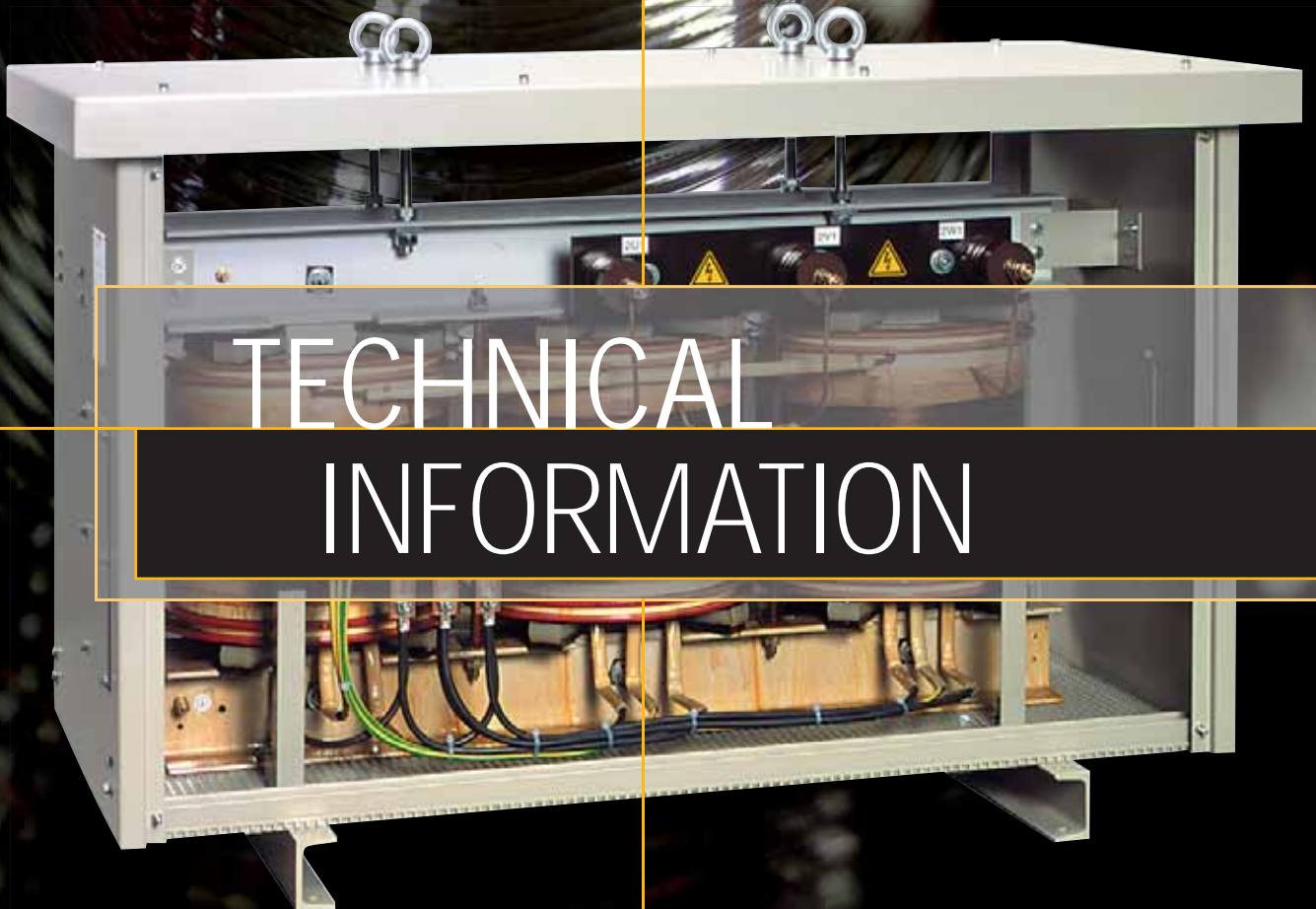
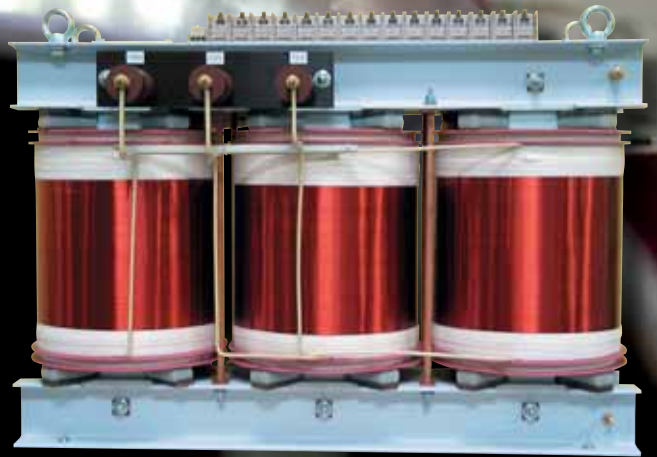




- | Single-Phase Low Voltage Dry-Type Transformers 5-400 kVA
- | Three-Phase Low Voltage Dry-Type Transformers 7.5-1000 kVA



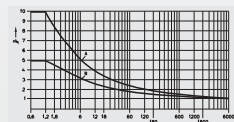
TECHNICAL INFORMATION



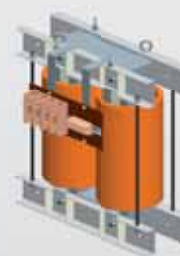
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■ Three-Phase Low Voltage Dry-Type Transformers
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ZVEI:



Quality and Experience are the guiding principles



RUHSTRAT is a medium-sized family-owned company being continued in the fourth generation. Founded in 1888 by the brothers Adolf and Ernst Ruhstrat at Göttingen – the company is located today at Bovenden near Göttingen and near to the Harz region. RUHSTRAT offers technology in the areas of electrical engineering and special plant construction.

The focus in electrical engineering products is on variable column transformers, voltage stabilizers, low-voltage dry-type transformers, power resistors and emergency power supplies with emergency escape lighting. In the segment of special plant construction we develop and manufacture heat treatment plants with the corresponding control panels and process technology for laboratory and industrial applications.

Besides the complete standard programme of these business fields RUHSTRAT emphasizes the design and manufacturing of plants and systems individually tailored to the requirements of our customers. Based on the long-time customer loyalty and the herein developed experiences we continue realizing plants that are exemplary in the respective industrial sectors.



RUHSTRAT has decades of experience in developing and manufacturing electrical winding products. We offer more than innovative technology. Being a reliable partner we assist our customers by developing optimal solutions customized to their needs. And what is most important is that we not only do the development, design, delivery and the installation of the system solutions. But we also offer a service which comprises everything from the maintenance and the technical support up to the delivery of spare parts.

Product overview:



Variable Transformers from 20 VA to 2 MVA

- variable toroidal transformers
- variable column transformers
- variable transformer aggregates



Voltage Stabilizers from 60 VA up to 2 MVA

- magnetic voltage stabilizers
- automatic voltage stabilizers



Power Transformers from 50 VA up to 2 MVA

- dry-type power transformers
- medium voltage transformers
- AC/DC reactors



Toroidal Core Transformers up to 400 kVA

High-Current Transformers up to 30 kA

Power Resistors

- load resistors
- test resistors
- tube resistors
- laboratory resistors

TECHNICAL EXPLANATIONS

RUHSTRAT-Transformers with a fixed transformation ratio, single-phase and three-phase types, as toroidal core or limb core transformers fulfill the current DIN VDE/ EN regulations.

General

This catalogue provides a general idea of RUHSTRAT's standard programme for transformers with fixed transformation ratio, constructed as toroidal core or limb core transformers.

Applications deviating from the standard programme are our strong point! Every product can be tailor-made according to your special application.

Quality Control

During its production every transformer has to undergo an intermediate test and after its production it has to undergo a thorough final electrical test; this is always done according to the respectively valid process instructions. According to the quality standard DIN ISO 9001 the documentation of the measuring results is effected in appropriate test certificates.

A high quality standard is guaranteed by the use of high-quality materials and by the special competence of the employees.

Technical Explanations

The transformers are manufactured according to the valid relevant VDE/EN regulations. Sheets for the electrical industry, cold-rolled and low-loss, with privileged magnetic direction are used for the cores. The windings are made of round or flat copper wire respectively of copper tape, this depends on the field of application. Further materials are chosen according to their temperature stability class.

Power

Power is calculated as the product of secondary voltage [V] and secondary current [A], the result is [kVA]. All power specifications refer to the collected power at the secondary side with:

- continuous operation (S1)
- excitation with rated voltage
- rated frequency 50/60 Hz
- an ambient temperature of max. 40 °C and
- an altitude of installation up to 1.000 m above MSL
- (load) power factor (LPF) = 1

Overload

In principle, the transformers can be loaded with higher currents for a short period of time, if the average temperature limit is kept. The limit values for short-time operation (S2) arise from fig 3.1.

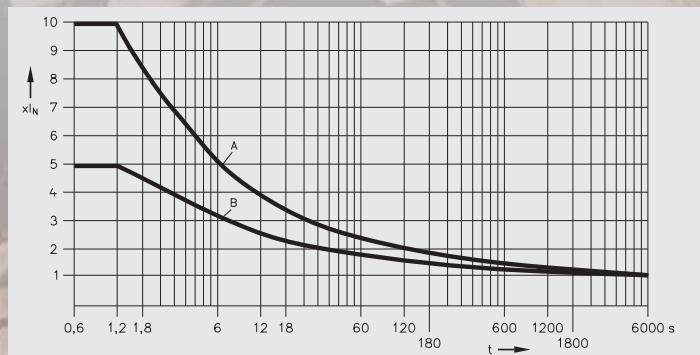


fig. 3.1
limit values for overload during short-time operation
A: overload in cold state
B: overload in warm state

Warming

The admissible temperature limits stipulated in the respective VDE/EN regulations are not exceeded, if the transformers are duly operated and if the ambient temperature does not rise above a maximum of 40 °C.

With an ambient temperature above 40 °C the transformer must not be charged with the full rated current, due to the possible exceeding of the highest admissible overtemperature limit of the winding.

It has to be ensured that there is a sufficient ventilation resp. unhindered entry of cool air at the transformer's site of installation!

ambient temperature [°C]	40	45	50	55	60
insulant class B	1,0	0,96	0,92	0,88	0,82
insulant class F	1,0	0,97	0,94	0,90	0,86
insulant class H	1,0	0,98	0,95	0,92	0,90

table 4.1

factors for the correction of the rated power with ambient temperatures above 40 °C

Altitude of Installation

The rated powers stipulated for the transformers are valid for an altitude of installation of 1.000 m above main sea level. With an altitude of installation of more than 1.000 m above main sea level it is the same as with an excessive overtemperature: a power reduction has to be carried out. This is necessary, as the smaller atmospheric pressure leads to reduced cooling.

altitude of installation [m] up to	1.000	1.500	2.000	2.500	3.000	3.500
insulant class B	1,0	0,98	0,97	0,93	0,92	0,89
insulant class F	1,0	0,98	0,97	0,94	0,93	0,90
insulant class H	1,0	0,98	0,97	0,94	0,93	0,91

table 4.2

factors for the correction of the rated power with operation at high altitudes

Kind of Load

The standard transformers stipulated refer to pure real load. Other deviating kinds of load and thyristor power controller operation of the transformers must be considered when they are constructed.

Insulation

For long life and high operation safety of a transformer it is very important that no part takes on an inadmissibly high temperature. The insulation of the windings is most sensitive against warmth, as it can only bear a limited temperature with a normal duration of life.

The insulation structure allows the use of transformers in dry rooms. During its production the transformer has to undergo an impregnation with resin under vacuum and then it is dried in a furnace. Through this the transformers are protected against external influences.

Admissible Winding Temperature

The winding temperature may not exceed the limit temperature which depends on the insulant class. The limit temperature is the highest admissible permanent temperature of the winding at the hottest point. The limit temperature emerges when adding the ambient temperature (40 °C), the admissible limit overtemperature and a safety addition.

insulant class	admissible limit over-temperature [K]	limit temperature of the insulant system [°C]
insulant class B	80	130
insulant class F	100	155
insulant class H	125	180

table 5.1
limit overtemperature and limit temperature of the insulant classes B, F, H

Transformers with Separate Winding

With these transformers there is no electrically conducting connection between the primary and secondary winding, as these are galvanically separated from each other.

Taps

Transformers can be constructed with taps on the primary as well as on the secondary side. Taps on the primary side serve for the adaptation of the transformer to different mains voltage tolerances.

Transformers with Autowinding

Autotransformers have a winding which consists of two parts. Both winding parts of the series winding and the parallel winding, are connected in series and are interspersed by the same magnetic flux. The autotransformer has the same mode of operation as the transformer with separate winding, which is also called transformer and also allows to step up and down voltages, but no physical separation.

In contrast to the complete transformer, there is only a part of the output power transferred from the input winding to the output winding with the autotransformer, by means of magnetic induction. The transfer of the other part of the output power is effected by means of direct current conduction. Therefore, referring to the autotransformer one distinguishes between transit-circuit power and structural power.

The structural power and consequently the size of the transformer diminishes considerably compared to transformers with separate winding, due to the saving of core iron and winding copper. The smaller the difference between input voltage and output voltage, the larger is the structural power.

Degrees of Protection

Depending on the site of installation and the intended purpose the parts of the transformer which are under voltage have to be protected against accidental touching and against penetration of water and foreign bodies. For this reason, different kinds of protection are distinguished. The kinds of protection are indicated by a short sign which consists of two reference numbers for the degree of protection. The first reference number gives an information about the protection degree against touching and penetration of foreign bodies. The second reference number marks the protection against the penetration of water.

Vector Groups of Three-Phase Transformers

The combination of the different connection systems for high-voltage winding and low-voltage winding is called vector group of the three-phase transformer. The vector group consists of at least one capital letter and one small letter as well as of a reference number. If three-phase transformers have a neutral point (star point) which is lead outside, the vector group is completed by an "N" or "n". The capital letter stands for the input winding, the small one for the output winding. Depending on the connection of the consumer to the winding's beginning or end of the low-voltage side phase displacements from 0° resp. 180° and 150° resp. 330° arise between high voltages and low voltages. This phase displacement is stated by the reference numbers 0, 5, 6 and 11, whereas the phase displacement angle is the product of the reference number and the angle of 30°.

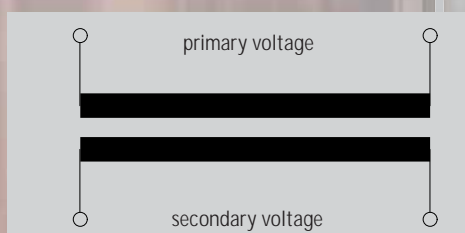


fig. 5.1
wiring diagram transformer with separate winding and tap on the primary side

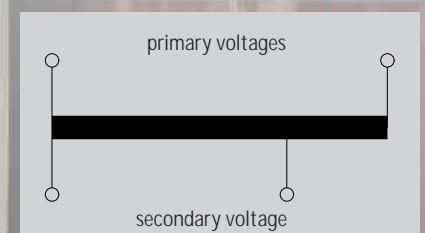
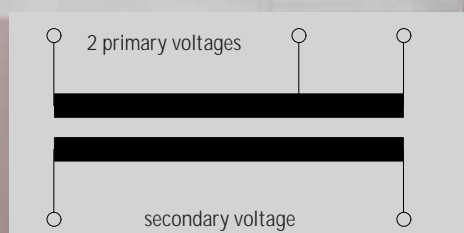


fig. 5.2
wiring diagram transformer with autowinding

TECHNICAL EXPLANATIONS

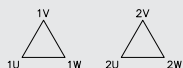
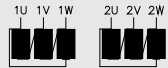
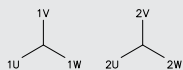

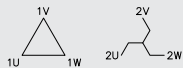

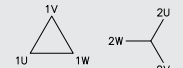

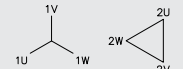

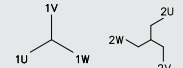

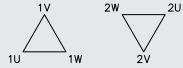

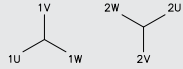
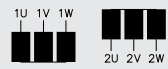
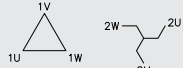

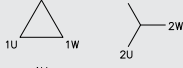

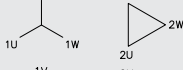

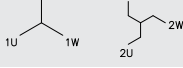

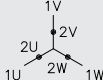
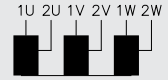
designation / ref. number	vector group	vector diagram	wiring picture	secondary / neutral point (star point)
0	Dd0			not available
	Yy0			10% loadable
	Dz0			fully loadable
5	Dy5			fully loadable
	Yd5			not available
	Yz5			fully loadable
6	Dd6			not available
	Yy6			10% loadable
	Dz6			fully loadable
11	Dy11			fully loadable
	Yd11			not available
	Yz11			fully loadable
0	Ya0			10% loadable

table 6.1
vector groups of three-phase transformers

Low Voltage Dry-Type Transformers according to DIN EN 61558 (VDE 0532/0570)

1. Structure

RUHSTRAT dry-type transformers are manufactured according to the valid regulations DIN EN 61558 (VDE 0532/0570). Low loss and cold-rolled sheets for the electrical industry, with privileged magnetic direction, are used as core material. The windings are made of insulated copper wire. With high rated currents streamlined copper wire and strip copper wire are used. The other insulations, materials are chosen according to the corresponding temperature stability class.

- As single-phase or three-phase construction, with separate winding or autowinding (autotransformer).
- Plants conceived according to customer's requirements as single and special production with a power range from 0.04 kVA up to 1.2 MVA and a voltage range up to 10 kV and as high-current transformer up to 10 kA.
- As transformer aggregate in combination with a variable transformer connected in series, in order to regulate voltages in the output steplessly from 0 to 100%.

2. Advantages

During the production process RUHSTRAT Dry-Type transformers undergo a resin impregnation under vacuum with following furnace drying. This insulation makes a higher protection against external mechanical influences possible as well as a long service life and high operation safety of the transformers.

3. Winding

If not indicated otherwise, RUHSTRAT Dry-Type transformers are delivered with galvanically separated windings. In case of a construction with autowinding (autotransformer) the structural power is reduced. The autotransformer is mechanically smaller and therefore it can be produced at lower costs.

4. Degrees of Protection

The following standard degrees of protection are possible:

- a) Degree of protection IP00 – open design for indoor installation, protection class 1, suitable for fitting up to IP20
- b) Degree of protection IP23 – designed with steel sheet enclosure, protection class 1, colour RAL 7032 or according to customer's requirements
- c) Degree of protection IP54 – with air/water heat exchanger or as oil transformer

5. Voltages

The explanations are applicable for a transformation from 230 V up to 500 V and for a tap on the primary side of $\pm 5\%$.

6. Frequency

RUHSTRAT Dry-Type transformers are designed for an operation frequency of 50/60 Hz. Other frequencies like 16 2/3 Hz and 400 Hz must be indicated when placing the order.

7. Regulations

RUHSTRAT Dry-Type transformers are manufactured according to the current DIN VDE- and EN regulations. Further regulations, as for example certain marine classifications, can be considered upon request.

8. Possibilities of application

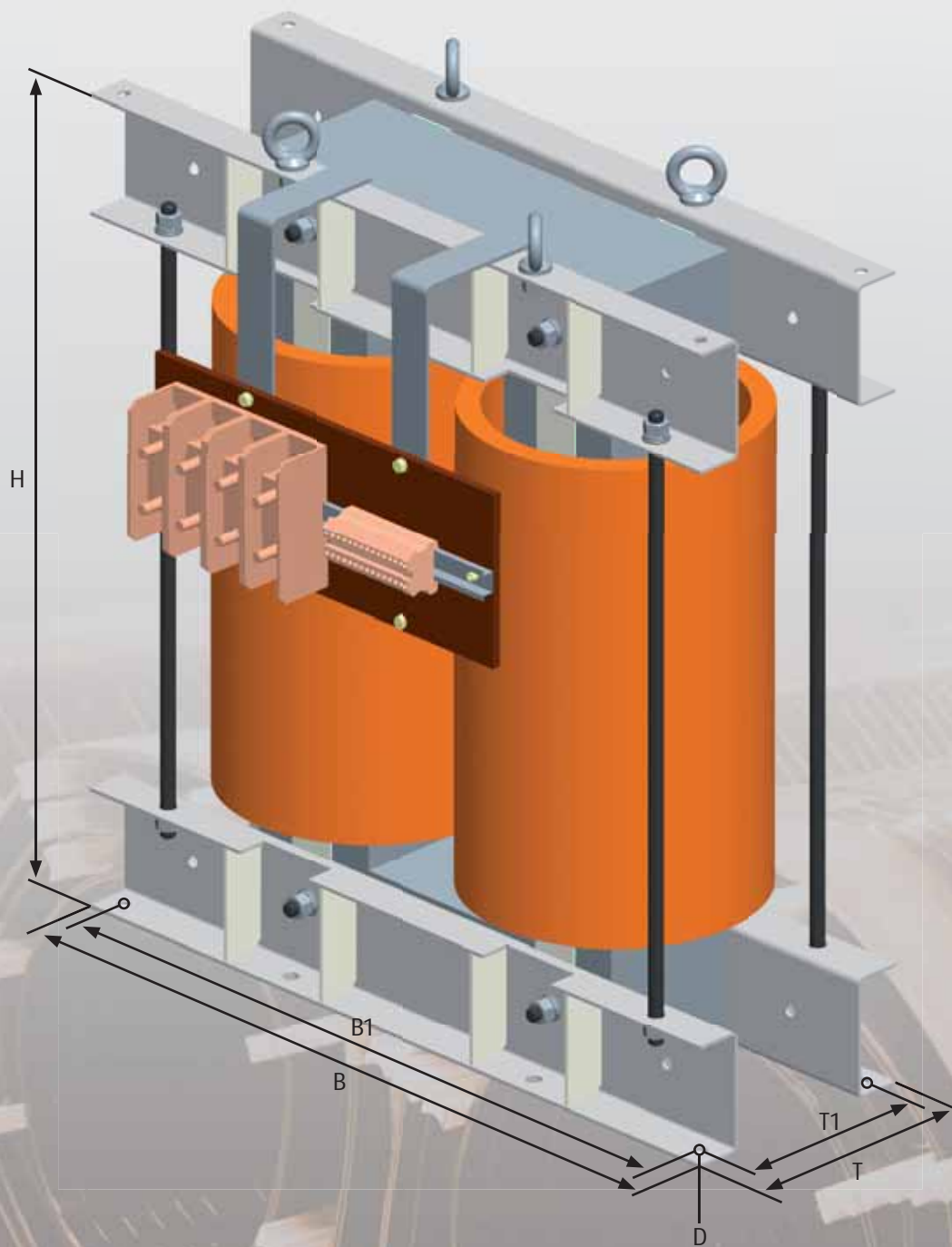
e. g. test fields, machine controls, marine engineering (precharging transformers for the reduction of the inrush current), resistance heated industrial furnaces, glass melting plants, neutral earthing transformers etc.

SINGLE-PHASE LOW VOLTAGE DRY-TYPE TRANSFORMERS

acc. to DIN EN 61558 (VDE 0532/0570)

POWER RANGE 5-40 KVA

type of protection IP00



LOW VOLTAGE – HIGH QUALITY

OVERVIEW SINGLE-PHASE TRANSFORMERS

TECHNICAL DATA

type:	TSIANWSE
power range:	5 – 40 kVA
rated voltage (primary):	max. 750 V with tap $\pm 5\%$
rated voltage (secondary):	max. 750 V
output current at:	
- screw-type terminal	max. 125 A
- bolt connection	max. 520 A
- copper bar	from 600 A to 2500 A
rated frequency:	50 / 60 Hz
vector group:	II0, galvanically separated windings
ambient temperature:	$t_a = 40\text{ °C}$
type of protection:	IP00, open construction, protection class 1 suitable for fitting up to IP20
accessories:	with positive temperature coefficient sensor for warning and shut-down, led on terminals

type	power [kVA]	Cu content [kg]	total weight [kg]	losses CU [W]	losses Fe [W]	dimensions [mm]					
						B	T	H	B1	T1	D
TSIANWSE 5	5	15	46	174	50	330	150	290	280	100	11
TSIANWSE 8	8	22	62	222	64	330	170	310	280	115	11
TSIANWSE 10	10	30	78	235	80	370	180	340	320	115	11
TSIANWSE 15	15	26	89	613	104	400	200	420	350	120	11
TSIANWSE 20	20	31	118	800	121	400	200	490	350	166	12
TSIANWSE 25	25	34	129	1090	135	390	200	560	340	166	12
TSIANWSE 30	30	40	146	1130	157	400	220	550	350	181	12
TSIANWSE 40	40	50	191	1210	206	450	220	590	400	181	12

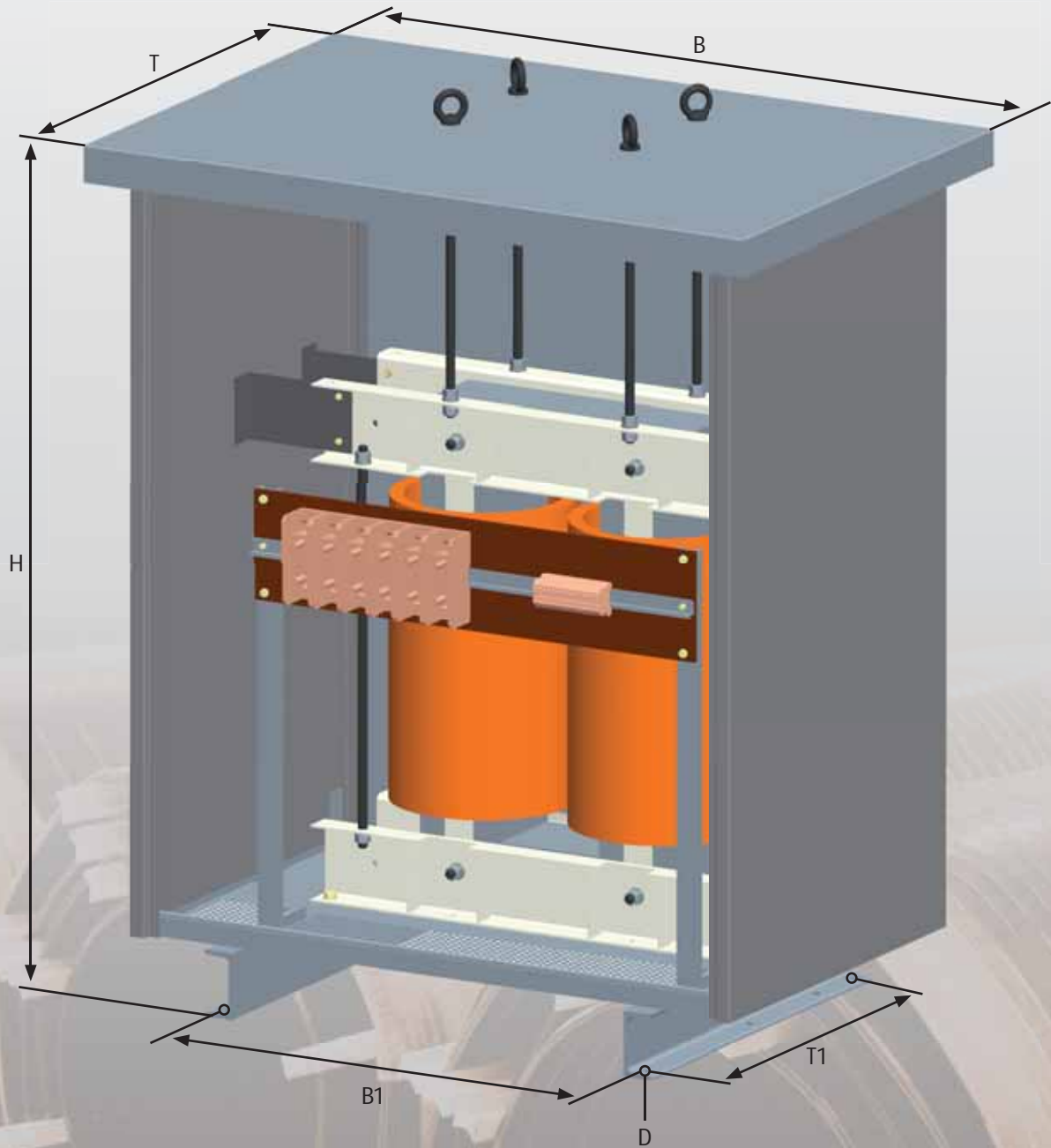
Deviating voltages, taps, ambient temperatures and degrees of protection, construction as autotransformers, thyristor power controller operation etc. upon request. When ordering please indicate your required primary and secondary voltage, required taps as well as the frequency.

SINGLE-PHASE LOW VOLTAGE DRY-TYPE TRANSFORMERS

acc. to DIN EN 61558 (VDE 0532/0570)

POWER RANGE 5-40 KVA

type of protection IP23



LOW VOLTAGE – HIGH QUALITY

OVERVIEW SINGLE-PHASE TRANSFORMERS

TECHNICAL DATA

type:	TSIANWS
power range:	5 – 40 kVA
rated voltage (primary):	max. 750 V with tap \pm 5%
rated voltage (secondary):	max. 750 V
output current at:	
- screw-type terminal	max. 125 A
- bolt connection	max. 520 A
- copper bar	from 600 A to 2500 A
rated frequency:	50 /60 Hz
vector group:	li0, galvanically separated windings
ambient temperature:	$t_a = 40$ °C
type of protection:	IP23, construction with enclosure, protection class 1
accessories:	with positive temperature coefficient sensor for warning and shut-down, led on terminals

type	power [kVA]	Cu content [kg]	total weight [kg]	losses CU [W]	losses Fe [W]	dimensions [mm]					
						B	T	H	B1	T1	D
TSIANWS 5	5	15	57	174	50	330	470	410	230	440	11
TSIANWS 8	8	22	76	222	64	420	480	520	320	450	11
TSIANWS 10	10	30	92	235	80	450	480	520	320	450	11
TSIANWS 15	15	26	107	613	104	500	510	590	400	480	11
TSIANWS 20	20	31	157	800	121	680	590	810	500	480	12
TSIANWS 25	25	34	168	1090	135	680	590	810	500	480	12
TSIANWS 30	30	40	185	1130	157	680	590	810	500	480	12
TSIANWS 40	40	50	237	1210	206	740	640	890	540	510	12

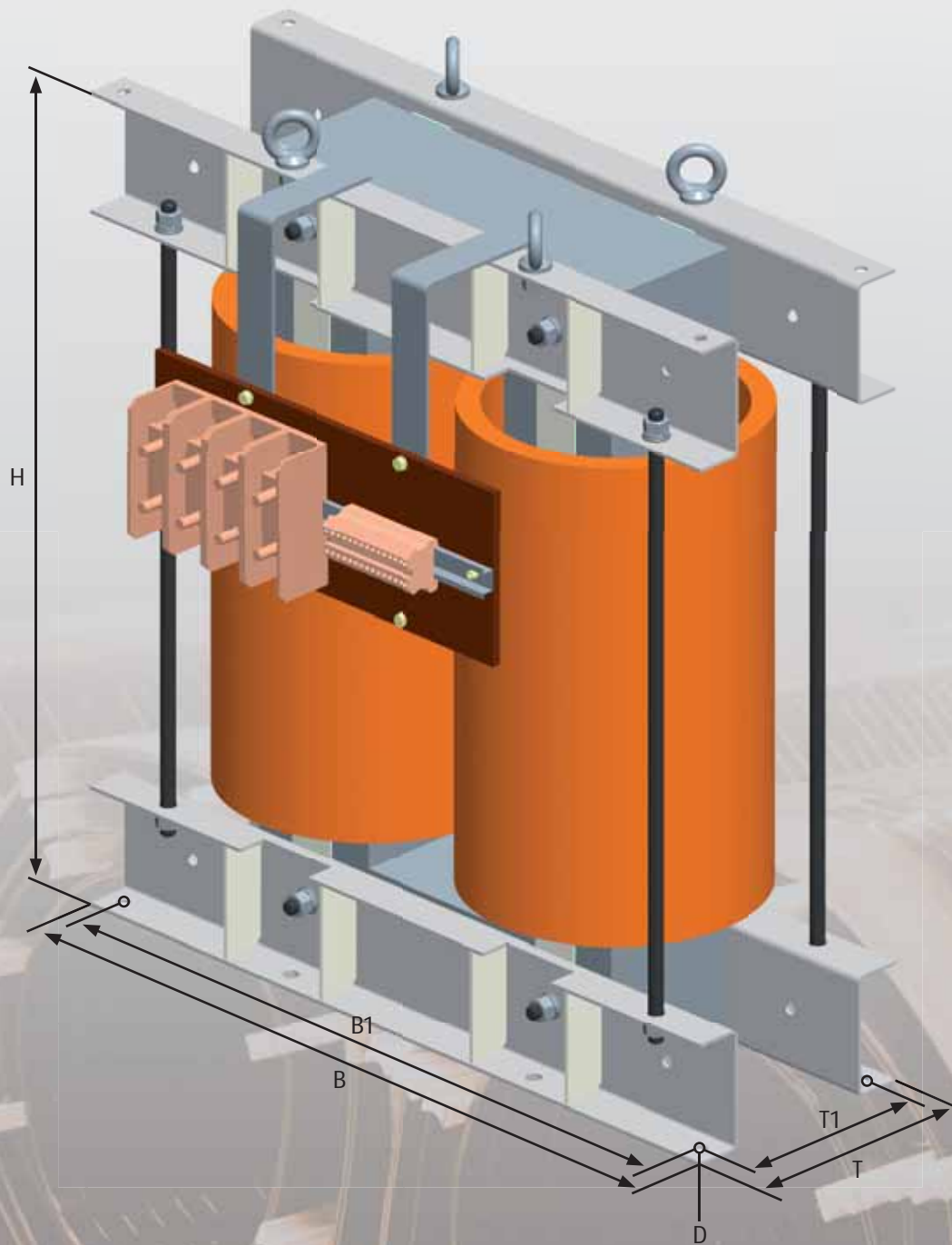
Deviating voltages, taps, ambient temperatures and degrees of protection, construction as autotransformers, thyristor power controller operation etc. upon request. When ordering please indicate your required primary and secondary voltage, required taps as well as the frequency.

SINGLE-PHASE LOW VOLTAGE DRY-TYPE TRANSFORMERS

acc. to DIN EN 61558 (VDE 0532/0570)

POWER RANGE 50-400 KVA

type of protection IP00



LOW VOLTAGE – HIGH QUALITY

OVERVIEW SINGLE-PHASE TRANSFORMERS

TECHNICAL DATA	
type	TSIANWSE
power range:	5-40 kVA
rated voltage (primary):	max. 750 V with tap \pm 5%
rated voltage (secondary):	max. 750 V
output current at:	
- screw-type terminal	max. 125 A
- bolt connection	max. 520 A
- copper bar	from 600 A to 2500 A
rated frequency:	50 / 60 Hz
vector group:	li0, galvanically separated windings
ambient temperature:	$t_a = 40$ °C
type of protection:	IP00, open construction, protection class 1 suitable for fitting up to IP20
accessories:	with positive temperature coefficient sensor for warning and shut-down, led on terminals

type	power [kVA]	Cu content [kg]	total weight [kg]	losses CU [W]	losses Fe [W]	dimensions [mm]					
						B	T	H	B1	T1	D
TSIANWSE 50	50	66	225	1280	238	470	250	590	420	196	12
TSIANWSE 70	70	95	283	1510	286	480	270	610	430	216	12
TSIANWSE 90	90	109	361	1740	384	520	270	730	470	221	12
TSIANWSE 115	115	151	438	2040	444	550	300	760	500	236	12
TSIANWSE 145	145	176	510	2370	521	550	320	810	500	256	14
TSIANWSE 180	180	202	603	2960	632	590	300	950	540	236	14
TSIANWSE 225	225	218	643	2800	410	730	350	910	680	247	14
TSIANWSE 285	285	224	756	3690	527	710	340	1150	660	251	18
TSIANWSE 300	300	258	795	3740	531	730	350	1150	680	251	18
TSIANWSE 350	350	323	925	3580	593	790	380	1080	730	265	18
TSIANWSE 400	400	302	1058	4370	743	760	360	1380	710	270	18

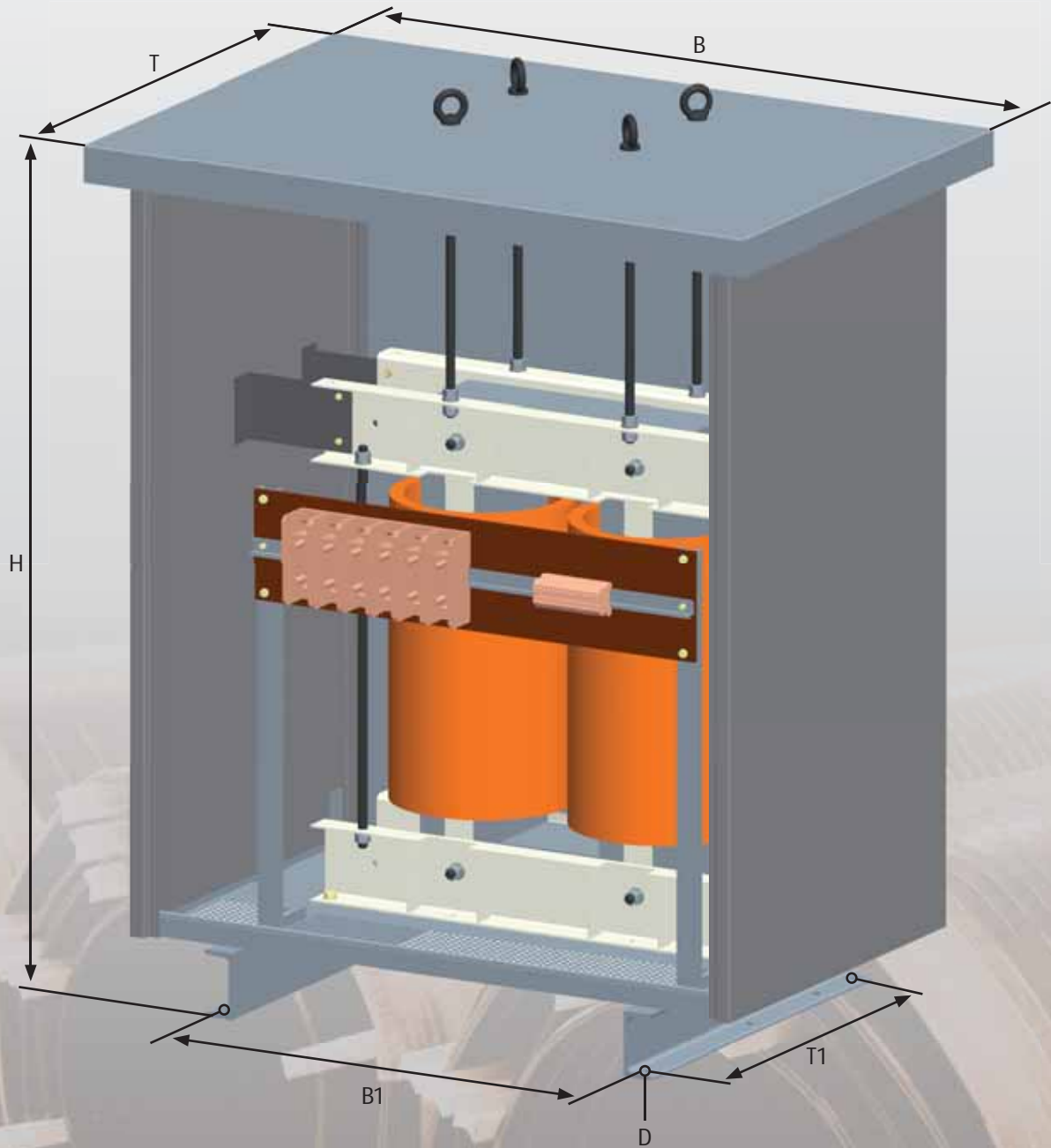
Deviating voltages, taps, ambient temperatures and degrees of protection, construction as autotransformers, thyristor power controller operation etc. upon request. When ordering please indicate your required primary and secondary voltage, required taps as well as the frequency.

SINGLE-PHASE LOW VOLTAGE DRY-TYPE TRANSFORMERS

acc. to DIN EN 61558 (VDE 0532/0570)

POWER RANGE 50-400 KVA

type of protection IP23



LOW VOLTAGE – HIGH QUALITY

OVERVIEW SINGLE-PHASE TRANSFORMERS

TECHNICAL DATA	
type:	TSIANWS
power range:	50 – 400 kVA
rated voltage (primary):	max. 750 V with tap $\pm 5\%$
rated voltage (secondary):	max. 750 V
output current at:	
- screw-type terminal	max. 125 A
- bolt connection	max. 520 A
- copper bar	from 600 A to 2500 A
rated frequency:	50 / 60 Hz
vector group:	li0, galvanically separated windings
ambient temperature:	$t_a = 40\text{ °C}$
type of protection:	IP23, construction with enclosure, protection class 1
accessories:	with positive temperature coefficient sensor for warning and shut-down, led on terminals

type	power [kVA]	Cu content [kg]	total weight [kg]	losses CU [W]	losses Fe [W]	dimensions [mm]					
						B	T	H	B1	T1	D
TSIANWS 50	50	66	274	1280	238	740	640	890	540	510	12
TSIANWS 70	70	95	335	1510	286	740	690	1000	540	560	12
TSIANWS 90	90	109	425	1740	384	930	750	1070	830	620	12
TSIANWS 115	115	151	507	2040	444	970	770	1130	870	640	12
TSIANWS 145	145	176	594	2370	521	1120	810	1230	920	680	14
TSIANWS 180	180	202	694	2960	632	1130	810	1350	930	680	14
TSIANWS 225	225	218	742	2800	410	1190	870	1350	970	740	14
TSIANWS 285	285	224	872	3690	527	1230	900	1570	1010	750	18
TSIANWS 300	300	258	920	3740	531	1300	940	1570	1080	790	18
TSIANWS 350	350	323	1050	3580	593	1300	940	1570	1080	790	18
TSIANWS 400	400	302	1194	4370	743	1320	990	1670	1100	840	18

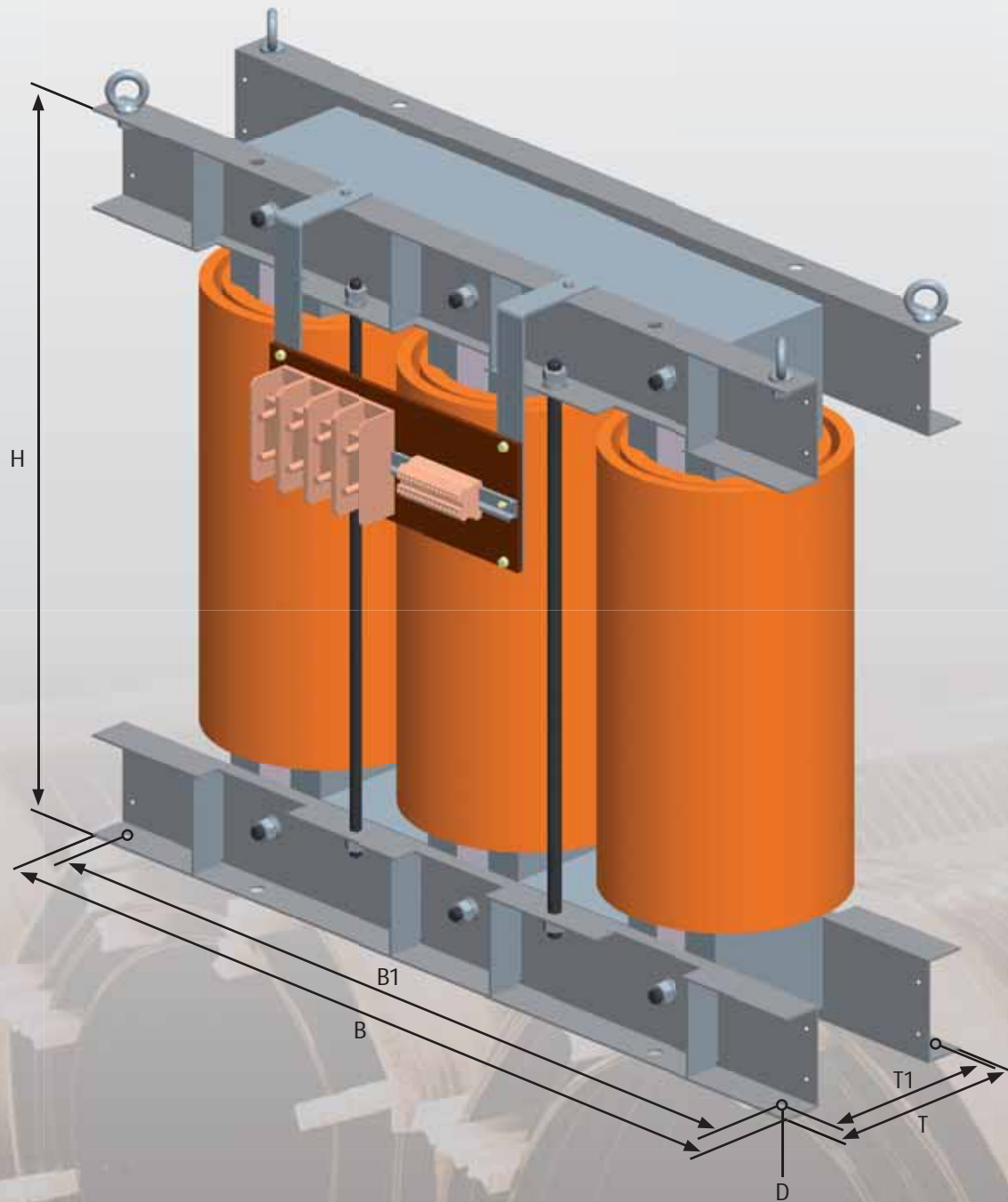
Deviating voltages, taps, ambient temperatures and degrees of protection, construction as autotransformers, thyristor power controller operation etc. upon request. When ordering please indicate your required primary and secondary voltage, required taps as well as the frequency.

THREE-PHASE LOW VOLTAGE DRY-TYPE TRANSFORMERS

acc. to DIN EN 61558 (VDE 0532/0570)

POWER RANGE 7.5-50 KVA

type of protection IP00



LOW VOLTAGE – HIGH QUALITY

OVERVIEW THREE-PHASE TRANSFORMERS

TECHNICAL DATA

type:	TSIANDSE
power range:	7.5 – 50 kVA
rated voltage (primary):	max. 750 V with tap $\pm 5\%$
rated voltage (secondary):	max. 750 V
output current at:	
- screw-type terminal	max. 125 A
- bolt connection	max. 520 A
- copper bar	from 600 A to 2500 A
rated frequency:	50 / 60 Hz
vector group:	YNyn0 or Dyn5, galvanically separated windings
ambient temperature:	$t_a = 40\text{ °C}$
type of protection:	IP00, open construction, protection class 1 suitable for fitting up to IP20
accessories:	with positive temperature coefficient sensor for warning and shut-down, led on terminals

type	power [kVA]	Cu content [kg]	total weight [kg]	losses CU [W]	losses Fe [W]	dimensions [mm]					
						B	T	H	B1	T1	D
TSIANDSE 7.5	7.5	16	60	429	96	400	120	410	350	90	10
TSIANDSE 10	10	21	71	499	111	400	130	410	350	100	10
TSIANDSE 12.5	12.5	26	95	454	152	460	140	420	410	110	10
TSIANDSE 15	15	28	105	541	171	450	150	420	410	120	10
TSIANDSE 20	20	50	155	484	210	480	170	460	430	156	10
TSIANDSE 25	25	49	164	651	231	480	180	460	430	166	10
TSIANDSE 30	30	32	171	1690	283	540	200	560	490	166	10
TSIANDSE 40	40	59	208	1630	307	550	220	560	500	176	12
TSIANDSE 50	50	76	274	1640	406	620	220	660	570	186	12

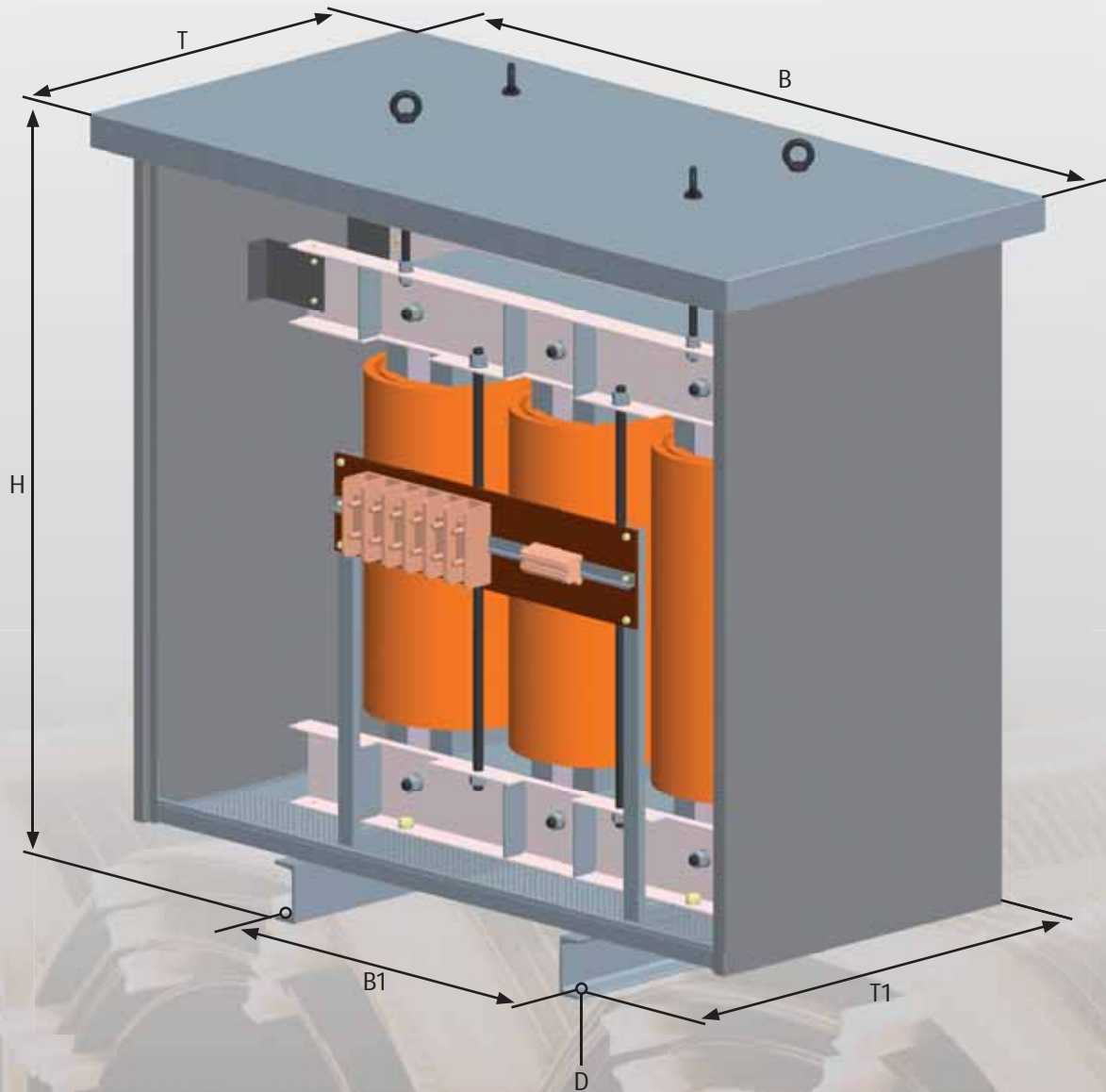
Deviating voltages, taps, ambient temperatures and degrees of protection, construction as autotransformers, thyristor power controller operation etc. upon request. When ordering please indicate your required primary and secondary voltage, required taps as well as the frequency.

THREE-PHASE LOW VOLTAGE DRY-TYPE TRANSFORMERS

acc. to DIN EN 61558 (VDE 0532/0570)

POWER RANGE 7.5-50 KVA

type of protection IP23



LOW VOLTAGE – HIGH QUALITY

OVERVIEW THREE-PHASE TRANSFORMERS

TECHNICAL DATA

type:	TSIANDS
power range:	7.5 – 50 kVA
rated voltage (primary):	max. 750 V with tap \pm 5 %
rated voltage (secondary):	max. 750 V
output current at:	
- screw-type terminal	max. 125 A
- bolt connection	max. 520 A
- copper bar	from 600 A to 2500 A
rated frequency:	50 / 60 Hz
vector group:	YNyn0 or Dyn5, galvanically separated windings
ambient temperature:	$t_a = 40$ °C
type of protection:	IP23, construction with enclosure, protection class 1
accessories:	with positive temperature coefficient sensor for warning and shut-down, led on terminals

type	power [kVA]	Cu content [kg]	total weight [kg]	losses CU [W]	losses Fe [W]	dimensions [mm]					
						B	T	H	B1	T1	D
TSIANDS 7.5	7.5	16	76	429	96	560	440	600	460	410	10
TSIANDS 10	10	21	87	499	111	560	440	600	460	410	10
TSIANDS 12.5	12.5	26	112	454	152	560	440	600	460	410	10
TSIANDS 15	15	28	125	541	171	560	510	620	460	480	10
TSIANDS 20	20	50	175	484	210	560	510	620	460	480	10
TSIANDS 25	25	49	202	651	231	760	550	790	580	440	10
TSIANDS 30	30	32	209	1690	283	760	550	790	580	440	10
TSIANDS 40	40	59	259	1630	307	870	660	900	690	550	12
TSIANDS 50	50	76	325	1640	406	870	660	900	690	550	12

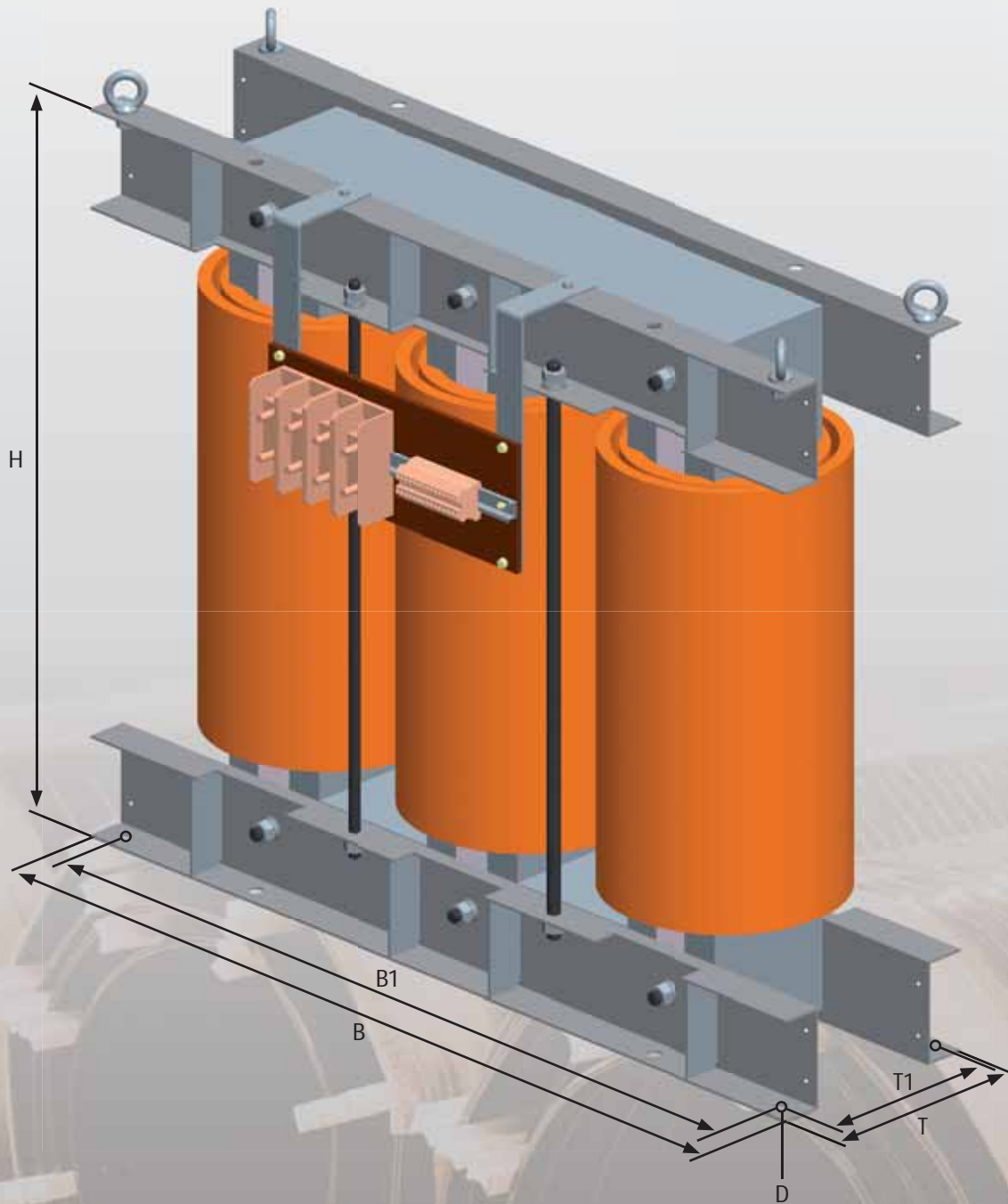
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THREE-PHASE LOW VOLTAGE DRY-TYPE TRANSFORMERS

acc. to DIN EN 61558 (VDE 0532/0570)

POWER RANGE 63-1000 KVA

type of protection IP00



LOW VOLTAGE – HIGH QUALITY

OVERVIEW THREE-PHASE TRANSFORMERS

TECHNICAL DATA	
type:	TSIANDSE
power range:	63 – 1000 kVA
rated voltage (primary):	max. 750 V with tap $\pm 5\%$
rated voltage (secondary):	max. 750 V
output current at:	
- screw-type terminal	max. 125 A
- bolt connection	max. 520 A
- copper bar	from 600 A to 2500 A
rated frequency:	50 / 60 Hz
vector group:	YNyn0 or Dyn5, galvanically separated windings
ambient temperature:	$t_a = 40\text{ °C}$
type of protection:	IP00, open construction, protection class 1 suitable for fitting up to IP20
accessories:	with positive temperature coefficient sensor for warning and shut-down, led on terminals

type	power [kVA]	Cu content [kg]	total weight [kg]	losses CU [W]	losses Fe [W]	dimensions [mm]					
						B	T	H	B1	T1	D
TSIANDSE 63	63	99	311	1860	439	630	240	660	580	196	12
TSIANDSE 75	75	83	358	2300	566	660	220	770	610	186	12
TSIANDSE 100	100	126	443	2400	660	710	250	740	660	206	12
TSIANDSE 125	125	153	537	2950	816	740	280	800	690	226	14
TSIANDSE 160	160	189	658	3430	1013	800	260	980	750	216	14
TSIANDSE 200	200	185	666	3660	468	950	290	940	900	209	14
TSIANDSE 250	250	216	778	4090	552	990	310	1020	940	230	14
TSIANDSE 315	315	307	974	4090	653	1050	330	1030	1000	238	16
TSIANDSE 400	400	302	1178	4860	864	1110	350	1100	1060	258	16
TSIANDSE 500	500	377	1374	5530	991	1170	370	1140	1120	267	16
TSIANDSE 630	630	503	1774	5350	1265	1260	400	1200	1210	285	16
TSIANDSE 750	750	577	1954	6180	1375	1320	420	1200	1270	295	16
TSIANDSE 1000	1000	838	2607	6910	1771	1440	460	1340	1390	318	16

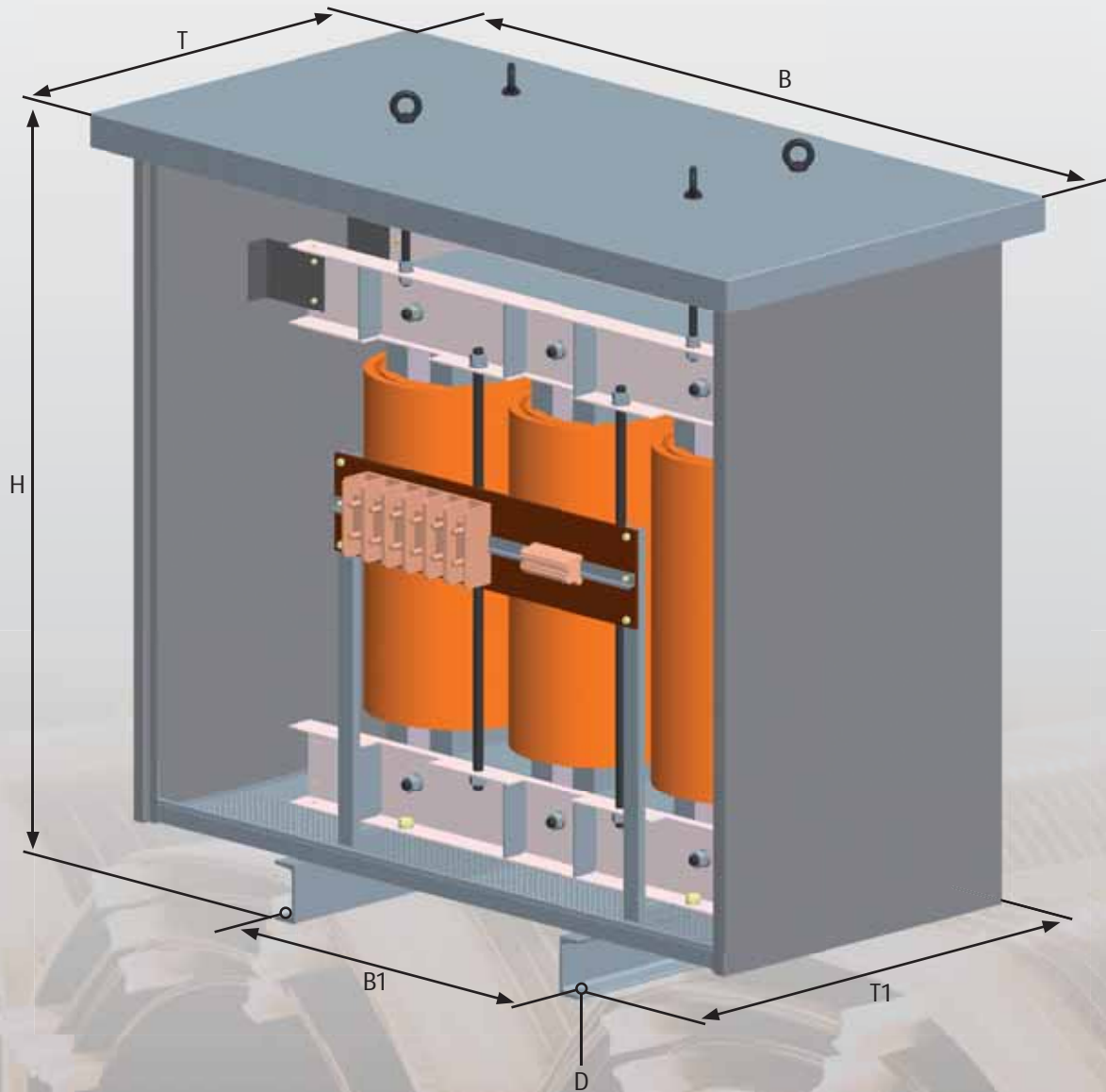
Deviating voltages, taps, ambient temperatures and degrees of protection, construction as autotransformers, thyristor power controller operation etc. upon request. When ordering please indicate your required primary and secondary voltage, required taps as well as the frequency.

THREE-PHASE LOW VOLTAGE DRY-TYPE TRANSFORMERS

acc. to DIN EN 61558 (VDE 0532/0570)

POWER RANGE 63-1000 KVA

type of protection IP23



LOW VOLTAGE – HIGH QUALITY

OVERVIEW THREE-PHASE TRANSFORMERS

TECHNICAL DATA	
type:	TSIANDS
power range:	63 – 1000 kVA
rated voltage (primary):	max. 750 V with tap $\pm 5\%$
rated voltage (secondary):	max. 750 V
output current at:	
- screw-type terminal	max. 125 A
- bolt connection	max. 520 A
- copper bar	from 600 A to 2500 A
rated frequency:	50 / 60 Hz
vector group:	YNyn0 or Dyn5, galvanically separated windings
ambient temperature:	$t_a = 40\text{ °C}$
type of protection:	IP23, construction with enclosure, protection class 1
accessories:	with positive temperature coefficient sensor for warning and shut-down, led on terminals

type	power [kVA]	Cu content [kg]	total weight [kg]	losses CU [W]	losses Fe [W]	dimensions [mm]					
						B	T	H	B1	T1	D
TSIANDS 63	63	99	369	1860	439	930	740	920	730	610	12
TSIANDS 75	75	83	423	2300	566	980	740	1030	780	610	12
TSIANDS 100	100	126	520	2400	660	1160	770	1150	960	640	12
TSIANDS 125	125	153	624	2950	816	1250	780	1290	1030	630	14
TSIANDS 160	160	189	730	3430	1013	1250	780	1290	1030	630	14
TSIANDS 200	200	185	775	3660	468	1310	890	1430	1090	740	14
TSIANDS 250	250	216	870	4090	552	1310	890	1430	1090	740	14
TSIANDS 315	315	307	1117	4090	653	1520	1030	1630	1300	880	16
TSIANDS 400	400	302	1321	4860	864	1520	1030	1630	1300	880	16
TSIANDS 500	500	377	1535	5530	991	1640	1080	1710	1400	910	16
TSIANDS 630	630	503	1956	5350	1265	1830	1130	1800	1590	960	16
TSIANDS 750	750	577	2165	6180	1375	1970	1220	1990	1710	1030	16
TSIANDS 1000	1000	838	2865	6910	1771	2170	1360	2210	1910	1170	16

Deviating voltages, taps, ambient temperatures and degrees of protection, construction as autotransformers, thyristor power controller operation etc. upon request. When ordering please indicate your required primary and secondary voltage, required taps as well as the frequency.

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Ruhstrat GmbH
Heinestr. 12
D-37120 Bovenden
phone +49 (0) 5593 803-0
fax +49 (0) 5593 803-50
e-mail: info@ruhstrat.com
internet: www.ruhstrat.com

Export-Division
phone: +49 55 93 803-17
fax: +49 55 93 803-80
e-mail: export@ruhstrat.com