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Solar Panel Guide Specification Data Sheet

**Waaree Energies Ltd
Arun Series WS-100-235
WS-110/24V**

Also available on the web at
EnergyPal.com/waaree-energies-ltd-solar-panels/ws-110-24v

WS-100 to WS-235

ARUN SERIES

WAAREE[®]
One with the Sun



Superior Module Efficiency as per International Benchmarks



Positive Power Tolerance 0/+ 5W



PID Resistant Modules



Glass with Anti Reflective Coating
Improves light transmission

Salt mist, Ammonia and Hail Resistant



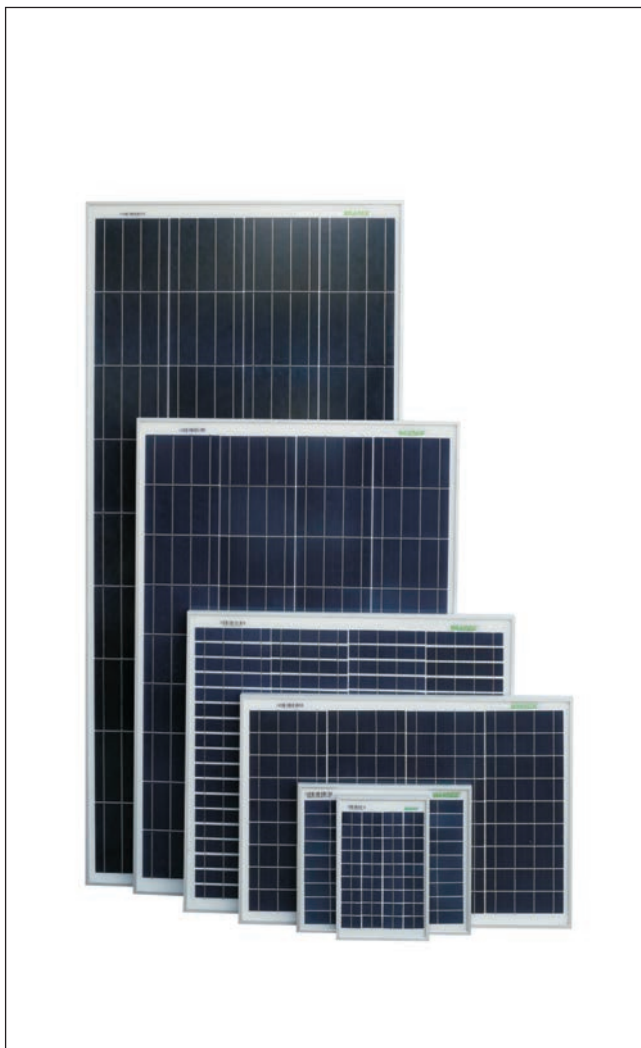
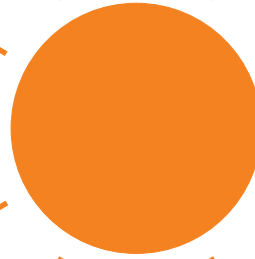
Sustain Heavy Wind & Snow loads
(2400 Pa & 5400 Pa)



System voltage: 1500VDC
to reduce the BOS cost



Modules binned by current to
improve system performance



TEMPERATURE COEFFICIENTS AND OPERATING CONDITIONS

Temperature coefficient of Current/°C	0.0051
Temperature coefficient of Voltage/°C	-0.2775
Temperature coefficient of Power/°C	-0.3859
NOCT	46° ± 2°
Operating Temperature Range	-40° to 85°

WARRANTY

-5 years Limited Product Warranty**

-25 years Limited Power Output Warranty**

- ♦ Minimum 90% at the end of 10 years
- ♦ Minimum 80% at the end of 25 years

INTERNATIONAL & NATIONAL CERTIFICATIONS

IEC 62804 | UI1703 | ROHS Compliance | REACH Compliance | IS 14286 | IS/IEC 61730-1&2

ISO 9001:2015 | ISO 14001:2015 | OHSAS 18001:2007 / ISO 45001:2018
IEC 61215 | IEC 61730-1&2 | IEC 60068-2-68 | IEC 61701 | IEC 62716

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WS-100 to WS-235

ARUN SERIES



ELECTRICAL CHARACTERISTICS

Model	WS-100 / 12V / 24V	WS-100 / 12V	WS-105 / 12V	WS-110 / 12V / 24V	WS-110 / 12V	WS-115 / 12V	WS-120 / 12V	WS-125 / 12V / 24V	WS-125 / 12V	WS-130 / 12V / 24V	WS-130 / 12V	WS-135 / 12V	WS-140 / 12V / 24V	WS-140 / 12V	WS-145 / 12V	WS-150 / 12V / 24V	WS-150 / 12V	WS-155 / 24V	WS-160 / 24V	WS-165 / 24V
Nominal Maximum Power, Pm (W)*	100	100	105	110	110	115	120	125	125	130	130	135	140	140	145	150	150	155	160	165
Power Tolerance	Positive Tolerance Only																			
Open Circuit Voltage, Voc (V)*	22.2	44	22.02	22.07	44.1	22.12	22.17	22.22	44.15	22.27	44.1	22.32	22.37	44.2	22.42	22.47	44.3	44.35	44.4	44.45
Short Circuit Current, Isc (A)*	6.07	3.03	6.36	6.65	3.33	6.93	7.22	7.5	3.78	7.78	3.93	8.06	8.34	4.22	8.62	8.9	4.51	4.66	4.8	4.95
Voltage at Maximum Power, Vmp (V)*	17.46	35.6	17.49	17.71	35.65	17.54	17.56	17.59	35.73	17.61	35.75	17.64	17.66	35.8	17.69	17.72	35.85	35.88	35.9	35.93
Current at Maximum Power, Imp (A)*	5.73	2.81	6.01	6.29	3.09	6.56	6.84	7.11	3.5	7.39	3.64	7.66	7.93	3.92	8.2	8.47	4.19	4.32	4.46	4.6
Maximum System Voltage (V)	1000																			
Module Efficiency (%)	12.93%	13.42%	13.92%	14.42%	13.92%	14.42%	14.91%	13.32%	13.75%	14.18%	12.93%	13.42%	13.92%	14.42%	13.92%	14.91%	14.91%	13.32%	13.75%	14.18%
Maximum Series Fuse Rating (A)	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Limiting Reverse Current (A)	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Rated Voltage (V dc)	17.46	35.6	17.49	17.51	35.7	17.54	17.56	17.59	35.8	17.61	35.9	17.64	17.66	35.7	17.69	17.72	36.1	36.15	36.2	36.25
Rated Current (A dc)	5.73	2.81	6.01	6.28	3.08	6.56	6.83	7.11	3.49	7.38	3.62	7.66	7.93	3.92	8.2	8.47	4.16	4.29	4.42	4.55

MECHANICAL CHARACTERISTICS

Model	WS-100 / 12V	WS-100 / 24V	WS-105 / 12V	WS-110 / 12V / 24V	WS-110 / 12V	WS-115 / 12V	WS-120 / 12V	WS-125 / 12V / 24V	WS-125 / 12V	WS-130 / 12V / 24V	WS-130 / 12V	WS-135 / 12V	WS-140 / 12V / 24V	WS-140 / 12V	WS-145 / 12V	WS-150 / 12V / 24V	WS-150 / 12V	WS-155 / 24V	WS-160 / 24V	WS-165 / 24V
Length x Width x Thickness (LxWxT) - mm	1035x 675x 35	1150x 675x 35	1260x 675x 35	1260x 675x 35	1260x 675x 35	1260x 675x 35	1260x 675x 35	1260x 675x 35	1490x 675x 35	1490x 675x 35	1490x 675x 35	1490x 675x 35	1490x 675x 35	1490x 675x 35	1490x 675x 35	1490x 675x 35	1490x 675x 35	1195x 990x 35	1195x 990x 35	1195x 990x 35
Mounting holes pitch (Y)-mm	545	645	645	645	645	645	645	645	915	915	915	915	915	915	915	915	915	595	595	595
Mounting holes pitch (X)-mm	633	633	633	633	633	633	633	633	633	633	633	633	633	633	633	633	633	950	950	950
Weight (kg)	10.15	10.15	10.15	11.30	11.30	11.5	13	13	13	13	13	13	13	13	13	13	13	14.45	14.45	14.45
Cells per module (Units)/ Arrangement	36 / (9x4) (18x4)	36 / (9x4) (9x4)	36 / (9x4) (9x4)	36 / (9x4) (18x4)	36 / (9x4) (9x4)	36 / (9x4) (9x4)	36 / (9x4) (9x4)	36 / (9x4) (18x4)	36 / (9x4) (18x4)	36 / (9x4) (9x4)	36 / (9x4) (9x4)	36 / (9x4) (9x4)	36 / (9x4) (18x4)	36 / (9x4) (9x4)	36 / (9x4) (9x4)	36 / (9x4) (9x4)	36 / (9x4) (9x4)	72 / (12x6) (12x6)	72 / (12x6) (12x6)	72 / (12x6) (12x6)
Cell Type	Polycrystalline Silicon																			
Front Cover (Material/ Thickness)	Tempered & Low Iron Glass, 3.2 / 4.0 mm																			
Encapsulate	Ethylene Vinyl Acetate																			
Frame Material	Anodized Aluminium Alloy																			
Junction Box (Protection degree/ Material)	Ip65 rated/ Weatherproof PPO enclosure with bypass diodes																			
Connector	Optional																			
Cable	Optional																			
Fire Safety Class	C																			
Application Class	A																			
Safety Class	II																			

* Mentioned electrical data are reference values which was derived at STC condition - Temp: 25°, Irradiance: 1000w/m2 and Am: 1.5Am with cleaned modules

**Refer To Waaree's Warranty Document For Terms & Conditions

*The Specifications Are For The References Purpose Only.

Waaree Reserves The Right To Change The Specifications Without Prior Notice.

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WS-100 to WS-235

ARUN SERIES



ELECTRICAL CHARACTERISTICS

Model	WS-170 / 12V	WS-175 / 24V	WS-180 / 24V	WS-185 / 24V	WS-190 / 24V	WS-195 / 24V	WS-200 / 12V	WS-200 / 24V	WS-205 / 205	WS-210 / 12V	WS-210 / 24V	WS-215 / 215	WS-220 / 12V	WS-220 / 24V	WS-225 / 225	WS-230 / 230	WS-235 / 235
Nominal Maximum Power, P _m (W)*	170	175	180	185	190	195	200	200	205	210	210	215	220	220	225	230	235
Power Tolerance	Positive Tolerance Only																
Open Circuit Voltage, Voc (V)*	44.5	32.5	32.6	32.7	32.8	32.9	32	22.97	44.8	33.1	23.07	43.6	36.6	23.17	43.7	36.8	36.9
Short Circuit Current, I _{sc} (A)*	5.09	7.18	7.36	7.54	7.72	7.9	8.08	5.95	8.33	8.26	6.42	7.85	8.01	6.71	8.14	8.33	8.49
Voltage at Maximum Power, V _{mp} (V)*	35.95	35.98	36	36.03	36.05	36.08	27	11.13	5.55	7.57	18.02	36.15	27.3	18.07	36.2	27.5	27.7
Current at Maximum Power, I _{mp} (A)*	4.73	4.87	5	5.14	5.28	5.41	7.41	11.41	5.57	7.57	11.66	5.81	7.88	12.18	6.08	8.19	8.49
Maximum System Voltage (V)	1000																
Module Efficiency (%)	14.61%	15.04%	12.20%	12.54%	12.88%	13.22%	13.56%	13.56%	13.90%	14.24%	14.24%	14.58%	14.91%	14.91%	14.91%	15.25%	15.93%
Maximum Series Fuse Rating (A)	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Limiting Reverse Current (A)	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Rated Voltage (V dc)	36.3	26.5	26.6	26.7	26.8	26.9	26	17.97	36.3	27.1	30	35.15	30.1	18.07	35.25	30.3	30.5
Rated Current (A dc)	4.68	6.6	6.77	6.93	7.09	7.25	7.41	5.51	7.7	7.56	7	5.97	7.14	6.24	7.6	7.43	7.7

MECHANICAL CHARACTERISTICS

Model	WS-170 / 12V	WS-175 / 24V	WS-180 / 24V	WS-185 / 24V	WS-190 / 24V	WS-195 / 24V	WS-200 / 12V	WS-200 / 24V	WS-205 / 205	WS-210 / 12V	WS-210 / 24V	WS-215 / 215	WS-220 / 12V	WS-220 / 24V	WS-225 / 225	WS-230 / 230	WS-235 / 235
Length x Width x Thickness (LxWxT) - mm	1035x 675x 35	1175x 990x 35	1490x 990x 42	1490x 990x 42	1490x 990x 42	1490x 990x 42	1360x 990x 35	1360x 990x 35	1360x 990x 35	1360x 990x 35	1360x 990x 35	1360x 990x 35	1360x 990x 35	1360x 990x 35	1640x 990x 40	1640x 990x 40	1640x 990x 40
Mounting holes pitch (Y)-mm	595	595	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900
Mounting holes pitch (X)-mm	950	950	942	942	942	942	942	942	942	942	942	942	942	942	942	942	942
Weight (kg)	14.45	14.45	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
Cells per module (Units)/ Arrangement	72 / (12x6)	72 / (12x6)	72 / (12x6)	72 / (12x6)	72 / (12x6)	72 / (12x6)	54 / (9x6)	72 / (12x6)	54 / (9x6)	72 / (12x6)	72 / (12x6)	54 / (9x6)	72 / (12x6)	72 / (12x6)	54 / (9x6)	54 / (9x6)	54 / (9x6)
Cell Type	Polycrystalline Silicon																
Front Cover (Material/ Thickness)	Tempered & Low Iron Glass, 3.2mm / 4.0 mm																
Encapsulate	Ethylene Vinyl Acetate																
Frame Material	Anodized Aluminium Alloy																
Junction Box (Protection degree/ Material)	Ip65 rated/ Weatherproof PPO enclosure with bypass diodes																
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