



**2CP450 BATTERY
PRODUCT
SPECIFICATION**

Part Number 61330450

TECHNOLOGY

VRLA-AGM Valve Regulated Lead-Acid and Absorbed Glass Mat

ELECTRICAL DATA


Type	2CP450			
Nominal Voltage	2 volts (1 cell)			
Rated Capacity	452 Ah - C ₁₀ to 1.80 Vpc at 20 °C 460 Ah - C ₁₀₀ to 1.80 Vpc at 20 °C			
Current / Power				
0.5 hr back-up time	1.65 Vpc	20 °C	504 A	907 W
1.0 hr back-up time	1.67 Vpc	20 °C	306 A	564 W
2.0 hr back-up time	1.80 Vpc	20 °C	169 A	317 W
4.0 hr back-up time	1.80 Vpc	20 °C	96.4 A	185 W
8.0 hr back-up time	1.80 Vpc	20 °C	55.3 A	105 W
10.0 hr back-up time	1.80 Vpc	20 °C	45.2 A	87.7 W
20.0 hr back-up time	1.80 Vpc	20 °C	22.8 A	48.4 W
Conversion to capacity at 25 °C (77 °F)	20° C Ah x 1.03 (t > 1 h)			
Internal resistance (± 10%) to IEC/EN 60896-21	0.26 mΩ			
Short circuit current (± 10%) to IEC/EN 60896-21	7.7 kA			
Self discharge at 20° C IEC/EN 60896-21	max. 3%/month			
Heat loss during float service at 20 °C	≈ 0.45 W			

MECHANICAL DATA

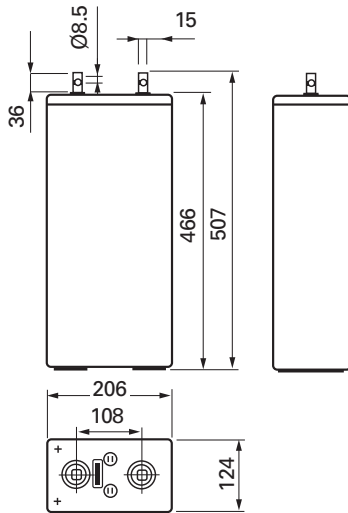
Weight ready for use	35.7 kg
Height of cell	507 mm
Height over terminal connector	512 mm
Width	206 mm
Depth	124 mm
Number of terminals	1⊕ / 1⊖
Terminals	ø 8.5 mm (through hole M8)
Suggested/maximum cable cross-section	2.185 mm ² *)
Connection torque	25 Nm
Terminal insulation class according to IEC/EN 60529	IP20
Diameter of diagnostic hole for voltage probe	4.0 mm ø
Connector (copper, tin-coated) rigid and insulated	2.90 mm ²
Complete connector and terminal connection accessories	available

*) for UPS duties the connecting cables must be dimensioned specially

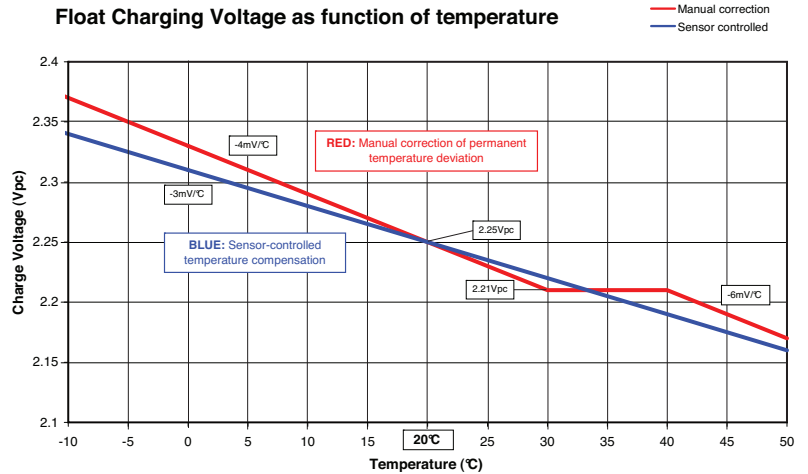
ENVIRONMENTAL DATA

Installation	Vertically / horizontally
Distance for cooling and ventilation (preset with the rigid connectors)	11 mm
Flame retardancy rating case/cover according to Underwriters Laboratories (UL) USA	ABS - PC – UL 94 V-0 with LOI > 32%, halogen-free
Flame barriers at vents	Installed
UL file number 	MH 26065
Service life expected at 20 °C	15 years
Eurobat classification	12+ Long Life
Shelves, cabinets and racks	available upon request

BATTERY DRAWINGS



FLOAT VOLTAGE COMPENSATION AS A FUNCTION OF TEMPERATURE



CAPACITY CORRECTION FACTORS AS A FUNCTION OF TEMPERATURE

Temperature	% of Rated Capacity
40 °C (104° F)	104.8
35 °C (95 °F)	104.2
30 °C (86 °F)	103.6
25 °C (77 °F)	103.0
20 °C (68 °F)	100.0
15 °C (59 °F)	97.0
10 °C (50 °F)	94.0
5 °C (41 °F)	90.0
0 °C (32 °F)	84.7
-5 °C (23 °F)	77.7
-10 °C (14 °F)	69.4
-15 °C (5 °F)	60.0
-20 °C (-4 °F)	49.6
-25 °C (-13 °F)	38.4
-30 °C (-22 °F)	25.6
-35 °C (-31 °F)	14.1
-40 °C (-40 °F)	2.1

INSTALLATION & OPERATION CHARACTERISTICS

Battery installation and operation	Stand-by mode with constant voltage float operation according to EN 50272-2:2001
Float voltage setting according to DIN 41773	2.25 Vpc ± 1% at 20 °C - 25 °C (68 °F - 77 °F)
Float voltage with daily discharge cycles	2.29 Vpc - 2.30 Vpc (no correction factor needed)
CC-CV charge current according to DIN 41773	unlimited, otherwise 3 · I ₁₀ max. if temp > 25 °C
Float voltage compensation in function of temperature	-2 to -4 mV / °C or with profile as displayed in graph above
Boost charge	Not needed, if desirable then 2.35 Vpc and I ₁₀ max. for 24 hr max. at temp < 30 °C
Air exchange	As a VRLA battery according to EN 50272-2:2001 $Q = 0.05 \cdot N_{cells} \cdot I_{gas} \cdot C_{Ah\ C10} \cdot 10^3 [m^3/h]$ I _{gas} = 1 (at 2.25 Vpc) I _{gas} = 8 (at 2.40 Vpc) e.g. 48 V: 0.5424 m ³ /hr = 10.39 cu.ft /hr (at 2.25 Vpc)
Preferred operating temperature range	Between 15 °C - 25 °C (59 °F - 77 °F)
Maximum long term operating temperature	+40 °C (104 °F) with ventilation assured (reduced service life)
Maximum short term operating temperature (for hours)	+50 °C (122 °F) with ventilation assured (reduced service life)
Minimum fully charged operating temperature	-40 °C (-40 °F)

2CP450 BATTERY PRODUCT SPECIFICATION

DISCHARGE DATA

Constant current performance (in amps) to the defined end-of-discharge voltage

Voltage (Vpc)	Temp.	Discharge time [min]																						
		1 - 2	3	5	7	10	15	20	25	30	40	50	60	90	120	180	240	300	360	480	600	720	1200	1440
1.90	20 °C	502	498	483	466	441	402	370	342	318	280	251	228	180	149	109	88.8	75.7	67.2	53.0	43.7	37.1	22.4	18.4
	25 °C	517	513	497	480	454	414	381	352	328	288	259	235	185	153	113	91.5	78.0	69.2	54.6	45.0	38.2	23.1	19.0
1.87	20 °C	593	586	566	543	509	458	417	382	353	306	272	245	190	157	114	91.7	77.7	68.6	53.9	44.3	37.5	22.6	18.5
	25 °C	611	604	583	559	524	472	430	393	364	315	280	252	196	162	117	94.5	80.0	70.7	55.5	45.6	38.6	23.3	19.1
1.85	20 °C	655	648	623	595	554	495	447	407	374	322	284	255	196	161	116	93.4	78.9	69.3	54.4	44.6	37.7	22.7	18.6
	25 °C	675	667	642	613	571	510	460	419	385	332	293	263	202	166	120	96.2	81.2	71.4	56.0	45.9	38.8	23.3	19.2
1.84	20 °C	687	678	651	621	577	513	461	419	384	330	290	259	199	163	117	94.1	79.4	69.7	54.6	44.8	37.8	22.7	18.6
	25 °C	708	698	671	640	594	528	475	432	396	340	299	267	205	168	121	97.0	81.8	71.8	56.2	46.1	38.9	23.4	19.2
1.83	20 °C	719	709	680	647	599	531	475	431	394	337	296	264	201	164	118	94.7	79.8	70.0	54.8	44.9	37.9	22.7	18.6
	25 °C	741	730	700	666	617	547	489	444	406	347	305	272	207	169	122	97.6	82.2	72.1	56.4	46.2	39.0	23.4	19.2
1.82	20 °C	751	740	708	672	621	548	489	442	403	344	301	268	204	166	119	95.4	80.2	70.3	55.0	45.0	38.0	22.7	18.6
	25 °C	773	763	729	693	640	564	504	455	415	354	310	276	210	171	123	98.2	82.6	72.4	56.6	46.4	39.1	23.4	19.2
1.80	20 °C	813	801	763	722	663	580	515	463	420	356	310	275	208	169	121	96.4	80.9	70.8	55.3	45.2	38.1	22.8	18.7
	25 °C	837	825	786	744	683	597	530	476	433	367	320	284	214	174	124	99.3	83.4	72.9	56.9	46.6	39.3	23.5	19.2
1.77	20 °C	902	887	841	791	721	624	549	490	443	373	322	285	213	172	126	100.0	83.2	71.4	55.6	45.5	38.3	22.9	18.7
	25 °C	929	914	867	815	743	643	565	505	456	384	332	294	220	177	130	103.0	85.7	73.6	57.3	46.8	39.5	23.5	19.3
1.75	20 °C	958	941	889	834	756	650	569	506	456	382	329	290	216	174	127	100.6	83.7	71.7	55.8	45.6	38.4	22.9	18.7
	25 °C	986	969	916	859	779	670	586	521	470	393	339	299	223	179	131	103.6	86.2	73.9	57.5	47.0	39.6	23.6	19.3
1.72	20 °C	1035	1016	956	892	804	685	596	527	473	393	338	297	220	177	128	101.4	84.2	72.1	56.1	45.8	38.5	22.9	18.8
	25 °C	1066	1046	985	919	828	706	614	543	487	405	348	306	227	182	132	104.4	86.7	74.3	57.8	47.2	39.7	23.6	19.4
1.70	20 °C	1083	1062	997	928	833	706	611	539	483	400	343	301	222	178	129	101.9	84.5	72.4	56.2	45.9	38.6	23.0	18.8
	25 °C	1116	1094	1027	955	858	727	630	555	497	412	353	310	229	183	133	104.9	87.1	74.5	57.9	47.2	39.8	23.6	19.4
1.67	20 °C	1152	1127	1054	977	872	734	632	555	496	409	350	306	225	180	130	102.4	84.9	72.7	56.4	46.0	38.7	23.0	18.8
	25 °C	1186	1161	1086	1006	898	756	651	572	511	421	360	315	232	185	134	105.5	87.5	74.8	58.1	47.4	39.8	23.7	19.4
1.65	20 °C	1195	1169	1091	1008	897	752	645	565	504	415	353	309	227	181	130	102.8	85.2	72.8	56.5	46.0	38.7	23.0	18.8
	25 °C	1231	1204	1123	1039	924	774	665	582	519	427	364	318	233	186	134	105.8	87.7	75.0	58.2	47.4	39.9	23.7	19.4
1.63	20 °C	1237	1209	1126	1038	921	768	657	575	511	419	357	312	228	182	131	103.1	85.4	73.0	56.6	46.1	38.8	23.0	18.8
	25 °C	1274	1246	1159	1069	948	791	677	592	526	432	368	321	235	187	135	106.2	87.9	75.2	58.3	47.5	39.9	23.7	19.4
1.60	20 °C	1297	1267	1175	1080	953	791	674	587	521	426	362	315	230	183	131	103.5	85.6	73.2	56.7	46.2	38.8	23.0	18.8
	25 °C	1336	1305	1210	1112	982	814	694	605	537	439	373	325	237	188	135	106.6	88.2	75.4	58.4	47.6	40.0	23.7	19.4

Constant power performance (in watt per cell) to the defined end-of-discharge voltage

Voltage (Vpc)	Temp.	Discharge time [min]																						
		1 - 2	3	5	7	10	15	20	25	30	40	50	60	90	120	180	240	300	360	480	600	720	1200	1440
1.90	20 °C	965	956	926	892	843	769	706	654	609	536	484	435	342	284	214	174	147	127	102	85.0	73.0	48.0	41.0
	25 °C	994	985	954	919	868	792	727	674	627	552	494	448	352	293	220	179	151	131	105	87.6	75.2	49.4	42.2
1.87	20 °C	1122	1110	1070	1025	960	866	787	722	667	581	515	464	360	296	221	178	150	130	103	86.0	74.0	48.1	41.1
	25 °C	1156	1143	1102	1056	989	892	811	744	687	598	530	478	371	305	228	183	155	134	106	88.6	76.2	49.5	42.3
1.85	20 °C	1229	1214	1166	1113	1037	927	838	765	704	608	537	481	370	303	225	181	152	131	104	87.0	74.2	48.1	41.1
	25 °C	1266	1250	1201	1146	1068	955	863	788	725	626	553	495	381	312	232	186	157	135	107	89.6	76.4	49.6	42.4
1.84	20 °C	1281	1266	1213	1156	1074	957	862	785	721	621	547	489	375	306	227	182	152	132	104	87.2	74.3	48.2	41.2
	25 °C	1320	1303	1250	1191	1107	986	888	808	742	639	563	504	386	316	234	187	157	136	107	89.8	76.5	49.7	42.5
1.83	20 °C	1334	1316	1260	1198	1111	986	885	804	737	633	556	497	379	309	228	183	153	132	105	87.3	74.5	48.3	41.3
	25 °C	1374	1356	1298	1234	1144	1015	912	828	759	652	573	512	391	319	235	188	158	136	108	90.0	76.7	49.7	42.5
1.82	20 °C	1385	1366	1305	1239	1146	1014	908	822	752	644	565	504	383	312	230	184	154	133	105	87.5	74.6	48.4	41.4
	25 °C	1427	1407	1344	1276	1180	1044	935	847	775	663	582	519	394	321	237	190	159	137	108	90.1	76.9	49.8	42.6
1.80	20 °C	1483	1462	1393	1318	1213	1065	949	856	780	665	580	516	391	317	232	185	155	134	105	87.7	74.8	48.4	41.4
	25 °C	1527	1506	1435	1358	1249	1097	977	882	803	685	597	531	403	327	239	191	160	138	108	90.3	77.0	49.9	42.7
1.77	20 °C	1619	1594	1512	1424	1302	1134	1003	900	816	691	600	532	399	322	236	187	156	135	106	87.8	74.9	48.5	41.5
	25 °C	1668	1642	1557	1467	1341	1168	1033	927	840	712	618	548	411	332	243	193	161	139	109	90.5	77.2	50.0	42.7
1.75	20 °C	1701	1673	1583	1487	1354	1173	1034	924	837	705	611	540	404	326	237	188	157	135	106	88.0	75.1	48.6	41.6
	25 °C	1752	1723	1630	1532	1395	1208	1065	952	862	726	629	556	416	336	244	194	162	139	109	90.6	77.3	50.0	42.8
1.72	20 °C	1811	1779	1678	1570	1423	1225	1073	956	862	723	624	551	410	329	239	190	158	136	106	88.2	75.2	48.6	41.6
	25 °C	1865	1832	1728	1617	1466	1262	1105	985	888	745	643	568	422	339	246	196	163	140	110	90.8	77.5	50.1	42.9
1.70	20 °C	1877	1843	1734	1620	1464	1254	1096	974	877	733	632	557	413	331	240	191	158	136	107	88.3	75.4	48.7	41.7
	25 °C	1933	1898	1786	1669	1508	1292	1129	1003	903	755	651	574	425	341	247	196	163	140	110	91.0	77.6	50.2	43.0
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