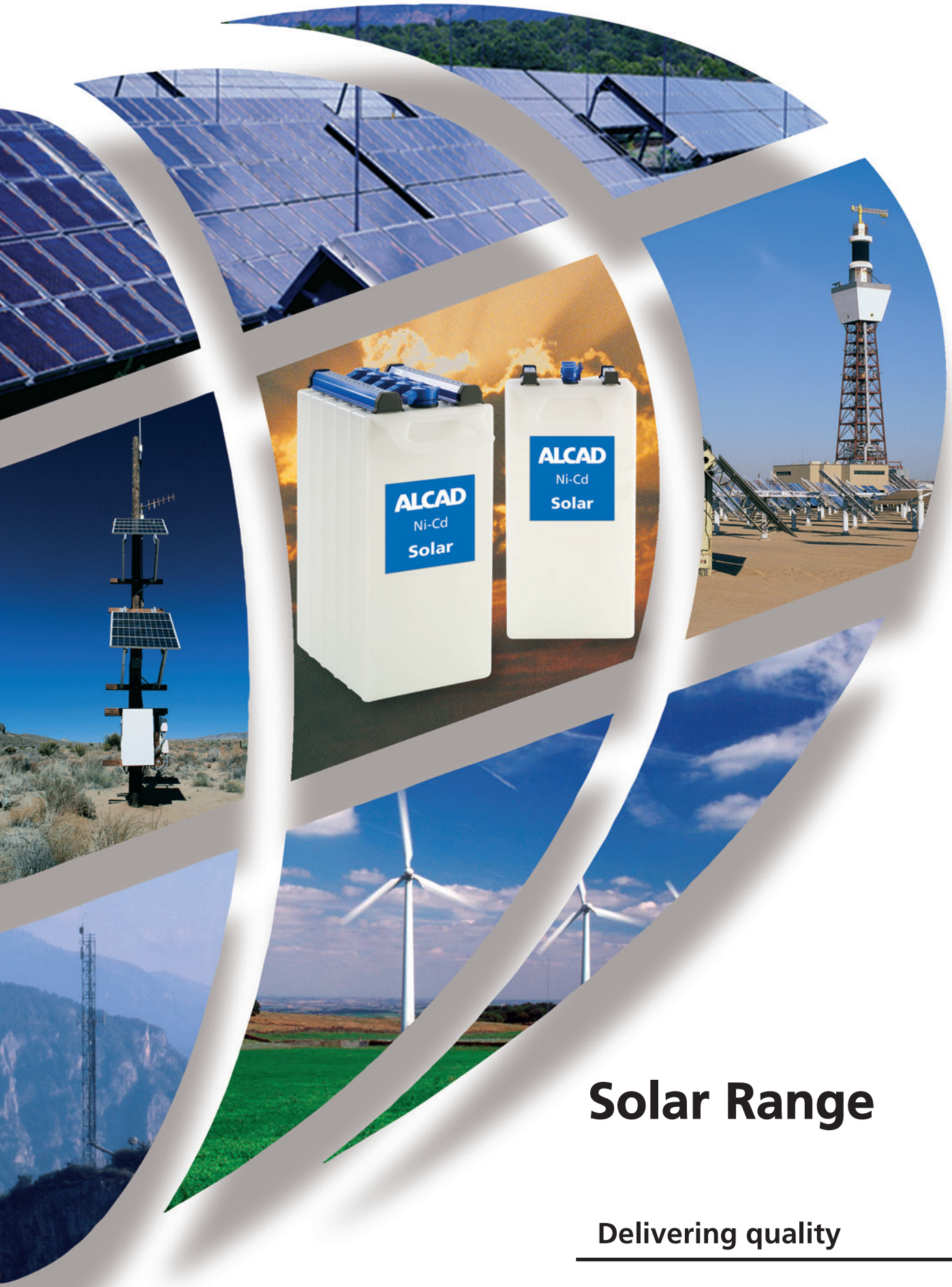


Solar Range

Delivering quality

ALCAD

ALCAD Solar Range

Low maintenance Ni-Cd batteries for stand-alone hybrid systems

Battery systems have a difficult job maintaining reliable service in isolated locations and hostile environments. Demands upon them fluctuate widely and charging depends entirely on irregular and unpredictable weather patterns.

For renewable energy applications

In remote outdoor installations, Alcad Solar is the natural choice for –

- photovoltaic applications
- stand-alone hybrid systems
- renewable energy applications

The solution is Alcad Solar

Alcad Solar storage batteries are purpose built to operate in these conditions. The range provides totally reliable service and very low maintenance which achieves a low life-cycle cost.

Efficient and reliable in tough conditions

Managing complex charging patterns is essential for efficient running of a hybrid system. Alcad Solar will continue to operate at any state of charge.

Over-compensation for unpredictable charging conditions with high charging voltages is unnecessary.

Alcad Solar's typical charging voltage of 1.5 V per cell minimises water-consumption, eliminating unscheduled service calls. The battery reaches a high state of charge without boost or reconditioning charges.

Alcad Solar range Ni-Cd batteries are compatible with all current photovoltaic charge regulators and conventional industrial battery chargers.

Extreme operating temperature

Alcad Solar's robust construction and stable electrochemistry enable it to operate comfortably within a temperature range of –20°C (–4°F) to +50°C (+122°F) and will tolerate extremes of –50°C (–58°F) to +70°C (+158°F).

For operation in temperatures below –20°C (–4°F), a special, higher density electrolyte is used.

Alcad Solar will deliver 80% capacity for a 120 hour discharge even at –40°C (–40°F).

Long-term low maintenance

The low life-cycle cost Alcad Solar range battery is a reliable long-term investment. It is constructed to resist electrical and physical abuses and therefore requires very low maintenance. In return it will provide totally reliable service at a predictable cost over 20 years.

Additionally, Alcad Solar's reliability reduces demands on expensive diesel generators, thereby contributing to the overall system running cost reduction.

Low life-cycle cost

Long maintenance intervals, Ni-Cd's inherent safety and total reliability combine to make Alcad Solar an exceptionally low life-cycle cost solution.

Solar

Connector cover
In line with
EN 50272-2 / IEC 62485-2 (safety)
with IP2 level.

Flame arresting vent
With transport seal protection.

Plate group bus
Connects the plate tabs with the terminal post. Plate tabs and terminal posts are projection welded to the plate group bus.

Plate tab
Spot welded to the plate side frames, to the upper edge of the pocket plate and to the plate group bus.

Handles
Moulded polypropylene handles allow Solar Range batteries to be easily manoeuvred and installed.

Separators
These separate the plates and insulate the plate frames from each other. This special type of separator improves the internal recombination.

Cell container
Made of tough polypropylene.

Plate frame
Seals the plate pockets and serves as a current collector.

Plate
Horizontal pockets of double-perforated steel strips.

Ni-Cd endures…

Alcad Solar batteries are built around Alcad's proven Ni-Cd pocket plate technology.

Active materials and nickel-plated steel components plus gas recombination technology give maintenance intervals of more than 6 years, reducing operating costs to a minimum.

…where lead acid cannot

Nickel-cadmium technology is inherently safe and resistant to over-, under- and complete discharging. Even at temperatures below –20°C (–4°F), Alcad Solar continues to perform without risk of corrosion or sulphation when cycled at low state of charge.

Alkaline electrolyte will not freeze and remains stable during operation. Lead acid batteries suffer from plate degradation, shortened life and risk of sudden death in similar conditions.

Alcad Solar Ni-Cd continues operating in conditions where lead acid cannot.

Alcad recycle

Alcad recycle old batteries as part of their responsibility to safeguard the environment.

Automated water filling system

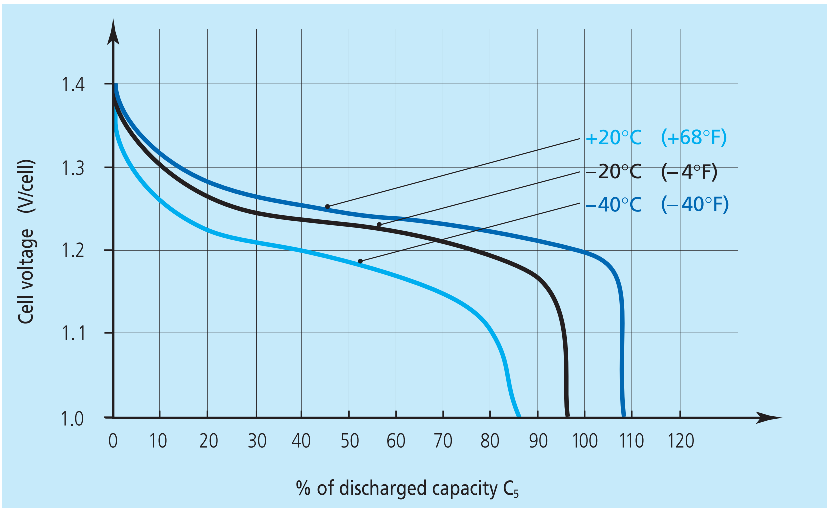
Alcad's water filling system is available as an option for Solar cell range. It enables automatic, fast and accurate topping-up, further extending maintenance intervals.

Meeting international standards

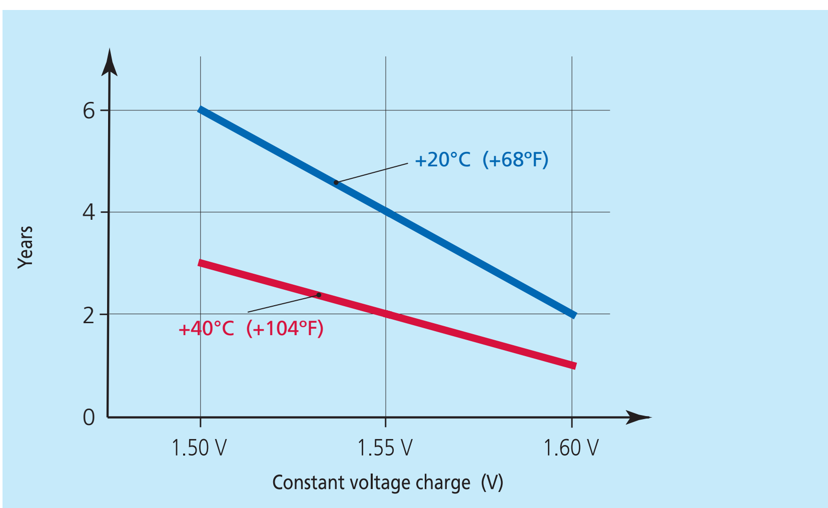
Alcad Solar has been developed in line with the safety requirements of EN 50272-2 / IEC 62485-2, and components used (such as insulated cable connectors and end lug covers) are defined to ensure high protection against electric shocks (IP2 level).

Alcad Solar features Alcad's highly efficient internal gas recombination pocket plate technology – meets IEC 62259 – and electrode design optimised for photovoltaic applications.

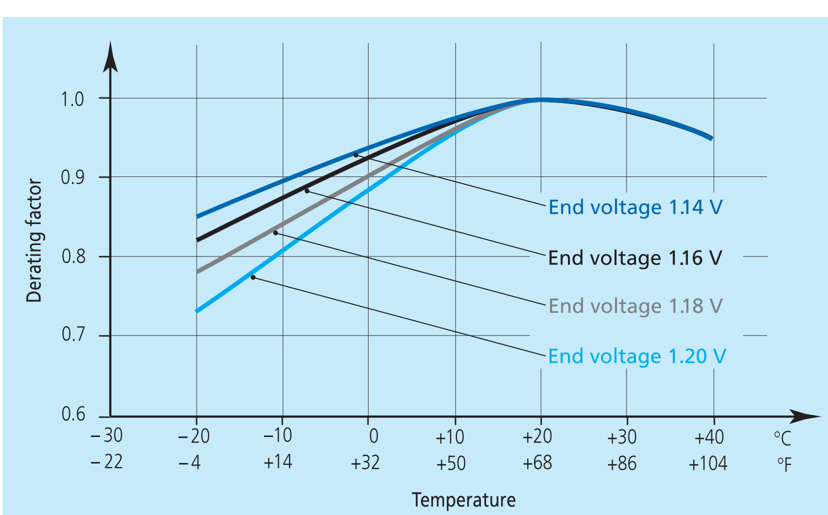
Solar



Discharge curves at $\frac{1}{120}$ C_{120} A according to temperature. Battery fully charged.



Typical water replenishment at +20°C (+68°F) and +40°C (+104°F).



Derating factor according to temperature and end voltage.

For typical solar application with 3 or more days back-up time.

Alcad engineers will work with you to calculate the optimum size of battery for your application. They will consider location, operating temperature, anticipated discharge requirements and your system's charging capabilities.

The battery size or Ampere-hours (Ah) required will depend on average load and minimum back-up time or autonomy. Capacity should be sufficient to sustain days of discharge with minimum support from the renewable energy source.

With daily limited time for charging, batteries are not always able to reach full charge. By operating the system so that it approaches, but rarely reaches full capacity, water consumption and maintenance are reduced considerably. By adhering to the recommended charging voltage provided in Table 1, the battery should reach 95% state of charge under average operating conditions.

Initial calculations

Most installations are 12, 24 or 48-volt systems. Typically for these system voltages 9, 18 and 36 cells are used. However, depending on various conditions these numbers may be adjusted by one or two cells.

First, determine the number of cells by establishing –

- Maximum permitted charging voltage
- Daily depth of discharge
- Minimum permitted end voltage

Second, check if "ideal" operating conditions can be established, by consulting Table 1.

Third, check in the cell performance tables the cell type giving the selected current in relation to the end voltage and the back-up time.

Additional sizing considerations

Operating temperature will influence available capacity. While Ni-Cd batteries are less affected by temperature variations than lead acid, it may still be advisable to include derating factors in sizing calculations according to the temperature and end voltage. Refer to derating factor curves on page 4.

Other factors such as design margin, battery aging and future load extension may be included for the battery sizing.

Alcad's optimum sizing method is:

I load
x
1/temperature derating factor
x
1/charge derating factor*
x
requested design margin
=
current value to select in the performance table

*The typical value is 95% when using the recommended charge voltage

Table 1. Recommended charging voltage

Battery system	12 V	24 V	48 V
Number of cells	9	18	36
5-10% daily depth of discharge	13.5 V	27 V	54 V
10-15% daily depth of discharge	13.95 V	27.9 V	55.8 V
15-25% daily depth of discharge	14.4 V	28.8 V	57.6 V

Solar

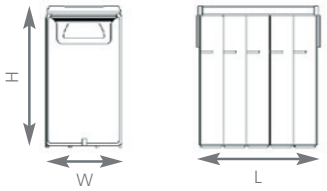
The range for a world of stand-alone systems

Cell type	Capacity		Height		Width		Length per block												Approx. weight per cell		Internal resistance*	Cell connection bolt per pole
							1 cell		2 cells		3 cells		4 cells		5 cells		6 cells					
	C_{120h} 1.0 V	C_{5h} 1.0 V																				
	Ah	Ah	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	kg	lb	mOhm	
PV 100	100	95	421	16.6	195	7.70	-	-	85	3.85	121	4.76	156	6.14	192	7.55	228	8.97	4.9	10.8	2.55	M8
PV 150	150	140	421	16.6	195	7.70	-	-	109	4.29	157	6.18	204	8.03	252	9.92	300	11.8	6.7	14.7	1.73	M10
PV 200	200	185	421	16.6	195	7.70	-	-	133	5.24	193	7.60	252	9.92	312	12.2	372	14.6	8.4	18.5	1.31	M10
PV 250	250	235	421	16.6	195	7.70	-	-	159	6.26	232	9.13	304	11.9	377	14.8	450	17.7	9.9	21.8	1.03	M10
PV 305	305	280	421	16.6	195	7.70	-	-	183	7.20	268	10.6	352	13.8	437	17.2	522	20.5	11.5	25.3	0.86	M10
PV 355	355	325	421	16.6	195	7.70	-	-	228	8.97	336	13.2	-	-	-	-	-	-	15.1	33.2	0.74	2xM10
PV 405	405	375	421	16.6	195	7.70	-	-	252	9.92	372	14.6	-	-	-	-	-	-	16.8	37.0	0.65	2xM10
PV 455	455	420	421	16.6	195	7.70	-	-	278	10.9	411	16.1	-	-	-	-	-	-	18.3	40.3	0.58	2xM10
PV 505	505	470	421	16.6	195	7.70	-	-	304	11.9	450	17.7	-	-	-	-	-	-	19.8	43.6	0.51	2xM10
PV 555	555	515	405	15.9	195	7.70	171	6.73	-	-	-	-	-	-	-	-	-	-	21.4	47.1	0.47	2xM10
PV 610	610	560	405	15.9	195	7.70	183	7.20	-	-	-	-	-	-	-	-	-	-	23.0	50.7	0.43	2xM10
PV 660	660	610	405	15.9	195	7.70	207	8.14	-	-	-	-	-	-	-	-	-	-	26.5	58.4	0.40	3xM10
PV 710	710	650	405	15.9	195	7.70	219	8.62	-	-	-	-	-	-	-	-	-	-	28.2	62.1	0.37	3xM10
PV 760	760	700	405	15.9	195	7.70	232	9.13	-	-	-	-	-	-	-	-	-	-	29.7	65.4	0.35	3xM10
PV 810	810	750	405	15.9	195	7.70	243	9.56	-	-	-	-	-	-	-	-	-	-	31.4	69.2	0.32	3xM10
PV 860	860	800	405	15.9	195	7.70	256	10.0	-	-	-	-	-	-	-	-	-	-	32.9	72.5	0.3	3xM10
PV 910	910	840	405	15.9	195	7.70	268	10.5	-	-	-	-	-	-	-	-	-	-	34.5	76.0	0.29	3xM10
PV 960	960	890	405	15.9	195	7.70	291	11.4	-	-	-	-	-	-	-	-	-	-	38.1	83.9	0.27	4xM10
PV 1015	1015	940	405	15.9	195	7.70	304	11.9	-	-	-	-	-	-	-	-	-	-	39.6	87.3	0.26	4xM10
PV 1065	1065	980	405	15.9	195	7.70	315	12.4	-	-	-	-	-	-	-	-	-	-	41.2	90.8	0.25	4xM10
PV 1115	1115	1030	405	15.9	195	7.70	327	12.8	-	-	-	-	-	-	-	-	-	-	42.9	94.5	0.23	4xM10
PV 1170	1170	1080	405	15.9	195	7.70	352	13.8	-	-	-	-	-	-	-	-	-	-	46.3	102	0.22	4xM10
PV 1215	1215	1120	405	15.9	195	7.70	352	13.8	-	-	-	-	-	-	-	-	-	-	46.0	101.4	0.22	4xM10
PV 1270	1270	1170	405	15.9	195	7.70	352	13.8	-	-	-	-	-	-	-	-	-	-	49.5	109	0.21	5xM10
PV 1320	1320	1220	405	15.9	195	7.70	387	15.2	-	-	-	-	-	-	-	-	-	-	51.3	113	0.20	5xM10
PV 1370	1370	1260	405	15.9	195	7.70	400	15.7	-	-	-	-	-	-	-	-	-	-	52.7	116.0	0.19	5xM10
PV 1420	1420	1300	405	15.9	195	7.70	412	16.2	-	-	-	-	-	-	-	-	-	-	54.4	119.9	0.19	5xM10
PV 1470	1470	1350	405	15.9	195	7.70	425	16.7	-	-	-	-	-	-	-	-	-	-	55.9	123	0.18	5xM10
PV 1520	1520	1400	405	15.9	195	7.70	437	17.2	-	-	-	-	-	-	-	-	-	-	57.5	126.7	0.17	5xM10
PV 1570	1570	1450	405	15.9	195	7.70	462	18.2	-	-	-	-	-	-	-	-	-	-	61.0	134	0.17	5xM10
PV 1620	1620	1500	405	15.9	195	7.70	472	18.5	-	-	-	-	-	-	-	-	-	-	62.8	138.4	0.16	6xM10
PV 1670	1670	1550	405	15.9	195	7.70	485	19.1	-	-	-	-	-	-	-	-	-	-	64.2	142	0.16	6xM10
PV 1720	1720	1600	405	15.9	195	7.70	497	19.5	-	-	-	-	-	-	-	-	-	-	65.9	145.2	0.15	6xM10
PV 1775	1775	1650	405	15.9	195	7.70	510	20.1	-	-	-	-	-	-	-	-	-	-	67.4	149	0.15	6xM10
PV 1830	1830	1700	405	15.9	195	7.70	522	20.5	-	-	-	-	-	-	-	-	-	-	69.0	152.1	0.14	6xM10

* Rigid connector included

PV 100 to PV 505: standard mounted on racks

PV 555 to PV 1830: crosswise mounted on racks.



Cell performance

Solar

For fully charged cells after a constant current charge according to IEC 62259 standard.

Available amperes at +20°C ± 5°C (+68°F ± 9°F)

d = days / h = hours

Cell type	C_{120} 120 h 1,0 V Ah	Final voltage: 1.14 V/cell									Final voltage: 1.16 V/cell								
		2 d 48 h	3 d 72 h	4 d 96 h	5 d 120 h	6 d 144 h	7 d 168 h	8 d 192 h	9 d 216 h	10 d 240 h	2 d 48 h	3 d 72 h	4 d 96 h	5 d 120 h	6 d 144 h	7 d 168 h	8 d 192 h	9 d 216 h	10 d 240 h
PV 100	100	2.03	1.38	1.04	0.84	0.71	0.61	0.54	0.48	0.43	2.00	1.37	1.03	0.84	0.70	0.61	0.54	0.48	0.43
PV 150	150	3.05	2.08	1.55	1.26	1.07	0.92	0.81	0.72	0.65	2.99	2.05	1.54	1.26	1.06	0.91	0.81	0.72	0.65
PV 200	200	4.07	2.77	2.07	1.68	1.42	1.23	1.08	0.96	0.87	3.99	2.74	2.05	1.68	1.41	1.22	1.08	0.96	0.87
PV 250	250	5.09	3.46	2.59	2.09	1.78	1.53	1.34	1.20	1.09	4.99	3.42	2.56	2.09	1.76	1.52	1.34	1.20	1.09
PV 305	305	6.20	4.22	3.16	2.55	2.17	1.87	1.64	1.47	1.32	6.09	4.17	3.13	2.55	2.15	1.86	1.64	1.47	1.32
PV 355	355	7.22	4.91	3.68	2.97	2.52	2.18	1.91	1.71	1.54	7.08	4.86	3.64	2.97	2.50	2.16	1.91	1.71	1.54
PV 405	405	8.24	5.60	4.20	3.39	2.88	2.49	2.18	1.95	1.76	8.08	5.54	4.16	3.39	2.85	2.46	2.18	1.95	1.76
PV 455	455	9.26	6.30	4.72	3.81	3.23	2.79	2.45	2.19	1.98	9.08	6.23	4.67	3.81	3.20	2.77	2.45	2.19	1.98
PV 505	505	10.3	6.99	5.23	4.23	3.59	3.10	2.72	2.43	2.19	10.1	6.91	5.18	4.23	3.56	3.07	2.72	2.43	2.19
PV 555	555	11.3	7.68	5.75	4.65	3.94	3.41	2.98	2.67	2.41	11.1	7.60	5.69	4.65	3.91	3.38	2.98	2.67	2.41
PV 610	610	12.4	8.44	6.32	5.11	4.33	3.74	3.28	2.94	2.65	12.2	8.35	6.26	5.11	4.30	3.71	3.28	2.94	2.65
PV 660	660	13.4	9.13	6.84	5.53	4.69	4.05	3.55	3.18	2.87	13.2	9.03	6.77	5.53	4.65	4.02	3.55	3.18	2.87
PV 710	710	14.4	9.82	7.36	5.95	5.04	4.36	3.82	3.42	3.08	14.2	9.72	7.28	5.95	5.00	4.32	3.82	3.42	3.08
PV 760	760	15.5	10.5	7.88	6.37	5.40	4.67	4.09	3.66	3.30	15.2	10.4	7.80	6.37	5.35	4.63	4.09	3.66	3.30
PV 810	810	16.5	11.2	8.40	6.78	5.76	4.97	4.35	3.90	3.52	16.2	11.1	8.31	6.78	5.70	4.93	4.35	3.90	3.52
PV 860	860	17.5	11.9	8.91	7.20	6.11	5.28	4.62	4.14	3.73	17.2	11.8	8.82	7.20	6.06	5.23	4.62	4.14	3.73
PV 910	910	18.5	12.6	9.43	7.62	6.47	5.59	4.89	4.38	3.95	18.2	12.5	9.34	7.62	6.41	5.54	4.89	4.38	3.95
PV 960	960	19.5	13.3	9.95	8.04	6.82	5.89	5.16	4.62	4.17	19.2	13.1	9.85	8.04	6.76	5.84	5.16	4.62	4.17
PV 1015	1015	20.6	14.0	10.5	8.50	7.21	6.23	5.46	4.89	4.41	20.3	13.9	10.4	8.50	7.15	6.18	5.46	4.89	4.41
PV 1065	1065	21.7	14.7	11.0	8.92	7.57	6.54	5.73	5.13	4.62	21.2	14.6	10.9	8.92	7.50	6.48	5.73	5.13	4.62
PV 1115	1115	22.7	15.4	11.6	9.34	7.92	6.85	5.99	5.37	4.84	22.2	15.3	11.4	9.34	7.85	6.79	5.99	5.37	4.84
PV 1170	1170	23.8	16.2	12.1	9.80	8.31	7.18	6.29	5.64	5.08	23.3	16.0	12.0	9.80	8.24	7.12	6.29	5.64	5.08
PV 1215	1215	24.7	16.8	12.6	10.2	8.63	7.46	6.53	5.85	5.27	24.2	16.6	12.5	10.2	8.56	7.39	6.53	5.85	5.27
PV 1270	1270	25.8	17.6	13.2	10.6	9.02	7.80	6.83	6.12	5.51	25.3	17.4	13.0	10.6	8.94	7.73	6.83	6.12	5.51
PV 1320	1320	26.9	18.3	13.7	11.1	9.38	8.10	7.10	6.36	5.73	26.3	18.1	13.5	11.1	9.30	8.03	7.10	6.36	5.73
PV 1370	1370	27.9	19.0	14.2	11.5	9.73	8.41	7.37	6.60	5.95	27.3	18.7	14.1	11.5	9.65	8.34	7.37	6.60	5.95
PV 1420	1420	28.9	19.6	14.7	11.9	10.1	8.72	7.63	6.84	6.16	28.3	19.4	14.6	11.9	10.0	8.64	7.63	6.84	6.16
PV 1470	1470	29.9	20.3	15.2	12.3	10.4	9.02	7.90	7.08	6.38	29.3	20.1	15.1	12.3	10.4	8.95	7.90	7.08	6.38
PV 1520	1520	30.9	21.0	15.8	12.7	10.8	9.33	8.17	7.32	6.60	30.3	20.8	15.6	12.7	10.7	9.25	8.17	7.32	6.60
PV 1570	1570	31.9	21.7	16.3	13.1	11.2	9.64	8.44	7.56	6.82	31.3	21.5	16.1	13.1	11.1	9.56	8.44	7.56	6.82
PV 1620	1620	33.0	22.4	16.8	13.6	11.5	9.95	8.71	7.80	7.03	32.3	22.2	16.6	13.6	11.4	9.86	8.71	7.80	7.03
PV 1670	1670	34.0	23.1	17.3	14.0	11.9	10.3	8.98	8.05	7.25	33.3	22.9	17.1	14.0	11.8	10.2	8.98	8.05	7.25
PV 1720	1720	35.0	23.8	17.8	14.4	12.2	10.6	9.25	8.29	7.47	34.3	23.5	17.6	14.4	12.1	10.5	9.25	8.29	7.47
PV 1775	1775	36.1	24.6	18.4	14.9	12.6	10.9	9.54	8.55	7.71	35.4	24.3	18.2	14.9	12.5	10.8	9.54	8.55	7.71
PV 1830	1830	37.2	25.3	19.0	15.3	13.0	11.2	9.84	8.82	7.94	36.5	25.0	18.8	15.3	12.9	11.1	9.84	8.82	7.94

Cell type	C_{120} 120 h 1,0 V Ah	Final voltage: 1.18 V/cell									Final voltage: 1.20 V/cell								
		2 d 48 h	3 d 72 h	4 d 96 h	5 d 120 h	6 d 144 h	7 d 168 h	8 d 192 h	9 d 216 h	10 d 240 h	2 d 48 h	3 d 72 h	4 d 96 h	5 d 120 h	6 d 144 h	7 d 168 h	8 d 192 h	9 d 216 h	10 d 240 h
PV 100	100	1.92	1.33	1.02	0.83	0.70	0.60	0.53	0.47	0.43	1.76	1.24	0.94	0.78	0.67	0.58	0.51	0.46	0.41
PV 150	150	2.88	2.00	1.53	1.24	1.05	0.90	0.79	0.71	0.64	2.65	1.86	1.41	1.16	1.00	0.86	0.76	0.68	0.62
PV 200	200	3.84	2.66	2.03	1.66	1.39	1.21	1.05	0.95	0.85	3.53	2.48	1.88	1.55	1.33	1.15	1.02	0.91	0.82
PV 250	250	4.79	3.33	2.54	2.07	1.74	1.51	1.32	1.18	1.07	4.41	3.10	2.35	1.94	1.66	1.44	1.27	1.14	1.03
PV 305	305	5.85	4.06	3.10	2.53	2.13	1.84	1.61	1.44	1.30	5.38	3.78	2.86	2.37	2.03	1.76	1.55	1.39	1.25
PV 355	355	6.81	4.73	3.61	2.94	2.48	2.14	1.87	1.68	1.52	6.26	4.40	3.33	2.75	2.36	2.05	1.81	1.62	1.46
PV 405	405	7.77	5.39	4.12	3.36	2.82	2.44	2.14	1.92	1.73	7.14	5.02	3.80	3.14	2.70	2.33	2.06	1.85	1.67
PV 455	455	8.73	6.06	4.63	3.77	3.17	2.74	2.40	2.15	1.94	8.02	5.64	4.27	3.53	3.03	2.62	2.32	2.08	1.87
PV 505	505	9.7	6.72	5.14	4.18	3.52	3.05	2.66	2.39	2.16	8.9	6.26	4.74	3.92	3.36	2.91	2.57	2.31	2.08
PV 555	555	10.6	7.39	5.64	4.60	3.87	3.35	2.93	2.63	2.37	9.8	6.88	5.21	4.30	3.69	3.20	2.82	2.53	2.28
PV 610	610	11.7	8.12	6.20	5.05	4.25	3.68	3.22	2.89	2.60	10.8	7.56	5.73	4.73	4.06	3.52	3.10	2.79	2.51
PV 660	660	12.7	8.79	6.71	5.47	4.60	3.98	3.48	3.12	2.82	11.6	8.18	6.20	5.12	4.39	3.80	3.36	3.01	2.72
PV 710	710	13.6	9.45	7.22	5.88	4.95	4.28	3.74	3.36	3.03	12.5	8.80	6.67	5.51	4.73	4.09	3.61	3.24	2.92
PV 760	760	14.6	10.1	7.73	6.30	5.30	4.58	4.01	3.60	3.24	13.4	9.4	7.14	5.89	5.06	4.38	3.87	3.47	3.13
PV 810	810	15.5	10.8	8.24	6.71	5.65	4.89	4.27	3.83	3.46	14.3	10.0	7.61	6.28	5.39	4.67	4.12	3.70	3.33
PV 860	860	16.5	11.4	8.75	7.13	6.00	5.19	4.54	4.07	3.67	15.2	10.7	8.08	6.67	5.73	4.96	4.38	3.93	3.54
PV 910	910	17.5	12.1	9.25	7.54	6.35	5.49	4.80	4.31	3.88	16.0	11.3	8.55	7.06	6.06	5.24	4.63	4.15	3.74
PV 960	960	18.4	12.8	9.76	7.95	6.69	5.79	5.06	4.54	4.10	16.9	11.9	9.01	7.44	6.39	5.53	4.88	4.38	3.95
PV 1015	1015	19.5	13.5	10.3	8.41	7.08	6.12	5.35	4.80	4.33	17.9	12.6	9.5	7.87	6.76	5.85	5.16	4.63	4.18
PV 1065	1065	20.4	14.2	10.8	8.83	7.43	6.42	5.62	5.04	4.55	18.8	13.2	10.0	8.26	7.09	6.14	5.42	4.86	4.38
PV 1115	1115	21.4	14.8	11.3	9.24	7.78	6.73	5.88	5.28	4.76	19.7	13.8	10.5	8.65	7.42	6.43	5.67	5.09	4.59
PV 1170	1170	22.4	15.6	11.9	9.70	8.16	7.06	6.17	5.54	4.99	20.6	14.5	11.0	9.07	7.79	6.74	5.95	5.34	4.81
PV 1215	1215	23.3	16.2	12.4	10.1	8.47	7.33	6.41	5.75	5.19	21.4	15.1	11.4	9.4	8.09	7.00	6.18	5.55	5.00
PV 1270	1270	24.4	16.9	12.9	10.5	8.86	7.66	6.70	6.01	5.42	22.4	15.7	11.9	9.8	8.45	7.32	6.46	5.80	5.23
PV 1320	1320	25.3	17.6	13.4	10.9	9.21	7.96	6.96	6.25	5.63	23.3	16.4	12.4	10.2	8.79	7.61	6.72	6.03	5.43
PV 1370	1370	26.3	18.2	13.9	11.4	9.55	8.26	7.23	6.48	5.85	24.2	17.0	12.9	10.6	9.12	7.89	6.97	6.26	5.64
PV 1420	1420	27.2	18.9	14.4	11.8	9.9	8.56	7.49	6.72	6.06	25.0	17.6	13.3	11.0	9.5	8.18	7.23	6.48	5.84
PV 1470	1470	28.2	19.6	14.9	12.2	10.3	8.87	7.75	6.96	6.27	25.9	18.2	13.8	11.4	9.8	8.47	7.48	6.71	6.05
PV 1520	1520	29.2	20.2	15.5	12.6	10.6	9.17	8.02	7.19	6.49	26.8	18.8	14.3	11.8	10.1	8.76	7.73	6.94	6.25
PV 1570	1570	30.1	20.9	16.0	13.0	10.9	9.47	8.28	7.43	6.70	27.7	19.5	14.7	12.2	10.5	9.05	7.99	7.17	6.46
PV 1620	1620	31.1	21.6	16.5	13.4	11.3	9.77	8.54	7.67	6.92	28.6	20.1	15.2	12.6	10.8	9.34	8.24	7.40	6.67
PV 1670	1670	32.0	22.2	17.0	13.8	11.6	10.1	8.81	7.90	7.13	29.5	20.7	15.7	12.9	11.1	9.6	8.50	7.63	6.87
PV 1720	1720	33.0	22.9	17.5	14.3	12.0	10.4	9.07	8.14	7.34	30.3	21.3	16.2	13.3	11.5	9.9	8.75	7.85	7.08
PV 1775	1775	34.0	23.6	18.0	14.7	12.4	10.7	9.36	8.40	7.58	31.3	22.0	16.7	13.8	11.8	10.2	9.03	8.10	7.30
PV 1830	1830	35.1	24.4	18.6	15.2	12.8	11.0	9.65	8.66	7.81	32.3	22.7	17.2	14.2	12.2	10.5	9.31	8.36	7.53

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