

1. TECHNICAL DATA SHEET

Power transformer Ungheni 25 MVA, 115 ± 9x1.78 % /38.5±2x2.5%/11 kV				
No	Description	Unit	Data required	Data offered
1	GENERAL			
	Manufacturer			ASTOR
	- country			TURKEY
	- city			ANKARA
	Kind of installation		outdoor	outdoor
	Standards		IEC60076	IEC60076
			IEC60137	IEC60137
			IEC61463	IEC61463
			IEEE 693-2005	IEEE 693-2005
	Single or three-phase unit		Three-phase	Three-phase
	Type of core		3 limb, step-lap stacked core form	3 limb, step-lap stacked core form
	Type of tank		Upper flange tank	Upper flange tank
	Tank fully vacuum proof		Yes	Yes
	Number of windings		Three	Three
	Winding material (HV,MV,LV)		Coper	Copper
	Insulation oil			Nynas or equ.
	- manufacturer			Mineral
	- type			
	- specification of oil		IEC 60296	IEC 60296
	- insulation oil inhibited		Yes	Yes
	- test method for corrosive sulphur		IEC 62535 and ASTM D1275B	IEC 62535 and ASTM D1275B
2	RATINGS			
	Rated power at nominal voltage (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)			
- HV	kV	115	115(no-load)
- MV	kV	38.5	38.5(no-load)
- LV	kV	11	11(no-load)
Rated frequency	Hz	50	50
Permissible load at neutral point	%	solidly earthed/surge arrester	100/solidly earthed
Vector group symbol		YNyn0d11	YNyn0d11
Impedance voltage – HV/LV (25 MVA basis)			
- maximum tap position	%	Specify	15@75°C,133,4/11 kV
- nominal tap position	%	17.5	17.5@75°C,115/11 kV
- minimum tap position	%	Specify	19@75°C,96,5/11 kV
Impedance voltage – HV/MV (25 MVA basis)			
- maximum tap position	%	Specify	9,5@75°C,133,4/38,5kV
- nominal tap position	%	10.5	10.5@75°C,115/38,5kV
- minimum tap position	%	Specify	11,7@75°C,96,5/38,5kV
Impedance voltage – secondary/tertiary (25 MVA basis)	%	Min. 6.5 (±30%/-0%)	Min. 6.5 (±30%/-0%)
Magnetic flux density at			
-rated voltage and frequency	Tesla	Max. 1.7	Max. 1.7
No load losses (tolerance +0%)	kW	<15	<15
No load current (I ₀ /I _n)	%	0.1	0.1
Core losses (W17/50)	W/kg	Max. 0.9	Max. 0.9
Short circuit voltage			
- HV-LV	%	17.5	17.5@75°C,115/11 kV
- HV-MV	%	10.5	10.5@75°C,115/38,5 kV
- MV-LV	%	6.5	6.5@75°C,38,5/11 kV
Load losses at rated power			
HV/LV (25 MVA basis)			
- maximum tap position	kW	Specify	109@75°C,133,4/11 kV
- nominal tap position	kW	Specify	112@75°C,115/11 kV
- minimum tap position	kW	Specify	117@75°C,96,5/11 kV
HV/MV (25 MVA basis)			
- maximum tap position	kW	Specify	117@75°C,133,4/38,5kV
- nominal tap position	kW	Specify	120@75°C,115/38,5kV
- minimum tap position	kW	Specify	125@75°C,96,5/38,5kV



	MT/JT (25 MVA basis)	kW	Specify	94@75°C,38,5/11 kV
	HV winding (25 MVA basis)			
	- maximum tap position	kW	Specify	46@75°C
	- nominal tap position	kW	Specify	49@75°C
	- minimum tap position	kW	Specify	54@75°C
	LV winding (25 MVA basis)	kW	Specify	40@75°C
	MT winding (25 MVA basis)			
	- maximum tap position	kW	Specify	45@75°C
	- nominal tap position	kW	Specify	48@75°C
	- minimum tap position	kW	Specify	53@75°C
	Power consumption of cooling plant	kW	Specify	~2
	Efficiency referred to 75 °C at rated voltage taping and at:			
	- 100% rated output and 1.0 power factor	%	99.7	99.46
	- 75% rated output and 1.0 power factor	%	Specify	99.56
	- 50% rated output and 1.0 power factor	%	Specify	99.64
	- 25% rated output and 1.0 power factor	%	Specify	99.64
	- 100% rated output and 0.8 power factor	%	Specify	99.32
	- 75% rated output and 0.8 power factor	%	Specify	99.45
	- 50% rated output and 0.8 power factor	%	Specify	99.55
	- 25% rated output and 0.8 power factor	%	Specify	99.55
	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	Uniform
	- MV		Uniform	Uniform
	- LV		Uniform	Uniform
	Seismicity on MSK scale		IX	IX
3	INSULATION LEVEL			
	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	kV	34	34
	- Lightning impulse level	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
4	OPERATION DETAILS			
	Cooling method		ONAF	ONAF
	Noise level (LpA) at a measuring distance of 2.0 m (all forced cooling in operation)	dB(A)	Max. 60	Max. 60
5	BUSHINGS			
	HV (lines)			
	- manufacturer			Trench or equ.
	- type			OIP
	- 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	2835
	- cantilever load level according to IEC 60137	daN	Specify	Acc. Manufacturer Standards
	HV (neutral)			
	- manufacturer			Trench or equ.
	- type			OIP
	- rated current	A		800
	- power frequency test voltage	kV	105	105
	- lightning impulse level		250	250
	- minimum creepage distance in accordance with IEC 60815	mm	1050	1050
	- cantilever load level according to IEC 60137	daN	Specify	Acc. Manufacturer Standards
	LV			
	- manufacturer			Hitachi or equ.




	- type			DIN
	- rated current	A	2000	2000
	- power frequency test voltage	kV	42	42
	- lightning impulse level		110	110
	- minimum creepage distance in accordance with IEC 60815	mm	280	280
	- cantilever load level according to IEC 60137	daN	Specify	Acc. Manufacturer Standards
	MT (lines/neutral)			
	- manufacturer			Hitachi or equ.
	- type			DIN
	- rated current	A	630	630
	- power frequency test voltage	kV	105	105
	- lightning impulse level		250	250
	- minimum creepage distance in accordance with IEC 60815	mm	1050	1050
	- cantilever load level according to IEC 60137	dan	Specify	Acc. Manufacturer Standards
6	CURRENT TRANSFORMERS			
	115 kV line side			
	For protection purposes			
	Rated output	VA	30	30
	Ratio			
	- primary	A	150-300	150-300
	- secondary	A	5	5
	Class		5P20	5P20
	For protection purposes			
	Rated output	VA	30	30
	Ratio			
	- primary	A	150-300	150-300
	- secondary	A	5	5
	Class		5P20	5P20
	115 kV neutral side			
	For protection purposes			
	Rated output	VA	10	10
	Ratio			
	- primary	A	150-300	150-300



	- secondary	A	5	5
	Class		5P20	5P20
	38.5 kV line side			
	For protection purposes			
	Rated output	VA	30	30
	Ratio			
	- primary	A	600-800	600-800
	- secondary	A	5	5
	Class		5P20	5P20
	For protection purposes			
	Rated output	VA	30	30
	Ratio			
	- primary	A	600-800	600-800
	- secondary	A	5	5
	Class		5P20	5P20
7	ON-LOAD TAP CHANGER			
	Manufacturer			MR
	Type			Vacutap
	Rated through current	A	≥400	≥400
	Rated step capacity	kVA	≥2200	≥2200
	Lightning impulses level	kV	550	550
	Power frequency withstand test voltage	kV	230	230
	Rated step voltage per phase	kV	3200	3200
	Short-time current			
	- 3s value	kA	≥10	≥10
	- peak value	kA	≥25	≥25
	Type of connection		Neutral	Neutral
	Type of switching		Vacuum type diverter switch	Vacuum type diverter switch
	Contact life operation	Nos	Min. 500 000	Min. 500 000
	Number of switching operation till first revision	Nos	Min. 250 000	Min. 250 000
	Auxiliary supply voltage (AC)	V	400/230	400/230
8	PROTECTION AND MONITORING EQUIPMENT			
	- Buchholz relay		EMB BF 80/10 (or. equ.)	Comem BR80 (or. equ.)
	- Oil flow operated protection relay		EMB URF 25/10 (or. equ.)	RS2001 for OLTC (or. equ.)



	- Conservator gas detection relay		EMB CF-38 (or/ equ.)	Elmek BR25 (or/ equ.)
	- Oil level indicator			
	Type			KYSB
	Manufacturer			Hitachi
	- Pressure relief device		resettable spring loaded	resettable spring loaded
	Type			LPRD
	Manufacturer			Qualitrol
	- Dehydrating breather		Automatic, maintenance free	Automatic, maintenance free
	Type			ESDB
	Manufacturer			Comem
	- Oil temperature indicator			
	Type			OTI
	Manufacturer			Comem
	- Winding temperature indicator			
	Type			EWTI
	Manufacturer			Comem
9	MASSES, MEASURES AND DRAWINGS			
	Transformer masses:			
	- total mass	kg		~76500
	- transportation mass	kg		~69000(with oil and w/o coolers)
	- untanking mass	kg		~39000(active part)
	- mass of insulating liquid	kg		~19500
	Overall dimensions including bushings:			
	- height	mm		~6500
	- depth	mm		~7400
	- width	mm	max. 6250	~4000
	Gauge of the tank			
	- longitudinal	mm	1524	1524
	- transverse	mm	2000	2000
10	RELIABILITY REQUIREMENTS			
	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 ≥ 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	Specify transformer type, present test report
	Life time	year	Min. 30	Min. 30
11	DELIVERY			
	Incoterms		DAP	DAP
	Unloading on site		No	No
12	DOCUMENTS TO BE PROVIDED WITH THE OFFER			
	Transformer data plate (photo or drawing)		Provide	Yes
	Passport or Test Certificate of the similar* transformer previously manufactured not earlier than 2010		Provide	Yes
	Reference list of the similar transformers for the last 5 years with end users contacts		Provide	Yes
	Certificate for manufacture's test laboratory (ISO/IEC)		Provide	Yes
	Outline transformer drawing		Provide	Yes
	Oil test certificate		Provide	Yes
	Short-circuit test report		Provide	Yes
	OLTC Type Test Report performed in independent and accredited European Laboratory according to IEC 60214-I:2014,		Provide	Yes
	OLTC instalatuon and operation manual		Provide	Yes
	Other documents required according to chapter 5 of the present document		Provide	Yes

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

Bidder's name: _____

Signature and stamp/electronic signature of the bidder: _____

Note: All dimensions and weights are specified as approximately.

Note: Accessories can only be supplied with the manufacturers' standards.

Note: Transformer has been designed according to IEC 60076. Tolerances will be applied on guaranteed values according to IEC 60076.


