

TECHNICAL DATASHEET

Medium Voltage Transformer

for Medium Voltage Power Station MVPS-XXXX-S2-10/11



TYPE	Medium-voltage transformer for inverter application			
DESIGN	Three-phase-oil-transformer hermetic sealed			
FREQUENCY	[Hz]	50 / 60		
RATED POWER AT 40°C or 50°C – based on chosen temperature option	[kVA]	(Check Table 1)		
LOAD PROFILE	[hrs]	12 / 24		
RATED CURRENT AT LOW-VOLTAGE LEVEL AT 40°C or 50°C – based on chosen temperature option	[A]	(Check Table 1)		
RATED VOLTAGE		(Check Table 1)		
VECTOR GROUP		Dy11 – YNd11 – YNy0		
NO-LOAD LOSSES (AT RATED VOLTAGE)		(Check Table 3)		
SHORT CIRCUIT LOSSES (AT REF. TEMP. AND RATED POWER)		(Check Table 3)		
PEAK EFFICIENCY INDEX (PEI)		(Check Table 4)		
IMPEDANE VOLTAGE AT RATED CURRENT (AT REF. TEMP. AND RATED POWER)	[%]	6 to 8,5		
TYPE OF COOLING		KNAN		
TAP CHANGER		With / Without		
TAPPING HIGH-VOLTAGE LEVEL	[%]	±2 x 2,5%		
SHIELD WINDING		With / Without		
MAX. ALTITUDE ABOVE SEA LEVEL	[m]	4000		
AMBIENT TERMPERATURES (MIN. / MAX.) and corresponding station ambient temperature option	[°C]	-25 / 40 (for -25 / 45 option)	-40 / 40 (for -40 / 45 option)	-25 / 50 (for -25 / 55 option)
@ 1000 m	[°C]	40		50
@ 2000 m	[°C]	37,5		47,5

@ 3000 m	[°C]	35		45	
@ 4000 m	[°C]	32,5		42,5	
MAX. TEMPERATURE RISE (HOT SPOT / WINDING / FLUID)	[K]	110 / 95 / 90	110 / 95 / 90	100 / 85 / 80	100 / 85 / 80
SHORT-CIRCUIT DURATION	[s]	2			
INRUSH CURRENT (STANDARD / REDUCED / STRONG REDUCED)		≤ 8 / ≤ 5 / ≤ 4			
MANUFACTURE REGULATION		IEC 60076			
INSULATION		Semi hybrid insulation			
INSULATION LEVEL (HV / LV)		(Check Table 2)			
MAX. VOLTAGE FOR EQUIPMENT U _m		(Check Table 2)			
HIGH-VOLTAGE BUSHINGS		3 outside cone bushings 630 A (Type C)			
LOW-VOLTAGE BUSHINGS		3.6kV bushings for at least 4000 A			
MAX. DIMENSIONS (L x W x H)	[mm]	1606 x 2200 x 2250			
MAX. TOTAL WEIGHT (APPROX., STANDARD / REDUCED INRUSH CURRENT)	[kg]	8500 / 10500			
MAX. OIL WEIGHT	[kg]	1930			
OIL TYPE		Natural ester or synthetic ester for -35 °C / -40 °C option			
COATING ACC. TO ISO 12944-5		C3-H / C5-H SMA Suggested Harsh Option (C5-H)			
DEGREE OF PROTECTION ACC. TO IEC 60529		IP54			
TRANSFORMER PROTECTION		<ul style="list-style-type: none"> - Resistance thermometer PT100 for analogue oil temperature measurement - Hermetic protection device for monitoring of oil pressure, gas and oil level - Overpressure valve 			
ACCESSORIES		<ul style="list-style-type: none"> - Oil filling pipe - Oil sampling valve - Lifting lugs - Earthing terminals - Nameplate - Warning label plate 			

Table 1 Rated Power at 40°C or 50°C (according to chosen ambient temperature option) and at 35°C (SC inverter) or 25°C (SCS inverter), with its corresponding LV level

RATED POWER @40°C or 50°C based on chosen ambient temperature option	[kVA]	1710	2000	2250	2267	2380	2400	2493	2520	2607	2640	2670	2760
POWER @35°C	[kVA]	-	2200	2475	-	-	2667	-	2800	-	2933	-	3067
POWER @25°C	[kVA]	1900	-	-	2667	2800	-	2933	-	3067	-	2940	-
RATED CURRENT AT LV LEVEL @ 40°C (or 50°C)	[A]	2930	2999	2993	2181	2181	2309	2181	2309	2181	2309	2964	2309
RATED LOW VOLTAGE	[kV]	0,337	0,385	0,434	0,6	0,63	0,6	0,66	0,63	0,69	0,66	0,52	0,69
RATED HIGH VOLTAGE	[kV]	10 / 10,5 / 11 / 12 / 12,5 / 13,2 / 13,8 / 15 / 20 / 21 / 22 / 23 / 30 / 33 / 34,5 / 35											
RATED POWER @40°C or 50°C based on chosen ambient temperature option	[kVA]	2930	3075	3230	3365	3400	3570	3600	3740	3780	3910	3960	4140
POWER @35°C	[kVA]	-	-	-	-	-	-	4000	-	4200	-	4400	4600
POWER @25°C	[kVA]	3450	3620	3800	3960	4000	4200	-	4400	-	4600	-	-
RATED CURRENT AT LV LEVEL @ 40°C or 50°C	[A]	2820	2820	2820	2820	3273	3273	3464	3273	3464	3272	3464	3464
RATED LOW VOLTAGE	[kV]	0,6	0,63	0,66	0,69	0,6	0,63	0,6	0,66	0,63	0,69	0,66	0,69
RATED HIGH VOLTAGE	[kV]	10 / 10,5 / 11 / 12 / 12,5 / 13,2 / 13,8 / 15 / 20 / 21 / 22 / 23 / 30 / 33 / 34,5 / 35											

Table 2 Basic insulation level (BIL) and AC withstand voltage for the different rated voltages (HV-side)

RATED VOLTAGE	MAX. VOLTAGE (Um)	INSULATION LEVEL (Dy11)	INSULATION LEVEL (YNd11) and (YNy0)
10 kV	12 kV	LI 75 AC 28 / LI - AC 10	LI 75 AC 28 / LI - AC 10
10,5 kV	12 kV	LI 75 AC 28 / LI - AC 10	LI 75 AC 28 / LI - AC 10
11 kV	12 kV	LI 75 AC 28 / LI - AC 10	LI 75 AC 28 / LI - AC 10
12 kV	17.5 kV	LI 95 AC 38 / LI - AC 10	LI 95 AC 38 / LI - AC 10
12,5 kV	17.5 kV	LI 95 AC 38 / LI - AC 10	LI 95 AC 38 / LI - AC 10
13,2 kV	17.5 kV	LI 95 AC 38 / LI - AC 10	LI 95 AC 38 / LI - AC 10
13,8 kV	17.5 kV	LI 95 AC 38 / LI - AC 10	LI 95 AC 38 / LI - AC 10

15 kV	17.5 kV	LI 95 AC 38 / LI - AC 10	LI 95 AC 38 / LI - AC 10
20 kV	24 kV	LI 125 AC 50 / LI - AC 10	LI 125 AC 50 / LI - AC 10
21 kV	24 kV	LI 125 AC 50 / LI - AC 10	LI 125 AC 50 / LI - AC 10
22 kV	24 kV	LI 125 AC 50 / LI - AC 10	LI 125 AC 50 / LI - AC 10
23 kV	26 kV	LI 150 AC 50 / LI - AC 10	LI 150 AC 50 / LI - AC 10
30 kV	36 kV	LI 170 AC 70 / LI - AC 10	LI 170 AC 70 / LI - AC 10
33 kV	36 kV	LI 170 AC 70 / LI - AC 10	LI 170 AC 70 / LI - AC 10
34.5 kV	40.5 kV	LI 200 AC 80 / LI - AC 10	LI 200 AC 80 / LI - AC 10
35 kV	40.5 kV	LI 200 AC 80 / LI - AC 10	LI 200 AC 80 / LI - AC 10

Table 3 Load Losses (LL) and No-Load Losses (NLL) for different power classes (TBD values must be requested for each configuration)

POWER CLASS	STANDARD				ECO DESIGN – TIER 1 *				ECO DESIGN – TIER 2 *			
	Um ≤ 26 kV		Um > 26 kV		Um ≤ 26 kV		Um > 26 kV		Um ≤ 26 kV		Um > 26 kV	
	NLL	LL	NLL	LL	NLL	LL	NLL	LL	NLL	LL	NLL	LL
1900 kVA / 337 V	2680	28300	2680	28300	1269	15100	1459	16610	1142	12825	1313	14108
2000 kVA / 385 V	2800	30800	2800	30800	1450	18000	1668	19800	1305	15000	1501	16500
2250 kVA / 434 V	3000	33000	3000	33000	1600	20000	1840	22000	1440	16750	1656	18425
2267 kVA / 600 V	3011	33125	3011	33125	1610	20136	1852	22150	1449	16869	1667	18556
2380 kVA / 630 V	3087	33953	3087	33953	1678	21040	1930	23144	1510	17660	1737	19426
2400 kVA / 600 V	3100	34100	3100	34100	1690	21200	1944	23320	1521	17800	1749	19580
2493 kVA / 660 V	3200	35200	3200	35200	1746	21944	2008	24138	1571	18451	1807	20296
2520 kVA / 630 V	3200	35200	3200	35200	1764	22169	2028	24386	1587	18638	1826	20502
2607 kVA / 690 V	3273	35998	3273	35998	1824	22905	2098	25196	1642	19241	1888	21165
2640 kVA / 660 V	3300	36300	3300	36300	1847	23185	2124	25503	1662	19469	1912	21416
2670 kVA / 520 V	3300	36300	3300	36300	1868	23438	2148	25782	1681	19677	1933	21645
2760 kVA / 690 V	3400	37400	3400	37400	1930	24200	2220	26620	1737	20300	1998	22330

2930 kVA / 600 V	3521	37926	3521	37926	2048	25638	2355	28202	1843	21477	2119	23625
3075 kVA / 630 V	3625	38375	3625	38375	2148	26865	2470	29552	1933	22481	2223	24729
3230 kVA / 660 V	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
3365 kVA / 690 V	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
3400 kVA / 600 V	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
3570 kVA / 630 V	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
3600 kVA / 600 V	4000	40000	4000	40000	3600	36000	3600	36000	3600	36000	3600	36000
3740 kVA / 660 V	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
3780 kVA / 630 V	4200	41000	4200	41000	3780	36900	3780	36900	3780	36900	3780	36900
3910 kVA / 690 V	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
3960 kVA / 660 V	4400	42000	4400	42000	3960	37800	3960	37800	3960	37800	3960	37800
4140 kVA / 690 V	4600	43000	4600	43000	4140	38700	4140	38700	4140	38700	4140	38700

*According to eco design regulation (EU) 2019/1783 and EN 50588-1

Note: For transformer power classes > 3150 kVA the PEI must be adhered (see **Table 4**) and P₀ and P_k are only guide values.

Table 4 Peak Efficiency Index PEI as per eco design regulation (EU) 2019/1783 and EN 50588-1 (TBD values must be requested for each configuration)

POWER CLASS	STANDARD		ECO DESIGN – TIER 1 *		ECO DESIGN – TIER 2 *	
	Ur ≤ 24 kV	Ur ≤ 36 kV	Ur ≤ 24 kV	Ur ≤ 36 kV	Ur ≤ 24 kV	Ur ≤ 36 kV
1900 kVA / 337 V	98,981	98,981	99,488	99,424	99,552	99,497
2000 kVA / 385 V	99,071	99,071	99,489	99,425	99,558	99,502
2250 kVA / 434 V	99,116	99,116	99,497	99,434	99,563	99,509
2267 kVA / 600 V	99,119	99,119	99,498	99,435	99,564	99,509
2380 kVA / 630 V	99,140	99,140	99,501	99,438	99,566	99,512
2400 kVA / 600 V	99,143	99,141	99,501	99,439	99,566	99,512
2493 kVA / 660 V	99,149	99,149	99,503	99,442	99,568	99,514
2520 kVA / 630 V	99,158	99,158	99,504	99,442	99,568	99,514

2607 kVA / 690 V	99,167	99,167	99,504	99,442	99,569	99,515
2640 kVA / 660 V	99,171	99,171	99,504	99,442	99,569	99,515
2670 kVA / 520 V	99,180	99,180	99,504	99,443	99,569	99,515
2760 kVA / 690 V	99,183	99,183	99,505	99,443	99,570	99,516
2930 kVA / 600 V	99,211	99,211	99,505	99,444	99,571	99,517
3075 kVA / 630 V	99,233	99,233	99,506	99,444	99,571	99,518
3230 kVA / 660 V	TBD	TBD	99,446	99,446	99,519	99,519
3365 kVA / 690 V	TBD	TBD	99,449	99,449	99,522	99,522
3400 kVA / 600 V	TBD	TBD	99,450	99,450	99,522	99,522
3570 kVA / 630 V	TBD	TBD	99,454	99,454	99,525	99,525
3600 kVA / 600 V	99,297	99,297	99,455	99,455	99,525	99,525
3740 kVA / 660 V	TBD	TBD	99,459	99,459	99,528	99,528
3780 kVA / 630 V	99,306	99,306	99,460	99,460	99,528	99,528
3910 kVA / 690 V	TBD	TBD	99,463	99,463	99,531	99,531
3960 kVA / 660 V	99,313	99,313	99,464	99,464	99,531	99,531
4140 kVA / 690 V	99,321	99,321	99,468	99,468	99,534	99,534

*According to eco design regulation (EU) 2019/1783 and EN 50588-1

Note: For transformer power classes ≤ 3150 kVA P₀ and P_k must be adhered (see **Table 3**). PEI values are not required to be reported.