

ANEXA nr. 7

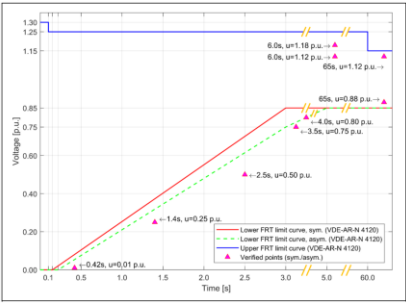
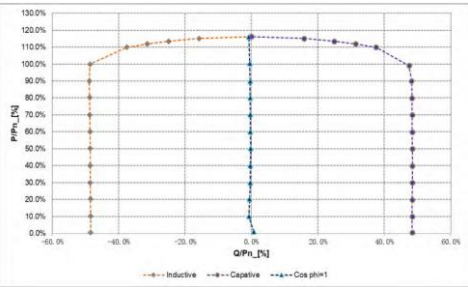
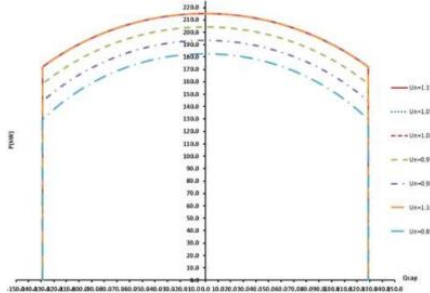
Date tehnice ale centralelor formate din module generatoare, de categorie D

1. Gestionarul centralei formate din module generatoare are obligația de a transmite ORR relevant datele tehnice prevăzute în tabelul 1D-centrale, în conformitate cu prevederile prezentei norme tehnice.
2. În cadrul procedurii de notificare pentru racordare a centralelor formate din module generatoare și de verificare a conformității acestora cu cerințele tehnice privind racordarea la rețelele electrice de interes public ORR poate solicita date suplimentare pentru fiecare etapă a procesului de notificare și de verificare a conformității.
3. Datele standard de planificare (S), comunicate prin cererea de racordare și utilizate în studiile de soluție, reprezintă totalitatea datelor tehnice generale care caracterizează centrala formată din module generatoare, de categorie D.
4. Datele detaliate pentru planificare (D), sunt date tehnice care permit analize speciale de stabilitate statică și tranzitorie, dimensionarea instalațiilor de automatizare și reglajul protecțiilor, precum și alte date necesare în programare operativă; datele detaliate pentru planificare (D) se transmit ORR cu minimum 6 luni înainte de PIF.
5. Datele, validate și completate la punerea sub tensiune a instalației pentru începerea perioadei de probe, sunt confirmate în procesul de verificare a conformității cu cerințele tehnice privind racordarea la rețelele electrice de interes public (R).

CENTRALA ELECTRICA FOTOVOLTAICA SALCEA IPOTESTI – 16,6 MW

Tabelul 1D-centrale cu module generatoare de categorie D

Descrierea datelor	Unitatea de măsură	Categoria datelor
Punctul de racordare/delimitare, după caz	Text, schemă	LEA 110 kV Suceava - Veresti
Condițiile standard de mediu pentru care au fost determinate datele tehnice	Text	D, R
Tensiunea nominală în punctul de racordare/delimitare, după caz	kV	110 kV
Valoarea curentului maxim de scurtcircuit în punctul de racordare/delimitare, după caz, furnizat de centrală la un defect:		
- Simetric (trifazat)	kA	D,R
- Nesimetric (bifazat, bifazat cu pământul, monofazat)	kA	D, R
Valoarea curentului minim de scurtcircuit în punctul de racordare/delimitare, după caz, furnizat de centrală la un defect:		
- Simetric (trifazat)	kA	D, R
- Nesimetric (bifazat, bifazat cu pământul, monofazat)	kA	D, R
Date în punctul de conectare/delimitare, după caz		
Putere netă	MW	16,6

Puterea activă nominală produsă	MW	16,6
Puterea activă maximă produsă	MW	16,6
Tensiunea nominală	kV	110
Frecvența maximă/minimă de funcționare la parametrii nominali	Hz	52 ÷ 47,5
Puterea reactivă în regim inductiv maximă	MVar	+ 10,7
Puterea reactivă în regim capacitiv maximă	MVar	- 10,7
Capabilitatea de trecere peste defect LVRT	Diagr.	
Funcțiile de protecție	Text	D
Diagrame		
Diagrama de capabilitate P-Q	Date grafice	
Diagrama P-Q în funcție de U în punctul de racordare/delimitare	Date grafice	
Diagrama de variație a datelor tehnice în funcție de abaterile față de condițiile standard de mediu		R
Răspunsul la scăderea de frecvență	Diagramă	R
Răspunsul la creșterea de frecvență	Diagramă	R
Domeniul de setare al statismului	%	R

Valoarea statistului s_1	%	R
Banda moartă de frecvență	mHz	R
Timpul de întârziere (timpul mort t_1)	s	R
Timpul de răspuns (t_2)	s	R
Zona de insensibilitate	mHz	R
Capabilitatea de insularizare	Da/NU	DA (cu funcții antiinsularizare inactive)
Detalii asupra reglajului de viteză prezentat în schema bloc referitoare la funcțiile de transfer asociate elementelor individuale și unitățile de măsură	Schemă	R
Funcția de transfer echivalentă, eventual standardizată a reglajului de tensiune, valori și unități de măsură	Text	S
Date generale modul generator care intră în componența centralei:		
Puterea nominală aparentă	MVA	0.215
Factor de putere nominal ($\cos \varphi_n$)	-	0,8ind. ÷ 0,8cap.
Putere netă	MW	0.2
Puterea activă nominală produsă la borne	MW	0.2
Puterea activă maximă produsă la borne	MW	0.215
Tensiunea nominală	kV	0.8
Frecvența maximă/minimă de funcționare la parametri nominali	Hz	52,0/47,5
Puterea reactivă în regim inductiv maximă la borne	MVAr	0.129
Putere reactivă în regim capacitiv maximă la borne	MVAr	0.129
Capabilitatea de trecere peste defect LVRT	Diagramă	
Funcțiile de protecție interne conținute	Text	D

Date pentru module generatoare de tip eolian racordate prin electronică de putere/asincron de tip eolian, care intră în componența unei centrale		
Tipul unității eoliene (cu ax orizontal/vertical)	Descriere	S, R
Diametrul rotorului	m	S, R
Înălțimea axului rotorului	m	S, R
Sistemul de comandă a palelor (pitch/stall)	Text	S, R
Sistemul de comandă a vitezei (fix/cu două viteze/variabil)	Text	S,R
Tipul de generator	Descriere	S, R
CertIFICATE de tip pentru invertoare însoțite de rezultatele testelor efectuate de laboratoare recunoscute pe plan european pentru: variații de	certIFICATE	D
Tipul de convertor de frecvență și parametri nominali	MW	S, R
Viteza de variație a puterii active	MW/min	S
Puterea reactivă	kVAr	S,
Curentul nominal	A	S, R
Tensiunea nominală	V	S, R
Viteza vântului de pornire	m/s	S, R
Viteza vântului (corespunzătoare puterii nominale)	m/s	S, R
Viteza vântului de deconectare	m/s	S, R
Variația puterii generate cu viteza vântului	Tabel	S, R
Diagrama P-Q	Date	S, R

Parametrii de calitate ai energiei electrice pentru fiecare modul generator care intră în componența centralei

Coeficient de flicker la funcționare continuă		Max. 1,79
Factorul treaptă de flicker pentru operații de		Max. 0,47
Factor de variație a tensiunii		Pornire 100%Pn – max. 1,03; Oprire la 100%Pn- max. 1,04
Număr maxim de operații de comutare la interval de		20
Număr maxim de operații de comutare la interval de 2 ore		240
Factor total de distorsiune de curent THD _i		<1%

Armonice (până la armonica 50)

Harmonics													
Order	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	
1	3.021	8.991	20.285	29.963	39.963	50.000	60.000	69.874	79.363	88.768	98.612	108.74	118.76
2	0.170	0.188	0.179	0.183	0.202	0.212	0.217	0.230	0.261	0.289	0.283	0.260	0.239
3	0.119	0.100	0.110	0.107	0.102	0.104	0.105	0.105	0.104	0.104	0.102	0.102	0.102
4	0.061	0.061	0.064	0.074	0.078	0.082	0.075	0.084	0.084	0.089	0.088	0.102	0.102
5	0.364	0.390	0.388	0.390	0.399	0.399	0.398	0.398	0.398	0.398	0.398	0.398	0.398
6	0.082	0.078	0.087	0.085	0.089	0.087	0.084	0.084	0.082	0.081	0.080	0.081	0.081
7	0.129	0.102	0.138	0.080	0.078	0.086	0.163	0.204	0.207	0.204	0.217	0.185	0.217
8	0.014	0.034	0.049	0.034	0.045	0.059	0.064	0.071	0.074	0.075	0.074	0.100	0.100
9	0.026	0.034	0.019	0.026	0.034	0.028	0.026	0.035	0.041	0.038	0.041	0.077	0.077
10	0.029	0.038	0.021	0.015	0.021	0.034	0.043	0.040	0.049	0.065	0.069	0.063	0.069
11	0.115	0.130	0.070	0.093	0.082	0.082	0.067	0.060	0.047	0.052	0.118	0.135	0.135
12	0.032	0.022	0.030	0.041	0.031	0.037	0.042	0.027	0.039	0.047	0.041	0.045	0.047
13	0.045	0.068	0.087	0.017	0.022	0.056	0.084	0.086	0.082	0.103	0.109	0.206	0.206
14	0.021	0.021	0.031	0.014	0.020	0.025	0.029	0.025	0.026	0.029	0.036	0.058	0.058
15	0.012	0.021	0.013	0.009	0.015	0.021	0.027	0.028	0.025	0.026	0.034	0.032	0.034
16	0.016	0.013	0.023	0.020	0.016	0.014	0.019	0.019	0.031	0.034	0.034	0.033	0.034
17	0.061	0.035	0.059	0.033	0.030	0.036	0.039	0.039	0.036	0.039	0.055	0.046	0.061
18	0.008	0.012	0.010	0.010	0.020	0.021	0.020	0.011	0.016	0.017	0.014	0.023	0.023
19	0.017	0.033	0.020	0.033	0.017	0.020	0.039	0.041	0.048	0.058	0.054	0.094	0.094
20	0.005	0.008	0.008	0.010	0.007	0.010	0.011	0.012	0.014	0.014	0.020	0.029	0.029
21	0.006	0.005	0.005	0.010	0.008	0.009	0.012	0.011	0.010	0.012	0.015	0.018	0.018
22	0.003	0.002	0.007	0.007	0.009	0.009	0.010	0.014	0.014	0.013	0.014	0.015	0.015
23	0.028	0.030	0.007	0.023	0.012	0.011	0.013	0.013	0.014	0.016	0.019	0.022	0.026
24	0.003	0.003	0.005	0.004	0.006	0.009	0.005	0.005	0.004	0.004	0.004	0.007	0.009
25	0.015	0.006	0.009	0.014	0.015	0.010	0.016	0.019	0.022	0.025	0.026	0.037	0.037
26	0.003	0.002	0.003	0.003	0.005	0.005	0.005	0.007	0.006	0.006	0.007	0.010	0.010
27	0.003	0.003	0.003	0.003	0.006	0.004	0.004	0.005	0.005	0.006	0.008	0.003	0.008
28	0.001	0.001	0.002	0.002	0.004	0.004	0.004	0.006	0.006	0.005	0.005	0.006	0.006
29	0.004	0.006	0.008	0.003	0.009	0.005	0.005	0.006	0.007	0.008	0.009	0.009	0.009
30	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.002	0.003
31	0.007	0.007	0.005	0.005	0.009	0.007	0.008	0.010	0.011	0.012	0.013	0.017	0.017
32	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.003	0.003
33	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.003	0.003	0.003	0.002	0.003
34	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.003
35	0.002	0.002	0.002	0.003	0.004	0.003	0.002	0.003	0.004	0.004	0.005	0.005	0.005
36	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.001	0.002
37	0.002	0.004	0.003	0.004	0.004	0.004	0.004	0.006	0.006	0.006	0.007	0.009	0.009
38	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002
39	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002
40	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
41	0.001	0.002	0.002	0.001	0.001	0.002	0.002	0.002	0.003	0.003	0.003	0.004	0.004
42	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
43	0.001	0.001	0.001	0.002	0.002	0.003	0.002	0.003	0.003	0.004	0.004	0.006	0.006
44	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
45	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002
46	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
47	0.001	0.002	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.003
48	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
49	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.004	0.004
50	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001

Factor de nesimetrie de secvență negativă

2 (preset) setabil între 0-10

Date pentru module generatoare de tip fotovoltaic

Numărul de panouri fotovoltaice care constituie centrala	Număr	34970
Firma producătoare a panourilor fotovoltaice	Denumire	RACOM
Tipul panourilor fotovoltaice	Descriere	RMC – 570 – 7DBNF
Aria suprafeței panoului fotovoltaic	m ²	3.106
Puterea nominală a panoului fotovoltaic (c.c.)	kW	0.57
Puterea maximă a panoului fotovoltaic (c.c.)	kW	0.57
Curentul electric nominal a panoului fotovoltaic (c.c.)	A	17.32
Tensiunea nominală a panoului fotovoltaic (c.c.)	V	38.7

Date pentru invertoarele utilizate de centrala formată din module generatoare, de tip fotovoltaic

Numărul de invertoare	Număr	83
Tipul invertorului	Descriere	SUN2000 -215KTL-H0
Certificate de tip pentru invertoare însoțite de rezultatele testelor efectuate de laboratoare recunoscute pe plan european pentru: variații de frecvență, tensiune și trecere peste defect	certificate	Anexate
Puterea nominală de intrare (c.c.)	kWp	219.4
Puterea maximă de intrare recomandată (c.c.)	kWp	215
Domeniul de tensiune de intrare (c.c.)	V	500÷1500
Tensiunea maximă de intrare (c.c.)	V	1500
Curentul maxim de intrare (c.c.) / MPPT	A	30
Puterea activă nominală de ieșire (c.a.)	kW	200
Puterea activă maximă de ieșire (c.a.)	kW	215
Puterea reactivă nominală de ieșire (c.a.)	kVAr	±129

Tensiunea nominală de ieșire (c.a.)	V, kV	800 V																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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Armonice de curent electric (până la armonica 50)	<table border="1"> <thead> <tr> <th colspan="8">SUN2000-21SKTL-H0 50Hz</th> </tr> <tr> <td colspan="4">Watts</td> <td colspan="4">67695/67573/67398</td> </tr> <tr> <td colspan="4">VA</td> <td colspan="4">67707/67588/67401</td> </tr> <tr> <td colspan="4">Vrms</td> <td colspan="4">800.53/800.50/803.51</td> </tr> <tr> <td colspan="4">Arms</td> <td colspan="4">145.783/146.053/145.985</td> </tr> <tr> <td colspan="4">PF</td> <td colspan="4">0.999</td> </tr> <tr> <td colspan="4">Frequency</td> <td colspan="4">50.00</td> </tr> <tr> <td colspan="4">THD50 (%)</td> <td colspan="4">0.831/0.652/0.631</td> </tr> <tr> <th rowspan="2">Harmonics</th> <th colspan="3">Current Magnitude [A]</th> <th colspan="3">% of Fundamental</th> <th rowspan="2">Phase</th> <th rowspan="2">Harmonic Current Limits [%]</th> </tr> <tr> <th>L1</th> <th>L2</th> <th>L3</th> <th>L1</th> <th>L2</th> <th>L3</th> </tr> </thead> <tbody> <tr><td>1st</td><td>145.641</td><td>145.679</td><td>145.519</td><td>100.859</td><td>100.896</td><td>100.775</td><td>Three Phase</td><td>--</td></tr> <tr><td>2nd</td><td>0.240</td><td>0.117</td><td>0.286</td><td>0.165</td><td>0.081</td><td>0.196</td><td>Three Phase</td><td>1</td></tr> <tr><td>3rd</td><td>0.625</td><td>0.337</td><td>0.290</td><td>0.429</td><td>0.231</td><td>0.199</td><td>Three Phase</td><td>4</td></tr> <tr><td>4th</td><td>0.107</td><td>0.205</td><td>0.101</td><td>0.074</td><td>0.141</td><td>0.069</td><td>Three Phase</td><td>1</td></tr> <tr><td>5th</td><td>0.408</td><td>0.272</td><td>0.322</td><td>0.280</td><td>0.187</td><td>0.221</td><td>Three Phase</td><td>4</td></tr> <tr><td>6th</td><td>0.083</td><td>0.065</td><td>0.057</td><td>0.057</td><td>0.044</td><td>0.039</td><td>Three Phase</td><td>1</td></tr> <tr><td>7th</td><td>0.140</td><td>0.114</td><td>0.111</td><td>0.096</td><td>0.078</td><td>0.076</td><td>Three Phase</td><td>4</td></tr> <tr><td>8th</td><td>0.038</td><td>0.037</td><td>0.061</td><td>0.026</td><td>0.026</td><td>0.042</td><td>Three Phase</td><td>1</td></tr> <tr><td>9th</td><td>0.105</td><td>0.034</td><td>0.080</td><td>0.072</td><td>0.023</td><td>0.055</td><td>Three Phase</td><td>4</td></tr> <tr><td>10th</td><td>0.057</td><td>0.061</td><td>0.078</td><td>0.039</td><td>0.042</td><td>0.054</td><td>Three Phase</td><td>0.5</td></tr> <tr><td>11th</td><td>0.266</td><td>0.157</td><td>0.188</td><td>0.183</td><td>0.106</td><td>0.125</td><td>Three Phase</td><td>2</td></tr> <tr><td>12th</td><td>0.075</td><td>0.052</td><td>0.047</td><td>0.052</td><td>0.036</td><td>0.032</td><td>Three Phase</td><td>0.5</td></tr> <tr><td>13th</td><td>0.297</td><td>0.266</td><td>0.312</td><td>0.204</td><td>0.183</td><td>0.214</td><td>Three Phase</td><td>2</td></tr> <tr><td>14th</td><td>0.050</td><td>0.039</td><td>0.068</td><td>0.034</td><td>0.027</td><td>0.047</td><td>Three Phase</td><td>0.5</td></tr> <tr><td>15th</td><td>0.054</td><td>0.098</td><td>0.089</td><td>0.037</td><td>0.067</td><td>0.061</td><td>Three Phase</td><td>2</td></tr> <tr><td>16th</td><td>0.055</td><td>0.072</td><td>0.081</td><td>0.038</td><td>0.050</td><td>0.056</td><td>Three Phase</td><td>0.5</td></tr> <tr><td>17th</td><td>0.270</td><td>0.190</td><td>0.205</td><td>0.186</td><td>0.130</td><td>0.141</td><td>Three Phase</td><td>1.5</td></tr> <tr><td>18th</td><td>0.103</td><td>0.058</td><td>0.057</td><td>0.071</td><td>0.040</td><td>0.039</td><td>Three Phase</td><td>0.5</td></tr> <tr><td>19th</td><td>0.320</td><td>0.287</td><td>0.233</td><td>0.220</td><td>0.197</td><td>0.160</td><td>Three Phase</td><td>1.5</td></tr> <tr><td>20th</td><td>0.037</td><td>0.072</td><td>0.096</td><td>0.025</td><td>0.050</td><td>0.067</td><td>Three Phase</td><td>0.5</td></tr> <tr><td>21th</td><td>0.105</td><td>0.126</td><td>0.054</td><td>0.072</td><td>0.086</td><td>0.037</td><td>Three Phase</td><td>1.5</td></tr> <tr><td>22th</td><td>0.032</td><td>0.090</td><td>0.090</td><td>0.022</td><td>0.061</td><td>0.062</td><td>Three Phase</td><td>0.5</td></tr> <tr><td>23th</td><td>0.211</td><td>0.166</td><td>0.175</td><td>0.145</td><td>0.114</td><td>0.120</td><td>Three Phase</td><td>0.6</td></tr> <tr><td>24th</td><td>0.096</td><td>0.059</td><td>0.055</td><td>0.066</td><td>0.041</td><td>0.038</td><td>Three Phase</td><td>0.5</td></tr> <tr><td>25th</td><td>0.320</td><td>0.273</td><td>0.219</td><td>0.220</td><td>0.187</td><td>0.150</td><td>Three Phase</td><td>0.6</td></tr> <tr><td>26th</td><td>0.055</td><td>0.039</td><td>0.083</td><td>0.038</td><td>0.027</td><td>0.057</td><td>Three Phase</td><td>0.5</td></tr> <tr><td>27th</td><td>0.080</td><td>0.125</td><td>0.055</td><td>0.055</td><td>0.086</td><td>0.037</td><td>Three Phase</td><td>0.6</td></tr> <tr><td>28th</td><td>0.026</td><td>0.086</td><td>0.084</td><td>0.018</td><td>0.059</td><td>0.058</td><td>Three Phase</td><td>0.5</td></tr> <tr><td>29th</td><td>0.177</td><td>0.125</td><td>0.159</td><td>0.121</td><td>0.086</td><td>0.109</td><td>Three Phase</td><td>0.6</td></tr> <tr><td>30th</td><td>0.090</td><td>0.037</td><td>0.047</td><td>0.041</td><td>0.029</td><td>0.032</td><td>Three Phase</td><td>0.5</td></tr> <tr><td>31th</td><td>0.259</td><td>0.242</td><td>0.151</td><td>0.178</td><td>0.166</td><td>0.104</td><td>Three Phase</td><td>0.6</td></tr> <tr><td>32th</td><td>0.053</td><td>0.020</td><td>0.050</td><td>0.036</td><td>0.013</td><td>0.035</td><td>Three Phase</td><td>0.5</td></tr> <tr><td>33th</td><td>0.077</td><td>0.080</td><td>0.053</td><td>0.053</td><td>0.055</td><td>0.036</td><td>Three Phase</td><td>0.6</td></tr> <tr><td>34th</td><td>0.021</td><td>0.056</td><td>0.064</td><td>0.015</td><td>0.038</td><td>0.044</td><td>Three Phase</td><td>--</td></tr> <tr><td>35th</td><td>0.127</td><td>0.110</td><td>0.136</td><td>0.087</td><td>0.076</td><td>0.094</td><td>Three Phase</td><td>--</td></tr> <tr><td>36th</td><td>0.027</td><td>0.030</td><td>0.040</td><td>0.019</td><td>0.021</td><td>0.028</td><td>Three Phase</td><td>--</td></tr> <tr><td>37th</td><td>0.206</td><td>0.208</td><td>0.127</td><td>0.141</td><td>0.143</td><td>0.087</td><td>Three Phase</td><td>--</td></tr> <tr><td>38th</td><td>0.043</td><td>0.016</td><td>0.035</td><td>0.030</td><td>0.011</td><td>0.024</td><td>Three Phase</td><td>--</td></tr> <tr><td>39th</td><td>0.049</td><td>0.051</td><td>0.051</td><td>0.034</td><td>0.042</td><td>0.035</td><td>Three Phase</td><td>--</td></tr> <tr><td>40th</td><td>0.020</td><td>0.036</td><td>0.042</td><td>0.014</td><td>0.025</td><td>0.029</td><td>Three Phase</td><td>--</td></tr> <tr><td>41th</td><td>0.114</td><td>0.105</td><td>0.123</td><td>0.078</td><td>0.072</td><td>0.084</td><td>Three Phase</td><td>--</td></tr> <tr><td>42th</td><td>0.013</td><td>0.033</td><td>0.033</td><td>0.009</td><td>0.023</td><td>0.023</td><td>Three Phase</td><td>--</td></tr> <tr><td>43th</td><td>0.174</td><td>0.188</td><td>0.111</td><td>0.120</td><td>0.129</td><td>0.076</td><td>Three Phase</td><td>--</td></tr> <tr><td>44th</td><td>0.033</td><td>0.022</td><td>0.021</td><td>0.023</td><td>0.015</td><td>0.015</td><td>Three Phase</td><td>--</td></tr> <tr><td>45th</td><td>0.044</td><td>0.054</td><td>0.060</td><td>0.031</td><td>0.037</td><td>0.041</td><td>Three Phase</td><td>--</td></tr> <tr><td>46th</td><td>0.025</td><td>0.027</td><td>0.029</td><td>0.017</td><td>0.019</td><td>0.020</td><td>Three Phase</td><td>--</td></tr> <tr><td>47th</td><td>0.116</td><td>0.102</td><td>0.111</td><td>0.079</td><td>0.070</td><td>0.076</td><td>Three Phase</td><td>--</td></tr> <tr><td>48th</td><td>0.009</td><td>0.034</td><td>0.028</td><td>0.006</td><td>0.023</td><td>0.020</td><td>Three Phase</td><td>--</td></tr> <tr><td>49th</td><td>0.152</td><td>0.169</td><td>0.110</td><td>0.104</td><td>0.116</td><td>0.078</td><td>Three Phase</td><td>--</td></tr> <tr><td>50th</td><td>0.029</td><td>0.026</td><td>0.018</td><td>0.020</td><td>0.018</td><td>0.012</td><td>Three Phase</td><td>--</td></tr> </tbody> </table>		SUN2000-21SKTL-H0 50Hz								Watts				67695/67573/67398				VA				67707/67588/67401				Vrms				800.53/800.50/803.51				Arms				145.783/146.053/145.985				PF				0.999				Frequency				50.00				THD50 (%)				0.831/0.652/0.631				Harmonics	Current Magnitude [A]			% of Fundamental			Phase	Harmonic Current Limits [%]	L1	L2	L3	L1	L2	L3	1st	145.641	145.679	145.519	100.859	100.896	100.775	Three Phase	--	2nd	0.240	0.117	0.286	0.165	0.081	0.196	Three Phase	1	3rd	0.625	0.337	0.290	0.429	0.231	0.199	Three Phase	4	4th	0.107	0.205	0.101	0.074	0.141	0.069	Three Phase	1	5th	0.408	0.272	0.322	0.280	0.187	0.221	Three Phase	4	6th	0.083	0.065	0.057	0.057	0.044	0.039	Three Phase	1	7th	0.140	0.114	0.111	0.096	0.078	0.076	Three Phase	4	8th	0.038	0.037	0.061	0.026	0.026	0.042	Three Phase	1	9th	0.105	0.034	0.080	0.072	0.023	0.055	Three Phase	4	10th	0.057	0.061	0.078	0.039	0.042	0.054	Three Phase	0.5	11th	0.266	0.157	0.188	0.183	0.106	0.125	Three Phase	2	12th	0.075	0.052	0.047	0.052	0.036	0.032	Three Phase	0.5	13th	0.297	0.266	0.312	0.204	0.183	0.214	Three Phase	2	14th	0.050	0.039	0.068	0.034	0.027	0.047	Three Phase	0.5	15th	0.054	0.098	0.089	0.037	0.067	0.061	Three Phase	2	16th	0.055	0.072	0.081	0.038	0.050	0.056	Three Phase	0.5	17th	0.270	0.190	0.205	0.186	0.130	0.141	Three Phase	1.5	18th	0.103	0.058	0.057	0.071	0.040	0.039	Three Phase	0.5	19th	0.320	0.287	0.233	0.220	0.197	0.160	Three Phase	1.5	20th	0.037	0.072	0.096	0.025	0.050	0.067	Three Phase	0.5	21th	0.105	0.126	0.054	0.072	0.086	0.037	Three Phase	1.5	22th	0.032	0.090	0.090	0.022	0.061	0.062	Three Phase	0.5	23th	0.211	0.166	0.175	0.145	0.114	0.120	Three Phase	0.6	24th	0.096	0.059	0.055	0.066	0.041	0.038	Three Phase	0.5	25th	0.320	0.273	0.219	0.220	0.187	0.150	Three Phase	0.6	26th	0.055	0.039	0.083	0.038	0.027	0.057	Three Phase	0.5	27th	0.080	0.125	0.055	0.055	0.086	0.037	Three Phase	0.6	28th	0.026	0.086	0.084	0.018	0.059	0.058	Three Phase	0.5	29th	0.177	0.125	0.159	0.121	0.086	0.109	Three Phase	0.6	30th	0.090	0.037	0.047	0.041	0.029	0.032	Three Phase	0.5	31th	0.259	0.242	0.151	0.178	0.166	0.104	Three Phase	0.6	32th	0.053	0.020	0.050	0.036	0.013	0.035	Three Phase	0.5	33th	0.077	0.080	0.053	0.053	0.055	0.036	Three Phase	0.6	34th	0.021	0.056	0.064	0.015	0.038	0.044	Three Phase	--	35th	0.127	0.110	0.136	0.087	0.076	0.094	Three Phase	--	36th	0.027	0.030	0.040	0.019	0.021	0.028	Three Phase	--	37th	0.206	0.208	0.127	0.141	0.143	0.087	Three Phase	--	38th	0.043	0.016	0.035	0.030	0.011	0.024	Three Phase	--	39th	0.049	0.051	0.051	0.034	0.042	0.035	Three Phase	--	40th	0.020	0.036	0.042	0.014	0.025	0.029	Three Phase	--	41th	0.114	0.105	0.123	0.078	0.072	0.084	Three Phase	--	42th	0.013	0.033	0.033	0.009	0.023	0.023	Three Phase	--	43th	0.174	0.188	0.111	0.120	0.129	0.076	Three Phase	--	44th	0.033	0.022	0.021	0.023	0.015	0.015	Three Phase	--	45th	0.044	0.054	0.060	0.031	0.037	0.041	Three Phase	--	46th	0.025	0.027	0.029	0.017	0.019	0.020	Three Phase	--	47th	0.116	0.102	0.111	0.079	0.070	0.076	Three Phase	--	48th	0.009	0.034	0.028	0.006	0.023	0.020	Three Phase	--	49th	0.152	0.169	0.110	0.104	0.116	0.078	Three Phase	--	50th	0.029	0.026	0.018	0.020	0.018	0.012	Three Phase	--
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13th	0.297	0.266	0.312	0.204	0.183	0.214	Three Phase	2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
14th	0.050	0.039	0.068	0.034	0.027	0.047	Three Phase	0.5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
15th	0.054	0.098	0.089	0.037	0.067	0.061	Three Phase	2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
16th	0.055	0.072	0.081	0.038	0.050	0.056	Three Phase	0.5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
17th	0.270	0.190	0.205	0.186	0.130	0.141	Three Phase	1.5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
18th	0.103	0.058	0.057	0.071	0.040	0.039	Three Phase	0.5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
19th	0.320	0.287	0.233	0.220	0.197	0.160	Three Phase	1.5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
20th	0.037	0.072	0.096	0.025	0.050	0.067	Three Phase	0.5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
21th	0.105	0.126	0.054	0.072	0.086	0.037	Three Phase	1.5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
22th	0.032	0.090	0.090	0.022	0.061	0.062	Three Phase	0.5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
23th	0.211	0.166	0.175	0.145	0.114	0.120	Three Phase	0.6																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
24th	0.096	0.059	0.055	0.066	0.041	0.038	Three Phase	0.5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
25th	0.320	0.273	0.219	0.220	0.187	0.150	Three Phase	0.6																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
26th	0.055	0.039	0.083	0.038	0.027	0.057	Three Phase	0.5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
27th	0.080	0.125	0.055	0.055	0.086	0.037	Three Phase	0.6																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
28th	0.026	0.086	0.084	0.018	0.059	0.058	Three Phase	0.5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
29th	0.177	0.125	0.159	0.121	0.086	0.109	Three Phase	0.6																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
30th	0.090	0.037	0.047	0.041	0.029	0.032	Three Phase	0.5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
31th	0.259	0.242	0.151	0.178	0.166	0.104	Three Phase	0.6																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
32th	0.053	0.020	0.050	0.036	0.013	0.035	Three Phase	0.5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
33th	0.077	0.080	0.053	0.053	0.055	0.036	Three Phase	0.6																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
34th	0.021	0.056	0.064	0.015	0.038	0.044	Three Phase	--																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
35th	0.127	0.110	0.136	0.087	0.076	0.094	Three Phase	--																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
36th	0.027	0.030	0.040	0.019	0.021	0.028	Three Phase	--																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
37th	0.206	0.208	0.127	0.141	0.143	0.087	Three Phase	--																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
38th	0.043	0.016	0.035	0.030	0.011	0.024	Three Phase	--																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
39th	0.049	0.051	0.051	0.034	0.042	0.035	Three Phase	--																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
40th	0.020	0.036	0.042	0.014	0.025	0.029	Three Phase	--																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
41th	0.114	0.105	0.123	0.078	0.072	0.084	Three Phase	--																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
42th	0.013	0.033	0.033	0.009	0.023	0.023	Three Phase	--																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
43th	0.174	0.188	0.111	0.120	0.129	0.076	Three Phase	--																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
44th	0.033	0.022	0.021	0.023	0.015	0.015	Three Phase	--																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
45th	0.044	0.054	0.060	0.031	0.037	0.041	Three Phase	--																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
46th	0.025	0.027	0.029	0.017	0.019	0.020	Three Phase	--																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
47th	0.116	0.102	0.111	0.079	0.070	0.076	Three Phase	--																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
48th	0.009	0.034	0.028	0.006	0.023	0.020	Three Phase	--																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
49th	0.152	0.169	0.110	0.104	0.116	0.078	Three Phase	--																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
50th	0.029	0.026	0.018	0.020	0.018	0.012	Three Phase	--																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
Factor total de distorsiune de tensiune		< 1%																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	

Armonice de tensiune (până la armonica 50)

4.3 SYSTEM PERTURBATIONS													
Harmonics - Voltage harmonics													
Rated voltage [V]: 800 (P-P)													
P [%P _n]	0 - 5	10	20	30	40	50	60	70	80	90	100	P _{lim}	Max.
Order	U _n [%U _n]												
2	0.076	0.076	0.065	0.114	0.114	0.105	0.114	0.114	0.124	0.143	0.162	0.152	0.162
3	0.067	0.065	0.286	0.285	0.304	0.304	0.314	0.314	0.333	0.352	0.352	0.361	0.361
4	0.067	0.067	0.133	0.114	0.114	0.105	0.114	0.124	0.133	0.143	0.152	0.152	0.152
5	0.067	0.066	0.219	0.219	0.219	0.219	0.228	0.238	0.247	0.257	0.257	0.257	0.257
6	0.038	0.048	0.124	0.105	0.105	0.096	0.096	0.105	0.105	0.105	0.105	0.105	0.114
7	0.067	0.105	0.238	0.219	0.209	0.238	0.247	0.257	0.247	0.247	0.238	0.257	0.257
8	0.029	0.038	0.124	0.105	0.095	0.088	0.095	0.105	0.105	0.095	0.105	0.095	0.124
9	0.019	0.038	0.143	0.171	0.171	0.171	0.171	0.171	0.171	0.181	0.181	0.181	0.181
10	0.029	0.029	0.124	0.114	0.105	0.095	0.105	0.114	0.105	0.105	0.105	0.105	0.124
11	0.247	0.162	0.238	0.295	0.304	0.276	0.238	0.200	0.200	0.181	0.162	0.162	0.304
12	0.029	0.019	0.105	0.105	0.105	0.095	0.095	0.095	0.088	0.088	0.088	0.088	0.105
13	0.143	0.114	0.219	0.171	0.160	0.200	0.171	0.152	0.133	0.133	0.143	0.152	0.219
14	0.038	0.029	0.095	0.114	0.114	0.095	0.105	0.114	0.105	0.095	0.095	0.095	0.114
15	0.038	0.067	0.114	0.114	0.124	0.124	0.133	0.124	0.143	0.133	0.152	0.143	0.152
16	0.029	0.019	0.076	0.114	0.124	0.114	0.114	0.124	0.124	0.124	0.124	0.105	0.124
17	0.171	0.171	0.181	0.247	0.181	0.209	0.200	0.162	0.162	0.143	0.133	0.152	0.247
18	0.019	0.019	0.057	0.095	0.105	0.088	0.088	0.095	0.088	0.076	0.076	0.088	0.105
19	0.088	0.124	0.067	0.181	0.076	0.076	0.105	0.124	0.105	0.095	0.095	0.266	0.266
20	0.029	0.029	0.057	0.105	0.114	0.105	0.105	0.124	0.133	0.124	0.124	0.105	0.133
21	0.038	0.038	0.067	0.088	0.095	0.105	0.114	0.105	0.124	0.124	0.143	0.124	0.143
22	0.029	0.029	0.057	0.095	0.114	0.105	0.105	0.114	0.105	0.105	0.105	0.095	0.114
23	0.182	0.076	0.067	0.114	0.143	0.088	0.124	0.105	0.095	0.088	0.088	0.190	0.190
24	0.019	0.019	0.038	0.067	0.088	0.067	0.076	0.076	0.057	0.057	0.067	0.076	0.088
25	0.048	0.124	0.095	0.105	0.088	0.133	0.105	0.114	0.133	0.143	0.133	0.380	0.380
26	0.019	0.019	0.038	0.067	0.076	0.088	0.076	0.095	0.105	0.105	0.105	0.095	0.105
27	0.029	0.029	0.048	0.057	0.076	0.088	0.076	0.076	0.095	0.095	0.105	0.105	0.105
28	0.019	0.029	0.057	0.076	0.076	0.076	0.067	0.088	0.076	0.076	0.057	0.057	0.088
29	0.095	0.048	0.029	0.076	0.076	0.048	0.048	0.038	0.057	0.067	0.067	0.067	0.095
30	0.019	0.019	0.019	0.038	0.057	0.048	0.057	0.057	0.048	0.048	0.048	0.057	0.057
31	0.038	0.029	0.088	0.105	0.067	0.114	0.105	0.105	0.124	0.133	0.133	0.314	0.314
32	0.019	0.019	0.029	0.038	0.048	0.057	0.057	0.057	0.067	0.067	0.067	0.067	0.067
33	0.019	0.038	0.038	0.048	0.048	0.067	0.057	0.057	0.067	0.067	0.076	0.088	0.088
34	0.019	0.019	0.019	0.029	0.048	0.057	0.048	0.057	0.048	0.048	0.048	0.038	0.057
35	0.038	0.088	0.088	0.029	0.057	0.048	0.057	0.076	0.076	0.088	0.088	0.048	0.088
36	0.019	0.019	0.029	0.038	0.048	0.048	0.048	0.048	0.038	0.048	0.038	0.038	0.048
37	0.048	0.067	0.067	0.048	0.088	0.088	0.088	0.088	0.105	0.114	0.114	0.247	0.247
38	0.019	0.019	0.029	0.029	0.038	0.038	0.038	0.038	0.048	0.048	0.038	0.038	0.048
39	0.029	0.048	0.048	0.048	0.048	0.057	0.048	0.048	0.048	0.048	0.057	0.057	0.057
40	0.019	0.019	0.029	0.019	0.029	0.038	0.038	0.038	0.029	0.029	0.038	0.029	0.038
41	0.029	0.057	0.057	0.067	0.067	0.057	0.076	0.067	0.088	0.095	0.105	0.076	0.105
42	0.019	0.019	0.029	0.029	0.029	0.038	0.038	0.038	0.038	0.038	0.038	0.029	0.038
43	0.029	0.067	0.067	0.076	0.076	0.076	0.088	0.076	0.088	0.105	0.114	0.209	0.209
44	0.019	0.019	0.029	0.029	0.029	0.029	0.029	0.029	0.038	0.038	0.029	0.029	0.038
45	0.038	0.057	0.057	0.057	0.057	0.048	0.048	0.048	0.048	0.048	0.038	0.038	0.057
46	0.019	0.019	0.029	0.029	0.019	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029
47	0.029	0.076	0.088	0.057	0.067	0.088	0.076	0.076	0.088	0.095	0.105	0.088	0.105
48	0.019	0.019	0.029	0.029	0.029	0.038	0.038	0.038	0.038	0.038	0.038	0.029	0.038
49	0.029	0.057	0.048	0.038	0.038	0.067	0.057	0.067	0.088	0.095	0.105	0.181	0.181
50	0.019	0.019	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.029	0.038
THD _u [%U _n]	0.455	0.450	0.731	0.809	0.808	0.804	0.805	0.801	0.823	0.835	0.845	1.044	1.044

Factor de nesimetrie de secvență negativă de tensiune

4.8 Unbalance										P
Test result: SUN2000-215KTL-H0										
P [%P _{max}]	P* [kW]	U _{1-*} [V]	U _{2-*} [V]	I _{1-*} [A]	I _{2-*} [A]	u* [% I ₁₋]	u _{max} * [% I ₁₋]	Number of data sets		
0 - 5	6,92	800,71	1,26	4,990	0,297	5,952	0,205	3		
10	21,55	800,79	1,42	15,537	0,363	2,336	0,251	3		
20	42,74	800,84	1,52	30,812	0,342	1,110	0,236	3		
30	63,35	800,72	1,57	45,675	0,378	0,828	0,261	3		
40	84,55	800,81	1,51	60,956	0,342	0,561	0,236	3		
50	105,67	800,91	1,33	76,174	0,392	0,515	0,271	3		
60	126,83	800,97	1,03	91,419	0,483	0,528	0,334	3		
70	148,55	800,96	3,39	107,080	0,552	0,516	0,382	3		
80	170,25	800,81	1,04	122,740	0,645	0,526	0,446	3		
90	190,90	800,88	0,96	137,620	0,531	0,396	0,367	3		
100	210,48	801,16	0,97	151,680	0,437	0,288	0,302	3		
Maximum unsymmetry u _{max} (>10%P _n)							2,336			

Date referitoare la protecții:

Protecția diferențială	Text	D, R
Unități de transformare:		
Număr de înfășurări	Text	2
Puterea nominală pe fiecare înfășurare	MVA	25
Raportul nominal de transformare	kV/kV	110/mt
Tensiune de scurtcircuit pe fiecare pereche de înfășurări (u ₁₂ pentru un transformator cu două înfășurări, u ₁₂ , u ₁₃ și u ₂₃ pentru un transformator cu trei înfășurări)	% din U _{nom} , la S nom	10,95
Pierderi în gol	kW	30
Pierderi în sarcină	kW	130
Curentul de magnetizare	%	1

Grupa de conexiuni	Text	Ynd-11
Domeniul de reglaj	kV-kV	110±9x1.78%
Schema de reglaj (longitudinal sau longo transversal)	Text, diagramă	D, R
Mărimea treptei de reglaj și numărul de prize	%	1.78
Reglaj sub sarcină	DA/NU	D, R
Tratarea neutrlui	Text, diagramă	legat direct la pamant
Curba de saturație	Diagramă	R

Denumire consultant autorizat,
S.C. FALMA-ROM S.R.L.

Denumire utilizator,
Primaria Municipiului Suceava

