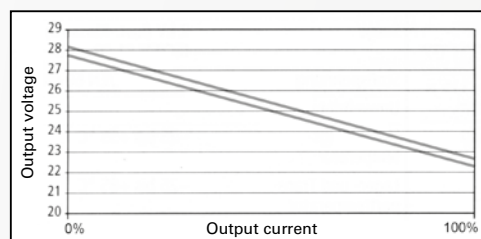
Environmental data

Ambient temperature	-25 °C to +55 °C
	linear characteristic of the Derating Curve from 40 °C to 55 °C
	from 100 % output to 93 % output
Storage and transport temperature	25 °C to +85 °C
Degree of soiling	2, EN 50 178
Vibration	0.0075 mm, (10-57 Hz), 10 Zyklen, IEC 60 068-2-6
Shock	11 ms/15 g, IEC 60 068-2-27, (3 shocks)
Installation altitude	max. 2000 m above sea level, if higher: take derating into account

Type	U1	I1	Switch	Rated current	Switch	only short-circuit protection
	V	A		A		
GW 4-030-BD3	230	0.45	PKZM0-0.63	0.45	FAZN S1	•
GW 4-050-BD3	230	0.8	PKZM0-1	0.8	FAZN S1	-
GW 4-080-BD3	230	1.2	PKZM0-1.6	1.2	FAZN S1	-
GW 4-100-BD3	230	1.4	PKZM0-1.5	1.4	FAZN S2	-
GD 4-050-BD3	3 x 400	0.24	PKZM0-0.25	0.24	FAZN S1	•
GD 4-100-BD3	3 x 400	0.46	PKZM0-0.63	0.46	FAZN S1	•
GD 4-150-BD3	3 x 400	0.65	PKZM0-1	0.65	FAZN S1	-
GD 4-200-BD3	3 x 400	0.9	PKZM0-1	0.9	FAZN S1	-
GD 4-300-BD3	3 x 400	1.8	PKZM0-2.5	1.8	FAZN S2	-



GW



GD

In order to help the user to select the correct protective motor switch, protective motor switches made by EATON are listed in the above table as examples. Of course other protective motor switches of other manufacturers are equally suited and approved for the performance of the task.



AING

Power supplies

Single-phase "all inclusive power supply"

German utility patent DE 2011864301

Designed and tested according to

- IEC/EN 61558-2-2 / 2-6
- VDE 0570-2-2 / 2-6

For use according to

- IEC/EN 60204-1
- VDE 0113

Basic equipment

- Separate windings
- Insulation class B
- Ambient temperature -25 to 40 °C
- Frequency 50/60 Hz



Typical applications

- for heating, refrigerating and air conditioning applications

Description:

The power packs are open design transformer power units with galvanically isolated windings, designed according to EN 61558-2-6. The connection area is made safe from finger-touch according to VBG4. The units are provided with three separate outputs for the supply of electric installations, such as heating, refrigerating and air-conditioning systems. All outputs are short-circuit-proof using conventional and inexpensive motor vehicle fuses (size / type FK2). For monitoring and indicating every individual output there is a potential-free relay contact (change-over contact). In addition, LEDs indicate the status 'under voltage' (LED lights green) and 'fuse defect' (LED lights red).

Technical Data:

Standard and test mark: EN61558-2-6

Primary: 230 V ± 5 % tapping, 50 Hz (special voltages possible)

Secondary 1: 24 V AC, 4.2 A (100 VA – AING 4) or 24 V AC, 8 A (192 VA - AING 8)

Secondary 2: 10 V DC, 1 A (10 W), residual ripple ≤ 5 %

Secondary 3: 24 V DC, 3 A (72 W), residual ripple ≤ 5 %

Type of protection: IP00

Protection of terminals: safe from finger-touch according to VBG4 / IP20 according to VDE0470 T1 / EN60529

Ambient temperature: 40 °C

Duty cycle: 100 %

Installation altitude: 1000 m above sea level

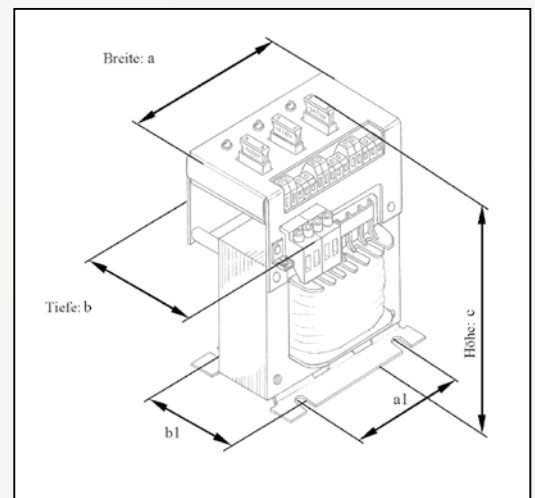
Design:

The upright unit consists of a single-phase transformer with a built-on rectifier head. All electric and electronic components on the secondary side are mounted on a printed circuit board. This results in reduced wiring and increased fail-safety. The connecting terminals for primary, secondary and signalling contacts are on one side. The fuses and the LEDs are on top of the rectifier head. The arrangement of the output terminals, fuses and LEDs is a logical combination in order to ensure special service and user-oriented operation.

Type	Order No.	Losses W	Weight kg	Cu-factor ¹⁾	a	a1	b	b1	c	Price per unit Euro
AING4	269516	ca. 50	3.2	0.75	110	80.5	90	62	155	204.10
AING8	269517	ca. 50	3.6	0.75	110	80.5	90	70	155	233.70

¹⁾ Material surcharge → page 60

all dimensions in mm





Single-phase Chokes

page 48



Three-phase Chokes

page 52



Enclosure

page 54



Optional equipment

page 56



Chokes

Single-phase smoothing chokes

Designed and tested according to

- IEC/EN 61558-2-20
- VDE 0570-2-20

Typical applications

- Inverter applications

Basic equipment

- Insulation class B
- Ambient temperature -25 to 40 °C
- Connection terminal (<63 A)
- Frequency 50/60 Hz



Further equipment

- Temperature Control page 59

DEG

Energy value L x I ²	Price ¹⁾ of currents up to	Type	Price per unit Euro	Cu-factor ²⁾	
0.19	16	DEG0,03(*mH/*A)	48.90	0.15	
0.38		DEG0,06(*mH/*A)	53.70	0.25	
0.64		DEG0,1(*mH/*A)	59.00	0.30	
1		DEG0,16(*mH/*A)	65.40	0.40	
1.3		DEG0,2(*mH/*A)	77.00	1.00	
1.6		DEG0,25(*mH/*A)	81.70	1.00	
2		DEG0,315(*mH/*A)	98.50	1.20	
2.5		25	DEG0,4(*mH/*A)	102.70	1.30
3.2			DEG0,5(*mH/*A)	113.60	1.40
4			DEG0,63(*mH/*A)	131.20	2.00
5.1	DEG0,8(*mH/*A)		146.60	2.30	
6.4	DEG1,0(*mH/*A)		176.40	3.00	
8.3	DEG1,3(*mH/*A)		207.20	4.00	
10.2	DEG1,6(*mH/*A)		306.40	4.50	
12.7	DEG2,0(*mH/*A)		327.40	5.00	
15.9	DEG2,5(*mH/*A)		352.70	5.50	
19.1	DEG3,0(*mH/*A)		647.00	10.80	
25.5	DEG4,0(*mH/*A)	726.40	11.00		

Formula for the calculation of the energy value:

$$W = L \times I^2$$

L = inductivity [H]

I = current [A]

For the exact design of the choke the following information must be added to the type designation:

DEG0,16(*mH/*A)

Replace the place holder in front of mH with the value of the inductivity and the place holder in front of A with the current.

Sample order

- requested inductivity 25 mH
- rated current 5.9 A
- calculated energy value according to formula 0.87 Ws type DEG0,16

The correct type designation reads
DEG0,16(25mH/5.9A)

The unambiguous article number of your configuration will be defined by trafomodern during the offer- and order process.

¹⁾ Excess charge for increased current on request

²⁾ Material surcharge → page 60

³⁾ Larger types on request

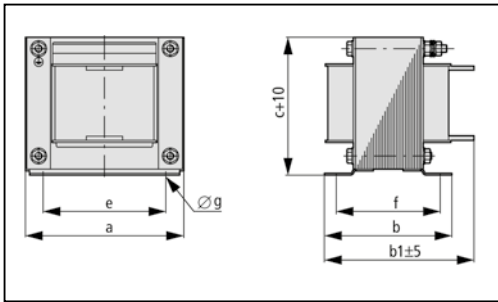


Fig.1

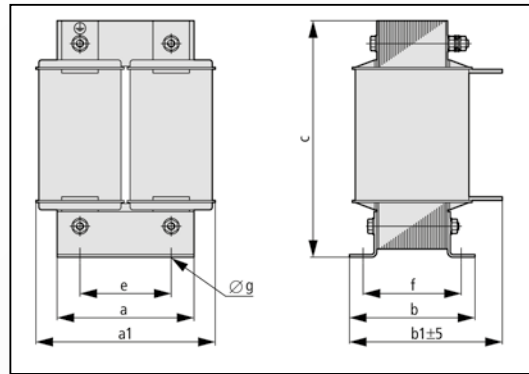


Fig.2

Type	Total weight	Copper losses	a	a1	b	b1	c	b1	c	b1	c	b1	c
	kg	W				10 A	10 A	25 A	25 A	63 A	63 A	100 A	100 A
Fig1													
DEG0,03	0.7	7	66	—	57	62	80	83	83	73	61	78	61
DEG0,06	1.5	7	84	—	63	68	90	89	78	78	75	83	75
DEG0,1	2	9	84	—	77	82	90	103	103	93	75	98	75
DEG0,16	2.3	14	84	—	85	91	112	112	103	100	75	105	75
DEG0,2	3	19	105	—	82	82	103	103	121	96	94	101	94
DEG0,25	3.8	16	105	—	90	90	111	111	121	104	94	109	94
DEG0,315	4.3	20	120	—	91	91	117	109	131	108	106	113	106
DEG0,4	5.2	21	120	—	103	103	117	121	131	120	106	125	106
DEG0,5	6.8	23	120	—	123	103	117	141	131	140	106	145	106
DEG0,63	7.7	29	150	—	109	109	142	122	155	127	132	132	132
DEG0,8	9.6	30	150	—	126	126	142	139	155	144	132	149	132
DEG1,0	13.4	31	150	—	152	152	142	165	155	170	132	175	132
DEG1,3	14.9	37	174	—	131	135	145	145	173	145	152	150	152
DEG1,6	17.4	46	192	—	146	146	181	151	194	159	170	164	170
DEG2,0	21.5	74	192	—	158	158	181	163	194	171	170	176	170
DEG2,5	21.5	78	192	—	158	158	181	163	194	171	170	176	170
Fig2													
DEG3,0	26	63	150	197	197	138	259	155	160	165	182	222	202
DEG4,0	35	97	150	197	197	163	259	175	180	185	202	242	222

all dimensions in mm

Type	b1	c	b1	c	b1	c	e	f	ø g
	200 A	200 A	630 A	630 A	1000 A	1000 A			
Fig1									
DEG0,03	61	61	96	61	136	61	50	44	4.8 x 9
DEG0,06	75	75	102	75	142	75	64	50	4.8 x 9
DEG0,1	75	75	117	75	157	75	64	64	4.8 x 9
DEG0,16	75	75	125	75	165	75	64	72	4.8 x 9
DEG0,2	94	94	121	94	161	94	84	66	5.8 x 11
DEG0,25	94	94	129	94	169	94	84	74	5.8 x 11
DEG0,315	106	106	130	106	170	106	90	75	5.8 x 11
DEG0,4	106	106	142	106	182	106	90	87	5.8 x 11
DEG0,5	106	106	162	106	202	106	90	107	5.8 x 11
DEG0,63	132	132	149	132	189	132	122	89	7 x 13
DEG0,8	132	132	166	132	206	132	122	106	7 x 13
DEG1,0	132	132	192	132	232	132	122	132	7 x 13
DEG1,3	152	152	181	152	221	152	135	111	7 x 13
DEG1,6	170	170	186	170	226	170	150	116	10 x 18
DEG2,0	170	170	198	170	238	170	150	128	10 x 18
DEG2,5	170	170	198	170	238	170	150	128	10 x 18
Fig2									
DEG3,0	108	197	150	197	138	259	155	160	165
DEG4,0	133	197	150	197	163	259	175	180	185

all dimensions in mm



Chokes

Single-phase commutating chokes

Designed and tested according to

- IEC/EN 61558-2-20
- VDE 0570-2-20

Typical applications

- Inverter applications

Basic equipment

- Insulation class B
- Ambient temperature -25 to 40 °C
- Connection terminal (<63 A)
- Frequency 50/60 Hz



Further equipment

- Temperature Control page 59

DEK

$\Delta U = 9.2 \text{ V / phase}$
rated current

A	Inductivity L mH	Type Order no.	Price per unit Euro	Cu-factor ¹⁾
6.5	4.51	DEK0,03-9,2 206954	48.90	0.15
13	2.25	DEK0,06-9,2 206955	53.70	0.25
22	1.33	DEK0,1-9,2 206956	66.40	0.30
35	0.84	DEK0,16-9,2 206957	89.30	0.40
44	0.67	DEK0,2-9,2 206958	99.80	1.00
54	0.54	DEK0,25-9,2 206959	104.40	1.00
69	0.42	DEK0,315-9,2 206960	122.40	1.20
87	0.34	DEK0,4-9,2 206961	130.10	1.30
109	0.27	DEK0,5-9,2 206962	141.10	1.40
137	0.21	DEK0,63-9,2 206963	183.00	2.00
174	0.17	DEK0,8-9,2 206964	197.30	2.30
217	0.13	DEK1,0-9,2 206965	228.20	3.00
285	0.103	DEK1,3-9,2 206966	329.60	4.00
350	0.084	DEK1,6-9,2 206967	389.80	4.50
440	0.067	DEK2,0-9,2 206968	509.20	5.00
550	0.053	DEK2,5-9,2 206969	535.70	5.50
650	0.045	DEK3,0-9,2 206970	830.00	10.80
870	0.034	DEK4,0-9,2 206971	999.70	11.00

¹⁾ Material surcharge → page 60

$\Delta U = 16 \text{ V / phase}$
rated current

A	Inductivity L mH	Type Order no.	Price per unit Euro	Cu-factor ¹⁾
3.7	13.76	DEK0,03-16 206976	48.90	0.15
7.5	6.79	DEK0,06-16 206977	53.70	0.25
12.5	4.07	DEK0,1-16 206978	59.00	0.30
20	2.54	DEK0,16-16 206979	72.30	0.40
25	2.03	DEK0,2-16 206984	85.20	1.00
31	1.64	DEK0,25-16 206985	104.40	1.00
38	1.34	DEK0,315-16 206986	105.00	1.20
50	1.01	DEK0,4-16 206987	126.70	1.30
62	0.82	DEK0,5-16 232251	135.60	1.40
78	0.65	DEK0,63-16 206989	158.70	2.00
100	0.51	DEK0,8-16 232252	174.20	2.30
125	0.407	DEK1,0-16 206991	205.00	3.00
160	0.318	DEK1,3-16 206992	257.90	4.00
200	0.254	DEK1,6-16 206993	358.20	4.50
250	0.203	DEK2,0-16 206994	448.60	5.00
310	0.164	DEK2,5-16 206995	475.10	5.50
375	0.135	DEK3,0-16 206996	830.00	10.80
500	0.101	DEK4,0-16 206997	910.40	11.00

¹⁾ Material surcharge → page 60

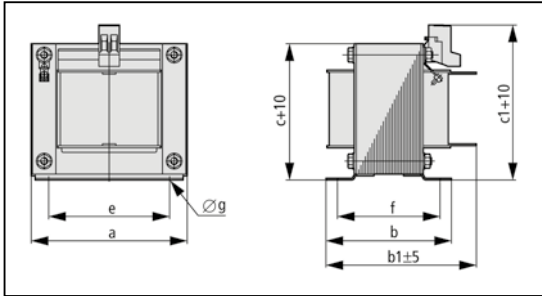


Fig.1

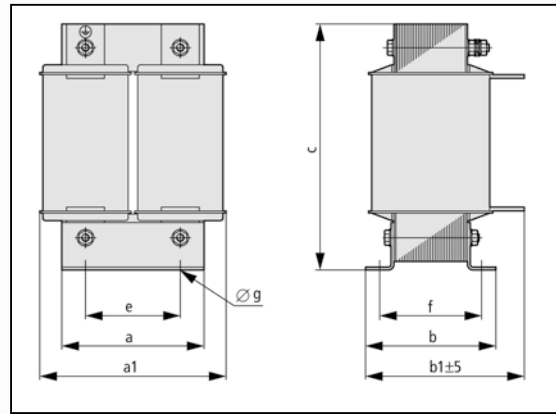


Fig.2

Type	Total weight	Copper losses	a	a1	b	b1	c	c1	e	f	øg	Terminal	Terminal lug
	kg	W											
Fig1													
DEK0,03	0.7	7	66	—	55	71	61	80	50	44	4.8 x 8	4 mm ²	—
DEK0,06	1.5	7	84	—	60	87	75	103	64	47	4.8 x 8	10 mm ²	—
DEK0,1	2	9	84	—	74	101	75	103	64	61	4.8 x 8	10 mm ²	—
DEK0,16	2.3	14	84	—	83	98	75	—	64	70	4.8 x 8	—	15 x 2/7ø
DEK0,2	3	19	105	—	80	94	94	—	85	63	5.8 x 12	—	15 x 2/7ø
DEK0,25	3.8	16	105	—	88	102	94	—	85	71	5.8 x 12	—	15 x 2/7ø
DEK0,315	4.3	20	120	—	86	108	106	—	90	68	5.8 x 12	—	20 x 3/9ø
DEK0,4	5.2	21	120	—	98	120	106	—	90	80	5.8 x 12	—	20 x 3/9ø
DEK0,5	6.8	23	120	—	118	145	106	—	90	100	5.8 x 12	—	25 x 5/11ø
DEK0,63	7.7	29	150	—	104	132	132	—	122	82	7 x 15	—	25 x 5/11ø
DEK0,8	9.6	30	150	—	121	149	132	—	122	99	7 x 15	—	25 x 5/11ø
DEK1,0	13.4	31	150	—	147	192	132	—	122	125	7 x 15	—	40 x 5/14ø
DEK1,3	14.9	37	174	—	140	181	152	—	135	115	7 x 15	—	40 x 5/14ø
DEK1,6	17.4	46	192	—	146	186	170	—	150	116	10 x 18	—	40 x 5/14ø
DEK2,0	21.5	74	192	—	158	198	170	—	150	128	10 x 18	—	40 x 10/14ø
DEK2,5	21.5	78	192	—	158	198	170	—	150	128	10 x 18	—	40 x 10/14ø
Fig2													
DEK3,0	26	63	150	197	138	222	259	—	100	108	11	—	50 x 10/2 x 14ø
DEK4,0	35	97	150	197	163	242	259	—	100	133	11	—	50 x 10/2 x 14ø

all dimensions in mm



Chokes

Three-phase commutating chokes

Designed and tested according to

- IEC/EN 61558-2-20
- VDE 0570-2-20
- UL 5085-2
- CSA 22.2 No. 66 (UL/CSA up to 600V)

Basic equipment

- Insulation class B / F from 3.2 kVA
- Ambient temperature -25 to 40 °C
- Connection terminal (<63 A)
- Frequency 50/60 Hz



Typical applications

- Inverter applications

DDK

DU = 9,2 V / phase rated current | Inductivity L | Type Order no. | Price per unit | Cu-factor¹⁾

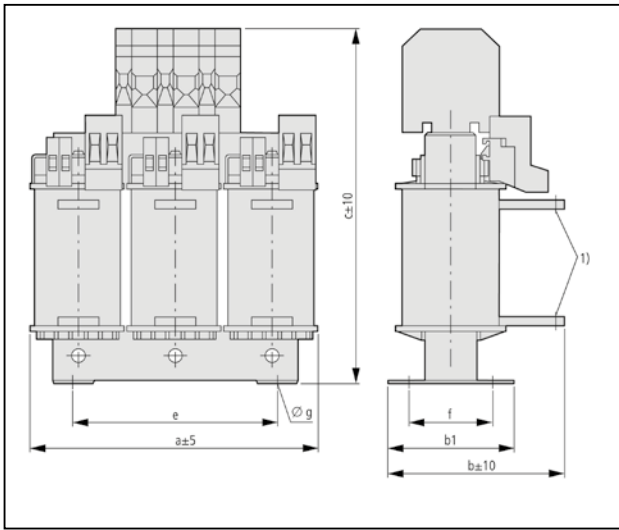
A	mH		Euro	
7	4.18	DDK0,1-9,2 215499	164.20	0.41
11	2.66	DDK0,16-9,2 215500	179.70	0.70
18	1.62	DDK0,25-9,2 215501	206.10	0.87
29	1.01	DDK0,4-9,2 215502	245.80	2.10
36	0.81	DDK0,5-9,2 215503	263.40	1.65
45	0.65	DDK0,63-9,2 215504	292.10	2.45
70	0.41	DDK1,0-9,2 215505	373.70	2.75
95	0.3	DDK1,3-9,2 215506	415.50	3.40
115	0.25	DDK1,6-9,2 215507	479.50	4.20
145	0.2	DDK2,0-9,2 215508	536.70	4.70
180	0.16	DDK2,5-9,2 215510	611.80	6.40
230	0.127	DDK3,2-9,2 215513	745.50	8.80
290	0.1	DDK4,0-9,2 215514	933.60	10.00
360	0,081	DDK5,0-9,2 215515	1,154.70	10.50
455	0.064	DDK6,3-9,2 215516	1,288.10	12.30
580	0.05	DDK8,0-9,2 215517	1,625.50	21.50
725	0.04	DDK10,0-9,2 215518	2,035.80	22.00
905	0.032	DDK12,5-9,2 215519	2,390.30	35.00
1160	0.025	DDK16,0-9,2 215520	2,874.80	48.00
1450	0.02	DDK20,0-9,2 215521	3,458.40	58.00
1810	0.016	DDK25,0-9,2 215522	4,002.10	61.00
2320	0.012	DDK32,0-9,2 215523	4,510.50	80.00
2900	0.01	DDK40,0-9,2 215524	5,335.80	63.00

- CUR according to UL-File XPTQ2.E168819 (General Purpose-Component)

¹⁾ Material surcharge → page 60

Chokes

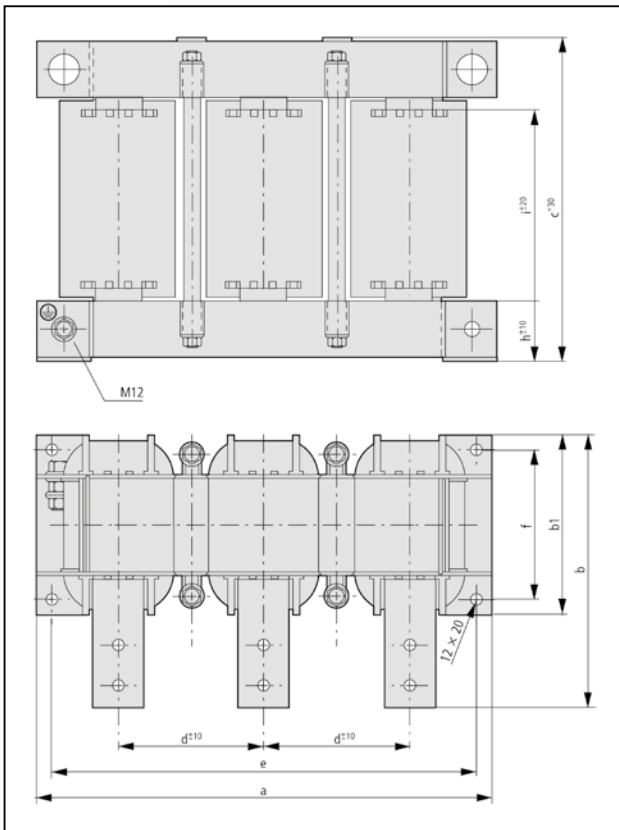
Three-phase commutating chokes DDK



Type	Total weight	Copper losses	a	b	b ₁	c	e	f	Ø g
	kg	W							
DDK0,1	1.5	25	115	66	66	118	100	50	5 x 10
DDK0,16	2.2	33	140	61	61	138	125	50	5 x 10
DDK0,25	2.9	41	140	71	71	138	125	50	5 x 10
DDK0,4	4.8	46	195	104	77	175	175	50	8 x 13
DDK0,5	5.0	56	195	119	92	172	175	75	8 x 13
DDK0,63	7.3	58	220	112	82	195	200	50	8 x 13
DDK1,0	10.2	75	220	130	102	160	200	75	8 x 13
DDK1,3	12.3	73	270	125	96	200	250	75	8 x 13
DDK1,6	14.9	89	270	155	120	202	250	100	8 x 13
DDK2,0	17.3	103	270	145	115	210	250	75	10 x 18
DDK2,5	20.6	106	270	155	125	210	250	100	10 x 18

¹⁾ Connection lugs

all dimensions in mm



Type	Total weight	Copper losses	a	b	b ₁	c	d	e	f	h	i
	kg	W									
DDK3,2	30	148	384	195	105	258	115	350	75	50	160
DDK4,0	31	185	384	215	130	258	115	350	100	50	160
DDK5,0	40	144	384	240	155	258	115	350	125	50	160
DDK6,3	45	182	384	260	180	258	115	350	150	50	160
DDK8,0	55	229	454	270	150	313	145	425	100	60	230
DDK10,0	70	377	454	285	165	313	145	425	125	60	230
DDK12,5	80	382	454	300	180	313	145	425	150	60	230
DDK16,0	95	420	504	310	170	358	165	475	125	70	270
DDK20,0	125	450	504	340	200	358	165	475	175	70	270
DDK25,0	160	520	504	370	230	358	165	475	200	70	270
DDK32,0	161	650	554	355	215	408	185	525	175	80	300
DDK40,0	190	700	554	385	245	408	185	525	200	80	300

all dimensions in mm

Dimension b is a maximum dimension depending on the rated current and the terminal lugs used.
Dimension c depends on the choke data (number of windings and set air core).
The precise height and depth of the choke can only be determined on the basis of the choke data.



Enclosure

Protective steel sheet enclosure

- Type of protection IP23
- Painted in RAL 7032
- Other types of protection on request
- Other colours on request

IP23

Enclosure	for Type STZ, UTI	for Type STN	for Type ET, ETSP	for Type DTZ	for Type DT, DTSP	for Type DTF/DTFSP	for Type D4TB	for Type D4TF	for Type DSB	Order no.	Price per unit
IP23/01	0,1–0,16	0,03–0,2	0,03–0,2							200618	33.40
IP23/02	0,2–0,5	0,25–0,5	0,25–0,63							200623	44.30
IP23/03	0,63–1,3	0,63–2,0	0,63–2,0							200624	77.00
IP23/04	1,6–2,5									226100	102.00
IP23/05	5,3–8,3		6,3–8,0							219648	241.40
IP23/06	13,3		10–25							200649	314.10
IP23/30				0,1–0,16	0,1–0,25					200706	44.30
IP23/31				0,25–0,63	0,4–0,5					200753	102.00
IP23/32A	3,0–4,0		2,5–5,0	1,0–2,0	0,63–2,5				0,67–1,3	200763	126.70
IP23/33				2,5–6,3	3,2–6,3		4,0–5,0		3,3–6,7	200754	213.80
IP23/34				8,0–25	8,0–10	12,5–20	6,3–16		10–20	200755	297.60
IP23/35						25–40	20	25–40	26,7–40	200756	400.10
IP23/36						50–125		50–100	46,7–93,3	200757	426.60
IP23/37						163–250				76613	2,121.90
IP23/38										76612	2,192.40

Sample order:
Enclosure IP23/01 for STZ0,1

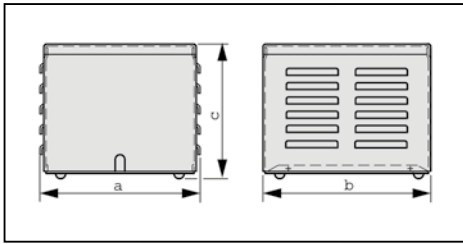


Fig.1

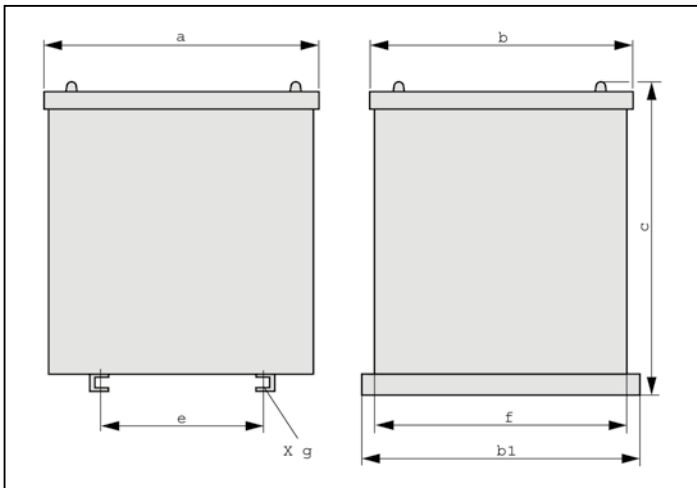


Fig.2

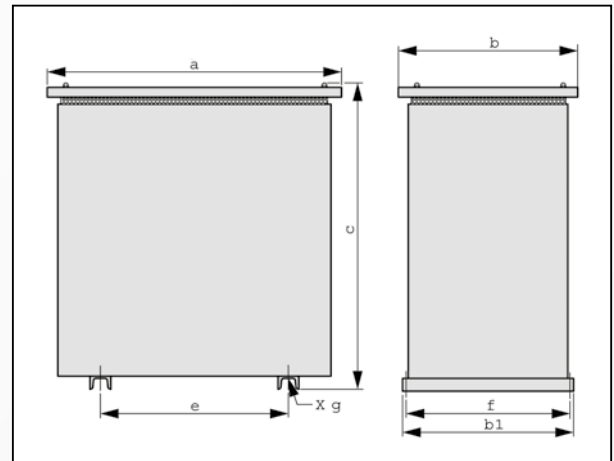


Fig.3

Type	Weight	a	b	b1	c	e	f	øg
	kg							
Fig1								
IP23/01	0.7	118	145	-	122	-	-	-
IP23/02	1.5	192	184	-	160	-	-	-
IP23/03	1.8	192	184	-	203	-	-	-
IP23/04	2.7	231	254	-	203	-	-	-
IP23/30	1.5	192	184	-	160	-	-	-
IP23/31	2.7	231	254	-	203	-	-	-
IP23/32A	6.4	263	360	-	315	-	-	-
Fig2								
IP23/05	17.8	390	390	430	570	230	390	10
IP23/06	26.0	500	480	540	690	270	500	13
IP23/33	14.9	410	340	360	520	212	330	10
IP23/34	23.0	560	440	460	620	350	430	12
Fig3								
IP23/35	33.0	730	480	450	857	450	425	14
IP23/36	50.0	930	580	550	1057	575	525	14
IP23/37	168.0	1510	970	920	1200	705	870	26
IP23/38	185.0	1510	970	920	1430	705	870	26

all dimensions in mm

Optional equipment

Increased currents

STR
W / TA / ZA

Base price of the transformer for currents up to	Type Order no.	Price per unit	Type Order no.	Price per unit	Type Order no.	Price per unit
A		Euro		Euro		Euro
	Larger design for currents up to 25 A		Larger design for currents up to 63 A		Larger design for currents up to 100 A	
16	+STR16/25	6.60	+STR16/63	18.20	+STR16/100	26.70
25	–		+STR25/63	12.10	+STR25/100	26.70
63	–		–		+STR63/100	14.60
	Larger design for currents up to 200 A		Larger design for currents up to 320 A		Larger design for currents up to 630 A	
16	+STR16/200	50.40	+STR16/320	111.80	+STR16/630	181.80
25	+STR25/200	45.50	+STR25/320	109.70	+STR25/630	161.30
63	+STR63/200	38.80	+STR63/320	101.30	+STR63/630	154.90
100	+STR100/200	26.20	+STR100/320	87.60	+STR100/630	142.00
200	–		+STR200/320	64.90	+STR200/630	130.20
320	–		–		+STR320/630	122.60
400	–		–		+STR400/630	105.30

Excess charge for higher currents

larger dimensioned terminals for STZ, ET, ETSP, DTZ, DT, DTSP transformers.

When selecting a transformer, the input voltage, the output voltage and the requested output must be considered.

The basic price of the selected transformer is always related to a specific current (refer to order indications, column 'Price for currents up to').

If, due to the selected output and voltage, the actual current exceeds the output of the basic type, an excess charge will be added.

Sample order

- Selected transformer STZ4,0(400/230).
max current: 25 A;
4000 VA: 230 V ($-\sqrt{3}^*$) = 17.4 A < 25 A
No excess charge as the current is in the permissible range
- Selected transformer STZ4,0(400/110)
max current: 25 A;
4000 VA: 110 V ($-\sqrt{3}^*$) = 36.4 A > 25 A
larger design necessary
- Select from the table: larger design up to 63 A, type affix + STR25/63, excess charge 11.70 Euro

(*) for three-phase current

Suitable for	Output	Type	Price per unit
	kVA		Euro
Static shield winding			
for single-phase transformers			
	0.03–2.0	+W1,8	11.00
	2.5–4.0	+W4,0	14.10
	5.0–13.0	+W6,0	40.60
	16.0–25.0	+W20,0	70.70
for three-phase transformers			
	0.1–6.3	+W6,0	42.00
	8.0–20.0	+W20,0	64.30
	25.0–100.0	+W163,0	103.10

Larger types on request

Suitable for	Output	Type	Price per unit
	kVA		Euro
Tropics resistant			
Additional finish after impregnation with tropics resistant finish			
	0.03–0.2	+TA0,2	4.90
	0.25–1.3	+TA1,4	8.10
	1.6–4.0	+TA4,0	10.50

Larger types on request

Selection of the correct tapping for single-phase transformers

Sample order:

- selected transformer STZ0,25(400/24)
- required voltage of the additional tapping 22 V
- the current for the selection of the tapping is calculated as follows:

$$I = S/U$$

I = current
 S = apparent output
 U = voltage of the tapping
 $I = 250/22 = 11.4 \text{ A} = +ZA16$

For the secondary tapping, the correct type affix reads:

+ZA16S(22)

Additional primary tapping is determined in the same manner.

Selection of the correct tapping for three-phase transformers

Sample order:

- selected transformer DTZ0,25(400/24)
- requested voltage of the additional tapping 22 V
- the current for the selection of the tapping is calculated as follows:

$$I = S/(\sqrt{3} \times U)$$

I = current
 S = apparent output
 U = voltage of the tapping
 $I = 250/(\sqrt{3} \times 22) = 6.6 \text{ A} = +DZA16$

For the secondary tapping, the correct type affix reads:

+DZA16S(22)

Additional primary tapping is determined in the same manner.

If the rated input or output voltages deviate by more than $\pm 10\%$:

- request size of transformer
- indicate output division in addition to the tapping

Suitable for	Output	Type	Price per unit	Type	Price per unit
	A		Euro		Euro
Additional tapping					
for single-phase transformers					
	< 16	+ZA16P(*)	4.00	+ZA16S(*)	4.00
	16–25	+ZA25P(*)	8.20	+ZA25S(*)	8.20
	25–63	+ZA63P(*)	12.80	+ZA63S(*)	12.80
	63–100	+ZA100P(*)	22.90	+ZA100S(*)	22.90
	100–200	+ZA200P(*)	27.70	+ZA200S(*)	27.70
	200–320	+ZA320P(*)	44.40	+ZA320S(*)	44.40
	400–630	+ZA630P(*)	67.20	+ZA630S(*)	67.20
for three-phase transformers					
	< 16	+DZA16P(*)	12.20	+DZA16S(*)	12.20
	16–25	+DZA25P(*)	24.40	+DZA25S(*)	24.40
	25–63	+DZA63P(*)	38.50	+DZA63S(*)	38.50
	63–100	+DZA100P(*)	68.20	+DZA100S(*)	68.20
	100–200	+DZA200P(*)	84.00	+DZA200S(*)	84.00
	200–320	+DZA320P(*)	133.40	+DZA320S(*)	133.40
	400–630	+DZA630P(*)	195.10	+DZA630S(*)	195.10

Optional equipment

Inrush current limiter

**EEB / DEB
ZW / DZW
C4**

Primary current ¹⁾ I_n	Suitable for	Type affix for	Order no. if ordered together with basic appliance	Type* Order no. for separate order	Price per unit
A					Euro
for single-phase transformers					
1	STI	+EEB1	EEB1	EEB1	9.70
	STZ	226101	226101	226102	
2	ET	+EEB2	EEB2	EEB2	10.10
		226103	226103	226104	
3		+EEB3	EEB3	EEB3	10.60
		226105	226105	226106	
5		+EEB5	EEB5	EEB5	11.10
		226107	226107	226108	
7		+EEB7	EEB7	EEB7	11.70
		226109	226109	226110	
10		+EEB10	EEB10	EEB10	17.20
		226111	226111	226112	
15		+EEB15	EEB15	EEB15	17.70
		226113	226113	226114	
18		+EEB18	EEB18	EEB18	18.40
		226115	226115	226116	
20		+EEB20	EEB20	EEB20	19.00
		226117	226117	226118	
30		+EEB30	EEB30	EEB30	19.20
		226119	226119	226120	
for three-phase transformers					
1	DTI	+DEB1	DEB1	DEB1	28.80
	DTZ	226121	226121	226122	
2	DT	+DEB2	DEB2	DEB2	30.40
		226123	226123	226124	
3		+DEB3	DEB3	DEB3	31.90
		226125	226125	226126	
5		+DEB5	DEB5	DEB5	33.40
		226127	226127	226128	
7		+DEB7	DEB7	DEB7	35.00
		226129	226129	226130	
10		+DEB10	DEB10	DEB10	51.50
		226131	226131	226132	
15		+DEB15	DEB15	DEB15	53.20
		226133	226133	226134	
18		+DEB18	DEB18	DEB18	55.10
		226135	226135	226136	
20		+DEB20	DEB20	DEB20	56.90
		226137	226137	226138	
30		+DEB30	DEB30	DEB30	57.50
		226139	226139	226140	

1) Primary current: rating plate of the transformer or by calculation

$$\text{single-phase: } I_n = S_n / (U_{Nprim} \times \eta)$$

$$\text{three-phase: } I_n = S_n / (\sqrt{3} U_{Nprim} \times \eta)$$

S_n = Rated transformer output

U_{Nprim} = primary rated voltage of the transformer

η = efficiency (refer to table Technical Data)

* For separate orders always indicate the relevant transformer type and its technical specifications

Suitable for	Output range	Type	Price per unit
	A		Euro
Screw-less terminal			
for primary currents up to 20 A or 4 mm ² STZ, STN, ET		+C4	1.10
Additional windings			
for single-phase transformers	< 16	+ZW16S(*V*VA)	8.20
	16–25	+ZW25S(*V*VA)	16.30
	25–63	+ZW63S(*V*VA)	25.50
	63–100	+ZW100S(*V*VA)	45.90
	100–200	+ZW200S(*V*VA)	55.30
	200–320	+ZW320S(*V*VA)	88.90
	320–400	+ZW400S(*V*VA)	111.70
	400–630	+ZW630S(*V*VA)	134.20
for three-phase transformers	< 16	+DZW16S(*V*VA)	12.20
	16–25	+DZW25S(*V*VA)	24.40
	25–63	+DZW63S(*V*VA)	38.50
	63–100	+DZW100S(*V*VA)	68.20
	100–200	+DZW200S(*V*VA)	84.00
	200–320	+DZW320S(*V*VA)	133.40
	320–400	+DZW400S(*V*VA)	166.70
	400–630	+DZW630S(*V*VA)	195.10

* Single-phase additional windings for three-phase transformers DTZ, DT, DTF on request

Screw-less terminals can be used both on the primary and the secondary side. STN transformers with screw-less terminals are not in stock.

Sample order for screw-less terminal:

STN0,5(400/230)

Determination of the current:

$$I_{\text{prim}} = S_N / (U_{\text{prim}} \times \eta)$$

$$I_{\text{sec}} = S_N / U_{\text{sec}}$$

S_N = rated transformer output

U_{prim} = primary voltage

U_{sec} = secondary voltage

η = efficiency (refer to table technical data)

$$I_{\text{prim}} = 500 \text{ VA} / (400 \text{ V} \times 0.93) = 1.34 \text{ A} < 20 \text{ A}$$

$$I_{\text{sec}} = 500 \text{ VA} / 230 \text{ V} = 2.17 \text{ A} < 20 \text{ A}$$

Number depending on the terminal points:

2 on the secondary side

4 on the primary side

Order types:

1 unit STN0,5(400/230)

6 units +C4

Sample order for additional winding (1-phase):

Transformer STZ... (400 V/200 V) with 1000 VA with 1 additional winding on the secondary side for 100 V and 200 VA. The resulting required output is 1200 VA.

Type to be selected:

STZ1,3(400/200)

To determine the price of the additional winding, the current is calculated as follows:

$$I = S/U$$

I = current

S = apparent output of the additional winding

U = voltage of the additional winding

$$I = 200 \text{ VA} / 100 \text{ V} = 2 \text{ A} = \text{+ZW16}$$

For the additional winding on the secondary side, the correct type affix reads:

+ZW16S(100 V/200 VA)

5 additional windings on the primary and/or secondary side can be ordered. Additional windings on the primary side on request.

Sample order for additional winding (3-phase):

Transformer DTZ... (400 V/200 V) with 1000 VA with 1 additional winding on the secondary side for 100 V and 200 VA. The resulting required output is 1200 VA.

Type to be selected:

DTZ1,3(400/200)

To determine the price of the additional winding, the current is calculated as follows:

$$I = S/U$$

I = current

S = apparent output of the additional winding

U = voltage of the additional winding

$$I = 200 \text{ VA} / (100 \text{ V} \times \sqrt{3}) = 1.15 \text{ A} = \text{+DZW16}$$

For the additional winding on the secondary side, the correct type affix reads:

+DZW16S(100 V/200 VA)

5 additional windings on the primary and/or secondary side can be ordered. Additional windings on the primary side on request.

	Price per unit
Special accessories	Euro
• Temperature control PTC resistor	40.80
• bi-metal thermostat (Clixon – open 250 V max. 0.5 A)	16.50
• PT100 sensor	186.90
• Transformer fuse terminal including insert 230 V max. 6.3 A	4.20
• 400 V max. 10.0 A	8.70
• Top hat rail adapter (retrofitting)	5.10

General conditions of business, delivery and payment (GCB) of Trafomodern Transformatorengesellschaft m.b.H., Industriestraße II/11, A-7053 Hornstein, hereinafter referred to as TM

1. Contract conclusion and field of application

- 1.1. These general conditions of business, delivery and payment (GCB) form an integral part of every offer and every contract unless expressly agreed otherwise in individual cases in writing. Any conditions of the party to the contract worded otherwise shall be ineffective.
- 1.2. This general conditions of business, delivery and payment (GCB) have the status as at May 2011. The version of the GCB shall be valid, which was released in the internet (www.trafomodern.com) at the date of the order confirmation.
- 1.3. Any arrangements made verbally require the written confirmation of TM to be effective.
- 1.4. Offers of TM are provisional unless expressly agreed otherwise. The contract is concluded after the order confirmation of TM.
- 1.5. TM expressly reserves the right to deviate from the technical or visual design or in technical or visual details without informing the party to the contract beforehand provided such deviations do not change the technically relevant characteristics of the TM products.

2. Prices

- 2.1. **Prices of TM always consist of two parts: The product price and – additionally – a material surcharge.** In all offers, catalogues, written documents, etc. always the product price is submitted. The material surcharge depends on the copper weight of the product and is calculated as follows: If the copper price is cheaper than 1,53 EUR/kg no material surcharge will be charged. If the copper price is higher than 1,53 EUR/kg, TM will charge the material surcharge according to the average of the copper quote (MK-quote) of the previous month. The copper weight will be announced by TM in catalogues, in the internet and on offers. The valid copper price (MK-quote) will be published by TM in the internet. The due date for the fixing of the copper price is the day of the order acknowledgement of TM.

material surcharge = (average copper price in EUR/kg – 1,53 EUR/kg) * Cu-factor

- 2.2. Unless agreed otherwise the agreed prices shall be fixed prices. The material surcharge will fluctuate every month.
- 2.3. The prices apply ex works or ex store of TM in Hornstein including packaging, loading (EXW, Incoterms 2000) but excluding tax on turnover. If charges, taxes or other duties are levied in connection with the delivery such shall be borne by the party to the contract. If the delivery includes transport under the agreement such plus transport insurance if requested by the buyer shall be charged separately, but does not include unloading and carrying. Packaging shall be taken back only by way of express agreement.
- 2.4. Should the order deviate from the general offer TM reserves the right to appropriate price adjustment.
- 2.5. The prices are based on the costs at the time of the first quotation. Should charges and other external costs included in the agreed price change after the contract has been concluded or should such newly arise, TM shall be entitled to appropriate price adjustment. Such charges and external cost could for instance be an updated collective agreement or other costs such as material, energy, transport, external work, financing, etc. required to render the service.

3. Conditions of payment

- 3.1. In the absence of any deviating written agreement

invoices of TM shall be payable within 30 days net after date of invoice.

- 3.2. Payment shall be made so that TM is able to dispose of the amount by the due date. The costs of the payment transaction shall be borne by the buyer. Offsetting is only permissible in the presence of an effective offsetting declaration, i.e. when claim and counterclaim are valid, of the same kind and due at the offsetting date. Moreover, no special offsetting prohibition must exist. The party to the contract may claim a retention right only if the performance offered does not correspond to the contract in terms of quantity or quality or if the party to the contract should demand improvement after the delivery of a defective matter.
- 3.3. Discounts must be agreed with TM in advance in written form. Agreed discounts are printed on the invoice of TM. Other agreements than in written form are invalid (e.g. verbally). The cash discount period (if agreed) is given on the TM invoice in calendar days (not in working days!). It is agreed that the invoice date is the only valid date of the start of the discount period. In order to profit from the discount, the payment needs to be done explicitly cashless by bank transfer so that TM can use the money on due date. If other ways of payment than cashless bank transfer are used (e.g. cash, check), no discount will be accepted.

- 3.4. If the buyer is in arrears with an agreed payment or other performance TM can

3.4.1. postpone the fulfilment of its own obligations until such payment or other performance has been effected,

3.4.2. declare due all outstanding claims from this or other transactions. The buyer will be charged interest on arrears to the legal amount (§ 352 UGB, General Civil Code Austria). Apart from the legal interest TM is also entitled to claim compensation for other damages caused by the debtor and incurred by TM, especially the costs necessary for out-of-court collection measures to suit the purpose provided such are appropriate for the claim pursued, irrespective of other rights.

- 3.5. Should the buyer get into payment arrears or should he fail to honour a bill when due, TM shall be entitled to take back the goods and, if applicable, to enter the buyer's operations and seize the goods. In addition to this TM shall be able to forbid the resale and the relocation of the delivered goods. Taking back the goods shall not constitute a withdrawal from the contract. In this case TM will only deliver the products again if the invoice is balanced completely in advance and all other costs are paid by the buyer in advance.

4. Fulfilment of delivery, terms of delivery and dates

- 4.1. The term of delivery starts with the date of the order confirmation of TM and is valid only provided that all details of the order are timely clarified and all obligations of the buyer (e.g. provision of material, etc.) are timely fulfilled.
- 4.2. The delivery obligation is subject to the reservation of correct and timely selfdelivery unless such incorrect or delayed delivery was caused by TM.
- 4.3. Events of acts of God entitle TM to postpone the deliveries by the duration of the impediment and an appropriate starting period. This applies also if such events occur in the presence of any delay. Acts of God include currency, trade, political and other sovereign measures, strikes, lockouts, operating interferences not caused by TM (e.g. fire, machine failures, lack of raw material or energy), obstruction of traffic routes, delays with import/customs clearance, as well as any other circumstances

not caused by TM which considerably impede or render impossible the deliveries and performances. In this context it is immaterial whether such circumstances occur at TM or a subsupplier. Should the fulfilment of the contract become unacceptable to TM as a result of the aforementioned events, TM can declare the annulment of the contract.

- 4.4. TM is entitled to perform and charge part deliveries or advance deliveries. If delivery on call is agreed the goods shall be considered as having been called not later than 1 year after the order. Advance deliveries shall be accepted by the buyer within acceptable limits.
- 4.5. The time of despatch ex works or store shall be decisive for the adherence to dates and terms of delivery. Such shall be considered adhered to upon notification of readiness for despatch if the goods cannot be despatched timely through no fault of TM.
- 4.6. If the buyer is in acceptance arrears and should the goods go under accidentally, TM shall be released of its performance obligation but retain the right to counter performance. In addition to this the care owed to the matter by TM is reduced from the occurrence of the acceptance delay so that TM shall henceforth be liable only for gross negligence. As a consequence of the delay of the creditor TM shall be entitled to bailment at the expense of the buyer (10 Euro per started calendar day) which has a debt-discharging effect. In such cases where continued readiness would particularly burden TM, TM can withdraw from the contract after setting an appropriate additional period and utilise the goods elsewhere; in such a case a conventional penalty of 0.5 % of the invoice amount per day shall be considered agreed. The maximum conventional penalty amounts to 20 % of the invoice amount.

5. Part delivery, continuous delivery and transfer of risk

- 5.1. TM always supplies ex works (Incoterms 2000: EXW)! Should a deviating regulation have been agreed, TM shall determine the dispatch route and means as well as forwarding agent and carrier.
- 5.2. Should the transport via the intended route or to the intended place be impossible in the intended time through no fault of TM, TM shall be entitled to deliver by way of another route or to another place; the additional costs incurred shall be borne by the buyer. The buyer will be given opportunity to respond beforehand.
- 5.3. Utilisation and risk pass to the buyer with the departure of the consignment ex works or ex store, regardless of the pricing agreed for the consignment (e.g. delivered free, DIF, CPT, DDP, etc.). The regulation described in Incoterms 2000 can not be applied in this sense, even if they were agreed in written form. This applies also when the delivery takes place as part of an installation or when the transport is performed or organised and managed by TM.

6. Redemption of goods

- 6.1. The buyer must not claim that TM takes back goods which were bought by the buyer before. This possibility is especially eliminated for customer specific goods.
- 6.2. If TM exceptionally agrees to take back goods for fair dealing (e.g. in case of standard products, which TM can use elsewhere), TM will refund 80 % of the product price and TM will charge 20 % of the product price (but at least 20.00 EUR) to cover the administrative costs.

7. Reservation of ownership

TM reserves ownership in all goods supplied by TM pending complete payment of the invoice amounts plus

interest and costs.

The buyer herewith cedes to TM his claim from any resale of reservation goods to safeguard his purchase price claim, even if these were processed, and undertakes to make an appropriate note in his books or on his invoices. Upon request the buyer shall inform TM of the ceded claim including its debtor and to make available all information and documents required for his claim collection and inform the third-party debtor of such cession. In the event of distraint of property or other utilisation the buyer shall be obligated to point out the ownership right of TM and to inform the latter immediately.

8. Notification of defects and warranty

8.1. No warranty claims can be derived from information in catalogues, brochures, advertising publications and written or verbal comments which have not been included in the contract. Only the written offer and the written order acknowledgement are valid.

8.2. TM is obligated in accordance with the following provisions to rectify any defect impairing the workability that exists at the time of the handover, which is due to a defect in the design, the material or the execution.

8.2.1. Defects of the goods must be reported in writing immediately, but not later than 14 days following delivery. Failure to immediately report in writing the defects incurred will render the warranty claims void. Defects that are not discovered within this period despite utmost care in inspection shall be reported in writing immediately after discovery, immediately ceasing possible processing. TM is entitled to get the following information in order to process the claim internally correctly:

- Production number (printed on the product)
- Explanation of defect or claim (date and circumstance)
- Suggestion of buyer how to further proceed
- Relevant photos of the defect
- Further relevant facts

8.2.2. Upon justified timely notification of defect TM shall improve the goods subject to the complaint or replace the goods with goods free from defect. If improvement is impossible or TM should get in arrears with the improvement/replacement the buyer is entitled to demand a price reduction or – if the defect is not minor – cancellation of the contract.

8.2.3. TM shall provide warranty for the improvement and replacement delivery in the same manner as for the original delivery or performance.

8.3. Should the defect manifest itself within three months following the handover of the goods TM shall have to furnish proof of the handover of the matter free from defect. After expiration of the period of three months the buyer shall have to furnish proof that the defect was present at the time of the handover.

8.4. The warranty period is 12 months unless special warranty periods are agreed for individual supply items. This applies also to supply and performance items which are permanently joined to a building or which were otherwise further processed. The warranty period shall commence with the time of the transfer of risk according to clause 5.3 of the GCB. Claims according to §933b ABGB (Austrian Civil Code) always fall under the statute of limitations upon expiration of the period mentioned in this clause.

8.5. All overheads (such as for installation and removal, transport, disposal, time for travelling and on the road) shall be for the expense of the buyer. Help personnel, lifting equipment, scaffolding and incidental materials etc. shall be provided free of charge for warranty operations in the operation of the buyer. Replaced parts

become the property of TM. If goods are made by TM based on design information, drawings, models or other specifications of the buyer, the liability of TM shall only cover the operational execution.

8.6. Excluded from the warranty are such defects as do not result from arrangement and installation effected by TM, insufficient facility, failure to observe installation requirements and utilisation conditions, overloading of the parts beyond the capacity specified by TM, negligent or incorrect treatment and utilisation of unsuitable operating materials; this applies also to defects which are due to material furnished by the buyer. TM shall not be liable either for damages resulting from actions of third parties, atmospheric discharges, overvoltages and chemical effects. The warranty does not cover the replacement of parts subject to natural wear. TM shall not accept any liability upon the sale of used goods.

8.7. The warranty will cease to exist immediately if the buyer himself or a third party not expressly authorised by TM should perform changes or repairs to the supplied objects without the written approval of TM.

8.8. These provisions apply mutatis mutandis also to every responsibility for defects for other legal reasons.

9. Compensation for damages, liability and product liability

9.1. TM shall be liable for damages outside the field of application of the Product Liability Act only if TM has been proven to have acted deliberately or grossly negligently, within the scope of the legal regulations. Liability for minor negligence, the compensation for consequential damages and financial damages, savings not achieved, loss of interest and of damages from third-party claims against the buyer shall be excluded. Provided that legal provisions do not provide for shorter periods, all claims of the buyer shall be judicially exercised within 3 years from the transfer of risk, otherwise any claims shall be waived.

9.2. Austrian product liability law shall apply.

10. Commercial intellectual property rights and copyright

10.1. If goods of TM are made based on design, details, models or other specifications of the buyer, the buyer shall indemnify TM for possible violations of intellectual property rights.

10.2. Execution documentation such as drawings, sketches and other technical documents as well as samples, catalogues, brochures, depictions etc. always remain the intellectual property of TM and are subject to the applicable legal regulations in terms of reproduction, copying, competition.

10.3. All offer and project documentation, drawings and drafts and sample pieces, models as well as blocks and other help material remain the property of TM and may not be used without the written permission of TM; these can be demanded back at any time and must be returned to TM immediately if the order is placed elsewhere. The order and all information, documentation etc. regarding the order constitute our business secrets and must be treated confidentially. If required all documents and data and copies of these documents and data must be given back to TM or must be abolished and must be erased from any hardware.

11. Data processing and data privacy

11.1. TM uses a modern data processing system, where company data of the (potential) business partners are stored as from the very early contact phase. When mentioning „company data“ TM will potentially store all kinds of contact persons, company name, addresses and other

contact data all well as acting persons and company organs (managing director, heading employees, etc.) and other relevant company data (VAT-number, ARA license number etc.). The contact persons communicating with TM herewith agree that TM stores this data and uses this data for internal use like analyses and marketing purposes without his prior approval.

11.2. TM ensures the confidentiality of this stored data regardless on which way TM got knowledge of this confidential data. TM guarantees that confidential data will not be used for other purposes that described above, as far TM can influence the usage of the concerned data.

12. General

12.1. Should individual provisions of the contract or these provisions be ineffective, such shall not affect the effectiveness of the remaining provisions. Such ineffective provision shall be replaced with a valid provision that comes as close as possible to the aspired objective.

12.2. All agreements, subsequent changes, amendments, additional verbal agreements etc. require the written form to be valid, consequently also the original signature or the secure signature. A fax also fulfils this required form. Emails are only valid if there is not only one email, but if there is a series of a two-way emails traffic which proves the existence of agreements.

13. Place of performance, venue and applicable law

13.1. Unless otherwise agreed place of performance shall be the plant TM in Hornstein. The substantially responsible court at the main seat of TM (currently A-7000 Eisenstadt) shall have exclusive competent jurisdiction to decide all disputes arising from the contract.

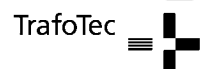
13.2. Austrian law applies subject to the exclusion of the referral standards. The application of the UNCITRAL treaty of the United Nations concerning contracts of international goods sale is excluded. The language used in the correspondence shall be agreed as contractual language, while German shall be considered the contractual language if in doubt.

Hornstein, May 2011

Trademarks:

 trafo modern

 trafomodern

 TrafoTec

are protected trademarks of
trafomodern Transformatorenges. m.b.H.

General Design

Transformers and Chokes



Standard transformer products (unless expressly otherwise ordered or offered) have following technical and design characteristics:

Standards and approval

All products always comply with the relevant standards and approvals. Basically the relevant standards are EN61558, EN60076 (for larger inductive components) and VDE0570. Many transformer products are manufactured according to the relevant approvals like for example UL5085 and CSA22.2

Resin impregnation

The impregnation protects the product against corrosion, improves the thermal characteristics or improves the heat emission. The "gluing" of the iron core significantly reduces the transformer's tendency to buzz.

As an option, the products can be covered with a tropical resistant finish, which gives additional protection against humidity and thus against corrosion, should the ambient conditions be less than ideal → optional equipment see page 57.

Weld seam

The yokes of small transformers are generally welded together with the limbs. For small transformers up to an output of 1.6 kVA, the treads are welded to the transformer's limbs. From 1.6 kVA upwards, screws fix them.

Core plate

The core plates used are exclusively high quality core sheets or cold rolled core oriented magnetic steel sheets (for standard products, the thickness is 0.35 mm or 0.5 mm).

Windings

The primary as well as the secondary windings are made out of enamel insulated copper wires, aluminium is not used as a standard.

Insulation class

The transformers are designed according to insulation class B and F, which implies a maximum constant temperature of 130 °C and 155 °C. Other usual insulation classes according to IEC 85 and IEC 216 are:

- E (120 °C)
- H (180 °C)

Ambient conditions

The transformers are suitable for installation and use in dry locations up to 1000 m above sea level. At higher altitudes, the transformer's output must be reduced in accordance with the derating graph (see page 62).

Air self-cooling transformers are designed for a maximum ambient temperature of 40 °C. If the transformers are used at higher temperatures, their output must be reduced in accordance with the derating graph (see page 62).

Degree of protection

The standard transformers have a degree of protection of IP00. Together with the optional equipment (see page 54) the degree of protection can be increased to IP23. Higher degree of protection like IP54 for example are not available as standard products, but our sales team will always be pleased to offer them on request.

Rated values

Nominal values are always rated values. Rated values are rated voltage, rated current (actual values), rated output, rated frequency and rated windings ratio. Together these values uniquely define a transformer.

Rated Input Voltage (Nominal Input Voltage)

The distribution voltage (in case of three-phase systems between the outer conductors), assigned to a transformer under defined operating conditions.

Rated Frequency (Nominal Frequency)

The frequency assigned to a transformer under defined operating conditions.

Rated Output Current (Nominal Output Current):

The output current at rated input voltage and rated frequency, assigned to the transformer for the set operational conditions.

Rated Output Voltage (Nominal Output Voltage)

The output voltage (for three phase systems between the outer conductors) at rated input voltage, rated output current and rated power factor (normally power factor $\cos \varphi = 1$), assigned to the transformer for the set operational conditions.

Rated Power (Nominal Power):

The product of the rated output voltage and the rated output current, for three-phase systems multiplied with $\sqrt{3}$. If the transformer has more than one system on the secondary side, it is the sum of the output powers of all simultaneously loaded output systems.

Throughput rated power ST: The throughput rated power is the power, which can be transmitted by a transformer. In case of a transformer with separated windings the throughput rated power is the same as the nominal power.

Type rated power SN (for autotransformers): For autotransformers the type rated power is the power of the core to transmit the throughput rated power.

Power Factor $\cos \varphi$

Power Factor $\cos \varphi$ indicates the ratio of apparent power ($U \cdot I$) being available as active power with sinusoidal variables.

Rated Ambient Conditions t_a

The highest temperature at which a transformer can be used in accordance with the prevailing operating conditions for continuous operation. Losses: Unless described otherwise all short circuit losses are regarded as approximate values. The values are measured at rated output current at operating state temperature.

No-load Output (= No Load Losses = core losses)

The input power of the off-load transformer at rated input voltage and rated frequency.

Short-circuit Losses (= Copper Losses)

Active input power, when the output side of the transformer is short-circuited and the rated (nominal) output current is flowing.

Short-time Rating

The short-time rating is the output at the secondary side of a control transformer with $\cos \varphi = 0.5$ and a maximum voltage drop of 5 % vs. the rated (nominal) output voltage.

No-load Output Voltage:

The output voltage of an unloaded transformer at rated input voltage and rated frequency.

No-load Current

The current at the input side of an unloaded transformer at rated (nominal) input voltage and rated frequency.

Short-circuit Voltage u_k

The voltage to be applied to the primary winding in order to obtain the same current as the rated output current at the secondary winding while the secondary winding is short-circuited and the windings are at ambient temperature. The value is given as a percentage of the primary rated input voltage. The u_k is almost in correlation with the no-load behaviour of the transformer.

How to select the size of your control transformers

Determination on the basis of continuous output

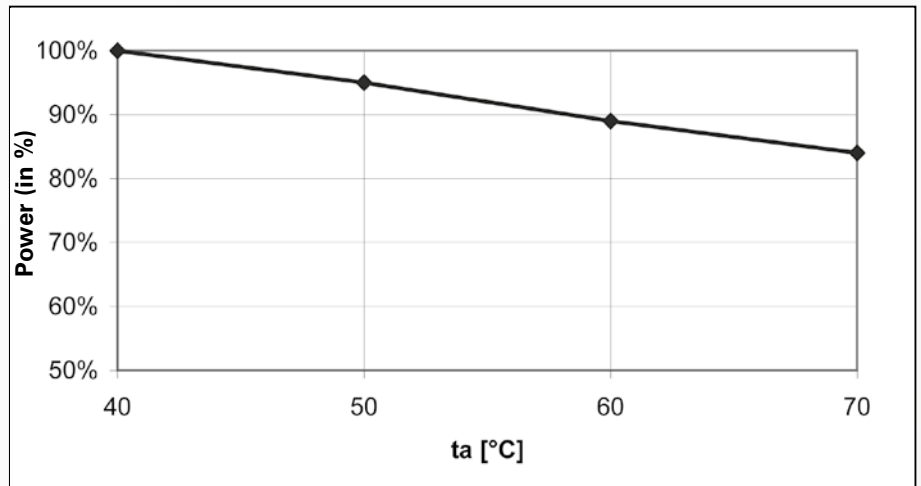
The control transformer must be of sufficiently large dimensions so that it keeps the voltage drop within permissible limits even under adverse conditions.
To calculate the size of the transformer, add the holding consumption of all consumers switched on at the same time, to the inrush consumption of the highest-rated consumer and multiply the result by 0.8. If the size of the consumers is approximately the same, add the sum of inrush consumption values of all consumers switched on at the same time to the sum of all holding consumption values and multiply the result by 0.8.

Determination on the basis of short-term output

If predominantly large contactors are to be switched, we recommend selecting the control transformer on the basis of the short-term output. Usually this reduces the required transformer output. Make sure the holding consumption does not exceed the continuous output.

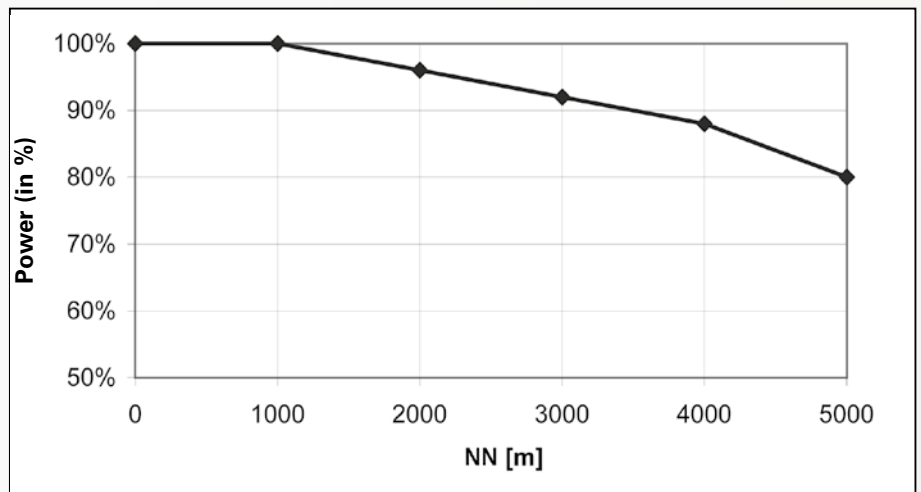
Derating ambient temperature

If natural air cooled transformers designed for insulation class B and an ambient temperature of max. 40°C, are operated in higher ambient temperatures, the output must be reduced according to the following diagram



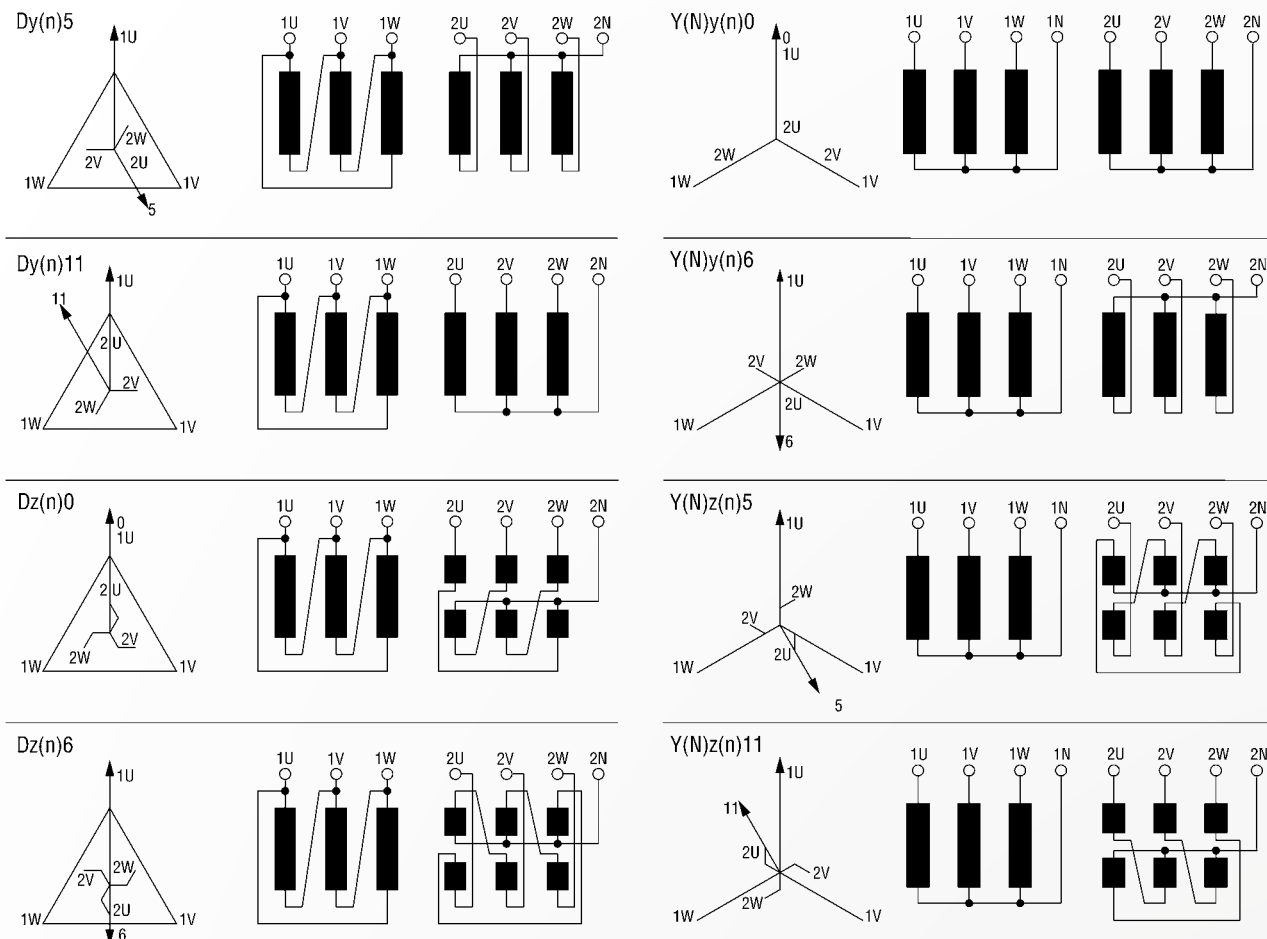
Derating installation altitude

If natural air cooled transformers are installed at an altitude higher than 1000 m above sea level the output must be reduced according to the following diagram



Standard configurations for three-phase transformers (extracts)

Further configurations on request.



1. The primary side is indicated by capital letters, the secondary side is indicated by small letters.
2. A Y (primary side) respectively y (secondary side) stands for a star configuration, a D (primarily) respectively d (secondary side) stands for a triangle configuration a z (secondary side) stand for a zig-zag configuration.
3. The number behind the letters indicates the phase shift. The number 1 indicates a phase shift of 30°, the number 2 indicates a phase shift of 60°, the number 3 indicates a phase shift of 90° etc.
4. The external neutral is indicated by the addition of a N (primary side) respectively n (secondary side) to the configuration.
5. The standard configuration is Yy0.

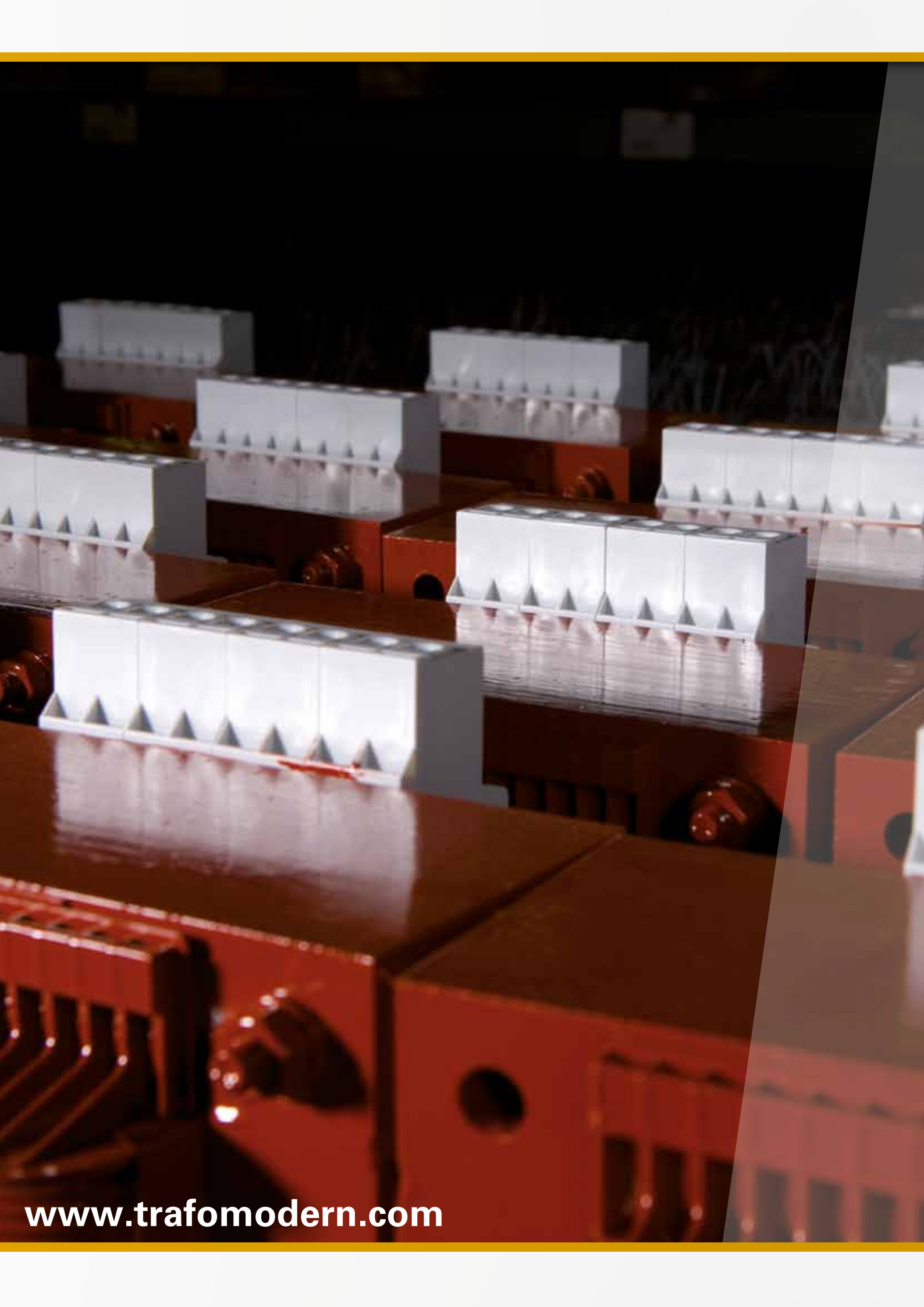
Protection of control transformers of the type series STN, STI and STZ

Control transformers must be protected at the primary side with a protective device with a tripping characteristic according to EN60947-4-1. This can be e.g. a motor overload switch or a transformer overload switch. The overload release must be set to value in the table mentioned below. This current is also printed on the label of the transformer. If a short-circuit trip is used, this device must be set to the maximum value. If transformers have a power of more than 2 kVA the protective device can be released under certain net environments ($I_k > 6$ kA) if the electric torque is coincidentally inappropriate. In such cases trafomodern recommends to use an inrush current limiter (→ page 58)

Type	S_N (B)	Voltage					
STN	[kVA]	230 V	400 V	415 V	440 V	500 V	690 V
0,03	0.03	0.17 A	0.10 A	0.09 A	0.09 A	0.08 A	0.06 A
0,06	0.06	0.33 A	0.19 A	0.18 A	0.17 A	0.15 A	0.11 A
0,1	0.1	0.52 A	0.30 A	0.29 A	0.27 A	0.24 A	0.17 A
0,16	0.16	0.80 A	0.46 A	0.44 A	0.42 A	0.37 A	0.27 A
0,2	0.2	0.97 A	0.56 A	0.54 A	0.51 A	0.45 A	0.32 A
0,25	0.25	1.20 A	0.69 A	0.66 A	0.63 A	0.55 A	0.40 A
0,315	0.315	1.49 A	0.86 A	0.83 A	0.78 A	0.69 A	0.50 A
0,4	0.4	1.88 A	1.08 A	1.04 A	0.98 A	0.86 A	0.63 A
0,5	0.5	2.33 A	1.34 A	1.29 A	1.22 A	1.07 A	0.78 A
0,63	0.63	2.93 A	1.69 A	1.62 A	1.53 A	1.35 A	0.98 A
0,8	0.8	3.69 A	2.12 A	2.04 A	1.93 A	1.70 A	1.23 A
1,0	1.0	4.57 A	2.63 A	2.53 A	2.39 A	2.10 A	1.52 A
1,3	1.3	5.99 A	3.45 A	3.32 A	3.13 A	2.76 A	2.00 A
1,6	1.6	7.30 A	4.20 A	4.05 A	3.82 A	3.36 A	2.43 A
2,0	2.0	9.13 A	5.25 A	5.06 A	4.77 A	4.20 A	3.04 A
2,5	2.5	11.41 A	6.56 A	6.33 A	5.97 A	5.25 A	3.80 A
3,0	3.0	13.57 A	7.80 A	7.52 A	7.09 A	6.24 A	4.52 A
4,0	4.0	17.91 A	10.30 A	9.93 A	9.36 A	8.24 A	5.97 A

Type	S_N (B)	Voltage					
STI/STZ	[kVA]	230 V	400 V	415 V	440 V	500 V	690 V
0,03	0.03	0.17 A	0.10 A	0.09 A	0.09 A	0.08 A	0.06 A
0,06	0.06	0.33 A	0.19 A	0.18 A	0.17 A	0.15 A	0.11 A
0,1	0.1	0.52 A	0.30 A	0.29 A	0.27 A	0.24 A	0.17 A
0,16	0.16	0.81 A	0.46 A	0.45 A	0.42 A	0.37 A	0.27 A
0,2	0.2	1.02 A	0.59 A	0.56 A	0.53 A	0.47 A	0.34 A
0,25	0.25	1.25 A	0.72 A	0.69 A	0.65 A	0.58 A	0.42 A
0,315	0.315	1.53 A	0.88 A	0.85 A	0.80 A	0.71 A	0.51 A
0,4	0.4	1.97 A	1.13 A	1.09 A	1.03 A	0.90 A	0.66 A
0,5	0.5	2.37 A	1.36 A	1.31 A	1.24 A	1.09 A	0.79 A
0,63	0.63	2.99 A	1.72 A	1.65 A	1.56 A	1.37 A	1.00 A
0,8	0.8	3.76 A	2.16 A	2.08 A	1.96 A	1.73 A	1.25 A
1,0	1.0	4.70 A	2.70 A	2.60 A	2.45 A	2.16 A	1.57 A
1,3	1.3	6.05 A	3.48 A	3.35 A	3.16 A	2.78 A	2.02 A
1,6	1.6	7.37 A	4.24 A	4.09 A	3.85 A	3.39 A	2.46 A
2,0	2.0	9.22 A	5.30 A	5.11 A	4.82 A	4.24 A	3.07 A
2,5	2.5	11.52 A	6.63 A	6.39 A	6.02 A	5.30 A	3.84 A
3,0	3.0	13.57 A	7.80 A	7.52 A	7.09 A	6.24 A	4.52 A
4,0	4.0	18.09 A	10.40 A	10.02 A	9.45 A	8.32 A	6.03 A
5,3 *	5.3	24.20 A	13.91 A	13.41 A	12.65 A	11.13 A	8.07 A
8,3 *	8.3	37.53 A	21.58 A	20.80 A	19.62 A	17.26 A	12.51 A
13,3 *	13.3	59.56 A	34.25 A	33.01 A	31.13 A	27.40 A	19.85 A

* Type series STI available up to 4.0 kVA, above only as STZ





© 2011 by trafomodern
Subject to modification and typing errors
Version: english, 05/2011

leadership in transformation

trafomodern Transformatorenges. m.b.H.
Industriestraße II/11
A 7053 Hornstein

Tel. +43 / 26 89 / 27 44 - 0 · Fax +43 / 26 89 / 27 44 - 9 · info@trafomodern.com · www.trafomodern.com