



Certificate of Compliance

Certificate: 80033900

Master Contract: 252024

Project: 80119618

Date Issued: 2022-07-05

Issued to: Shanghai Aerospace Automobile Electromechanical Co., Ltd.
222 Caoxi Rd, the 8th Floor of Spaceflight Building
Shanghai, 200235
CHINA

Attention: Yuhua Tian

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only



Issued by: Qiang (Sean) Jiang
Qiang (Sean) Jiang

PRODUCTS

CLASS 5311 10 - POWER SUPPLIES - Photovoltaic Modules and Panels

CLASS 5311 90 - POWER SUPPLIES - Photovoltaic Modules and Panels - Certified to U.S. Standards

Photovoltaic modules with Fire Performance (USA) Type 1, maximum system voltage of 1500 V dc, model series: HT72-156M(V)-xxx (xxx=380-420, in steps of 5), Fuse rating 20A, NMOT: 45+/-2°C.

Photovoltaic modules with Fire Performance (USA) Type 1, maximum system voltage of 1500 V dc, model series: HT60-156M(V)-xxx (xxx=305-345, in steps of 5), Fuse rating 20A, NMOT: 45+/-2°C.

Photovoltaic modules with Fire Performance (USA) Type 1, maximum system voltage of 1500 V dc, model series: HT72-156M(V)-C-xxx (xxx=385-420, in steps of 5), Fuse rating 20A, NMOT: 45+/-2°C.

Photovoltaic modules with Fire Performance (USA) Type 1, maximum system voltage of 1500 V dc, model series: HT60-156M(V)-C-xxx (xxx=315-350, in steps of 5), Fuse rating 20A, NMOT: 45+/-2°C.

Photovoltaic modules with Fire Performance (USA) Type 29, maximum system voltage of 1500 V dc, model series: HT72-156M(PDV)-BF-xxx (xxx=380-415, in steps of 5), Fuse rating 20A, NMOT: 45+/-2°C.

Photovoltaic modules with Fire Performance (USA) Type 29, maximum system voltage of 1500 V dc, model series: HT60-156M(PDV)-BF-xxx (xxx=310-345, in steps of 5), Fuse rating 20A, NMOT: 45+/-2°C.

Photovoltaic modules with Fire Performance (USA) Type 29, maximum system voltage of 1500 V dc, model series: HT72-156M(PDV)-CBF-xxx (xxx=385-420, in steps of 5), Fuse rating 20A, NMOT: 45+/-2°C.

Photovoltaic modules with Fire Performance (USA) Type 29, maximum system voltage of 1500 V dc, model series: HT60-156M(PDV)-CBF-xxx (xxx=315-350, in steps of 5), Fuse rating 20A, NMOT: 45+/-2°C.



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Photovoltaic modules with Fire Performance (USA) Type 1, maximum system voltage of 1500 V dc, model series: HT72-166M-xxx (xxx=390-465, in steps of 5), Fuse rating 20A, NMOT: 45+/-2°C.
 Photovoltaic modules with Fire Performance (USA) Type 1, maximum system voltage of 1500 V dc, model series: HT66-166M-xxx (xxx=380-420, in steps of 5), Fuse rating 20A, NMOT: 45+/-2°C.
 Photovoltaic modules with Fire Performance (USA) Type 1, maximum system voltage of 1500 V dc, model series: HT60-166M-xxx (xxx=340-390, in steps of 5), Fuse rating 20A, NMOT: 45+/-2°C.
 Photovoltaic modules with Fire Performance (USA) Type 29, maximum system voltage of 1500 V dc, model series: HT72-166M(PD)-F-xxx (xxx=390-465, in steps of 5), Fuse rating 20A, NMOT: 45+/-2°C.
 Photovoltaic modules with Fire Performance (USA) Type 29, maximum system voltage of 1500 V dc, model series: HT60-166M(PD)-F-xxx (xxx=340-390, in steps of 5), Fuse rating 20A, NMOT: 45+/-2°C.
 Photovoltaic modules with Fire Performance (USA) Type 1, maximum system voltage of 1500 V dc, model series: HT54-18X-xxx (xxx=390-420, in steps of 5), Fuse rating 25A, NMOT: 45+/-2°C.
 Photovoltaic modules with Fire Performance (USA) Type 1, maximum system voltage of 1500 V dc, model series: HT60-18X-xxx (xxx=435-465, in steps of 5), Fuse rating 25A, NMOT: 45+/-2°C.
 Photovoltaic modules with Fire Performance (USA) Type 1, maximum system voltage of 1500 V dc, model series: HT66-18X-xxx (xxx=475-515, in steps of 5), Fuse rating 25A, NMOT: 45+/-2°C.
 Photovoltaic modules with Fire Performance (USA) Type 1, maximum system voltage of 1500 V dc, model series: HT72-18X-xxx (xxx=520-560, in steps of 5), Fuse rating 25A, NMOT: 45+/-2°C.
 Photovoltaic modules with Fire Performance (USA) Type 1, maximum system voltage of 1500 V dc, model series: HT78-18X-xxx (xxx=560-605, in steps of 5), Fuse rating 25A, NMOT: 45+/-2°C.

Notes:

1. The electrical characteristics are within ± 5 , ± 5 , ± 3 percent of the rated values of I_{sc} (± 5), V_{oc} (± 5), and P_{max} (± 3) under standard test conditions (irradiance of 1000 W/m², AM 1.5 spectrum, and a cell temperature of 25°C (77°F)).
2. The operating ambient temperature of these devices may exceed 40°C at full load for all wire sizes if it is determined suitable in the field use application.

Model	Open Circuit Voltage at STC (V dc)	Short Circuit Current at STC (A dc)	Rated Voltage at STC (V dc)	Rated Current at STC (A dc)	Rated Maximum Power at STC (Watts)
HT72-156M(V)-xxx (xxx=380-420, in steps of 5)					
HT72-156M(V)-380	48.3	10.34	39.9	9.53	380
HT72-156M(V)-385	48.4	10.47	40.1	9.61	385
HT72-156M(V)-390	48.5	10.55	40.3	9.68	390
HT72-156M(V)-395	48.6	10.67	40.5	9.76	395
HT72-156M(V)-400	48.7	10.79	40.7	9.84	400
HT72-156M(V)-405	48.8	10.91	40.9	9.91	405
HT72-156M(V)-410	48.9	11.03	41.1	9.98	410
HT72-156M(V)-415	49.0	11.15	41.3	10.06	415
HT72-156M(V)-420	49.1	11.26	41.5	10.13	420
HT60-156M(V)-xxx (xxx=305-345, in steps of 5)					
HT60-156M(V)-305	39.9	10.07	33.4	9.15	305
HT60-156M(V)-310	40.0	10.22	33.6	9.25	310



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Model	Open Circuit Voltage at STC (V dc)	Short Circuit Current at STC (A dc)	Rated Voltage at STC (V dc)	Rated Current at STC (A dc)	Rated Maximum Power at STC (Watts)
HT60-156M(V)-315	40.1	10.36	33.7	9.37	315
HT60-156M(V)-320	40.2	10.49	33.8	9.49	320
HT60-156M(V)-325	40.3	10.61	33.9	9.60	325
HT60-156M(V)-330	40.4	10.74	34.1	9.69	330
HT60-156M(V)-335	40.5	10.87	34.3	9.78	335
HT60-156M(V)-340	40.6	11.00	34.5	9.87	340
HT60-156M(V)-345	40.7	11.14	34.7	9.96	345
HT72-156M(V)-C-xxx (xxx=385-420, in steps of 5)					
HT72-156M(V)-C-385	48.4	10.47	40.1	9.61	385
HT72-156M(V)-C-390	48.5	10.55	40.3	9.68	390
HT72-156M(V)-C-395	48.6	10.67	40.5	9.76	395
HT72-156M(V)-C-400	48.7	10.79	40.7	9.84	400
HT72-156M(V)-C-405	48.8	10.91	40.9	9.91	405
HT72-156M(V)-C-410	48.9	11.03	41.1	9.98	410
HT72-156M(V)-C-415	49.0	11.15	41.3	10.06	415
HT72-156M(V)-C-420	49.1	11.26	41.5	10.13	420
HT60-156M(V)-C-xxx (xxx=315-350, in steps of 5)					
HT60-156M(V)-C-315	40.1	10.36	33.7	9.37	315
HT60-156M(V)-C-320	40.2	10.49	33.8	9.49	320
HT60-156M(V)-C-325	40.3	10.61	33.9	9.60	325
HT60-156M(V)-C-330	40.4	10.74	34.1	9.69	330
HT60-156M(V)-C-335	40.5	10.87	34.3	9.78	335
HT60-156M(V)-C-340	40.6	11.00	34.5	9.87	340
HT60-156M(V)-C-345	40.7	11.14	34.7	9.96	345
HT60-156M(V)-C-350	40.8	11.28	34.9	10.05	350
HT72-156M(PDV)-BF-xxx (xxx=380-415, in steps of 5)					
HT72-156M(PDV)-BF-380	48.3	10.34	39.9	9.53	380
HT72-156M(PDV)-BF-385	48.4	10.47	40.1	9.61	385
HT72-156M(PDV)-BF-390	48.5	10.55	40.3	9.68	390
HT72-156M(PDV)-BF-395	48.6	10.67	40.5	9.76	395
HT72-156M(PDV)-BF-400	48.7	10.79	40.7	9.84	400
HT72-156M(PDV)-BF-410	48.8	10.91	40.9	9.91	405
HT72-156M(PDV)-BF-415	48.9	11.03	41.1	9.98	410
HT60-156M(PDV)-BF-xxx (xxx=310-345, in steps of 5)					
HT60-156M(PDV)-BF-310	40.0	10.22	33.6	9.25	310
HT60-156M(PDV)-BF-315	40.1	10.36	33.7	9.37	315
HT60-156M(PDV)-BF-320	40.2	10.49	33.8	9.49	320
HT60-156M(PDV)-BF-325	40.3	10.61	33.9	9.60	325
HT60-156M(PDV)-BF-330	40.4	10.74	34.1	9.69	330
HT60-156M(PDV)-BF-335	40.5	10.87	34.3	9.78	335
HT60-156M(PDV)-BF-340	40.6	11.00	34.5	9.87	340
HT60-156M(PDV)-BF-345	40.7	11.14	34.7	9.96	345
HT72-156M(PDV)-CBF-xxx (xxx=385-420, in steps of 5)					
HT72-156M(PDV)-CBF-385	48.4	10.47	40.1	10.47	385



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HT72-156M(PDV)-CBF-390	48.5	10.55	40.3	10.55	390
HT72-156M(PDV)-CBF-395	48.6	10.67	40.5	10.67	395
HT72-156M(PDV)-CBF-400	48.7	10.79	40.7	10.79	400
HT72-156M(PDV)-CBF-405	48.8	10.91	40.9	10.91	405
HT72-156M(PDV)-CBF-410	48.9	11.03	41.1	11.03	410
HT72-156M(PDV)-CBF-415	49.0	11.15	41.3	11.15	415
HT72-156M(PDV)-CBF-420	49.1	11.26	41.5	11.26	420
HT60-156M(PDV)-CBF-xxx (xxx=315-350, in steps of 5)					
HT60-156M(PDV)-CBF-315	40.1	10.36	33.7	9.37	315
HT60-156M(PDV)-CBF-320	40.2	10.49	33.8	9.49	320
HT60-156M(PDV)-CBF-325	40.3	10.61	33.9	9.60	325
HT60-156M(PDV)-CBF-330	40.4	10.74	34.1	9.69	330
HT60-156M(PDV)-CBF-335	40.5	10.87	34.3	9.78	335
HT60-156M(PDV)-CBF-340	40.6	11.00	34.5	9.87	340
HT60-156M(PDV)-CBF-345	40.7	11.14	34.7	9.96	345
HT60-156M(PDV)-CBF-350	40.8	11.28	34.9	10.05	350
HT72-166M-xxx (xxx=390-465, in steps of 5)					
HT72-166M-390	47.8	10.74	38.9	10.04	390
HT72-166M-395	48.0	10.83	39.1	10.11	395
HT72-166M-400	48.2	10.92	39.3	10.19	400
HT72-166M-405	48.4	11.01	39.5	10.26	405
HT72-166M-410	48.6	11.11	39.7	10.34	410
HT72-166M-415	48.8	11.20	39.9	10.41	415
HT72-166M-420	49.0	11.29	40.1	10.49	420
HT72-166M-425	49.2	11.38	40.3	10.56	425
HT72-166M-430	49.4	11.46	40.5	10.63	430
HT72-166M-435	49.6	11.53	40.7	10.70	435
HT72-166M-440	49.8	11.60	40.9	10.77	440
HT72-166M-445	49.9	11.72	41.0	10.86	445
HT72-166M-450	50.0	11.83	41.1	10.96	450
HT72-166M-455	50.1	11.96	41.4	10.99	455
HT72-166M-460	50.2	12.06	41.5	11.09	460
HT72-166M-465	50.3	12.16	41.6	11.18	465
HT66-166M-xxx (xxx=380-420, in steps of 5)					
HT66-166M-380	45.1	11.10	37.5	10.15	380
HT66-166M-385	45.2	11.21	37.6	10.25	385
HT66-166M-390	45.3	11.33	37.7	10.36	390
HT66-166M-395	45.4	11.44	37.8	10.46	395
HT66-166M-400	45.5	11.54	37.9	10.56	400
HT66-166M-405	45.6	11.67	38.0	10.66	405
HT66-166M-410	45.7	11.80	38.1	10.77	410
HT66-166M-415	45.8	11.93	38.2	10.88	415
HT66-166M-420	45.5	11.77	38.3	10.97	420
HT60-166M-xxx (xxx=340-390, in steps of 5)					



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HT60-166M-340	40.3	11.11	32.9	10.35	340
HT60-166M-345	40.5	11.22	33.1	10.44	345
HT60-166M-350	40.7	11.33	33.3	10.53	350
HT60-166M-355	40.9	11.43	33.5	10.61	355
HT60-166M-360	41.1	11.53	33.7	10.69	360
HT60-166M-365	41.3	11.63	33.9	10.77	365
HT60-166M-370	41.5	11.72	34.1	10.86	370
HT60-166M-375	41.6	11.85	34.2	10.98	375
HT60-166M-380	41.7	11.98	34.6	10.99	380
HT60-166M-385	41.8	12.12	34.7	11.10	385
HT60-166M-390	41.9	12.25	34.8	11.21	390
HT72-166M(PD)-F-xxx (xxx=390-465, in steps of 5)					
HT72-166M(PD)-F-390	47.8	10.74	38.9	10.04	390
HT72-166M(PD)-F-395	48.0	10.83	39.1	10.11	395
HT72-166M(PD)-F-400	48.2	10.92	39.3	10.19	400
HT72-166M(PD)-F-405	48.4	11.01	39.5	10.26	405
HT72-166M(PD)-F-410	48.6	11.11	39.7	10.34	410
HT72-166M(PD)-F-415	48.8	11.20	39.9	10.41	415
HT72-166M(PD)-F-420	49.0	11.29	40.1	10.49	420
HT72-166M(PD)-F-425	49.2	11.38	40.3	10.56	425
HT72-166M(PD)-F-430	49.4	11.46	40.5	10.63	430
HT72-166M(PD)-F-435	49.6	11.53	40.7	10.70	435
HT72-166M(PD)-F-440	49.8	11.60	40.9	10.77	440
HT72-166M(PD)-F-445	49.9	11.72	41.0	10.86	445
HT72-166M(PD)-F-450	50.0	11.83	41.1	10.96	450
HT72-166M(PD)-F-455	50.1	11.96	41.4	10.99	455
HT72-166M(PD)-F-460	50.2	12.06	41.5	11.09	460
HT72-166M(PD)-F-465	50.3	12.16	41.6	11.18	465
HT60-166M(PD)-F-xxx (xxx=340-390, in steps of 5)					
HT60-166M(PD)-F-340	40.3	11.11	32.9	10.35	340
HT60-166M(PD)-F-345	40.5	11.22	33.1	10.44	345
HT60-166M(PD)-F-350	40.7	11.33	33.3	10.53	350
HT60-166M(PD)-F-355	40.9	11.43	33.5	10.61	355
HT60-166M(PD)-F-360	41.1	11.53	33.7	10.69	360
HT60-166M(PD)-F-365	41.3	11.63	33.9	10.77	365
HT60-166M(PD)-F-370	41.5	11.72	34.1	10.86	370
HT60-166M(PD)-F-375	41.6	11.85	34.2	10.98	375
HT60-166M(PD)-F-380	41.7	11.98	34.6	10.99	380
HT60-166M(PD)-F-385	41.8	12.12	34.7	11.10	385
HT60-166M(PD)-F-390	41.9	12.25	34.8	11.21	390
HT54-18X-xxx (xxx=390-420, in steps of 5)					
HT54-18X-390	36.73	13.67	30.85	12.66	390
HT54-18X-395	36.90	13.75	31.01	12.74	395
HT54-18X-400	37.05	13.83	31.17	12.84	400



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HT54-18X-405	37.19	13.91	31.31	12.95	405
HT54-18X-410	37.33	13.98	31.44	13.05	410
HT54-18X-415	37.48	14.06	31.60	13.14	415
HT54-18X-420	37.63	14.14	31.74	13.24	420
HT60-18X-xxx (xxx=435-465, in steps of 5)					
HT60-18X-435	40.88	13.69	34.33	12.68	435
HT60-18X-440	41.03	13.76	34.48	12.77	440
HT60-18X-445	41.18	13.83	34.63	12.86	445
HT60-18X-450	41.33	13.90	34.78	12.95	450
HT60-18X-455	41.48	13.97	34.93	13.04	455
HT60-18X-460	41.63	14.04	35.08	13.13	460
HT60-18X-465	41.78	14.11	35.23	13.22	465
HT66-18X-xxx (xxx=475-515, in steps of 5)					
HT66-18X-475	44.80	13.58	37.26	12.64	475
HT66-18X-480	44.95	13.65	37.77	12.72	480
HT66-18X-485	45.10	13.73	37.92	12.80	485
HT66-18X-490	45.25	13.79	38.07	12.88	490
HT66-18X-495	45.40	13.86	38.22	12.96	495
HT66-18X-500	45.55	13.93	38.37	13.04	500
HT66-18X-505	45.70	13.99	38.52	13.12	505
HT66-18X-510	45.85	14.06	38.67	13.20	510
HT66-18X-515	46.00	14.13	38.82	13.28	515
HT72-18X-xxx (xxx=520-560, in steps of 5)					
HT72-18X-520	48.90	13.63	41.05	12.68	520
HT72-18X-525	49.05	13.70	41.20	12.75	525
HT72-18X-530	49.20	13.76	41.35	12.83	530
HT72-18X-535	49.35	13.83	41.50	12.90	535
HT72-18X-540	49.50	13.90	41.65	12.97	540
HT72-18X-545	49.65	13.95	41.80	13.05	545
HT72-18X-550	49.80	14.00	41.95	13.12	550
HT72-18X-555	49.95	14.07	42.10	13.20	555
HT72-18X-560	50.10	14.14	42.25	13.27	560
HT78-18X-xxx (xxx=560-605, in steps of 5)					
HT78-18X-560	52.89	13.54	44.38	12.62	560
HT78-18X-565	53.04	13.61	44.53	12.69	565
HT78-18X-570	53.19	13.68	44.68	12.76	570
HT78-18X-575	53.34	13.75	44.83	12.83	575
HT78-18X-580	53.49	13.82	44.98	12.90	580
HT78-18X-585	53.64	13.89	45.13	12.97	585
HT78-18X-590	53.79	13.96	45.28	13.04	590
HT78-18X-595	53.94	14.03	45.43	13.11	595
HT78-18X-600	54.09	14.10	45.58	13.17	600
HT78-18X-605	54.24	14.17	45.73	13.24	605

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APPLICABLE REQUIREMENTS

CSA C22.2 No. 61730-1:19 Photovoltaic (PV) module safety qualification — Part 1: Requirements for construction, 2019-12.

CSA C22.2 No. 61730-2:19 Photovoltaic (PV) module safety qualification — Part 2: Requirements for testing, 2019-12.

UL 61730-1 1st: Photovoltaic (PV) Module Safety Qualification – Part 1: Requirements for Construction, 2017-12-04, revision date 2020-04-30.

UL 61730-2 1st: Photovoltaic (PV) Module Safety Qualification – Part 2: Requirements for Testing, 2017-12-04, revision date 2020-04-30.

Notes:

Products certified under Class C531110 have been certified under CSA’s ISO/IEC 17065 accreditation with the Standards Council of Canada (SCC). www.scc.ca





Supplement to Certificate of Compliance

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The products listed, including the latest revision described below, are eligible to be marked in accordance with the referenced Certificate.

Product Certification History

Project	Date	Description
80119618	2022-07-05	Update report 80033900 to add new cell type M182-10BB-Bifacial-Half-PERC and M166-9BB-Bifacial-Half-PERC made by Runergy, add new black string ribbon with new EPE cover, new flux(SF105), add new HT66-166M, HT54-18X module series.
80128498	2022-06-17	Update report 80033900 to add new cell type M182-10BB-Bifacial-Half-PERC and M166-9BB-Bifacial-Half-PERC made by Talesun, add new string ribbon, new flux(AATF9800).
80114232	2022-03-25	Update report 80033900 to increase the fire performance (from type 4 to type 1) for model series HT60/66/72/78-18X.
80081359	2021-07-09	Update report 80033900 to add new factory (HT FELLOW ENERJI ANONIM SİRKETİ), alternate new junction box adhesive for PV-JM07 (adhesive type HT906Z) and PV-JM07w (adhesive type 1527(a)), alternate new potting material for PV-JM07 (5299W-S, 5299W) and PV-JM07w (1521A/1521B), update the thickness of EVA and POE, correct the thickness of cell type HT-M182P and HT-M182BP.
80073913	2021-07-09	Update report 80033900 to add new full cell (M1585BBPERCPB) made by HT Fellow Enerji Anonim Şirketi.
80073912	2021-07-09	Update report 80033900 to add new half cell (M1585BBPERCPB) made by HT Fellow Enerji Anonim Şirketi.
80073911	2021-07-09	Update report 80033900 to add new cell (M166 9BBPERCPB) made by HT Fellow Enerji Anonim Şirketi, add new cell connector (0.6*0.2 mm).
80073907	2021-06-04	Update report 80033900 to add new model series HT60-18X, HT66-18X, HT72-18X, HT78-18X with new glass (CSG), new cell (HT-M182BP, HT-M182P), new cell ribbon (10 bus strips), new EVA combination (F406P& F806P), new substrate (TFB-30(plus)-T-1, FFC-JW30(plus)-B, FFC-JW30(plus)), new junction box (JM07w), new frame tape (57006), new flux (SF56, PV105A), add black type frame, update the standard version, APT lab assessment for Leading Edge Construction Materials Testing Company Limited.
80047462	2020-11-04	Update report 80033900 to add new cell with series HT72-166M, HT72-166M(PD)-F, HT60-166M and HT60-166M(PD)-F.
80033900	2020-11-04	Original certificate, new model series HT72-156M(V), HT72-156M(PDV), HT60-156M(V) and HT60-156M(PDV) series.