1.0 Reference and Address			
Report Number	220602022HAN-001S	Original Issued: 26-Oct-2022	Revised: 24-Aug-2023
Standard(s)	Photovoltaic (PV) Module Safety Qualification - Part 1: Requirements for Construction [UL 61730-1:2017 Ed.1+R:30Apr2020] Photovoltaic (PV) Module Safety Qualification - Part 1: Requirements for Construction [CSA C22.2#61730-1:2019 Ed.2] Photovoltaic (PV) Module Safety Qualification - Part 2: Requirements for Testing [UL 61730-2:2017 Ed.1+R:30Apr2020] Photovoltaic (PV) Module Safety Qualification - Part 2: Requirements for Testing [CSA C22.2#61730-2:2019 Ed.2] Terrestrial Photovoltaic (Pv) Modules - Design Qualification And Type Approval - Part 1: Test Requirements [UL 61215-1:2017 Ed.1] Terrestrial Photovoltaic (PV) Modules - Design Qualification And Type Approval - Part 1-1: Special Requirements For Testing of Crystalline Silicon Photovoltaic (PV) Modules [UL 61215-1-1:2017 Ed.1] Terrestrial Photovoltaic (Pv) Modules - Design Qualification And Type Approval - Part 2: Test Procedures [UL 61215-2:2017 Ed.1]		

Applicant	G-Star Pte Ltd	Manufacturer 1	**LIGHT&HOPE ENERGY COMPANY LIMITED**
Address	6 RAFFLES QUAY, # 14-06 SINGAPORE (048580)	Address	NO. 88/23-25 MU 15 BANG SAOT HONG, SUB-DISTRICT, BANG SAO THONG DISTRICT, SAMUT PRAKARN PROVINCE, THAILAND
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FAX	-	FAX	-
Email	lyntonlin@gstar-solar.com	Email	lyntonlin@gstar-solar.com

Manufacturer 2	**Ocean Energy Company Limited**
Address	998/106-109, 998/111 MOO.9, Bang Pla Subdistrict, Bang Phli District Samut Prakarn
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2.0 Product Description	
Product	Crystalline Silicon Photovoltaic Module
Brand name	Gstar
Description	The product covered by this report are terrestrial used photovoltaic modules which convert elements of the electromagnetic spectrum to DC electrical power. The basic construction consists of a laminated assembly of individual solar cells, which are interconnected with conductive matrial such as ribbons, and encapsulated within an insulating material. This encapsulated assembly is sandwiched between a rigid transparent top frontsheet and an insulating backsheet. The laminated assembly mostly be supported by an anodized Aluminum frame. Field wiring connections to the module are made via a factory installed junction box with polarized mating cables and connectors. The modules include a weatherproof junction box with mating connectors only provided for field-connection. The modules are manufactured from the factory and shipped fully assembled. An installation manual is provided. The modules must be mounted over a fire resistant roof covering material rated for the application. Internal buss ribbon wires, and cross buss ribbon wires are enclosed within the module front cover and back substrate. Bypass diodes are provided inside the junction box. Modules are intended to be installed in accordance with the National Electrical Code, NFPA 70 and Canadian Electrical Code (CEC) respectively.
Models	GSP6F72M maybe followed by (H); followed by 425, 430, 435, 440, 445, 450, 455, 460 or 465; maybe followed by BW or BB. GSP6G72M maybe followed by (H); followed by 425, 430, 435, 440, 445, 450, 455, 460 or 465; followed by BT or WT. GSP6F60M maybe followed by (H); followed by 350, 355, 360, 365, 370, 375, 380 or 385; maybe followed by BW or BB. GSP6G60M maybe followed by (H); followed by 350, 355, 360, 365, 370, 375, 380 or 385; followed by BT or WT. GSP7F78M maybe followed by (H); followed by 570, 575, 580, 585, 590, 595, 600 or 605; maybe followed by BW or BB. GSP7G78M maybe followed by (H); followed by 570, 575, 580, 585, 590, 595, 600 or 605; followed by BT or WT. GSP7F72M maybe followed by (H); followed by 525, 530, 535, 540, 545, 550, 555 or 560; maybe followed by BW or BB. GSP7G72M maybe followed by (H); followed by 525, 530, 535, 540, 545, 550, 555 or 560; followed by BT or WT. GSP7F66M maybe followed by (H); followed by 485, 490, 495, 500 or 505; maybe followed by BW or BB. GSP7G66M maybe followed by (H); followed by 485, 490, 495, 500 or 505; followed by BT or WT. GSP7F60M maybe followed by (H); followed by 435, 440, 445, 450 or 455; maybe followed by BW or BB. GSP7G60M maybe followed by (H); followed by 435, 440, 445, 450 or 455; followed by BT or WT. GSP7F54M maybe followed by (H); followed by 390, 395, 400, 405, 410 or 415; maybe followed by BW or BB. GSP7G54M maybe followed by (H); followed by 390, 395, 400, 405, 410 or 415; followed by BT or WT.

2.0 Product Description	
Model Similarity	All Models have similar structure. Letter ‘P’ after ‘GS' means module have P type solar cell, figure '6' after letter 'P' denote 166 solar cell, and '7' denotes 182 soalr cell. The following letter 'F' denotes mono-facial module and 'G' means bifacial module. '(H)' means models have system voltage 1500V, and 1000V for model name without ’(H)'. The following figure '54', '60', ‘66’, '72' or '78' means module has '108', '120', '144' or '156' pieces of solar cells, and letter 'M' denotes mono crystalline solar cell technology, and followed rated power output. Meanings of Suffix at the module name: 'BB' at the end of model name denotes black frame / black backsheet modules. 'BW' at the end of model name denotes silver frame / black backsheet modules. 'BT' at the end of model name denotes black frame / transprant backsheet modules. 'WT' at the end of model name denotes silver frame / transprant backsheet modules.

2.0 Product Description

Model	Pmax(W) (±3%)	Voc (V) (±3%)	Isc (A) (±3%)	Vmp (V)	Imp (A)	System voltage (V)	MSF (A)
GSP7F54M(H)390	390	36.50	13.61	30.65	12.73	1500	25
GSP7F54M(H)395	395	36.75	13.69	30.85	12.81	1500	25
GSP7F54M(H)400	400	37.00	13.78	31.05	12.89	1500	25
GSP7F54M(H)405	405	37.25	13.86	31.24	12.97	1500	25
GSP7F54M(H)410	410	37.50	13.94	31.43	13.05	1500	25
GSP7F54M(H)415	415	37.75	14.02	31.64	13.13	1500	25
GSP7F54M(H)390BB	390	36.50	13.61	30.65	12.73	1500	25
GSP7F54M(H)395BB	395	36.75	13.69	30.85	12.81	1500	25
GSP7F54M(H)400BB	400	37.00	13.78	31.05	12.89	1500	25
GSP7F54M(H)405BB	405	37.25	13.86	31.24	12.97	1500	25
GSP7F54M(H)410BB	410	37.50	13.94	31.43	13.05	1500	25
GSP7F54M(H)415BB	415	37.75	14.02	31.64	13.13	1500	25
GSP7F54M(H)390BW	390	36.50	13.61	30.65	12.73	1500	25
GSP7F54M(H)395BW	395	36.75	13.69	30.85	12.81	1500	25
GSP7F54M(H)400BW	400	37.00	13.78	31.05	12.89	1500	25
GSP7F54M(H)405BW	405	37.25	13.86	31.24	12.97	1500	25
GSP7F54M(H)410BW	410	37.50	13.94	31.43	13.05	1500	25
GSP7F54M(H)415BW	415	37.75	14.02	31.64	13.13	1500	25
GSP7G54M(H)390BT	390	36.50	13.61	30.65	12.73	1500	30
GSP7G54M(H)395BT	395	36.75	13.69	30.85	12.81	1500	30
GSP7G54M(H)400BT	400	37.00	13.78	31.05	12.89	1500	30
GSP7G54M(H)405BT	405	37.25	13.86	31.24	12.97	1500	30
GSP7G54M(H)410BT	410	37.50	13.94	31.43	13.05	1500	30
GSP7G54M(H)415BT	415	37.75	14.02	31.64	13.13	1500	30
GSP7G54M(H)390WT	390	36.50	13.61	30.65	12.73	1500	30
GSP7G54M(H)395WT	395	36.75	13.69	30.85	12.81	1500	30
GSP7G54M(H)400WT	400	37.00	13.78	31.05	12.89	1500	30
GSP7G54M(H)405WT	405	37.25	13.86	31.24	12.97	1500	30
GSP7G54M(H)410WT	410	37.50	13.94	31.43	13.05	1500	30
GSP7G54M(H)415WT	415	37.75	14.02	31.64	13.13	1500	30
GSP7F60M(H)435	435	40.82	13.60	34.17	12.73	1500	25
GSP7F60M(H)440	440	40.99	13.69	34.35	12.81	1500	25
GSP7F60M(H)445	445	41.16	13.78	34.53	12.89	1500	25
GSP7F60M(H)450	450	41.33	13.86	34.70	12.97	1500	25
GSP7F60M(H)455	455	41.50	13.94	34.87	13.05	1500	25
GSP7F60M(H)460	460	41.67	14.02	35.04	13.13	1500	25
GSP7F60M(H)435BB	435	40.82	13.60	34.17	12.73	1500	25
GSP7F60M(H)440BB	440	40.99	13.69	34.35	12.81	1500	25
GSP7F60M(H)445BB	445	41.16	13.78	34.53	12.89	1500	25
GSP7F60M(H)450BB	450	41.33	13.86	34.70	12.97	1500	25
GSP7F60M(H)455BB	455	41.50	13.94	34.87	13.05	1500	25
GSP7F60M(H)460BB	460	41.67	14.02	35.04	13.13	1500	25
GSP7F60M(H)435BW	435	40.82	13.60	34.17	12.73	1500	25
GSP7F60M(H)440BW	440	40.99	13.69	34.35	12.81	1500	25
GSP7F60M(H)445BW	445	41.16	13.78	34.53	12.89	1500	25
GSP7F60M(H)450BW	450	41.33	13.86	34.70	12.97	1500	25
GSP7F60M(H)455BW	455	41.50	13.94	34.87	13.05	1500	25
GSP7F60M(H)460BW	460	41.67	14.02	35.04	13.13	1500	25
GSP7G60M(H)435BT	435	40.82	13.60	34.17	12.73	1500	30
GSP7G60M(H)440BT	440	40.99	13.69	34.35	12.81	1500	30
GSP7G60M(H)445BT	445	41.16	13.78	34.53	12.89	1500	30

2.0 Product Description								
Ratings	GSP7G60M(H)450BT	450	41.33	13.86	34.70	12.97	1500	30
	GSP7G60M(H)455BT	455	41.50	13.94	34.87	13.05	1500	30
	GSP7G60M(H)460BT	460	41.67	14.02	35.04	13.13	1500	30
	GSP7G60M(H)435WT	435	40.82	13.60	34.17	12.73	1500	30
	GSP7G60M(H)440WT	440	40.99	13.69	34.35	12.81	1500	30
	GSP7G60M(H)445WT	445	41.16	13.78	34.53	12.89	1500	30
	GSP7G60M(H)450WT	450	41.33	13.86	34.70	12.97	1500	30
	GSP7G60M(H)455WT	455	41.50	13.94	34.87	13.05	1500	30
	GSP7G60M(H)460WT	460	41.67	14.02	35.04	13.13	1500	30
	GSP7F72M(H)525	525	49.18	13.65	41.16	12.76	1500	25
	GSP7F72M(H)530	530	49.32	13.72	41.32	12.83	1500	25
	GSP7F72M(H)535	535	49.46	13.79	41.48	12.90	1500	25
	GSP7F72M(H)540	540	49.60	13.86	41.64	12.97	1500	25
	GSP7F72M(H)545	545	49.76	13.93	41.80	13.04	1500	25
	GSP7F72M(H)550	550	49.92	14.00	41.96	13.11	1500	25
	GSP7F72M(H)555	555	50.08	14.07	42.12	13.18	1500	25
	GSP7F72M(H)560	560	50.24	14.14	42.28	13.25	1500	25
	GSP7F72M(H)525BB	525	49.18	13.65	41.16	12.76	1500	25
	GSP7F72M(H)530BB	530	49.32	13.72	41.32	12.83	1500	25
	GSP7F72M(H)535BB	535	49.46	13.79	41.48	12.90	1500	25
	GSP7F72M(H)540BB	540	49.60	13.86	41.64	12.97	1500	25
	GSP7F72M(H)545BB	545	49.76	13.93	41.80	13.04	1500	25
	GSP7F72M(H)550BB	550	49.92	14.00	41.96	13.11	1500	25
	GSP7F72M(H)555BB	555	50.08	14.07	42.12	13.18	1500	25
	GSP7F72M(H)560BB	560	50.24	14.14	42.28	13.25	1500	25
	GSP7F72M(H)525BW	525	49.18	13.65	41.16	12.76	1500	25
	GSP7F72M(H)530BW	530	49.32	13.72	41.32	12.83	1500	25
	GSP7F72M(H)535BW	535	49.46	13.79	41.48	12.90	1500	25
	GSP7F72M(H)540BW	540	49.60	13.86	41.64	12.97	1500	25
	GSP7F72M(H)545BW	545	49.76	13.93	41.80	13.04	1500	25
	GSP7F72M(H)550BW	550	49.92	14.00	41.96	13.11	1500	25
	GSP7F72M(H)555BW	555	50.08	14.07	42.12	13.18	1500	25
	GSP7F72M(H)560BW	560	50.24	14.14	42.28	13.25	1500	25
	GSP7G72M(H)525BT	525	49.18	13.65	41.16	12.76	1500	30
	GSP7G72M(H)530BT	530	49.32	13.72	41.32	12.83	1500	30
	GSP7G72M(H)535BT	535	49.46	13.79	41.48	12.90	1500	30
	GSP7G72M(H)540BT	540	49.60	13.86	41.64	12.97	1500	30
	GSP7G72M(H)545BT	545	49.76	13.93	41.80	13.04	1500	30
	GSP7G72M(H)550BT	550	49.92	14.00	41.96	13.11	1500	30
	GSP7G72M(H)555BT	555	50.08	14.07	42.12	13.18	1500	30
	GSP7G72M(H)560BT	560	50.24	14.14	42.28	13.25	1500	30
	GSP7G72M(H)525WT	525	49.18	13.65	41.16	12.76	1500	30
	GSP7G72M(H)530WT	530	49.32	13.72	41.32	12.83	1500	30
	GSP7G72M(H)535WT	535	49.46	13.79	41.48	12.90	1500	30
	GSP7G72M(H)540WT	540	49.60	13.86	41.64	12.97	1500	30
	GSP7G72M(H)545WT	545	49.76	13.93	41.80	13.04	1500	30
	GSP7G72M(H)550WT	550	49.92	14.00	41.96	13.11	1500	30
	GSP7G72M(H)555WT	555	50.08	14.07	42.12	13.18	1500	30
	GSP7G72M(H)560WT	560	50.24	14.14	42.28	13.25	1500	30
	GSP7F78M(H)570	570	53.31	13.65	44.69	12.76	1500	25
	GSP7F78M(H)575	575	53.54	13.72	44.83	12.83	1500	25
	GSP7F78M(H)580	580	53.59	13.79	44.97	12.90	1500	25
	GSP7F78M(H)585	585	53.73	13.86	45.11	12.97	1500	25
	GSP7F78M(H)590	590	53.87	13.93	45.25	13.04	1500	25
	GSP7F78M(H)595	595	54.01	14.00	45.39	13.11	1500	25
	GSP7F78M(H)600	600	54.15	14.07	45.53	13.18	1500	25

2.0 Product Description

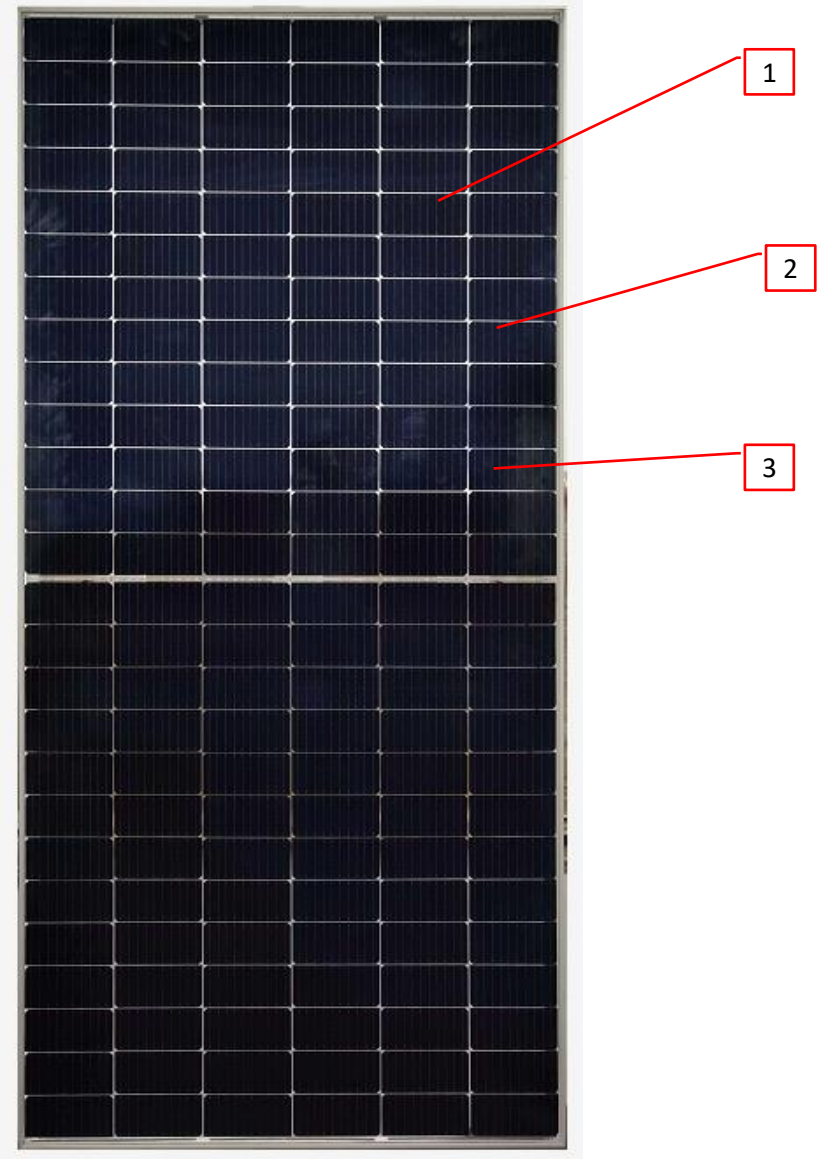
GSP7F78M(H)605	605	54.29	14.14	45.67	13.25	1500	25
GSP7F78M(H)570BB	570	53.31	13.65	44.69	12.76	1500	25
GSP7F78M(H)575BB	575	53.54	13.72	44.83	12.83	1500	25
GSP7F78M(H)580BB	580	53.59	13.79	44.97	12.90	1500	25
GSP7F78M(H)585BB	585	53.73	13.86	45.11	12.97	1500	25
GSP7F78M(H)590BB	590	53.87	13.93	45.25	13.04	1500	25
GSP7F78M(H)595BB	595	54.01	14.00	45.39	13.11	1500	25
GSP7F78M(H)600BB	600	54.15	14.07	45.53	13.18	1500	25
GSP7F78M(H)605BB	605	54.29	14.14	45.67	13.25	1500	25
GSP7F78M(H)570BW	570	53.31	13.65	44.69	12.76	1500	25
GSP7F78M(H)575BW	575	53.54	13.72	44.83	12.83	1500	25
GSP7F78M(H)580BW	580	53.59	13.79	44.97	12.90	1500	25
GSP7F78M(H)585BW	585	53.73	13.86	45.11	12.97	1500	25
GSP7F78M(H)590BW	590	53.87	13.93	45.25	13.04	1500	25
GSP7F78M(H)595BW	595	54.01	14.00	45.39	13.11	1500	25
GSP7F78M(H)600BW	600	54.15	14.07	45.53	13.18	1500	25
GSP7F78M(H)605BW	605	54.29	14.14	45.67	13.25	1500	25
GSP7G78M(H)570BT	570	53.31	13.65	44.69	12.76	1500	30
GSP7G78M(H)575BT	575	53.54	13.72	44.83	12.83	1500	30
GSP7G78M(H)580BT	580	53.59	13.79	44.97	12.90	1500	30
GSP7G78M(H)585BT	585	53.73	13.86	45.11	12.97	1500	30
GSP7G78M(H)590BT	590	53.87	13.93	45.25	13.04	1500	30
GSP7G78M(H)595BT	595	54.01	14.00	45.39	13.11	1500	30
GSP7G78M(H)600BT	600	54.15	14.07	45.53	13.18	1500	30
GSP7G78M(H)605BT	605	54.29	14.14	45.67	13.25	1500	30
GSP7G78M(H)570WT	570	53.31	13.65	44.69	12.76	1500	30
GSP7G78M(H)575WT	575	53.54	13.72	44.83	12.83	1500	30
GSP7G78M(H)580WT	580	53.59	13.79	44.97	12.90	1500	30
GSP7G78M(H)585WT	585	53.73	13.86	45.11	12.97	1500	30
GSP7G78M(H)590WT	590	53.87	13.93	45.25	13.04	1500	30
GSP7G78M(H)595WT	595	54.01	14.00	45.39	13.11	1500	30
GSP7G78M(H)600WT	600	54.15	14.07	45.53	13.18	1500	30
GSP7G78M(H)605WT	605	54.29	14.14	45.67	13.25	1500	30
GSP7F54M390	390	36.50	13.61	30.65	12.73	1000	25
GSP7F54M395	395	36.75	13.69	30.85	12.81	1000	25
GSP7F54M400	400	37.00	13.78	31.05	12.89	1000	25
GSP7F54M405	405	37.25	13.86	31.24	12.97	1000	25
GSP7F54M410	410	37.50	13.94	31.43	13.05	1000	25
GSP7F54M415	415	37.75	14.02	31.64	13.13	1000	25
GSP7F54M390BB	390	36.50	13.61	30.65	12.73	1000	25
GSP7F54M395BB	395	36.75	13.69	30.85	12.81	1000	25
GSP7F54M400BB	400	37.00	13.78	31.05	12.89	1000	25
GSP7F54M405BB	405	37.25	13.86	31.24	12.97	1000	25
GSP7F54M410BB	410	37.50	13.94	31.43	13.05	1000	25
GSP7F54M415BB	415	37.75	14.02	31.64	13.13	1000	25
GSP7F54M390BW	390	36.50	13.61	30.65	12.73	1000	25
GSP7F54M395BW	395	36.75	13.69	30.85	12.81	1000	25
GSP7F54M400BW	400	37.00	13.78	31.05	12.89	1000	25
GSP7F54M405BW	405	37.25	13.86	31.24	12.97	1000	25
GSP7F54M410BW	410	37.50	13.94	31.43	13.05	1000	25
GSP7F54M415BW	415	37.75	14.02	31.64	13.13	1000	25
GSP7G54M390BT	390	36.50	13.61	30.65	12.73	1000	30
GSP7G54M395BT	395	36.75	13.69	30.85	12.81	1000	30

For bifacial modules only the electrical parameters of front-surface are listed, more ratings refer to ILL9~9E in section 7.

2.0 Product Description	
Other Ratings	Module fire performance: Type 1. (Fire test report refer to 220905011SHF-001) Front side design load = 3600 Pa Back side design load = 1600 Pa Proctection Class: Class Ⅱ (Classified as per IEC 61140) Pollution degree: 1 Altitude up to 2000m Bifaciality factor: 70%±5% Maximum system voltage: 1000V or 1500V

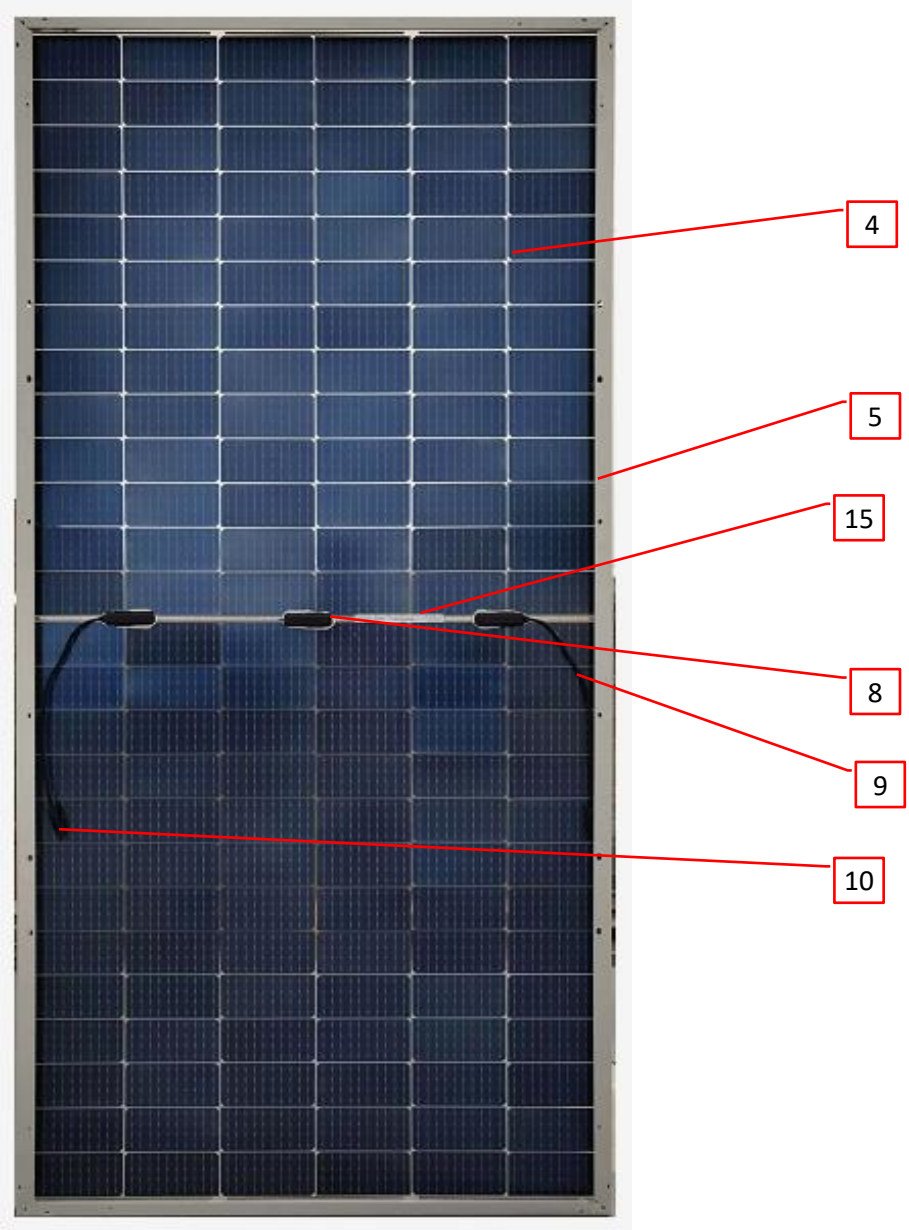
3.0 Product Photographs

Photo 1 - Front View of Model GSP7G78M(H)575WT



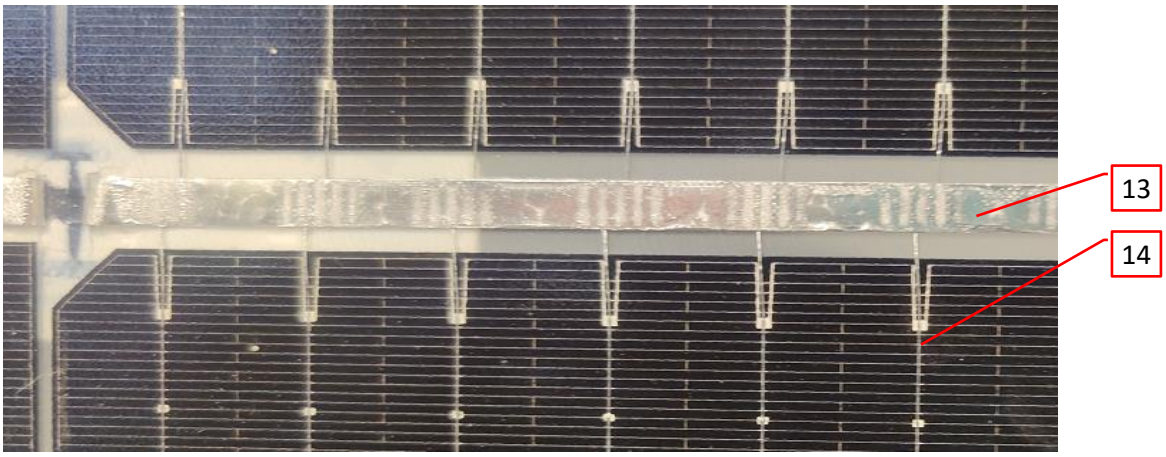
3.0 Product Photographs

Photo 2 - Rear View of Model GSP7G78M(H)575WT



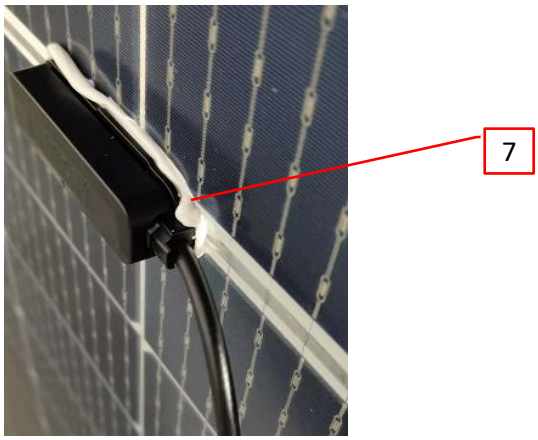
3.0 Product Photographs

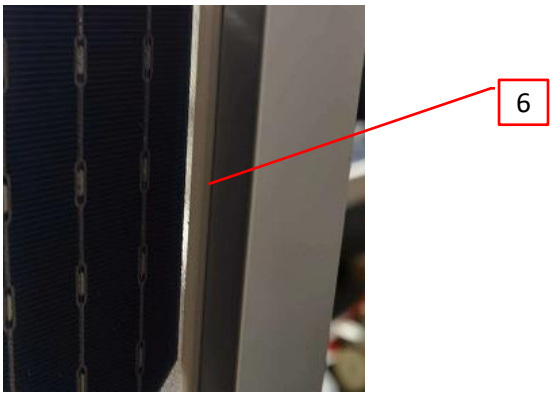
Photo 3 - Detail view of String connector and Cell connector



3.0 Product Photographs

Photo 4 - Detail view of Adhesive





4.0 Critical Components						
Photo #	Item no.[1]	Name	Manufacturer/ trademark[2]	Type / model[2]	Technical data and securement means	Mark(s) of conformity[3]
1	1	Frontsheet	Xinyi Glass Holding Limited	Tempered Glass ironless	3.2mm thick, Tempered Glass ironless	NR
1	2	Solar Cell	T.S Solar Energy Co.,Ltd.	182-10BB-144F	Bifacial Mono Silicon PERC Mono silicon crystalline solar cell, 10 or 9 busbars, dimension 182*91mm(±0.25mm). Thickness 175±15μm	NR
				TS166M-9BB	Bifacial Mono Silicon PERC Mono silicon crystalline solar cell, 9 busbars, dimension 166*83mm(±0.25mm). Thickness 175±15μm	NR
1	3	Encapsulate	HANGZHOU FIRST APPLIED MATERIAL CO., LTD (E326347)	F406PS	Ethyl-Vinyl-acetate (EVA), onesheet of clear EVA is provided at frontsheet side,thickness 0.50mm	UR
				F806PS	Ethyl-Vinyl-acetate (EVA), onesheet of clear EVA is provided at backsheet side,thickness 0.50mm	UR
2	4	Backsheet	Crown Advanced Matertial Co., LTD (E342395)	Crown BO-P2	PET/PU, Ti=120℃， Photovoltaic Backsheets,furnished as sheets, 0.31 nominal thickness, white or black or transprant color. Refer to ILL7 for component combination requirement.	UR
2	5	Frame	Suzhou Sentong Photovoltaic Co.,Ltd.	6005-T6	anodized aluminium alloy, Secured together by Corner Keyswith CrimpingColor: silver or black	NR
			Jiangyin YSST Alloy Technology Co.,Ltd.	6005-T6	anodized aluminium alloy, Secured together by Corner Keyswith CrimpingColor: silver or black	NR
4	6	Adhesive of frame (Not Shown)	Shanghai Huitian New Material Co., LTD. (E248611)	HT906Z	RTI(Elec, Imp, Str)=105℃. Silicone "Room Temperature Vulcanizing" (RTV), furnished as two liquid components(usually divided as A and B).White or black color	UR
4	7	Adhesive (between junction box and backsheet)	Shanghai Huitian New Material Co., LTD. (E248611)	HT906Z	RTI(Elec, Imp, Str)=105℃. Silicone "Room Temperature Vulcanizing" (RTV), furnished as two liquid components(usually divided as A and B).White or black color	UR
			Zhejiang Zhonghuan Sunter PV Technology Co., Ltd. (E330400)	PV-ZH011C-5	Rated 1500 VDC, 30 A Max. Provide with three separate bodies.With IEC62790 certification R 50505349 0001~0006 issued by TUV Rheinland.	UR

4.0 Critical Components						
Photo #	Item no.[1]	Name	Manufacturer/ trademark[2]	Type / model[2]	Technical data and securement means	Mark(s) of conformity[3]
2	8	Junction Box	Zhejiang Jiaming Tianheyuan Photovoltaic Technology Co.,Ltd. (E337337)	JM17X	Rated 1500 VDC, 25 A Max. Provide with three separate bodies.With IEC62790 certification R 50473848 001~004 issued by TUV Rheinland.	UR
2	9	Cable	Zhejiang Zhonghuan Sunter PV Technology Co., Ltd. (E353853)	PV Wire	12 AWG, sunlight resistant, -40~90°C wet or dry	UR
			ZHEJIANG JIAMING TIANHEYUAN PHOTOVOLTAIC TECHNOLOGY CO LTD (E343893)	PV Wire	12 AWG, sunlight resistant, -40~90°C wet or dry	UR
2	10	Connectors	Zhejiang Zhonghuan Sunter PV Technology Co., Ltd. (E342393)	PV-ZH202B	1500 V dc, 30 A max with 12 AWG cable	UR
			Zhejiang Jiaming Tianheyuan Photovoltaic Technology Co.,Ltd. (E341975)	PV-JM601A	1500 V dc, 35 A max with 12AWG PV cable	UR
				PV-JM608	1500 V dc, 35 A max with 12AWG PV cable	UR
			STAUBLI ELECTRICAL CONNECTORS AG (E343181)	PV-KBT4-EVO2/6II-UR (female)	1500 V dc, 39 A max with 12 AWG cable, With IEC62852 Cert. TUV Rheinland R60127169	UR
				PV-KST4-EVO2/6II-UR (male)	1500 V dc, 39 A max with 12 AWG cable, With IEC62852 Cert. TUV Rheinland R60127169	UR
				PV-KBT4-EVO2A/xy (female)	1500 V dc, 39 A max with 12 AWG cable, With IEC62852 Cert. TUV SUD B 112370 0007	UR
				PV-KST4-EVO2A/xy (male)	1500 V dc, 39 A max with 12 AWG cable, With IEC62852 Cert. TUV SUD B 112370 0007	UR
			JIANGSU TONGLIN ELECTRIC CO	TL-CABLE01S-F	1500 V dc, 35 A max with 12 AWG PV cable, with IEC62852 Cert. TUV R 50332904	UR

4.0 Critical Components						
Photo #	Item no.[1]	Name	Manufacturer/ trademark[2]	Type / model[2]	Technical data and securement means	Mark(s) of conformity[3]
			LTD (E342623)	TL-CABLE01S-FR	1500 V dc, 35 A max with 12 AWG PV cable, with IEC62852 Cert. TUV R 50332904	UR
2	11	Potting Material (Not Shown)	Shanghai Huitian New Material Co., LTD. (E248611)	5299W-S	RTI (Elec, Imp, Str)=105℃, CTI=0, White or black.	UR
2	12	Bypass Diode (Not Shown)	Zhejiang Zhonghuan Sunter PV Technology Co.,Ltd	35SQ045	Rated 25A, 510mV at 35A; 15.3uA at 45V, apply to models with Maximum overcurrent protection rating no more than 25A.	NR
				30SQ045	Rated 20A, 491mV at 30A; 19.9uA at 45V apply to models with Maximum overcurrent protection rating no more than 20A.	NR
				40SQ045	Rated 30A, 479m at 40A; 1uA at 45V apply to models with Maximum overcurrent protection rating no more than 30A.	NR
			Hangzhou Lion Microelectronics Co., Ltd.	THY4050	Rated current 25A, Forward voltage max. 456mV at 20A; leakage current max. 28.994uA at 50V, If=40A, Tj=200℃ apply to models with Maximum overcurrent protection rating no more than 25A.	NR
3	13	String Connector	Taicang Juren International Trade Co., ltd	4mm wide by 0.4m thick	TU1 (99.97%) base plated with solder material Sn60Pb40, Coating thickness 0.018mm for single side Elongation≥25% Tensile Strength≥170Mpa	NR
				7mm wide by 0.4m thick	TU1 (99.97%) base plated with solder material Sn60Pb40, Coating thickness 0.018mm for single side Elongation≥25% Tensile Strength≥170Mpa	NR
3	14	Cell Connector	Taicang Juren International Trade Co., ltd	Φ0.30mm	TU1 (99.97%) base plated with solder material Sn60Pb40, Coating thickness 0.017mm for single side Elongation≥20% Tensile Strength≥150Mpa Yield Strength≤ 70Mpa	NR
2	15	Label	3M Company (MH18072)	7818EH 3M TT5 MS PET 75-310E-90WG	Application Temperature: -40℃~60℃	UR

4.0 Critical Components						
Photo #	Item no.[1]	Name	Manufacturer/ trademark[2]	Type / model[2]	Technical data and securement means	Mark(s) of conformity[3]
1	16	Fixing Tape (Not Shown)	3M Company (E230409)	UV-1	Anti-UV PET Tape, Color: clearThickness: 0.060 mmUsed to fix the cells before laminate.	UR
1	17	Insulation Sheet (Not Shown)	Shanghai cncun industrial co., LTD	EPE D300	EVA/PET/EVA thickness 300μm	NR
1	18	Flux (Not Shown)	Singapore Asahi Chemical & Solder Industries Pte Ltd	SF105	Liquid, in which the cellinterconnector and stringconnector are immersed toenhance the soldering quality.	NR

NOTES:

1) Not all item numbers are indicated (called out) in the photos, as their location is obvious.

2) “Various“ means any type, from any manufacturer that complies with the "Technical data and securement means" and meets the "Mark(s) of conformity" can be used.

3) Indicates specific marks to be verified, which assures the agreed level of surveillance for the component. "NR" - indicates Unlisted and only visual examination is necessary. "See 5.0" indicates Unlisted components or assemblies to be evaluated periodically refer to section 5.0 for details.

4) Specific components combination requirements refer ILL5, ILL6, ILL6A and ILL7 in section 7

5.0 Critical Unlisted CEC Components

No Unlisted CEC components are used in this report.

6.0 Critical Features

Recognized Component - A component part, which has been previously evaluated by an accredited certification body with restrictions and must be evaluated as part of the basic product considering the restrictions as specified by the Conditions of Acceptability.

Listed Component - A component part, which has been previously Listed or Certified by an accredited Certification Organization with no restrictions and is used in the intended application within its ratings.

Unlisted Component - A part that has not been previously evaluated to the appropriate designated component standard. It may also be a Listed or Recognized component that is being used outside of its evaluated Listing or component recognition.

Critical Features/Components - An essential part, material, subassembly, system, software, or accessory of a product that has a direct bearing on the product's conformance to applicable requirements of the product standard.

Construction Details - For specific construction details, reference should be made to the photographs and descriptions. All dimensions are approximate unless specified as exact or within a tolerance. In addition to the specific construction details described in this Report, the following general requirements also apply.

1. Spacing - At the wiring terminals, a minimum of 19.4mm* through air and 10.4mm over surface spacing is provided between uninsulated live parts of opposite polarity (the negative and positive load terminals). At the module edges, a minimum of 19.4mm* through air and 10.4mm over surface spacing is provided between the live parts including cells and interconnecting ribbons and the edges of the laminate before attachment of the frame. There are no grounded metal parts within the wiring compartment.
   The measured clearance can be smaller than the minimum required clearance, since the implusive voltage test as specified in IEC 60664-1 was conducted and passed to show that the distance is adequate.
2. Mechanical Assembly - Components such as switches, fuseholders, connectors, wiring terminals and display lamps are mounted and prevented from shifting or rotating by the use of lockwashers, starwashers, or other mounting format that prevents turning of the component.The components of the laminate portion of the module are monolithically adhered with encapsulation material. The junction box is secured to the rear cover with adhesive and the junction box internal tabs are secured in place by pressure fit contact rails. The tabbing entering the junction box and the wire end connectors are secured with cable gland so they cannot be separated. The frame is form fitted around the perimeter of the laminate and adhered in place with adhesive. All of the parts of this module are secured in a way that prevents any shifting, rotating or turning of components.
3. Corrosion Protection - All ferrous metal parts are protected against corrosion by painting, plating or the equivalent. These modules are made of a glass front cover and durable rear cover with all internal wiring fully encapsulated in a corrosion resistant package. The enclosures of junction box, wire leads and connectors are made of polymeric materials, and the frame is made of anodized Aluminum, each of which are inherently resistant to corrosion. Since all of the components of the modules are composed of such materials no additional corrosion protection is employed.
4. Accessibility of Live Parts - All uninsulated live parts in primary circuitry are housed within a non-metallic enclosure constructed with no openings other than those specifically described in Sections 4 and 5. All uninsulated live parts in primary circuitry are housed within the junction box which is factory sealed and not user serviceable in the field therefore there are no accessible live parts.
5. Grounding - All exposed dead-metal parts and all dead-metal parts within the enclosure that are exposed are connected to the equipment grounding terminal. Module with metal frame is clearly indicated with the appropriate ground connection point with a ground symbol marking. The means of grounding is specified in the installation instructions, see Illustration 3 in section 7.0.
6. Polarized Connection - This product is provided with a polarized power supply connection. All single pole switches and fuses are connected only to the ungrounded supply circuit conductor. Each connector is polarized and cannot be joined to create an improper connection.

6.0 Critical Features

7. Internal Wiring - Internal wiring is routed away from sharp or moving parts. Internal wiring leads terminating in soldered connections are made mechanically secure prior to soldering. Recognized Component separable (quick disconnect) connectors of the positive detent type, closed loop connectors, or other types specifically described in the text of this report are also acceptable as internal wiring terminals. At points where internal wiring passes through metal walls or partitions, the wiring insulation is protected against abrasion or damage by plastic bushings or grommets. The internal wiring such as cell connectors and string connectors on the module is within the encapsulation material or within the sealed junction box neither of which is designed for field accessibility nor service. Internal wiring is routed away from sharp or moving parts.

8. Schematics - Refer to ILL1~ILL2A for schematics requiring verification during field representative Inspection Audits.

9. Markings - The product is marked on a labeling system as described in item no. 15 of Section 4.0, information on the marking shall include:
a) name, registered brand name of applicant;
b) type or model number designation;
c) serial number;
d) date and place of manufacture; alternatively serial number assuring traceability of date and place of manufacture, and won't repeat in 10 years;
Exception No. 1: The applicant's identification may be in a traceable code if the product is identified by the brand or trademark owned by a private labeler.
Exception No. 2: The date of manufacture may be abbreviated; or may be in a nationally accepted conventional code or in a code affirmed by the applicant, provided that the code:
e) polarity of terminals or leads, PV connectors or wiring shall be marked in accordance to IEC 62852 with a symbol „Do not disconnect under load";
f) "Maximum system voltage" or "V_{sys}";
g) Class of protection against electrical shock;
h) "voltage at open-circuit" or "Voc" including manufacturing tolerances;
i) "current at short-circuit;" or "Isc" including manufacturing tolerances;
j) "PV module maximum power" or "Pmax" including manufacturing tolerances;
k) "Maximum overcurrent protection rating"
l)"PV module may be marked with "Fire Type:___. See Installation Instructions for Installation Requirements to Achieve a Specified System Fire Class Rating with this Product"."
J) Marking of Multiple listee must fulfill requirements listed above.
k) Bifacial module shall be present front-surface STC ratings and shall also include bifaciality coefficients at STC for open-circuit voltage, short-circuit current and maximum power. Fuse rating shall assume a 30% albedo under STC conditions, and no less than 1.56 times of Isc.
All electrical data shall be shown as relative to standard test conditions (STC) (1000 W/m2, (25 ± 2) °C, AM 1,5 according to IEC 60904-3).

10. Cautionary Markings - The following is required:
All cautionary text shall be marked in both english and french.
a) PV module shall be marked 'Do not disconnect under load' and 'Ne vous déconnectez pas sous la charge.', or marked with a symbol instead. Refer to ILL8 or ILL8A in section 7 for the symbol. Symbol or warning notice shall be imprinted or labelled close to connector. PV connectors shall be clearly marked '+' and '-' to indicating the terminal polarity.
b) Symbol of Caution, risk of electric shock shall be applied near the PV module electrical connection means. Refer to ILL8B in section 7 for the symbol.
c) PV modules shall be marked to indicate the protective class , refer to ILL8C in section 7 for the symbol.

6.0 Critical Features

11. Installation, Operating and Safety Instructions - Instructions for installation and use of this product are provided by the applicant:

PV modules shall be supplied with documentation describing the methods of electrical and mechanical installation as well as the electrical ratings of the PV module. The documentation shall state the Class under which the PV module was qualified and any specific limitations required for that Class. The documentation shall state the environmental conditions to which the module has been qualified, which by default includes a temperature range of –40 °C to +40 °C and wind/snow load including safety factor. It shall be ensured that appropriate documentation for safe installation, use, and maintenance is available to installers and operators.

For identical PV modules it is considered to be sufficient that one set of documentation is supplied with the PV module shipping unit. The module is considered to be in compliance with this standard only when the module is mounted in the manner specified by the mounting instructions. A module with exposed conductive parts is considered to be in compliance with this standard only when it is electrically grounded in accordance with the applicant's instructions and the requirements of the National Electrical Code, ANSI/NFPA 70 (2014-2017).

Environmental conditions to which a PV module has been qualified may include IEC 61701 or IEC 62716.

• recommended maximum series/parallel PV module configurations;
• the current rating of overcurrent protection, as determined in MST 26. Guidance to determine current rating may be given in to IEC 60269-6;
• applicant's stated tolerance for Voc, Isc and maximum power output Pmax under standard test conditions;
• temperature coefficient for voltage at open-circuit, maximum power and short-circuit current.

All electrical data shall be shown as relative to standard test conditions (1000 W/m2, (25 ± 2) °C, AM 1.5 according to IEC 60904-3).

International symbols shall be used where applicable.

The electrical documentation shall include a detailed description of the electrical installation wiring method to be used. This description shall include :

• any limitations on wiring methods and wire management that apply to the junction box for the PV module;
• specific PV connector model/types and manufacturer to which the PV module connectors can be mated;
• the bonding and grounding method(s) to be used (if applicable) shall be specified. All provided or specified hardware shall be identified in the documentation;
• the type and rating of bypass-diodes to be used as well as the installation instructions for those diodes (if applicable);
• limitations to the mounting situation (e.g. slope, mounting means, cooling);
• a statement indicating the fire rating(s) and the applied standard, or a statement that resistance to external resources was not evaluated, as well as the limitations to that rating (e.g. installation slope, substructure or other applicable installation information);
• a statement indicating the minimum mechanical means for securing the PV module (as evaluated during the mechanical load test (MST 34)); and
• a statement indicating the maximum altitude the PV module is designed for. De-ratings can be applied.

The documentation for roof mounting shall include:

• a statement indicating the minimum mechanical means for securing the PV module to the roof (as evaluated during the mechanical load test according (MST 34);
• details of the specific parameter(s) when the fire rating is dependent on a specific mounting structure, specific spacing, or specific means of attachment to the roof or structure.

The documentation shall include a statement advising that external or otherwise artificially concentrated sunlight shall not be directed onto the front or back face of the PV module (if not qualified for).

Assembly instructions shall be provided with a product shipped in subassemblies and shall be detailed and adequate to the degree required to facilitate complete and safe assembly of the product to specific cations set forth in the IEC 61730 standard series.

6.0 Critical Features

To facilitate proper system sizing the applicant shall include relevant parameters in the installation instructions that allow system layout based not only on STC values given in the documentation. For example a safety factor for Voc and Isc of 1,25 is recommended since irradiance is often higher then 1000 W/m2 and temperature below 25 °C may raise Voc.

The following or equivalent statement shall be included:

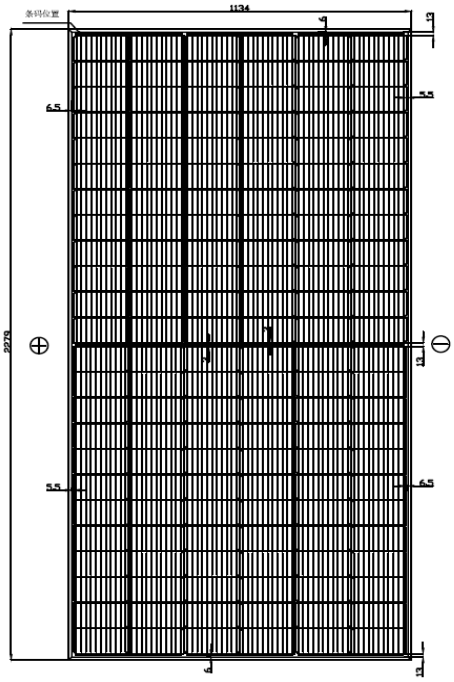
"Under normal conditions, a photovoltaic module is likely to experience conditions that produce higher current and/or voltage than reported at standard test conditions. Accordingly, the values of Isc and Voc marked on this PV module should be multiplied by a factor of 1,25 when determining component voltage ratings, conductor current ratings, and size of controls (e.g. inverter) connected to the PV output."

The safety factor of 1,25 for the minimum voltage rating of the components can be modified during the design of a system according to the minimum temperature of the location of the installation and the temperature coefficient for Voc. Isc can be adjusted based on maximal temperature, irradiance and orientation of the module. To this end a full simulation for the specific location is required using long term weather data.

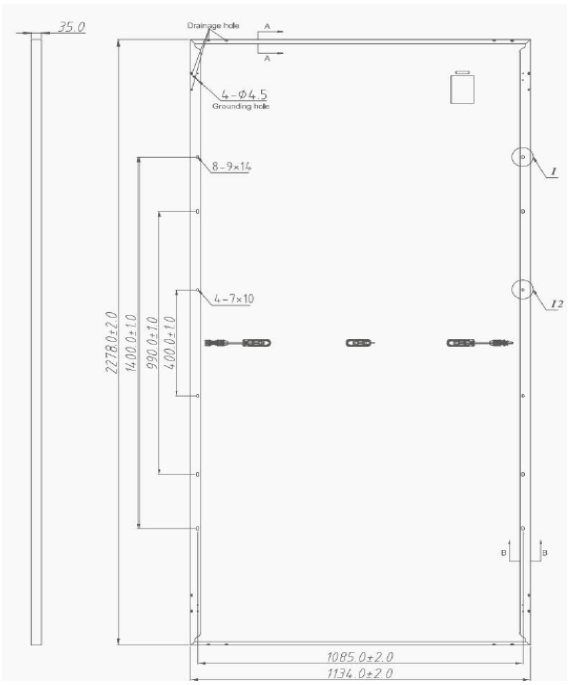
Refer to ILL3 ~ ILL4B in section 7 for grounding and installation methold.

7.0 Illustrations

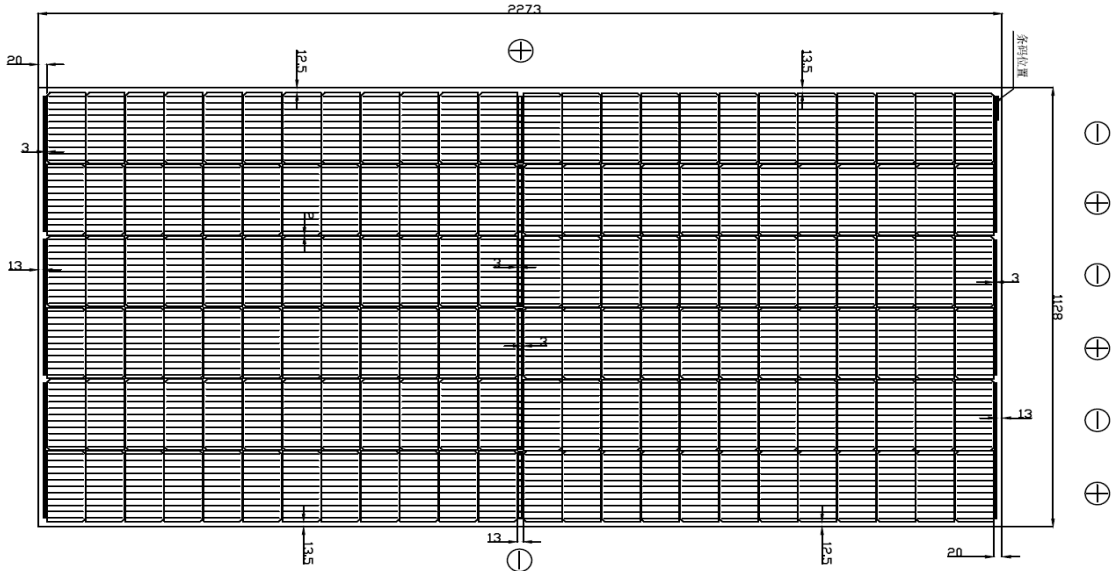
Illustration 1A - Schematic of modules with mono-facial module with 144 pieces of halved 182mm solar cells



Front



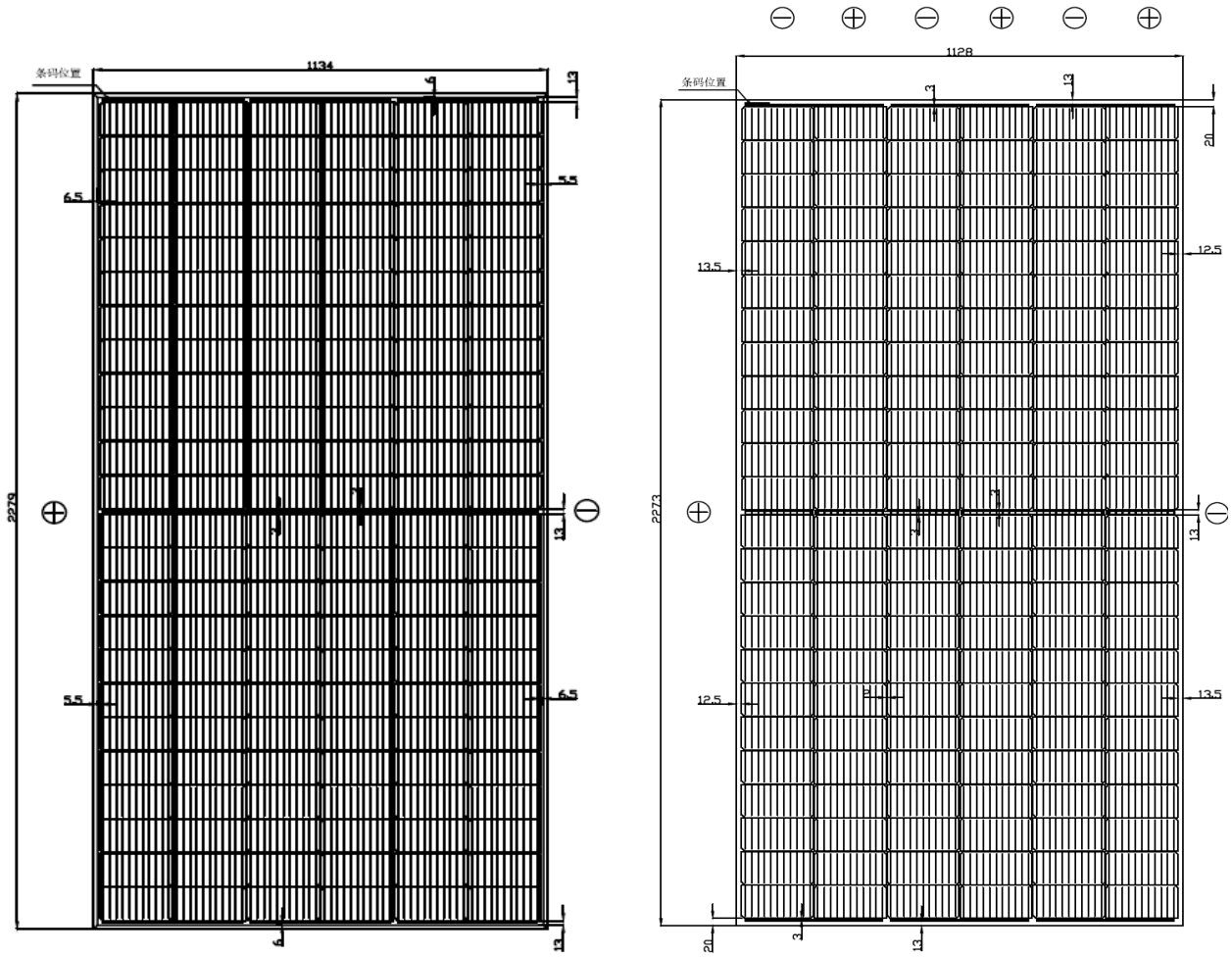
Rear



Lamination

7.0 Illustrations

Illustration 1A1 - Schematic of modules with bifacial module with 144 pieces of halved 182mm solar cells

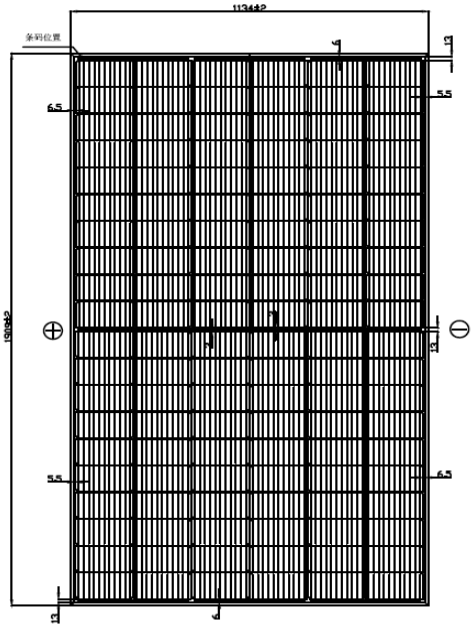


Front

Lamination

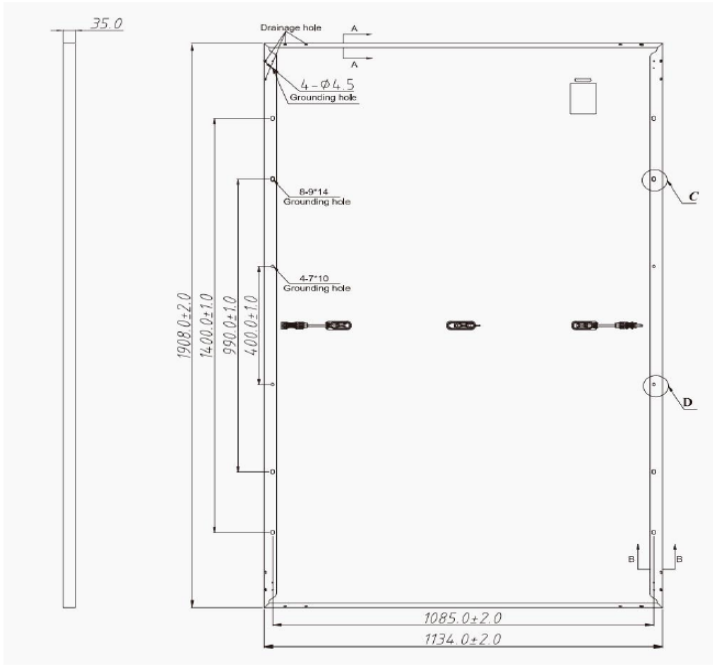
7.0 Illustrations

Illustration 1B - Schematic of modules with mono-facial module with 120 pieces of halved 182mm solar cells



正面图

Front



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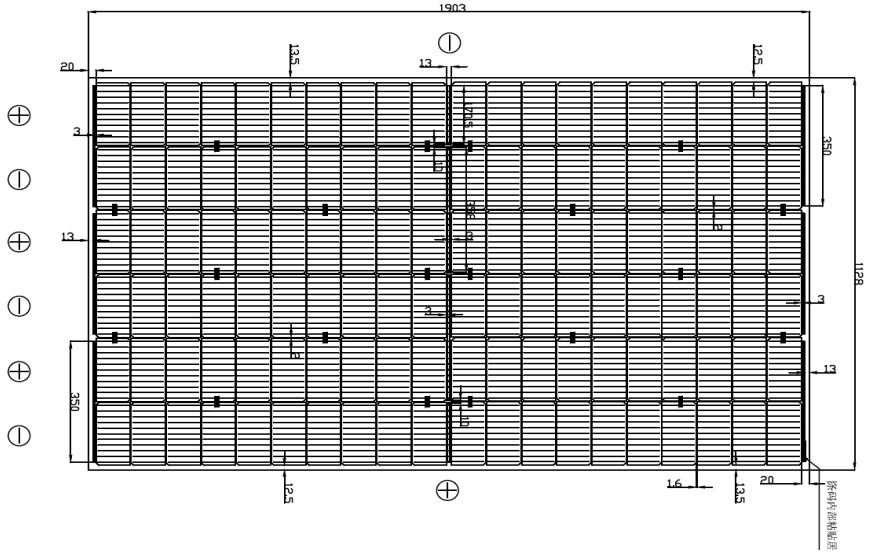
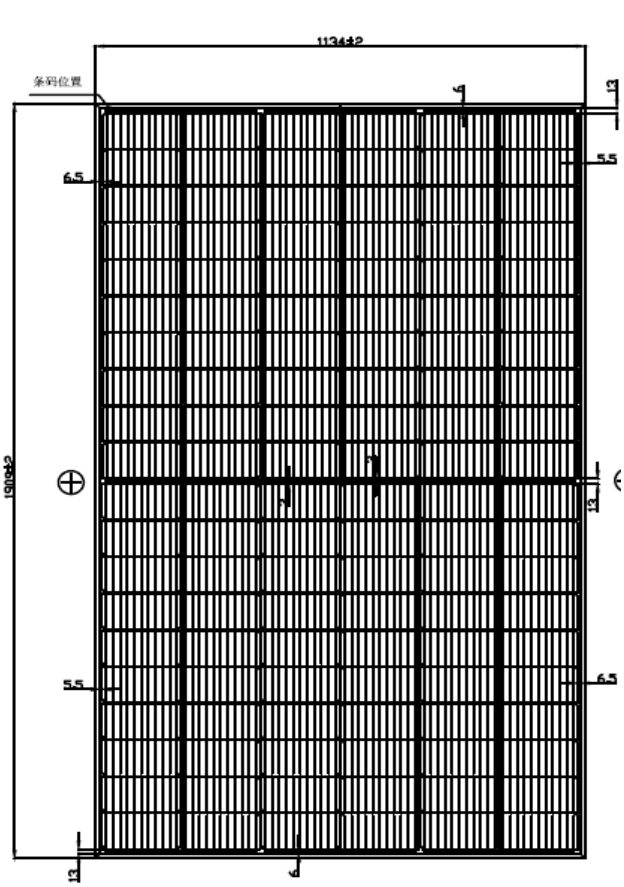


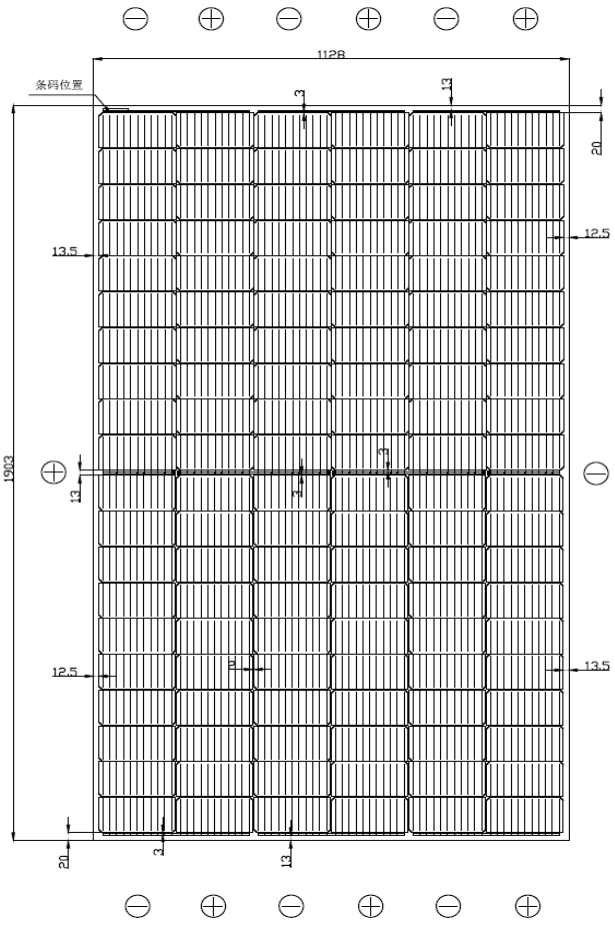
Lamination

7.0 Illustrations

Illustration 1B1 - Schematic of modules with Bifacial module with 120 pieces of halved 182mm solar cells



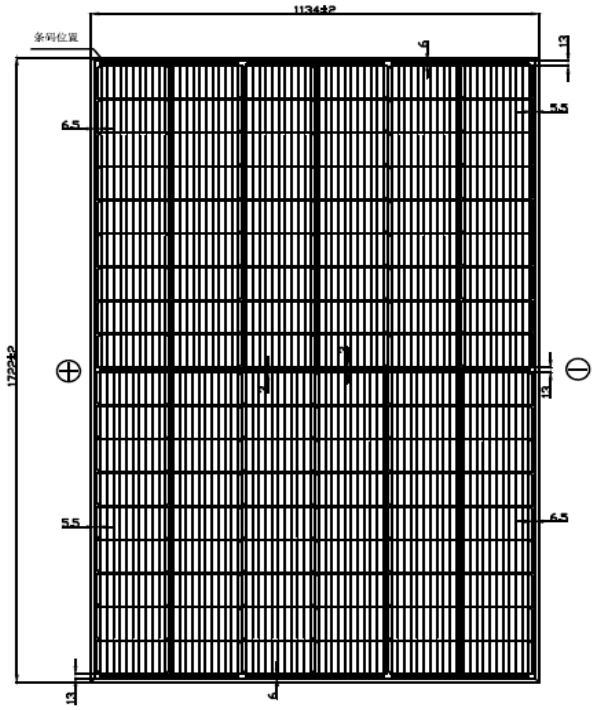
Front



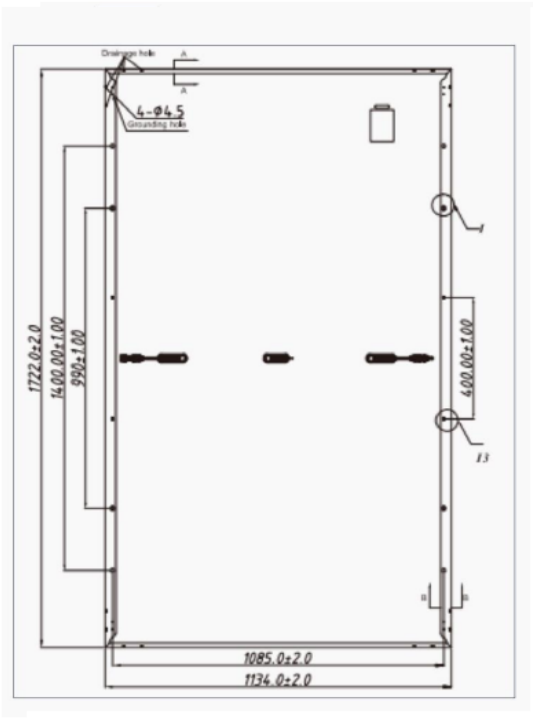
back

7.0 Illustrations

Illustration 1C - Schematic of modules with Mono-facial module with 108 pieces of halved 182mm solar cells



Front



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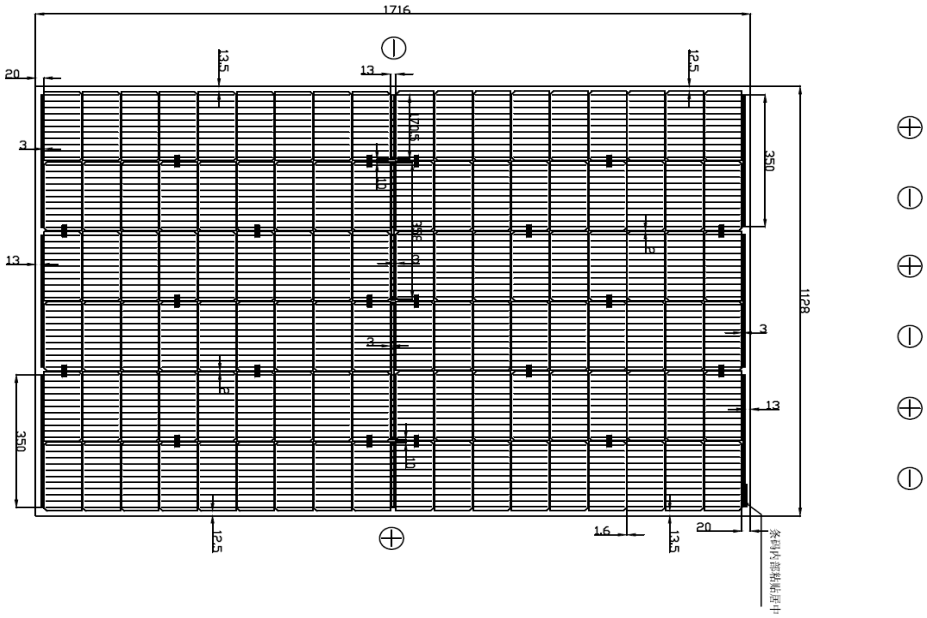
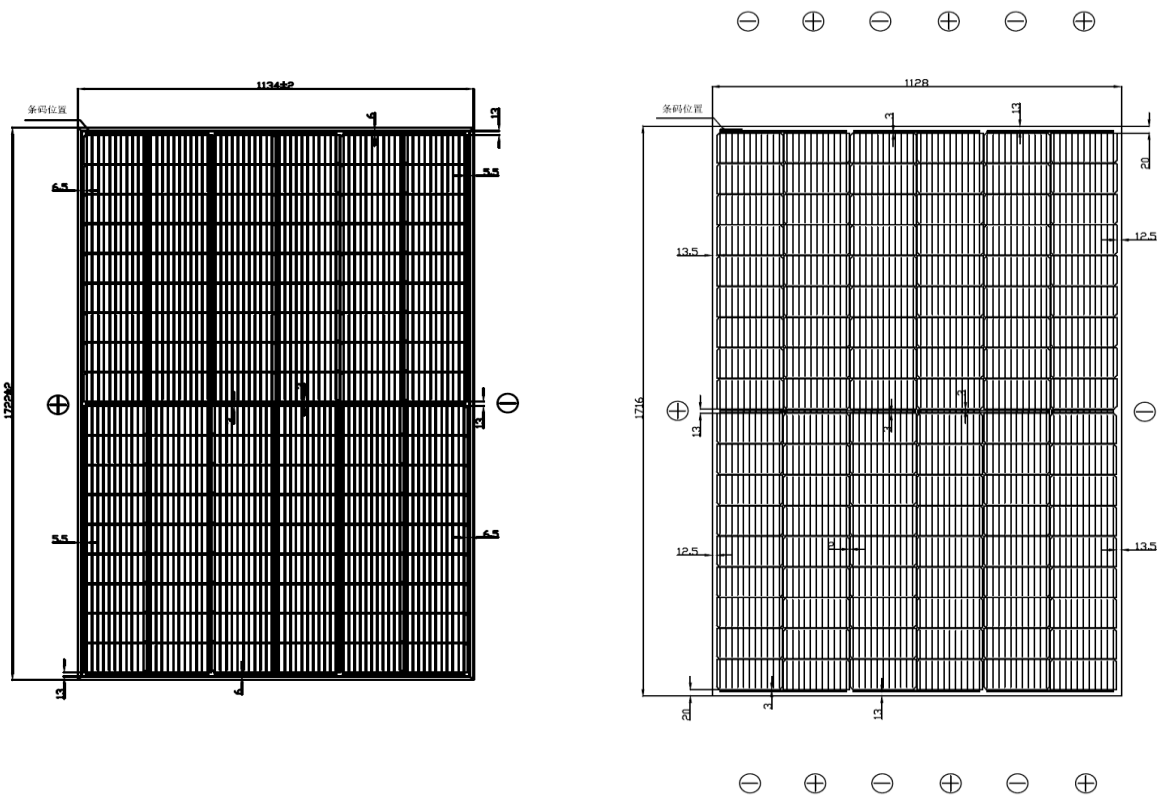


lamination

7.0 Illustrations

Illustration 1C1 - Schematic of modules with Bifacial module with 108 pieces of halved 182mm solar cells

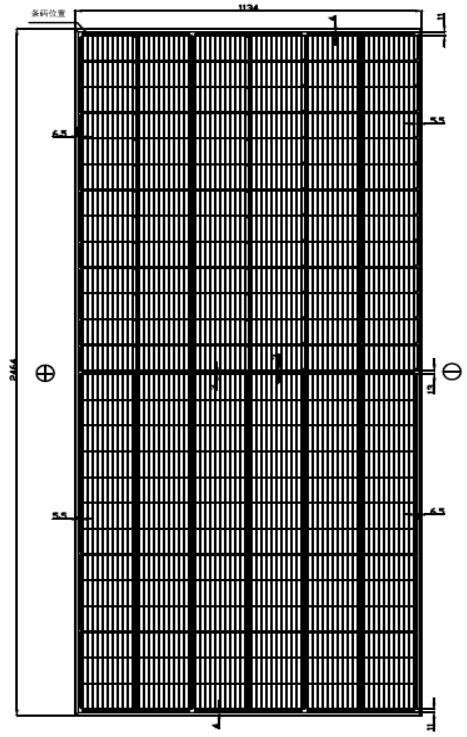


Front

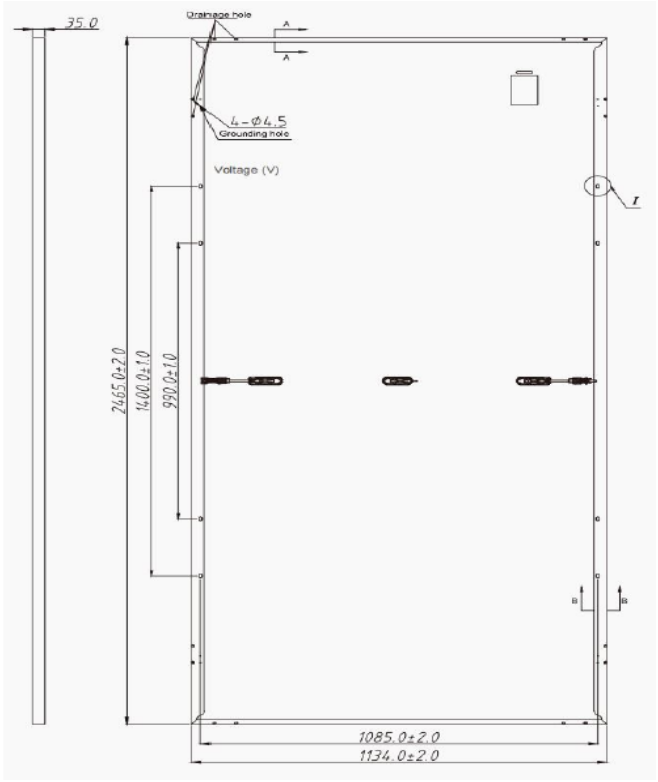
back

7.0 Illustrations

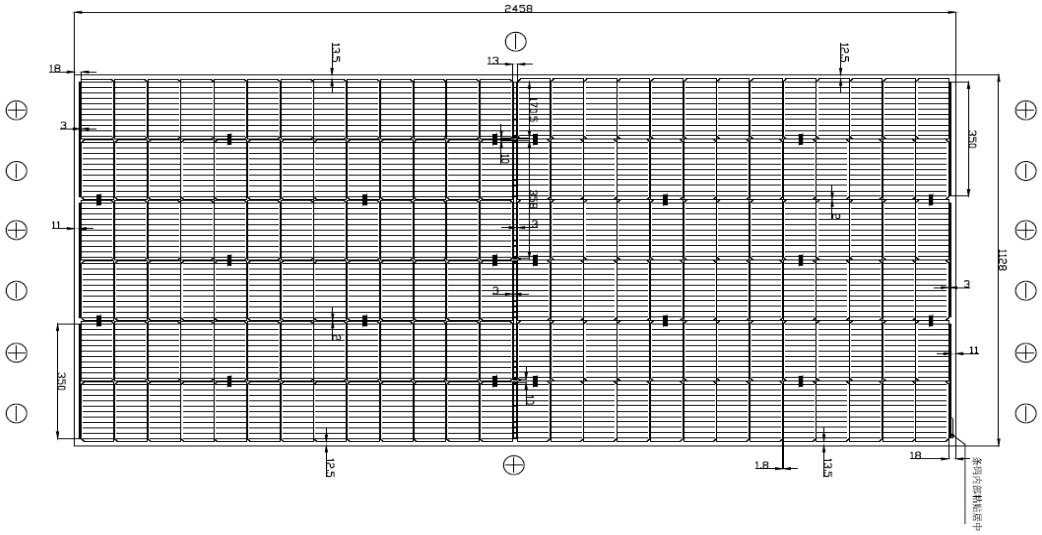
Illustration 1D - Schematic of modules with mono-facial module with 156 pieces of halved 182mm solar cells



Front



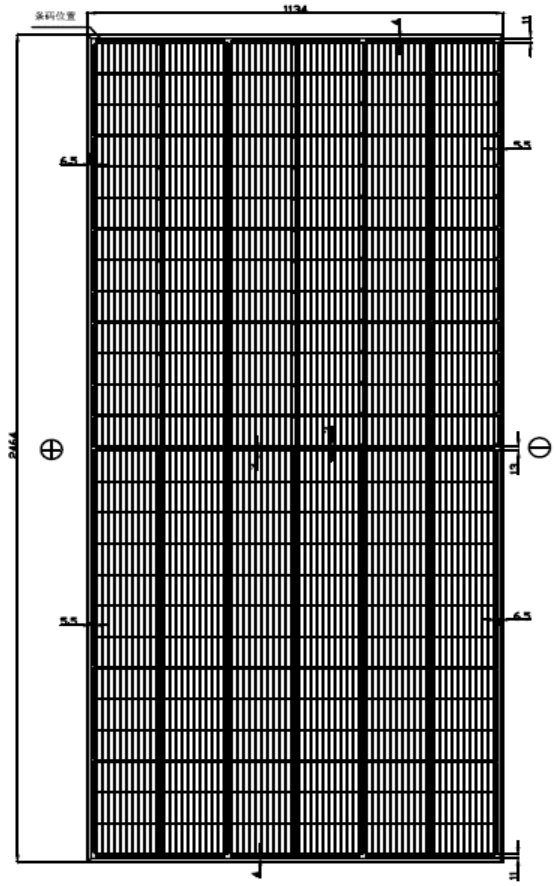
back



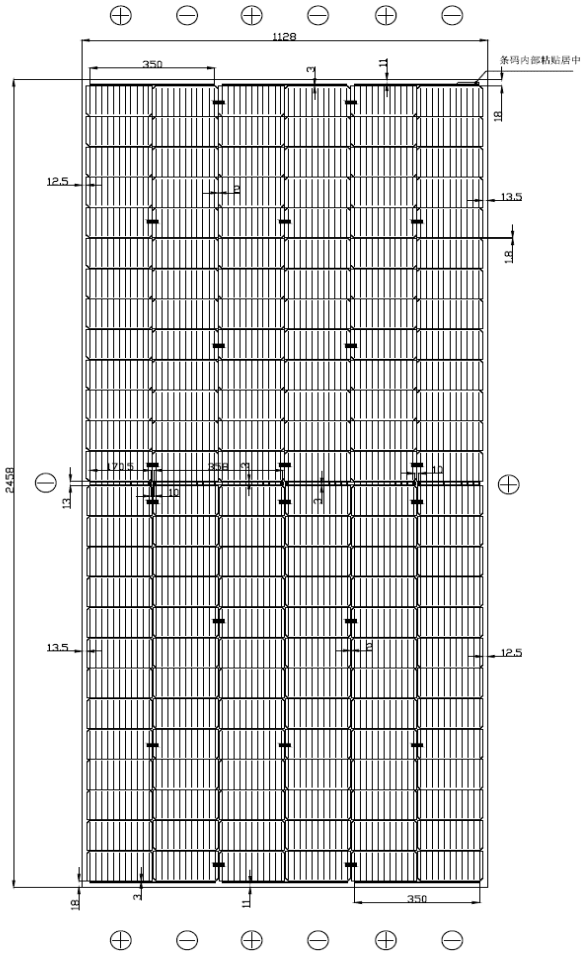
Lamination

7.0 Illustrations

Illustration 1D1 - Schematic of modules with Bifacial module with 156 pieces of halved 182mm solar cells



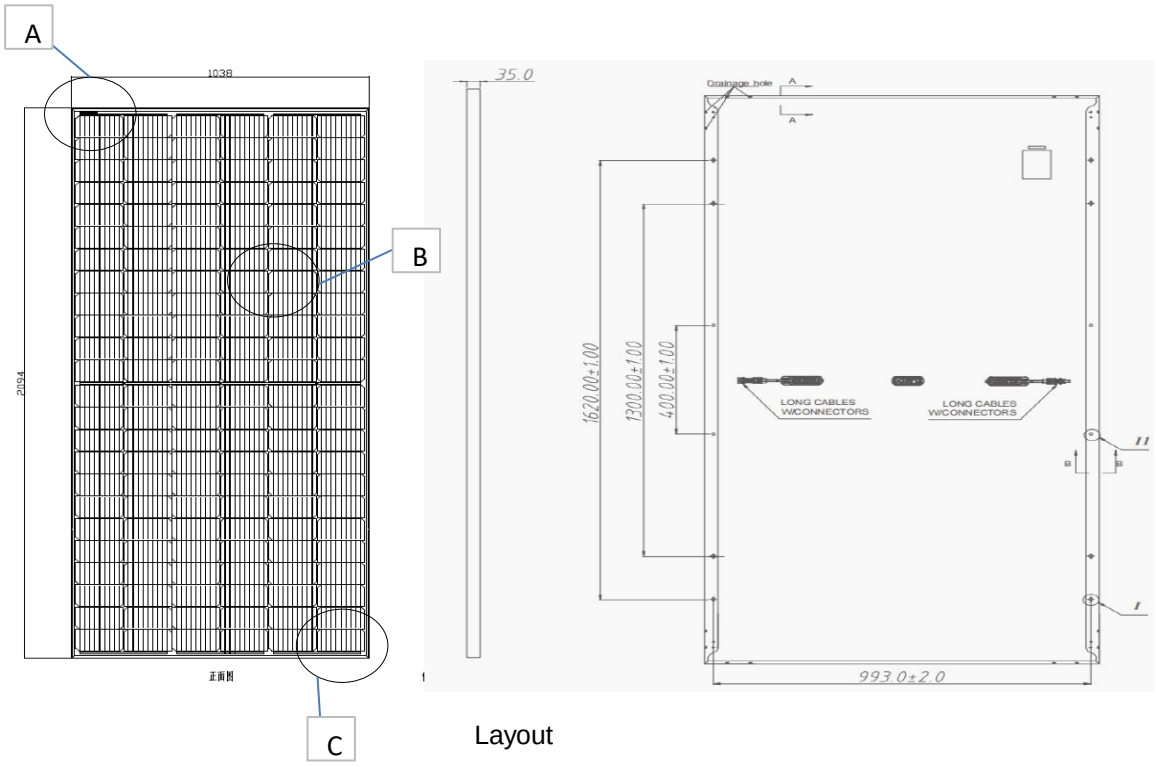
Layout



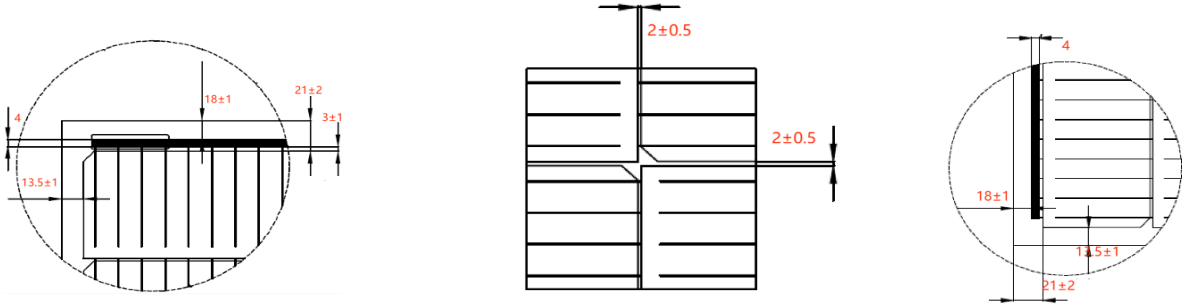
Lamination

7.0 Illustrations

Illustration 1E - Schematic of modules with mono-facial module with 144 pieces of halved 166mm solar cells



Layout

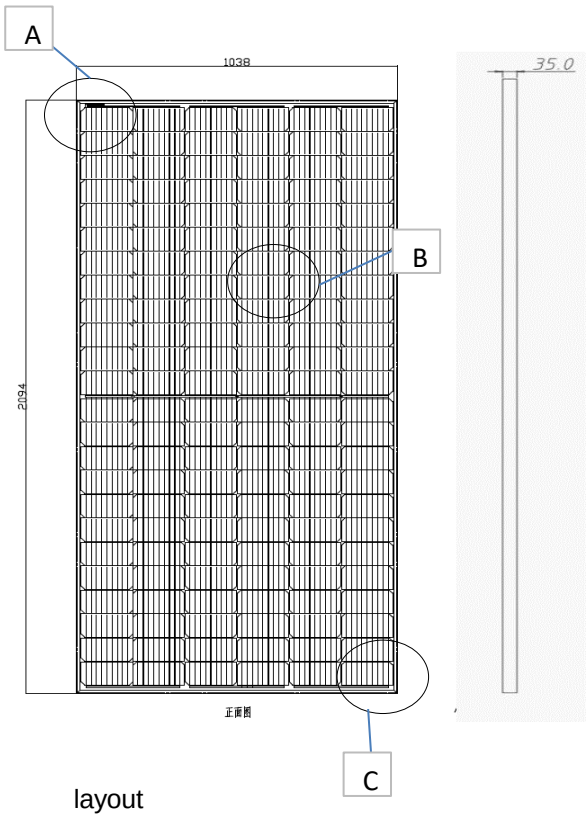


A B C

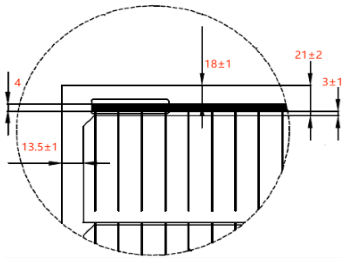
Lamination

7.0 Illustrations

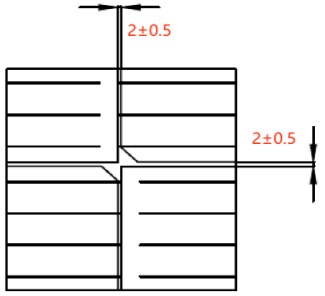
Illustration 1E1 - Schematic of modules with bifacial module with 144 pieces of halved 166mm solar cells



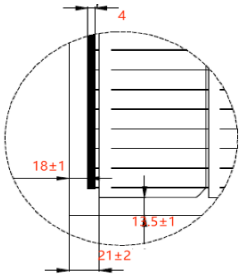
layout



A



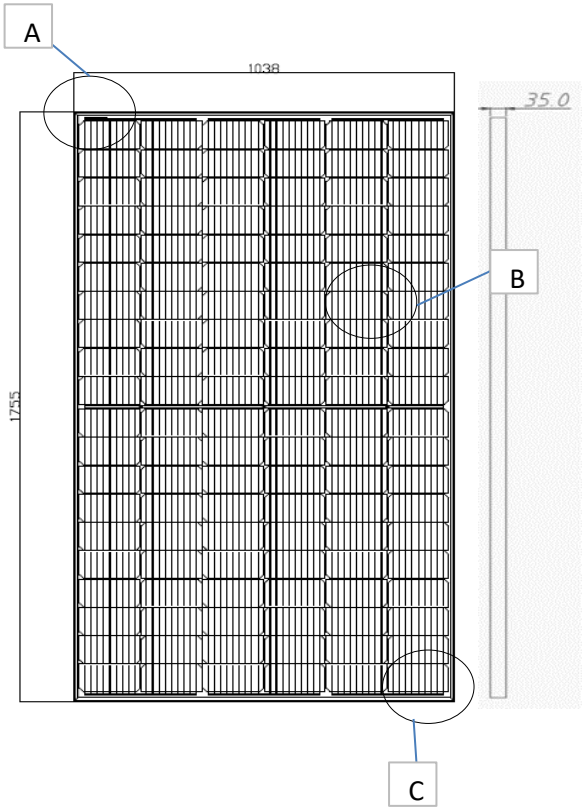
B

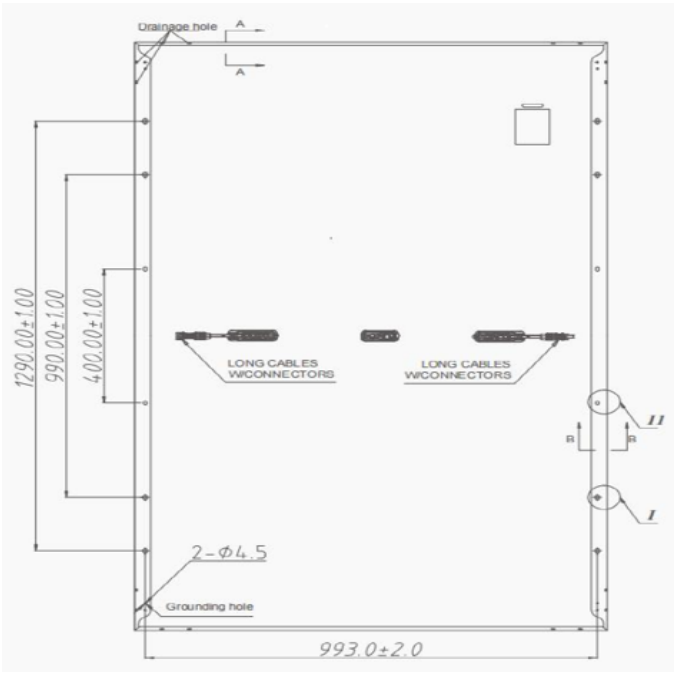


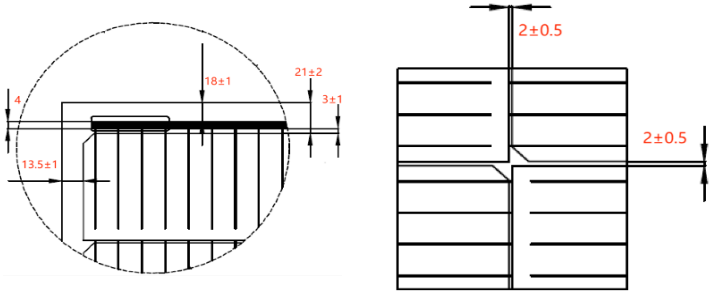
C

7.0 Illustrations

Illustration 1F - Schematic of modules with mono-facial module with 120 pieces of halved 166mm solar cells



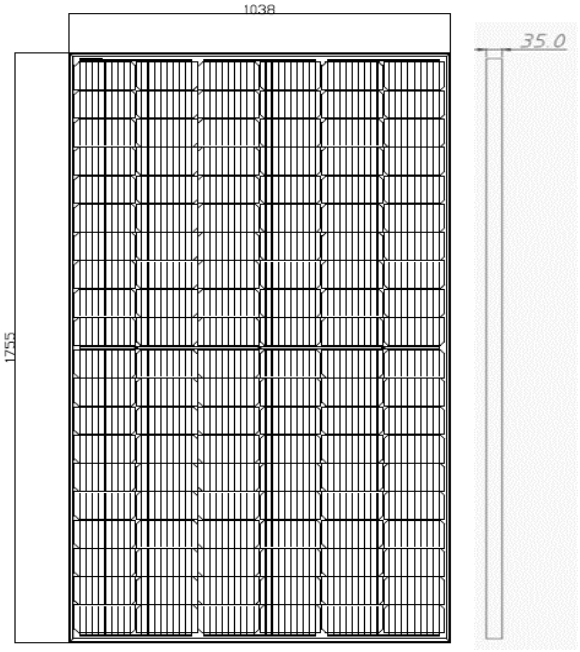


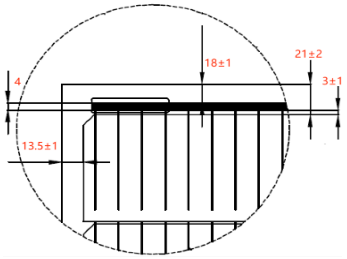


A B C

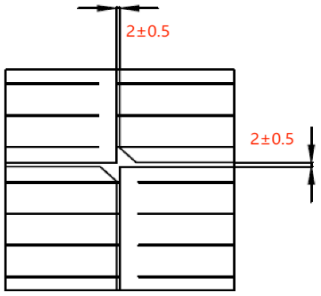
7.0 Illustrations

Illustration 1F1 - Schematic of modules with bifacial module with 120 pieces of halved 166mm solar cells

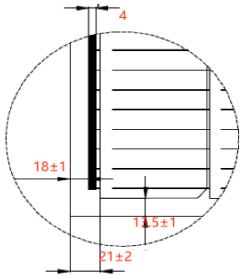




A



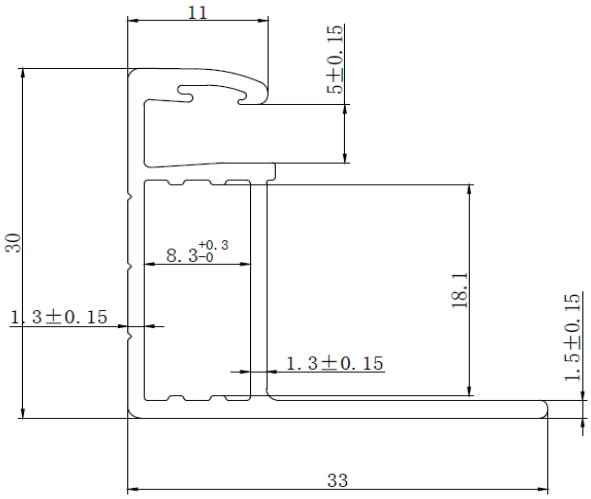
B



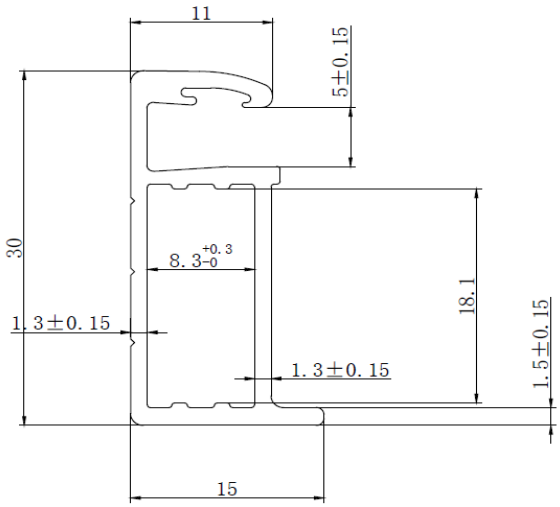
C

7.0 Illustrations

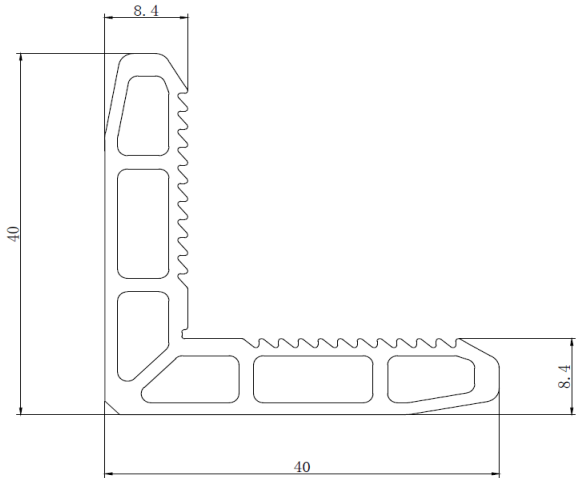
Illustration 2 - Schematic of frame crosssection



long side



short side

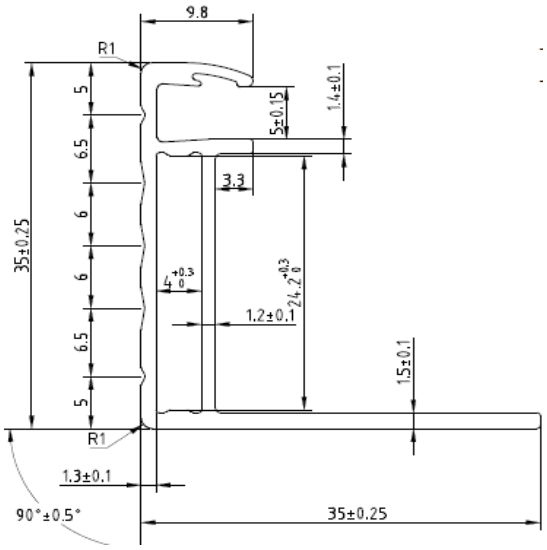


Corner Key

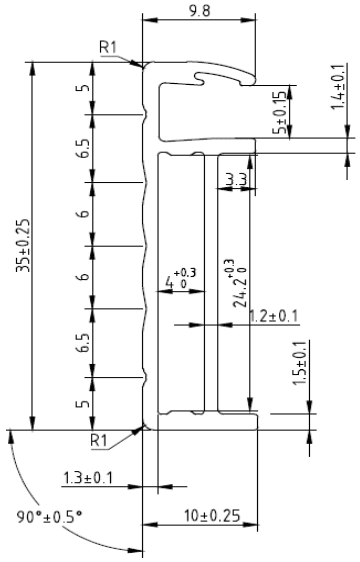
Note: Only apply to module with 182mm solar cells

7.0 Illustrations

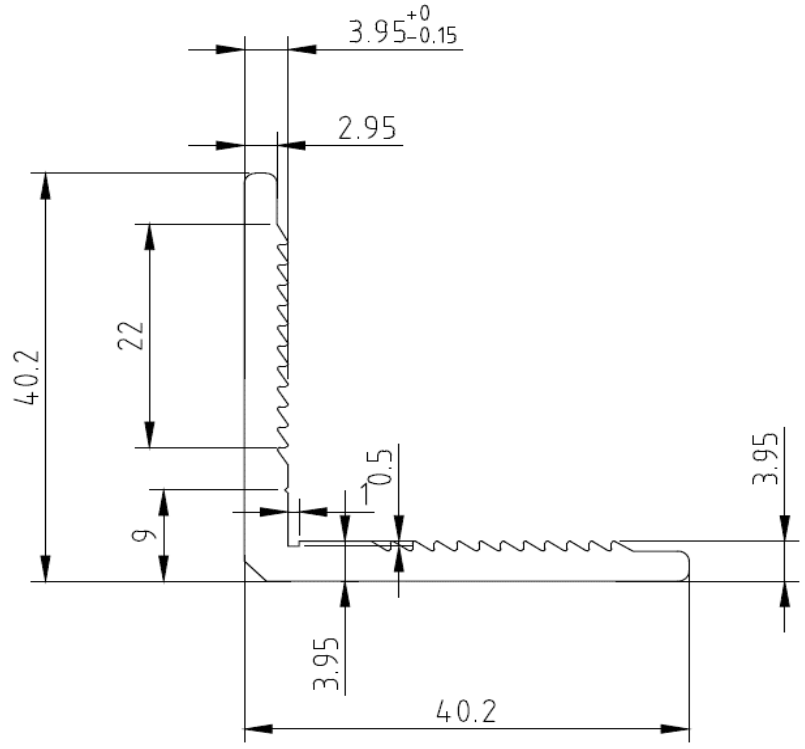
Illustration 2A - Schematic of frame crosssection



long side



short side



Corner key

Note: Only apply to module with 166mm solar cells

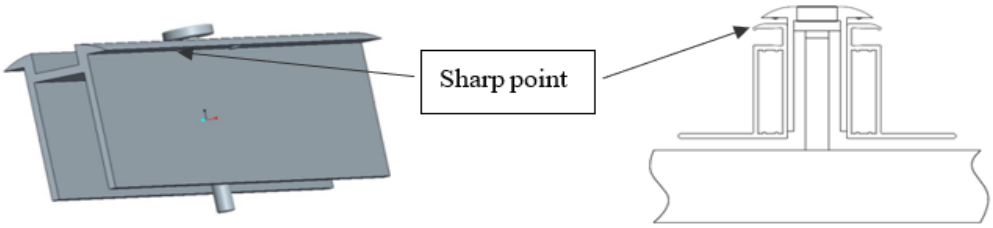
7.0 Illustrations

Illustration 3 - Grounding method

6.2. GROUNDING

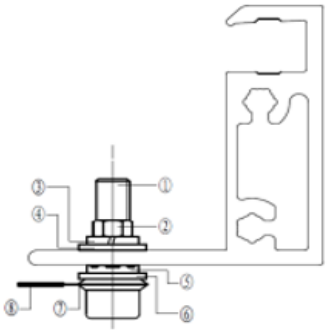
- All module frames and mounting racks must be properly grounded in accordance with appropriate respective National Electrical Code.
- Proper grounding is achieved by bonding the module frame(s) and all metallic structural members together continuously using a suitable grounding conductor. The grounding conductor or strap may be copper, copper alloy, or any other material acceptable for use as an electrical conductor per respective National Electrical Codes. The grounding conductor must then make a connection to earth using a suitable earth ground electrode.
- Gstar Solar modules can be installed with the use of third party listed grounding devices for grounding the metallic frames of PV modules. The devices have to be installed in accordance with the grounding device manufacturer's specified instructions.
- Gstar Solar recommends using the following grounding ways：

a）Using Schleter for grounding. Connecting modules to the support structure according to the picture below. (Grounding accessories need pass the UL467 standard test.)



- Recommended torque is 20.5Nm
- For more information, please contact the supplier Schletter（http：//www.solar.schletter.de）

b）The traditional way of grounding（Grounding accessories need pass the UL467 standard test and UL E34440/E6207 test.）



① Stainless steel bolt M4×30
② Stainless steel nut M4
③ Stainless steel spring washer M4
④ ⑥ Stainless steel flat washer M4
⑤ Stainless steel lock-toothed washer M4
⑦ Stainless steel cup washer M4
⑧ Grounding wire

- For fully grounding, grounding hardware should penetrate the anodic oxidation layer of frame.
- Recommended 10-12 AWG bare copper grounding wire.

7.0 Illustrations

Illustration 4 - Installation Method

6.1. MOUNTING METHODS

PV modules can be mounted to the substructure using either corrosion-proof M8 bolts placed through the mounting holes on the rear of the module or specially designed module clamps.

Regardless of the fixing method the final installation of the modules must ensure that:

A clearance of at least 115mm is provided between modules frame and the surface of the wall or roof.

The minimum distance between two modules is 10 mm.

The mounting method does not block the module drainage holes.

Panels are not subjected to wind or snow loads exceeding the maximum permissible loads, and are not subject to excessive forces due to the thermal expansion of the support structures.

A.Mounting with Bolts

The frame of each module has 8 x ϕ9mm mounting holes, ideally placed to optimize the load handling capability, to secure the modules to supporting structure.

- To maximize mounting longevity, Gstar Solar strongly recommends the use of corrosion proof (stainless steel) fixings
- Secure the module in each fixing location with an M8mm bolt and a flat washer, spring washer and nut as shown in Figure 1 and tighten to a torque of 16 Nm.

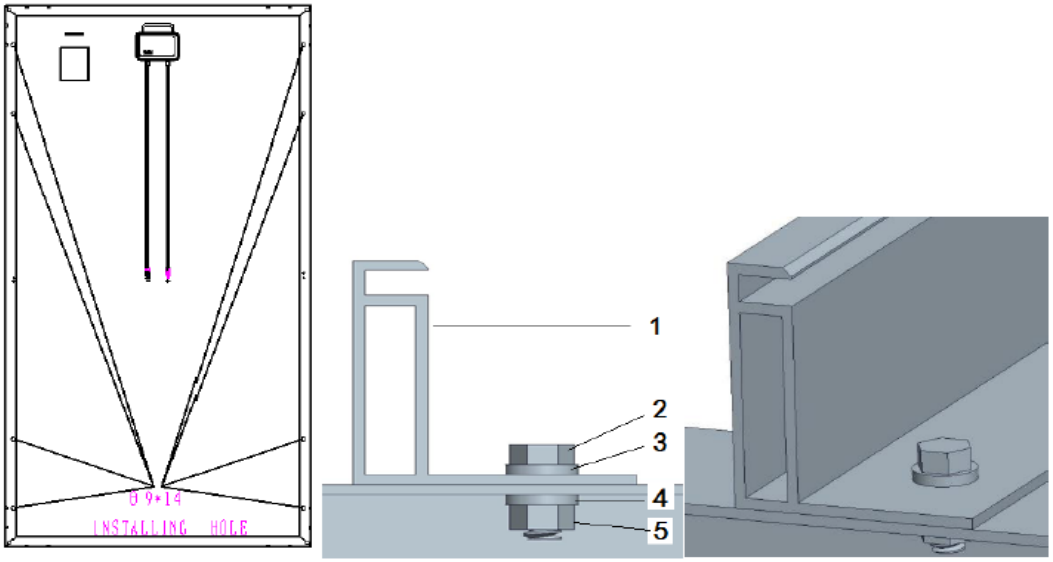


Figure1.Module installed with Bolt fitting method

1）Aluminum Frame

2）M8 Stainless bolt

3）Flat Stainless Washer

4）Spring Stainless Washer

5）Stainless Nut

7.0 Illustrations

Illustration 4A - Continued Installation Method

B. Mounting with Clamps:

- Gstar Solar has tested its modules with a number of clamps from different manufacturers and recommends the use of clamps which have an EPDM or similar insulating washer, fixing bolt of at least M6. The clamp must overlap the module frame by at least 7mm but no more than 10 mm.
- Use at minimum 4 clamps to fix modules on the mounting rails.
- Modules clamps should not come into contact with the front glass and must not deform the frame.
- Be sure to avoid shadowing effects from the module clamps.
- The module frame is not to be modified under any circumstances.
- When choosing this type of clamp-mounting method, use at least four clamps on each module, two clamps should be attached on each long sides of the module (for portrait orientation) and each short sides of the module (for landscape orientation). Depending on local wind and snow loads, additional clamps may be required to ensure that modules can bear the load.
- Applied torque should refer to mechanical design standard according to the bolt customer is using, ex:M6 is 8N*M;M8 is 16N*M.

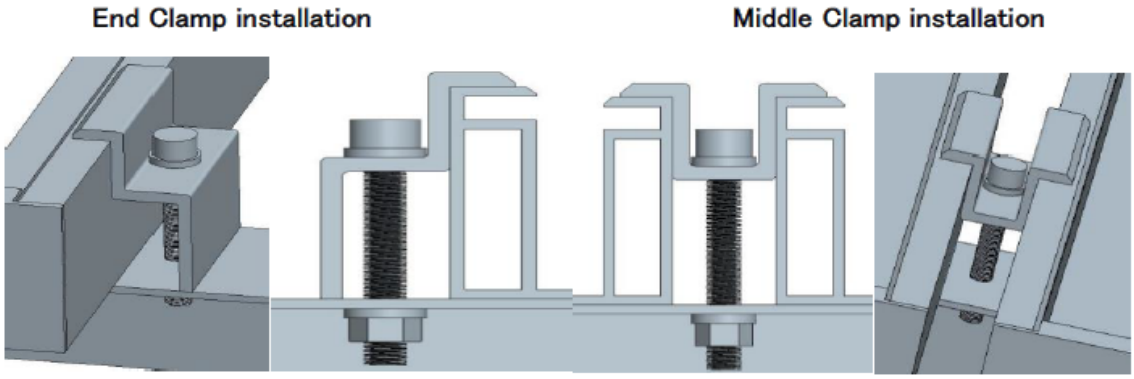


Figure2. Module installed with clamp fitting method

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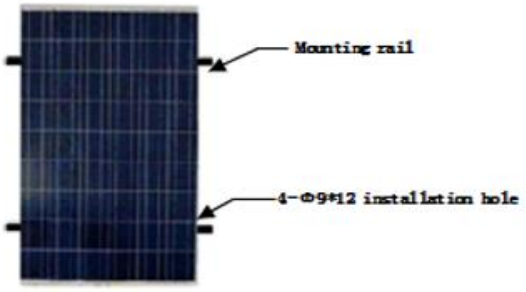
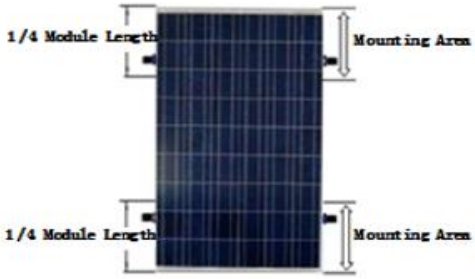
Illustration 4B - Continued Installation Method

Mounting system	
Clamping system Attachment to the long frame	

Other mounting configurations can be used however, failure to comply with the above recommendations will result in a lowering of the load handling (snow/wind load) capabilities below the product specification design load 3600/1600Pa and product failure as a result of an overload situation will not be covered by the guarantee.

7.0 Illustrations

Illustration 5 - Controled combination of material solar cell and encapsulation

Combination No.	Component Name	Manufacturer	Type
1	Encapsulation (Upper side)	HANGZHOU FIRST APPLIED MATERIAL CO., LTD	F406PS
	Solar Cell	T.S Solar Energy Co.,Ltd.	182-10BB-144F
			TS166M-9BB
	Encapsulation (lower side)	HANGZHOU FIRST APPLIED MATERIAL CO., LTD	F806PS

7.0 Illustrations

Illustration 6 - Controled combination of material for junction box PV-ZH011C-5

Component Name	Manufacturer	Type
Junction Box	Zhejiang Zhonghuan Sunter PV Technology Co., Ltd.	PV-ZH011C-5
Backsheet	Crown Advanced Matertial Co., LTD	Crown BO-P2
Cable	Zhejiang Zhonghuan Sunter PV Technology Co., Ltd.	PV Wire
Connector	Zhejiang Zhonghuan Sunter PV Technology Co., Ltd.	PV-ZH202B
	STAUBLI ELECTRICAL CONNECTORS AG	PV-KBT4-EVO2/6II-UR (female) PV-KST4-EVO2/6II-UR (male)
		PV-KBT4-EVO2A/xy (female) PV-KST4-EVO2A/xy (male)
Potting Material	Shanghai Huitian New Material Co., LTD.	5299W-S
Junction Box Adhesive	Shanghai Huitian New Material Co., LTD.	HT906Z
Bypass diode	Zhejiang Zhonghuan Sunter PV Technology Co.,Ltd	30SQ045 35SQ045 40SQ045

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Illustration 6A - Controled combination of material for junction box JM17X

Component Name	Manufacturer	Type
Junction Box	Zhejiang Jiaming Tianheyuan Photovoltaic Technology Co.,Ltd.	JM17X
Backsheet	Crown Advanced Matertial Co., LTD	Crown BO-P2
Cable	Zhejiang Jiaming Tianheyuan Photovoltaic Technology Co.,Ltd.	PV Wire
Connector	Zhejiang Jiaming Tianheyuan Photovoltaic Technology Co.,Ltd.	PV-JM608
	STAEUBLI ELECTRICAL CONNECTORS ESSEN GMBH	PV-KST4-EVO2/6II-UR (male) PV-KBT4-EVO2/6II-UR (female)
		PV-KBT4-EVO2A/xy (female) PV-KST4-EVO2A/xy (male)
	ZHEJIANG JIAMING TIANHEYUAN PHOTOVOLTAIC TECHNOLOGY CO LTD	PV-JM601A
	JIANGSU TONGLIN ELECTRIC CO LTD	TL-CABLE01S-F
		TL-CABLE01S-FR
Potting Material	Shanghai Huitian New Material Co.,Ltd.	5299W-S
Junction Box Adhesive	Shanghai Huitian New Material Co.,Ltd.	HT906Z
Bypass diode	Hangzhou Lion Microelectronics Co., Ltd.	THY4050

7.0 Illustrations

Illustration 7 - Controled combination of material Backsheet and Encapsulation

Combination No.	Component Name	Manufacturer	Type
1	Backsheet	Crown Advanced Matertial Co., LTD	Crown BO-P2
	Encapsulation	HANGZHOU FIRST APPLIED MATERIAL CO., LTD	F806PS

7.0 Illustrations

Illustration 8 - Cautionary Markings 'Do not disconnect under load'

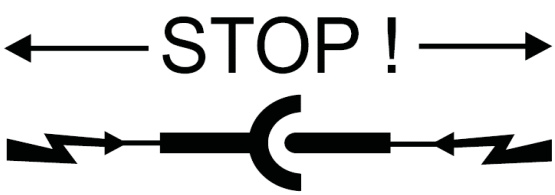

Illustration 8A - Cautionary Markings 'Do not disconnect under load'

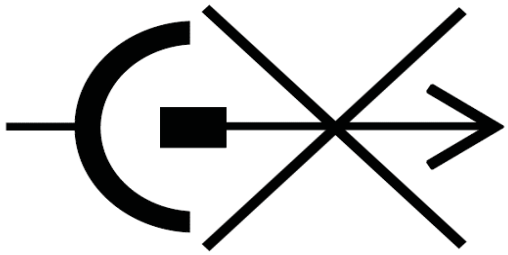

Illustration 8B - Cautionary Markings 'risk of electric shock'

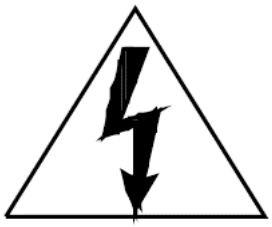

Illustration 8C - Cautionary Markings 'Classfication'

Class II	

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Illustration 9 - Other Ratings

Model	Pmax(W) (±3%)	Voc (V) (±3%)	Isc (A) (±3%)	Vmp (V)	Imp (A)	System voltage (V)	MSF (A)
GSP7G54M400BT	400	37	13.78	31.05	12.89	1000	30
GSP7G54M405BT	405	37.25	13.86	31.24	12.97	1000	30
GSP7G54M410BT	410	37.5	13.94	31.43	13.05	1000	30
GSP7G54M415BT	415	37.75	14.02	31.64	13.13	1000	30
GSP7G54M390WT	390	36.5	13.61	30.65	12.73	1000	30
GSP7G54M395WT	395	36.75	13.69	30.85	12.81	1000	30
GSP7G54M400WT	400	37	13.78	31.05	12.89	1000	30
GSP7G54M405WT	405	37.25	13.86	31.24	12.97	1000	30
GSP7G54M410WT	410	37.5	13.94	31.43	13.05	1000	30
GSP7G54M415WT	415	37.75	14.02	31.64	13.13	1000	30
GSP7F60M435	435	40.82	13.6	34.17	12.73	1000	25
GSP7F60M440	440	40.99	13.69	34.35	12.81	1000	25
GSP7F60M445	445	41.16	13.78	34.53	12.89	1000	25
GSP7F60M450	450	41.33	13.86	34.7	12.97	1000	25
GSP7F60M455	455	41.5	13.94	34.87	13.05	1000	25
GSP7F60M460	460	41.67	14.02	35.04	13.13	1000	25
GSP7F60M435BB	435	40.82	13.6	34.17	12.73	1000	25
GSP7F60M440BB	440	40.99	13.69	34.35	12.81	1000	25
GSP7F60M445BB	445	41.16	13.78	34.53	12.89	1000	25
GSP7F60M450BB	450	41.33	13.86	34.7	12.97	1000	25
GSP7F60M455BB	455	41.5	13.94	34.87	13.05	1000	25
GSP7F60M460BB	460	41.67	14.02	35.04	13.13	1000	25
GSP7F60M435BW	435	40.82	13.6	34.17	12.73	1000	25
GSP7F60M440BW	440	40.99	13.69	34.35	12.81	1000	25
GSP7F60M445BW	445	41.16	13.78	34.53	12.89	1000	25
GSP7F60M450BW	450	41.33	13.86	34.7	12.97	1000	25
GSP7F60M455BW	455	41.5	13.94	34.87	13.05	1000	25
GSP7F60M460BW	460	41.67	14.02	35.04	13.13	1000	25
GSP7G60M435BT	435	40.82	13.6	34.17	12.73	1000	30
GSP7G60M440BT	440	40.99	13.69	34.35	12.81	1000	30
GSP7G60M445BT	445	41.16	13.78	34.53	12.89	1000	30
GSP7G60M450BT	450	41.33	13.86	34.7	12.97	1000	30
GSP7G60M455BT	455	41.5	13.94	34.87	13.05	1000	30
GSP7G60M460BT	460	41.67	14.02	35.04	13.13	1000	30
GSP7G60M435WT	435	40.82	13.6	34.17	12.73	1000	30
GSP7G60M440WT	440	40.99	13.69	34.35	12.81	1000	30
GSP7G60M445WT	445	41.16	13.78	34.53	12.89	1000	30
GSP7G60M450WT	450	41.33	13.86	34.7	12.97	1000	30
GSP7G60M455WT	455	41.5	13.94	34.87	13.05	1000	30
GSP7G60M460WT	460	41.67	14.02	35.04	13.13	1000	30
GSP7F72M525	525	49.18	13.65	41.16	12.76	1000	25
GSP7F72M530	530	49.32	13.72	41.32	12.83	1000	25
GSP7F72M535	535	49.46	13.79	41.48	12.9	1000	25
GSP7F72M540	540	49.6	13.86	41.64	12.97	1000	25
GSP7F72M545	545	49.76	13.93	41.8	13.04	1000	25
GSP7F72M550	550	49.92	14	41.96	13.11	1000	25
GSP7F72M555	555	50.08	14.07	42.12	13.18	1000	25
GSP7F72M560	560	50.24	14.14	42.28	13.25	1000	25
GSP7F72M525BB	525	49.18	13.65	41.16	12.76	1000	25

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Illustration 9A - Other Ratings

GSP7F72M530BB	530	49.32	13.72	41.32	12.83	1000	25
GSP7F72M535BB	535	49.46	13.79	41.48	12.9	1000	25
GSP7F72M540BB	540	49.6	13.86	41.64	12.97	1000	25
GSP7F72M545BB	545	49.76	13.93	41.8	13.04	1000	25
GSP7F72M550BB	550	49.92	14	41.96	13.11	1000	25
GSP7F72M555BB	555	50.08	14.07	42.12	13.18	1000	25
GSP7F72M560BB	560	50.24	14.14	42.28	13.25	1000	25
GSP7F72M525BW	525	49.18	13.65	41.16	12.76	1000	25
GSP7F72M530BW	530	49.32	13.72	41.32	12.83	1000	25
GSP7F72M535BW	535	49.46	13.79	41.48	12.9	1000	25
GSP7F72M540BW	540	49.6	13.86	41.64	12.97	1000	25
GSP7F72M545BW	545	49.76	13.93	41.8	13.04	1000	25
GSP7F72M550BW	550	49.92	14	41.96	13.11	1000	25
GSP7F72M555BW	555	50.08	14.07	42.12	13.18	1000	25
GSP7F72M560BW	560	50.24	14.14	42.28	13.25	1000	25
GSP7G72M525BT	525	49.18	13.65	41.16	12.76	1000	30
GSP7G72M530BT	530	49.32	13.72	41.32	12.83	1000	30
GSP7G72M535BT	535	49.46	13.79	41.48	12.9	1000	30
GSP7G72M540BT	540	49.6	13.86	41.64	12.97	1000	30
GSP7G72M545BT	545	49.76	13.93	41.8	13.04	1000	30
GSP7G72M550BT	550	49.92	14	41.96	13.11	1000	30
GSP7G72M555BT	555	50.08	14.07	42.12	13.18	1000	30
GSP7G72M560BT	560	50.24	14.14	42.28	13.25	1000	30
GSP7G72M525WT	525	49.18	13.65	41.16	12.76	1000	30
GSP7G72M530WT	530	49.32	13.72	41.32	12.83	1000	30
GSP7G72M535WT	535	49.46	13.79	41.48	12.9	1000	30
GSP7G72M540WT	540	49.6	13.86	41.64	12.97	1000	30
GSP7G72M545WT	545	49.76	13.93	41.8	13.04	1000	30
GSP7G72M550WT	550	49.92	14	41.96	13.11	1000	30
GSP7G72M555WT	555	50.08	14.07	42.12	13.18	1000	30
GSP7G72M560WT	560	50.24	14.14	42.28	13.25	1000	30
GSP7F78M570	570	53.31	13.65	44.69	12.76	1000	25
GSP7F78M575	575	53.54	13.72	44.83	12.83	1000	25
GSP7F78M580	580	53.59	13.79	44.97	12.9	1000	25
GSP7F78M585	585	53.73	13.86	45.11	12.97	1000	25
GSP7F78M590	590	53.87	13.93	45.25	13.04	1000	25
GSP7F78M595	595	54.01	14	45.39	13.11	1000	25
GSP7F78M600	600	54.15	14.07	45.53	13.18	1000	25
GSP7F78M605	605	54.29	14.14	45.67	13.25	1000	25
GSP7F78M570BB	570	53.31	13.65	44.69	12.76	1000	25
GSP7F78M575BB	575	53.54	13.72	44.83	12.83	1000	25
GSP7F78M580BB	580	53.59	13.79	44.97	12.9	1000	25
GSP7F78M585BB	585	53.73	13.86	45.11	12.97	1000	25
GSP7F78M590BB	590	53.87	13.93	45.25	13.04	1000	25
GSP7F78M595BB	595	54.01	14	45.39	13.11	1000	25
GSP7F78M600BB	600	54.15	14.07	45.53	13.18	1000	25
GSP7F78M605BB	605	54.29	14.14	45.67	13.25	1000	25
GSP7F78M570BW	570	53.31	13.65	44.69	12.76	1000	25
GSP7F78M575BW	575	53.54	13.72	44.83	12.83	1000	25
GSP7F78M580BW	580	53.59	13.79	44.97	12.9	1000	25
GSP7F78M585BW	585	53.73	13.86	45.11	12.97	1000	25
GSP7F78M590BW	590	53.87	13.93	45.25	13.04	1000	25
GSP7F78M595BW	595	54.01	14	45.39	13.11	1000	25

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Illustration 9B - Other Ratings

GSP7F78M600BW	600	54.15	14.07	45.53	13.18	1000	25
GSP7F78M605BW	605	54.29	14.14	45.67	13.25	1000	25
GSP7G78M570BT	570	53.31	13.65	44.69	12.76	1000	30
GSP7G78M575BT	575	53.54	13.72	44.83	12.83	1000	30
GSP7G78M580BT	580	53.59	13.79	44.97	12.9	1000	30
GSP7G78M585BT	585	53.73	13.86	45.11	12.97	1000	30
GSP7G78M590BT	590	53.87	13.93	45.25	13.04	1000	30
GSP7G78M595BT	595	54.01	14	45.39	13.11	1000	30
GSP7G78M600BT	600	54.15	14.07	45.53	13.18	1000	30
GSP7G78M605BT	605	54.29	14.14	45.67	13.25	1000	30
GSP7G78M570WT	570	53.31	13.65	44.69	12.76	1000	30
GSP7G78M575WT	575	53.54	13.72	44.83	12.83	1000	30
GSP7G78M580WT	580	53.59	13.79	44.97	12.9	1000	30
GSP7G78M585WT	585	53.73	13.86	45.11	12.97	1000	30
GSP7G78M590WT	590	53.87	13.93	45.25	13.04	1000	30
GSP7G78M595WT	595	54.01	14	45.39	13.11	1000	30
GSP7G78M600WT	600	54.15	14.07	45.53	13.18	1000	30
GSP7G78M605WT	605	54.29	14.14	45.67	13.25	1000	30
GSP7F66M485	485	45.16	13.7	37.87	12.81	1000	25
GSP7F66M490	490	45.31	13.78	38.02	12.89	1000	25
GSP7F66M495	495	45.46	13.86	38.17	12.97	1000	25
GSP7F66M500	500	45.61	13.94	38.32	13.05	1000	25
GSP7F66M505	505	45.76	14.02	38.47	13.13	1000	25
GSP7F66M485BB	485	45.16	13.7	37.87	12.81	1000	25
GSP7F66M490BB	490	45.31	13.78	38.02	12.89	1000	25
GSP7F66M495BB	495	45.46	13.86	38.17	12.97	1000	25
GSP7F66M500BB	500	45.61	13.94	38.32	13.05	1000	25
GSP7F66M505BB	505	45.76	14.02	38.47	13.13	1000	25
GSP7F66M485BW	485	45.16	13.7	37.87	12.81	1000	25
GSP7F66M490BW	490	45.31	13.78	38.02	12.89	1000	25
GSP7F66M495BW	495	45.46	13.86	38.17	12.97	1000	25
GSP7F66M500BW	500	45.61	13.94	38.32	13.05	1000	25
GSP7F66M505BW	505	45.76	14.02	38.47	13.13	1000	25
GSP7G66M485BT	485	45.16	13.7	37.87	12.81	1000	30
GSP7G66M490BT	490	45.31	13.78	38.02	12.89	1000	30
GSP7G66M495BT	495	45.46	13.86	38.17	12.97	1000	30
GSP7G66M500BT	500	45.61	13.94	38.32	13.05	1000	30
GSP7G66M505BT	505	45.76	14.02	38.47	13.13	1000	30
GSP7G66M485WT	485	45.16	13.7	37.87	12.81	1000	30
GSP7G66M490WT	490	45.31	13.78	38.02	12.89	1000	30
GSP7G66M495WT	495	45.46	13.86	38.17	12.97	1000	30
GSP7G66M500WT	500	45.61	13.94	38.32	13.05	1000	30
GSP7G66M505WT	505	45.76	14.02	38.47	13.13	1000	30
GSP7F66M(H)485	485	45.16	13.7	37.87	12.81	1500	25
GSP7F66M(H)490	490	45.31	13.78	38.02	12.89	1500	25
GSP7F66M(H)495	495	45.46	13.86	38.17	12.97	1500	25
GSP7F66M(H)500	500	45.61	13.94	38.32	13.05	1500	25
GSP7F66M(H)505	505	45.76	14.02	38.47	13.13	1500	25
GSP7F66M(H)485BB	485	45.16	13.7	37.87	12.81	1500	25
GSP7F66M(H)490BB	490	45.31	13.78	38.02	12.89	1500	25
GSP7F66M(H)495BB	495	45.46	13.86	38.17	12.97	1500	25
GSP7F66M(H)500BB	500	45.61	13.94	38.32	13.05	1500	25
GSP7F66M(H)505BB	505	45.76	14.02	38.47	13.13	1500	25

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Illustration 9C - Other Ratings

GSP7F66M(H)485BW	485	45.16	13.7	37.87	12.81	1500	25
GSP7F66M(H)490BW	490	45.31	13.78	38.02	12.89	1500	25
GSP7F66M(H)495BW	495	45.46	13.86	38.17	12.97	1500	25
GSP7F66M(H)500BW	500	45.61	13.94	38.32	13.05	1500	25
GSP7F66M(H)505BW	505	45.76	14.02	38.47	13.13	1500	25
GSP7G66M(H)485BT	485	45.16	13.7	37.87	12.81	1500	30
GSP7G66M(H)490BT	490	45.31	13.78	38.02	12.89	1500	30
GSP7G66M(H)495BT	495	45.46	13.86	38.17	12.97	1500	30
GSP7G66M(H)500BT	500	45.61	13.94	38.32	13.05	1500	30
GSP7G66M(H)505BT	505	45.76	14.02	38.47	13.13	1500	30
GSP7G66M(H)485WT	485	45.16	13.7	37.87	12.81	1500	30
GSP7G66M(H)490WT	490	45.31	13.78	38.02	12.89	1500	30
GSP7G66M(H)495WT	495	45.46	13.86	38.17	12.97	1500	30
GSP7G66M(H)500WT	500	45.61	13.94	38.32	13.05	1500	30
GSP7G66M(H)505WT	505	45.76	14.02	38.47	13.13	1500	30
GSP6F60M(H)350	350	40.3	11.04	33.7	10.4	1500	20
GSP6F60M(H)355	355	40.5	11.1	34	10.45	1500	20
GSP6F60M(H)360	360	40.7	11.15	34.3	10.5	1500	20
GSP6F60M(H)365	365	40.9	11.2	34.6	10.56	1500	20
GSP6F60M(H)370	370	41.1	11.26	34.9	10.61	1500	20
GSP6F60M(H)375	375	41.3	11.31	35.2	10.66	1500	20
GSP6F60M(H)380	380	41.5	11.37	35.5	10.71	1500	20
GSP6F60M(H)350BB	350	40.3	11.04	33.7	10.4	1500	20
GSP6F60M(H)355BB	355	40.5	11.1	34	10.45	1500	20
GSP6F60M(H)360BB	360	40.7	11.15	34.3	10.5	1500	20
GSP6F60M(H)365BB	365	40.9	11.2	34.6	10.56	1500	20
GSP6F60M(H)370BB	370	41.1	11.26	34.9	10.61	1500	20
GSP6F60M(H)375BB	375	41.3	11.31	35.2	10.66	1500	20
GSP6F60M(H)380BB	380	41.5	11.37	35.5	10.71	1500	20
GSP6F60M(H)350BW	350	40.3	11.04	33.7	10.4	1500	20
GSP6F60M(H)355BW	355	40.5	11.1	34	10.45	1500	20
GSP6F60M(H)360BW	360	40.7	11.15	34.3	10.5	1500	20
GSP6F60M(H)365BW	365	40.9	11.2	34.6	10.56	1500	20
GSP6F60M(H)370BW	370	41.1	11.26	34.9	10.61	1500	20
GSP6F60M(H)375BW	375	41.3	11.31	35.2	10.66	1500	20
GSP6F60M(H)380BW	380	41.5	11.37	35.5	10.71	1500	20
GSP6G60M(H)350BT	350	40.3	11.04	33.7	10.4	1500	25
GSP6G60M(H)355BT	355	40.5	11.1	34	10.45	1500	25
GSP6G60M(H)360BT	360	40.7	11.15	34.3	10.5	1500	25
GSP6G60M(H)365BT	365	40.9	11.2	34.6	10.56	1500	25
GSP6G60M(H)370BT	370	41.1	11.26	34.9	10.61	1500	25
GSP6G60M(H)375BT	375	41.3	11.31	35.2	10.66	1500	25
GSP6G60M(H)380BT	380	41.5	11.37	35.5	10.71	1500	25
GSP6G60M(H)350WT	350	40.3	11.04	33.7	10.4	1500	25
GSP6G60M(H)355WT	355	40.5	11.1	34	10.45	1500	25
GSP6G60M(H)360WT	360	40.7	11.15	34.3	10.5	1500	25
GSP6G60M(H)365WT	365	40.9	11.2	34.6	10.56	1500	25
GSP6G60M(H)370WT	370	41.1	11.26	34.9	10.61	1500	25
GSP6G60M(H)375WT	375	41.3	11.31	35.2	10.66	1500	25
GSP6G60M(H)380WT	380	41.5	11.37	35.5	10.71	1500	25
GSP6F72M(H)425	425	48.6	11.19	39.9	10.66	1500	20
GSP6F72M(H)430	430	48.8	11.26	40.1	10.73	1500	20
GSP6F72M(H)435	435	49	11.33	40.3	10.8	1500	20

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Illustration 9D - Other Ratings

GSP6F72M(H)440	440	49.2	11.4	40.5	10.87	1500	20
GSP6F72M(H)445	445	49.4	11.47	40.7	10.94	1500	20
GSP6F72M(H)450	450	49.6	11.54	40.9	11.01	1500	20
GSP6F72M(H)455	455	49.8	11.61	41.1	11.08	1500	20
GSP6F72M(H)425BB	425	48.6	11.19	39.9	10.66	1500	20
GSP6F72M(H)430BB	430	48.8	11.26	40.1	10.73	1500	20
GSP6F72M(H)435BB	435	49	11.33	40.3	10.8	1500	20
GSP6F72M(H)440BB	440	49.2	11.4	40.5	10.87	1500	20
GSP6F72M(H)445BB	445	49.4	11.47	40.7	10.94	1500	20
GSP6F72M(H)450BB	450	49.6	11.54	40.9	11.01	1500	20
GSP6F72M(H)455BB	455	49.8	11.61	41.1	11.08	1500	20
GSP6F72M(H)425BW	425	48.6	11.19	39.9	10.66	1500	20
GSP6F72M(H)430BW	430	48.8	11.26	40.1	10.73	1500	20
GSP6F72M(H)435BW	435	49	11.33	40.3	10.8	1500	20
GSP6F72M(H)440BW	440	49.2	11.4	40.5	10.87	1500	20
GSP6F72M(H)445BW	445	49.4	11.47	40.7	10.94	1500	20
GSP6F72M(H)450BW	450	49.6	11.54	40.9	11.01	1500	20
GSP6F72M(H)455BW	455	49.8	11.61	41.1	11.08	1500	20
GSP6G72M(H)425BT	425	48.6	11.19	39.9	10.66	1500	25
GSP6G72M(H)430BT	430	48.8	11.26	40.1	10.73	1500	25
GSP6G72M(H)435BT	435	49	11.33	40.3	10.8	1500	25
GSP6G72M(H)440BT	440	49.2	11.4	40.5	10.87	1500	25
GSP6G72M(H)445BT	445	49.4	11.47	40.7	10.94	1500	25
GSP6G72M(H)450BT	450	49.6	11.54	40.9	11.01	1500	25
GSP6G72M(H)455BT	455	49.8	11.61	41.1	11.08	1500	25
GSP6G72M(H)425WT	425	48.6	11.19	39.9	10.66	1500	25
GSP6G72M(H)430WT	430	48.8	11.26	40.1	10.73	1500	25
GSP6G72M(H)435WT	435	49	11.33	40.3	10.8	1500	25
GSP6G72M(H)440WT	440	49.2	11.4	40.5	10.87	1500	25
GSP6G72M(H)445WT	445	49.4	11.47	40.7	10.94	1500	25
GSP6G72M(H)450WT	450	49.6	11.54	40.9	11.01	1500	25
GSP6G72M(H)455WT	455	49.8	11.61	41.1	11.08	1500	25
GSP6F60M350	350	40.3	11.04	33.7	10.4	1000	20
GSP6F60M355	355	40.5	11.1	34	10.45	1000	20
GSP6F60M360	360	40.7	11.15	34.3	10.5	1000	20
GSP6F60M365	365	40.9	11.2	34.6	10.56	1000	20
GSP6F60M370	370	41.1	11.26	34.9	10.61	1000	20
GSP6F60M375	375	41.3	11.31	35.2	10.66	1000	20
GSP6F60M380	380	41.5	11.37	35.5	10.71	1000	20
GSP6F60M350BB	350	40.3	11.04	33.7	10.4	1000	20
GSP6F60M355BB	355	40.5	11.1	34	10.45	1000	20
GSP6F60M360BB	360	40.7	11.15	34.3	10.5	1000	20
GSP6F60M365BB	365	40.9	11.2	34.6	10.56	1000	20
GSP6F60M370BB	370	41.1	11.26	34.9	10.61	1000	20
GSP6F60M375BB	375	41.3	11.31	35.2	10.66	1000	20
GSP6F60M380BB	380	41.5	11.37	35.5	10.71	1000	20
GSP6F60M350BW	350	40.3	11.04	33.7	10.4	1000	20
GSP6F60M355BW	355	40.5	11.1	34	10.45	1000	20
GSP6F60M360BW	360	40.7	11.15	34.3	10.5	1000	20
GSP6F60M365BW	365	40.9	11.2	34.6	10.56	1000	20
GSP6F60M370BW	370	41.1	11.26	34.9	10.61	1000	20
GSP6F60M375BW	375	41.3	11.31	35.2	10.66	1000	20
GSP6F60M380BW	380	41.5	11.37	35.5	10.71	1000	20
GSP6G60M350BT	350	40.3	11.04	33.7	10.4	1000	25

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Illustration 9E - Other Ratings

GSP6G60M355BT	355	40.5	11.1	34	10.45	1000	25
GSP6G60M360BT	360	40.7	11.15	34.3	10.5	1000	25
GSP6G60M365BT	365	40.9	11.2	34.6	10.56	1000	25
GSP6G60M370BT	370	41.1	11.26	34.9	10.61	1000	25
GSP6G60M375BT	375	41.3	11.31	35.2	10.66	1000	25
GSP6G60M380BT	380	41.5	11.37	35.5	10.71	1000	25
GSP6G60M350WT	350	40.3	11.04	33.7	10.4	1000	25
GSP6G60M355WT	355	40.5	11.1	34	10.45	1000	25
GSP6G60M360WT	360	40.7	11.15	34.3	10.5	1000	25
GSP6G60M365WT	365	40.9	11.2	34.6	10.56	1000	25
GSP6G60M370WT	370	41.1	11.26	34.9	10.61	1000	25
GSP6G60M375WT	375	41.3	11.31	35.2	10.66	1000	25
GSP6G60M380WT	380	41.5	11.37	35.5	10.71	1000	25
GSP6F72M425	425	48.6	11.19	39.9	10.66	1000	20
GSP6F72M430	430	48.8	11.26	40.1	10.73	1000	20
GSP6F72M435	435	49	11.33	40.3	10.8	1000	20
GSP6F72M440	440	49.2	11.4	40.5	10.87	1000	20
GSP6F72M445	445	49.4	11.47	40.7	10.94	1000	20
GSP6F72M450	450	49.6	11.54	40.9	11.01	1000	20
GSP6F72M455	455	49.8	11.61	41.1	11.08	1000	20
GSP6F72M425BB	425	48.6	11.19	39.9	10.66	1000	20
GSP6F72M430BB	430	48.8	11.26	40.1	10.73	1000	20
GSP6F72M435BB	435	49	11.33	40.3	10.8	1000	20
GSP6F72M440BB	440	49.2	11.4	40.5	10.87	1000	20
GSP6F72M445BB	445	49.4	11.47	40.7	10.94	1000	20
GSP6F72M450BB	450	49.6	11.54	40.9	11.01	1000	20
GSP6F72M455BB	455	49.8	11.61	41.1	11.08	1000	20
GSP6F72M425BW	425	48.6	11.19	39.9	10.66	1000	20
GSP6F72M430BW	430	48.8	11.26	40.1	10.73	1000	20
GSP6F72M435BW	435	49	11.33	40.3	10.8	1000	20
GSP6F72M440BW	440	49.2	11.4	40.5	10.87	1000	20
GSP6F72M445BW	445	49.4	11.47	40.7	10.94	1000	20
GSP6F72M450BW	450	49.6	11.54	40.9	11.01	1000	20
GSP6F72M455BW	455	49.8	11.61	41.1	11.08	1000	20
GSP6G72M425BT	425	48.6	11.19	39.9	10.66	1000	25
GSP6G72M430BT	430	48.8	11.26	40.1	10.73	1000	25
GSP6G72M435BT	435	49	11.33	40.3	10.8	1000	25
GSP6G72M440BT	440	49.2	11.4	40.5	10.87	1000	25
GSP6G72M445BT	445	49.4	11.47	40.7	10.94	1000	25
GSP6G72M450BT	450	49.6	11.54	40.9	11.01	1000	25
GSP6G72M455BT	455	49.8	11.61	41.1	11.08	1000	25
GSP6G72M425WT	425	48.6	11.19	39.9	10.66	1000	25
GSP6G72M430WT	430	48.8	11.26	40.1	10.73	1000	25
GSP6G72M435WT	435	49	11.33	40.3	10.8	1000	25
GSP6G72M440WT	440	49.2	11.4	40.5	10.87	1000	25
GSP6G72M445WT	445	49.4	11.47	40.7	10.94	1000	25
GSP6G72M450WT	450	49.6	11.54	40.9	11.01	1000	25
GSP6G72M455WT	455	49.8	11.61	41.1	11.08	1000	25
GSP6F60M(H)385	385	41.7	11.42	35.8	10.76	1500	20
GSP6F60M(H)385BW	385	41.7	11.42	35.8	10.76	1500	20
GSP6F60M(H)385BB	385	41.7	11.42	35.8	10.76	1500	20
GSP6F60M(H)385BT	385	41.7	11.42	35.8	10.76	1500	25
GSP6F60M(H)385WT	385	41.7	11.42	35.8	10.76	1500	25
GSP6F72M(H)460	460	50	11.68	41.3	11.14	1500	20
GSP6F72M(H)460BW	460	50	11.68	41.3	11.14	1500	20

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Illustration 9F - Other Ratings

GSP6F72M(H)460BB	460	50	11.68	41.3	11.14	1500	20
GSP6F72M(H)460BT	460	50	11.68	41.3	11.14	1500	25
GSP6F72M(H)460WT	460	50	11.68	41.3	11.14	1500	25
GSP6F72M(H)465	465	50.2	11.75	41.5	11.21	1500	20
GSP6F72M(H)465BW	465	50.2	11.75	41.5	11.21	1500	20
GSP6F72M(H)465BB	465	50.2	11.75	41.5	11.21	1500	20
GSP6F72M(H)465BT	465	50.2	11.75	41.5	11.21	1500	25
GSP6F72M(H)465WT	465	50.2	11.75	41.5	11.21	1500	25
GSP6F60M385	385	41.7	11.42	35.8	10.76	1000	20
GSP6F60M385BW	385	41.7	11.42	35.8	10.76	1000	20
GSP6F60M385BB	385	41.7	11.42	35.8	10.76	1000	20
GSP6F60M385BT	385	41.7	11.42	35.8	10.76	1000	25
GSP6F60M385WT	385	41.7	11.42	35.8	10.76	1000	25
GSP6F72M460	460	50	11.68	41.3	11.14	1000	20
GSP6F72M460BW	460	50	11.68	41.3	11.14	1000	20
GSP6F72M460BB	460	50	11.68	41.3	11.14	1000	20
GSP6F72M460BT	460	50	11.68	41.3	11.14	1000	25
GSP6F72M460WT	460	50	11.68	41.3	11.14	1000	25
GSP6F72M465	465	50.2	11.75	41.5	11.21	1000	20
GSP6F72M465BW	465	50.2	11.75	41.5	11.21	1000	20
GSP6F72M465BB	465	50.2	11.75	41.5	11.21	1000	20
GSP6F72M465BT	465	50.2	11.75	41.5	11.21	1000	25
GSP6F72M465WT	465	50.2	11.75	41.5	11.21	1000	25

8.0 Test Summary					
Evaluation Period	June 20, 2022 to October 24, 2022			Project No.	220602022HAN
Sample Rec. Date	20-Jun-2022	Condition	Prototype	Sample ID.	0220620-32
Test Location	Building No.2, No. 500 East Shuiyueting Road, Haining City, Zhejiang Province, China				
Test Procedure	Testing Lab				

Determination of the result includes consideration of measurement uncertainty from the test equipment and methods. The product was tested as indicated below with results in conformance to the relevant test criteria.

The following tests were performed on Model GSP7G78M(H)575WT to evaluate the product.
1. Frontsheet 'Tempered Glass ironless' manufactured by 'Xinyi Glass Holding Limited'
2. Solar Cell '182-10BB-144F' manufactured by 'T.S Solar Energy Co.,Ltd.'
3. Encapsulate 'F406PS' and 'F806PS' manufactured by HANGZHOU FIRST APPLIED MATERIAL CO., LTD
4. Backsheet 'Crown BO-P2' manufactured by 'Crown Advanced Matertial Co., LTD'
5. Frame '6005-T6' manufactured by 'Suzhou Sentong Photovoltaic Co.,Ltd.'
6. Adhesive of frame 'HT906Z' manufactured by 'Shanghai Huitian New Material Co., LTD.'
7. Adhesive (between junction box and backsheet) 'HT906Z' manufactured by 'Shanghai Huitian New Material Co., LTD.'
8. Junction Box 'PV-ZH011C-5' manufactured by 'Zhejiang Zhonghuan Sunter PV Technology Co., Ltd.'
9. PV Wire manufactured by 'Zhejiang Zhonghuan Sunter PV Technology Co., Ltd.'
10. Connectors 'PV-ZH202B' manufactured by 'Zhejiang Zhonghuan Sunter PV Technology Co., Ltd.'
11. Potting Material '5299W-S' manufactured by 'Shanghai Huitian New Material Co., LTD.'
12. Bypass Diode '35SQ045' manufactured by 'Zhejiang Zhonghuan Sunter PV Technology Co.,Ltd.'
13. String Connector '4mm wide by 0.4m thick' manufactured by 'Taicang Juren International Trade Co., ltd'
14. Cell Connector 'Φ0.30mm' manufactured by 'Taicang Juren International Trade Co., ltd'
15. Fixing Tape 'UV-1' manufactured by '3M Company'
16. Insulation Sheet 'EPE-100' manufactured by 'Shanghai cncun industrial co., LTD.'
17. Flux 'SF105' manufactured by 'Singapore Asahi Chemical & Solder Industries Pte Ltd'
Power ranges were verified on model GSP7G78M(H)570WT and GSP7G78M(H)605WT.

Test Description	[CSA C22.2#61730-2:2019 Ed.2] Clause	[UL 61730-2:2017 Ed.1+R:30Apr2020] Clause	[UL 61215-2:2017 Ed.1] Clause
Visual inspection	10.2	10.2	4.1
Performance at STC and NMOT (only STC condition)	10.3	10.3	4.6
Maximum power determination	10.4	10.4	4.2
Durability of markings	10.6	10.6	–
Insulation Thickness Test	10.5	–	–
Sharp edge test	10.7	10.7	–
Bypass diode functionality test	10.8	10.8	4.18.2
Bypass diode thermal test	–	–	4.18.1
Accessibility test	10.9	10.9	–
Cut susceptibility test	10.10	10.10	–
Continuity test of equipotential bonding	10.11	10.11	–
Impulse voltage test	10.12	10.12	–
Insulation test	10.13	10.13	4.3
Wet leakage current test	10.14	10.14	4.15
Temperature test	10.15	10.15	–
Hot-spot endurance test	10.16	10.16	4.9
Bypass diode thermal test	10.19	10.19	–
Reverse current overload test	10.20	10.20	–
Module breakage test	10.21	10.21	–
Static mechanical load test (safety factor 1.5, front 5400Pa, rear 2400Pa, Screw and clamp)	10.23	10.23	4.16
Materials creep test	10.26	10.26	–
Robustness of terminations test (only retention of junction	10.27	10.27	4.14

8.0 Test Summary			
Thermal cycling test	10.28	10.28	4.11
Humidity freeze test	10.29	10.29	4.12
Damp heat test	10.30	10.30	4.13
UV test	10.31	10.31	4.10
Cold conditioning	10.32	10.32	–
Dry heat conditioning	10.33	10.33	–
Measurement of temperature coefficients	–	–	4.4
Performance at low irradiance	–	–	4.7
Outdoor exposure test	–	–	4.8
Hail test	–	–	4.17
Stabilization	–	–	4.19

The following tests were performed on Model GSP7G78M(H)575BB to evaluate black color backsheet
Backsheet 'Crown BO-P2' manufactured by 'Crown Advanced Matertial Co., LTD'
Power ranges were verified on model GSP7G78M(H)570BB and GSP7G78M(H)605BB.

Test Description	[CSA C22.2#61730-2:2019 Ed.2] Clause	[UL 61730-2:2017 Ed.1+R:30Apr2020] Clause	[UL 61215-2:2017 Ed.1] Clause
Visual inspection	10.2	10.2	4.1
Performance at STC and NMOT (only STC condition)	10.3	10.3	4.6
Maximum power determination	10.4	10.4	4.2
Durability of markings	10.6	10.6	–
Sharp edge test	10.7	10.7	–
Temperature test	10.15	10.15	–
Hot-spot endurance test	10.16	10.16	4.9
Stabilization	–	–	4.19

The following tests were performed on Model GSP6G72M(H)435WT to evaluate:
1. TS166M-9BB manufactured by T.S Solar Energy Co.,Ltd.
2. 35*35mm long frame and 35*10mm short frame
Power ranges were verified on model GSP6G72M(H)425WT, GSP6G72M(H)425BB, GSP6G72M(H)455BB and GSP6G72M(H)455WT

Test Description	[CSA C22.2#61730-2:2019 Ed.2] Clause	[UL 61730-2:2017 Ed.1+R:30Apr2020] Clause	[UL 61215-2:2017 Ed.1] Clause
Visual inspection	10.2	10.2	4.1
Maximum power determination	10.4	10.4	4.2
Durability of markings	10.6	10.6	–
Insulation Thickness Test	10.5	–	–
Sharp edge test	10.7	10.7	–
Bypass diode functionality test	10.8	10.8	4.18.2
Continuity test of equipotential bonding	10.11	10.11	–
Insulation test	10.13	10.13	4.3
Wet leakage current test	10.14	10.14	4.15
Temperature test	10.15	10.15	–
Hot-spot endurance test	10.16	10.16	4.9
Reverse current overload test	10.20	10.20	–
Static mechanical load test (safety factor 1.5, front 5400Pa, rear 2400Pa, Screw and clamp)	10.23	10.23	4.16
Thermal cycling test	10.28	10.28	4.11
Damp heat test	10.30	10.30	4.13
Stabilization	–	–	4.19

8.0 Test Summary					
Evaluation Period	September 05, 2022 to September 20, 2022			Project No.	220602022HAN
Sample Rec. Date	2-Sep-2022	Condition	Prototype	Sample ID.	0220620-32
Test Location	No. 7 Building, No. 6958 Daye Road, Fengxian District, Shanghai, China				
Test Procedure	Testing Lab				
Determination of the result includes consideration of measurement uncertainty from the test equipment and methods. The product was tested as indicated below with results in conformance to the relevant test criteria.					
The following tests were performed on Model GSP7G72M(H)540WT to evaluate the product.					

Test Description	[CSA C22.2#61730-2:2019 Ed.2] Clause	[UL 61730-2:2017 Ed.1+R:30Apr2020] Clause	[UL 61215-2:2017 Ed.1] Clause
Fire test (Type 1)	10.17	10.17	–
Ignitability test	10.18	-	-

Evaluation Period	August 03, 2023 to August 19, 2023			Project No.	230801127SHA
Sample Rec. Date	31-Mar-2023	Condition	Prototype	Sample ID.	0230331-50
Test Location	Building No.2, No. 500 East Shuiyueting Road, Haining City, Zhejiang Province, China				
Test Procedure	Testing Lab				
Determination of the result includes consideration of measurement uncertainty from the test equipment and methods. The product was tested as indicated below with results in conformance to the relevant test criteria.					
The following tests were performed on Model GSP6F72M465BB and GSP6F72M465BT to evaluate the product.					

Test Description	[CSA C22.2#61730-2:2019 Ed.2] Clause	[UL 61730-2:2017 Ed.1+R:30Apr2020] Clause	[UL 61215-2:2017 Ed.1] Clause
Visual inspection	10.2	10.2	4.1
Maximum power determination	10.4	10.4	4.2
Stabilization	–	–	4.19

8.1 Signatures			
A representative sample of the product covered by this report has been evaluated and found to comply with the applicable requirements of the standards indicated in Section 1.0.			
Completed by:	Sherwin Zhu	Reviewed by:	Ken Gu
Title:	Engineer	Title:	Reviewer
Signature:		Signature:	

9.0 Correlation Page For Multiple Listings	
The following products, which are identical to those identified in this report except for model number and Listee name, are authorized to bear the ETL label under provisions of the Intertek Multiple Listing Program.	
BASIC LISTEE	G-Star Pte Ltd
Address	6 RAFFLES QUAY, # 14-06 SINGAPORE (048580)
Country	SINGAPORE
Product	Crystalline Silicon Photovoltaic Module

MULTIPLE LISTEE 1	Bluesun Solar Co., Ltd.
Address	1499 Zhenxing Road，Shushan District, Hefei City, Anhui Province, 230071
Country	China
Brand Name	BLUESUN
ASSOCIATED MANUFACTURER	LIGHT&HOPE ENERGY COMPANY LIMITED
Address	NO. 88/23-25 MU 15 BANG SAOT HONG, SUB-DISTRICT, BANG SAO THONG DISTRICT, SAMUT PRAKARN PROVINCE
Country	THAILAND

MULTIPLE LISTEE 1 MODELS	BASIC LISTEE MODELS
BSM followed by 425, 430, 435, 440, 445, 450, 455，460 or 465; followed by M-72HPH.	GSP6F72M maybe followed by (H); followed by 425, 430, 435, 440, 445, 450, 455, 460 or 465; maybe followed by BW or BB.
BSM followed by 425, 430, 435, 440, 445, 450, 455，460 or 465; followed by M-72HBD.	GSP6G72M maybe followed by (H); followed by 425, 430, 435, 440, 445, 450, 455, 460 or 465; followed by BT or WT.
BSM followed by 350, 355, 360, 365, 370, 375, 380 or 385; followed by M-60HPH.	GSP6F60M maybe followed by (H); followed by 350, 355, 360, 365, 370, 375, 380 or 385; maybe followed by BW or BB.
BSM followed by 350, 355, 360, 365, 370, 375, 380 or 385; followed by M-60HBD.	GSP6G60M maybe followed by (H); followed by 350, 355, 360, 365, 370, 375, 380, or 385; followed by BT or WT.
BSM followed by 570, 575, 580, 585, 590, 595, 600 or 605; followed by M10-78HPH.	GSP7F78M maybe followed by (H); followed by 570, 575, 580, 585, 590, 595, 600 or 605; maybe followed by BW or BB.
BSM followed by 570, 575, 580, 585, 590, 595, 600 or 605; followed by M10-78HBD.	GSP7G78M maybe followed by (H); followed by 570, 575, 580, 585, 590, 595, 600 or 605; followed by BT or WT.
BSM followed by 525, 530, 535, 540, 545, 550, 555 or 560; followed by M10-72HPH.	GSP7F72M maybe followed by (H); followed by 525, 530, 535, 540, 545, 550, 555 or 560; maybe followed by BW or BB.
BSM followed by 525, 530, 535, 540, 545, 550, 555 or 560; followed by M10-72HBD.	GSP7G72M maybe followed by (H); followed by 525, 530, 535, 540, 545, 550, 555 or 560; followed by BT or WT.
BSM followed by 485, 490, 495, 500 or 505; followed by M10-66HPH.	GSP7F66M maybe followed by (H); followed by 485, 490, 495, 500 or 505; maybe followed by BW or BB.
BSM followed by 485, 490, 495, 500 or 505; followed by M10-66HBD.	GSP7G66M maybe followed by (H); followed by 485, 490, 495, 500 or 505; followed by BT or WT.
BSM followed by 435, 440, 445, 450 or 455; followed by M10-60HPH.	GSP7F60M maybe followed by (H); followed by 435, 440, 445, 450 or 455; maybe followed by BW or BB.
BSM followed by 435, 440, 445, 450 or 455; followed by	GSP7G60M maybe followed by (H); followed by 435,

9.0 Correlation Page For Multiple Listings	
M10-60HBD. BSM followed by 390, 395, 400, 405, 410 or 415; followed by M10-54HPH. BSM followed by 390, 395, 400, 405, 410 or 415; followed by M10-54HBD.	440, 445, 450 or 455; followed by BT or WT. GSP7F54M maybe followed by (H); followed by 390, 395, 400, 405, 410 or 415; maybe followed by BW or BB. GSP7G54M maybe followed by (H); followed by 390, 395, 400, 405, 410 or 415; followed by BT or WT.

MULTIPLE LISTEE 2	None
Address	
Country	
Brand Name	
ASSOCIATED MANUFACTURER	
Address	
Country	

MULTIPLE LISTEE 2 MODELS	BASIC LISTEE MODELS

MULTIPLE LISTEE 3	None
Address	
Country	
Brand Name	
ASSOCIATED MANUFACTURER	
Address	
Country	

MULTIPLE LISTEE 3 MODELS	BASIC LISTEE MODELS

10.0 General Information

The Applicant and Manufacturer have agreed to produce, test and label ETL Listed products in accordance with the requirements of this Report. The Manufacturer has also agreed to notify Intertek and to request authorization prior to using alternate parts, components or materials.

COMPONENTS

Components used shall be those itemized in this Intertek report covering the product, including any amendments

LISTING MARK

The ETL Listing mark applied to the products shall either be separable in form, such as labels purchased from Intertek, or on a product nameplate or other media only as specifically authorized by Intertek. Use of the mark is subject to the control of Intertek.

The mark must include the following four items:

1) applicable country identifiers "US" and/or "C" or "US", "C" and "EU"
2) the word "Listed" or "Classified" or "Recognized Component" (whichever is appropriate)
3) a control number issued by Intertek
4) a product descriptor that identifies the standards used for certification. Example:

For US standards, the words, “Conforms to” shall appear with the standard number along with the word, “Standard” or “Std.” Example: “Conforms to ANSI/UL Std. XX.”

For Canadian standards, the words “Certified to CAN/CSA Standard CXX No. XX.” shall be used, or abbreviated, “Cert. to CAN/CSA Std. CXX No. XX.”

Can be used together when both standards are used.

If all standards on the ATM have the same standard title, the shared title or its abbreviation may be used in place of the examples above. Example: "Medical Electrical Equipment" or "MEE"; "Information Technology Equipment" or "ITE"; "Audio/Video Information And Communication Technology Equipment" or "A/V ICTE".

Note: A facsimile must be submitted to Intertek, Attn: Follow-up Services for approval prior to use. The facsimile need not have a control number. A control number will be issued **after signed Certification Agreements** have been received by the Follow-up Services office, approval of the facsimile of your proposed Listing Mark, satisfactory completion of the Listing Report, and scheduling of a factory

MANUFACTURING AND PRODUCTION TESTS

Manufacturing and Production Tests shall be performed as required in this Report.

FOLLOW-UP SERVICE

Periodic unannounced audits of the manufacturing facility (and any locations authorized to apply the mark) shall be scheduled by Intertek. An audit report shall be issued after each visit. Special attention will be given to the following:

1. Conformance of the manufactured product to the descriptions in this Report.
2. Conformance of the use of the ETL mark with the requirements of this Report and the Certification Agreement.
3. Manufacturing changes.
4. Performance of specified Manufacturing and Production Tests.

In the event that the Intertek representative identifies non-conformance(s) to any provision of this Report, the Applicant shall take one or more of the following actions:

1. Correct the non-conformance.
2. Remove the ETL Mark from non-conforming product.
3. Contact the issuing product safety evaluation center for instructions.

10.1 Evaluation of Unlisted Components

Because Unlisted Components are uncontrolled, and they do not fall under a third party follow up program, Intertek may require these components to be tested and/or evaluated at least once annually, more often for certain components, as part of the independent certification process. The Unlisted Components in Section 5.0 require testing and/or evaluation as indicated.

The Applicant will be notified, in writing, via the applicable contact methods, as defined in Section 1.0, when these components must be selected and sent to Component Evaluation Center (CEC) for re-evaluation.

Due to particular testing requirements, some components may be requested to be shipped to specific labs. Thus, specific shipment destination(s) for each sample will be provided in the written notification.

Managing CEC Location:
Intertek Testing Services Shanghai Limited
ETL Component Evaluation Center
Building No. 86, 1198 Qinzhou Road (North)
Shanghai 200233, China
Attn: Ms. Emiliana Zhou
Sample Disposition: Due to the destructive nature of the testing, all samples will be discarded at the conclusion of testing unless, the manufacturer specifically requests the return of the samples. The request for return must accompany the initial component shipment.

11.0 Manufacturing and Production Tests

The manufacturer agrees to conduct the following Manufacturing and Production Tests as specified:

Required Tests

Insulation Test
Module Output Power Test
Bypass Diode Functionality Test
Continuity test of equipotential bonding Test
Visual Inspection

11.1 Insulation Test

Method

Each module (100%) shall withstand for 1 second without electrical breakdown as a routine production line test, the application of a dc test potential of $1.2 \times (2 \times V_{SYS} + 1000V)$ where V_{SYS} is the maximum rated system voltage. The voltage shall be applied between the active circuit of the module and accessible metal parts. The test is to be conducted when the module is complete and ready for packing, or when it is complete except for covers or other parts that may interfere with the performance of the test.

Test Equipment

The test equipment is to include a means of indicating the test voltage that is being applied to the product under test and a means of effectively indicating unacceptable performance. A leakage current of greater than 50 µA represents a failure.

Products Requiring Insulation Test:

	Test Voltage	Test Time
All products covered by this Report with 1000V system voltage	3000V	60 s
	or	
	3600V	1 s
All products covered by this Report with 1500V system voltage	4000V	60 s
	or	
	4800V	1 s

11.2 Module Output Power Test

Method

Check the results from I-V curve measurements to verify that the output power, current and voltage rating falls within the specification. All production values of Isc and Voc shall be covered by the tolerances of the product qualified under UL 61730. Possible stabilization effects shall be considered if changes of Isc and Voc are expected during operation in sunlight. This test will also verify that bypass diodes are not shorted.

Products Requiring Module Output Power Test:

All products covered by this report.

11.3 Bypass Diode Functionality Test

Method

Verification that bypass diodes are working properly shall be performed on all modules.
Three alternative test methods can be applied:
a) Perform successive additional I-V measurements in conjunction with maximum power determination with one cell of each string in the interconnection circuit completely shaded. The bypass diode belonging to this string is working properly, if the characteristic bend in the I-V curve is observed.
b) A conductivity test can be performed with the PV module terminals connected in reverse polarity to a current source. The current flow and voltage drop across the PV module terminals can be used as indicator that the diodes are working properly.
c) The I-V characteristics of all diodes can be verified just before their assembly. If the bypass diodes are in the junction box this could be done through measurement at the corresponding terminals of the junction box. A precondition for the latter method is an appropriate plan to mitigate possible influence of electrostatic discharges on the diodes in production.

Products Requiring Bypass Diode Functionality Test:
All products covered by this report.

11.4 Continuity test of equipotential bonding Test
Method PV modules provided with a connection for equipotential bonding are subjected to a continuity test for equipotential bonding (MST 13). At a sampling rate of 1 PV module per framing station per working shift demonstrate the electrical continuity between the grounding connection and all accessible conductive parts. Any appropriate indication device is able to be employed (current supply in conjunction with current and voltage measurement). PV modules that have no frames or equipotential bonding locations identified shall be exempt from this requirement.
Products Requiring Continuity test of equipotential bonding Test:
1 PV module per framing station per working shift

11.5 Visual inspection
Method Verify the clearance distances (distances of live parts to PV module edges) are within the product specification. It is recommended to do this inspection before the framing process if applicable.
Products Requiring Visual inspection:
All products covered by this report.

12.0 Revision Summary				
The following changes are in compliance with the declaration of Section 8.1:				
Date/ Proj # Site ID	Project Handler/ Reviewer	Section	Item	Description of Change
24-Aug-2023	Sherwin Zhu/ Ken Gu	1	-	Added Manufacturer 2: Ocean Energy Company Limited
230801127SHA	Sherwin Zhu	2	-	Added Models: GSP6F72M maybe followed by (H); followed by 460 or 465; maybe followed by BW or BB. GSP6G72M maybe followed by (H); followed by 460 or 465; followed by BT or WT. GSP6F60M maybe followed by (H); followed by 385; maybe followed by BW or BB. GSP6G60M maybe followed by (H); followed by 385; followed by BT or WT.
		7	9F	Updated ILL9 due to new models added
		8	-	Added new evluation period from August 03, 2023 to August 19, 2023
			-	Revised with new signatures.
		9	1	Added Multiple listee 1: Bluesun Solar Co., Ltd. Brand Name: BLUESUN Models: BSM followed by 425, 430, 435, 440, 445, 450, 455， 460 or 465; followed by M-72HPH. BSM followed by 425, 430, 435, 440, 445, 450, 455， 460 or 465; followed by M-72HBD. BSM followed by 350, 355, 360, 365, 370, 375, 380 or 385; followed by M-60HPH. BSM followed by 350, 355, 360, 365, 370, 375, 380 or 385; followed by M-60HBD. BSM followed by 570, 575, 580, 585, 590, 595, 600 or 605; followed by M10-78HPH. BSM followed by 570, 575, 580, 585, 590, 595, 600 or 605; followed by M10-78HBD. BSM followed by 525, 530, 535, 540, 545, 550, 555 or 560; followed by M10-72HPH. BSM followed by 525, 530, 535, 540, 545, 550, 555 or 560; followed by M10-72HBD. BSM followed by 485, 490, 495, 500 or 505; followed by M10-66HPH. BSM followed by 485, 490, 495, 500 or 505; followed by M10-66HBD. BSM followed by 435, 440, 445, 450 or 455; followed by M10-60HPH. BSM followed by 435, 440, 445, 450 or 455; followed by M10-60HBD. BSM followed by 390, 395, 400, 405, 410 or 415; followed by M10-54HPH. BSM followed by 390, 395, 400, 405, 410 or 415; followed by M10-54HBD.