



## Die Transformator-Manufaktur

HTT · Postfach 1347 · 34333 Hann. Münden

Hitec Power Protection BV  
Bedrijvenpark Twenthe 40  
7602 KB Almelo  
**NIEDERLANDE**

Customer no. 50001  
Contact Lutz Hasenkopf  
Phone 05541 7008 16  
Fax 05541 7008 39  
email lutz.hasenkopf@htt-trafo.de  
Date 07.07.2017

### Invoice 17-00107

Your VAT- no.: NL804231849B01  
Your P/O: 1234079 dd. 07.04.2017  
Delivery free site Almelo, w/o unloading

Delivery address Hitec Power Protection BV Bedrijvenpark Twenthe 40 7602 KB Almelo

1 unit	<b>Three-phase-cast-resin-inductor</b> Delivery note 101705 dd. 03.07.2017 pos. 1 Type GDIN 1310 / 24 - 2 Serial-No. 17 38470	25.279,10 €	25.279,10 €
1 unit	<b>Three-phase-cast-resin-inductor</b> Delivery note 101705 dd. 03.07.2017 pos. 2 Type GDIN 1310 / 24 - 2 Serial-No. 17 38471	25.279,10 €	25.279,10 €
1 unit	<b>Three-phase-cast-resin-transformer</b> Delivery note 101705 dd. 03.07.2017 pos. 3 Type GDNN/S 2720 / 24 - 2 Serial-No. 17 38472	43.949,10 €	43.949,10 €
1 unit	<b>Three-phase-cast-resin-transformer</b> Delivery note 101705 dd. 03.07.2017 pos. 4 Type GDNN/S 2720 / 24 - 2 Serial-No. 17 38473	43.949,10 €	43.949,10 €



**Die Transformator-Manufaktur**

**Invoice 17-00107**

page : 2

Date : 07.07.2017

Net price total

138.456,40 €

VAT 0 %

0,00 €

**Invoice total**

**138.456,40 €**

Payment

net within 60 days after date of invoice.

Bank account

Sparkasse Werra-Meißner in Eschwege  
BLZ 522 500 30, Konto 500 16328  
S.W.I.F.T.-Code HELA DE F1 ESW  
IBAN DE29 5225 0030 0050 0163 28

Delivery inside the European Union !!!

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**Customer :** HITEC Power Protection , Almelo, Netherlands**Rating**

Rated power (kVA)	1191			
Rated voltage (V)			22000	
Rated current (A)			50	
Um (kV)	24			
LI / AC (kV)	125 / 50			
Terminal/position	see rating plate			
Highest voltage (V)	22000	Vector-group Protection Type	III	Cooling method
Rated frequency (Hz)	50		IP 21	Year of manufacture
Total-weight (kg)	3780		GDIN 1310/24	IEC / VDE
Thermal class HV/LV	F			60289 / 0532
short time duty 57,2 A 1 hour / 10 hour				
Winding ratio Np / (Np+Ns): 70%				

**Dielectric test**

Separate-source voltage withstand test

Connection	U (V)	f (Hz)	t (sek.)
U1 - V1 -W1	50000	50	60

**Resistance measuring**

1U - 2U (Milliohm)	1V - 2V (Milliohm)	1W - 2W (Milliohm)	T (°C)
608	608	608	27,2
U3 - U2 (Milliohm)	V3 - V2 (Milliohm)	W3 - W2 (Milliohm)	T (°C)
151,1	151,2	151,1	27,2

**Impedance-measuring**

Terminal	Um (V)	Im (A)	XL (Ohm)	L (Henry)	T (°C)	
U1 - V1 -W1	6501	25,49	147,2	0,469	27,2	Starpoint on U2 - V2 - W2
U1 - V1 -W1	6001	46,29	74,8	0,238	27,2	Starpoint on U3 - V3 - W3
U2 - V2 -W2	960,2	43,29	12,8	0,041	27,2	Starpoint on U3 - V3 - W3

**Winding ratio measuring**

Winding ratio	U (%)	V (%)	W (%)
1 - 2 / 1 - 3	70	70	70



Customer : HITEC Power Protection , Almelo, Netherlands

**Rating**

Rated power (kVA)	1191				
Rated voltage (V)		22000			
Rated current (A)		50			
Um (kV)	24				
LI / AC (kV)	125 / 50				
Terminal/position	see rating plate				
Highest voltage (V)	22000	Vector-group Protection Type	III	Cooling method	AN
Rated frequency (Hz)	50		IP 21	Year of manufacture	2017
Total-weight (kg)	3780		GDIN 1310/24	IEC / VDE	60289 / 0532
Thermal class HV/LV	F				
short time duty 57.2 A 1 hour / 10 hour					
Winding ratio Np / (Np+Ns): 70%					

**Dielectric test**

Separate-source voltage withstand test

Connection	U (V)	f (Hz)	t (sek.)
U1 - V1 -W1	50000	50	60

**Resistance measuring**

1U - 2U (Milliohm)	1V - 2V (Milliohm)	1W - 2W (Milliohm)	T (°C)
608	608	608	27,2
U3 - U2 (Milliohm)	V3 - V2 (Milliohm)	W3 - W2 (Milliohm)	T (°C)
151,0	151,1	151,0	27,2

**Impedance-measuring**

Terminal	Um (V)	Im (A)	XL (Ohm)	L (Henry)	T (°C)	
U1 - V1 -W1	6503	25,47	147,4	0,469	27,2	Starpoint on U2 - V2 - W2
U1 - V1 -W1	5999	46,02	75,3	0,240	27,2	Starpoint on U3 - V3 - W3
U2 - V2 -W2	960,4	43,3	12,8	0,041	27,2	Starpoint on U3 - V3 - W3

**Winding ratio measuring**

Winding ratio	U (%)	V (%)	W (%)
1 - 2 / 1 - 3	70	70	70

**Customer :** Hitec Power Protection BV, Almelo, Netherlands**Rating**

System	1				2	
Rated power (kVA)	2720				2720	
Rated voltage (V)	22000				400	
Rated current (A)	71,4				3926	
Um (kV)	24				1,1	
LI / AC (kV)	125 / 50				- / 3	
Terminal/position	see rating plate					
Rated frequency (Hz)	50	Vector-group Protection Type	D yn11	Cooling method		AN
Total-weight (kg)	7050		IP 21	Year of manufacture		2017
Thermal class HV/LV	F / F		GDNN 2720 / 24 - 2		IEC / VDE	60076 / 0532
Nominal at 120°C	Po (W) = 3350		Pk (W) = 20000		Uz (%) = 5	+ - 10 %
Remarks						

**Voltage-ratio test**

System 1 (V)		22000							
U - V (%)		0							
ratio error in per cent V - W (%)		0							
W - U (%)		0							
System 2 (V)	400								
Vector-group	D yn11								

**Dielectric test**

	System	Terminal	U test (V)	f (Hz)	t (sec.)
Separate-source voltage withstand test	1	1U - 1V - 1W	50000	50	60
Separate-source voltage withstand test	2	2U - 2V - 2W	3000	50	60
Induced overvoltage withstand test	2	2U - 2V - 2W	800	200	30
Partial discharge test	PD <= 10pC	1	1U - 1V - 1W	28600	200

**No-load test**

System	Terminal	fm (Hz)	U average (V)	Iu (A)	Iv (A)	Iw (A)	Io (A)	Io (%)	Po (W)
2	2U - 2V - 2W	50	400	11,89	9,11	11,74	10,91	0,28	3342

**Resistance measuring**

System	Terminal	Position (V)	U - V (Milliohm)	V - W (Milliohm)	W - U (Milliohm)	T (°C)
1	1U - 1V - 1W	22000	764	762	763	27,2
2	2U - 2V - 2W	400	0,221	0,222	0,229	27,2

**Short-circuit test**

Terminal (V)	Short-circuit (V)	Im (A)	Ci	Um (V)	Cu	Pm (W)	T (°C)	Pk (W) [120°C]	Uz (%)
22000	400	35,7	2	596	2	15020	27,2	17997	5,43



## EC-Declaration of Conformity

**Manufacturer:**

HTT Hochspannungstechnik und  
Transformatorbau GmbH  
Veckerhäger Straße 100  
34346 Hann. Münden  
Germany

Authorized representative  
for the compilation of the technical  
documents:

Nils Martin, Technical manager/Authorized officer,  
HTT Hochspannungstechnik und  
Transformatorbau GmbH  
Veckerhäger Straße 100  
34346 Hann. Münden  
Germany

**Product:**

**Three-phase-cast-resin-transformer**

**Type: GDNN 2720 / 24 - 2**

**Serial number: 1738472**

We hereby confirm that the product described above is in compliance with the relevant provisions of Ecodesign Directive (EU) Nr. 548/2014.

The above mentioned product fulfills the requirements of the following directives and standards:

- Directive 2009/125 EC of the European Parliament and of the Council of 21 October 2009,
- Commission Regulation (EU) No. 548/2014 of 21 May 2014.

Hann. Münden, 26-06-2017

ppa. Nils Martin, Technical Manager



Customer : Hitec Power Protection BV, Almelo, Netherlands

## Rating

System	1		2
Rated power (kVA)	2720		2720
Rated voltage (V)	22000		400
Rated current (A)	71,4		3926
Um (kV)	24		1,1
LI / AC (kV)	125 / 50		- / 3
Terminal/position	see rating plate		
Rated frequency (Hz)	50	Vector-group	D yn11
Total-weight (kg)	7050	Protection	IP 21
Thermal class HV/LV	F / F	Type	GDNN 2720 / 24 - 2
Nominal at 120°C	Po (W) = 3350	Pk (W) = 20000	Uz (%) = 5
Remarks			

## Voltage-ratio test

System 1 (V)		22000							
U - V (%)		-0,1							
ratio error in per cent V - W (%)		-0,1							
W - U (%)		-0,1							
System 2 (V)		400							
Vector-group		D yn11							

## Dielectric test

	System	Terminal	U test (V)	f (Hz)	t (sec.)
Separate-source voltage withstand test	1	1U - 1V - 1W	50000	50	60
Separate-source voltage withstand test	2	2U - 2V - 2W	3000	50	60
Induced overvoltage withstand test	2	2U - 2V - 2W	800	200	30
Partial discharge test PD ≤ 10pC	1	1U - 1V - 1W	28600	200	180

## No-load test

System	Terminal	fm (Hz)	U average (V)	Iu (A)	Iv (A)	Iw (A)	Io (A)	Io (%)	Po (W)
2	2U - 2V - 2W	50	400	11,82	9,13	11,87	10,94	0,28	3340

## Resistance measuring

System	Terminal	Position (V)	U - V (Milliohm)	V - W (Milliohm)	W - U (Milliohm)	T (°C)
1	1U - 1V - 1W	22000	763	765	765	27,5
2	2U - 2V - 2W	400	0,222	0,222	0,23	27,5

## Short-circuit test

Terminal (V)	Short-circuit (V)	Im (A)	Ci	Um (V)	Cu	Pm (W)	T (°C)	Pk (W) [120°C]	Uz (%)
22000	400	35,7	2	595,6	2	15068	27,5	18034	5,43



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**Manufacturer:**

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**Authorized representative  
for the compilation of the technical  
documents:**

Nils Martin, Technical manager/Authorized officer,  
HTT Hochspannungstechnik und  
Transformatorbau GmbH  
Veckerhäger Straße 100  
34346 Hann. Münden  
Germany

**Product:**

**Three-phase-cast-resin-transformer**

**Type: GDNN 2720 / 24 - 2**

**Serial number: 1738473**

We hereby confirm that the product described above is in compliance with the relevant provisions of Ecodesign Directive (EU) Nr. 548/2014.

The above mentioned product fulfills the requirements of the following directives and standards:

- Directive 2009/125 EC of the European Parliament and of the Council of 21 October 2009,
- Commission Regulation (EU) No. 548/2014 of 21 May 2014.

Hann. Münden, 26-06-2017

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ppa. Nils Martin, Technical Manager