

**TECHNICAL DATA SHEET**

Power transformer Ungheni 25 MVA, 115 ±9*1.78% / 38,5±2*2.5/11				
No	Description	Unit	Data required	Data offered
<b>1</b>	<b>GENERAL</b>			
	Manufacturer			ETD TRANSFORMÁTORY a.s.
	- country			Czech Republic
	- city			Pilsen
	Kind of installation		outdoor	Outdoor
	Standards		IEC60076	Yes
			IEC60137	Yes
			IEC61463	Yes
			IEEE 693-2005	Yes
	Single or three-phase unit		Three-phase	Yes
	Type of core		3-limbs, step-lap stacked core form	Yes
	Type of tank		Upper flange tank	Yes
	Tank fully vacuum proof		Yes	Yes
	Number of windings		Three	Yes
	Winding's material (HV, MV, LV)		Copper	Yes
	Insulation oil			
	- manufacturer			NYNAS
	- type			NYTRO LYRA X
	- specification of oil		IEC 60296	Yes
	- insulation oil inhibited		Yes	Yes
	- test method for corrosive sulphur		IEC 62535 and ASTDM D1275B	Yes
<b>2</b>	<b>RATINGS</b>			
	Rated power at all taps (primary/secondary/tertiary)			
	- at ONAN cooling	MVA	20/20/20	20/20/20
	- at ONAF cooling	MVA	25/25/25	25/25/25
	Maximum ambient temperature	°C	50	50
	Annual average ambient temperature	°C	15	15
	Minimum ambient temperature	°C	-30	-30

	Maximum service altitude	m	1000	1000
	Temperature rise limits at all tap changer settings			
	- oil/top	K	50	50
	- windings/average	K	55	55
	- windings/hot spot	K	68	68
	Rated voltages (no load)			
	- primary	kV	115	115
	- secondary	kV	38,5	38,5
	- tertiary	kV	11	11
	Rated frequency	Hz	50	50
	Permissible load at neutral point	%	100/solidly earthed/surge arrester	100% earthed / unearthed with connected surge arrester
	Vector group symbol		YNyn0d11	YNyn0d11
	Impedance voltage — HV/LV (25 MVA basis)			
	- maximum tap position	%	specify	18% inf. Value
	- nominal tap position	%	17.5	17,5% ± tol. IEC
	- minimum tap position	%	specify	17,2% inf. Value
	Impedance voltage — HV/MV (25 MVA basis)			
	- maximum tap position	%	specify	11% inf. Value
	- nominal tap position	%	10.5	10,5% ± tol. IEC
	- minimum tap position	%	specify	10,2% inf. Value
	Impedance voltage — secondary/tertiary (25 MVA basis)	%	Min. 6.5 (±30%/-0%)	6,5% ± tol. IEC
	Magnetic flux density at rated voltage and frequency	Tesla	Max. 1.7	≤ 1,7T
	No load losses (tolerance +0%)	kW	< 15	15kW +0% tol.
	No load current (I <sub>0</sub> /I <sub>n</sub> )	%	0,1	0,1% +tol. IEC
	No load losses (W 17/50)	W/kg	Max. 0,9	< 0,9
	Short circuit voltage			
	- HV-LV	%	17.5	17,5% ± tol. IEC
	- HV-MV	%	10.5	10,5% ± tol. IEC
	- MV-LV	%	6,5	6,5% ± tol. IEC
	Load losses at rated power			
	HV/LV (25 MVA basis)			
	- maximum tap position	kW	specify	118kW inf. Value

	- nominal tap position	kW	Max.120	120kW + 0% tol.
	- minimum tap position	kW	specify	165kW inf. Value
	HV/MV (25 MVA basis)			
	- maximum tap position	kW	specify	118kW inf. Value
	- nominal tap position	kW	Max.120	120kW + 0% tol.
	- minimum tap position	kW	specify	165kW inf. Value
	MT/JT (25 MVA basis)	kW	Max.110	110kW + 0% tol.
	HV winding (25 MVA basis)			
	- maximum tap position	kW	specify	~ 59,5
	- nominal tap position	kW	specify	~ 64,1
	- minimum tap position	kW	specify	~ 90,4
	LV winding (25 MVA basis)	kW	specify	~ 42,2
	MV winding (25 MVA basis)			
	- maximum tap position	kW	specify	~ 52,6
	- nominal tap position	kW	specify	~ 55,5
	- minimum tap position	kW	specify	~ 58,9
	Power consumption of cooling plant	kW	specify	~ 9,5
	Efficiency referred to 75 °C at rated voltage taping and at:			HV - MV
	- 100% rated output and 1.0 power factor	%	99,7	99,460
	- 75% rated output and 1.0 power factor	%	99,7	99,560
	- 50% rated output and 1.0 power factor	%	99,7	99,640
	- 25% rated output and 1.0 power factor	%	99,7	99,640
	- 100% rated output and 0.8 power factor	%	99,7	99,325
	- 75% rated output and 0.8 power factor	%	99,7	99,450
	- 50% rated output and 0.8 power factor	%	99,7	99,550
	- 25% rated output and 0.8 power factor	%	99,7	99,550
	Voltage variation range HV	kV	+/- 18.423	+/- 18.423
	Taping range HV	%	+/- 16	+/- 16
	Number of steps HV	steps	+/-9	+/-9
	Continuous power on all taps		Yes	Yes
	Voltage variation range MV 38.5 kV	kV	+/- 1.925	+/- 1.925
	Tapping range MV 38.5 kV	%	+/-5	+/-5

	Number of steps MV 38.5 kV	steps	+/- 2	+/- 2
	Principal taping HV	kV	115	115
	Principal taping MV	kV	38.5	38.5
	Winding insulation design			
	- HV		Uniform	Yes
	- MV		Uniform	Yes
	- LV		Uniform	Yes
	Seismicity on MSK scale		IX	Yes
<b>3</b>	<b>INSULATION LEVEL</b>			
	Insulation level HV winding			
	- Power frequency withstand voltage line/neutral	kV	230/230	230/230
	- Lightning impulse level line/neutral	kV	550/550	550/550
	Insulation level LV winding			
	- Power frequency withstand voltage line/neutral	kV	34	34
	- Lightning impulse level line/neutral	kV	110	110
	Insulation level MT winding			
	- Power frequency withstand voltage line/neutral	kV	95/95	95/95
	- Lightning impulse level line/neutral	kV	250/250	250/250
<b>4</b>	<b>OPERATION DETAILS</b>			
	Cooling method		ONAN/ONAF	ONAN/ONAF
	Noise level (l-PA) at a measuring distance of 2.0 m (all forced cooling in operation)	dB(A)	Max. 60	Lpa < 60dB(A)
<b>5</b>	<b>BUSHINGS</b>			
	HV (lines)			
	- manufacturer			HSP
	- type			STARIP Si+
	- rated current	A	800	800
	- power frequency test voltage	kV	255	255

	- lightning impulse level		550	550
	- minimum creepage distance in accordance with IEC 60815	mm	2835	3976
	- cantilever load level according to IEC 60137	daN	specify	3150
	HV (neutral)			
	- manufacturer			HSP
	- type			STARIP Si+
	- rated current	A		800
	- power frequency test voltage	kV	105	255
	- lightning impulse level		250	550
	- minimum creepage distance	mm	1050	3976
	- cantilever load level according to IEC 60137	daN	specify	3150
	LV			
	- manufacturer			CEDASPE
	- type			24-2000/P3
	- rated current	A	2000	2000
	- power frequency test voltage	kV	42	50
	- lightning impulse level		110	125
	- minimum creepage distance in accordance with IEC 60815	mm	280	620
	- cantilever load level according to IEC 60137	daN	specify	625
	MT			
	- manufacturer			CEDASPE
	- type			52/1250 – P3
	- rated current	A	630	1250
	- power frequency test voltage	kV	105	105 Dry
	- lightning impulse level		250	250
	- minimum creepage distance in accordance with IEC 60815	mm	1050	1350
	- cantilever load level according to IEC 60137	daN	specify	500
<b>6</b>	<b>CURRENT TRANSFORMERS</b>			
	<b>115 kV line side</b>			

	For protection purposes			
	Rated output	VA	10	10
	Ratio			
	- primary	A	100-150-200-300	100-150-200-300
	- secondary	A	5	5
	Class		0.5sFS5	0.5sFS5
	For protection purposes			
	Rated output	VA	30	30
	Ratio			
	- primary	A	200-300-400-600	200-300-400-600
	- secondary	A	5	5
	Class		5P20	5P20
	For protection purposes			
	Rated output	VA	30	30
	Ratio			
	- primary	A	200-300-400-600	200-300-400-600
	- secondary	A	5	5
	Class		5P20	5P20
	<b>115 kV neutral side</b>			
	For protection purposes			
	Rated output	VA	10	10
	Ratio			
	- primary	A	200-300-400-600	200-300-400-600
	- secondary	A	5	5
	Class		5P20	5P20
	<b>38.5 kV line side</b>			
	For protection purposes			
	Rated output	VA	10	10
	Ratio			
	- primary	A	100-200-300-400	100-200-300-400
	- secondary	A	5	5
	Class		0.5sFS5	0.5sFS5
	For protection purposes			
	Rated output	VA	30	30

	Ratio			
	- primary	A	200-300-400-600	200-300-400-600
	- secondary	A	5	5
	Class		5P20	5P20
<b>7</b>	<b>ON-LOAD TAP CHANGER</b>			
	Manufacturer			Elprom Heavy Industries
	Type			RSV 9.3 III-400-123
	Rated through current	A	400	400
	Rated step capacity	kVA	1320	1400
	Lightning impulses level	kV	550	550
	Power frequency withstand test voltage	kV	230	230
	Short-time current			
	- 3s value	kA	6	6
	- peak value	kA	15	15
	Type of connection		Neutral	Yes
	Type of switching		Vacuum type diverter switch	Yes
	Contact life operation	Nos	600 000	Yes
	Auxiliary supply voltage (AC)	V	400/230	400/230 V, 50Hz
<b>8</b>	<b>PROTECTION AND MONITORING EQUIPMENT</b>			
	- Buchholz relay		EMB BF 80/10 (or equ.)	EMB BF 80/10
	- Oil flow operated protection relay		EMB URF 25/10 (or equ.)	EMB URF 25
	- Conservator gas detection relay		EMB CF-38 (or equ.)	EMB CF-38
	- Oil level indicator			Yes
	Type			LA22 + LB22
	Manufacturer			CEDASPE
	- Pressure relief device		resettable spring loaded	Yes
	Type			VP-150
	Manufacturer			CEDASPE
	- Dehydrating breather		Automatic, maintenance free	Yes
	Type			MTRAB
	Manufacturer			MESSKO

	- Oil temperature indicator			Yes
	Type			MT-ST160F
	Manufacturer			MESSKO
	- Winding temperature indicator			Yes
	Type			MT-STW160F2
	Manufacturer			MESSKO
<b>9</b>	<b>MASSES, MEASURES AND DRAWINGS</b>			
	Transformer masses:			
	- total mass	kg		~ 59 500
	- transportation mass	kg		~ 49 300
	- untanking mass	kg		~ 30 500
	- mass of insulating liquid	kg		~ 14 200
	Overall dimensions including bushings:			
	- height	mm		~ 5000
	- depth	mm		~ 3600
	- width	mm	max. 6250	~ 6150
	Gauge of the tank			
	- longitudinal	mm	1524	1524
	- transverse	mm	2000	2000
<b>10</b>	<b>RELIABILITY REQUIREMENTS</b>			
	Design of windings and/or magnetic core pressing system should not require any maintenance for the whole expected life term		Yes	Yes
	Manufacture has to have experience in short-circuit tests $\geq$ 110 kV rated voltage transformers (withstand short circuit) according to IEC standard in independent laboratories not earlier than 2010		Specify transformer type, present test report	Yes
	Life time	year	min.30	$\geq$ 30
<b>11</b>	<b>DELIVERY</b>			
	Incoterms		DAP	DAP
	Unloading on site		Yes	Yes



<b>12</b>	<b>DOCUMENTS TO BE PROVIDED BY BIDDER WITH OFFER</b>			
	Transformer data plate (photo or drawing)		provide	Transformer data plate of the similar transformer.pdf
	Passport or Test Certificate of the similar* transformer previously manufactured not earlier than 2010		provide	Test Certificate of the similar transformer.pdf
	Reference list of the similar transformers for the last 5 years with end users contacts		provide	provided
	Certificate for manufacture's test laboratory (ISO/IEC)		provide	provided
	Outline transformer drawing		provide	Outline drawing.pdf
	Oil test certificate		provide	Oil test certificate.zip
	Short-circuit test report		provide	Short-circuit test report for the manufactured transformer.pdf
	OLTC Type Test Report performed in independent and accredited European Laboratory according to IEC 60214-1:2014		provide	provided
	OLTC installation and operation manual		provide	provided
	Other documents required according to chapter 5 of the present document		provide	provided

\* Similar transformer is a three — winding transformer with same/similar rated power, HV and MV rated voltage, no-load and load losses, impedance voltage, sound pressure level.

Bidder's name: ETD TRANSFORMÁTOR a.s.

Signature and stamp/electronic signature of the bidder: Michael Amon (Managing Director)