



Kirkland, Washington

SPECIFICATION
100087677-SWYD-47ES-42001

REVISION PA



FOR

MAIN TRANSFORMER

CONTRACT NO. 100087677

PATTERN PR
BARCELONETA, PUERTO RICO



By:	<u>Rawee Ratana</u>	Date:	<u>11/21/2023</u>
Project Technical Manager:	<u>Shawn Smith</u>	Date:	<u>11/21/2023</u>
Approval	<u>Shahram Arabi</u>	Date:	<u>11/21/2023</u>

Rev			MAIN TRANSFORMER			
			Item Number:			
			Design Data			
	Project Name		Pattern Energy PR Solar Project	ATKINS No.	100087677-SWYD-47ES-42001	
	Client		Pattern Energy	Req. No.		Issue
	Location		Barceloneta, PR	Doc. No.		Revision
						PA



1	Applicable To	30% DESIGN	Classification	
4	Service Area	Substation	Type	
5	Manufacturer		No. Required	1
6	Model			
7	Standard	IEEE C57.12.00 / ANSI / NEMA		
8				
9	ITEM	REQUIREMENTS	Vendor data	
10	SITE CONDITION			
11	Location	Outdoor Application		
12	Elevation	≤3,300 ft AMSL		
13	Operating Temperature	5°C - 40°C (41°F - 104°F)		
14	Seismic Design Category	D		
15	Seismic Zone	3		
16	Seismic Load	0.2-second acceleration: S _s = 1.35 1-second acceleration: S ₁ = 0.53 Importance Factor: 1.25		
17	Design Wind Speed (km)	160 mph		
18	Area Classification	General, Unclassified		
19				
20	Capacity/Design			
21	Capacity @ 65°C	90/120/150 MVA		
22	Cooling Class	KNAN/KNAF/KNAF		
23	Frequency	60 Hz		
24	Number of Phases	Three		
25	Impedance	8.5%, 90 MVA Base		
26	Maximum sound level	80 dB(a) at 3 ft		
27				
28	Rated Voltage			
29	H Winding	115 kV		
30	X Winding	34.5 kV		
31	Y Winding	18 kV		
32				
33	Winding Connection			
34	H Winding	Grounded Wye - Solid		
35	X Winding	Grounded Wye - NGR 200 A		
36	Y Winding	Buried Delta		
37				
38	BIL:			
39	H Winding	550 kV		
40	X Winding	200 kV		
41	Y Winding	110 kV		
42				
43	Winding Material			
44	H Winding:	Copper		
45	X Winding:	Copper		
46	Y Winding:	Copper		
47				
48	Physical			
49	Approximate Dimensions			
50	Tank Height		TBD Inches	

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8			
9	ITEM	REQUIREMENTS	Vendor data
51	Overall Height	TBD Inches	
52	Width	TBD Inches	
53	Depth	TBD Inches	
54			
55	Approximate Weight		
56	Oil	TBD Pounds	
57	Total	TBD Pounds	
58			
59	Warranted no-load losses (@ 20 Deg. C)	TBD kW	
60	Based on no-load loss value	TBD \$/kW	
61			
62	Warranted load losses for the following three		
63	a) ONAN rating	TBD kW	
64	b) ONAF rating	TBD kW	
65	c) Full Load rating	TBD kW	
66	Based on load loss value	TBD \$/kW	
67			
68	Efficiency		
69	a) ONAN rating	TBD %	
70	b) ONAF rating	TBD %	
71	c) Full Load	TBD %	
72			
73	Exciting Current % of Full Load		
74			
75	Voltage regulation at 85°C		
76	a. ONAN rating unity pf	TBD %	
77	b. Full Load 0.8pf	TBD %	
78			
79	Exciting current on HV winding		
80	100% voltage	TBD A-RMS	
81	110% voltage	TBD A-RMS	
82	115% voltage	TBD A-RMS	
83			
84	Max time transformer may be operated at 1:		
85	a. Following prolonged full load operation at 30°C	TBD Hours	
86	b. Following prolonged de-energization at 30°C	TBD Hours	
87			
88	Impedance @ 85°C		
89	a) Impedance on ONAN rating Base 34.5kV HV	8.50%	
90	b) Impedance on ONAF rating Base 34.5kV HV	TBD %	
91	c) Impedance on Full Load Base 34.5kV HV	TBD %	
92	X/R	TBD ratio	

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8				
9	ITEM	REQUIREMENTS	Vendor data	
93				
94	DETC	N/A		
95	Low Side or High Side	N/A		
96	Number of DETC tapping positions	N/A		
97	Tapping range and steps	N/A %		
98				
99	OLTC			
100	Type	Vacuum Type		
101	Manufacturer	MR (Germany)		
102	Low Side or High Side	High Side		
103	Number of LTC tapping positions	33		
104	Tapping range and steps	±10%, 32 steps %		
105				
106	Specfically Designed for Parallel Operation	N/A		
107				
108	Specfically Designed for Line Compensation	N/A		
109				
110	Guaranteed maximum noise level	per NEMA dB		
111				
112	Guaranteed maximum internal corona			
113	a. @ 115% operating voltage	TBD		
114	b. @ 50% full induced test voltage	TBD		
115	c. @ Full induced test voltage	TBD		
116				
117	Maximum top oil temperature rise of cooling medium at Full Load	65 °C		
118				
119	Bushing Information			
120		Mfr and Type BIL (kV)		
121	HV	TBD 550		
122	LV, XO	TBD 350		
123	HO	TBD 350		
124				
125	Surge Arrester Information			
126		MCOV Mfr.		
127	HV	88 kV MCOV		
128	LV	29 kV MCOV		
129	HO,XO	N/A		
130				
131	Transformer Winding Type	Max Short Circuit Capacity		
132	HV	TBD		
133	LV	TBD		
134	HO,XO	TBD		

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9	ITEM	REQUIREMENTS	Vendor data	
135				
136	Current Transformer Information Winding Type	Please confirm the BCT's accuracy.		
137	HV	2 x 1200:5A SR C800 TRF2.0 1 X 600:5A SR 0.3B-1.8 TRF 2.0		
138	LV	2 x 2000:5A MR C800 TRF2.0		
139	HO,XO	2 x 1200:5A MR C400 TRF 2.0, each HO & XO)		
140	Y (tertiary)	N/A		
141				
142	Delivery Date to Site	TBD		
143	Shipping Date ex factory	TBD		
144	Delivery Method	TBD		
145				
146	Approval Drawing Issuance Date	TBD		
147				
148				
149				
150				
	NOTES			
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